

DEVELOPING A METHOD FOR REGIONAL FOOD SYSTEM PLANNING  
IN THE SEA TO SKY REGION, BRITISH COLUMBIA

By

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## **Abstract**

This study set out to test the potential of an environmental management planning method to be adapted into a food system planning framework, referred to as a Regional Food System Management Plan (RFSMP). The RFSMP approach is a valuable and useful tool for regional food systems planning as it promotes community and environmental sustainability through enhanced food self-reliance. The RFSMP framework was developed and tested in the context of the Sea to Sky Region of British Columbia. The main components of the RFSMP framework included delineation of regional boundaries, stakeholder values identification and calculation of food self-reliance. Implementation of the RFSMP framework focused on the planning stage and the crop production components of the food system. This study recommends future work to address agricultural data gaps, complete the RFSMP framework beyond the planning phase and production component of the food system, and test the planning framework in other regions.

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## **Introduction**

Societies around the globe rely on a continuous supply of food in sufficient quantities to provide basic daily nutritional requirements. How we acquire food, the types of food we consume, and the inputs required to produce this food have major implications on environmental, economic and social well-being of cities, communities and citizens (Department of Environment Foods and Rural Affairs (DEFRA), 2010; Kloppenburg, Hendrickson & Stevenson, 1996; Peters, Bills, Wilkins & Fick, 2008; Pollan, 2006). For example, the average meal travels over 2,000 kilometers from farm production to consumption (Getz, 1991; Heinberg, 2005; Kloppenburg et al., 1996), a distance approximately equivalent to that from Vancouver, British Columbia to the Baja Peninsula, Mexico. The industrial agri-food system produces high yields of select crops at low cost, these costs of food production are mostly externalized, that are transported over large distances from original point of production, to processing facilities and ultimately to local points of consumption (Lang & Heasman, 2004). This has resulted in production practices that cause degradation of water and soil, overuse of pesticides and fertilizers, waste production and disease creation (Kimbrell, 2002). The agri-food system generates significant amounts of greenhouses gases including carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O), all of which have an impact on global climate change (Edwards-Jones et. al, 2008; Moreau, Moore & Mullinix, 2011).

The Sea to Sky Corridor is a region where government and citizens desire change in the way the current food system is configured and organized. They recognize the implications of being reliant on a global and industrialized food system. The region is

located north of Vancouver, centered around the communities of Squamish, Whistler and Pemberton. It is generally an ecologically and culturally discrete area (Figure 1). Citizens of this region desire to determine and delineate feasible strategies to achieve enhanced regional food self-reliance. Szymanski and Sutherland (2006, pg. 16) describe these communities as “distinctly different in character, history and culture”, which can create both opportunities and challenges to the successful development of a life-place based food system (Thayer, 2003). People of these communities realize that a number of barriers to achieving sustainability currently exist in the production, distribution, processing and consumption of food in the region (Szymanski & Sutherland, 2006).

Conventional industrial agri-business and local-scale, human-intensive agri-food systems are often considered to be two competing agricultural paradigms (Condon, Mullinix, Fallick & Harcourt, 2010). However, it must be recognized that limitations likely exist in the ability of a region to achieve complete food self-reliance. The intent of this study therefore is to explore the ability of a region to plan for appropriate food production on a regional level while remaining mindful that what cannot be produced regionally, can be supplemented by alternative or conventional global food systems. Assessing and recognizing this complement between the global and regional food systems will lead to increased food security, self-reliance and sustainability in a region. With increasing food demand, population growth, the dependence of agriculture on non-renewable energy sources, increasing distances that foods travel, and overuse and abuse of natural resources such as water and soil, the sustainability of the dominant, industrial, and transnational agri-food system is in question (Foley et al., 2011).

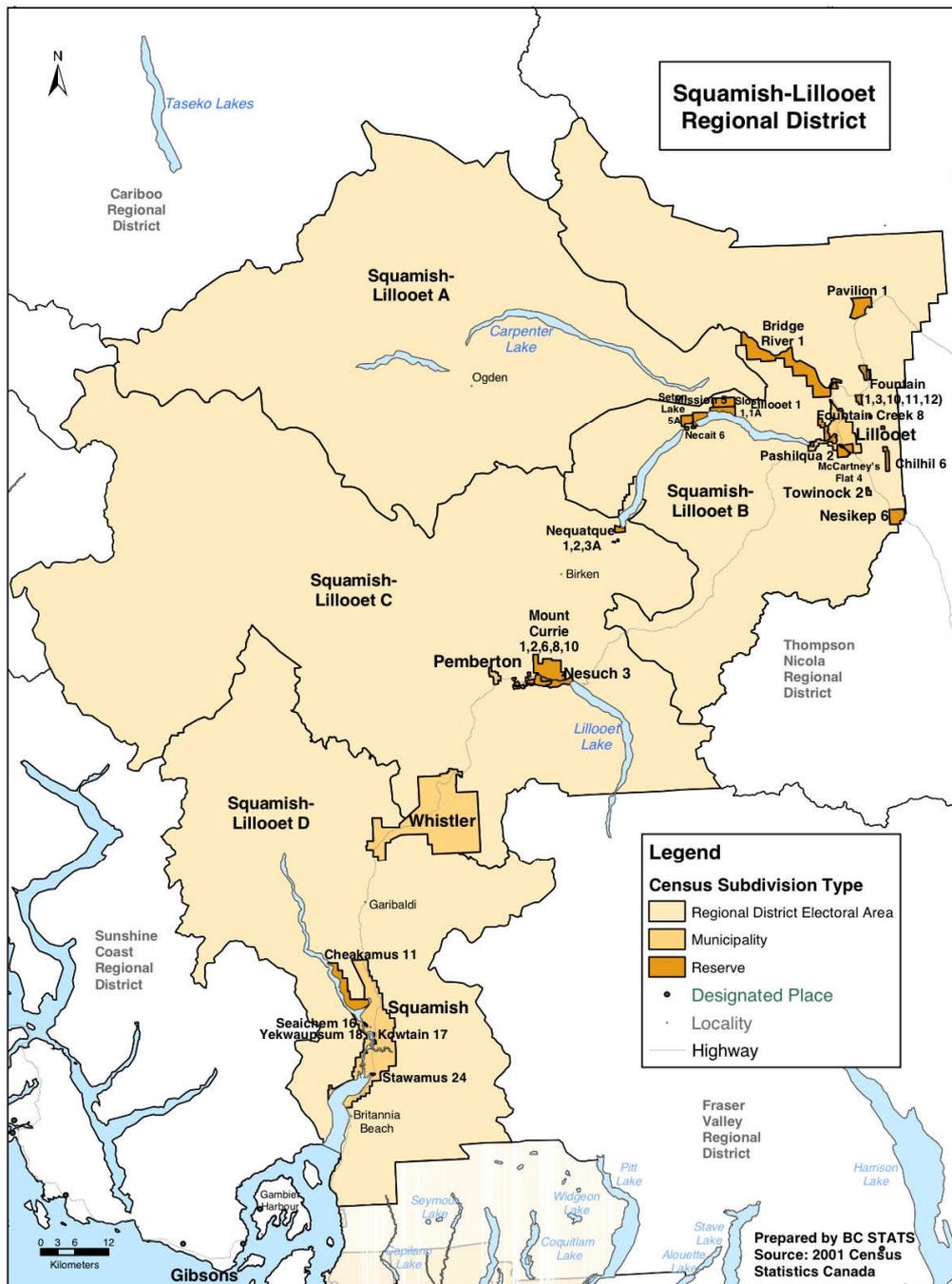


Figure 1. Squamish-Lillooet Regional District Map. The Sea to Sky Region is delineated in yellow and noted as Squamish-Lillooet C, Squamish-Lillooet D, Squamish, Whistler and Pemberton. From 2001 Census of Canada: Census Profiles. (2001). Retrieved August 12, 2010, from [http://www.bcstats.gov.bc.ca/data/cen01/profiles/csd\\_txt.asp](http://www.bcstats.gov.bc.ca/data/cen01/profiles/csd_txt.asp). Copyright 2011 Province of British Columbia. Reprinted with permission.

## **The Region as a Life-Place Concept**

A regional approach looks at the physiographic, ecological and cultural components of a place to gain a better understanding of how to enhance sustainability within that region (Thayer, 2003; Sustainability Now!, 2010). This approach embodies a “place-based nature-human linked system”, where humans are as much a part of the natural environment as the ecology that exists within a region (Sustainability Now!, 2010, pg.2). Adapting a place-based, regional approach in food systems planning advances and operationalizes the idea that the physical boundaries of the region are linked to the natural environment as well as the cultural identity and economies of our communities. This approach takes into consideration the deep connection that exists between humans and food and the importance of protecting and preserving the water, air, land and soil that is required to support a regional food system and community.

The concept of life-place and regional identity are linked but not necessarily equivalent. As stated by Meredith (2005, pg.84) and Paasi (as cited in Meredith, 2005):

“A community is an experience rather than a place. Natural systems as metaphors for cultural coherence are difficult to sustain: forms of life (bios) within a region (regia) are not the same as ideas about them. The miniature biosphere (the bioregion) is therefore a cultural construct”.

As such, for this research it was assumed that a region is not solely defined by geophysical boundaries; it is also culturally dependent. Therefore, the Sea to Sky Region is also defined by the culture, history, values and connection of the community to a place.

## **Regional Food Systems**

Food systems are comprised of dynamic, interconnected processes involved in maintaining our food supply, including production, processing, distribution, sales, marketing, consumption and waste (K. Mullinix & A. Fallick, personal communication, August 6, 2010). Regionalized food systems are gaining attention as a catalyst for moving toward advancing environmental stewardship, economic vitality and socio-cultural responsibility.

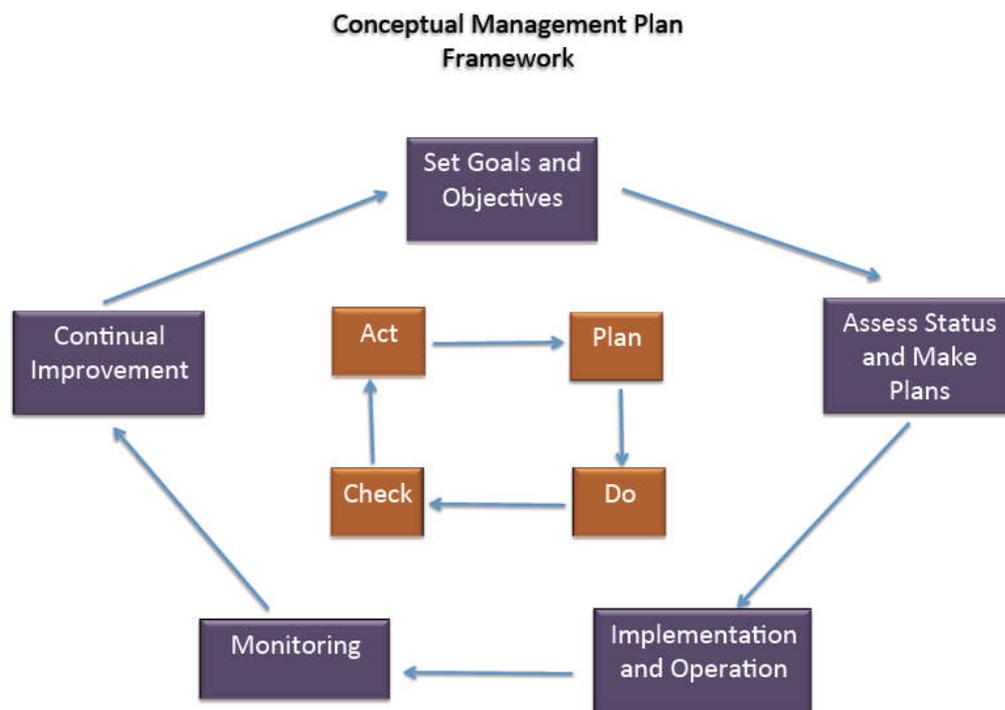
## **Management Plans**

This research employed the concept and methodology of an environmental management plan - a tool commonly used in environmental and ecological management. The conceptual framework of a management plan follows a systematic process consisting of: planning, doing, checking and acting (British Standards Institute, 2009). Specific system components of this process includes (Figure 2):

1. Goals and objectives.
2. Current state of an issue.
3. Future desired state.
4. Management tools and actions.
5. Monitoring.
6. Continual improvement.

The planning phase of this model, specifically setting goals and objectives, assessing status and making plans, has been adapted and used in the context of a planning

framework for a Regional Food System Management Plan (RFSMP). A RFSMP is intended to be a dynamic tool by design and intent. The remaining components of the management plan were not pursued to completion due to time and logistical constraints.



*Figure 2. Generic Management Plan Framework. Adapted from British Standards Institute, 2009.*

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## Overview of the Sea to Sky Region

The Sea to Sky Region is located in southwestern British Columbia, Canada. It is situated within the Coast Mountain Physiographic region, on the west side of the Cadwallader Range, and is characterized by northern latitude rainforests (British Columbia

Ministry of Forests Research Branch, 1992; Cannings & Cannings, 1996). The southern boundary of the region is approximately 50 kilometers (km) north of Vancouver; the northern boundary is approximately 125 km north. The boundaries of the Sea to Sky Region is defined by the southwestern portion of the Squamish-Lillooet Regional District (SLRD), an area comprised of the electoral districts of Squamish-Lillooet C and Squamish-Lillooet D, and the District of Squamish, Resort Municipality of Whistler, and Village of Pemberton (Figure 1). Approximately 31,000 individuals live in the region (British Columbia Ministry of Agriculture and Lands (BC MAL), 2008).

### **Sea to Sky Agriculture Past and Present**

Historically, agriculture was the basis of the local economy of Squamish and Pemberton. The fertile soils in the Squamish area allowed for mixed farming with agronomic crops including hops, hay and potatoes (Squamish Historical Society, n.d.). In the early 1900s, the first settlers in the Pemberton area established a few larger farms; however, subsistence farming was the main agricultural activity occurring in the Pemberton area during this time (Decker, Fougberg, & Ronayne, 1977). Farming in the twentieth century largely focused on crops such as seed potatoes, turnips, carrots, small fruit, peas, oats, wheat, forage crops, livestock and commodities such as milk and cream (Decker et al., 1977). With the exception of fur bearing animal production, minimal agricultural activity occurred in the Whistler area during this time (Whistler Museum, 2010).

As of 2006, there were 86 farms in the Sea to Sky Region. That covers an area of approximately 4,400 hectares and average farm size was 52 hectares (BC MAL, 2008). The majority of farming in the Sea to Sky Region today occurs in the Pemberton Valley,

where approximately 3,500 hectares of land is farmed (BC MAL, 2008). Establishment of small-scale farms has recently occurred in the Squamish area (SLRD, 2011). A variety of crops including hay and fodder, potatoes, carrots and apples are produced and livestock including cattle and pigs are raised (SLRD, 2011).

Seasonal farmers markets and community gardens or greenhouses exist in all three of the main communities. No food processing or commercial value-added processing occurs within the region and the majority of foods imported arrives by truck (SLRD, 2011).

### **Research Question and Objectives**

The purpose of this research was to create a framework for a RFSMP using the Sea to Sky Region as the study area. Focus was placed on the planning stage and crop production component of the food system. The intent was that the RFSMP framework developed and tested would be applicable to other regions and promote community sustainability through enhanced regional food self-reliance. It is my intention that this study adds to the existing body of work and contributes a greater understanding of the strengths, weaknesses, opportunities and barriers to the successful development and implementation of sustainable, regional food systems in Canada and elsewhere.

The objectives of this study were:

- Review information on food systems in the Sea to Sky Region as well as models of regional food systems.
- Conduct stakeholder values identification to inform the development of the RFSMP framework.

- Create a food self-reliance calculation method, as an element of the planning methodology, and apply it within the context of the Sea to Sky Region.
- Delineate a RFSMP framework for the Sea to Sky Region.

### **Assumptions and Limitations**

A number of assumptions underlie this research:

- That processing, distribution and storage capacity can be developed to accommodate regional production potential.
- There is potential to develop or identify specific crops and cultivars that can be adapted to suite growing conditions in the Sea to Sky Region. Crops were limited to those best suited for regional cultivation.
- Grains are excluded as these crops can be readily and economically transported long distances by rail, stored for extensive periods of time, and require minimal processing (Grewel & Grewel, 2011).
- All land in the Sea to Sky Region located within the Agricultural Land Reserve (ALR) boundaries is available and suitable for some type of agriculture.

The following general limitations of this research have been noted:

- The focus of this research is on production and consumption; however, it is recognized that processing, distribution, marketing, disposal, and waste management are necessary components of a complete food system.
- Food waste, nutritional considerations, and future consumption patterns were not considered in production-demand satisfaction calculations.

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- Restrictions on agricultural infrastructure and land-base for crop production exist. As such, the area available for food production does not take into account potential for protected agriculture (e.g. greenhouses), community and residential gardens, and rooftop production.
- Consideration is given only to land based products, such that seafood and seafood products are not included.
- Regulatory limitations such as supply management rules, trade agreements and regulatory requirements, and other economic issues were not a focus of this study.
- Dairy, poultry and eggs are supply managed, such that domestic production and consumption are regulated, and are not be included in this research (Desjardins, MacRae & Schumilas, 2009).
- Although traditional knowledge of place is an important piece to the development of regional food systems planning, the role of First Nations as part of the regional community was not assessed during the course of this research.
- Study participants represent a select subsection of the population in the Sea to Sky Region. The duration and scope of this research precluded deriving a statistically significant sample.

The following limitations in the food self-reliance model are noted:

- The model looks at a single point in time and assumes that appropriate technologies and production methods are utilized.
- Only foods categorized as vegetables are considered in the self-reliance calculation.

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- The model is highly dependent on data quality and availability. As the scope of this research precluded direct collection of data required to model food self-reliance, this work relied on existing information. Available data is assumed accurate and valid.
- The model includes select crops that can reasonably and feasibly be grown in the Sea to Sky Region.
- Numerous crops and value-added foods are excluded from the study; this does not imply that the diet of the population will be limited to the listed crops.
- Per capita consumption data is available at a national level only. This may not be representative of food consumption patterns in the Sea to Sky Region.

### **Ethical Considerations**

This study received an ethical review and approval by the Royal Roads University Research Ethics Board. All information collected during the course of this study was kept confidential and consent was obtained from all research participants.

## **Review of Literature**

### **Food Security and Food Self-Reliance**

Food security relates to food availability, accessibility and use, and is defined as being achieved when “all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life” (The World Health Organization, 2011). Enhancing food security is closely tied to access, food that is healthy and nutritious, local sourcing and affordability. Food self-reliance is reached “by supplying as much of the foods in a region that is physically possible without degrading the resource base” which results in “maximum resilience, minimum importation, and significant economic and social return to all stakeholders in the region” (Clancy & Rhuf, 2010, pg.1). The idea of food self-reliance is related to a society’s capacity to produce their own food and what impacts this has on the natural resources in the area (BC MAL, 2006). A self-reliant region supports locally owned businesses, uses resources within the region sustainably, provides employment and food products to citizens living within the region, and provides livable wages (Shuman, 1998). Being a food self-reliant region does not mean that access to markets and commodities outside of the regional boundaries are unavailable. Food security and food self-reliance are related concepts but are not equivalent such that food self-reliance does not assure food security.

## **Food Systems and Sustainability**

A sustainable food system is one that encourages a strong, direct relationship between the producer and the consumer, values workers employed in all parts of the food system, and is constructed based on the unique characteristics of a particular region and the community (Fenestra, 2002). Attributes of a sustainable food system are often described using these following terms: relational, proximate, diverse, just, ethical, sacred, knowledgeable, communicative, seasonal, temporal, healthful, participatory, sustainably regulated, environmentally sound, economically viable, decentralized, place-based and socially, culturally and spiritually healthy (Fenestra, 2002; Kloppenberg, Lezberg, Master, Stevenson & Hendrickson, 2000). All are generally accepted desirable food system characteristics; note the inclusion of several related to physical proximity. There are specific and tangible activities that communities can undertake to promote sustainability in the food system. Examples include eating regionally and seasonally produced and processed foods, schools purchasing from local farms, community gardens and Community-supported agriculture (CSA), community farms run by community members and local university students, food policy councils, community food security, farmers markets, food circles and local sustainable farming systems (Feagen, 2007; Fenestra, 2002).

Food systems are complex. Enhancing sustainability in complex systems requires the ability to adapt to subtle, moderate or dramatic changes. Food systems, at all scales, will be impacted by global climate change, peak oil, population growth, and disruption in food distribution patterns (Heinberg, 2011; Kimbrell, 2002). This research was based on the

premise that a sustainable food system is one that possesses the attributes of self-reliance, adaptability, resilience, robustness and attempts to integrate environmental, economic and socio-cultural integrity. An understanding of the relationships and connections between the above attributes is necessary to promote sustainability in regional food systems.

### **Regional Food Systems**

The terms local and regional are often used interchangeably in food system discourse. To some, local food systems simply describe a system alternative to, or opposite from, the global food system. Globalization lacks uniqueness and diversity, and has particular implications in terms of the resilience and adaptability of the food system relative to factors such as peak oil, climate change and population growth. Comparatively, local food systems are embedded in place, which necessarily enables and constrains food system activities due to its unique physical and environmental characteristics and capacities (Feagan, 2007). A socio-political perspective on localism is described by Allen (as cited in Feagen, 2007, pg.169) as “A defensive position against the disempowering and homogenizing effects of globalization”.

The concepts of distancing, embeddedness, foodsheds, and CSA are strongly connected to the regional food system paradigm. Awareness of the origin of our food, and the building of close, strong and direct relationships with producers is referred to as “distancing” (Elton, 2010). Feagan (2007) states that for a food system to be sustainable the physical and metaphorical distance between the producer and the consumer must be minimized. Spatial shifts in the contemporary, dominant food system have expanded to the

extent that production and consumption exceed the available natural resources (Kloppenberget al., 2000). It is thought that shortening the food chains will bring consumers closer to the origin of their food and food producers.

In the food system literature, embeddedness and place are frequently used to characterize different states of the food system: the globalized, conventional, place-less and disembedded versus the localized, alternative, place-based, and embedded (Sonnino, 2007). Embeddedness, a socio-cultural concept, describes the activities between a producer and consumer as related to a community and place (Feagan, 2007). The term place is commonly used to describe the territoriality of a food chain or system and is often used to describe the strong association between a food system and its context of production (Clancy & Ruhf, 2010; Sonnino, 2007). Both embeddedness and place have significant relevance to regional food systems as relocalization brings consumers closer to producers and closer to the origin of food. Greater understanding of the social, cultural and ecological characteristics of a place brings awareness to regional food systems (Feagan, 2007).

The concept of a foodshed has significant relevance to the notion of regional food systems and sustainability. It provides a construct for contextualizing a regional food system and the flow of food through a system (Peters et al. 2008). Using a watershed analogy, Getz (1991) describes a foodshed in terms of food supply and the importance of protecting the natural resources that support this continuous and sufficient supply. A foodshed embeds a food system into a particular place and community within a defined geographic area and aids in following and analyzing the movement of food from origin to consumption (Feagan, 2007; Peters et al., 2008).

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Community supported agriculture is one model of “local” agriculture that brings community closer to the farm, and the origin of food, while directly providing economic and social support systems for the producer. This implies a direct relationship between residents, consumers and producers. Such relations connect and give the community a vested interest in the success of the growing season, agricultural inputs and practices, food quality, and the health and well being of the farmer and the land. Importance is placed on understanding and incorporating community values into perspectives when assessing sustainability in a food system (Kloppenberget al., 2000).

Regional food systems are local in one sense but generally operate over larger geographic areas than commonly considered “local”. Boundaries of a regional food system can be based on a number of physically defined factors including political, geographic or administrative. However, the boundaries of a regional food system should be permeable and flexible, not rigid and impermeable, with overlap between and within regions (Clancy & Ruhf, 2010). Kloppenberget al. (1996, pg. 38) state that foodsheds are defined by overlapping attributes including “plant communities, soil types, ethnicities, cultural traditions, and culinary patterns”. Feagan (2007) supports this idea stating that we are connected to a variety of scales that are considered local throughout the world. Regional food systems operate in relation to other neighboring and distant regions, and at national and international scales (Clancy & Ruhf, 2010). Importing and exporting of products within and between regions, and at the global and national scale will be necessary to bring products into a region where they cannot be produced due to extreme economic or natural resource constraints.

## **Community, Regional and Provincial Related Documentation**

Three publically available documents relating to food systems and food security in the Sea to Sky Region, prepared for the communities of Whistler and Pemberton, contributed to the formulation of the RFSMP. They are: *A Sustainable Food and Agriculture Strategy for Whistler* (Holland Barrs Planning Group Inc., 2005), the *Pemberton Valley Agriculture Area Plan* (SLRD, 2010), and *Agricultural Land Use Inventory for the Pemberton Valley* (BC MAL, 2009). The Whistler report provides a background rationale and scopes preliminary opportunities that would form a baseline for a future sustainable food strategy in the Whistler area. Priorities, directions, opportunities and recommended initiatives for a food strategy in the Whistler document are guided by the priority areas delineated in the *Whistler Community Sustainability Plan (CSP)*, which include enriching community life, enhancing resort experience, protecting the environment, ensuring economic vitality, and partnering for success.

The *Pemberton Agriculture Area Plan (AAP)* was introduced as an amendment bylaw to the Electoral Area C Official Community Plan (OCP). In it, key options and recommended prioritized actions were outlined. Prepared in consultation with area farmers and stakeholders, the AAP outlines a vision for agriculture in the Pemberton Valley. This vision includes protection of existing farmland, maintaining the agronomic advantages in the Pemberton Valley, development of and access to local and regional markets, supporting sustainable agriculture in the region, and assistance for new farmers (SLRD, 2011). The *Agricultural Land Use Inventory for the Pemberton Valley* (2009) records and categorizes land use within and adjacent to the ALR. This inventory provides information on the health

of agriculture, the capacity for agricultural expansion, and pressures on agricultural land in the Pemberton area (BC MAL, 2009).

Two regional level reports *Community Food Action Initiative: Food on Every Table* (Szymanski & Sutherland, 2006) and *Creating Resilience in the SLRD*, prepared by the SLRD Energy Resilience Task Force (SLRD, 2011), also speak to regional agriculture and food and contributed to the formulation of the RFSMP. Szymanski & Sutherland (2006) held three community meetings and one public open house to gain insight into existing natural and human resources and initiatives which make-up the current food system in terms of production, accessibility, distribution, consumption and waste management in the region. They identified issues relating to food management, food security and sustainability within the Sea to Sky Region. Key issues presented included availability of agricultural land and infrastructure (i.e. greenhouses), the role of traditional food sources, food storing and processing facilities, community education on food and agriculture issues, food costs and accessibility, and coordination and communication of food and agriculture initiatives across the region. They also generated a food system baseline assessment and gap analysis based on community member discussions that occurred in the community meetings and public open house.

The SLRD Energy Resilience Task Force report outlines recommendations to mitigate the impacts of declining energy supplies and to build energy resilience in the SLRD (SLRD, 2011). It includes a chapter dedicated to food and agriculture issues in the context of the SLRD. Pertinent recommendations for enhanced food system sustainability in the region includes changes to municipal, regional and provincial agricultural land use

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bylaws and regulations, completion of studies relating to processing and value-added potential, SLRD food security planning, food and agriculture education, and supporting actions that promote soil health and seed saving. The report also explores the energy issues specifically relating to food product transportation and distribution and recommends re-regionalization of the food system to bring energy resilience back to the region.

A third regional level document, *SLRD Regional Growth Strategy*, outlines a high-level approach to regional planning that includes goals and objectives for the protection, enhancement and investment around agriculture (SLRD, 2008). Key recommendations presented in this document include land use planning that protects agriculture, sustainable economic development that supports agriculture, and promotion of agriculture development strategies and planning.

The Whistler 2020 Food Strategy and Task Force was created to work toward enhancing the regional system with the intention to inform decision makers, resource management, and provide a guidance framework for directing community values (Whistler2020, 2011). The *Whistler2020* website contains a variety of resources, information and actions occurring at the regional and provincial levels that relates to food and agriculture in the community of Whistler (Whistler2020, 2011).

*Can B.C. Feed Our Growing Population?* (BCMAL, 2006) provides quantitative data on food production and consumption in British Columbia and outlines a methodology to estimate food self-reliance in B.C. using farm gate production data. The study attempts to connect food production to the land, give consideration toward foods typically produced in

BC, assumes that food production technology is held constant, and explores per capita consumption in the province of B.C.

### **Models of Regional Food Systems**

Regional food system models, planning documents, assessments and evaluations in North America and internationally are extensive (Table 1). Many have elements potentially applicable to the development of an RFSMP methodology and to the Sea to Sky Region. They collectively described various specific goals, objectives, actions, strategies, programs, projects and policies to promote regional food systems that represent innovative and progressive approaches to enhance sustainability. Recurring themes in the above listed food system models include food accessibility, availability and affordability, health and nutrition, education, ecological stewardship, economic develop in terms of employment and wages, collaboration and partnerships, and technology and infrastructure innovation.

Table 1

*Select models of regional food system plans and strategies in North America presented by date created*

Document Title	Year
Cultivating Resilience: A Food System Blueprint that Advances the Health of Iowans, Farms and Communities	2011
Eating Here: Greater Philadelphia Food System Plan	2011
Vermont Farm 2 Plate Strategic Plan	2011
Iowa Local Food and Farm Plan	2011
Regional Food System Strategy for Metro Vancouver	2011
FoodNYC: A Blueprint for a Sustainable Food System	2010
FoodWorks: A Vision to Improve NYC's Food System	2010
Goto2040 Comprehensive Regional Plan: Promote Sustainable Local Food (Chicago)	2010
Northeast Ohio Local Food Assessment and Plan	2010
From Farm to Fork: A Guide to Building North Carolina's Sustainable Local Food Economy	2010
A Healthy Seasonal Local Food System Plan for the Iowa Corridor Food & Agriculture Coalition	2010
Multnomah Food Action Plan	2010
Portland Plan: Food Systems	2009
North Okanagan Food System Plan: Strengthening the Regional Food System	2009
A Plan to Strengthen the Local Food System of the Richmond, Virginia Metropolitan Area	2008
A Healthy Community Food System Plan for the Waterloo Region	2007
Seattle Food System Enhancement Project	2006-2007

## **Critiques of Regional Food Systems**

Challenges associated with advancing regional food systems have also been raised. Sustainable food systems are often small, few in number and sporadic with gaps in buy-in from the entire community (Feenstra, 2002). From an economic perspective, it has been argued that local food denies the principle of comparative advantage and gains from international trade. Thus, growing food locally results in food not being grown in the most productive or least-cost locations (Edwards-Jones et. al, 2008; Lusk & Norwood, 2011). Additionally, there are significant complexities and ambiguities in the concept of local food such as distance travelled, food miles, as well as consumers' perception of fresh, safe and natural (Edwards-Jones, 2008). My research recognizes that there are inherent challenges with designing and implementing regional food systems. However, in-depth investigations will reveal the advantages and disadvantages of such and aid in the continued exploration and development of more sustainable options in the food system.

## Methodology

### Research Design and Approach

The general approach taken for this research was both qualitative and quantitative in nature and utilized methodological triangulation. Triangulation is the use of multiple sources of data, theories, investigators and methods to enhance the validity, credibility and increase confidence in findings and conclusions (Bryman, 2003). Triangulation was facilitated via document review and evaluation, conducting knowledge cafes and semi-structured interviews, and food self-reliance calculations.

This research project constitutes, and is reported as, a case study. Case study research involves investigating social phenomenon in a real-world setting that enables details specific to the situation to be studied in depth (Yin, 2008). The advantage of a case study approach is that it supports an analysis of events in context and produces results with high internal validity (Gagnon, 2010). Regional food systems studies are inherently highly contextual. Additionally, a RFSMP for the Sea to Sky Region has significant potential to be implemented, as per expressed interest from both the public and private sectors. Therefore, the case study approach was deemed an appropriate methodology.

Yin (2008) and Gagnon (2010) agree regarding the importance of developing an analytic strategy for case study research data collection. To yield more empirically based and objective conclusions, and per Gagnon (2010), procedures followed in this study included:

- Selecting a coding and classification strategy.

- Purging irrelevant data.
- Ensuring the chosen strategy was compatible with the data and research.
- Presenting data in a database or other method through which data analysis can be conducted.

The RFSMP framework was created based on an environmental management planning framework, a commonly employed tool in the environmental planning field. For this study only the planning stage (Figure 2) of the proposed RFSMP was tested and which specifically focused on:

1. Goals and objectives.
2. The current state of the issue.
3. Future desired state.

Baseline information on the current state of the food system in the Sea to Sky Region was gained through collection, analysis and application of data requisite for food self-reliance calculation. Qualities of a preferred regional food system were based on information gained during knowledge cafés and semi-structured interviews. An iterative process was used in the preparation of the RFSMP framework such that the preliminary framework prepared prior to the initial knowledge café was revised based on participant feedback for the subsequent knowledge café and semi-structured interviews.

### **Data Collection and Analysis**

Qualitative data was generated via knowledge cafés and semi-structured interviews. The method used for estimating food self-reliance required quantitative data obtained from government agencies and educational institutions. Non-participant or direct observation

## **Regional Food System Planning 25**

was also used as every visit to the region was considered an opportunity for spontaneous data collection. Stakeholder values identification was obtained through knowledge cafés and semi-structured interviews (Appendix A). A knowledge café is “a means to bring a group of people together to have an open, creative conversation on a topic of mutual interest to surface their collective knowledge, to share ideas and insights and to gain a deeper understanding of the subject and the issues involved” (Gurteen, 2011). For this research, participants of the knowledge cafes included representatives from a variety of stakeholder groups involved with different parts of the food system from the communities in the SLRD. Data was collected via written notes, audio and video recordings and diagrams of group ideas and perspectives. Thirty-two individuals were invited to the Whistler knowledge café and 65 individuals to the Squamish knowledge café (Table 2).

Table 2

*Knowledge cafe locations, dates, times and participant information conducted with stakeholders in the communities of Whistler and Squamish*

Location	Date	Time	Participants	
			#	Representation
Whistler	March 31, 2011	1:30 – 4:00	6	<ul style="list-style-type: none"> <li>• Whistler Community Services Society.</li> <li>• Whistler 2020 Food Strategy Task Force.</li> <li>• Whistler Farmers Market.</li> </ul>
Squamish	April 19, 2011	9:30 – 12:00	7	<ul style="list-style-type: none"> <li>• Sea to Sky Food Distribution Group.</li> <li>• Squamish Climate Action Network.</li> <li>• Vancouver Coastal Health (VCH).</li> <li>• Squamish Farmers Market.</li> <li>• Squamish Food Bank and Helping Hands.</li> <li>• Squamish Community Health Centre.</li> <li>• Interested community members.</li> </ul>

The review of food system models and literature prepared for the communities and region was used as the basis for a preliminary RFSMP framework that was presented and explained at each knowledge café. Participants were also provided background information about the project and the goals of the knowledge café. Flip chart paper and pens were placed across a table and participants were encouraged to write or sketch their thoughts and ideas. In each knowledge café, two activities were conducted. Activity 1 involved a 45-minute guided, open discussion about what the main themes of a RFSMP framework would look like for the Sea to Sky Region. Potential preliminary themes were provided to initiate

discussion (Table 3). Participants were then asked to select and prioritize six themes, from all those identified, that they felt were most important or significant.

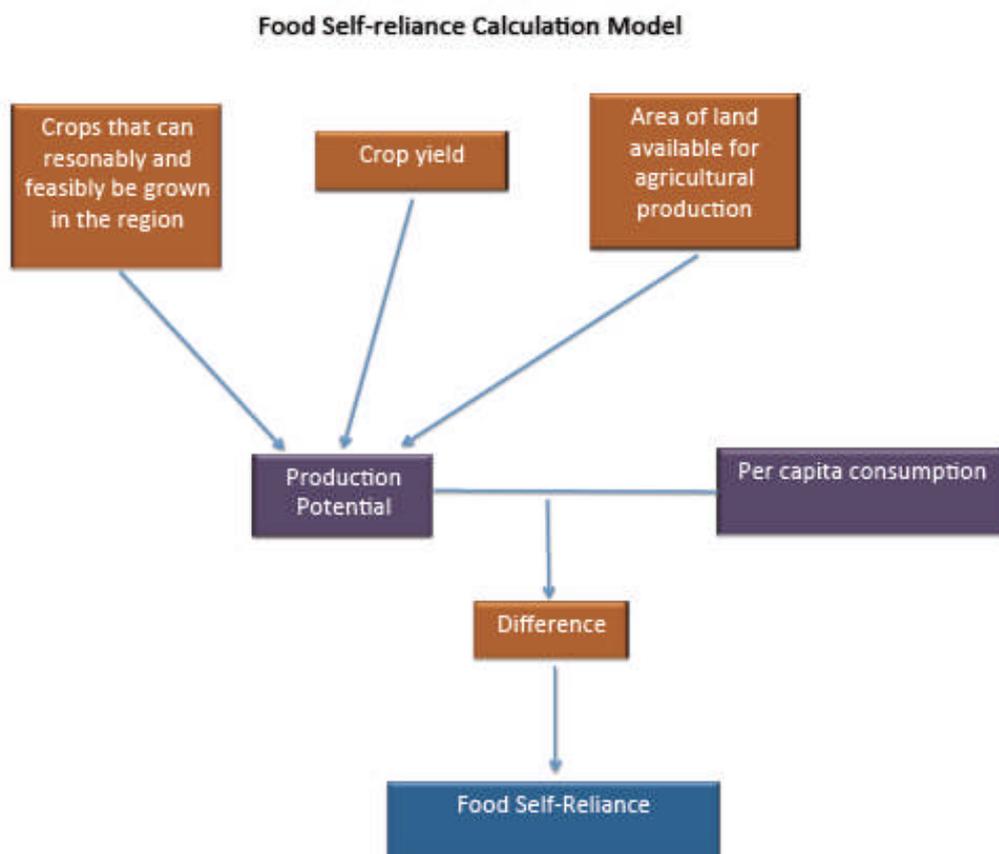
The prioritized themes thus identified were then used in the Activity 2 values identification discussion. In activity 2, the six priority themes were written on notepaper and arranged on a single piece of flip-chart paper. Participants were asked to consider and share what they valued within each of the themes. Discussion regarding the relationship between the themes and values ensued. A flip chart sheet was then dedicated to each theme and participants were asked to place the values identified under the appropriate theme. Values identified and related to themes were recorded on paper.

A representative from the Pemberton Farmers Institute (PFI) indicated that due to farmer's schedules and the nature of operating a farm it was recommended that interviews, rather than a knowledge café, be conducted with members. As such, semi-structured interviews were completed as part of qualitative data collection. An outline of topics was covered in these interviews. The interviewer used variation in question wording and order (Appendix B). Seven agriculturalists were contacted and three interviews conducted by phone or email. The main form of data recording was note-taking.

Data collected during knowledge cafés and semi-structured interviews were transcribed and key concepts, ideas and perspectives were coded which allowed text to be organized in a manner that revealed patterns and the organizational structure of the information collected (Auerbach & Silverstein, 2003). Data compilation and tabulation were completed by hand and analyzed to ascertain consistent stakeholder themes and values.

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Quantitative data on land-based production potential and per capita consumption in the Sea to Sky Region was collected and used to calculate regional food self-reliance (Figure 3). The methodology employed was adapted from a variety of studies, but most specifically those completed for the Waterloo Region in Ontario, Canada (Desjardins et al., 2009), the City of Cleveland (Grewal & Grewal, 2011) and the province of British Columbia (BC MAL, 2006).



*Figure 3. Generic Model for Estimating Food Self-Reliance*

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A variety of government agencies were contacted, and publically available websites reviewed, in an attempt to obtain data to be applied to the self-reliance model. Supplementary to this, various community groups and organizations affiliated or located within the communities in the Sea to Sky Region were contacted. Data sources reviewed and collected included soil surveys, agricultural soil capability, land located within the ALR, municipal agricultural land zoning and area, agricultural land use inventory, yield data and historical crop production, topography, food consumption, and population census (Appendix C).

### **Production potential.**

The methodology used to estimate production potential included identification of crops that could reasonably and feasibly be grown in the Sea to Sky Region, agricultural land available for crop production, and average yield per unit area for selected crops. The growing conditions, specifically soil and climate, of the Sea to Sky Region dictated the chosen crop species for the self-reliance calculation. For corroboration, Pemberton farmers were asked to provide anecdotal information about crops that can be grown in open fields or by protected methods in the region. Historical information was also reviewed (Decker et al., 1977). Estimated land available for production was based on, and limited to, ALR land designations in the SLRD. These lands were assumed to be suitable for cultivated agriculture of some sort.

Yield potential was determined by reviewing local, regional and national scale production budgets. In order of preference, budgets from the SLRD, Metro Vancouver and the Fraser Valley, southwestern B.C., the Pacific Northwest, and northeastern North

America were used. Production budgets used were published by government ministries and Universities within Canada and the United States. If data was unavailable on a local or regional scale, then data for an area most climatically similar, with preference given to the Metro Vancouver, the Fraser Valley and southwestern British Columbia, was used.

**Per capita consumption.**

Per capita consumption was estimated using Canadian food disappearance data available through the Statistics Canada publication *Food Statistics* (Desjardins et al., 2009; BC MAL, 2006). These data are available on a national basis only and as such were extrapolated to the population of the study area (BC MAL, 2006). For the purposes of this study, the term consumption is synonymous with demand.

**Estimating food self-reliance.**

The approach used for calculating food self-reliance is consistent with methods used in other studies (BC MAL, 2006, Desjardins et al, 2009, Grewal & Grewal, 2011). Figure 4 outlines the model for estimating food self-reliance.

1. Determine the agricultural land area required to meet consumption of a selected crop for total population. This is the area of land required to be 100% self-reliant in the selected food crop for one year.

$$\frac{\text{Consumption/Population}}{\text{Yield/Unit Area}} = \text{Area Needed}$$

2. Determine self-reliance for selected crop.

$$[(\text{Area Needed} \times \text{Yield/Unit Area}) / (\text{Consumption/Population})] \times 100 = \% \text{ Self-Reliance}$$

Whereas,

Area Needed - land base required to meet consumption requirements (hectares).

Yield/Unit Area - quantity of selected crop produced per unit area (kg/hectare).

Consumption/Population - per capita consumption of selected crop multiplied by the total target population (kg).

*Figure 4. Model for Estimating Food Self-Reliance*

The above model was applied to select crops for which both per capita consumption and yield data were available. Area of land required for self-reliance in the selected food crops was estimated for 100%, 50% and 25% regional self-reliance.

## **Results and Discussion**

The following provides a summary of results and analysis of the regional approach, stakeholder values identification, food self-reliance modeling and testing of the RFSMP framework. Discussion focuses on the concept, design, context and implementation of the RFSMP into the Sea to Sky Region with emphasis on how the RFSMP framework promotes community sustainability through enhanced regional food self-reliance.

## **The Regional Approach**

The Sea to Sky Region is unique in culture and environment and comprises several communities. Squamish is the largest, both in geographic area and permanent resident population (BC MAL, 2008). Whistler, a resort town and centre for outdoor recreation, has a population that is constantly in flux as a result of extensive tourism in the area (Whistler2020 Food Task Force, personal communication, June 23, 2010). Pemberton is the agricultural hub of the region. This diversity and uniqueness demands planning that reflects diverse community values, physiographic conditions, and variations in agricultural production and potential economic activity.

Citizens living in the Sea to Sky Region view the SLRD as comprising two separate areas in terms of community, culture and environment. These include the Sea to Sky Region itself, and the districts of Squamish-Lillooet A and Squamish-Lillooet B, which comprise the northeastern portion of the SLRD. The latter were not included in the study region as regional boundaries were delineated based on physiographic characteristics and, more importantly, the perceptions of the community. However, including the latter within the boundaries of the region would have added diversity to a regional food system in terms of types of crops produced, and the environmental and cultural characteristics of the region. Inclusion of this area may have also influenced economic viability, and processing or value-added potential for the region.

Based on information gathered via literature reviewed, knowledge cafés, semi-structured interviews, and discussions with individuals in these communities, citizens living in the region view themselves as a connected, regional-scale community. As a regional

community, there is a realization that nearly complete dependence on food from outside sources exists and it is perceived that the geographic location, surrounding environment, and lack of agricultural land pose a number of challenges to local food production and food self-reliance (Whistler2020 Food Task Force, personal communication, June 23, 2010). As stated by Fallick & Mullinix (2009), and evident through information provided during knowledge cafés and semi-structured interviews, the region faces challenges with adopting a regional food system including limited scope to local agriculture, threats to productive farmland from commercial and residential developments, reliance on food imported from long distances, and a high cost associated with fresh food.

### **Delineating food system boundaries.**

The scale of a food system can be local, regional, national or global, or can integrate, to varying extents, all scales. The boundaries of a food system, which operate from the producer to the consumer, could be delineated by a community garden to Metro Vancouver to the entire North American continent. The food system, regardless of boundaries, cannot be isolated in a single time or space. For example, inputs into production, such as compost or fertilizer, may be brought in from outside the boundaries of the system. Alternatively, food produced within the defined boundaries of the system could be exported outside the system to other regions. A place-based, regional approach places constraints on a food system, where culture and community, and physiographic characteristics delimit system boundaries.

This research assumed that a food system for the Sea to Sky Region could be delineated for a known population. For this area to achieve complete self-reliance, such that

consumption does not exceed production and a closed system with no movement of materials and energy into, or out of, the defined boundaries would need to exist. However, this work prescribes an open system with movement of materials across a regional boundary that maximizes local production and self-reliance capacity. As such, the boundaries of the Sea to Sky Region, no matter how they are delineated should be appropriately permeable. In such a food system, there will be several interacting scales occurring simultaneously, reflective of the particular aspect under consideration and regional capacity. This could imply multiple smaller systems operating within the regional boundaries or a larger system into which the Sea to Sky Region is embedded.

**Environmental and cultural characteristics within a region.**

Employing a regional approach leads to a RFSMP that is specifically created for that area. Delineating the physiographic characteristics of an area provides the context for the management plan by taking into consideration the distinctive environmental characteristics and resources contained therein. The physiographic conditions of an area will influence crop growth, soil quality and conditions, water resources and availability of arable land, which, in combination, influence food production capacity. Incorporating and respecting limitations of the ecology that exists within a given region will necessarily advance a regional approach to planning. Likewise, the relationships, networks and interactions that occur within the ecosystem inform how agricultural activities and operations can or should be integrated into the structure and functioning of that ecosystem. A clear assessment of environmental and ecological conditions provides an understanding

of the challenges and opportunities relative to food production. The area characteristics to which the RFSMP is being applied would contribute to differences in the resulting plan.

### **Stakeholder Values Identification**

The stakeholder values identification process was intended to explore and gain an understanding of community sentiment around the breadth of issues relating to all components of a food system. The following outlines and discusses the themes and values that were presented, discussed, and identified during this process. For this research, values relate to the specific interests of stakeholders associated with the themes identified during knowledge cafes and interviews. Stakeholders valued different actions and activities relating to the themes and according to what extent those actions contribute to the creation of a sustainable food system for the region. A food system is comprised of a complexity of interacting components and themes. Different stakeholders may value these components in different ways. This RFSMP study was limited to one food system component, production. However, a comprehensive RFSMP would similarly address all of the components and themes presented during the stakeholder identification process.

#### **Knowledge café.**

The intent of the knowledge cafés was to gain insight into the values and perspectives of stakeholders and simultaneously guide the development of the RFSMP framework. Perspectives gained during focus groups, termed knowledge cafes in this research, can guide the development of a project, program or activity. Such sessions provide a structured interactive environment for participants with common goals but

different perspectives, ideas and experiences, to bring forth valuable information (Kruger & Casey, 2008).

This study was initially conducted under the assumption that stakeholders identified within each of the communities would be available to participate in a knowledge café. However, a number of challenges arose during the course of contacting and recruiting potential participants. Additionally, knowledge café participants were limited to those who were members of the key stakeholder groups identified. Both likely resulted in the exclusion of individuals or groups interested in providing, or that should have provided, input into the RFSMP framework. Furthermore, the knowledge café likely attracted participants who were most knowledgeable and passionate about food and agriculture issues or had a particular perspective about food, agriculture and community.

Knowledge café participants were provided with a preliminary framework for a RFSMP based on the primary topics presented and discussed in previous reports and investigations for the communities and region. This framework was provided to participants at the start of the session to guide and generate discussion. The preliminary RFSMP framework consisted of sixteen themes (Table 3).

Table 3

*Preliminary themes for a RFSMP presented in the Whistler and Squamish knowledge cafes*

Preliminary Themes for a RFSMP	
1. Consumer demand	9. Food quantity
2. Consumer education	10. Food system education
3. Marketing	11. Work force development
4. Food production	12. Food system technical assistance and business planning
5. Agricultural inputs	13. Leadership
6. Food processing	14. Communication and coordination across the food system
7. Food distribution	15. Food quality
8. Food storage	16. Population health

After open and guided discussions, participants were asked to identify what they felt to be the six priority themes of the 16 provided. Themes identified by participants of the Whistler knowledge café were:

- Education.
- Production.
- Environmental Integrity.
- Economics.
- Distribution.
- Culture.

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Seven themes were identified in the Squamish knowledge café as participants could not decide between the themes coordination and economics. They are listed below:

- Training, Education and Learning.
- Production.
- Processing and Storage.
- Leadership.
- Governance.
- Coordination and Collaboration.
- Economics.

Values associated with themes were identified by session participants. The main values, sub-themes, actions or activities identified by session participants are summarized in Appendix D. Detailed results are discussed for each below.

***Coordination and collaboration.***

Participants in the Squamish knowledge café felt that enhanced coordination and collaboration within and between communities was an essential element of a regional food system. Participants specifically value networking opportunities, frequent communications through events, workshops and conferences, and integration of the food system region-wide. Specific activities relating to this theme included sharing of backyards and private lands for food production, cooking and preserving workshops, and identification of individuals or groups to act as leaders for food system initiatives. The theme of coordination and collaboration was seen as applicable to all stakeholders in a regional food system.

***Education, training and learning.***

Education, training and learning was identified as a priority theme during both knowledge cafés. Participants agreed that this theme is applicable to a variety of players in the food system including tourists, school children, farmers, farm labour, restaurateurs and consumers. A sharing of knowledge and experience within and between the above groups was a priority value. Also indicated were the role farmers markets could play in food system education and farm business model education to new and existing farmers as well as a need for food system education for consumers and students of all ages.

Educating consumers and tourists about food costs and quality was also valued as an important part of a regional food system. Furthermore, participants felt that cooking and preserving workshops could act as an educational venue for knowledge dissemination. Specific examples for consumer education included newsletters and educational literature

in CSA food boxes and at farmers markets, using farms as a tool for learning and training, and providing clear visuals and messaging on food labels and print media.

Participants of the Squamish knowledge cafe felt strongly about the need for food system education in the school system. Actions identified relating to food system education in the school system included consideration of food security issues in district school board decision-making, incorporating functional home economics into school curricula, food system career education, and agriculture production methods training programs. There is a need for education, training and learning for new, young farmers, as they will be the ones who will replace the aging, regional farmers.

***Production.***

Participants in both the Whistler and Squamish knowledge cafés identified production as a priority theme in a food system for the region. Key sub-themes identified include agricultural practices, small-scale production, infrastructure, and land use.

Participants valued organic and biodynamic production methods and permaculture practices with a focus on the inputs and outputs of the system. Special consideration was given to seed saving and traceability compliance as participants felt that this was an important aspect of enhanced food security. Enhancing food production infrastructure, such as greenhouses and hoop houses, was felt to be especially applicable to areas unsuitable for land-based crop production. Land costs and availability of arable land was a concern to participants as was connecting individuals interested in farming with those who own available land. Participants also noted that there are issues relating to the use of the land

included in the ALR in the region. However, due to time constraints and the complexities of this issue, detailed discussions surrounding the ALR were not pursued.

***Processing and storage.***

One of the key values identified by Squamish session participants was the need to develop central processing and storage facilities in the Sea to Sky Region. Processing was considered by participants to include restaurants, abattoirs, and communal events for canning, pickling and other food preserving action. Key sub-themes identified included infrastructure, mass processing technology, centralized processing plants, processing and storage on a community scale, and restaurants purchasing local food. Consideration was given to new technologies for food processing and storage that could be applied on a regional scale that would preserve the nutritional quality of the food. It was noted that mass processing and storage facilities are not currently present in the region.

***Leadership.***

Leadership was another priority theme identified during the Squamish knowledge café. Participants regarded leadership as emanating from the community and local government. The main sub-themes and values identified included leadership awards, media coverage, self-organization to achieve a common goal, and culture shift. Participants agreed that leaders needed to be identified and supported, and could come from various parts of the food system. It was felt that leadership in food issues was needed from political parties to advance the discussion about local food.

### ***Governance.***

The participants of the Squamish knowledge café felt that governance was a priority theme for creating a regional food system. Main sub-themes included placing food security on the political agenda, identification of food system champions, and seeking guidance on the food system from other governance models. Participants felt that local and regional governments needed to be supportive of a regional food system through development of enabling policies and bylaws. It was also identified that individuals within local and regional government would need to bring awareness to a regional food system by championing the cause. Specific actions identified included development of a food charter at the regional level, creation of institutional food purchasing policies, and consideration of food issues in all policies created at the municipal and regional levels. Participants also noted that there are governance models elsewhere in Canada, North America and worldwide that has been successful in enhancing food systems at the regional level, which could be adapted and applied to the Sea to Sky Region.

### ***Environmental integrity.***

Whistler knowledge café participants identified environmental integrity as a key theme in a regional food system. Specific focus was placed on greenhouse gas emissions and dependence on fossil fuels in current production and distribution systems as well as carbon intensity associated with the overall agri-food system. Participants felt that environmental integrity was interconnected with the theme of production. Crop biodiversity and soil health were also noted as main values under the environmental integrity theme.

***Economic.***

The economic component of the food system was identified as a key theme in both knowledge cafés. Main sub-themes identified were business and marketing opportunities for farmers, value added opportunities for crops, sufficient income for basic necessities, and local job creation. Key values identified included fair wages, supporting local growers and food sector businesses. It was noted that both private and public investment of time and financial resources in local agriculture is required to advance local production and purchasing. Discussion also ensued regarding farmers needing access to sufficient markets that give them the ability to sustain business. Gaps in processing capacity, canning and smoking for example, could lead to future business opportunities and income generation potential. Specific potential activities identified included supporting an export crop, access to food programs, and creating a currency for local food. Ultimately, participants felt that there was significant potential for a regional food system to be a driver of economic vitality in the region.

***Distribution.***

Distribution was regarded as a priority theme in the Whistler knowledge café. Issues discussed included the food supply chain, labeling and certification. Participants noted that there was significant overlap of this theme with marketing, education and processing.

***Culture.***

Participants of the Whistler knowledge café identified culture as a priority theme. They identified the need to shift societal values about food. Values identified included an

appreciation for food quality, source and preparation, food selection and creating the time to purchase and prepare healthy, nutritious food. Food and agricultural tourism, innovation and creativity were also valued by participants.

**Semi-structured interviews with Pemberton farmers.**

Semi-structured interviews conducted with Pemberton farmers yielded insight into what they perceive would be appropriate main themes for a RFSMP. This information is quite valuable as farmers possess first-hand, local knowledge on issues surrounding food systems in the Sea to Sky Region and, as their livelihoods depend on the supply and demand for agricultural products, bring a particular perspective to the issue. Key themes identified by interviewees included coordination and collaboration, governance, processing, culture and economy. Production, in terms of food availability and accessibility, and food system education for farmers and consumers were also noted.

***Coordination and collaboration.***

Interviewees felt that enhanced coordination and collaboration across the food system in the region is essential. It was noted that inefficiencies, barriers, redundancy and rigidity exist in the current food system. Examples provided include grocers unwilling to sell local produce, costs to sell produce at local grocers, and logistics.

Grocers and restaurants are frequently highly computerized. Generally, this is not compatible with purchasing products directly from farms that often sell on a simpler more direct system. Small-scale farmers need more time to devote to farming as opposed to marketing, processing and distribution activities. Their time and resources are thinned; therefore a system to pool resources is needed. For locally produced food to be available to

the region, a more streamlined, specialized, yet flexible distribution and sales system is needed.

Enhanced food availability and accessibility was also noted as a value. Local food is only available when the farmers market is open or through farm gate sales. For a regional food system to be successful food needs to be available year round and systems need to be in place that support wholesaling. A shared cooperative retail space, and access to markets on a regular basis were recommended. Integration of the food system with other systems, such as transportation, was recognized. It was indicated that coordination in the food system could be improved through integrating the official community plans in Squamish, Whistler and Pemberton with the AAP.

***Production.***

Sub-themes under production included land use, food variety, and cost of production. Interviewees noted that Pemberton is a farming community with arable land but that this land is being purchased and developed at a rapid and unsustainable rate. Other issues with land use included the cost of land and start-up. Vegetables are readily available in the region, mainly in Pemberton, but local dairy and meat are scarce. There appears to be sufficient Class 4 to Class 6 land within the Sea to Sky Region that could support stock production. However, an analysis of this was beyond the scope of this research.

The interviewees promoted the notion of small lot agriculture, and supported innovative practices and technologies to produce food, and initiatives that save and preserve farmland. It was also felt that there is a need to support the family farm. Land use and land preservation was a key value within this theme. This involved the protection of the

ALR, the need to reduce commercial and industrial development activities on ALR land in the region, and the necessity for government to enact mechanisms to make that happen.

***Governance.***

Key sub-themes provided under governance were policies, funding, and education for local and regional governments on agriculture and food issues. One recommendation was the creation and implementation of policies that enable a sustainable regional food system and support existing and new farmers and agriculture. Examples provided included policies that protect agricultural lands, allocating publically owned land for local food production, financial incentives such as taxes, and zoning designations. The need for a regional government with a department specializing in agriculture planning and regional food issues, with associated funding to support activities, was also noted. Interviewees indicated that a greater focus on the strategies and recommendations outlined in the AAP, a plan created in collaboration with the farming community in Pemberton, by local and regional governments would assist in building strong relationships between farmers and governments.

***Processing.***

Processing was viewed as essential to allow seasonal crops grown in the region to be available throughout the year. Value-added processing and preserving include canning, freezing, and drying, which would require a central food processing facility with a commercial kitchen. Although farmers markets occur in the region, the need to have a consistent marketing venue in the Sea to Sky Region for value-added products was noted.

***Culture.***

All interviewees noted the importance of nurturing a cultural shift to food quality as opposed to quantity. A change in social views about the quantity of food available and selected to be consumed needs to occur. The general public is not necessarily aware of the inputs and costs required to produce quality food products.

***Education.***

Education for all actors in the food system, including consumer, farmer, and government and in schools, was a key theme. It was thought that increased food awareness would promote more educated food choices by all groups. The public needs to be made aware of the systems and methods used to produce food in order to gain an understanding of farmers and agriculture. Pricing transparency is needed to educate the consumer about the real costs of food production and reasons for discrepancy between locally grown food and conventional food. Interviewees felt strongly about incorporating food education into the school curriculum from an early age via visits to farms, farmers markets, gardening and food preparation. Additionally, interviewees felt it was important for food and agriculture education to be provided to local and regional governments. Technical education is needed for both new and existing farmers to promote creativity, innovation, adaptability and diversity.

***Economy.***

Interviewees noted key sub-themes as the cost of locally produced food, balancing increased supply and demand for local food, and employment opportunities within various parts of the regional food system.

In summary, the culture of a community is expressed through the values and vision for a future sustainable food system. The stakeholder values identification process was valuable as it presented critical elements of a future vision for a sustainable food system for the region, informed the development of the RFSMP, and likely engaged community support and collaboration. Similarities were present in themes and values resulting from the various stakeholder values identification sessions. Semi-structured interviews were a more appropriate method to obtain valuable information from farmers.

It was evident that participants were passionate, knowledgeable and enthusiastic about enhancing a regional food system. A keen interest and desire was expressed to make changes to the existing food system and to move towards greater food self-reliance. Furthermore, there are a number of community champions leading change in the food system within government, industry and non-profit organizations. Yet, there is a marked contrast between the current state of food and agricultural in the Sea to Sky Region and the vision of a sustainable regional based food system as articulated by session participants. There was an implicit awareness among the participants that significant and immediate change in action, beliefs and values is necessary to set a new course (i.e. plan) for a future regional food system.

### **Food Self-Reliance Model**

Gaining insight into the extent a regional food system can provide a regional population with sufficient food involves an estimation of production potential and per capita consumption. A calculation of the difference between these two metrics is an

important element of RFSMP development. The following section outlines the results of applying the food self-reliance model within the context of the Sea to Sky Region and provides an analysis of the findings.

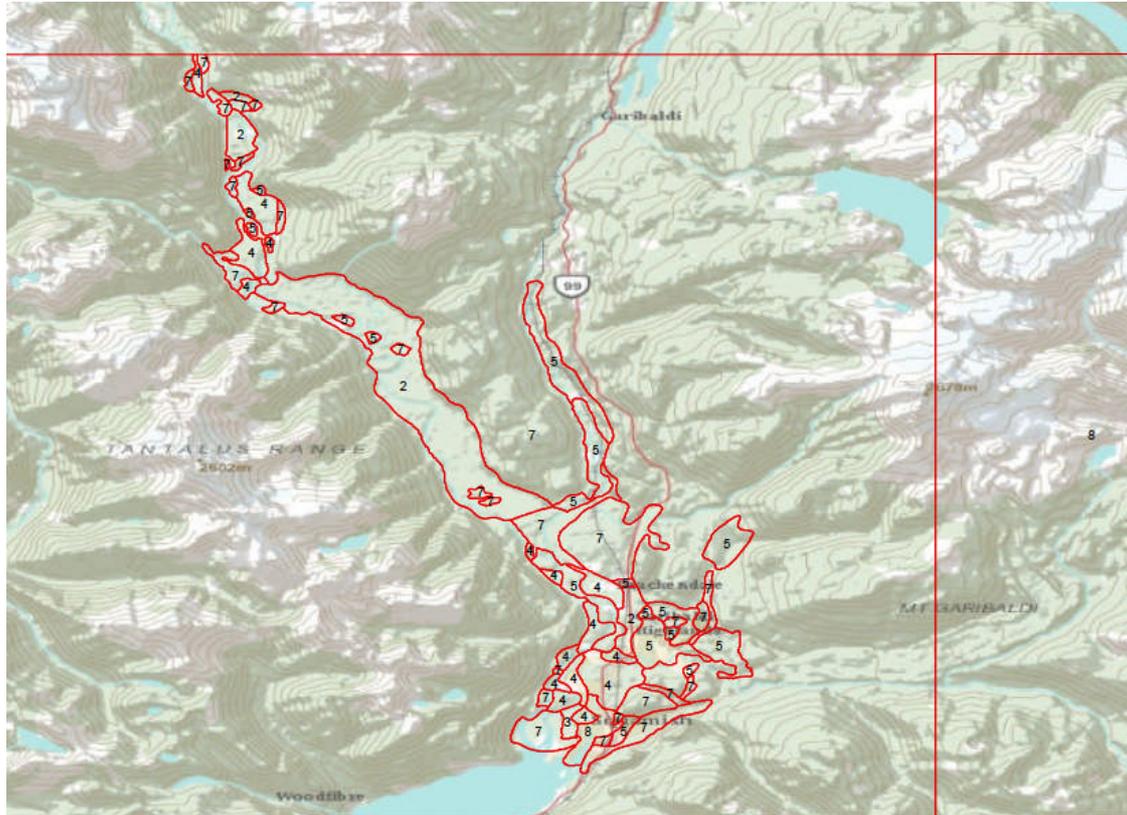
**Production potential.**

Production potential estimation involved defining the environmental characteristics of a region, specifically soil and climatic characteristics, agricultural land base, yield potential, as well as determination of crops that could be grown in the Sea to Sky Region.

In general, the dominant soil type in the Sea to Sky Region is podzols, soils characteristic of coniferous and boreal forests (British Columbia Ministry of Forest Research Branch, 1992). Agriculture and Agri-Food Canada (2008) has outlined a soil classification methodology for determining land capability for agriculture as part of the Canada Lands Inventory (CLI) under the National Soils Database (NSDB). This methodology outlines the potential for agricultural production in a specific area based on the characteristics of soil as determined by agricultural soil surveys.

A map obtained from the Canada Lands Inventory Land Capability for Agriculture (1:250,000) online database for the Squamish area indicates that the highest quality agricultural land is located within the Squamish River Valley, which is dominated by Class 2 and 4 soils intermixed with small pockets of Classes 5 and 7 soils (Figure 5). The area centered on the District of Squamish has predominantly Class 4, 5, 7 and 8 soils with a small pocket of Class 3 soils. Class 1, 2 and 3 soils considered suitable for agricultural crop production, make up an estimated 30% of the land base in the District of Squamish and the

Squamish River Valley. The remainder of the land area, comprised of Classes 4 to 7 soils, is deemed suitable for haying, pasture and livestock grazing.



*Figure 5. Land Capability for Agriculture, District of Squamish and Squamish River Valley. Natural Resources Canada GeoGratis. (2011). Canada Lands Inventory (1:250,000) Land Capability for Agriculture. Retrieved from <http://geogratias.cgdi.gc.ca/geogratias/en/collection/search.do#C>. © Department of Natural Resources Canada. All rights reserved.*

Kuurne (1980) assessed agricultural capability for Pemberton area agriculture soils in the Lillooet River Valley. She said:

“The land capability for agriculture maps indicates that the best agricultural lands occur in the Lillooet River Valley and are predominantly classes 2, 3, or 4 with lesser areas of classes 1, 5, 6 or 7. Conversely, in the Green River, Birkenhead

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River, Blackwater Creek, Gates River valleys and on the uplands, the lands are predominantly Classes 5, 6 or 7 with few areas of Classes 2, 3 or 4.”

The area considered to have Class 1, 2 and 3 soils (land suitable for agricultural crop production), is estimated to be less than 15% in the Village of Pemberton and surrounding valleys. The remainder is made up of soil Classes 4 to 7. Land capability for agriculture was determined using guidelines as outlined in the Canada Lands Inventory (1965) and British Columbia Land Inventory (1973).

The RFSMP framework was developed under the assumption that agricultural soil capability maps would be readily available in a digital format, or a format that could be digitized, as is common. Electronic maps were available for the area in and around Squamish. However, only hard copy maps could be located for the Pemberton area. Sufficiently reproducible maps for the Village of Pemberton and surrounding river valleys were not available. The data and classification information presented in these maps was difficult to interpret due to quality and scale. This created difficulties when attempting to present information as a GIS overlay with other key parameters such as land use, water resources or topography. The availability of high quality, digitized agricultural soil capability maps are important in making informed decisions regarding agriculture, land use planning and policy development.

The climatic characteristics of the Sea to Sky Region are key determinants of growing conditions in the area and, therefore, determine what crops can be grown in the region as is true for all agriculture in all regions. As such, knowledge and understanding of

climatic characteristics, such as those presented in Table 4 for the Sea to Sky Region, is of paramount importance in development of an RFSMP.

Table 4

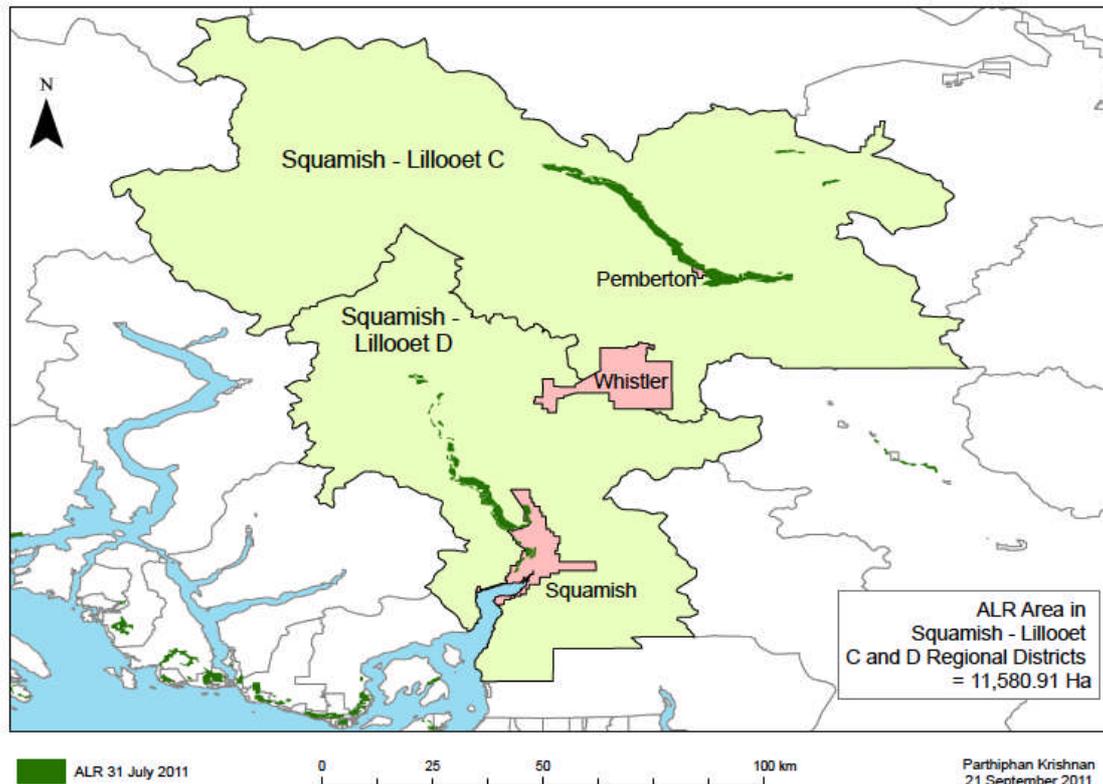
*Temperature, precipitation and frost parameters for the Sea to Sky Region*

<b>Climatic Parameter</b>	<b>Squamish</b>	<b>Whistler</b>	<b>Pemberton</b>
Daily mean temperature (°C)	9.0	6.3	6.3
Daily maximum temperature (°C)	13.7	11.4	11.4
Daily minimum temperature (°C)	4.1	1.2	1.2
Number of frost free days (days)	160 to 180	60 to 80	60 to 80
Mean total precipitation (mm)	2366.9	1228.9	1228.9
Last frost in spring	May 1 to May 15	May 15 to June 1	May 15 to June 1
First frost in autumn (killing frost)	November 1 to November 15	September 15 to October 1	September 15 to October 1

Note. Precipitation and temperature data adapted from Environment Canada, National Climate Data and Information Archive, Canadian Climate Normals 1971 – 2000, for climate stations “Squamish Upper”, Climate ID 1047672, and “Whistler”, Climate ID 1048898 available from [http://climate.weatheroffice.gc.ca/climate\\_normals/index\\_e.html](http://climate.weatheroffice.gc.ca/climate_normals/index_e.html). The closest Environment Canada climatic station to Pemberton is located in Whistler, BC, Station ID 1048898. Frost data adapted from The Atlas of Canada online maps “Frost Free Period”, “Last Frost in Spring”, and “First Frost in Autumn”, available from <http://atlas.nrcan.gc.ca/site/english/index.html>.

The agricultural land reserve (ALR) is a provincial zone where a range of agricultural activities is the priority use (Agricultural Land Commission, 2002a). Official documentation of the area of ALR designated land located within the Sea to Sky Region is, interestingly, not available. However, from GIS data obtained from the ALC website, it was estimated by a GIS specialist at Kwantlen Polytechnic University, that approximately 11,580 hectares of ALR land exists within the boundaries of the Sea to Sky Region (ALC,

2002b). ALR designated land in the Sea to Sky Region is mainly in two areas - the Squamish River Valley and the Pemberton Valley (Figure 6).



*Figure 6.* Area of ALR Land Located within the Sea to Sky Region. Agricultural Land Commission. (2002). ALR GIS data dated July 31, 2011. Retrieved from [http://www.alc.gov.bc.ca/mapping/GIS\\_data.htm](http://www.alc.gov.bc.ca/mapping/GIS_data.htm). Map prepared by Dr. Parthiphan Krishnan, Geography Department, Kwantlen Polytechnic University. Copyright 2011 by Dr. Parthiphan Krishnan. Reprinted with permission.

Using the ALR to establish the area of land available for agricultural production presented challenges. Not all lands designated as ALR is available or suitable for soil based agricultural production, nor used for agricultural purposes. Therefore, using the ALR land

designation for estimating land available for agricultural production would represent a point in time and does not necessarily provide an accurate estimation of resource capacity.

Yield data were obtained for crops that can reasonably and feasibly be grown in the Sea to Sky Region (Table 5). Yield data specific to the study region is not available. Therefore, crop yield data estimates were obtained for southwestern BC or locations with as similar a climate as possible with an understanding that climate, temperature and duration of growing season most substantially determine crop growth and development and thus suitability for calculation in any given region. The best and most reliable data available was used and the most conservative figures utilized to reduce chance of over estimation. A good knowledge of crop yield potential is necessary to improve accuracy and reliability in food self-reliance calculation. Challenges with obtaining crop yield data were also experienced in similar studies (BC MAL, 2006; Desjardins et al., 2010; Grewal & Grewal, 2011).

Table 5

*Yield data for select crops grown in the Sea to Sky Region*

<b>Vegetables</b>	<b>Yield (kg/hectare)</b>	<b>Year</b>	<b>Source Region</b>
Asparagus	5,043	2001	Fraser Valley
Beets	22,190	2008	Fraser Valley
Broccoli	8,741	2008	Fraser Valley
Brussels Sprouts	11,834	2008	Fraser Valley
Cabbage	35,750	2008	Fraser Valley
Carrots	26,560	2008	Fraser Valley
Garlic	3,844	2008	Fraser Valley
Lettuce	25,182	2008	Fraser Valley
Pak Choy	20,172	2008	Maryland
Pole Beans	7,531	2008	North Carolina
Potatoes	22,022	2008	Fraser Valley
Pumpkins	33,733	2008	Fraser Valley
Snow Peas	11,487	2008	Fraser Valley
Spinach	14,457	2008	Fraser Valley
Yellow Onions	36,747	2008	Fraser Valley

Notes: Mullinix, K., Dorward, C., & Schutzbank, M. (2011). [Enhanced Local Scale Agriculture: research and analysis in Surrey, British Columbia]. Institute for Sustainable Horticulture, Kwantlen Polytechnic University. Unpublished raw data.

Two Pemberton farmers provided information regarding crops that can be grown in the Pemberton Valley. Root crops (e.g. carrots, turnips) have been historically grown, with seed potatoes being the largest commercial crop grown historically and contemporarily. In addition to potatoes, crops currently grown in the Pemberton Valley include carrots, beets, turnips, lettuce, spinach, tomatoes, garlic, onions, cabbages, brussel sprouts, squash, pumpkins, cucumbers, kale, and a variety of culinary herbs. Many are cultivated using organic methods. Vegetables are grown in fields and under polyethylene covered hoop houses. No hydroponic technologies are used. It was also noted that most field crops, and temperate zone tree fruits (e.g. apples, pears, plums), could be grown in the Pemberton

Valley. It is likely that temperate zone small fruits (e.g. brambles, strawberry, blueberry) could also be cultivated but these were not mentioned.

**Per capita consumption.**

Per capita consumption rates for specific crops (Table 6) were obtained from Statistics Canada publication *2009 Food Statistics* (2011a). They use the supply-disposition approach, which is a calculation of food availability and disappearance rather than a direct measurement of per capita consumption. As described by Statistics Canada (2011b):

“The supply-disposition approach is used to produce per capita food availability. All components of supply are added together and all uses (disposition) other than consumption are deducted. This residual, which represents the amount of food available for human consumption, is referred to as "food available" (previously known as disappearance). To calculate total supply, imports, beginning stocks and Canadian production are added together. Net supply information is obtained by deducting ending stocks, exports, manufacturing uses, livestock feed, and waste where applicable from the total supply. This is then divided by the Canadian population to derive the per capita availability of the numerous food types.”

The data available for estimation of per capita consumption is not therefore a direct representation of the actual quantity of food purchased or consumed. Furthermore, this data “does not account for losses, such as waste and/or spoilage in stores, households, private institutions or restaurants or losses during preparation” (Statistics Canada, 2011b).

Therefore, the data is not a true representation of food purchase consumption but rather a surrogate approximation. It is, however, the best estimate available.

Table 6

*Per capita consumption data for select crops grown in the Sea to Sky Region*

<b>Vegetables</b>	<b>Quantity (kg/person)</b>
Asparagus	0.70
Beans, green and wax	0.96
Beets	0.64
Broccoli	2.89
Brussels sprouts	0.14
Chinese Cabbage (i.e. pak choy)	0.85
Cabbage	5.20
Carrots	7.19
Garlic	0.44
Lettuce	9.98
Onions and shallots	9.81
Peas	0.31
Potatoes, white fresh and processed, fresh equivalent	64.22
Pumpkins and squash	3.09
Spinach	0.65

Notes: Table adapted from *2009 Food Statistics*, prepared by Statistics Canada. Does not account for losses, such as waste and/or spoilage, in stores, households, private institutions or restaurants or losses during preparation.

**Food self-reliance scenarios.**

An application of the food-self reliance model was generated for select crops that can be grown in the Sea to Sky Region where both yield and per capita consumption information were available. The scenarios were generated based on the area of land required to be 25%, 50% and 100% food self-reliant for each crop (Table 7). For 100% self-reliance, regional demand could only be met through proper storage and processing as production is seasonally dependent and does not occur year round; however, planning for food storage and processing capacity was beyond the scope of this study.

Table 7

*Application of Food Self-reliance Model – area of land as a percent of total SLRD agricultural lands required to be 25%, 50% and 100% self-reliant for select crops.*

Crop	Yield (kg/hectare)	Consumption (for total population per year; kg)	Land Area Required per Year (hectares)/ Percent Self-Reliant		
			25%	50%	100%
Asparagus	5,043	21,700	1.08	2.15	4.30
Beets	22,190	19,840	0.22	0.45	0.89
Broccoli	8,741	89,590	2.56	5.12	10.25
Brussels Sprouts	11,834	4340	0.09	0.18	0.37
Cabbage	35,750	161,200	1.13	2.25	4.51
Carrots	26,560	222,890	2.10	4.20	8.39
Garlic	3,844	13,640	0.89	1.77	3.55
Lettuce	25,182	309,380	3.07	6.14	12.29
Pak Choy	20,172	26,350	0.33	0.65	1.31
Pole Beans	7,531	29,760	0.99	1.98	3.95
Potatoes	22,022	1,990,820	22.60	45.20	90.40
Pumpkins	33,733	95,790	0.71	1.42	2.84
Snow Peas	11,487	9,610	0.21	0.42	0.84
Spinach	14,457	20,150	0.35	0.70	1.39
Yellow Onions	36,747	304,110	2.07	4.14	8.28
<b>Total</b>			<b>38.39</b>	<b>76.78</b>	<b>153.55</b>

Notes: Consumption figures are based on per capita consumption multiplied by the approximate population of the Sea to Sky Region as of 2006 (31,000 persons). Per capita consumption for green and wax beans has been used for pole beans.

The total area in the Region located within the ALR was estimated to be 11,581 hectares; therefore based on the land area totals in Table 7, the percentage of ALR land required to be 100%, 50% and 25% self-reliant in the above 15 selected crops is 1.3%, 0.7% and 0.3% of ALR designated land, respectively. Based on these percentage estimates, the Sea to Sky Region would not only be able to be 100% self-reliance in the selected crops, but may also be able to, under certain environmental and economic conditions,

export crops to other regions in British Columbia. Most likely appropriate are adjacent northern regions where the physiographic conditions are not as conducive to crop production.

The preliminary step in modeling food self-reliance potential is to identify sources for data required. It was anticipated that this data was readily available through various government and other agencies. It was determined however that readily available, accurate data necessary to complete the calculation were unavailable for the Sea to Sky Region or even the larger geopolitical region of the SLRD. Therefore, proxy data sets were created using an iterative process based on assumptions and limitations (Desjardins et al., 2009).

Lack of accurate, reliable data has significant implications on planning regional food systems. Using a regional approach involves the collection of environmental data on a regional level (Thayer, 2003). This study revealed a lack of readily available, reliable information relating to crop yield, agricultural soil capability, agricultural land base, and per capita consumption specific to the study area. It is not likely that this information is readily available for many regions, as regional food system planning has not been seen relevant to the human economy. Accurate, place specific information is necessary for more precise food self-reliance modeling and subsequently, to calculate baseline food self-reliance potential in any given region.

Food self-reliance scenarios were generated to demonstrate the application of the food self-reliance model. It is intended that the information generated be used to inform discussion and the decision-making process of policy makers, the private sector, and

community leaders regarding the state of the food system and regional agricultural production potential relative to food self-reliance.

### **The RFSMP Framework Tool**

Development of the RFSMP framework was based on the concept of widely accepted and utilized environmental management planning tool with the following as key components (British Standards International, 2009):

1. Goals and objectives.
2. Current state of an issue or baseline.
3. Future desired state.
4. Management tools and actions.
5. Monitoring.
6. Continual improvement.

#### **Delineation of the RFSMP framework.**

Through this research, it was demonstrated that the RFSMP framework could effectively comprise the following:

- Delineation of the boundaries of the regional food system and determination of the physiographic baseline.
- Stakeholder values identification process to outline goals and objectives and a vision for a regional food system.
- Calculation of food self-reliance based on consumption and demand estimates and production potential data within the region.

- Identification and design of processing, distribution and sales elements of the food system (not dealt with in this study beyond the stakeholder values identification process).

### **RFSMP framework conceptualization and design.**

An iterative process was employed during the conceptualization and design of the RFSMP framework such that the preliminary framework used in the initial stakeholder values identification session was revised for the subsequent session and semi-structured interviews. One of the main challenges with using an iterative approach is that modifications to the framework have the potential to skew participant discussion and values identification. Alternatively, taking an iterative approach allowed for adapting to changes and challenges that surfaced during the course of RFSMP development. This allowed for a flexible and adaptable framework that accounted for unanticipated variations and necessary adjustments to the scope of the research. Iterations also allowed for the interests and values of citizens in the Sea to Sky Region to be more accurately reflected, which is critical for the development of the RFSMP.

The RFSMP framework was conceptualized with the intention of creating an approach to food system planning in any region. The Sea to Sky Region was used as a case study for its development, to explore and ascertain the feasibility of its use and determine the opportunities and challenges presented by utilizing the framework. The framework, as a conceptual model, generally achieved these overarching goals. Although a viable approach to food system planning, a number of challenges were encountered. These included gaps in requisite data for food self-reliance modeling, and the logistics of stakeholder participation

in the values identification process. Methods for estimating and calculating processing, storage, distribution, etc. were not developed, but will need to be.

This research took the position that such an environmental management plan approach could be adapted for regional food systems planning: the RFSMP framework. A complete RFSMP would include all stages of management planning and aspects of the food system; however, this study focused on the planning stage and production potential within that. It is the intention that a similar methodology be used for development of the remaining components of a complete plan. The food self-reliance model was intended to serve as an empirically based estimation of potential food self-reliance to facilitate discussion, rather than be a stand-alone, precise measure of food self-reliance. For this research, this proved to be valid.

An idealized context for applying the RFSMP framework food self-reliance calculation would be one where natural resource characteristics such as soil and climate have been clearly delineated, and regional data on crop yields and the agricultural land base were readily available. The data would ideally be specific to the area under study and made available in a digitized or electronic format. Stakeholder value identification would be completed to include a portion of the population not directly involved with food and agriculture issues, as this would provide a different perspective and likely result in values identification more representative of the regional population as a whole. However, both incur significant financial and human resource costs. Advancing a sustainable human economy may justify such allocation of resource.

### **Literature and previous studies.**

The food system literature and models of regional food systems contributed to the creation of a RFSMP framework for the Sea to Sky Region in a number of ways. Food system models prepared for other regions can provide specific actions, programs and projects that could be adapted and implemented in the Sea to Sky Region. Additionally, methodologies employed in creating existing food system planning models can be applied to a RFSMP. Studies specific to the region were reviewed to gain insight into sustainability issues surrounding the food system and agriculture in the region. Various studies have been completed for each of the individual communities, and for the SLRD. These focused on strengthening government, community and business relationships, and encouraging the formation of strategic partnerships across the region (Holland Barrs Planning Group, 2005; Szymanski & Sutherland, 2006). Such studies and reports can, and in this case did, provide essential baseline information used to inform the development of the RFSMP framework and can be applied during any food system and agriculture planning process.

A number of key points relating to the development of the RFSMP framework within the context of the Sea to Sky Region were assembled from community and regional documentation. Existing planning tools, such as the Natural Step adopted by Whistler, could provide support, augment, and inform the development of a RFSMP for the region. The content of the RFSMP can and should build on local and regional food initiatives already occurring in the regions communities, such as farmers markets, school and community food education programs, and food networking organizations. The opportunities, challenges, strengths and threats to the current and future food system

identified and discussed in the food system studies such as those prepared for the Sea to Sky Region can be used to inform and support the development of a RFSMP. These documents provided expanded insight into specific actions, policies and plans that could be adopted and implemented to move towards achieving the vision for a sustainable food system in the region.

## **Conclusions and Recommendations**

### **The RFSMP framework as a model for other communities and regions**

The RFSMP framework could be implemented in other geographic regions as a tool to advance sustainability in the food system. The complexity involved in implementing the framework would vary with scale and the physical and environmental attributes used to define the boundaries as well as the dimensions of the food system being addressed. Regions could be defined by physiographic, geopolitical, cultural or ecological boundaries and could be of a geographic scale larger or smaller than that of the Sea to Sky Region.

Factors that need to be considered when applying the framework to other areas include population size, community interest and willingness to participate, and availability of accurate environmental and land resource data. For larger areas, support, financial and other, from the appropriate level of government, educational institutions, and community groups or organizations, would be required. This would better ensure successful utilization of the framework, plan outcome, adoption of the management plan and action to achieve plan goals and objectives. Inherent conditions including economic conditions, governance structure, and consumer diversity in terms of food crop demand and purchasing

preferences, may also inhibit effective RFSMP framework utilization. Challenges of complexity and intricacy may also exist when applying the RFSMP framework to a very large multi-region context.

The framework developed for regional food system planning seems to be sufficiently adaptable and flexible. The main components of the framework can be applied to different geographic regions. However, challenges can be anticipated in the implementation of the framework in terms of partner and stakeholder support, community engagement, data availability, and region size and complexity.

### **Completion of the management plan**

This study tested a conceptual environmental management plan development framework for food system planning. Focus was placed on identification of goals and objectives, and completing an exploration of the current and future desired state of the food system in the study region. Additionally, emphasis was placed on stakeholder values identification and production potential estimation. To achieve a comprehensive RFSMP, components of a comprehensive management plan including implementation and operation, monitoring and continual improvement would need to be addressed. Implementation and operation provide further specifics and details on policies, plans, tools and actions to enhance sustainability in a regional food system. Monitoring allows for adaptations and adjustments to the RFSMP and drives continual improvement toward enhanced sustainability. Furthermore, methodologies following the RFSMP framework approach need to be developed to address, in an integrated fashion, the remaining components of the

food system including processing and storage, distribution, consumption and waste management.

### **Incorporate stakeholder values identification into a RFSMP**

A community that values healthy food and the preservation of natural resources into the food system will generate more sustainable practices with regard to how food is moved through the production, transportation, processing and distribution components of the food system (Kimbrell, 2002; Kloppenburg et al., 1996). Stakeholders in the Sea to Sky Region identified themes and values for a regional food system that would provide guidance and direction to a RFSMP, if implemented. Stakeholder values identification is an integral part of a RFSMP as the insights are sensitive to the cultural, economic and social context of a region. These themes and values are representative of the community culture and, combined with the delineation of environmental characteristics, represent a place-based approach to food system planning.

### **Build on existing food system literature and studies prepared for the Sea to Sky Region**

Several studies and investigations into food systems and agriculture have been completed for the SLRD, individual communities and, to a lesser extent, the Sea to Sky Region. These documents identify a number of factors relevant to sustainable food and agriculture systems in the region. Incorporating existing information and previous studies into the development of a comprehensive RFSMP will lead to a more informed and suitable

plan. Building on such work will provide a solid foundation for utilization and development of a RFSMP.

### **Look to existing food system models created and implemented in other regions**

Insight into actions, activities and policies that have proved most successful for other communities and regions is invaluable. These models delineate example frameworks, specific components, and approaches that can be adapted into the context of regional food systems planning. Learn from other regional food system models. They will provide insights into challenges and opportunities in developing regional food system plans saving time and resources.

### **Gain support from local and regional governments**

Food system planning and local governance are interconnected. Creating local food policies and opportunity for the community to work with decision-makers is part of promoting enhanced sustainability in the food system (Feenstra, 2002). In the Sea to Sky Region community, there is a desire for local and regional governments to support, promote and encourage a sustainable agri-food system. This desire was clearly expressed during the stakeholder values identification process. There is a need for a more prominent role from municipal and regional governments on issues involving food (American Planning Association, 2011). This too was clearly expressed in the values identification process. If food systems are to be embedded into a municipal or regional context, governance systems need to shift in support of that change. The addition of agri-food system planners is an

example that was identified in this study. Food and agriculture policies and legislation that promote local-regional food production, processing, transportation and consumption need to be devised and put into place to achieve sustainability in the food system. This can be done through the formation of food policy councils, development of food charters and the participation of community groups, non-governmental organizations and citizens in government decision-making processes (Elton, 2010; Feenstra, 2002).

From a policy or regulatory standpoint, this would involve placing food on the political agenda and commencing a discussion on the value and importance of local and regional food systems and how to make it happen. Food and agriculture cross over into numerous other sectors such as water resources, transportation, and land development. Taking an integrated, cross-disciplinary approach to policy development by incorporating food into other policy areas will aid in achieving goals and objectives such as those identified in this food system planning study (A. Rowan, personal communication, July 15, 2011). Government and citizen champions will be needed to ensure the success of a self-reliant food system and the promotion of sustainable agriculture.

### **Future research to address data gaps in the food self-reliance model**

A number of data gaps were encountered when implementing the food self-reliance model as part of the RFSMP framework. Readily available environmental and land resource data that is accurate and reliable, for rigorous calculation, is necessary. Such data were either only available for parts of the region, or unavailable altogether. Although costs associated with generating this data may be significant, availability and access to accurate and complete data is necessary to move towards a more realistic estimate of food self-

reliance capability that can subsequently inform policy-making. It is recommended that further research and study be conducted on crop yields, soil quality, agricultural land availability, and per capita consumption on regional levels.

### **Encourage and promote coordination and collaboration**

The food system is complex, multi-faceted and involves a variety of stakeholders with differing perspectives. It is often a polarizing issue. Community support and collaboration is required to incorporate stakeholder values into planning for and actualizing regional food systems. The successful development and implementation of a RFSMP requires a coordinated effort between all stakeholders within a region. These include government, community groups and organizations, and businesses all working towards a common goal. This requires focused coordination of plans, policies and tools.

### **Concluding Thoughts**

Planning for food systems raises ethical questions – can and should food systems and agriculture be managed? If so, how? If not, why? Food systems and agriculture are ubiquitous, essential to human existence, and have significant environmental, economic and social consequences. Intervention, through carefully designed actions, programs and projects, can promote sustainability in the food system. The management of agriculture has been undertaken for hundreds, and in some parts of the world, thousands of years (Wright, 2005). The currently dominant global agri-food system is based on a highly industrialized, transnational model that is managed largely through national and transnational regulation, policy and trade agreements. There is a distinction between global and regional food

systems. If the goals and objectives of the food system are to encourage and support regional food security and food self-reliance then the actions and activities undertaken will differ greatly from those that support the global food system.

A rescaling of the food system has the potential to enhance community sustainability by bringing agriculture, food and food systems closer and in line with global ecological capacities (Kimbrell, 2002). Developing a food system at the regional scale requires consideration of a community's relationship and interaction with food, agriculture, environmental characteristics of the region, and the dynamics and complexities of the system. A food system is comprised of highly connected and interrelated networks. Patel (2008, pg.163) presents a compelling perspective on food systems when he states that “[Food] Systems, like seeds, flourish in a context, and future agricultural systems will surely fail if they are insensitive to the biology, geography, history and democracy into which they are introduced”.

Strong leadership and good decision-making by government and stakeholders will drive sustainability in food and agriculture. Moving toward sustainability in the food system requires maintaining an open and transparent dialogue between all stakeholders and the development a strong relationship built on trust, respect, and accountability. The detrimental environmental, social and economic implications of the dominant global, industrialized food system are too great to ignore.

Wendell Berry states “One of the primary results – and one of the primary needs – of industrialism is the separation of people and place and products from their histories” (2002, pg.39). To enhance sustainability in the food system, in the Sea to Sky Region and

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elsewhere, consideration of what has been done in the past, what is currently being done, and a future vision of the food system is imperative.

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## Appendix A: Knowledge Café Invitation and Agendas

The Institute for Sustainable Horticulture would like to invite you to a knowledge café

Tuesday, April 19<sup>th</sup>  
9:30 to noon  
at the Squamish  
Library, 37907 Second  
Avenue

*Knowledge Café: An event that brings together a group of people to have an open, creative conversation on a topic of mutual interest to surface their collective knowledge, to share ideas and insights and to gain a deeper understanding of the subject and the issues involved*

Please RSVP if you are able to attend.

### Research Purpose:

To outline a framework, or “how-to” guide, for developing a regional food system management plan for the bioregion encompassing the communities of Whistler, Squamish, Pemberton and Lillooet.

This event will provide a venue for individuals and groups to provide their valuable input into the development of a framework for a food system management plan.

Looking forward to seeing you there!

## THE KNOWLEDGE CAFE

*April 19, 2011, Squamish Public Library,  
37907 2<sup>nd</sup> Avenue, 9:30 to noon*

Dialogue on how to develop a food system management  
plan framework for the Sea to Sky Bioregion

*Welcome and Introductions*

*(9:30 – 9:45)*

*Activity I*

*Q: What are the main themes of a food system management  
plan for the Sea to Sky Bioregion?*

*(9:45 – 10:45)*

*Break*

*(10:45 – 10:50)*

*Activity II*

*Q: What do you value within these identified themes?*

*(10:50 – 11:45)*

*Knowledge Café Debrief*

*(11:45 – 12:00)*

Look forward to seeing you there!

## THE KNOWLEDGE CAFE

*March 31, 2011, Whistler Public Library,  
4329 Main Street, 2:00 to 4:30*

Dialogue on how to develop a food system management  
plan framework for the Sea to Sky Bioregion

*Welcome and Introductions*

*(2:00 – 2:15)*

*Activity I*

*Q: What are the main themes of a food system management  
plan for the Sea to Sky Bioregion?*

*(2:15 – 3:15)*

*Break*

*(3:15 – 3:20)*

*Activity II*

*Q: What do you value within these identified themes?*

*(3:20 – 4:15)*

*Knowledge Café Debrief*

*(4:15 – 4:30)*

Look forward to seeing you there!

## **Appendix B: Semi-Structured Interview Questions**

### **Semi-Structured Interviews – Pemberton Farmers/Agriculturalists**

#### **Ice Breaker Questions**

1. What is your name and occupation?
2. How long have you lived in the Pemberton area?
3. What is your involvement with food issues in your community?

#### **Main Questions**

1. How would you describe the current food system in terms in the region? Provide three key themes, elements or characteristics.
2. What does a sustainable food system for the SLRD look like to you? What are three key themes, elements, or characteristics?
3. What do you value within these themes?
4. What are the tools, actions or activities you see are needed to build a sustainable food system for the Sea to Sky Region (i.e. one that enhances food security and food self-reliance)?
5. Do you have any additional insights, comments or perspectives you would like to share?

## Appendix C: Data Source Matrix for Food Self-Reliance Calculation

Government Agency, Organization or website	Information Requested								
	Soil Survey	Agricultural Soil Capability	ALR	Municipal Agricultural Land Zoning/area	Agricultural Land Use Inventory	Yield Data/Historical Crop Production	Topography	Consumption Data	Municipal Population Data
District of Squamish	X	X	X	X					
Resort Municipality of Whistler	X	X							
Village of Pemberton	X	X	X	X					
SLRD	X	X	X	X	X				
BC MAL	X	X		X	X	X			
ALC	X	X	X						
GeoBC	X	X					X		
BC MOE	X	X							
Ministry of Energy, Mines and Responsible for Housing (The Map Place)	X								
NRC (GeoGratis)	X	X					X		
Ministry of Natural Resource Operations (IMapBC)	X	X					X		
AAFC (CLI)	X	X				X			
Statistics Canada				X		X		X	X
PFI	X	X				X			

Notes: "X" – data source checked. Agricultural Land Reserve (ALR). Squamish-Lillooet Regional District (SLRD); British Columbia Ministry of Agriculture and Lands (BC MAL); Agricultural Land Commission (ALC); British Columbia Ministry of Environment (BC MOE); Natural Resources Canada (NRC); Agriculture and Agri-foods Canada (AAFC); Canada Lands Inventory (CLI); Pemberton Farmers Institute (PFI)

## Appendix D: Knowledge Café Themes and Values Summary

Knowledge Café	Themes	Values, Sub-themes, Actions or Activities
Whistler	Education	<ul style="list-style-type: none"> <li>• Link between food and health</li> <li>• Paying the real cost of food</li> <li>• Gardening</li> <li>• Food addictions</li> <li>• Change demand</li> <li>• Cooking</li> <li>• Communicating the value of farmers markets</li> <li>• Clear and correct food labeling</li> </ul>
	Production	<ul style="list-style-type: none"> <li>• Regional growing capacity</li> <li>• Workforce development</li> <li>• Gardening</li> <li>• Outputs including air quality and food quality</li> <li>• Farm practices</li> <li>• Diversity</li> <li>• Inputs including fossil fuels, fertilizers and pesticides</li> <li>• Certification</li> <li>• Traceability compliance</li> <li>• Soil health</li> <li>• Seeds</li> </ul>
	Environmental Integrity	<ul style="list-style-type: none"> <li>• Soil</li> <li>• Carbon intensity</li> <li>• Distribution</li> <li>• Transportation</li> <li>• Air quality issues</li> <li>• Availability of quality farmland</li> </ul>
	Economic	<ul style="list-style-type: none"> <li>• Jobs</li> <li>• Externalizing costs</li> <li>• Local</li> <li>• Investing in agriculture</li> <li>• Fair wages</li> <li>• Viable economy</li> <li>• Affordability</li> </ul>
	Distribution	<ul style="list-style-type: none"> <li>• Marketing</li> <li>• Supply chain</li> <li>• Labeling issues</li> <li>• Certification</li> <li>• Storage</li> </ul>

		<ul style="list-style-type: none"> <li>• Processing</li> </ul>
	Culture	<ul style="list-style-type: none"> <li>• Social</li> <li>• Leadership</li> <li>• Addictions</li> <li>• Health</li> <li>• Values shift</li> </ul>
Squamish	Education, training and learning	<ul style="list-style-type: none"> <li>• Community skill building (cooking healthy meals)</li> <li>• Mandatory functional home-economics (in schools) i.e. canning</li> <li>• Consumer education (clear message regarding food quality, nutrition, cost)</li> <li>• Career education (in the local food sector)</li> <li>• Funding for workshops</li> <li>• Farmers market education</li> <li>• Hands-on learning (i.e. farm school)</li> <li>• Skills training</li> <li>• Farmers education</li> </ul>
	Production	<ul style="list-style-type: none"> <li>• Organic and Non-GMO</li> <li>• Seeds (saving)</li> <li>• Infrastructure (i.e. greenhouses)</li> <li>• Production potential (what can you grow)</li> <li>• Small scale, permaculture, maximizing urban production</li> <li>• Access to markets (local)</li> <li>• Finding farmers (i.e. farm school)</li> <li>• Farmer education (business)</li> </ul>
	Processing and Storage	<ul style="list-style-type: none"> <li>• Facilities and infrastructure</li> <li>• Decentralized processing plants</li> <li>• Technology for mass preservation</li> <li>• Storage space (community programs)</li> <li>• Workshops (hands-on skills)</li> <li>• Abattoir</li> <li>• Chefs and restaurants (buying local)</li> <li>• networking</li> </ul>
	Leadership	<ul style="list-style-type: none"> <li>• Hands on demonstrations</li> <li>• Awards (create a profile)</li> <li>• Media coverage (supporting leaders in local food)</li> <li>• “Fire souls” creating change</li> <li>• Supporting the leaders</li> <li>• Elders and seniors</li> <li>• Citizens</li> </ul>

	<ul style="list-style-type: none"> <li>• Create a culture around sharing</li> <li>• Groups</li> </ul>
Governance	<ul style="list-style-type: none"> <li>• Elections (municipal, school board, municipal, provincial)</li> <li>• Support for ALR</li> <li>• Champions</li> <li>• Supportive bylaws and policies (food in all policies)</li> <li>• Food Charter</li> <li>• Models for local government</li> <li>• Institutional purchasing practices (i.e. hospitals, schools)</li> <li>• Funding (provincial)</li> <li>• Creation of local jobs in the food sector</li> <li>• Access to markets</li> </ul>
Coordination and Collaboration	<ul style="list-style-type: none"> <li>• Uniting group efforts</li> <li>• Food events (frequency)</li> <li>• Networking (frequency)</li> <li>• Corridor wide coordination (i.e. farmers to markets)</li> <li>• Finding leaders (a “driving-force”)</li> </ul>
Economic	<ul style="list-style-type: none"> <li>• Access to programs, income, social status, all age groups</li> <li>• Social determinants of health</li> <li>• Local currency for food</li> <li>• Creation of local jobs</li> <li>• Economic drivers in the food system</li> </ul>

## Appendix E: Project Participants

Representatives from the following groups and organizations participated in this research:

- Pemberton Farmers Institute (PFI).
- Whistler Community Services Society (WCSS).
- Members of the Whistler 2020 Food Strategy Task Force.
- Sea to Sky Food Distribution Group.
- Squamish Climate Action Network (Squamish CAN).
- Vancouver Coastal Health (VCH).
- Squamish, Pemberton and Whistler Farmers Markets.
- Squamish-Lillooet Regional District (SLRD).
- Whistler Centre for Sustainability.
- Squamish Food Bank and Helping Hands.
- Squamish Community Health Centre.
- Interested community members.