Surrey's Underutilized ALR Lands

An Analysis of their Economic and Food Production Potential in Direct Market Agriculture

Research Conducted for the City of Surrey by the Sustainable Food Systems Research Group at The Institute for Sustainable Horticulture, Kwantlen Polytechnic University

Principle Investigators:

Dr. Kent Mullinix – Director, Sustainable Agri-Food Systems*
Dr. Arthur Fallick – Director, Sustainable Urban Systems*
Caitlin Dorward – Research Associate*

Institute for Sustainable Horticulture, Kwantlen Polytechnic University* **www.kwantlen.ca/ish

Contributing Researchers:

Marc Schutzbank - Research Assistant, ISH (Kwantlen Polytechnic University)
Sheryl Webster – Research Assistant, ISH (Kwantlen Polytechnic University)
Dr. Parthipan Krishnan – Faculty Member, Geography Department (Kwantlen Polytechnic University)
Ellen Pond, MLA – Research Scientist, Collaborative for Advanced Landscape Planning (UBC)
Glenis Canete – Research Assistant, Collaborative for Advanced Landscape Planning (UBC)

KWANTLEN POLYTECHNIC UNIVERSITY
INSTITUTE FOR SUSTAINABLE HORTICULTURE

Acknowledgements

The principle investigators and contributing researchers wish to acknowledge the support received from many individuals during the planning and execution of this research.

For their support and guidance as we completed a historical analysis of Surrey's ALR lands, we owe thanks to Brian Underhill at the Agricultural Land Commission, Susan Wilson at the City of Surrey, and Ryan Gallagher at the Surrey Archives. For the information and photographs they supplied about the history of Surrey's dyking and drainage infrastructure, thanks goes to Carrie Baron and Remi Dube at the City of Surrey. For their assistance with our survey of landowners in the ALR, thanks goes out to City of Surrey Staff Joanne McCurdy, Debbie Gallichen, and Melanie Atkinson. For their support sourcing and interpreting the geographic information system data used in our analysis, we thank Deepa Spaeth Filatow in the Knowledge Management Branch at the Ministry of Environment, as well as City of Surrey staff Stuart Jones and Bill McKay.

Thanks goes out to the following farmers, who entertained our questions about their small-scale farm operations, provided many of the photographs used in this report, and served as inspiration for the agriculture model which we present herein: Chris Bodnar, Chris Thoreau, Seann Dory (SOLEfood Farm), Curtis Stone, Lydia and Rachel Ryall, and Jim Rahe. Many Surrey residents and landowners also provided invaluable information for our research during the course of our field work, at our stakeholder focus group session, and through the landowner survey, and our thanks goes out to them for their willingness to participate in and contribute to our study.

Finally, for their ongoing work to advance the goal to advance the sustainability of agriculture and urban landscapes as an integral element of sustainable communities, our recognition goes out to the entire research team at the Institute for Sustainable Horticulture, including Anna Rallings, Tara Moreau, Caitriona Feeney, Laura Raimondi, Greg Harris, as well as Deborah Henderson and her Langley research group.

EXECUTIVE SUMMARY

How can Surrey promote and support local agriculture on small, underutilized parcels in the Agricultural Land Reserve?

Research indicates that the nature of a community's agriculture sector profoundly influences its economic and social character. At Kwantlen Polytechnic University's Institute for Sustainable Horticulture (ISH), the Sustainable Agri-food Systems working group is investigating various ways by which municipal governments can enhance and support local-scale, human-intensive and ecologically sound agriculture by investing in regional agri-food systems that will have direct and positive impacts on local and regional economies, protect and preserve farmland against urban encroachment, and increase local food production and consumption.

We use the term Municipally Enabled and Supported Agriculture (MESA) to describe the full integration of agriculture and the food system (production, processing, distribution, consumption and waste management) within the planning, development and function of our rapidly growing communities. Applied MESA projects being conducted in partnership with ISH and municipalities across southwest British Columbia are producing a compendium of concepts, tools and strategies to inform the design and implementation of local-scale, human-intensive agri-food systems that will connect urbanites to their food, the land, and the sustainability of our human settlements.

In a series of meetings that followed from contributions ISH made to the 2009 Surrey Economic Summit on issues of sustainable agriculture, Mayor Dianne Watts and the senior management team shared some of the City's intuitions around the strategic importance Surrey's ALR lands, raising concern that increased fragmentation or the loss of land from agriculture could have long term deleterious effects on Surrey's food security. The Mayor expressed a clear desire that the researchers explore potential strategies to increase the agricultural utilization and productivity of the City's underutilized ALR lands, and where possible, identify specific ways to enhance the localized food system.

This research report identifies strategies to enhance Surrey's local economy, create jobs, advance food self-reliance in the City, and potentially curtail the loss of agricultural land. Our study of Surrey's underutilized ALR lands, and recent related projects, suggest that Municipally Enabled and Supported Agriculture (MESA) has significant direct economic, ecological and socio-cultural potential which can be used to help re-think our relationship to nature, place, agriculture, and to the strategic value of our food for the vitality of our communities.

Surrey's Agriculture

Surrey's current agriculture sector generates over $153 million in annual farm receipts and over $37 million in wages paid through its ties to both local and global food markets. Data from the 2006 Census of Agriculture report that approximately 4,470 people are employed on Surrey farms with average gross farm receipts of $314,971, a high average when compared to Metro Vancouver ($278,306) and BC as a whole ($133,641). Despite this high average, most Surrey farms (46%, or 226) report gross receipts of less than $10,000, reflective of the high incidence of hobby farms which contribute less to the agri-food economy than their commercial counterparts.

Although farming remains an important component of Surrey's municipal landscape, Statistics Canada data reveals that farm numbers in the municipality are steadily declining. According to the Census of

Agriculture, farmers make up about 14% of Surrey's 10,576 residents living in the ALR in 2006. The number of census reporting farms has dropped by approximately 30% over the past 20 years, with most losses being of small to mid-sized farms. The loss of these smaller ALR parcels to agriculture and the high proportion of the rural population not engaged in agriculture are indicative of two key threats to agricultural viability in Surrey: subdivision and the non-farm use of ALR land.

An investigation of changes to parcel size within Surrey's agricultural land base (and ALR) since 1971, gives some indication that the highly parcelized nature of Surrey's current ALR is not entirely the result of successful applications for subdivision to the Agricultural Land Commission. Our research suggests that although Surrey's ALR is vulnerable to speculation, their exclusion is not inevitable. Very few Surrey parcels have in fact been lost to the ALR as a result of exclusion applications since 1973. The City of Surrey has done an exemplary job of maintaining the borders of its agricultural land base, and is strongly positioned to continue to do so into the future.

Underutilized Agricultural Lands

If a significant amount of land has not been lost from the ALR, then how has its utilization evolved since 1973? Our research revealed that a greater threat to agricultural viability than the loss of ALR land out of the reserve in Surrey is non-farm use of parcels *within* the ALR.

ISH researchers conducted an inventory of 632 properties, covering 7,185 acres or approximately 33% of the total Surrey ALR, which had been identified as underutilized for agriculture in 2004. This field work revealed that 561 of the parcels which were underutilized for agriculture in 2004 remained underutilized in 2011. This amounts to 6,347 acres (2,570 hectares), or 29.6% of Surrey's ALR.

Approximately 3,802 acres within this area could feasibly be used for agriculture. This second figure is **equivalent to almost 18% of the municipality's total ALR land base, constitutes 1.4 times as much land as Surrey currently has in berry production, and could host 81 average sized farms if it were spatially contiguous.**

It is presumed that standard field preparation and soil building activities (for example, composting, liming, tilling, etc.) would be sufficient to bring most of the underutilized ALR land that is available for agriculture into production (however, approximately 1,237 acres (500 hectares) of the underutilized land that is available for agriculture would require more intensive form of land remediation before they could be put into production). While the majority of underutilized parcels (503 out of 561, or 90%) are privately owned, a small number are owned by public institutions including the City of Surrey, the Surrey School Board, the Provincial Government, and BC Hydro.

The amount of underutilized ALR land that is potentially available for agriculture represents a significant untapped resource for the City of Surrey with enormous potential from food production, economic, and job creation perspectives. However, bringing this land into agricultural production will be challenging for a variety of reasons. There is a high incidence of ownership of these parcels by non-agriculturalists with a wide range of interest, willingness, and ability to make their land available to farmers or take up farming themselves. On many parcels, degradation has made soil-based agriculture impossible, but the costs associated with developing structure based alternatives may be prohibitive to landowners in the short term.

Five scenarios for human-scale agriculture or food system services were developed to illustrate the potential to support agriculture on all of Surrey's underutilized ALR lands. The scenarios were based

upon an evaluation of the various sizes of underutilized ALR parcels observed during the field work; the type of agricultural activities possible on different underutilized ALR parcel sizes observed during the field work; and the inputs, infrastructure, equipment, labour, and capital necessary to support them.

Economic and Food Production Potential On Surrey's Underutilized Agricultural Lands

Local food systems can increase business innovation and entrepreneurship, result in sector-specific economic growth, foster regional economic development, and support employment. Direct marketing channels, such as farmers markets and farm gate sales, are identified as especially significant contributors, as these systems allow most, if not all, of sales revenue to be retained locally. Our research measured the potential revenue, job creation, and food production outputs that could result if these lands were brought into agriculture under a small-scale, human-intensive, direct market agriculture model. To do so, we applied crop specific production, consumption, and income generation data to four cropping alternatives which were laid explored in twelve unique scenarios using three different land use configurations and four different cropping alternatives.

If the available underutilized ALR land was put to best use in one or more of these types of farm operations, they could satisfy 100% of Surrey's seasonal demand for 29 commonly consumed crops and animal products, create almost 2,500 jobs, and more than double the current economic magnitude of Surrey's agriculture industry.

Agriculturalists are astute entrepreneurs, traditionally attuned to responding to economic and regulatory signals. There is a growing recognition by agriculturalists and broader society, reinforced by many market signals, of the emerging potential in the re-localization of food systems. However, the strength and singularity of contemporary market structure and economic environments have precluded the substantial emergence of this sector. If its potential is to be fully realized, it will have to be supported and facilitated by governments through policy, regulation, and programming.

In Surrey specifically, the transition of these lands into full agricultural utilization is not without significant policy and strategic challenges, all of which are related to two underlying problems: non-farmer ownership of ALR land, and limited resources and support for small-scale farmers. **Tackling these critical issues can be done in a manner which will not detriment Surrey's existing agriculture sector. It will require an integrated, systems approach that addresses economic, social, and political factors related to small-scale farmers, landowners, and the wider community in Surrey.** The report offers 34 specific recommendations to address these issues. These recommendations are summarized in

Table 1 (page 9).

Innovative Practices from Across North America

A "local foods" movement is sweeping Canada and the United States, as evidenced by the growing assortment of initiatives which are seeking to support local family farms and offer a safe and steady supply of locally grown foods to communities. Municipal governments in British Columbia are not as yet at the forefront of this community-based momentum, and as a consequence, many local groups and coalitions are frustrated that their efforts lack critical cohesion with policy and decision makers. While food policy councils are being established, and significant stakeholder values identification is occurring around the infrastructure and support that is required to nurture and sustain local food initiatives, there is little evidence to suggest that these initiatives are building toward the type of comprehensive locally and regionally focused food systems that engender face-to-face connections between local farmers and consumers, support a locally grown food economy, and strengthen the social networks of local communities by (re-)connecting people to their food and the land. **Surrey is strategically positioned to take a leadership role in promoting and strengthening local and regional agri-food systems that fully support the emerging local foods movement in southwest British Columbia.**

An extensive review of local and regional food systems, plans, food system assessments and related strategic documents from across North America and the United Kingdom revealed several emerging trends and potentially useful indicators and findings that Surrey may find of value as the municipality explores ways to encourage and support agriculture and strengthen food security. If municipalities take a leadership role in promoting the enhancement of the sustainability and increased resilience of the food system, there is a greater likelihood of establishing and maintaining a series of linked and inter-dependent bio-regional food systems that will strengthen the economic, health, and agricultural prosperity of British Columbians. The case studies reviewed offer insights on regional and bio-regional agri-food systems, local food plans and food system assessments that may be relevant to planners and policy makers who see municipalities as strategic leaders in encouraging and supporting local-scale, human-intensive, direct-market agriculture. They also underscore the potential economic, health, policy, planning and cultural benefits to communities associated with promoting and strengthening local and regional agri-food systems.

Table 1: Summary of Recommendations to Address Challenges Related to Surrey's Underutilized ALR Lands

Challenge		Potential Solutions & Recommendations		Potential Partners
1	**Water for Agricultural Operations**	**1.1**	Conduct a review of Bylaw 16337 in light of its impact on the viability of small scale agriculturalists and new farmers.	
		1.2	Collaborate with the Ministry of Environment (Water Stewardship Division) to explore opportunities to promote the sharing of existing ground and surface water resources among established and new farmers.	Ministry of Environment - Water Stewardship Division
2	**Skilled, Knowledgeable Small Scale Farmers**	**2.1**	Publicly celebrate Surrey farmers and promote small-scale agriculture as a legitimate career path within Surrey, akin to professions such as medicine, engineering, or education.	Surrey Board of Trade
		2.2	Develop a "Farm School" or other formal education program to prepare people from all walks of life for careers in agriculture.	Institute for Sustainable Horticulture (Kwantlen Polytechnic University)
		2.3	Provide support to link future or inexperienced farmers with established farms seeking interns or employees.	Young Agrarians (Farm Folk/City Folk), SOIL
3	**Constraints to Accessing Agricultural Land for Farming**	**3.1**	Assist with the establishment of an independent organization or civic department which could serve to connect willing landowners to farmers seeking land.	Young Agrarians (Farm Folk/City Folk), SOIL
		3.2	Make city-owned land available for agriculture on a long term basis.	Farm Folk/City Folk - Community Farms Program, The Land Conservancy of British Columbia
		3.3	Conduct a further, comprehensive examination into the extent of agricultural land under-utilization on all Surrey agricultural land (including all ALR lands and those zoned municipally for agriculture).	Ministry of Agriculture, Institute for Sustainable Horticulture (Kwantlen Polytechnic University)
		3.4	Identify strategies to stem speculation on agricultural land.	Real Estate Foundation of BC
4	**Limited Technical Support, Equipment, and Infrastructure for New Farmers**	**4.1**	Establish an Agricultural Development Office, with permanent full time staff, dedicated to providing technical extension services for small scale farmers.	Metro Vancouver and its Municipal Governments, Institute for Sustainable Horticulture (Kwantlen Polytechnic University)

		4.2	Make City of Surrey owned land available for small scale agriculture research and demonstration.	Institute for Sustainable Horticulture (Kwantlen Polytechnic University)
4	**Limited Technical Support, Equipment, and Infrastructure for New Farmers (Continued)**	**4.3**	Assist with the establishment of a farming machinery and implement cooperative, or lending library, so that farm-members can pool resources to collectively own or affordably borrow large farm equipment.	
		4.4	Conduct a review of Zoning By-law 12000 in light of its impact on the potential for establishing food-system services on non-arable ALR land.	
5	**Financing for New Farmers**	**5.1**	Incorporate agriculture and food systems into amenity contribution categories.	Agricultural Land Commission
		5.2	Explore Community Trust Farming as means to acquire land for under-capitalized farmers.	Institute for Sustainable Horticulture (Kwantlen Polytechnic University), Farm Folk/City Folk Community Farms Program, The Land Conservancy of British Columbia
		5.3	Work with the financial sector to develop a micro-loans program for new small scale farmers.	
6	**Constraints to Value-Added Processing**	**6.1**	Identify non-arable land on which "Agricultural Enterprise Zones" could be established to stimulate the co-location of agricultural and food system services.	Agricultural Land Commission
		6.2	Assist with the establishment of a cooperative hub for small-scale food processing and storage.	Local Food First, BC Cooperative Association
		6.3	Conduct a review of Zoning By-law 12000 in light of its impact on the potential for small scale food processing in Surrey.	Agricultural Land Commission
		6.4	Lobby the Province to have the income generated from on-farm value added processing eligible as farm income for tax assessment purposes.	BC Assessment
		6.5	Encourage local health authorities to work with small-scale farmers to re-develop small-scale food processing guidelines that are appropriate for their scale.	Agricultural Land Commission, Regional Health Authorities, Get Local BC, Fraser Valley Farm Direct Marketing Association

7	**Under-Developed Markets for Local Food**	**7.1**	Lead by example, supporting local farmers and encourage healthy eating at the Local Government level.	Neighbouring Municipalities
		7.2	Support and encourage farm gate sales in the ALR.	Get Local BC (FF/CF), Fraser Valley Farm Direct Marketing Association
		7.3	Develop a comprehensive farmer's market strategy and suite of supportive policies.	BC Association of Farmers Markets
		7.4	Investigate the feasibility of providing property or business tax benefits to retailers that devote a certain percentage of their store's floor space to local farm produce.	BC Assessment
		7.5	Foster broad-based public support and understanding for local food and agriculture.	
8	**The Non-Agricultural Use of Surrey's ALR**	**8.1**	Consider stronger regulations around or penalties for the non-agricultural use of Surrey's ALR.	Agricultural Land Commission
		8.2	Limit home-plate size, scale, and placement in the ALR.	Agricultural Land Commission
		8.3	Strengthen enforcement of existing rules pertaining to permitted activities on A1, A2, A3, and other zones in the ALR.	
		8.4	Consider amendments to Bylaw 16337 to restrict the use of City water for non-agricultural uses in the ALR.	Agricultural Land Commission
		8.5	Ensure BC Assessment is reviewing and monitoring residents claiming farm class status for tax assessment purposes.	BC Assessment
9	**Landowners' Unwillingness to Allow Agricultural Use of their ALR Land**	**9.1**	Educate landowners in the ALR about the benefits of leasing land to farmer.	Surrey Realtors
		9.2	Develop additional incentives for allowing the agricultural use of ALR land by leasing to farmers	
		9.3	Lobby the Province to make changes to the Assessment Act which would encourage landowners to enter long term leases with farmers.	BC Assessment

TABLE OF CONTENTS

LIST OF FIGURES, MAPS, AND TABLES

PREFACE

The Institute for Sustainable Horticulture (ISH) is an applied research unit of Kwantlen Polytechnic University. We work to advance the sustainability of agriculture and urban landscapes as an integral element of sustainable communities. This vision is predicated on our belief that sustainability is the premier challenge facing humanity, and consequently, that the sustainability of agriculture is a real and significant issue for British Columbia.

The Institute is comprised of two research groups that collaboratively advance the polytechnic mandate of the university: The Bio-Control and Bio-Products research group associated with the Canadian Foundation for Innovation research laboratory on the Langley campus; and the Sustainable Food Systems research group based on the Richmond campus. Both groups are engaged in applied research, extension programming and knowledge transfer, and each makes significant contributions to the education programs of the university.

Figure 1:
Institute for Sustainable Horticulture Working Groups and Focus Areas

The Sustainable Agri-food systems working group is engaged in a variety of integrated research projects with municipalities in three focus areas:

- Food Systems research – bioregional agri-food system modeling and planning (Yukon and Southwest BC) and Municipally Enabled and Supported Agriculture (MESA)
- Education – integrated study of theory and practical skills in small-scale sustainable agriculture at the Kwantlen Farm School - Richmond
- Field based production methods research and demonstration

This research directly ties sustainable agriculture to the economic, social and ecological sustainability of communities.

The Sustainable Agri-food Systems working group is investigating various ways by which municipal governments can enhance and support local-scale, human-intensive and ecologically sound agriculture by investing in a regional agri-food system which will have direct and positive impacts on local and regional economies, protect and preserve farmland against urban encroachment, and increase local food production and consumption.

We use the term Municipally Enabled and Supported Agriculture (MESA) to describe the full integration of agriculture and the food system (production, processing, distribution, consumption and waste

management) within the planning, development and function of our rapidly growing communities. The applied research MESA projects being conducted in partnership with municipalities across southwest British Columbia are producing a compendium of concepts, tools and strategies that can be used to inform, enhance and enable the design and implementation of local-scale, human-intensive agri-food systems that will connect urbanites, in real and meaningful ways, to their food, the land, and the sustainability of our human settlements. We believe that this emphasis on regional food systems planning and implementation will reduce the dependence on ecologically unsound and increasingly vulnerable agri-food systems that rely on unsustainable levels of input such as fossil fuels, and produce excessive carbon footprints.

Research indicates that the nature of a community's agriculture sector profoundly influences its economic and social character. The primary focus of our MESA and bio-regional agri-food systems research is to bring forth new ideas and generate new knowledge to answer the question: what is an appropriate agriculture that will ensure the sustainability of our human settlements? Our findings from the study of Surrey's underutilized ALR lands, and recent related projects, suggest that MESA has significant direct economic, ecological and socio-cultural potential, and can help re-establish our relationship to nature, place, agriculture, and to the strategic value of our food for the vitality of our communities.

Genesis and Focus of This Study

In May 2010, following contributions that they had had made to the 2009 Surrey Economic Summit on issues of sustainable agriculture, Mayor Dianne Watts requested a meeting with Dr. Kent Mullinix and Dr. Arthur Fallick, Directors at the Institute for Sustainable Horticulture. During the meeting, the Mayor had shared some of the City's intuitions around the strategic importance Surrey's ALR lands and concerns that increased fragmentation, misuse, and outright loss of land from agriculture could have long term deleterious effects on Surrey's food security, agricultural resilience, and quality and character.

In two follow-up meetings with the Mayor and senior management team, ISH was afforded the opportunity to share its research focus and to suggest several potential lines of inquiry that could provide Surrey with information and strategies for enhancing the city's local-scale agriculture. The Mayor expressed a clear desire from the outset that the researcher team should explore potential opportunities to increase the agricultural utilization and productivity of the city's underutilized ALR lands, and where possible, to identify specific ways through which a localized food system could be increased or enhanced, contribute to economic activity, and create jobs within the municipality.

Through discussion with the Manager, Planning and Development, these initial conversations with the Mayor and senior management team were expanded into several broad expectations that would enable Surrey to engage in more informed community consultation on agricultural issues, produce greater clarity with respect to the spatial dimensions and parameters of the city's underutilized ALR lands, and enrich the policy analysis and discussions on the economic and land use potentials that could be considered to ensure the underutilized parcels remain a vital component of Surrey's sustainable agriculture strategy.

In the ensuing year, the Sustainable Agri-Food Systems working group has undertaken research and analysis to address the following research question: How can Surrey promote and support local agriculture on small, underutilized parcels in the Agricultural Land Reserve? Key objectives of this research include identifying strategies to enhance Surrey's local economy, create jobs, advance food self-reliance in the city, and if possible, curtail loss of agricultural land.

1.0 INTRODUCING SURREY'S CURRENT AGRI-FOOD SYSTEM

Figure 2: Surrey's Peri-Urban Agricultural Landscape in the Regional Context

With a population of over 474,000 people, Surrey is British Columbia's second largest municipality and one of the fastest growing in the country. Surrey's extensive agricultural lands, which run geographically north-south through the heart of a very urbanized municipality, are a unique feature for a city of this size that lead many to describe it as having a dual "urban and rural" character. Surrey's 22,000 acres (9,000 hectares) of agricultural lands currently make up approximately 25% of the city's total jurisdictional area and account for about 15% of all the agricultural land in Metro Vancouver[1].

Surrey has a long agricultural history, as the city grew up around the pioneer family farms which were established in the fertile Nicomekl and Serpentine River lowlands during the late 1800's. These early farms, which produced a variety of agricultural products, played a key role in what was then a relatively local agri-food system reliant on rail and shipping to transport goods to markets in the Lower Mainland, Vancouver Island and interior British Columbia.

By 1940, the completion of the Pattullo Bridge and King George Highway had connected Surrey to neighbouring municipalities which would eventually form the Greater Vancouver and Fraser Valley Regional Districts. This was a period of rapid urbanization, and marked the beginning of a trend towards suburban development and the conversion of much of Surrey's farmland into residential neighbourhoods which became populated by families escaping the higher cost of housing in Vancouver and other municipalities. This pattern was reflected across the province, where overall as many as 6,000 hectares of prime agricultural land were being lost each year to urban and other uses[2].

[1] BC Ministry of Agriculture and Lands, 2009
[2] BC Porvincial Agricultural Land Commission

Urban development of farmland continued unabated until 1973, when the provincial government introduced the Agricultural Land Commission Act with the objective of protecting threatened farmland in perpetuity. The Act resulted in the creation of The Agricultural Land Reserve (ALR), a "provincial zone in which agriculture is recognized as a priority use, farming is encouraged, and non-agricultural uses are controlled"[3]. In Surrey, approximately 21,704 acres (8,787 hectares) were designated as part of the ALR. Despite this, however, the pressure to develop farmland is intense in the region, and farmland values are unusually high as a result. Surrey realtors report that ALR land in the municipality sells for $175,000 - $200,000 per acre, a price that cannot be justified based on agriculture and make it nearly impossible for new entrants to farming to attain secure land.

> "Surrey's agricultural land deserves continued protection as part of creating a more sustainable region that can meet a share of its food needs locally. This requires a long-term vision and commitment in view of increased pressure to convert agricultural land to other uses."
>
> Surrey Sustainability Charter p.26

The proximity of Surrey's ALR to highly urbanized, metropolitan areas offers local agriculturalists unique opportunities for direct marketing and the integration of their agriculture into the vitality of Surrey's urban community. Likewise, it endows the City of Surrey with increased capacity to enhance food security and self-sufficiency, to improve population health and nutrition, to strengthen the local economy, and to adapt to climate change – all of which are characteristics of a healthy and vibrant food system. At the same time, however, the close proximity of urban and agricultural lands poses serious threats to the viability of Surrey agriculture and raises unique challenges for the municipality's planners and policy makers, speculation, development pressure, and the high price of farmland being just some of them. In order to contextualize the issues which will be discussed in the body of the report, this section will outline key facts and figures about this unique, "peri-urban," agricultural area and introduce some critical issues and opportunities facing Surrey's agriculturalists.

[3] BC Provincial Agricultural Land Commission, 2002

Surrey's Agricultural Capability

Southwestern BC is one of Canada's most productive agricultural regions, of which Surrey's agricultural lands represent one critical component. Endowed with naturally fertile soils and a temperate climate, and aided by extensive engineering improvements put in place by the City of Surrey to address drainage and flooding issues, Surrey's ALR is capable of supporting a wide range of crops and livestock.

Climate and Soils[4]

Surveys conducted by the provincial government in the 1980s have been used to classify the quality of all of BC's agricultural land according to the "Land Capability Classification for Agriculture in BC." In this classification system, lands are assessed on a scale of 1 – 7 for both climate and soil factors. In general, the range of suitable crops decreases and/or the management inputs needed increases from Class 1 to 4. Class 5 lands are considered only useable for perennial forage or specially adapted crops, Class 6 lands for sustained natural grazing for livestock, and Class 7 lands cannot support either grazing or cultivation.

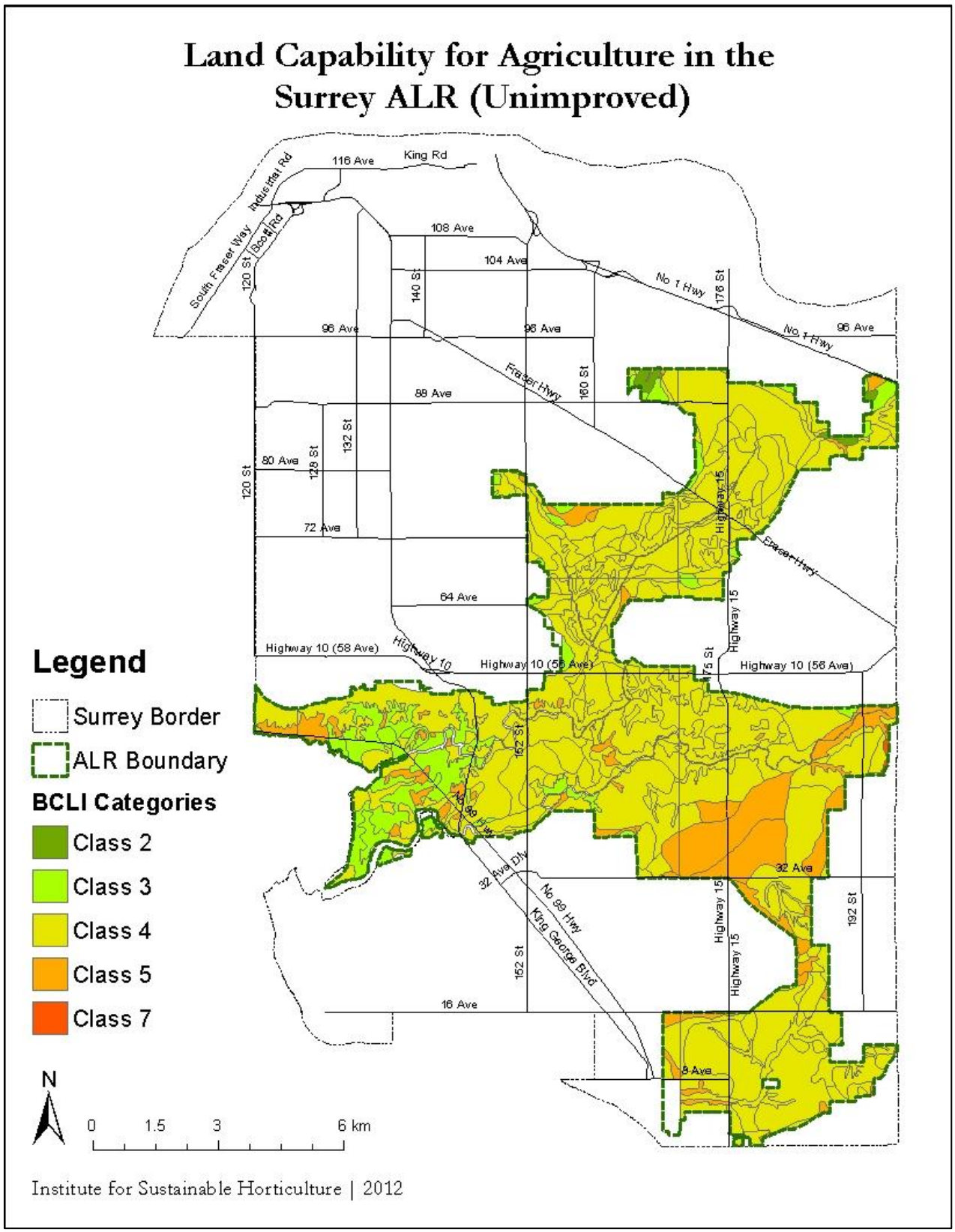
> "Land capability for agriculture is determined by assessing both climate and soils. In general, the climate determines the range of crops possible in an area and the soils govern the type and relative level of management practices required."
>
> MOE Manual: Land Capability Classification for Agriculture in BC p.5

The system considers both *unimproved ratings,* which are based on the conditions that existed at the time of the soil survey, without irrigation and *improved ratings,* which indicate the lands' capability for agriculture after the alleviation of limitations and/or hazards through improvements such as drainage, irrigation, diking, stone removal, desalinization, sub-soiling, and the addition of fertilizers or other soil amendments.

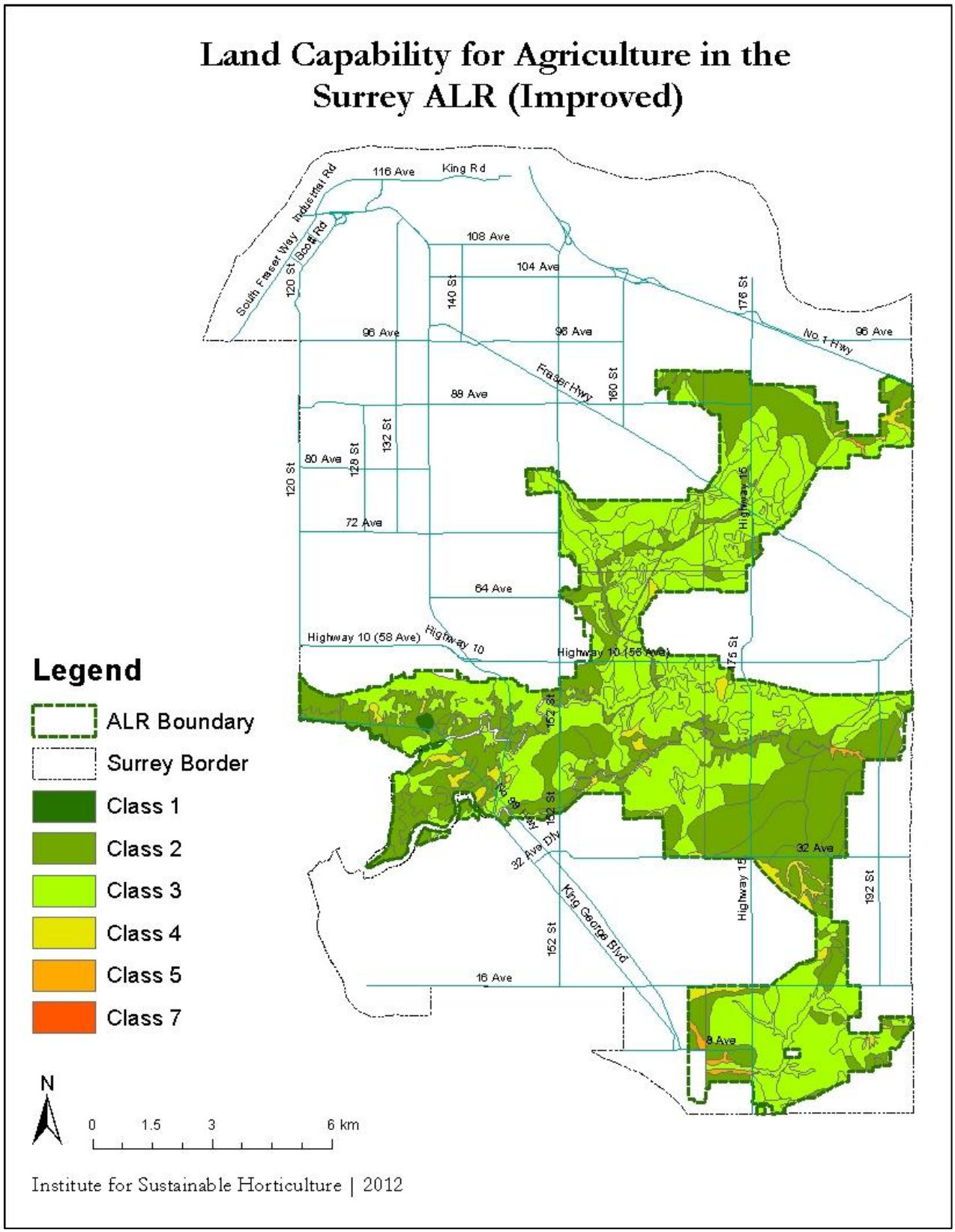
The following series of maps, generated for this study, are based on soil surveys completed by the Ministry of Agriculture and Food in the 1980s and show unimproved and improved BC Land Capability for Agriculture ratings for Surrey's ALR and. Unimproved, Surrey's ALR lands largely fall into the Class 4 rating, with some Class 3 unimproved soils in the Mud Bay area and some unimproved Class 5 soils scattered throughout the municipality (See *Map 1: Unimproved Land Capability for Agriculture*).

As illustrated in *Map 2: Improved Land Capability for Agriculture*, once improved, the majority of Surrey's soils are rated at Class 2 or 3, and are considered "prime" agricultural land. Dyking and flood control measures put in place on Surrey ALR lands have been instrumental in achieving improved ratings for agriculture, largely in the Class 1 – 3 range, these are discussed in the next section (See p.25).

[4] All information in this section from: Ministry of Agriculture and Food, Ministry of Environment, 1983



Map 1: Unimproved Land Capability for Agriculture in the Surrey ALR



Map 2: Improved Land Capability for Agriculture in the Surrey ALR

Figure 3: Degradation of Surrey's ALR

Not reflected in these capability ratings are the impacts of degradation to agricultural land that has occurred since the data were collected (over thirty years ago). During this time, the deposition of fill and paving of prime farmland, both legal and illegal, have decreased the potential for soil-based agriculture in many areas of the ALR, and led to the widespread non-farm use of this land. *Figure 3*: Degradation of Surrey's ALR is illustrative of this trend, which will be discussed further in other sections of this report.

Improvements to Agriculture Lands

Figure 4: Early Flooding in Surrey's Agricultural Lowlands

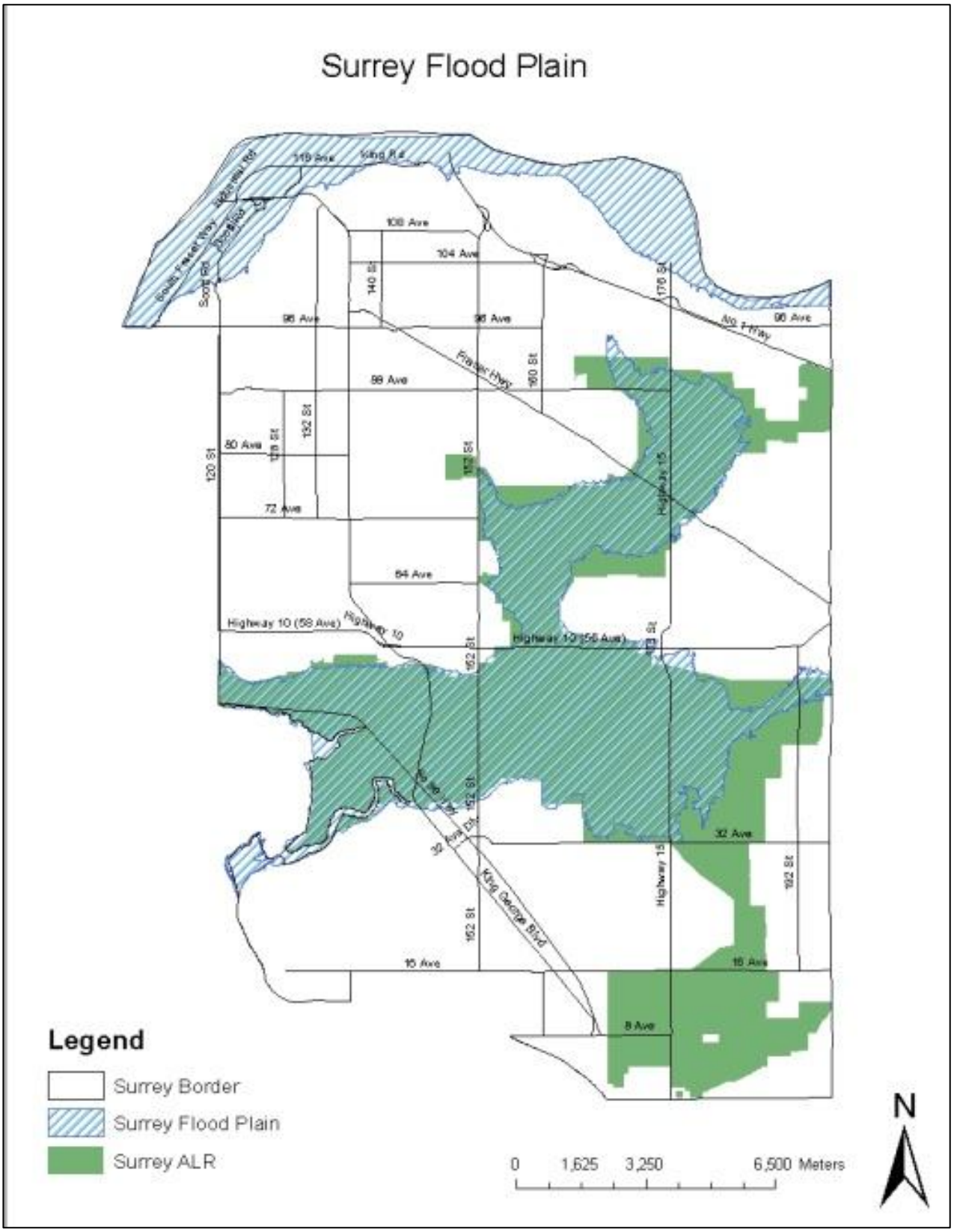
Flood Control Infrastructure[5]

Flooding has long been an issue affecting Surrey farmers, as the city's agricultural lands lie within natural lowlands separated by three tidal rivers, the Serpentine, Nicomekl, and Campbell (See Map 3: Surrey Flood Plain). At an average elevation of only 5 to 30 feet above sea level, these lowlands flooded frequently before today's modern infrastructure was put in place.

Flood control efforts began as early as the 1860's, when area farmers began building dykes along the Serpentine and Nicomekl rivers to allow further cultivation of the fertile lowlands. In 1910, the Surrey Dyking District (SDD) was formed to bring a more coordinated approach to the efforts of individual farmers. Most significantly, the SDD took on the construction of two sea dams, river gates which open when tides are low to allow fresh water to flow to Mud Bay, and close to prevent salt water from migrating up the river into farm land when tides are high. Despite these and continued efforts to construct and maintain the dyking infrastructure, flooding persisted in the Serpentine-Nicomekl lowlands into the 1990s. Although the fundamental cause of flooding in the lowlands was the area's low elevation and range of ocean tide levels, accelerated urban development and logging in the uplands of Surrey was also contributing to increased frequency and duration of flooding.

> *"The problem with Surrey's flood plain isn't the flood plain, [it's] the developer on the highlands. This was emphasized at the annual meeting of Surrey Dyking District, [where] a resident on 83rd avenue north of Fry's Corner told of the tremendous flow of water coming from off the Clayton hillside and also from Port Kells. "It's a river now, not a ditch," the property owner declared."*
>
> *- The Surrey Leader*
> February 18th, 1972

[5] All information in this section from personal communication with Reme Dube and Carrie Baron, City of Surrey Engineering Department, and the City of Surrey presentations entitled "The Development of a Strategic Plan for Lowlands Flood Control" and "The Implementation of a Strategic Plan for Lowlands Flood Control."



Map 3: Surrey Flood Plain

In 1994, recognizing that municipal support was needed to control flooding and establish a set level of service that could support and promote agricultural activities within the 56.1km^2 floodplain, the City of Surrey began a consultation process with the local agricultural community, the BC Ministry of Agriculture, the BC Ministry of Environment, local Dyking Districts, and the Department of Fisheries and Oceans to determine how they would address the issues. This process led to the implementation, beginning in 1997, of the "Serpentine and Nicomekl Lowlands Flood Control Project", which saw the City of Surrey actively planning, designing, and constructing dykes, pump stations, and conveyance improvements within the lowlands (See *Figure 5: Sea Dam (L) and Ditch (R) Construction*).

Figure 5: Sea Dam (L) and Ditch (R) Construction

Today, the project is nearing completion. With almost all pump stations and dykes installed and only the conveyances to complete, the system has already delivered significant benefits to the lowland agricultural community by providing greater protection against frequent flood events, faster flood relief during periods of heavy rainfall and, according to City staff, rendering essentially the entire ALR area suitably drained for agricultural production. While initial financing for the $45.7 million dollar project came solely from The City of Surrey, costs to maintain the infrastructure are now offset by a Drainage Tax levied on all Surrey properties[6].

Agricultural Water

Surrey's farmers rely on ground and surface water to meet their farm operation water needs, as the municipal water can only be used for residential purposes. The use of surface water (from ditches and watercourses) is governed by the BC Water Act. Under the Act, a license from the BC Ministry of Environment is required for the use of surface water for irrigation purposes, at a rate of $100/year for an area smaller than 5 hectares (12.35 acres), $150/year for an area 5 – 50 hectares (12.35 – 123.5 acres), or $400/year to irrigate 50 hectares (123.5 acres) or more[7].

Figure 6: Irrigation Ditch

[6] Non-farm and farm properties pay annual rates of $161 and $105, respectively.
[7] BC Ministry of Environment , 2011

Land Use and Agricultural Production in the ALR

According to the most current, available data, Surrey is home to approximately 487 farms[8], 12 of which are certified organic[9].

Berry production, forage and pasture dominate agricultural production in Surrey. Berry production is the second most common agricultural land use, occupying 12% of the ALR and almost one fifth of the ALR area used for agricultural production. Blueberries are the most common and intensively cultivated berry crop, and the success of this crop in local and international markets has a strong bearing on the overall performance of Surrey's agri-food economy. Although the BC blueberry industry has seen strong growth in the last sector, it is experiencing challenges. Rapid expansion of blueberry acreage across North America has pushed blueberry prices down locally and increased international competition.

On a smaller scale, the land also supports a variety of other crops and livestock. *Table 2: Primary Agricultural Land Use Activities in the Surrey ALR,* provides an overview of agricultural land use activities on Surrey farms in the ALR.

Table 2: Primary Agricultural Land Use Activities in the Surrey ALR

Primary Agricultural Land Use Activity	Number of Parcels	Total Parcel Area (acres)	Total Parcel Area (ha)	Percent of Surrey ALR in this Use
Forage and Pasture	226	4777	1934	22%
Berries	140	2638	1068	12%
Field Vegetables	113	2087	845	10%
Horse Farms and Stable/Riding Facilities	46	753	305	4%
Beef Cattle	45	1141	462	5%
Nurseries and Tree Farms	35	576	233	3%
Specialty Crops	23	380	154	2%
Dairy Farms	18	1126	456	5%
Poultry Farms	16	227	92	1%
Specialty Livestock	16	148	60	1%
Greenhouse Operations	15	346	140	2%
Agritourism/Crop Preparation or Processing	9	205	83	1%
Sheep/goat farms	8	82	33	0%
Total	***710***	***14487***	***5865***	***67%***

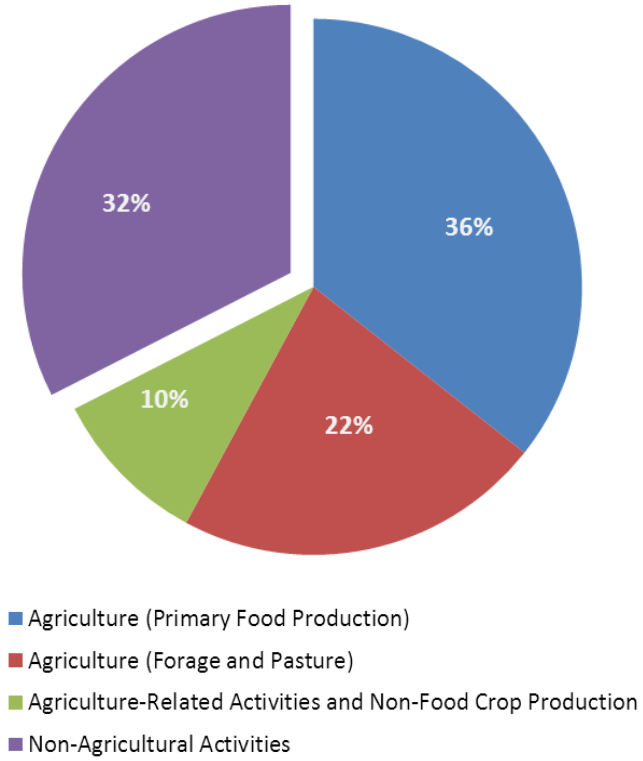
Derived from Ministry of Agriculture and Lands *City of Surrey Agricultural Land Use Inventory 2004*

[8] Ministry of Agriculture and Lands, 2009
[9] Certified Organic Associations of British Columbia, 2011

Although farming remains an important component of Surrey's municipal landscape, Statistics Canada reveals that farm numbers in the municipality are steadily declining. According to the most recent Census of Agriculture, farmers make up about 14% of Surrey's total rural population (ie: those Surrey residents living in the ALR), which totaled 10,576 people in 2006. The number of census reporting farms has dropped by approximately 30% over the past 20 years, with most losses being of small to mid-sized farms[10]. The loss of these smaller ALR parcels to agriculture and the high proportion of the rural population not engaged in agriculture are indicative of the key threats to agricultural viability in Surrey: subdivision and the non-farm use of ALR land.

The subdivision of agricultural land is another long-standing concern for farmers and their advocates in British Columbia, the province which is considered to have "the most heavily parcelized agricultural land base in Canada"[11]. Surrey is no exception, as the "Minimum Lot Size" (MLS) zoning provisions used by municipalities to adjudicate subdivision have left it with a highly parcelized agricultural landbase with a large proportion of ALR parcels under five hectares. Small farms can be highly productive, but the land they are situated on is often converted to rural residential use. Good farmland in parcels of 20 hectares or more in the Fraser Valley costs between $50,000 and $100,000 per hectare. Add the permitted house to a small parcel and the value can escalate enormously. Soaring urban housing costs are increasing the upward pressure.

Figure 7: Primary Land Use Activities in the Surrey ALR



Although Surrey's smaller parcels are still valuable from an agricultural perspective, their relatively small size has also made them attractive to non-agriculturalist landowners. 2,827 hectares (approximately 32%) of Surrey's ALR are used for non-agricultural activities, including residential, institutional, industrial, and commercial use, hobby farm and recreational use, golf courses, and other uses. The fragmentation of farmland by these residential, commercial, and industrial lands uses increases the likelihood of urban/rural conflicts that compromise the viability of large-scale, conventional farms: in addition to vandalism, trespass, increased storm water drainage, and increased land costs, non-agriculturalist rural residents not accustomed to the smells, sounds, and slow moving traffic associated with conventional agricultural production have been known to file nuisance complaints about neighbouring farms[12]. Whether or not this negative effect also hold true for small-scale farms, however, has not been substantially investigated.

[10] Ministry of Agriculture and Lands, 2009
[11] Smith, 1998
[12] Curran & Stobbe, 2010

Surrey's Agri-Food Economy

Through its ties to both local and global food markets, Surrey's current agriculture sector generates over $153 million in gross annual revenue and over $37 million in wages paid[13]. Data from the 2006 Census of Agriculture report that approximately 4,470 people are employed on Surrey farms having average gross farm receipts of $314,971, higher than Metro Vancouver ($278,306) and BC as a whole ($133,641). Despite this high average, most Surrey farms (46%, or 226) report gross receipts of less than $10,000, reflective of the high incidence of hobby farms which contribute less to the agri-food economy than their commercial counterparts.

Despite the close proximity to local consumers, most of Surrey's farms market their produce through standard commodity channels, including Marketing Boards and indirect sales to wholesalers and distributors, rather than directly to the consumer through roadside stands, farmers markets, or community supported agriculture programs (under a Community Supported Agriculture [CSA] program, consumers purchase "shares" in a farm's harvest and receive a weekly box of seasonal, fresh produce for the duration of the growing season. This is widely seen as a mutually beneficial arrangement as it guarantees the farm a market for its products, provides CSA members with fresh food, allows farmers and consumers to share risk, and fosters relationships between farmer and consumer).

Surrey hosts one summer Farmers Market and only about 36 of Surrey's 487 farms have business licenses to sell their farm products directly to the consumer at the farm gate[14]. Given the growing market for high quality, local food in the Lower Mainland, direct marketing is viewed as an area with high growth potential for Surrey farmers, but one that is not likely to thrive without an increase in the availability of local, small-scale facilities for product storage and small-scale processing.

Figure 8: Surrey ALR land for sale, Summer 2011

The high price of farmland is often cited as one of the premier challenges facing both current and would-be farmers, a situation mirrored across the Lower Mainland. Today 74% of Surrey farms are owned by the farm operator while the remaining 26% are leased. Our conversations with Surrey Realtors indicate that ALR land is currently valued at up to $200,000 per acre, or up to $500,000 per acre if it is situated on the urban-rural edge.

[13] City of Surrey - Economic Development Office (N.D)
[14] City of Surrey, 2010

Surrey's Agricultural Policy Environment

Agriculture is a shared federal-provincial jurisdiction in Canada. While federal level policy and programs are important, the role of Agriculture and Agri-Food Canada and other federal bodies is oriented toward international trade, inter-provincial coordination, and subsidy regulation than local food systems and farm viability, and is not discussed further in this section of the report.

Note that this section is summarized in table format on p.42.

Key Provincial Policies and Regulations Affecting Surrey's Agri-Food System

The Local Government Act

The *Local Government Act* is the primary legislation under which the Province delegates responsibility for land use planning, zoning, and control of building and development. It also determines how new municipalities are created or expanded, the election of Councils and Boards, the assessment and collection of taxes, administration, property management and spending. Certain provisions of the Act affect agriculture, including those covering community planning, the Agricultural Land Reserve, development permit areas, zoning, nuisance regulations, the removal and deposit of soil, weed and pest control water use and drainage, and the use of land for agricultural operations. Several of these areas are discussed further below.

The Agricultural Land Commission Act

The *Agricultural Land Commission Act* is the primary tool used to protect farmland from development in BC. It applies to all land in the Agricultural Land Reserve (ALR), a provincial zone in which agriculture is recognized as the priority use, farming is encouraged and non-agricultural uses are controlled. The ALR currently comprises 11 million acres of agricultural land in British Columbia. Surrey's ALR land, at 21,470 acres (8,692 hectares), makes up less than 1% of the provincial total.

The Provincial Agricultural Land Commission (ALC) is the independent Provincial agency responsible for administering the ALR in favour of agriculture. Its three-pronged mandate is to *preserve agricultural land; to encourage farming in collaboration with other communities of interest*; *and to encourage local governments, First Nations, the government and its agents to enable and accommodate farm use of agricultural land and uses compatible with agriculture in their plans, bylaws and policies*.

> *The ALR and BC's Municipalities:*
>
> *"The planning, zoning, and service delivery functions of municipalities… will play a central and enhanced role in implementing a shared vision of our working land base… a vision founded on the ethics of resource stewardship, and the need to ensure that the business of agriculture has a secure home in BC."*
>
> *-K.B. Miller*
> *ALC Chair, 1998*

As a part of this mandate, the ALC adjudicates requests and questions decisions related to ALR land use, subdivision, and exclusion from the Reserve. All landowners require Commission approval to include or exclude land in the ALR, subdivide land in the ALR, use land in the ALR for non-farm purposes, or place fill or remove soil from land in the ALR. In a multi-staged application process, the applicant first submits their request to their local government which completes a report on the application and forwards it to the ALC along with its municipal-perspective comments and recommendations. The Commission then receives the application and, after holding meetings with the applicant and determining the potential

impact that the application may have on agriculture, decides whether it will approve or refuse the application. Although the Commission is the final arbiter of any application, the perspective of the local or regional government is taken into account and can have an impact on the final outcome of the case.

The Farm Practices Protection Act

The *Farm Practices Protection ("Right to Farm") Act* legislates the right to farm in the ALR and on land zoned for farm use, and protects farmers that are using "normal farm practices" from nuisance lawsuits and nuisance bylaws of local governments. This is a particularly important piece of legislation for Surrey farmers, who are farming in close proximity to an urban environment, as non-farm neighbours do not always understand or appreciate the realities of the sights, smells, sounds, and slow moving traffic associated with working farms.

> *"[The province] makes important linkages between **farm practices protection** and **planning for agriculture** … Local governments are encouraged to consider means within their plans and bylaws to reduce the potential for land use conflict."*
>
> -Ministry of Agriculture, 2012

The Water Act

The *Water Act* is the provincial law for managing the diversion and use of provincial water resources. Under the Act, a license from the BC Ministry of Environment is required for the use of surface water for irrigation purposes, at a rate of $100/year for an area smaller than 5 hectares (12.35 acres), $150/year for an area 5 – 50 hectares (12.35 – 123.5 acres), or $400/year to irrigate 50 hectares (123.5 acres) or more.

The Assessment Act

The *Assessment Act* establishes the framework for property assessment in British Columbia. In general, "farm class properties" are subject to lower municipal property tax rates than non-farm properties, and under the Act, land owners who farm all or part of their land must apply to BC Assessment to have their properties classified as a farm for tax purposes. Under current legislation, to be classified as a farm,

- Land smaller than 2 acres must earn $10,000 from the sale of primary agricultural products;
- Land between 2 – 10 acres must earn $2,500 from the sale of primary agricultural products;
- Land larger than 10 acres must earn $2,500 plus 5% of the actual value of any farmland in excess of 4ha from the sale of primary agricultural products.

Although the preferential tax rates set by BC municipalities for farmers help them cover their costs in near urban environments where farmland is typically valued at non-agricultural rates, it can also encourage or facilitate the use of valuable commercial farmland for hobby farm purposes. In their article, "Hobby Farms in and the Protection of Farmland in British Columbia" (2009), Stobbe, Cotteleer, and VanKooten argue that *"hobby farms benefit from BC's favourable property tax treatment of agricultural land, which sets a low threshold for obtaining tax benefits. Indeed, it is clear that potential hobby farmers seek parcels that provide them the lowest threshold for qualifying for farm class status, avoiding parcels smaller than 0.8ha that would place them into the category with the highest taxes as well as ones greater than 4.0 ha that would require them to become "serious" farmers."*

While the hobby farms can provide amenity benefits such as open space, views, and wildlife habitat, they also make valuable farmland unavailable for commercial agriculture and thus compete with small-scale agriculturalists who also seek land within the ALR.

Guidelines for Sale of Food at Temporary Markets

The BC Ministry of Health and BC's Health Authorities, develop food safety guidelines that have an impact on how farmers undertake value added processing and direct marketing. The provincial *"Guidelines for Sale of Foods at Temporary Markets"* [15] addresses food safety concerns associated with the processing of foods in home kitchens and the sale of foods at temporary food markets (including farmers markets and farm gate sales).

In general, vendors of low risk foods such as dried fruit, jam, jelly, pickles, and most baked goods, are not required to submit an application before commencing sales, while the sale of high risk foods such as prepared meals, canned vegetables or beans, juice, and processed meat, requires the vendor to contact their local Health Authority and submit an application. Higher risk foods must be processed and packaged in inspected and licensed premises, which can prove challenging for small-scale farmers who lack the economy of scale that warrants that is necessary to afford the use or construction of these facilities.

The Land Titles Act

The *Land Titles Act* is another key piece of legislation affecting local government's influence over its food system, as it gives municipalities (among other groups) the power to assess impacts of new subdivisions on farmland, and to refuse subdivisions if the development would cause "unreasonable interference with farming operations"[16]. Before subdivision approval is given, the approving officers may require adequate buffering of farmland from the subdivision or the removal of unnecessary roads directed at the ALR to ensure no unreasonable interference occurs with farm operations.

[15] BC Centre for Disease Control- Food Protection Services,, 2011
[16] Curran and Stobbe, 2010

Regional Level Policies, Tools, and Programs Affecting Surrey's Agri-Food System

Metro Vancouver Regional Food System Strategy

Metro Vancouver plays a role in supporting the food system by developing regional agriculture and food policy under the direction of the Board's Regional Planning and Agriculture Committees. In February 2011, the Metro Vancouver Board adopted a Regional Food System Strategy to address the regional interest in food issues as part of its commitment to making a sustainable region. The Strategy provides a framework for creating "a collaborative approach to a sustainable, resilient and healthy food system that will contribute to the well-being of all residents and the economic prosperity of the region while conserving our ecological legacy". The plan outlines five major goals:

- Increase capacity to produce food closer to home;
- Improve the financial viability of the food sector;
- People make sustainable food choices;
- Everyone has access to healthy, culturally diverse and affordable food; and,
- A food system consistent with ecological health Increasing local capacity to produce food

Metro Vancouver will soon start working with partners, including the City of Surrey and other municipal governments, to develop an Action Plan and identify priorities to strengthen the local food system.

> *"Regional interest in food issues is taking place at the same time research indicates that the global food system is likely to face significant changes. Food prices are rising reflecting a growing demand for food and constraints on food production, both in agriculture and fisheries. Within this context, we have an opportunity to expand the local food supply within Metro Vancouver if all levels of government, their agencies, food producers and others in the food sector … can agree to a common vision and a plan to realize it."*
>
> - Metro Vancouver Regional Food System Strategy

Municipal Policies, Tools, Programs Affecting the Surrey Agri-Food System

With the authority delegated to it under the *Local Government Act, Land Titles Act, and Agricultural Land Commission Act,* the City of Surrey has developed a number of policies and programs with the aim of protecting its agricultural land base and supporting its local agri-food system.

Official Community Plan

Surrey's Official Community Plan (OCP) is a statement of objectives and policies that is used to guide decisions on planning and land use management within the municipality. The OCP provides a long term vision for the community and, with respect to agriculture, outlines the municipality's commitment to "protecting and enhancing agriculture within the agriculturally designated areas, ensuring farm viability, strengthening the farm community, and maintaining agricultural boundaries" (p.90). In addition to this general goal, several elements in the OCP pertain to agriculture, as described below.

Issues and Policies

Sections B-8 (Promote agriculture as an economic growth sector) and F (Protect agriculture and agricultural areas) outline several key policy directions for addressing agricultural and farming issues, including: (F-1.1) promote compatibility between agricultural and non-agricultural land uses; (F-1.2)

maintain agricultural activities; (F-1.3) enhance agricultural viability; (F-1.4) coordinate farming and environmental protection; (F-1.5) manage water use and drainage; and (F-1.6) Increase agricultural awareness and community involvement.

Development Permit Areas and Residential Buffering Adjacent to the ALR

The City of Surrey has been commended by the Ministry of Agriculture, the Agricultural Land Commission, and the farm community for being the first local government in British Columbia to use Development Permit Area (DPA) provisions for the protection of farmland in their Official Community Plan. Under these provisions, all properties outside of, but abutting, agricultural zones have been designated a DPA for the purpose of protecting farming, and any proposed building and subdivision within this DPA requires the issuance of a development permit by the City of Surrey. *Map 4: Surrey's Development Permit Areas* (p.36) shows the extent of this area and its geographic relationship to the ALR. The DPA guidelines related to building location and landscape buffering allow Council to exercise discretion in granting or refusing a permit on a case by case basis.

DPA provisions have since become a key tool for the protection of farmland and farming that allow the city to control and regulate development with designated areas according to stated goals.

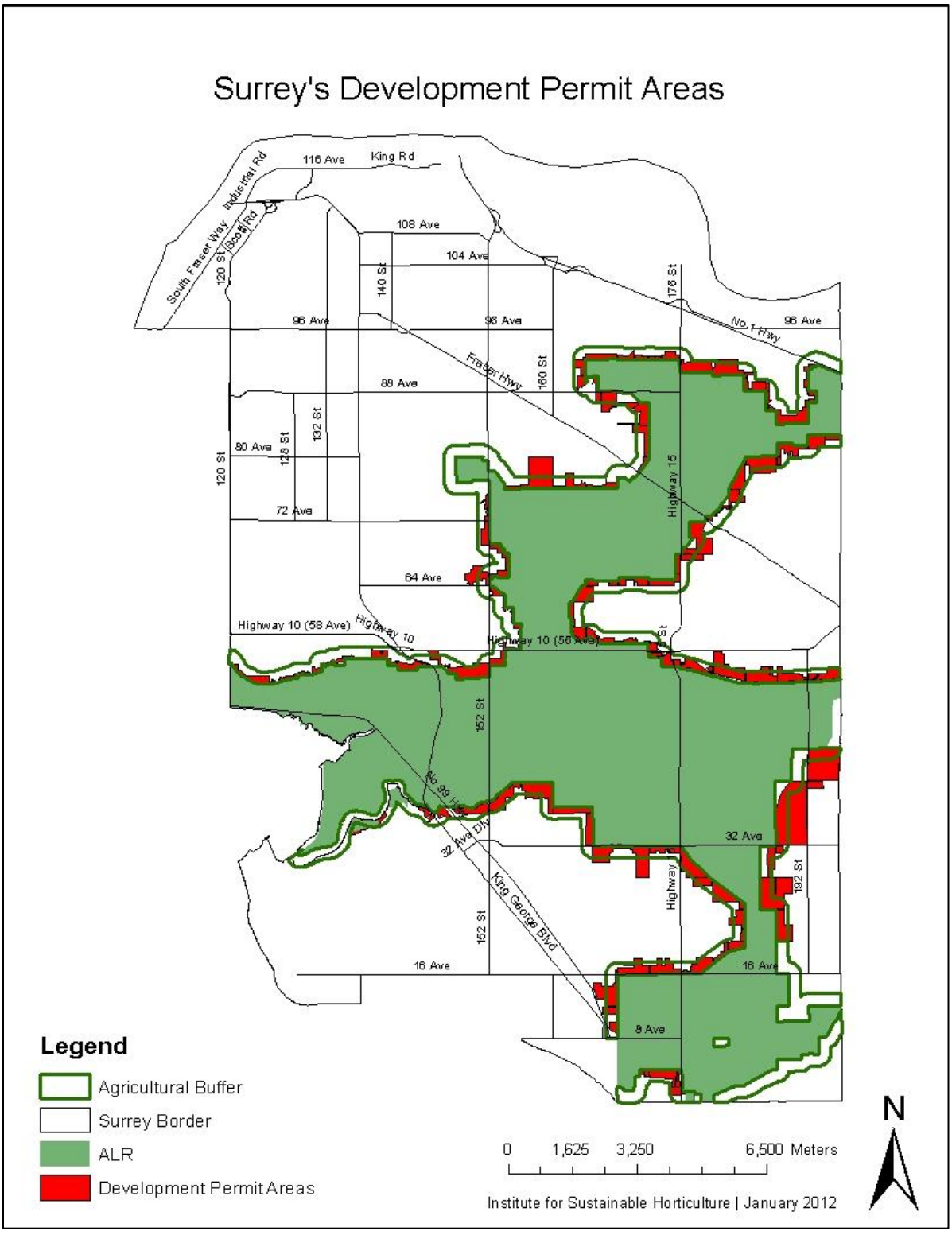
Land Use Designations and Zoning

Surrey's OCP outlines broad categories of permitted land uses within the city. These categories, called "Land Use Designations" provide the basis upon which rezoning applications, Neighbourhood Concept Plans, and Local Area Plans can be approved or rejected.

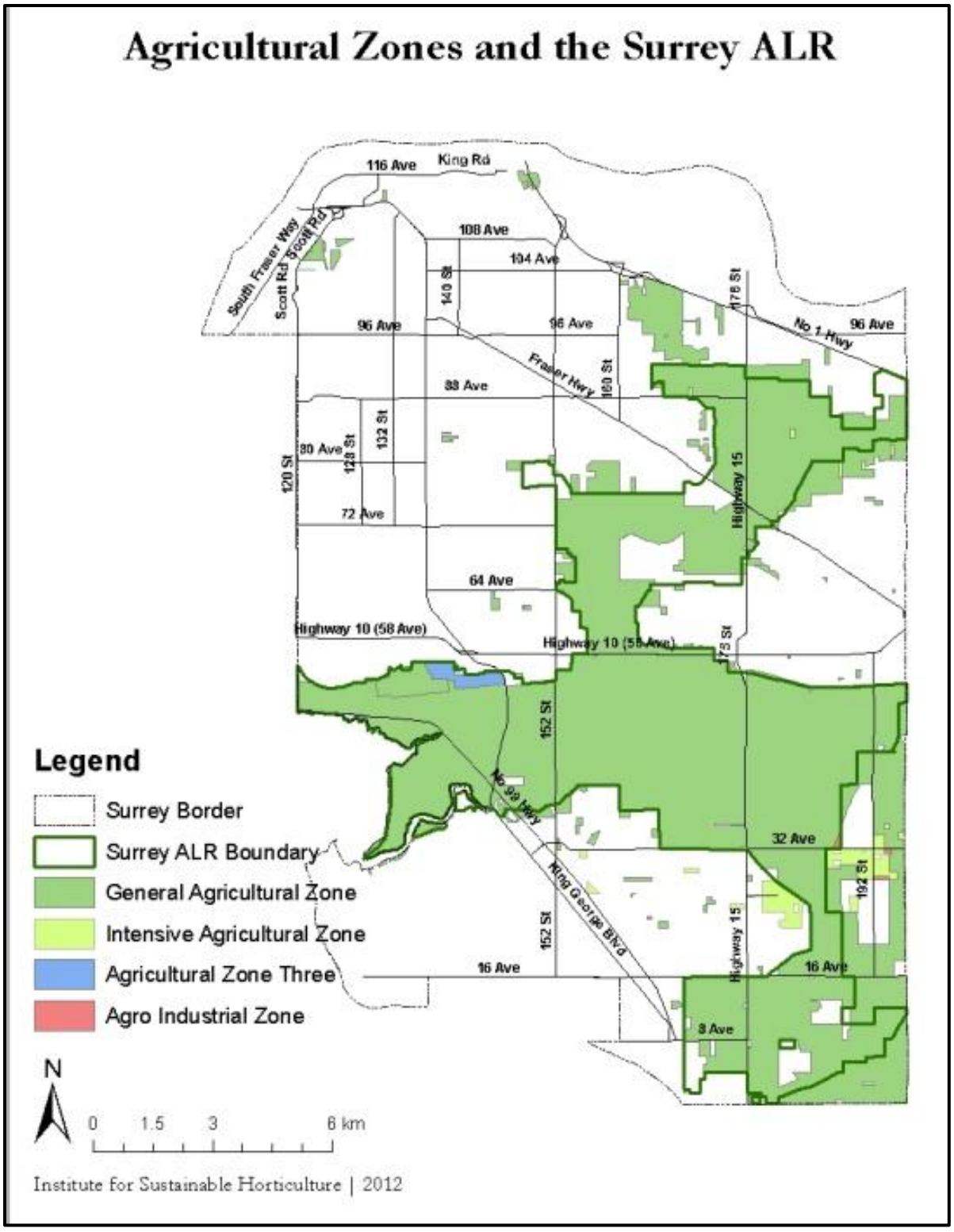
The "Agricultural" land use designation, which is intended to protect areas suitable for agriculture, covers a total area of approximately 24,700 acres (10,000 hectares or 31.5 % of the City's total land base). It is composed largely of the zones A-1 (General Agriculture Zone) and A-2 (Intensive Agriculture Zone, where mushroom growing and the production of confined poultry, livestock, or other fur bearing animals is allowed in addition to the uses permitted in the A-1 Zone), in addition to several other zones as shown in Map 5: Agricultural Zones and the Surrey AL (p.37). Note that the Agricultural land use designation encompasses, but is not exclusively composed of, the ALR.

Further discussion of the specific provisions of these zones can be found Part Six: Recommendations.

> *"Agriculture is a prominent land use in Surrey and a vital component of the local economy. Continuing growth of the City creates the potential for land use conflicts along the boundaries of Agricultural areas. By creating a Development Permit area and guidelines along boundary of the Agricultural designation, the Plan intends to minimize urban encroachment on agricultural land and farming activities."*
>
> -Surrey OCP. 227(b)



Map 4: Surrey's Development Permit Areas (2011)



Map 5: Agricultural Zones and the Surrey ALR

"In 50 years … Surrey will be a leader in the protection of its ALR and in enhancing the productivity of this land base. Surrey will promote urban agriculture and support sustainable agriculture, with most of the City's high quality food being produced locally. Fresh and healthy people will be available to people of all income levels. Food processing industries will create local jobs and incorporate a "value added' component to the local economy."

-Surrey Sustainability Charter 2008

Surrey's Sustainability Charter

In September 2008, Surrey City Council unanimously adopted the Sustainability Charter, a comprehensive framework for implementing a progressive, 50 year vision for a Sustainable City. The Sustainability Charter is a commitment by the City to place the principles of social, environmental, and economic sustainability at the foundation of all decisions that the City makes.

The Sustainability Charter includes several sustainability goals related to agriculture and the food system, including supporting food security, protecting the agricultural land base, and developing green procurement policies and sustainable land use planning and development practices. Overall, its vision, goals, and scope provide a basis upon which policy and programs to support a vibrant agriculture sector, linked to a sustainable local food system, will be developed and implemented.

City of Surrey Economic Development Strategy

Surrey's *Economic Development Strategy* (2008) characterizes the city as having a dual "urban and rural" identity, each of which are supported by Council and staff. The Strategy describes Surrey's ALR land base as playing a key role in a regional strategy for increased food self-sufficiency and long term sustainability, and acknowledges the significant investment that the City has made in enhancing the viability of the agriculture sector through diking and drainage improvements, the creation of the Agricultural Advisory Committee, and the development of the Surrey Agriculture Plan.

The Economic Development Strategy identifies eleven key actions to be led by the Planning and Development Department and Economic Development Office to continue to support Surrey agriculture, including:

- Completing and implementing an Agricultural Development Strategy;
- Designating an "agricultural ombudsman" within City staff;
- Designating representatives from Planning and Economic Development staff to serve as members of the Agricultural Advisory Committee;
- Continuing and expanding various events, programs, and agri-tourism designed to promote to local food and farming;
- Encouraging collaboration and cooperation within the farm community, and;
- Seeking additional funding to assist with agri-food planning and initiatives.

Surrey's Agriculture and Food Security Advisory Committee

To meet the challenge of ensuring farm connections to the broader community, Surrey became the first municipality in the Lower Mainland to establish an Agriculture Advisory Committee in 1995. In 2012, the Committee's terms of reference were broadened to include a mandate to advise the City on food security issues. The re-named *Agriculture and Food Security Advisory Committee* (AFSAC) is now made up of ten members, at least five of whom represent Surrey's farming community, three represent other agricultural and food sectors, one represents the Environmental Advisory Committee, and one is a City Councilor.The AFSAC has:

- Assisted with the development of agricultural policies in the Official Community Plan;
- Played an active role in Surrey's land development review process and preparation of Neighbourhood Plans;
- Supported investment in a comprehensive flood control strategy for the Nicomekl and Serpentine watersheds;
- Promoted initiatives to increase the viability and productivity of farms and the farming community;
- Implemented measures to address conflict in the rural-urban interface;
- Promoted best agricultural practices for farm operations;
- Reviewed and made recommendations to Council regarding subdivisions, re-zonings, and development applications in and adjacent to the ALR; and
- Prepared the Surrey Agricultural Plan.

City of Surrey Agricultural Plan

In 1999, Surrey released an Agricultural Plan intended to provide a comprehensive framework for addressing agricultural development issues, resolving rural-urban conflicts, and ensuring the long-term viability of agriculture within the municipality.

The plan includes baseline information about Surrey's agricultural sector and a series of recommendations for improving agricultural viability in the city. It advocates that Surrey take a proactive stance towards agricultural development by providing services, incentives, and encouragement for the farm community. Key issue areas and proposed actions, which were developed in consultation with City staff, the farm community, and the general public, include:

- *Improve agricultural viability:* increase agricultural land use efficiency, demand for and marketing of local agricultural products, and support for the agricultural sector including succession planning; and decrease rural-urban conflicts.
- *Reduce encroachment on the agricultural land base:* decrease the conversion of agricultural land to non-farm purposes and the impact of residential development in the ALR; and, investigate the impact of ownership of agricultural land by non-farmers.
- *Reduce encroachment on agricultural operations:* investigate recreational access, wildlife depredation of crops, improve drainage, irrigation, and flood control, fish habitat protection, safe farm vehicle movement; and, reduce pesticide drift and chemical usage.
- *Develop an agricultural implementation strategy*.

An implementation plan for the 1999 Agricultural Plan was never completed. The 1999 Plan is now being reviewed and the preparation of an updated plan is being considered.

Surrey Policies and Regulatory Bylaws

Farm Business Licensing

The provisions of BC's *Farm Practices Protection Act* protect agriculturalists' right to operate farm businesses. Thus, unlike all other businesses in the municipality, Surrey farmers are not required to hold business licenses for their farms. The City of Surrey does, however, require its farmers who are engaging in farm gate sales of their products to hold a business license for this enterprise. At the time of writing, the process and enforcement of these licenses was under review by the AAC and bylaw enforcement division.

Policy for Considering Applications for Exclusion of Land from the Agricultural Land Reserve (Policy 0-51)

As described previously, though the AAC is the final arbiter of any application for changes to land use in the ALR, the City of Surrey has the opportunity to provide comments and a recommendation to the AAC. This municipal perspective is taken into account and can impact the final outcome of the case.

In December 2003, Surrey adopted an aggressive set of criteria to use for the evaluation of applications received by the City to exclude land from the ALR. Most notably, the policy includes a "compensation principle." This principle ensures that the overall productive capability of Surrey's ALR lands is maintained by requiring that any exclusion of any ALR lands is offset by the *inclusion of an area within the City of Surrey that is twice as large as that being excluded*.

> *"The intention of this policy is not directed at lending support to or encouraging ALR exclusions nor is its intention to allow the ALR to be "opened up" for development. This policy is focused on maintaining the City's long-standing practice of protecting agricultural lands for agricultural purposes consistent with the OCP.*
>
> -Policy 0-51

Water: Bylaw 16337

The use of city water on agricultural parcels is regulated by Surrey's *Water Bylaw,* which states:

> *"For parcels in the agricultural land reserve, the water supplied by the City is for normal use, except for commerce and industries. Subject to the availability of water in excess of these purposes, water may also be used for other less essential, aesthetic-enhancing purposes such as lawn and garden irrigation, car washing and other cleaning processes."*

In effect, City water can only be used for residential purposes in the ALR, not crop irrigation or stock watering. Under the current policy, farming operation water needs must be met with ground or surface water, which is regulated by the Water Act as described above.

Soil Conservation and Protection Bylaw 16389

In order to protect the City's soil resource base and ensure that the placement of fill does not affect neighbouring properties, storm-water system operations, or municipal conformity with the requirements set out by the Agricultural Land Commission, Surrey requires permits to be approved before any deposition or removal of soil and/or fill from properties within the city. For properties within the ALR, applications must also be approved at the provincial level, by the ALC.

Tree Protection Bylaw 16100

Figure 9: Tree removal permit posted on ALR property, summer 2011

In recognition of the environmental and aesthetic benefits of urban forests, Surrey's Tree Protection Bylaw is intended to reduce the number of trees unnecessarily removed or damaged by builders or residential homeowners, and ensure that replacement trees are planted when trees do have to be removed. Under the bylaw, tree cutting permit applications and fees are required for the removal of any tree in the city, with penalties being enforced in instances of non-compliance.

Tree cutting on agricultural land also requires an arborist's report; a sworn affidavit by the owner declaring that the tree removal is for agricultural purposes and the agriculture cannot occur on the property unless the site is cleared; and a sworn affidavit by the owner (within the ALR) or a restrictive covenant registered on the title of the lot (outside the ALR) stating that there will be no application for subdivision, rezoning, or development of the lot for a period of five (within the ALR) or ten (outside the ALR) years. In some instances, the completion of a raptor study and or the preparation of a farm plan are also required.

Table 3: Key Policies, Tools, and Programs Affecting the Surrey Agri-Food System (Summary Table)

	Policy, Tool, or Program	Brief Description
Provincial	**Local Government Act**	The act under which the Province delegates authorities to municipalities.
	Agricultural Land Commission Act	The primary tool used to protect farmland in BC. Its passing resulted in the creation of the Agricultural Land Reserve.
	Farm Practices Protection Act	Legislates the right to farm in BC. Protects farmers using "normal farm practices".
	Water Act	Legislates the management, diversion and use of provincial water resources.
	Assessment Act	Establishes the framework for property assessment for taxation purposes.
	Guidelines for Sale of Food at Temporary Markets	Addresses food safety concerns associated with the processing of foods in home kitchens and the sale of food at temporary markets.
	Land Titles Act	Gives local governments the power refuse, new subdivisions on farmland.
Regional	**Metro Vancouver Regional Food System Strategy**	Addresses the regional interest in food issues as part of a commitment to making a sustainable region. Provides a framework for taking a collaborative approach to building a sustainable regional food system.
Municipal	**Official Community Plan**	A statement of objectives and policies used to guide decisions on planning and land use management within the city. Includes several elements pertaining directly to agriculture, including: issues and policies, development permit areas and residential buffering, and land use designations and zoning.
	Sustainability Charter	A comprehensive framework for implementing a progressive, 50 year vision for a sustinable city. Includes several sustainability goals related to agriculture.
	Economic Development Strategy	Outlines the City's goals to create job opportunities and drive investment into Surrey to create a healthy business community. Identifies eleven key actions to support agriculture.
	Agriculture and Food Security Advisory Committee	A committee appointed to establish liaison and maintain communication between the agricultural community and the City on agricultural and food security issues.
	Agricultural Plan	Intended to provide a comprehensive framework for addressing agricultural development issues, resolving rural-urban conflicts, and ensuring the long-term viability of agriculture within the municipality.
	Policy 0-51	Policy for Considering Applications for Exclusion of Land from the ALR. Requires that any exclusion of any ALR lands is offset by the inclusion of an area within the City of Surrey that is twice as large as that being excluded.
	Bylaw 16337	Water Bylaw. Regulates, among other factors, the use of city water for agricultural purposes in the Agricultural Land Reserve.
	Bylaw 16389	Soil Conservation and Protection Bylaw. Requires permits to be approved before any deposition or removal of soil and/or fill from properties within the city.
	Bylaw 16100	Tree Protection Bylaw. Intended to reduce the number of trees unnecessarily removed or damaged by builders or residential homeowners, and ensure that replacement trees are planted when trees do have to be

2.0 THE EVOLUTION OF SURREY'S ALR SINCE 1973

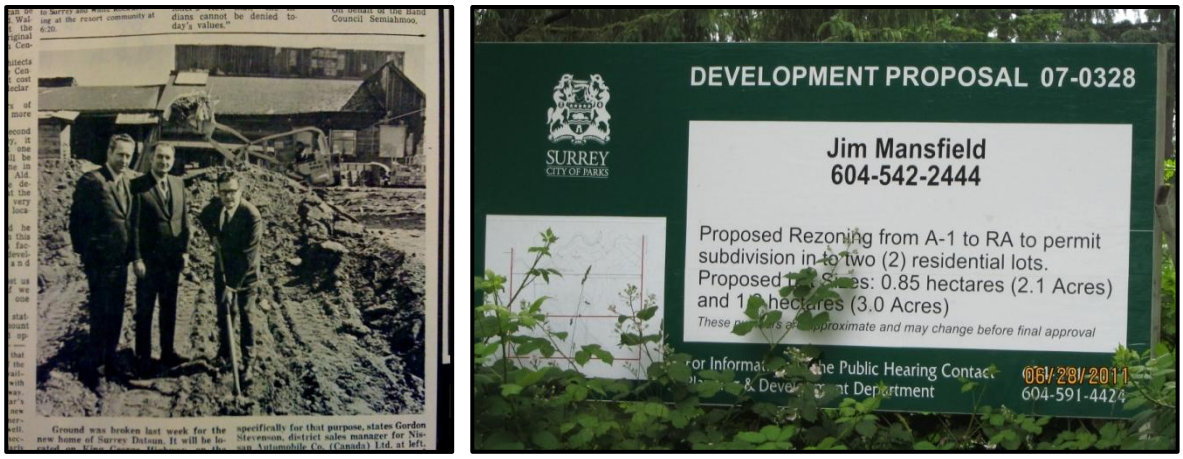


Figure 10: Historic and Modern Development of Surrey's ALR (1971 (L) and 2011 (R))

The passing of the Agricultural Land Commission Act in 1973 ushered in a new era of agricultural land protection in British Columbia as a moratorium was placed on development of agricultural land. In Surrey, where approximately 21,704 acres (8,787 Hectares) were designated as part of the provincial reserve, property owners essentially lost, overnight, their legal entitlement to develop or use their land for non-farm purposes.

Forty years later, the ALR program has undeniably slowed the rate at which agricultural land has been converted to non-agricultural use in the province. Many high profile cases of exclusion approval in urban-rural fringe areas, however, highlight the reality that the reserve is still being eroded. In some instances, the ALR has inconvenienced but not thwarted landowners and entrepreneurs willing to invest time and money into the political process necessary to have their exclusion requests approved.

Certainly, with rapid urbanization and the resultant need for municipal services, a balance between developing and preserving agricultural land has been difficult to achieve in many communities. As new research reveals the positive impacts that vital agri-food systems have on our societies, economies and environments, however, the protection of agricultural land is increasingly being viewed as critically important. In British Columbia, where agricultural land is scarce to begin with, the need to protect what remains today is particularly acute. Surrey is exemplifying progressive thinking and leadership by critically examining the issue and beginning to employ innovative and creative strategies to both manage urban growth and foster vibrant agriculture on its arable lands.

To assist Planners and policy-makers in meeting these objectives, ISH researchers undertook an examination of the loss and evolution of land in Surrey's Agricultural Land Reserve since 1973, with the specific research goals to describe the process, sequence, and extent of loss, identify trends and patterns, and discern if there has been an unintended "shadow effect" of urbanization policies and strategies on the ALR.

Historical Records Accessed

Archived documents held at the Agricultural Land Commission (ALC) were the first point of inquiry. As previously described, the ALC is an independent Provincial agency responsible for administering the ALR in favour of agriculture, and is the sole adjudicator of applications related to ALR land use, subdivision, and exclusion from the reserve. All landowners therefore require Commission approval to include or exclude land in the ALR, subdivide land in the ALR, use land in the ALR for non-farm purposes, or place fill or remove soil from land in the ALR.

In the multi-staged application process, the applicant first submits their request to their local government, which completes a report on the application and forwards it to the ALC along with its municipal-perspective comments and recommendations. The Commission then receives the application and, after holding meetings with the applicant and determining the potential impact that the application may have on agriculture, decides whether it will approve or refuse the application. Although the Commission is the final arbiter of any application, the perspective of the local government is taken into account and can have an impact on the final outcome of the case.

All records of ALR loss and (legal) land use changes are thus contained in the applications made by landowners to the ALC. These records include approved and refused applications for inclusion, exclusion, subdivision, or non-farm use within the ALR, applications to place fill or remove soil, and applications for transportation, utility and recreational trail uses in the ALR that had been submitted by land owners, development groups, local and provincial governments, or First Nations. Access to these historic records was gained in two ways.

In 2006, the ALC launched an online archive of Commission decisions on ALR applications, publicly through their website, which contains files associated with applications made for Surrey properties from 2006-2010 [17]. These included **fourteen** applications for non-farm use; **nine** applications for transportation, utility, and recreational use; **six** applications for subdivision; **one** application to deposit fill; and **one** joint application for exclusion and inclusion that would result in a net gain to the ALR area. Records for these applications generally included copies of ALC Staff Reports with information about the nature of the application and the subject property, minutes from the ALC meeting held to discuss and decide on the application, and a copy of the final decision letter sent to the applicant. Other supporting documentation, including the applicant's submission and rationale for making the request, was in most cases not available in these online records.

For records of applications that predate 2006, only hardcopy archive files were available. Despite our interest in applications of all types, ALC staff were only able to retrieve those archive files associated with exclusion applications from 1973 – 2005. Applications for non-farm use, to place fill or remove soil, and for transportation, utility and recreational trail uses were not available. Based on this limitation, it was only possible to complete an historical analysis of exclusion applications. Although data associated with other application types were collected through the online archive, results were not analyzed for this study.

[17] See References for URL

A total of 30 applications for exclusion were reviewed in hardcopy format at the ALC. These archive files typically included all or some of the following documents:

- The application by the landowner;
- City of Surrey reports and recommendations including an Engineering Department report describing the cost and feasibility, from an engineering standpoint, of the proposed use for the land; a Planning Department report assessing the proposal's congruence with Surrey's Official Community Plan, Zoning Bylaw, and general planning mandate; minutes from AAC meetings at which the application was discussed (in applications from 1995 or later); minutes from City Council meetings at which the application was discussed; and, City Council's recommendation to the ALC to approve or refuse the application;
- ALC reports and decisions, including ALC Staff Reports with information about the nature of the subject property (its current use, soil capability for agriculture, surrounding land use, and total size); minutes from the ALC Meeting held to discuss and decide on the application, including ALC evaluation of the parcel's agricultural suitability and the potential impact of the proposal on Surrey agriculture; and a copy of the final decision Letter to the applicant;
- Minutes from Greater Vancouver Regional District meetings at which the application was discussed;
- Letters of opinion from concerned citizens or citizens groups.

Historical City of Surrey land use inventories, zoning maps or aerial photography were also considered pertinent as they might reveal trends in agricultural and urban land management that the individual ALC applications would not. Although retrieving these documents would be useful for evaluating agricultural land loss rational and patters, it required extensive effort well beyond the means and scope of this project. Ultimately only a 1971 City of Surrey zoning map was available through the Surrey Archives.

Analysis of Records Collected

A significant challenge to the intended research, as described above, stemmed from the fact that historical maps and records related to ALR applications were either incomplete or, in the case of subdivision or non-farm use records, unavailable. From both online records and hardcopy archives, every attempt was made to collect comprehensive information related to the application, the parcel affected, the City of Surrey's recommendations, and the ALC's decision making process. In many instances, however, records were incomplete and we were thus unable to retrieve information related to all of these factors. These gaps in the data made objective analysis difficult and the identification of consistent trends impossible. As such, there is insufficient evidence to demonstrate a "shadow effect" of unintended consequences of urban land use policies on ALR lands. Likewise, without the complete data set it is impossible to comprehensively and conclusively identify the determinants of ALR land loss and change.

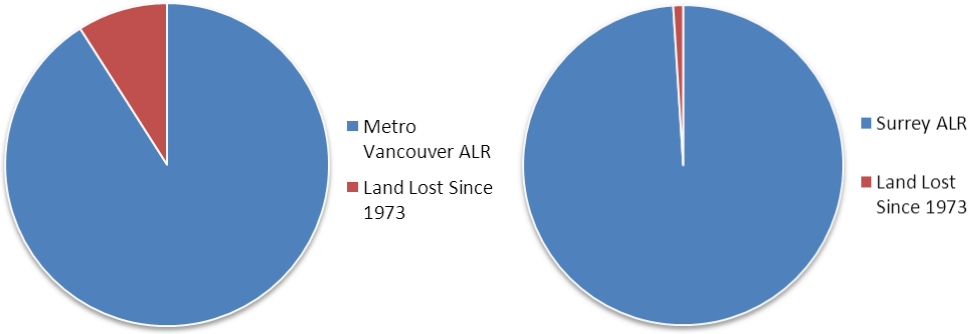
A total of 29 exclusion applications were made in Surrey over the 37 year study period, ten of which were approved and nine of which were approved in part or with conditions. Although this rate of approval (66%) is relatively high, it was noted that all applications for exclusion occurred before December 2003, the date on which Surrey's *Policy for Considering Applications for Exclusion of Land from the Agricultural Land Reserve (Policy 0-51)* (the "two for one" policy) came into effect. Since this policy was put in place, there are no records of exclusion applications being made for ALR land in Surrey. It would appear that this policy has effectively put a moratorium on the exclusion of land, though its effect on the rate of application for non-farm use, subdivision, soil deposition, transportation, or boundary adjustments cannot be measured due to a lack of data about these types of applications before the bylaw came into effect.

Table 4 summarizes the subset of applications for ALR properties in Surrey from 1973 – 2010, that the research was able to analyze.

Table 4: Historic Applications for Surrey ALR Properties, Reviewed by ISH

Application Type	1973 - 2005				2006 - 2010				Total
	Refused	Approved	Approved with Conditions / In Part	With- drawn	Refused	Approved	Approved with Conditions / In Part	With- drawn	
Exclusion	9	10	9	0	1	0	0	0	**29**
Non-Farm Use	*Records Not Available*				8	0	5	0	**13**
Subdivision					1	0	4	1	**6**
Soil Deposition					1	0	0	0	**1**
Transportation					4	2	2	1	**9**
Boundary Adjustment					0	1	0	0	**1**
Total	9	10	9	0	15	3	11	2	**59**

As a result of the 10 exclusion applications that have been approved in Surrey since 1973, a total of 233 acres (95 hectares) were lost from the ALR, representing about 1% of Surrey's total ALR landbase. Compared to the Metro Vancouver regional area, which lost 9% of its ALR landbase in approximately the same timeframe (Provincial Agricultural Land Commission, 2011), Surrey's losses via exclusion are very small.



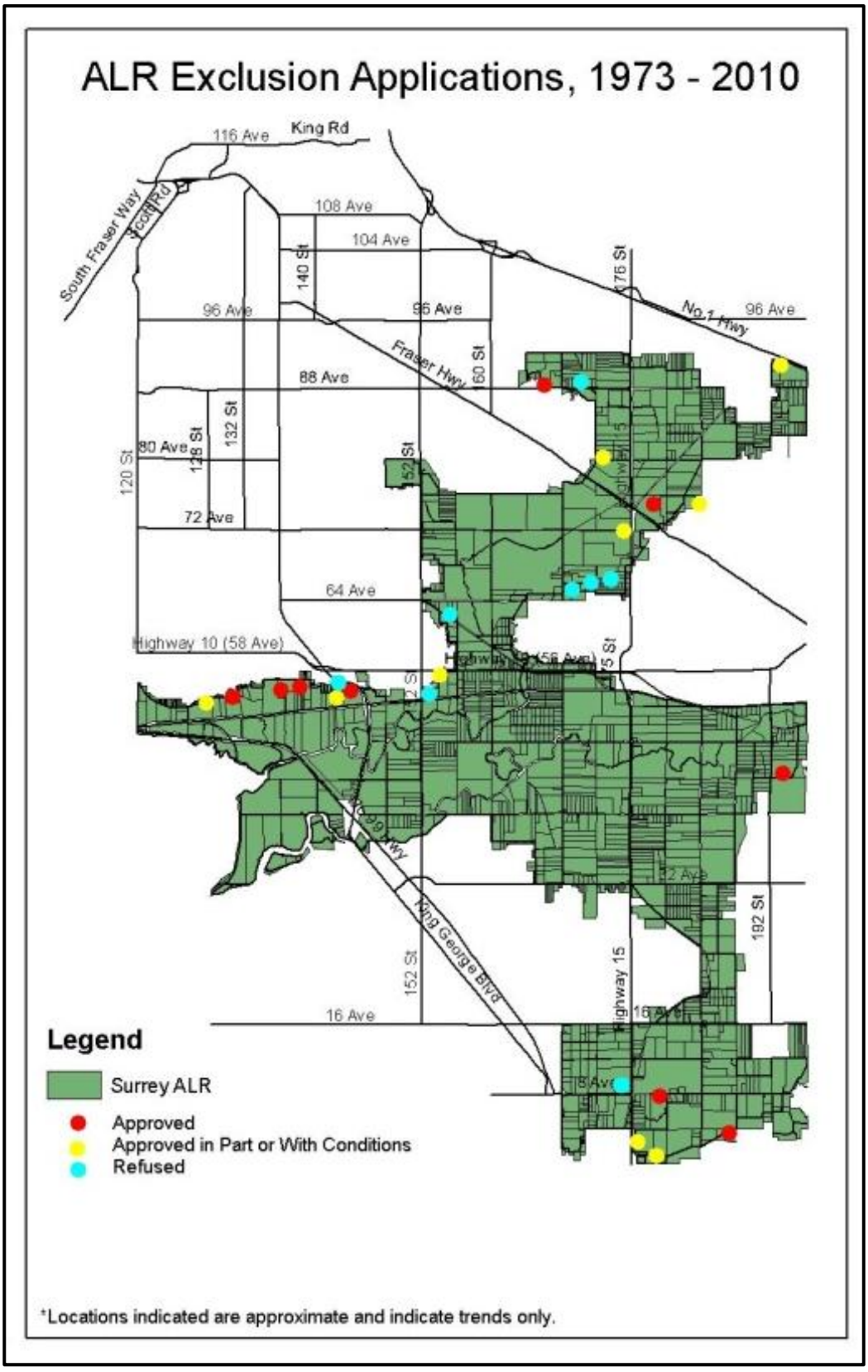
An Edge Effect

To determine the extent of change to the ALR due to exclusion from 1973-2010, the researchers sought maps of the ALR boundary at its inception in 1973. These maps, however, were unavailable from the City of Surrey or the Agricultural Land Commission. Illustrating likely boundary changes is thus only possible by mapping the location of properties for which exclusion applications were made from 1973 – 2010, as seen in *Map 6* (p.22).

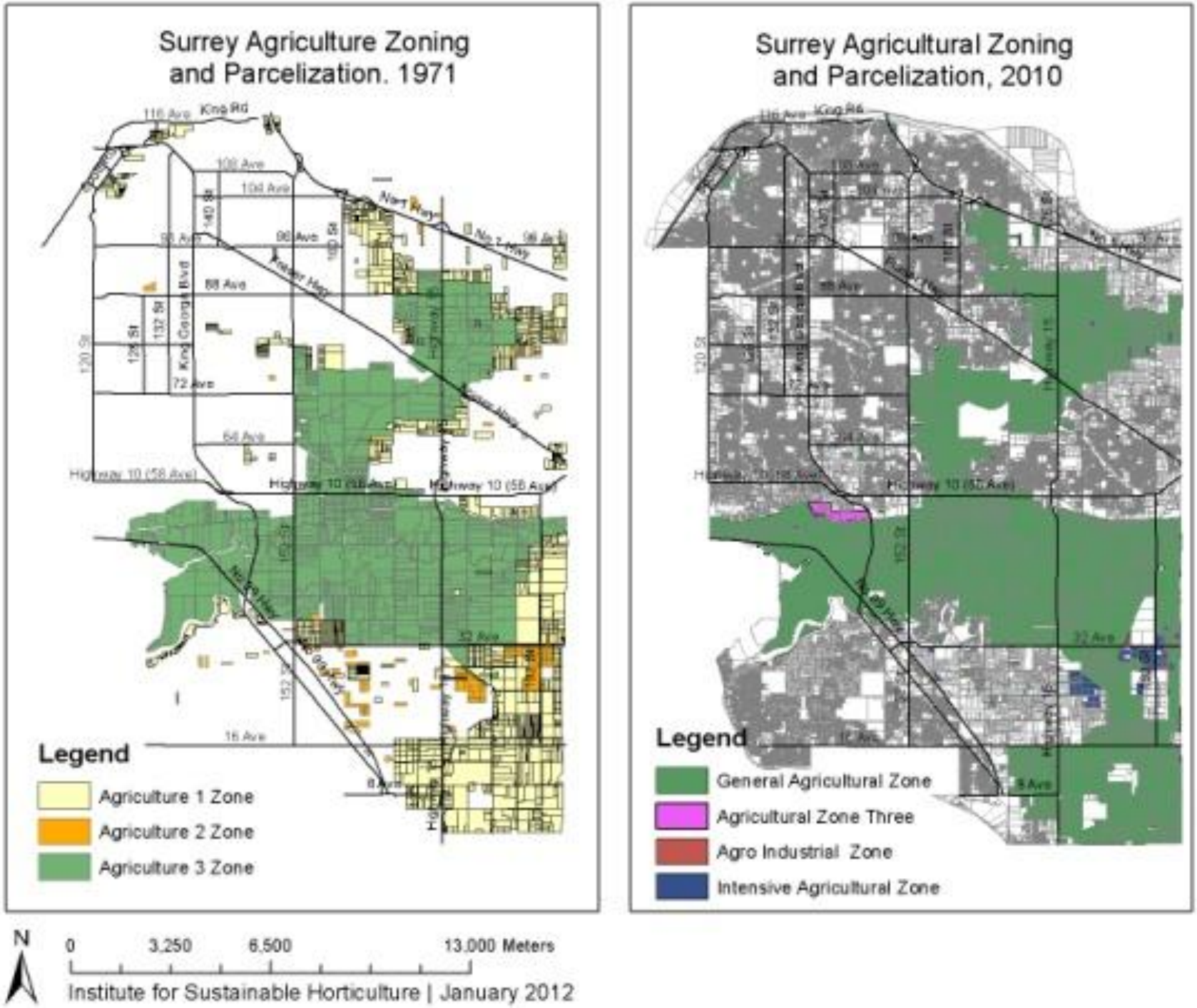
Note the significant "edge effect" that this map reveals: all historic exclusion applications (successful and unsuccessful) were found to have occurred on agricultural properties near the ALR edge. Although this suggests that the edge was historically most at risk to exclusion from the ALR, caution is required in interpreting this to suggest that it remains as such today. As described, the City's current efforts to preserve agricultural land within the ALR boundary are by all accounts successful. There has not been a single successful exclusion application made since the passing of the 2003 "two for one" by-law. Informal conversations with local realtors revealed that current land values are higher at the edge, which indicates that these properties may be subject to speculative valuation or seen as suitable sites for non-farm use, though not necessarily exclusion[18].

Map 7: Surrey's Agricultural Zoning and Parcelization, 1971-2010 (p.49) was created by ISH using current City of Surrey GIS data, and by digitizing a hardcopy Planning Department zoning map from 1971. Note that the area was already highly parcelized before creation of the ALR (1971). Although we were not able to examine ALR applications for subdivision from 1973-2005, this map, which illustrates the change in parcel sizes within Surrey's agricultural land base (and ALR) since 1971, gives some indication that the highly parcelized nature of Surrey's current ALR is not entirely a result of successful applications for subdivision.

[18] Interview with Real Estate Agents (Anonymous). (December 2011)



Map 6: ALR Exclusion Applications in Surrey, 1973 - 2010



Map 7: Surrey's Agricultural Zoning and Parcelization, 1971-2010

Discussion

The research was driven by initial thinking that an examination of the loss of Surrey's agricultural land from the ALR would be a useful line of enquiry if we were to assist Planners and policy-makers to protect and enhance the agricultural land base in the municipality. It was assumed that Surrey's ALR lands were under significant threat of exclusion from the ALR through a variety of pressures, including, rapid urbanization, speculation from developers and non-agricultural interests, and expropriation for transportation and infrastructure requirements.

Surprisingly, however, the investigation of historical records revealed that although Surrey's ALR is vulnerable to speculation, the exclusion of these lands is not inevitable. Very few Surrey parcels have, in fact, been lost to the ALR as a result of exclusion applications since 1973. Gary Runka, former General Manger and then Chair of the Agricultural Land Commission (1973-1975) has described the ALR program as initially being introduced under the recognition that, "in the face of increasing land use pressures, local governments were unable or unwilling to hold the line against rezoning agricultural lands to purportedly 'higher and better uses'."[19] The City of Surrey, supported by the Agricultural Land Commission and the provisions of the ALC Act, has proven an exception to this rule as it has historically done an exemplary job of maintaining the borders of its agricultural land base, and is strongly positioned to continue to do so into the future.

If a significant amount of land has not been lost from the ALR, then how has its utilization evolved since 1973? This is the more pertinent question our unexpected finding led us to ask, and which is explored in greater detail in the remainder of this report.

[19] Runka, 2006

3.0 UNDERUTILIZED LAND IN THE SURREY ALR

The investigation of historical change and loss to Surrey's ALR revealed that exclusion of ALR lands poses a minor threat to the vitality of the municipality's food system and agricultural land base. It suggested, however, that the more troubling dynamic is occurring *inside* the ALR and is related to the high incidence of this land's use for non-agricultural purposes. The most recent land use data available for the City of Surrey, which comes from an Agricultural Land Use Inventory completed by the Ministry of Agriculture in 2004, corroborates this notion and provided a basis from which to evaluate the extent of the problem today. *Table 5: Utilized and Underutilized Parcels in the Surrey ALR* describes land uses in Surrey's ALR in 2004 and distinguishes between those parcels we considered to be "underutilized for agriculture" and "utilized for agriculture" in the context of this investigation.

Table 5: Utilized and Underutilized Parcels in the Surrey ALR, 2004

	Primary Land Use Activity	Total Acres	Total Hectares	Percent of Surrey ALR	Total # Parcels
Underutilized	**Unused farm land**	2016	816	9.2%	166
	Not in use	380	154	1.7%	32
	Residential Use	717	290	3.3%	154
	Hobby Farm	405	164	1.8%	77
	Park	906	367	4.1%	44
	Institutional Use	74	30	0.3%	7
	Commercial/Service Use	326	132	1.5%	19
	Recreational Use	96	39	0.4%	2
	Mobile Home Park	57	23	0.3%	2
	Industrial Use	291	118	1.3%	10
	Golf Course	1272	515	5.8%	26
	Wildlife Management Area	230	93	1.0%	3
	Water Management	15	6	0.1%	13
	Utility	2	1	0.0%	2
	Transportation and Communications	138	56	0.6%	47
	Land in Transition	116	47	0.5%	19
	Unknown	143	58	0.7%	9
	Total	**7185**	**2909**	**32.8%**	**632**
Utilized	**Agriculture**	14672	5940	66.9%	710
	Freshwater Aquaculture	74	30	0.3%	2
	Total	**14746**	**5970**	**67.2%**	**712**

*This table derived from Ministry of Agriculture and Lands *City of Surrey Agricultural Land Use Inventory 2004*.

Inventory of Surrey's Underutilized ALR Land

To understand and assess the extent to which the underutilization of ALR land remains an issue today, we conducted an inventory of the 632 properties, covering 7,185 acres or approximately 33% of the total Surrey ALR, which had been identified as underutilized for agriculture in 2004. Over the summer of 2011, using a combination of road-side visual inspection and aerial photography interpretation, the following key data was collected for each of the 632 properties within the area:

- The parcel's 2011 primary land use, standardized into the categories: Commercial/Service Use, Golf Course, Industrial Use, Institutional Use, Not in use, Park, Residential Use, Unused Farm Land, Wood Lot, Agriculture*, Water Management, Wildlife Management, Transportation/ Communications, or Unknown.

  *Note that any parcels found to have become actively farmed since 2004 were subsequently removed from the study area as they were no longer considered to be "underutilized".

- A description of any permanent structures present on the parcels (for example: homes, garages, outbuildings, driveways and sidewalks, barns, commercial buildings, etc), and the approximate portion of the property they occupied.

- The general type of agriculture related activities the parcel had the potential to support, standardized into two categories:

  1. Soil based agriculture,
  2. Structure based agriculture (including greenhouses/hoop houses, raised beds, aquaculture, apiculture, or livestock barns), and/or food system services (those services required to support small-scale local agriculture, including production and pre-production services, post-harvest services, and distribution and supply services).

  This determination was based upon an assessment of the parcels' land cover, soil availability, proximity to major intersections, and current use(s). In general, land with an available soil resource was considered to have potential for any type of agriculture related activity, and land which was paved or had an otherwise degraded soil base was considered to have potential for structure based agriculture or food system services.

- The type of remediation necessary to make the parcel available to the selected agriculture related activities, standardized into the categories: Change of use, land clearing, structure reclamation or development, field preparation, or minimal to none. A complete description of these can be found on Page 59 (*Quality and Remediation of Underutilized Lands*).

- The portion of the parcel available for agriculture-related activities (ARAs), recorded as a percentage of the whole. Recording specifically what portion of each property would be available for ARAs, rather than simply the total size of the underutilized parcel, allowed us to make more accurate estimates of land available for future agriculture related activities in our analysis of the data collected.

For example, if a given property was composed of an unused field, a home, and a small woodlot, the unused field would be classified as available for ARAs (immediately), the woodlot as available for ARAs (after remediation), and the land base occupied by the home as unavailable for ARAs. Figure 11 represents this graphically.

Figure 11: Underutilized ALR Parcels (Outlined in Red) and Unusable Land (Outlined in Turquoise)

As the inventory was being compiled, the opportunity occasionally arose to speak informally with the owners of parcels in the study area. These conversations, which centered around their interest in small-scale agriculture, their perception of the value (agricultural or otherwise) of their land, and their opinions about development taking place on and around Surrey's ALR, contributed a qualitative understanding of the issues facing landowners in the ALR; the challenges Surrey would face if it attempted to increase the incidence of agriculture on these lands; and the potential benefits of doing so.

In addition to the inventory conducted, a survey package was delivered to the owners of all parcels in the study area. The package included of a letter notifying the land owner of the research being conducted, a six question survey designed to gather additional information about the underutilized land and its ownership, an invitation to a stakeholder focus group session to be held at Kwantlen University's Surrey campus, and a stamped, addressed envelope for respondents to mail completed surveys and focus group RSVPs back to the researchers. A copy of these documents can be found in Appendix 1 (p.146).

Where possible, the survey was delivered by hand. If this option was not available, surveys were mailed to parcel owners, whose addresses were retrieved via a BC Assessment title search performed by the City of Surrey on behalf of ISH researchers.

Findings

Land Use within the Study Area

The field work revealed that 561 of the parcels which were underutilized for agriculture in 2004 remained underutilized in 2011. This amounts to 6,347 acres (2,570 hectares), or 29.6% of Surrey's ALR.

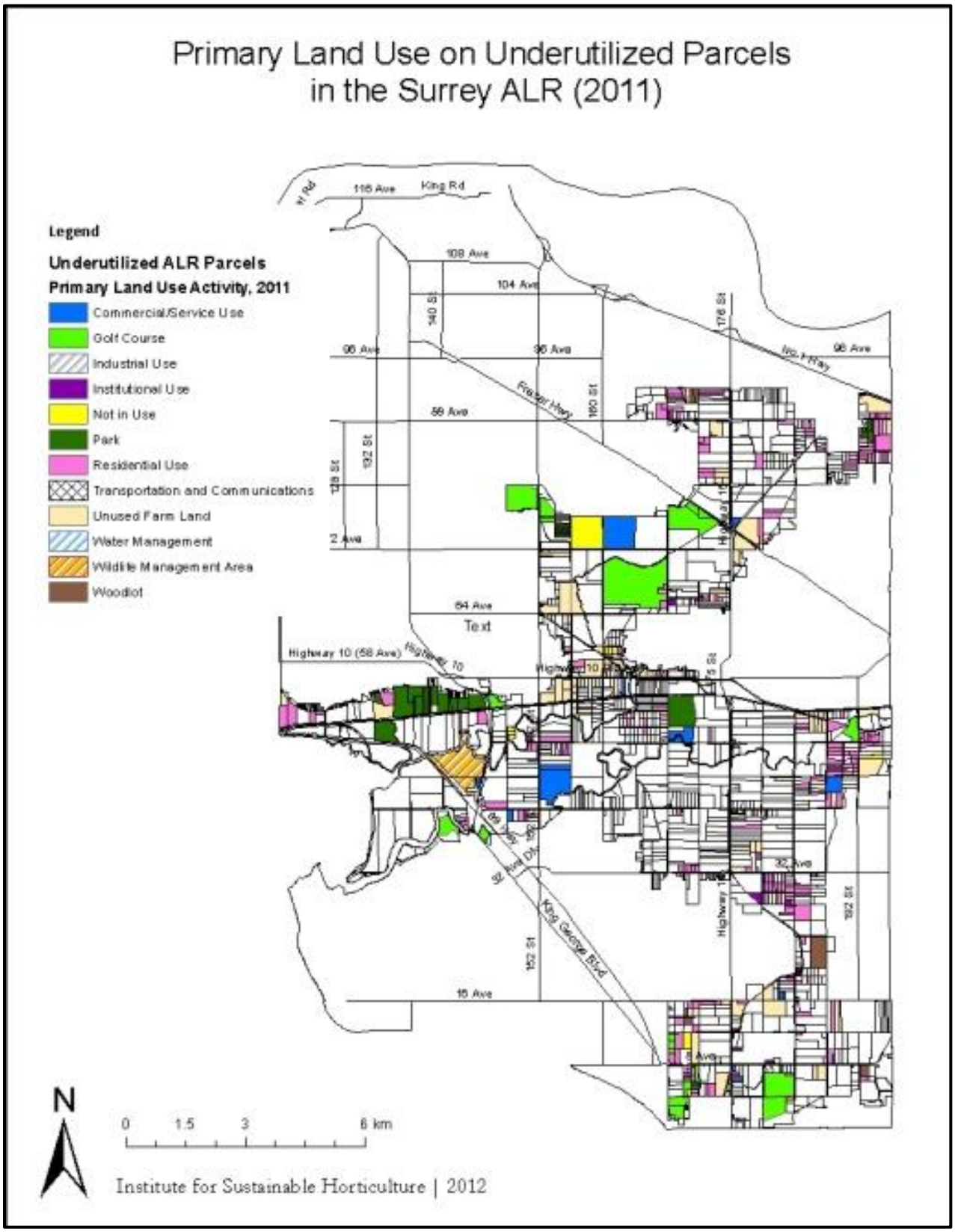
Of the 669 parcels surveyed by ISH researchers, only 25 were found to have transitioned into agriculture since the Ministry of Agriculture's survey was conducted in 2004. 83 were not surveyed because we were unable to identify their discreet street address or property identification number. These parcels, classified with the primary land uses "Agriculture" and "Unknown", respectively, have been removed from our analysis as they cannot be considered "underutilized".

Table 6: *Primary Land Use Activity on Surveyed Parcels in the Surrey ALR* outlines the primary land use classification assigned to the 561 underutilized parcels and Map 8: Primary Land Use Activities on Underutilized Parcels in the Surrey ALR (2011) highlights the distribution of these lands. It is significant to note that the underutilized parcels tend to cluster around ALR edges, pinch points, and nodes (areas where ALR land protrudes into non-ALR land)

Table 6: Primary Land Use Activity on Surveyed Parcels in the Surrey ALR

	Primary Land Use Activity (2011)	Number of Parcels	Total Area		
			Acres	Hectares	As Percent of Surrey ALR
UNDERUTLIZED PARCELS	Commercial/Service Use	21	477	193	2.2%
	Industrial Use	6	30	12	0.1%
	Institutional Use	8	76	31	0.4%
	Not in Use	31	275	111	1.3%
	Park	31	617	250	2.9%
	Residential Use	275	1,645	666	7.7%
	Unused Farmland	117	1,418	574	6.6%
	Woodlot	6	143	58	0.7%
	Golf Course	27	1,311	531	6.1%
	Water Management	11	14	6	0.1%
	Wildlife Management	3	229	93	1.1%
	Transportation and Communications	25	114	46	0.5%
	Sub-Total (underutilized parcels only)	*561*	*6,347*	*2,570*	*29.6%*
OTHER PARCELS	Agriculture	25	262	106	1.2%
	Unknown	83	891	361	4.1%
	Sub-Total (other parcels only)	*108*	*1,153*	*467*	*5.4%*
	Total (all surveyed parcels)	*669*	*7,500*	*3,037*	*34.9%*

*Table derived from ISH field work data and Ministry of Agriculture and Lands *City of Surrey Agricultural Land Use Inventory 2004*



Map 8: Primary Land Use Activities on Underutilized Parcels in the Surrey ALR (2011)

Figure 13: Size of Underutilized Parcels in Surrey's ALR (2011)

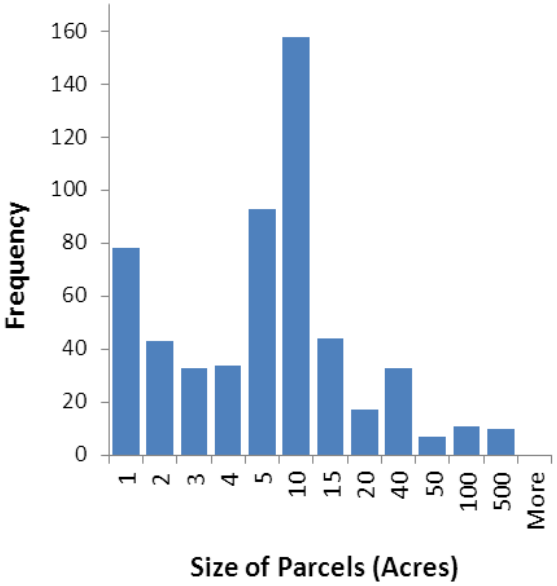
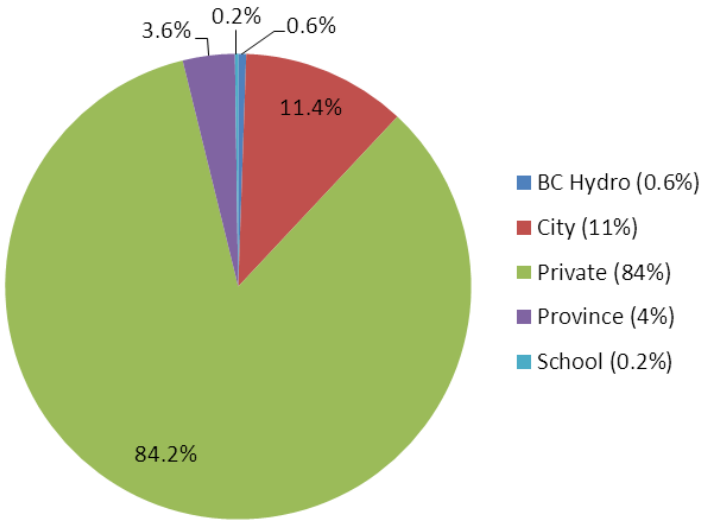


Figure 12: Ownership of Underutilized Parcels in Surrey's ALR (2011)



Surrey's underutilized ALR parcels are typically small in size, with 50% being 5 acres (2.4 hectares) or smaller and 78% being 10 acres (5 hectares) or smaller. *Figure 13: Size of Underutilized Parcels in Surrey's ALR (2011)* illustrates the distribution of parcel size.

While the majority of underutilized parcels (503 out of 561, or 90%) are privately owned, a small number are owned by public institutions including the City of Surrey, the Surrey School Board, the Provincial Government, and BC Hydro (see Figure 12: Ownership of Underutilized Parcels in Surrey's ALR (2011)). City owned parcels, though relatively low in number, are significant from a land area perspective as they cumulatively account for approximately 726 acres (294 hectares) of ALR land on 42 parcels, or enough land for roughly 15 "average sized" Surrey farms[20]. Most of these parcels are currently public parks with varying levels of development. None of the underutilized parcels are federally owned.

[20] Average farm size in Surrey is 19 hectares, as reported in the 2006 Census of Agriculture

Usable area of Under Utilized Lands

The field work revealed a total of 6,347 acres (2,570 hectares) of currently underutilized agricultural land on 561 parcels in the Surrey ALR. Some parcels within the underutilized ALR land, including those categorized as *Woodlot, Not in Use, and Unused Farmland*, are largely undeveloped and thus usable for agriculture in their entirety. Not all parcels, however, are necessarily available or suitable for agriculture related activities.

Figure 14: Example golf course (L) and permanent structure (R) on ALR Land

Buildings, residences, or other structures were typically found on parcels used for commercial, industrial, institutional, and residential purposes. These structures, though technically impermanent, effectively render portions of each property not amenable to agriculture or food system services in the near term future. **The portion of underutilized land occupied by structures, which was calculated to be approximately 877 acres (355 hectares), was therefore subtracted from our estimation of total underutilized area[21].**

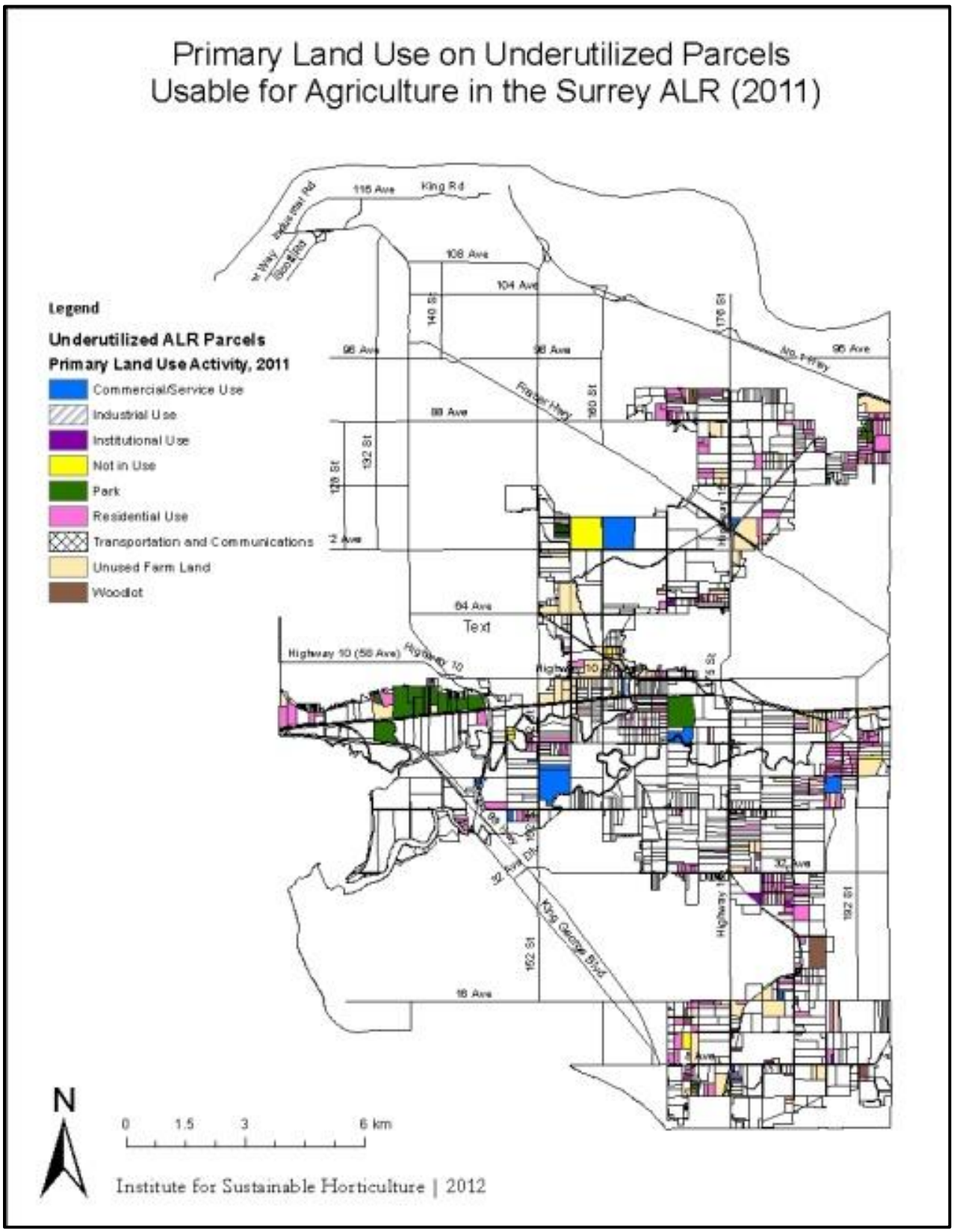
Although we do not condone the use of ALR land for golf courses, based on a lack of available information about into the feasibility and cost of converting Golf Courses back into agricultural land, the **1,312 acres (531 hectares) of Surrey ALR land that is currently occupied by *Golf Courses* was subtracted from the total underutilized area.**

[21] This was calculated by multiplying the estimated percent of the parcel occupied by permanent structures (as recorded during the field work) by the area of the whole parcel.

Figure 15: Serpentine Fen Wildlife Management Area

Some non-agricultural land uses, including *Water Management Areas, Wildlife Management Areas, and Transportation and Communication corridors*, are unlikely to be utilized for agriculture because they support important ecosystem or infrastructure services which are essential for Surrey's urban and agricultural communities. **These areas, which together constitute 356 acres (144 hectares), were considered permanently alienated from agriculture and their area was also subtracted from the total underutilized area.**

Subtracting the parcels or parcel portions described above from the total amount of underutilized ALR land allowed us to conservatively estimate that **approximately 3,802 acres (1,539 hectares) of Surrey's currently underutilized ALR land could be used for agriculture.** *Map 9: Primary Land Use Activities on Underutilized Parcels Usable for Agriculture in the Surrey ALR (*2011*),* on p.59, illustrates the distribution of only those underutilized parcels in the Surrey ALR that have land potentially available for agriculture.



Map 9: Primary Land Use Activities on Underutilized Parcels Usable for Agriculture in the Surrey ALR (2011)

Quality and Remediation of Underutilized Lands

The assessment of agricultural potential on Surrey's underutilized ALR parcels, completed during the field work, did not include any soil sampling and was largely based on the identification of permanent structures or natural features which would prohibit future agricultural activities from taking place on the land. Based on BCLI soil surveys (see Map 2: Improved Land Capability for Agriculture, page 23) and the extensive improvements that the City of Surrey has made to agricultural lands through dyking and drainage (See "Flood Control Infrastructure" page 25), it is presumed that standard field preparation and soil building activities (for example, composting, liming, tilling, etc.) will be sufficient to bring most of the underutilized ALR land that is available for agriculture into production. These activities are standard to any agricultural enterprise and well within the economic and means of a startup farming operation.

Beyond standard field preparation and soil enhancement that would be required to bring any land into production, however, approximately 1,237 acres (500 hectares) of the underutilized land that is available for agriculture were noted during the field work to require some more intensive form of land remediation before they could be put into production[22]. Generalized categories of remediation include *change of use, land clearing,* and *structure reclamation or development*. The challenges and, if applicable, costs associated with each kind of remediation are discussed below.

Change of use

A change of use involves converting into agricultural use those portions of properties currently used for a non-agricultural purposes. The most common non-agricultural uses in this category include: hobby farms, truck parking, and residential or commercial lawns. The willingness of the landowner to engage their land in agriculture rather than its current non-agricultural use is the biggest barrier to this type of remediation taking place. For many land owners, a more feasible alternative to farming their land themselves would be leasing or licensing their land to a farmer on an annual basis. This will be discussed further below.

Figure 16: Commercial property requiring "change of use" remediation

Land clearing

Land clearing involves the remediation of once-farmed parcels which are now unmanaged and over-grown with brush and scrub, as well as the clearing of woodlots. A number of companies in the Lower Mainland and Fraser Valley provide tree cutting and land clearing services, and their cost varies from approximately $5,000 – 15,000 per acre, depending on a variety of factors including tree density and size, undergrowth density, and land access. The City of Surrey's tree cutting bylaw and tree protection bylaw would also apply to any land clearing activity taking place in the ALR. Permits would need to be obtained by the land owner before any trees were felled.

[22] Note that this land is not considered permanently alienated from agriculture and therefore the landbase it represents is included in the analysis which follows in forthcoming sections of the report.

Recognizing that existing forested areas can, if properly managed, be significant carbon sinks (natural reservoirs that accumulate and store carbon), a further investigation of the feasibility of alternative forest management practices such as agroforestry or selective logging is warranted to determine best practices for minimizing the environmental impact of land clearing on Surrey's underutilized ALR parcels.

Structure reclamation or development

Some parcels were assessed to be only suitable for food system services or structure based agriculture, because of lack of soil or soil degradation. These parcels generally would require appropriate structures such as greenhouses, hoop houses or raised beds to be built and soil imported. In some instances, pre-existing abandoned buildings on the property may be able to be re-claimed for use in a food system services capacity.

Figure 17: Land available for the development of structure based agriculture

The costs associated with this category of land remediation are highly variable and dependent upon the specific project and design implemented on the site. Successful structure based agriculture could take a form as simple as raised beds built on marginal soil, or small unheated hoophouses which cost $6,000 – 7,000, or as intensive as fully lit, heated, vented, and irrigated greenhouse which can cost many millions to establish.

Likewise, food system services infrastructure can be as simple as setting up a Farmers Market on an unused parking lot or as complex as the proposed multi-million dollar "New City Market" facility that has been proposed for Vancouver, which is planned to include a farmers market, cold storage facilities, a processing facility, food retail, and research and development facilities to support the continued development of a local food system[23].

Real Estate Value of Underutilized ALR

During course of our fieldwork we noted many parcels in the ALR for sale and represented by real estate agencies. To further understand the dynamics of ALR land valuation we queried five realtors representing five parcels, ranging from 1.35 acres to 2.2 acres (average 1.79) in size that were for sale. Asking price for these parcels ranged from $850,000 to $2,280,000, with an average price of $1,416,000, or $790,179 per acre.

These realtors reported, however, that small parcel ALR land was generally valued even higher, at $175,000 to $200,000 per acre, and that location within the ALR greatly influenced valuation. The existence of dwellings and other structures on the land was reported to increase ALR land value, although not as significantly as proximity to urban development. ALR lands near the urban- agriculture

[23] Local Food First, 2011

edge were reported to be valued far in excess of lands located deeper in the ALR, with urban- ALR interface lands, without structural improvements, reportedly valued at $500,000 or more per acre.

This level of valuation, one source noted, was not limited to very small parcels only, referencing one 4.6 acre property with a small 46 year old house listing for $2.2 million. Additionally it was relayed to us that many of Surrey's small ALR lands are bought with a 50% down payment required by most lending institutions, and as such often purchased for investment by entities with no intention of residing (or farming) there. All five realtors interviewed concurred that no small lot ALR parcel (20 acres or less) in Surrey is "bought or sold for agriculture" and agriculture-urban edge ALR land value is unequivocally based on the expectation of future exclusion from the ALR and subsequent development.

Findings - Landowner Survey and Focus Group

Forty-four of 561 surveys administered to owners of Surrey's underutilized ALR parcels were returned completed (7.6% return rate). The majority of respondents (96%) were from property owners for whom the parcel is principally a family or individual residence. Fewer than 5% of respondents indicated that the property was owned by a corporation or business, and no survey respondents indicated ownership by a government, cooperative, community trust, or developer. Therefore, while data is not representative of all types of ownership (for example we know from other sources that 11% of parcels are owned by municipal government and 4% by the Provincial Government, see Figure 12: Ownership of Underutilized Parcels in Surrey's ALR (2011), p.56), it is likely very representative of the residential owner segment.

The survey results corroborate our field work findings that this land is highly underutilized for commercial agriculture, with respondents reporting a variety of non-agricultural uses within the categories "residential", "business-related", and "undeveloped". Most respondents who did indicate agricultural activities on their property (32%) generate under $10,000 in gross annual revenue, primarily with forage or pasture, not food crop production. The data indicate that these respondents generally lease their land to another party, and benefit from the farm class tax status that this arrangement affords.

Respondents' explanations of reasons why their property is not used for agricultural activities related to the landowners' *lack of interest or training in farming* (36%), the landowners' *lack of confidence in the economic profitability of farming* (30%), and the landowners' *belief that their land is not suitable for agriculture* (36%). These three barriers are reflective of the attitudes and perspectives that the researchers encountered when the opportunity arose to speak casually with landowners as the field work was completed.

> *36% of survey respondents (owners of underutilized parcels in the Surrey ALR) indicated that they lack the interest and/or skills necessary to farm their land.*

Despite their overall lack of knowledge of or confidence in agriculture, 39% of respondents indicated they are "likely" or "very likely" to allow the increased use of their property for agriculture (specifically, for the production of food crops), suggesting that genuine potential to bring this land into agriculture does exist. The respondent indicated that a range of potential policies, programs, or support networks would incentivize them to allow the increased use of their land for agricultural production. These include: improved tax incentives (48% support), subsidies for land remediation (30%), subsidized utility rates (25%), a network to connect landowners to land-seeking farmers (23%), municipal support for landowners entering into lease agreements with tenant farmers (18%), risk free lease with tenant farmers guaranteed by municipal government (16%), agricultural training for landowners (20%), and a mandated minimum level of agricultural activity on land zoned A1 or ALR (11%).

The focus group held at Kwantlen Polytechnic University's Surrey campus on August 17th, 2011, was attended by six owners of underutilized land in the Surrey ALR. After presenting an overview of the research questions and results to that point, these stakeholders were engaged in a discussion around the questions:

- *Are you interested in farming your land or leasing it to a farmer?*
- *What currently prevents or discourages you from farming your land or leasing it to a farmer?*

- *What would you need /what would encourage you to do agriculture on your land? What, specifically, could the City of Surrey offer that would support you?*
- *Has the evening's discussion and presentation changed your opinion on the agricultural potential of your land or interest in seeing it farming? And,*
- *Do you believe that small- lot, local-scale, direct-market agriculture sector in Surrey is possible?*

Participants represented a range of age, background, and interest in agriculture. All shared a concern for what they saw as an increasingly frequent misuse of Surrey's ALR for non-agricultural purposes including the illegal dumping of fill and parking of transport trucks. Most participants saw feasibility in the option of leasing their land to farmers, but expressed concerns related to ensuring the farmer was reliable, whether or not the rent would justify any inconveniences associated with their use of the land, and in general how they would administer the lease and their relationship with the farmer.

Two of the participants hoped to farm their land themselves in the future, but lacked the knowledge and experience of how to do so. They expressed interest in working further with ISH or the City of Surrey to implement an agricultural enterprise on their land.

For more details, tabulated survey results can be found in Appendix 2 (p.150) and Focus Group meeting minutes can be found in Appendix 3 (p.153).

Discussion

The field work revealed that there are approximately 6,347 acres (2,570 hectares) of underutilized land in Surrey's ALR, 3,802 of which could feasibly be used for agriculture. This second figure is equivalent to almost 18% of the municipality's total ALR land base, constitutes 1.4 times as much land as Surrey currently has in berry production, and could host 81 average sized farms if it were more spatially contiguous[24].

While this area alone is undoubtedly significant from an agricultural perspective, it is worth pointing out that the field work examined only those parcels of land in Surrey's ALR that had been classified as underutilized in 2004, updating the available historic data with their current use and potential for agriculture. Not included in the survey was any land that was classified in 2004 as being used for commercial agriculture but which could have since become underutilized. While conducting the field work, researchers did notice parcels where this had occurred, but did not record the data as it was beyond the scope of the study. Further examination of land use on all ALR parcels would be required to evaluate the extent of this.

Regardless of whether the field-work accounted for all of the underutilized land or not, it goes without saying that bringing this land into agricultural production will be challenging to for a variety of reasons. As the survey and focus group, as well as informal discussions with landowners revealed, there is a high incidence of ownership of these parcels by non-agriculturalists with a wide range of interest, willingness, and ability to make their land available to farmers or take up farming themselves. On many parcels, degradation has made soil-based agriculture impossible, but the costs associated with developing structure based alternatives may be prohibitive to landowners in the short term.

That being said, the amount of land that is available represents a significant untapped resource for the City of Surrey with enormous potential from food production, economic, and job creation perspectives. While the Municipality's main planning concern historically has been the loss of ALR land *to the reserve*, our evaluation of ALR records and field analysis of underutilized ALR lands identified that the greater threat to agricultural viability in Surrey is *non-farm use of parcels within the ALR* and its valuation being much higher than that justified by agriculture.

After 40 years of the ALR programs' existence, its policies and strategies are proving effective in protecting and preserving the large parcels of agricultural land, but the smaller parcels, particularly those on the edge, are increasingly under threat of speculation, and loss to agriculture, but not necessarily to the ALR. This finding suggests that current planning strategies and policies have been inadequate or insufficient to stimulate or maintain agricultural use on the municipality's ALR lands. Addressing the issue will require a shift in the approach taken for agricultural land management and protection in which municipalities are seen as key players who are supported by, but not solely dependent on, the Agricultural Land Reserve Program, but doing could yield significant economic and community benefits.

The potential of this land, and the strategies Surrey can employ to catalyze its realization, will be explored in the following sections of this report.

[24] Average farm size in Surrey is 19.1ha, as reported by Statistics Canada in the 2006 Census of Agriculture.

4.0 AGRICULTURAL POTENTIAL OF SURREY'S UNDERUTILIZED ALR LAND

Local-scale, Human-intensive, Ecologically Sound Agricultural Scenarios for Surrey's Underutilized ALR Lands

To convey the inherent agricultural potential of different types and conditions of Surrey small parcel ALR lands that our field study revealed, we developed five illustrative local agri-food system scenarios. These scenarios we designate as 1) Micro-farms, 2) Small-scale Farms, 3) Mid-scale Farms and/or Community Farms, 4) Structure- Based Agriculture and 5) Local Agri-food System Services.

Some of these scenarios are appropriate for only one parcel type while others might be appropriate for differing parcel sizes and types. We offer that all these scenarios reflect realistic, feasible ways for underutilized small lot ALR lands to contribute to the realization of a substantial local agri-food sector in Surrey, and collectively represent valuable and/or necessary elements of a local-regional agri-food system. It is noteworthy that, per the scenarios put forth and our field assessment findings, very few small parcel ALR land types cannot be matched to one or more scenario (singly or in combination) and put meaningfully to local food crop production. Finally these scenarios are not intended to be prescriptive or delimiting in any way, rather they are to suggest realistic, transformative ways for these lands to be farm lands, as they are intended and designated to be, again.

The table below provides an overview of the five scenarios and the quantitative and qualitative description of Surrey's underutilized lands that fit within each. The following sections describe each in more detail.

Agricultural Scenario	Land Size	Land Type	Underutilized Land Suited to this Scenario		
			Total Parcels	Total Area (Acres)	Total Area (Ha)
Micro Farm	Under 0.5 acres	Arable	16	5.5	2.2
Small Scale Farm	0.5 – 2 acres	Arable	56	73	30
Mid-Scale Farm or Community Farm	Over 2 acres	Arable	347	3685	1492
Structure Based Agriculture or Food System Services	Any size	Non-arable	19	39	16
Total			**438**	**3803**	**1540**

Best Practices in Local Scale, Human Intensive Agriculture

*"While we [have achieved] miracles of productivity**, agriculture … is now the single greatest source of human damage to the global environment**. That damage takes a number of forms: erosion and salinization of soils; deforestation; fertilizer runoff; loss of biodiversity; fresh water scarcity; and agrochemical pollution of water and soil."*

-Richard Heinberg
"50 Million Farmers" Address, 2006

Perhaps no other field sees such a dichotomy between methods of production as agriculture. Given the intensity of this debate, the City of Surrey needs to consider carefully what type of agricultural practices it can promote and restrict in its policies, bylaws, and programs, especially as it relates to bringing currently underutilized ALR land into production. By strategically incentivizing agronomic practices that third parties have determined minimize negative environmental impact, or in some cases even enhance ecosystem services capacity of farms, Surrey has the potential to configure this agriculture to contribute to community health and vitality, economic wealth, and its greenhouse gas emissions reductions targets.

Popular and academic literature is rich with information about agricultural practices which are the best choice for the health of consumers, the protection and enhancement of the environment, and the sustainability of food systems, and many certifications are available for farmers seeking third-party recognition approval of the on-farm practices they employ.

In this report, rather than describe specific recommended production techniques for local scale, human intensive agriculture on Surrey's underutilized ALR lands, ***the following scenarios are based on an assumption that these farms will use low input, biologically based production systems that have allow environmental impact, reduce GHG emissions, increase GHG sequestration, and are highly compatible with small spaces and peri-urban agricultural areas.***

Further resources on best practices can be found in the following recommended sources and guidelines:

- UN FAO Climate Smart Agriculture
- Canadian Organic Growers
- Local Food Plus
- Biodynamic Farming and Gardening Association
- Salmon Safe
- Food Alliance

Small Lot to Micro Farm

- *Farm Size:* Under 0.5 acres
- *Land Type:* Arable

This scenario includes the very smallest scale commercial farms, which are highly suited to urban and peri-urban locations where growing space is limited and the market is in close proximity to the farm. Best crop choices for this scale of agriculture are either a diversified mix of annual vegetable crops (including beets, herbs, leafy greens, peas, and tomatoes) or a single, high value and easily marketed annual crop (such as sprouts, salad greens, or garlic). Labour is done by hand, minimizing the need for expensive farm equipment.

This scale of agriculture is best suited to direct marketing at farmers markets, or to regular customers through a community supported agriculture program. A farmer may cultivate a single plot of this size, or choose to farm multiple small plots which together make up a larger agricultural enterprise. Either option requires little in the way of start-up capital, could employ one half to full time farmer, and can be profitable within the first year.

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:
Approximately 16 parcels, each with fewer than half an acre of underutilized usable, arable land, currently exist in the Surrey ALR. The parcels generally include residences, hobby farms, and commercial properties. Together, they constitute over 2.2 hectares (5.5 acres) of usable underutilized agricultural land. Landowners with this amount available for agriculture may choose to farm it themselves or lease/license it to a farmer to use on a two to five year basis.

Figure 18: Before (Small Lot) and After (Micro Farm)

MICRO FARM CASE EXAMPLE: Greencity Acres – Kelowna BC
When Curtis Stone, a former Montreal musician, began farming in 2009 with no agricultural experience and little in the way of land, the Kelowna, BC resident adopted the SPIN® (Small Plot Intensive) farming method, which is "a non-technical, easy-to-learn and inexpensive-to-implement vegetable farming system that makes it possible to earn significant income from land bases under an acre in size" (What's SPIN, 2011). Stone is now growing on seven plots of urban land (most of them backyards) that together make up about three quarters of an acre of growing space. Stone grows mixed organic vegetables for sale in a CSA program, eight restaurants, and one farmers market, and generates over $50,000 per year in revenue.
http://www.greencityacres.com, http://spinfarming.com/

MICRO FARM CASE EXAMPLE: My Urban Farm – Vancouver BC
Chris Thoreau of My Urban Farm grows sunflower, buckwheat, and pea sprouts on approximately 2,000 square feet (1/20th of an acre) of leased land in the heart of Vancouver. Over a 21 week growing season, the tiny operation employs one full time and one half time staff and generates about $21,000 in revenue. Thoreau's sprouts are delivered, by bicycle, for sales at two Vancouver farmers markets, through two local produce distributors, and in several grocery stores and restaurants.
http://myurbanfarm.drupalgardens.com

Large, Occupied Lot to Small-scale Farm

- *Farm Size:* 0.5 – 2 acres
- *Land Type:* Arable

At 0.5 – 2 acres, this is a common size for human intensive, organic farms producing for the local market. Best crop choices for this scale of agriculture are a diversified mix of annual vegetable crops (including beets, carrots, herbs, leafy greens, peas, garlic, and beans). With enough space, a small flock of free range laying hens can also be incorporated into the business model.

This scale of agriculture is best suited to direct marketing at farmers markets, or to regular customers through a community supported agriculture program. Most labour is done by hand, minimizing the need for expensive farm machinery. In the first few years, this scale of farm could generate between $50,000 and $100,000 in annual revenue.

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:
Approximately 56 parcels with 0.5 – 2 acres of underutilized usable, arable land, currently exist in the Surrey ALR. They generally include residences, hobby farms, and commercial properties. Together, they constitute over 29.7 hectares (73.4 acres) of usable underutilized agricultural land. Landowners with this amount available for agriculture may choose to farm it themselves or lease/license it to a farmer on a two to five year basis.

Figure 19: Before (Large Lot) and After (Small Scale Farm)

SMALL SCALE FARM CASE EXAMPLE: Rootdown Farm – Pemberton, BC
Rootdown Organic Farm is a two acre organic farm located in the Pemberton Valley, BC. In addition to vegetables and eggs which are sold through a community supported agriculture program, at farmers markets in Pemberton, Squamish, and Vancouver, and to several local restaurants, Rootdown Farm also offers a "pig share" program, in which customers commit to purchasing a whole or half pig in the spring by making a deposit. The farmer can then put the deposit toward the cost of raising the pig. In the fall the remaining cost is paid when the pig is butchered and delivered. http://rootdownfarm.net/

SMALL SCALE FARM CASE EXAMPLE: Cropthorne Farm – Ladner, BC
Cropthorne Farm is run by sisters Lydia and Rachel Ryall, who lease a two and a half acre portion of their parents' seventy five acre parcel in Ladner, BC. Capitalizing on their own personal strengths and interests, Lydia manages the farm and their farm internship program, while Rachel orchestrates the marketing of their forty types of organic vegetables and free range eggs through a community supported agriculture program and at several Lower Mainland farmers markets. http://cropthornefarm.wordpress.com/

Large, Unoccupied Lot to Mid-Scale Farm or Community Farm

- *Farm Size:* Over 2 acres
- *Land Type:* Arable

At this scale (over two acres) two or more full time farmers, in addition to part time labour during harvest season, are needed to farm the land. On a privately owned farm of this scale, crop choice can include both high and mid-value vegetables, which could be complimented by a small flock of free range laying hens or other small livestock such as goats or rabbits. A small scale orchard would also be feasible at this scale. Direct sales at the farm gate or farmers markets, to local restaurants and institutions, or to regular customers through a community supported agriculture program, are all viable marketing strategies.

With more land available, farms of this scale could be based on the multi-functional “community farm” model where the land is held "in trust" for the community rather than owned privately. Under this model, a community group or co-operative oversees agreements governing the use of the land, and its agricultural uses are shared by a community of farmers. While monetary profit is necessary to the survival of community farms, it is not usually their main goal. Community farms work to protect and develop local farming capacity, the supply of local, sustainably produced food, and the agricultural land base. Some community farms incorporate residential development and agriculture-related elements into their design, including educational institutions, processing and storage facilities, and “incubator” farmland for new farmers to use on a short term basis as a launch-pad for their farming careers and businesses.

The Community Farms Program, which is jointly delivered by FarmFolk/CityFolk and The Land Conservancy of BC, currently supports more than 20 community farms in BC by providing information and resources for community farm stakeholders through a web page, a network, roundtable and other meetings, and personal contact. The program also brings landowners, farmers, and local communities together to form new community farms (Community Farms Program, 2009).

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:
Approximately 347 parcels with over 2 acres of underutilized usable, arable land currently exist in the Surrey ALR. They generally include overgrown or unused fields, grounds of institutions/businesses, municipal parks, or unused areas of residential properties. Together, they constitute 1492 hectares (3685 acres) of usable underutilized agricultural land. Landowners with this amount available for agriculture may choose to farm it themselves or lease to a farmer on a minimum ten year basis.

Figure 20: Before (Large Lot) and After (Mid-Scale Farm or Community Farm)

MID SCALE FARM CASE EXAMPLE: Glen Valley Organics – Abbotsford, BC
Managed by farmers Chris Bodnar and Jeremy Pitchford, Glen Valley Organic farm is known for its organic fruit, vegetables, and eggs which are grown on twelve and a half acres in the Fraser Valley. With a larger farm comes the need for additional labour and equipment; Glen Valley employs two full time and five half time employees, who make use of two small tractors, a large washing station, a walk in cooler and freezer, as well as storage area for harvested crops. Bodnar and Pitchford lease the land at an annual rate of $3,500. The farm generates approximately $60,000 in annual revenue.
http://glenvalleyorganicfarmcoop.org/

MID SCALE FARM CASE EXAMPLE: Apple Annie Orchard – Langley, BC
Apple Annie Orchard is a four acre orchard in Langley, BC, owned and managed by retired Professor Jim Rahe. By finding a niche market in rare and heritage apple varieties, not available in grocery stores, Rahe has successfully developed a base of regular customers who return annually to buy apples from his farm gate. Rahe and his wife put in approximately 35 hours per week of work on the orchard to generate $31,000 annually, or an hourly rate of $25 – 30 for their own labour.

COMMUNITY FARM CASE EXAMPLE: Horse Lake Community Farm Co-Op – Lone Butte, BC
Horse Lake Community Farm Co-operative is an agricultural co-op operating on 133 acres of heritage farm property in the South Caribou region of BC, where increasing development pressure is leading to the development and subdivision of agricultural land and sensitive waterfront areas. The Co-op is run by a board of directors, and the property currently leased to member farmers who have over 30 years of experience in cooperative agriculture and use the land to raise and cultivate organic vegetables, sheep, cattle, and poultry. The property is also used for retreats, agricultural workshops, and other educational and fundraising events. The Co-op's goal is "to protect and develop local farming capacity and agricultural resources, together with cultivating an ethical and high quality food supply."
http://www.horselakefarmcoop.ca/

COMMUNITY FARM CASE EXAMPLE: The Intervale Centre – Vermont, USA
The Intervale is a nationally recognized centre for sustainable agriculture and a unique community resource for farmers and residents in the Burlington, Vermont region. The Centre incorporates a "Farms Program," which leases land, equipment, greenhouses, irrigation and storage facilities to small independent farms, a two-year business planning program that helps Vermont farm operations improve their viability, a farmer-managed "Food Hub" that aggregates, markets and distributes local vegetables, fruits, meats, eggs, cheeses and specialty products, a conservation nursery growing native riparian trees and shrubs for conservation projects statewide, as well as community consulting, lands stewardship initiatives, and community outreach initiatives. Their goal is to "grow viable farms, preserve productive agricultural land, increase access to local, organic food, compost and other soil amendments, and protect water quality through organic waste management and stream bank restoration" (Intervale Centre, 2011).
http://www.intervale.org/

Non-Arable Land to Structure Based Agriculture

- *Farm Size: Any size*
- *Land Type: Non-arable*

Even in agricultural areas, some parcels have marginal soils, have been paved over, or are for other reasons no longer arable. Although these parcels are not suitable for traditional farming, they still can still play a valuable role in the local agri-food system by supporting structure-based agriculture or food system services. Under a structure-based agriculture scenario, crops are grown in raised beds, greenhouses, or hoop houses (unheated greenhouses) in imported soil. Over time, soil importation can be minimized by establishing on-site composting.

For hoop houses and greenhouses, heat loving crops such as cucumbers, eggplants, peppers, and tomatoes are the best choice. In the Lower Mainland's mild climate, farmers also have the opportunity to use agricultural structures as season extension tools which can allow them to grow and harvest fresh crops all year round. This type of agriculture is best suited to direct marketing at farmers markets or to local restaurants, institutions, or processors.

Figure 21: Before (Truck Parking Lot) and After (Hoophouse Farming)

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:

Approximately 19 properties with underutilized non-arable land currently exist in Surrey's ALR. Together, these non-arable areas constitute they constitute 38.6 acres (15.6 hectares) of usable, underutilized agricultural land. The most common current use of these lands is vehicle or transport truck parking.

In this scenario, a truck parking lot has been converted into a structure-based agriculture site based on hoop houses growing heat-loving crops in raised beds. Higher start-up costs associated with the building of infrastructure associated with this type of agriculture lend it to be more suitable to farming by the landowner, or by a tenant farmer on a minimum seven year lease.

Non-Arable Land to Food System Services

- *Farm Size: Any size*
- *Land Type: Non-arable*

Non-arable parcels can also be used to support the range of services and infrastructure that are required to sustain an enhanced small scale local agriculture sector. These include:

- Production and pre-production services (composting, equipment sales and repair, and agricultural supplies retail);
- Post-harvest services (food processing and storage facilities; distribution and supply facilities such as terminal markets, farmers markets, and local food retail stores);
- Agriculture extension and education centres.

Some of these enterprises could be managed by an individual while others are more suited to management by a community organization, institution, or government agency.

AGRICULTURAL POTENTIAL IN EXISTING, UNDERUTILIZED SURREY LOTS:

As described above, approximately 19 properties with underutilized non-arable land currently exist in Surrey's ALR. Together, these non-arable areas constitute they constitute 38.6 acres (15.6 hectares) of usable, underutilized agricultural land. The most common current use of these lands is vehicle or transport truck parking.

In this scenario, an abandoned gas station has been converted into a local food market which sells produce from neighbouring farms. Higher start-up costs associated with this type of scenario lend it to be more suitable to be undertaken by the landowner, by a long term tenant, or by an institutional body.

Note that food system services are best suited to lands zoned for agricultural industries (I-A Agro Industrial Zone in Surrey), which are generally located in close proximity to but not on valuable farmland. In this way, services are accessible to the agricultural community but the industrial use does not compete with agriculture for scarce, arable land. Only in instances where structure-based agriculture is not an option on non-arable land should these services be established on parcels within the ALR. In this case, the site's proximity to major roadways, small size, and pre-existing structure make it more suitable to use in a food system services capacity than a structure based agriculture capacity.

STRUCUTRE BASED AGRICULTURE CASE EXAMPLE: SOLEfood Farm – Vancouver, BC

SOLEfood Farm, established in 2009 by the charitable organization United We Can, is an urban, community-based farm consisting of hundreds of planters built on an unused hotel parking lot in the heart of Vancouver's Downtown East Side. In exchange for allowing the farm to use the parking lot, the hotel owners receive a tax break on city property taxes. The farm provides training and employment opportunities to neighbourhood residents, who plant, maintain, and harvest food from the farm. The locally grown food is sold to restaurants, at farmers markets and when possible, supplied to community organizations with similar aims of improving neighbourhood food security. This farm's noteworthy success in its first three seasons has led to the planned expansion of the operation in 2012 to include two additional farm sites and expanded markets and employment. http://1sole.wordpress.com/

STRUCUTRE BASED AGRICULTURE CASE EXAMPLE: Growing Power – Milwaukee, Wisconsin

Growing Power is an American non-for-profit organization and land trust which teaches people to grow, process, market, and distribute food in a sustainable manner. Their internationally renowned "community food centre" is a two acre farm and agriculture demonstration site in Milwaukee, Wisconsin, that includes six greenhouses and nine hoop houses growing vegetables and freshwater fish in a structure-based aquaponics system. The site also incorporates an apiary with 14 beehives; three poultry hoop houses with laying hens and ducks; outdoor pens for livestock including goats and turkeys; a sophisticated composting operation including a work depository for building soil health; an anaerobic digester to produce energy from the farm's food waste; a rain water catchment system; and a retail store to sell produce, meat, worm castings, and compost to the community. Under this intensive and incredibly productive growing system, Growing Power founder Will Allen estimates that the site generates $5/square foot in revenue, or $217,800 per acre (Allen, 2011). http://www.growingpower.org/

FOOD SYSTEM SERVICES CASE EXAMPLE:
Farmers Markets

Surrey's *Urban Farmers Market* is held once a week throughout the summer. Market vendors, who directly grow, raise, create or make the items they sell, come from Surrey and other areas in Metro Vancouver or the Fraser Valley. Farmers' market success in other cities, including Vancouver which boasts five weekly summer markets and one weekly winter market, speaks to the potential for growth and expansion of the Surrey farmer's market to other areas and a longer season.
http://www.surreymarket.org/
http://www.eatlocal.org/

FOOD SYSTEM SERVICES CASE EXAMPLE:
Sustainable Agriculture Tool Lending Library – North Carolina, USA

George O'Neal and Kelly Owensby, beginner farmers in North Carolina, US, developed The Sustainable Agriculture Tool Lending Library when they realized how difficult it was for new farmers to rent or buy equipment for their farms. Together with ten other farmers, they formed a cooperative to buy farm tools together. The lending library uses a shared calendar to manage who gets what tool when, and collects annual membership fees that are used to maintain the current tool inventory and collectively purchase additional tools.

FOOD SYSTEM SERVICES CASE EXAMPLE:
The Seattle Farm Co-Op – Seattle, Washington

The Seattle Farm Co-op is a community-based project supplying urban farmers in the Seattle area. The co-op focuses on obtaining supplies such as animal feed, fertilizers, mulch, seeds, etc., from local and sustainable sources, and saving money through co-operative purchasing. The growing organization, which is currently run entirely by volunteers, aims to become a place for urban farmers and other community members to share tools, information, and resources, take classes, and more.
http://www.seattlefarmcoop.com/

5.0 ECONOMIC, JOB CREATION, and FOOD PROVISION POTENTIAL OF SURREY'S UNDERUTILIZED ALR LAND

Recent interest in local food and agriculture systems has sparked many investigations into the potential for re-localized systems to make substantial contributions to the economies in which they are situated. Jeffrey O'Hara describes this potential succinctly in his 2011 report *Market Forces*, which found that local food systems can increase business innovation and entrepreneurship; result in sector-specific economic growth; foster regional economic development; and support employment. O'Hara identifies direct marketing channels such as farmers markets and farm gate sales as especially critical to local economies, as these systems allow most, if not all, of sales revenue to be retained in and multiplied through the local economy.

In light of the perceived potential of food production, we were interested in evaluating and illustrating the potential of Surrey's underutilized ALR lands to contribute to the local economy and satisfy Surrey residents' demand for commonly consumed fruits, vegetables, and animal products. To do so, we estimated the potential job creation, revenue, and food production that could result if these lands were brought into agriculture under a small-scale, human-intensive, direct-market model. Direct marketing refers to the practice of farmers selling their products directly to the consumer, rather than to a "middle man" type agent such as a broker, packing house, wholesaler, or grocer.

To illustrate the lands' potential under this small-scale, human-intensive, direct-market model, we developed the four following production scenarios:

Direct Marketing is favoured by many small scale farmers as it allows them to capture a larger share of the "food dollar" and therefore achieve a higher return on their crop sales. Direct Marketing can be done through a variety of channels, including:

- Farm gate sales;
- Road side stands;
- U-pick operations;
- Farmers markets;
- Community supported agriculture schemes; and,
- Farm-to-institution or farm-to-restaurant programs.

- *Scenario 1: Mixed Production*
  This scenario models the production of the following *29 fruit and vegetable crops and 3 animal products*: apples, asparagus, beets, bell peppers, broccoli, Brussels Sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, eggs, garlic, honey, hazelnuts, kale, lamb, lettuce, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, and zucchini.

- *Scenario 2: Labour Intensive Production*
  This scenario models the production of the following *ten most labour intensive crops:* tomatoes, snow peas, turnips, apples, beets, garlic, carrots, radishes, bell peppers, potatoes.

- *Scenario 3: Highly Profitable Crop Production*
  This scenario models the production of the following *ten most profitable crops:* spinach, tomatoes, pak choy, snow peas, radishes, Chinese cabbage, beets, pumpkins, cabbage, turnips.

- *Scenario 4: Production Based on Consumption*
  This scenario models the production of the following *ten highly consumed products:* tomatoes, apples, carrots, potatoes, cabbage, lettuce, yellow onions, table grapes, cucumbers, eggs.

Note that the crops used in these scenarios were selected due to their adaptability to Surrey's physical and climatic environment. Furthermore, these crops are representative of a Canadian diet, and can be expected to be eaten by Surrey residents. These crops do not constitute an exhaustive list of possible producst that could be produced and sold by direct-market agriculturalists in Surrey.

We applied the four production scenarios to three different land scenarios: one acre of underutilized ALR land, City of Surrey owned underutilized ALR land (685 acres), and on all underutilized ALR land (3,804 acres). Table 7, below, summarizes the cropping and land use scenarios applied to assess economic and food production potentials of Surrey's underutilized ALR.

Table 7: Cropping and Land Use Scenarios Applied to Assess Potentials of Surrey's Underutilized ALR

		LAND USE SCENARIOS - Production On:		
		All Underutilized ALR Land (3,802.1 acres)	All City Owned Underutilized ALR Land (684.68 acres)	1 Acre of Underutilized ALR Land
CROPPING SCENARIOS - Production Of:	29 crops and 3 animals suited to the region (1)			
	10 most labour intensive crops/ animals suited to the region (2)			
	10 most profitable crops/ animals suited to the region (3)			
	10 most highly consumed crops/ animals suited to the region (4)			

Analysis and results, reported in terms of: *food production potential, revenue generation potential, and job creation potential.*

1 Apples, asparagus, beets, bell peppers, broccoli, Brussels Sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, garlic, lettuce, hazelnuts, kale, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, zucchini, eggs, honey, and lamb.

2 Tomatoes, snow peas, turnips, apples, beets, garlic, carrots, radishes, bell peppers, potatoes.

3 Spinach, tomatoes, pak choy, snow peas, radishes, Chinese cabbage, beets, pumpkins, cabbage, turnips.

4 Tomatoes, apples, carrots, potatoes, cabbage, lettuce, yellow onions, table grapes, cucumbers, eggs.

To illustrate the potential of Surrey's underutilized ALR lands to satisfy Surrey residents' demand for commonly consumed fruit, vegetable, and animal products, farm production and food consumption data was applied to two production scenarios on *all underutilized ALR land*:

- The production of 32 crops and animal products for provisioning on a seasonal basis (approximately 6 months/year); and,
- The production of 24 crops and animal products for provisioning on a year-round basis (12 months/year).

The source of data and methods used in this analysis are described in the following two sections, and the results of both analyses follow.

Methodology Used for Calculating the Economic Potential of Underutilized Land in the Surrey ALR

Data used in this analysis were sourced from farm production budgets (single enterprise or mixed enterprise) and market research conducted by ISH in 2009 and 2011. A farm production budget estimates the expected inputs, expenses, yields, and revenue of various farm products.

Production Budgets:

The following crop-specific data was obtained from the production budgets, as described in more detail below: *yield, variable costs of production, fixed costs of production*, and *labour hours.*

Every effort was made to obtain and use crop production budgets from southwest British Columbia (BC Ministry of Agriculture's *Planning for Profit* series), as these were deemed most reflective of Surrey's production environment conditions. In instances where budgets from southwest British Columbia were not available, ISH selected enterprise budgets from climatically-similar locations including Vancouver Island (Planning for Profit), western Washington, and Oregon (university extension publications). Where these were also not available, budgets from eastern regions were used. A complete listing of the enterprise budgets consulted for each crop and animal product is provided in the references section of this report. Where production budgets were used from American sources, we assumed an exchange rate of $1USD = $1CAD.

It was assumed that enterprise budget production costs and yields were reflective of conventional production systems, not those associated with small-scale, human intensive production. recognizing this, as well as the inherent variability in farming costs and yields as well as the potential of relatively higher cost for crop production inputs (such as water) in Surrey, we increased estimated costs of production by 15% and decreased estimated yield by 10% from those offered in the enterprise budgets we referenced in order to have higher levels of confidence in our calculations.

Yield per Unit Area (Pounds per Acre):

- Radish yield was expressed in *bunches* in the production budgets. We converted it to pounds using the formula: 1 bunch = ½ lb.
- Corn yield was expressed in *ears* in the production budgets. We converted it to pounds using the formula: 1 ear = 1 ½ lbs.
- Apple, pear and grape yield values were decreased by 50% to account for differences in growing conditions in the Lower Mainland as compared to growing conditions in the region where data was sourced from. All other yield values obtained from the literature were reduced by 10%, as described above.

V*ariable Costs of Production per Unit Area (Dollars per Acre):*

- This cost category includes, generally, field labour (production and harvest), and crop production costs (seeds, fertilizer/lime/manure, pest management and control, fuel, machinery, repairs and maintenance, transport, irrigation, wildlife control, and packaging). Note that irrigation costs are not included for apples, hazelnuts, pears, and radishes as this data was not available from their production budgets.

- Manager's salary is not included in variable cost estimates. It is assumed that the farm manage would be paid out of the farm's net revenue.
- Values obtained from the literature were increased by 15%, as described above.

Fixed Costs of Production per Unit Area (Dollars per Acre):

- This cost category includes accounting and legal, bank charges, insurance, rent, utilities, repair and maintenance, auto expenses, office supplies and postage, telephone, small tools and supplies, and Workers Compensation Board (WCB), Employment Insurance (EI), and Canadian Pension Plan (CPP) contributions.
- Values were derived from BC Ministry of Agriculture Planning for Profit "Five Acre Mixed Vegetable Operation: Full Production" by dividing the total presented in that budget by five to arrive at an estimate of fixed costs on a per acre basis, which were applied to all crops equally.

Labor hours per unit area: Expressed as Full Time Equivalent - Labour (FTE-L)

- One FTE-L is based on 40 hours of work per week for 48 work weeks per year. Note that:
    - Although this calculus allows comparison of the employment potential of agriculture to other industries, it does not take into account the seasonal nature of agricultural employment.)
    - Labour data available are likely reflective of operations with some level of mechanization (tractors, tillage implements, rototillers, cultivators, seed drills etc.) and therefore may underestimate labor required for more human-intensive farming enterprises.
- FTE-L is a measure of field labour, which includes only crop/product planting, tending, and harvesting. Labour requirements for these activities were reported in a variety of formats, including:
    - *Direct Hours*: Production Budget indicated the total number of hours needed to produce crop
    - *Piece Rate*: Labour costs are given in piece rate. We derived the hours worked by assuming a $12/hour base wage.
    - *Labour Costs and Labour Wages*: Production budget indicated total labour cost and hourly wage. To derive labour hours, we divided labour costs by the hourly wage.

  For all crops, these various measures were converted to total labour hours and then number of FTE-L positions.
- Management and marketing labour is not reflected FTE-L, and therefore the farm Manager's salary is not included in the labour costs. We assume that manager salary comes out of the net profit for the scenario, as described below.

Market Research

2009 data collected by ISH at several lower mainland farmers markets and 2011 data collected by ISH at Surrey grocery stores (Save-On Foods, Choices Markets and Fruiticana) were used to determine the direct market price, expressed in $CAD per pound, for each of the 29 crops and 2 animal products used in the analysis. Whenever possible, farmers' market values were used. When these were not available, prices for organic, local product was preferentially used over prices for conventional products or those of an unspecified origin. In instances where more than one preferred data point was available, (e.g. three sources for local, organic cabbage), an average was calculated and used.

Table 8 shows all of the pricing data that was collected and used for the study. Note that these were considered accurate reflections of the *direct* market price for organic farm products, under which the farmer captures 100% of the sale price of their products.

Table 8: Pricing Data Collected and Used for Economic Analysis

Crop		Prices Used in Analysis		Prices Collected							
				Save-On-Foods		Fruiticanna		Choices Market		Farmers' Markets	
		Price	Source	Price	Type	Price	Type	Price	Type	Price	Type
Vegetables	Asparagus	$ 4.98	CM	$ 2.49	?			$ 4.98	O		
	Beets	$ 2.75	FMs	$ 1.79	L	$ 0.79	?	$ 2.98	O	$ 2.75	DM
	Bell Peppers	$ 3.98	CM	$ 3.39	?	$ 0.99	?	$ 3.98	L, O		
	Broccoli	$ 2.25	FMs	$ 1.79	O	$ 0.98	?	$ 2.48	O	$ 2.25	DM
	Brussel Sprout:	$ 1.98	CM	$ 2.79	?	$ 0.98	?	$ 1.98	L, O		
	Cabbage	$ 1.60	FMs	$ 0.69	O	$ 0.59	?	$ 2.50	L, O	$ 1.60	DM
	Carrots	$ 2.23	FMs	$ 1.50	O	$ 0.59	?	$ 2.50	L, O	$ 2.23	DM
	Cauliflower	$ 3.50	FMs	$ 2.99	L, O	$ 1.79	?	$ 3.98	O	$ 3.50	DM
	Cucumbers	$ 2.25	FMs	$ 1.90	O	$ 1.95	?	$ 3.98	O	$ 2.25	DM
	Garlic	$ 9.00	FMs	$18.61	O	$ 0.79	?	$ 14.98	L, O	$ 9.00	DM
	Kale	$ 4.00	CM	$ 2.64	?			$ 4.00	L, O		
	Lettuce	$ 1.25	FMs	$ 2.99	L	$ 0.99	?	$ 2.48	L, O	$ 1.25	DM
	Pak Choy	$ 3.98	CM	$ 1.88	?	$ 1.49	?	$ 3.98	L, O		
	Pole Beans	$ 3.99	CM	$ 2.69	?	$ 1.49	?	$ 3.99	O		
	Potatoes	$ 1.85	FMs	$ 1.99	L	$ 0.99	?	$ 2.98	L, O	$ 1.85	DM
	Pumpkins	$ 1.63	FMs			$ 1.98	?			$ 1.63	DM
	Radishes	$ 2.48	CM	$ 0.99	?	$ 0.75	?	$ 2.48	L, O		
	Snow Peas	$ 7.98	CM	$ 9.99	?			$ 7.98	O		
	Spinach	$ 7.98	SOF	$ 7.98	O						
	Sweet Corn	$ 1.25	SOF	$ 1.25	?						
	Tomatoes	$ 1.63	FMs	$ 1.24	L	$ 0.99	?	$ 1.48	L, O	$ 1.63	DM
	Turnips	$ 1.24	Average	$ 1.49	L	$ 0.59	?	$ 0.98	L		
	Yellow Onions	$ 1.09	Average	$ 1.19	L	$ 0.79	?	$ 0.98	L		
	Zucchini	$ 1.63	FMs	$ 1.69	?	$ 0.99	?	$ 1.28	L	$ 1.63	DM
Animal Products	Egg Production	$ 6.14	Average	$ 6.49	L, O			$ 5.79	L, O		
	Honey	$ 7.27	CM	$ 8.61	L, O	$ 4.09	?	$ 7.27	L		
	Lamb	$ 17.62	Average	$15.41	?			$ 19.82	?		
Fruit & Nuts	Apple(Jonagol	$ 1.89	FMs	$ 1.39	L	$ 0.99	?	$ 1.68	L	$ 1.89	DM
	Hazelnuts	$ 14.02	Average	$12.20	?			$ 15.83	?		
	Pears	$ 2.25	FMs	$ 2.49	L, O	$ 0.40	?	$ 2.48	L, O	$ 2.25	DM

L Indicates a price for local produce
O Indicates a price for organic produce
L, O Indicates a price for local, organic produce
? Indicates a price for produce which had unknown origin and production practices
FMs Farmers' Markets
CM Choices Market
SOF Save On Foods
Average Indicates that an average price was derived based on collected data

Derived data

- *Gross income per unit area*, calculated as follows:

$$Gross\ Income = \frac{Lbs.}{Acre} \times \frac{\$CAD}{Lb.}$$

- *Contribution Margin per unit area,* calculated as follows:

$$CM = Gross\ Income - Variable\ Costs$$

- *Net receipts (profit) per unit area,* calculated as follows:

$$Profit = CM - Fixed\ Costs$$

- *Management hours per unit area:* expressed as Full Time Equivalent - Manager (FTE-M)
  Because production budgets used to estimate farm labour requirements did not include labour associated with farm management or marketing of produce, farm manager labour was added to these scenarios. Based on the demands of a human-intensive, direct market production system, it was assumed that one full time farm manager would be required per five acres in production or per farm operation, whichever is less.

- *Job creation potential*: expressed as Full Time Equivalent (FTE) and calculated as follows:

$$FTE\ Total = FTE\ Labour + FTE\ Manager$$

Water and Revenue Generation Potential in Surrey

Cost and availability of water for crop and stock irrigation has been identified as a significant barrier to the establishment of farms on currently underutilized ALR parcels in Surrey. The availability of City water within the ALR is currently restricted to essential residential and limited agricultural applications,a nd the cost of broadening its agricultural availability is significant. Further discussion of thes limitations, and potential policy and programmatic solutions, can be found on page 93.

Note, however, that (with the exception of four crops: apples, hazelnuts, pears, and radishes), the cost of irrigation is included in the variable costs of production used in the forthcoming scenarios, and that the variable costs of production have been increased by 15% to account for the potentially high cost of water in Surrey.

Table 9 (page 81) offers a summary of all crop production and economic data collected from the literature, the field work, and derived for use in the analysis that follows.

Table 9: Summary of Crop Production Data Collected from Literature and Field Word and Derived for Use in Analysis

		Data Collected from Production Budgets and Field Work					Data Derived for Use in Analysis		
	Crop	Yield	Variable Cost of Production	Market Price	Gross Income	Contribution Margin	Labor Requirements	Variable Cost**	Yield***	Contribution Margin****
Animal	Eggs	4,560 dozen/acre	$ 10,139 /acre	$ 5.79 /lb	$ 26,402 /acre	$ 16,263 /acre	94 hours/acre	$ 11,153	3,876	$ 11,289
	Honey*	100 lbs/acre	$ 73 /acre	$ 7.27 /lb	$ 727 /acre	$ 654 /acre	2 hours/acre	$ 80	85	$ 538
	Lamb	549 lbs/acre	$ 3,380 /acre	$ 17.62 /lb	$ 9,671 /acre	$ 6,291 /acre	51 hours/acre	$ 3,718	467	$ 4,502
Fruit	Apples	11,713 lbs/acre	$ 6,893 /acre	$ 1.89 /lb	$ 22,138 /acre	$ 15,245 /acre	434 hours/acre	$ 7,582	9,956	$ 11,235
	Hazelnuts	2,500 lbs/acre	$ 1,477 /acre	$ 14.02 /lb	$ 35,040 /acre	$ 33,563 /acre	104 hours/acre	$ 1,625	2,125	$ 28,159
	Pears	14,222 lbs/acre	$ 3,467 /acre	$ 2.25 /lb	$ 31,929 /acre	$ 28,462 /acre	217 hours/acre	$ 3,814	12,089	$ 23,326
	Table Grapes	6,000 lbs/acre	$ 1,833 /acre	$ 2.99 /lb	$ 17,940 /acre	$ 16,107 /acre	204 hours/acre	$ 2,016	5,100	$ 13,233
Vegetable	Asperagus	4,500 lbs/acre	$ 2,779 /acre	$ 4.98 /lb	$ 22,410 /acre	$ 19,631 /acre	200 hours/acre	$ 3,057	3,825	$ 15,992
	Beets	19,800 lbs/acre	$ 7,954 /acre	$ 2.75 /lb	$ 54,450 /acre	$ 46,496 /acre	400 hours/acre	$ 8,749	16,830	$ 37,533
	Bell Peppers	9,300 lbs/acre	$ 7,717 /acre	$ 3.98 /lb	$ 37,014 /acre	$ 29,297 /acre	303 hours/acre	$ 8,488	7,905	$ 22,973
	Broccoli	7,800 lbs/acre	$ 5,580 /acre	$ 2.25 /lb	$ 17,550 /acre	$ 11,970 /acre	222 hours/acre	$ 6,138	6,630	$ 8,780
	Brussels Sprouts	10,560 lbs/acre	$ 6,143 /acre	$ 1.98 /lb	$ 20,909 /acre	$ 14,766 /acre	246 hours/acre	$ 6,757	8,976	$ 11,015
	Cabbage	31,900 lbs/acre	$ 6,503 /acre	$ 1.60 /lb	$ 51,040 /acre	$ 44,537 /acre	283 hours/acre	$ 7,154	27,115	$ 36,230
	Carrots	23,700 lbs/acre	$ 14,613 /acre	$ 2.23 /lb	$ 52,733 /acre	$ 38,119 /acre	347 hours/acre	$ 16,075	20,145	$ 28,748
	Cauliflower	8,050 lbs/acre	$ 5,034 /acre	$ 3.50 /lb	$ 28,175 /acre	$ 23,141 /acre	120 hours/acre	$ 5,538	6,843	$ 18,411
	Chinese Cabbage	37,500 lbs/acre	$ 4,062 /acre	$ 1.60 /lb	$ 60,000 /acre	$ 55,938 /acre	52 hours/acre	$ 4,468	31,875	$ 46,532
	Cucumbers	14,625 lbs/acre	$ 4,325 /acre	$ 2.25 /lb	$ 32,906 /acre	$ 28,581 /acre	111 hours/acre	$ 4,758	12,431	$ 23,213
	Garlic	3,430 lbs/acre	$ 12,238 /acre	$ 9.00 /lb	$ 30,870 /acre	$ 18,632 /acre	356 hours/acre	$ 13,462	2,916	$ 12,778
	Kale	7,500 lbs/acre	$ 1,791 /acre	$ 4.00 /lb	$ 30,000 /acre	$ 28,209 /acre	150 hours/acre	$ 1,970	6,375	$ 23,530
	Lettuce	22,470 lbs/acre	$ 5,896 /acre	$ 1.25 /lb	$ 28,088 /acre	$ 22,192 /acre	257 hours/acre	$ 6,485	19,100	$ 17,389
	Pak Choy	18,000 lbs/acre	$ 2,561 /acre	$ 3.98 /lb	$ 71,640 /acre	$ 69,079 /acre	209 hours/acre	$ 2,817	15,300	$ 58,077
	Pole Beans	6,720 lbs/acre	$ 1,961 /acre	$ 3.99 /lb	$ 26,813 /acre	$ 24,852 /acre	200 hours/acre	$ 2,157	5,712	$ 20,634
	Potatoes	19,650 lbs/acre	$ 6,801 /acre	$ 1.85 /lb	$ 36,254 /acre	$ 29,453 /acre	299 hours/acre	$ 7,481	16,703	$ 23,335
	Pumpkins	30,100 lbs/acre	$ 3,918 /acre	$ 1.63 /lb	$ 48,913 /acre	$ 44,994 /acre	120 hours/acre	$ 4,310	25,585	$ 37,266
	Radishes	19,800 lbs/acre	$ 5,967 /acre	$ 2.48 /lb	$ 49,104 /acre	$ 43,137 /acre	323 hours/acre	$ 6,564	16,830	$ 35,175
	Snow Peas	10,250 lbs/acre	$ 12,182 /acre	$ 7.98 /lb	$ 81,795 /acre	$ 69,613 /acre	753 hours/acre	$ 13,400	8,713	$ 56,126
	Spinach	12,900 lbs/acre	$ 4,003 /acre	$ 7.98 /lb	$ 102,942 /acre	$ 98,939 /acre	117 hours/acre	$ 4,403	10,965	$ 83,097
	Sweet Corn	20,250 lbs/acre	$ 4,020 /acre	$ 0.83 /lb	$ 16,875 /acre	$ 12,855 /acre	99 hours/acre	$ 4,422	17,213	$ 9,922
	Tomatoes	154,688 lbs/acre	$ 130,516 /acre	$ 1.63 /lb	$ 251,367 /acre	$ 120,851 /acre	5423 hours/acre	$ 143,568	131,484	$ 70,094
	Turnips	37,870 lbs/acre	$ 9,150 /acre	$ 1.24 /lb	$ 46,769 /acre	$ 37,620 /acre	512 hours/acre	$ 10,065	32,190	$ 29,689
	Yellow Onions	32,790 lbs/acre	$ 6,728 /acre	$ 1.09 /lb	$ 35,577 /acre	$ 28,849 /acre	256 hours/acre	$ 7,400	27,872	$ 22,840
	Zucchini	9,925 lbs/acre	$ 4,314 /acre	$ 1.63 /lb	$ 16,128 /acre	$ 11,815 /acre	115 hours/acre	$ 4,745	8,436	$ 8,964

* **Honey production:** one bee hive/acre was assumed.

** **Variable cost:** values obtained from the literature were increased by 15%, as described in the methodology. Variable costs generally include field labour (production and harvest), and crop production costs (seeds, fertilizer/manure/lime, pest management and control, fuel, machinery repairs and maintenance, transport, irrigation, wildlife control, and packaging).

*** **Yield:** Apple, pear, and grape yield values obtained from the literature were decreased by 50% and all other values decreased by 10%, as described in the methodology.

**** **Contribution margin:** calculated based on the increased variable cost and decreased yield values.

~ Fixed Costs of Production: note that fixed costs of production are not included in this table as they were calculated on a per acre basis ($3,335 per acre) and applied to all crops equally.

Methodology Used for Calculating the Food Provision Potential of Surrey's Underutilized ALR Land

The following methodology, developed to estimate food demand satisfaction potential, is consistent with other studies (BC MAL, 2006, Desjardins et al, 2009, Grewal & Grewal, 2011),

Annual Food Demand

Annual per-capita consumption and demand for the 32 crops and animal products selected for the analysis[25] was sourced from Statistics Canada and USDA "food disappearance data." Surrey residents' actual demand for these food products may differ slightly, but Surrey specific data do not exist. National figures provide a reasonable proxy for the purposes of this analysis.

Surrey's total annual demand for the 32 crops and animal products was then derived using the population estimate of 465,150, and the following formula:

$$\boldsymbol{Total\ Annual\ Food\ Demand\ in\ Surrey} = \boldsymbol{Annual\ PerCapita\ Demand} \times \mathbf{465,150}$$

Acres in Agricultural Production Required to Satisfy Annual Food Demand

Crop and animal product yield data, sourced from production budgets as described in the previous section, were then used to calculate the number of acres required to produce 100% of Surrey's demand for each crop, as show in the following formula:

$$\boldsymbol{Acres\ Needed\ to\ Satisfy\ 100\%\ of\ Surrey's\ Annual\ Food\ Demand} = \frac{\boldsymbol{Annual\ PerCapita\ Demand}}{\boldsymbol{Yield/Acre}}$$

Finally, the potential of the underutilized land to satisfy Surrey's demand for a specific selection of crops and animal products was calculated by dividing the amount of land available by the total amount of land necessary to satisfy 100% of Surrey's demand for those crops and animal products, as shown in the following formula:

$$\boldsymbol{Potential\ to\ of\ Land\ to\ Satisfy\ Surrey's\ Annual\ Demand\ for\ Selected\ Foods} = \frac{\boldsymbol{Acres\ of\ Land\ Available}}{\boldsymbol{Acres\ Needed\ to\ Satisfy\ 100\%\ of\ Surrey's\ Annual\ Demand\ for\ Selected\ Foods}}$$

[25] Apples, asparagus, beets, bell peppers, broccoli, Brussels Sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, eggs, garlic, honey, hazelnuts, kale, lamb, lettuce, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, and zucchini

Seasonal Food Demand and Acres Required to Satisfy Seasonal Food Demand

To derive the potential of the underutilized lands to satisfy Surrey's total food demand for 6 months of the year (the approximate growing/availability season for most of these crops in Surrey's temperate coastal climate) , the following formulas were used:

$$\boldsymbol{Total\ 6\ Month\ Food\ Demand\ in\ Surrey} = \quad \boldsymbol{Annual\ PerCapita\ Demand} \div \mathbf{2} \quad \times \mathbf{465,150}$$

And;

$$\boldsymbol{Acres\ Needed\ to\ Satisfy}\ \mathbf{100\%}\ \boldsymbol{of\ Surrey's\ 6\ Month\ Food\ Demand} = \frac{\boldsymbol{Annual\ PerCapita\ Demand} \div \mathbf{2}}{\boldsymbol{Yield/Acre}}$$

And;

$$\boldsymbol{Potential\ of\ Land\ to\ Satisfy\ Surrey's\ 6\ Month\ Demand\ for\ Selected\ Foods}$$

$$= \frac{\boldsymbol{Acres\ of\ Land\ Available}}{\boldsymbol{Acres\ Needed\ to\ Satisfy}\ \mathbf{100\%}\ \boldsymbol{of\ Surrey's\ 6\ Month\ Demand\ for\ Selected\ Foods}}$$

Table 10 offers a summary of Surrey's demand for 32 crops and animal products, and the land necessary to satisfy each.

Table 10: Acres Needed to Satisfy Surrey's Annual and Six Month Demand for 32 Crops and Animal Products

Crop or Animal Product	Annual Demand - Per Capita*	Annual Demand - Surrey Total**	Acres Needed to Satisfy Surrey's Annual Demand***	Acres Needed to Satisfy Surrey's 6 Month Demand
Honey	2.007 lb/yr	933,347 lb/year		
Lamb	2.580 lb/yr	1,200,017 lb/year	7.8	3.9
Eggs	16.050 dz/yr	7,465,658 dz/yr	414.8	207.4
Apple	26.636 lb/yr	12,389,921 lb/year	1208.8	604.4
Hazelnuts	3.440 lb/yr	1,600,023 lb/year	42.7	21.3
Pears	4.829 lb/yr	2,246,186 lb/year	113.4	56.7
Table Grapes	11.003 lb/yr	5,118,022 lb/year	170.0	85.0
Asparagus	1.544 lb/yr	717,959 lb/year	22.5	11.3
Beets	1.411 lb/yr	656,420 lb/year	33.2	16.6
Bell Peppers	9.680 lb/yr	4,502,629 lb/year	118.9	59.4
Broccoli	6.372 lb/yr	2,964,145 lb/year	125.1	62.5
Brussel Sprouts	0.309 lb/yr	143,592 lb/year	57.4	28.7
Cabbage	11.466 lb/yr	5,333,410 lb/year	711.1	355.6
Carrots	15.854 lb/yr	7,374,465 lb/year	518.5	259.3
Cauliflower	5.667 lb/yr	2,635,935 lb/year	180.2	90.1
Chinese Cabbage	1.874 lb/yr	871,807 lb/year	44.4	22.2
Cucumbers	10.496 lb/yr	4,882,121 lb/year	525.0	262.5
Garlic	0.970 lb/yr	451,289 lb/year	13.8	6.9
Kale	0.198 lb/yr	92,199 lb/year	13.7	6.9
Lettuce	22.006 lb/yr	10,236,044 lb/year	1271.6	635.8
Pak Choy	1.874 lb/yr	871,807 lb/year	38.8	19.4
Pole Beans	2.117 lb/yr	984,630 lb/year	48.6	24.3
Potatoes	142.090 lb/yr	66,093,257 lb/year	14687.4	7,343.7
Pumpkins	3.677 lb/yr	1,710,529 lb/year	285.1	142.5
Radishes	1.389 lb/yr	646,163 lb/year	188.4	94.2
Snow Peas	0.684 lb/yr	317,953 lb/year	69.7	34.9
Spinach	1.433 lb/yr	666,676 lb/year	56.9	28.5
Sweet Corn	7.078 lb/yr	3,292,355 lb/year	311.8	155.9
Tomatoes	16.383 lb/yr	7,620,622 lb/year	767.8	383.9
Turnips	2.668 lb/yr	1,241,043 lb/year	159.1	79.6
Yellow Onions	21.631 lb/yr	10,061,683 lb/year	18327.3	9,163.6
Zucchini	3.972 lb/yr	1,847,668 lb/year	18476.7	9,238.3
Total Acres Needed to Satisfy Surrey Demand			59,010	29,505.2

* Based on Food Disappearance data gathered from Statistics Canada

** Based on Surrey population estimate of 465,150

*** Based on prooduction data gathered from crop enterprise budgets

Economic Potential of One Acre of Underutilized Land

This scenario illustrates the potential income generation, job creation, and food production that could result if just one acre of Surrey's underutilized ALR land were brought into agricultural production. This scale can be thought of as a single, small-scale farm, rather than a measure of the aggregated output of many small farms (the latter of which is reported in the following two scenarios). Table 11 summarizes the results of this analysis, and crop-specific details are included in Appendix 4.

Table 11: Economic Potential of 1 Acre of Underutilized Land In Surrey, BC, Under Four Cropping Alternatives

		Food Production Potential: Total Food Produced	Revenue Generation Potential		Job Creation Potential**	
			Total Contribution Margin	Total Profit	FTE-L Created	FTE-M Created
Cropping Alternative - Production Of:	29 crops and 3 animals *(1)*	16,248 lbs food* 319 dozen eggs 85 lbs honey	$27,740	$24,405	0.41	1
	10 most labour intensive crops/animals *(2)*	26,367 lbs produce	$32,769	$29,434	0.46	1
	10 most profitable crops/animals *(3)*	31689 lbs produce	$48,982	$45,647	0.38	1
	10 most highly consumed crops/animals *(4)*	26,135 lbs produce 1,243 dozen eggs	$25,761	$22,426	0.20	1

1 Apples, asparagus, beets, bell peppers, broccoli, Brussels Sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, garlic, lettuce, hazelnuts, kale, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, zucchini, eggs, honey, and lamb.

2 Tomatoes, snow peas, turnips, apples, beets, garlic, carrots, radishes, bell peppers, potatoes.

3 Spinach, tomatoes, pak choy, snow peas, radishes, Chinese cabbage, beets, pumpkins, cabbage, turnips.

4 Tomatoes, apples, carrots, potatoes, cabbage, lettuce, yellow onions, table grapes, cucumbers, eggs.

* Includes both produce and meat

** **FTE-L** indicates "Full Time Equivalent Labour" positions created; FTE-M indicates "Full Time Equivalent Manager" positions cre

According to our analysis, farms of this scale employ between 1 and 1.5 people full time, and generate between $22,400 and $48,982 in contribution margin, or up to $45,647 in profit. Our analysis demonstrates that crop choice greatly affects farm profitability at this scale of production, as revenue potential for the "10 most valuable crops/animal products" scenario is nearly double that of the "29 crops and 3 animal products" scenario.

The figures generated in this analysis are comparable to those collected during the research both from small-scale farmers in the Surrey area and the currently available literature. This gives us confidence in the veracity of the following, larger-scale, scenarios.

Economic Potential of City of Surrey Owned Underutilized Land

This scenario illustrates the potential outputs that could result if all of the underutilized ALR parcels which are owned by the City of Surrey (685 acres) were brought into agricultural production. Table 12 summarizes the results of this analysis and crop-specific details are included in Appendix 5.

Table 12: Economic Potential of City Owned Underutilized ALR Land in Surrey, BC, Under Four Cropping Alternatives (685 acres)

		Food Production Potential: Total Food Produced	Revenue Generation Potential		Job Creation Potential**	
			Total Contribution Margin	Total Profit	FTE-L Created	FTE-M Created
Cropping Alternative - Production Of:	29 crops and 3 animals *(1)*	10,865,773 lbs Food* 213,066 dozen Eggs 323,170 lbs Honey	$18,559,980	$18,331,639	138	137
	10 most labour intensive crops/animals *(2)*	16,909,419 lbs Produce	$22,436,010	$22,207,669	303	137
	10 most profitable crops/animals *(3)*	21,696,576 lbs Produce	$33,536,922	$31,253,514	280	137
	10 most highly consumed crops/animals *(4)*	17,894,126 lbs Produce 851,143 dozen Eggs	$17,637,791	$17,409,450	246	137

1 Apples, asparagus, beets, bell peppers, broccoli, Brussels Sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, garlic, lettuce, hazelnuts, kale, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, zucchini, eggs, honey, and lamb.

2 Tomatoes, snow peas, turnips, apples, beets, garlic, carrots, radishes, bell peppers, potatoes.

3 Spinach, tomatoes, pak choy, snow peas, radishes, Chinese cabbage, beets, pumpkins, cabbage, turnips.

4 Tomatoes, apples, carrots, potatoes, cabbage, lettuce, yellow onions, table grapes, cucumbers, eggs.

* Includes both produce and meat

** **FTE-L** indicates "Full Time Equivalent Labour" positions created; FTE-M indicates "Full Time Equivalent Manager" positions created

The analysis demonstrates the potential that lies only in the underutilized ALR lands owned by the City of Surrey. If these 685 acres were brought into agricultural production in their entirety, they would have the potential to contribute over $31 million to Surrey's economy. The enterprises on this land could employ between 272 and 450 full time employees.

We recognize that many competing proposals for the use of this land already exist, this analysis provides a realistic assessment of what may be possible in the near future if the City of Surrey were to take a progressive and active role in supporting new and small-scale farmers in the municipality, and make municipally owned land available to them for agriculture.

Economic Potential of All Underutilized Land

This scenario illustrates the potential outputs that could result if all of the underutilized ALR parcels in the City of Surrey (3,802 acres) were brought into agricultural production, under the same four cropping alternatives. This includes land that is both privately owned and land owned by the City of Surrey. Table 13 summarizes the results of this analysis and crop-specific details are included in Appendix 6.

Table 13: Economic Potential of Underutilized ALR Land in Surrey, BC, Under Four Croping Alternatives (3,802 acres)

		Food Production Potential: Total Food Produced	Revenue Generation Potential		Job Creation Potential**	
			Total Contribution Margin	Total Profit	FTE-L Created	FTE-M Created
Cropping Alternative - Production Of:	29 crops and 3 animals *(1)*	60,320,274 lbs Food* 1,182,812 dozen Eggs 10,098 lbs Honey	$101,054,169	$88,373,799	747	760
	10 most labour intensive crops/animals *(2)*	100,250,240 lbs Produce	$124,589,520	$111,909,150	1,739	760
	10 most profitable crops/animals *(3)*	120,483,369 lbs Produce	$186,234,053	$173,553,682	1,557	760
	10 most highly consumed crops/animals *(4)*	92,023,731 lbs Produce 92,023,731 dozen Eggs	$97,944,506	$85,264,136	1,467	760

1 Apples, asparagus, beets, bell peppers, broccoli, Brussels Sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, garlic, lettuce, hazelnuts, kale, pak choy, pears, pole beans, potatoes, pumpkins, radishes, snow peas, spinach, sweet corn, table grapes, turnips, tomatoes, yellow onions, zucchini, eggs, honey, and lamb.

2 Tomatoes, snow peas, turnips, apples, beets, garlic, carrots, radishes, bell peppers, potatoes.

3 Spinach, tomatoes, pak choy, snow peas, radishes, Chinese cabbage, beets, pumpkins, cabbage, turnips.

4 Tomatoes, apples, carrots, potatoes, cabbage, lettuce, yellow onions, table grapes, cucumbers, eggs.

* Includes both produce and meat

** **FTE-L** indicates "Full Time Equivalent Labour" positions created; FTE-M indicates "Full Time Equivalent Manager" positions created

The analysis demonstrates the potential of Surrey's underutilized agricultural lands in their entirety. If all 3,802 acres of land that is currently underutilized for agriculture were brought into production, they would have the potential to contribute over $173 million in net receipts to Surrey's agriculture sector, which would more than double the current economic magnitude of the industry. The enterprises on this land could employ between 1,511 and 2,499 full time employees.

Food Production Potential of Surrey's Underutilized ALR Land

Our analysis reveals that Surrey's underutilized land has the capacity to make significant contributions to Surrey's food supply. The following two scenarios are not intended to prescribe what crops should be grown on the underutilized land. Instead, they are intended to illustrate that, despite the small scale and fragmented nature of these agricultural lands, they still hold immense value from a food production and demand satisfaction perspective.

Scenario One: Seasonal Food Demand Satisfaction Potential

The first scenario takes into account today's fairly limited infrastructural capacity to store and process crops for year round consumption. It illustrates the potential of underutilized ALR land to contribute to Surrey's local food supply for six months of the year, which is the approximate duration of availability of most of these crops in Surrey's temperate coastal climate.

Using the methodology outlined above, our estimates suggest that, if brought into production on the small scale, direct market model described in this report, Surrey's underutilized ALR lands could satisfy 100% of Surrey's demand for the following 29 crops and animal products for six months of the year: apples, asparagus, beets, bell peppers, broccoli, Brussels sprouts, cabbage, carrots, cauliflower, Chinese cabbage, cucumbers, eggs, garlic, honey, hazelnuts, kale, lamb, lettuce, pak choy, pears, pole beans, pumpkins, radishes, snow peas, spinach, sweet corn, tomatoes, and turnips.

See *Table 14: Potential of 3,802 Acres of Underutilized ALR Land to Satisfy 100% of Surrey's Demand for 24 Crops and Animal Products for Six Months per* Year for details.

Table 14: Potential of 3,802 Acres of Underutilized ALR Land to Satisfy 100% of Surrey's Demand for 24 Crops and Animal Products for Six Months per Year

Crop	Total Annual Demand per Person*		Total Six-Month Demand in Surrey**		Acres Needed to Satisfy Six -Month Surrey Demand***
Honey	2.007	lb/yr	466,673	lb/year	-
Lamb	2.580	lb/yr	600,009	lb/year	3.9
Eggs	16.050	dz/yr	3,732,829	dz/yr	207.4
Apple	26.636	lb/yr	6,194,961	lb/year	604.4
Hazelnuts	3.440	lb/yr	800,011	lb/year	21.3
Pears	4.829	lb/yr	1,123,093	lb/year	56.7
Table Grapes	11.003	lb/yr	2,559,011	lb/year	85.0
Asparagus	1.544	lb/yr	358,980	lb/year	11.3
Beets	1.411	lb/yr	328,210	lb/year	16.6
Bell Peppers	9.680	lb/yr	2,251,314	lb/year	59.4
Broccoli	6.372	lb/yr	1,482,073	lb/year	62.5
Brussel Sprouts	0.309	lb/yr	71,796	lb/year	28.7
Cabbage	11.466	lb/yr	2,666,705	lb/year	355.6
Carrots	15.854	lb/yr	3,687,232	lb/year	259.3
Cauliflower	5.667	lb/yr	1,317,968	lb/year	90.1
Chinese Cabbage	1.874	lb/yr	435,904	lb/year	22.2
Cucumbers	10.496	lb/yr	2,441,061	lb/year	262.5
Garlic	0.970	lb/yr	225,644	lb/year	6.9
Kale	0.198	lb/yr	46,100	lb/year	6.9
Lettuce	22.006	lb/yr	5,118,022	lb/year	635.8
Pak Choy	1.874	lb/yr	435,904	lb/year	19.4
Pole Beans	2.117	lb/yr	492,315	lb/year	24.3
Pumpkins	3.677	lb/yr	855,265	lb/year	142.5
Radishes	1.389	lb/yr	323,082	lb/year	94.2
Snow Peas	0.684	lb/yr	158,977	lb/year	34.9
Spinach	1.433	lb/yr	333,338	lb/year	28.5
Sweet Corn	7.078	lb/yr	1,646,177	lb/year	155.9
Tomatoes	16.383	lb/yr	3,810,311	lb/year	383.9
Turnips	2.668	lb/yr	620,522	lb/year	79.6
Acres Needed to Satisfy 100% of Surrey Demand for these 29 Crops					**3,759.5**
Total Acres Needed to Satisfy Surrey ConsumptionPercent of Surrey Demand for 24 Crops and Animal Products Which Can be Satisfied on 3,802 Acres of Underutilized ALR Land					**101%**

* Based on Food Disappearance data gathered from Statistics Canada

** Based on Surrey population estimate of 465,150

*** Based on prooduction data gathered from crop enterprise budgets

Scenario Two: Year Round Food Demand Satisfaction Potential

The second scenario is future-oriented, illustrative of the potential for Surrey's underutilized ALR lands to contribute to local demand on a year round basis. This scenario would be feasible given a significantly more robust local food sector than exists today, with the storage and processing infrastructure necessary to support the provisioning of locally grown crops and animal products to Surrey residents year round. It was beyond the scope of this report to delineate the potential cost implications and challenges of realizing this scenario, however we believe that it is within the technical and resource capacity of Surrey to achieve. This is discussed further in the recommendations and conclusions section of the report.

Using the methodology outlined above, our estimates suggest that, if brought into production on the small scale, direct market model described in this report, Surrey's underutilized ALR lands could satisfy 100% of Surrey's demand for the following 24 crops and animal products on a year-round basis: asparagus, beets, bell peppers, broccoli, Brussels sprouts, carrots, cauliflower, Chinese cabbage, cucumbers, eggs, garlic, honey, hazelnuts, kale, lamb, pak choy, pole beans, pumpkins, radishes, snow peas, spinach, sweet corn, and turnips.

See *Table 15: Potential of 3,802 Acres of Underutilized ALR Land to Satisfy 100% of Surrey's Demand for 24 Crops and Animal Products on a Year Round Basis* for details.

Table 15: Potential of 3,802 Acres of Underutilized ALR Land to Satisfy 100% of Surrey's Demand for 24 Crops and Animal Products on a Year Round Basis

Crop	Total Demand per Person*	Total Demand in Surrey**	Acres Needed to Satisfy 100% of Surrey Demand***
Lamb	2.580 lb/yr	1,200,017 lb/year	7.8
Eggs	16.050 dz/yr	7,465,658 dz/yr	414.8
Hazelnuts	3.440 lb/yr	1,600,023 lb/year	42.7
Pears	4.829 lb/yr	2,246,186 lb/year	113.4
Table Grapes	11.003 lb/yr	5,118,022 lb/year	170.0
Asparagus	1.544 lb/yr	717,959 lb/year	22.5
Beets	1.411 lb/yr	656,420 lb/year	33.2
Bell Peppers	9.680 lb/yr	4,502,629 lb/year	118.9
Broccoli	6.372 lb/yr	2,964,145 lb/year	125.1
Brussel Sprouts	0.309 lb/yr	143,592 lb/year	57.4
Carrots	15.854 lb/yr	7,374,465 lb/year	518.5
Cauliflower	5.667 lb/yr	2,635,935 lb/year	180.2
Chinese Cabbage	1.874 lb/yr	871,807 lb/year	44.4
Cucumbers	10.496 lb/yr	4,882,121 lb/year	525.0
Garlic	0.970 lb/yr	451,289 lb/year	13.8
Kale	0.200 kg/yr	93,241 lb/year	13.9
Pak Choy	1.874 lb/yr	871,807 lb/year	38.8
Pole Beans	2.117 lb/yr	984,630 lb/year	48.6
Pumpkins	3.688 lb/yr	1,715,642 lb/year	285.9
Radishes	1.389 lb/yr	646,163 lb/year	188.4
Snow Peas	0.684 lb/yr	317,953 lb/year	69.7
Spinach	1.433 lb/yr	666,676 lb/year	56.9
Sweet Corn	7.078 lb/yr	3,292,355 lb/year	311.8
Turnips	2.668 lb/yr	1,241,043 lb/year	159.1
Acres Needed to Satisfy 100% of Surrey Demand for these 24 Crops			3,561
Percent of Surrey Demand for 24 Crops and Animal Products Which Can be Satisfied on 3,802 Acres of Underutilized ALR Land			**107%**

* Based on Food Disappearance data gathered from Statistics Canada

** Based on Surrey population estimate of 465,150

*** Based on prooduction data gathered from crop enterprise budgets

6.0 RECOMMENDATIONS AND CONCLUSIONS

As the analysis and scenarios have demonstrated, the potential for increased local-scale, human-intensive agriculture in Surrey is substantial. If the available underutilized ALR land was put to use in these small-scale, human-intensive farm operations, they could satisfy Surrey's demand for 24 commonly consumed crops and animal products, create almost 2,500 jobs, and contribute over $173 million in gross receipts to Surrey's agriculture sector, more than doubling the current size of the industry in Surrey.

Agriculturalists are astute entrepreneurs, traditionally attuned to responding to economic and regulatory signals. There is a growing recognition by agriculturalists and broader society, reinforced by many market signals, of the emerging potential in the re-localization of food systems. However, the strength and singularity of contemporary market structure and economic environments have precluded the substantial emergence of this sector. If its potential is to be fully realized, it will have to be supported and facilitated by governments through policy, regulation, and programming.

This report has delineated the very real potential for this agriculture to contribute to the economic viability of Surrey and suggested other compelling reasons for its promotion. In Surrey specifically, realizing this potential will not be without its own suite of challenges, all of which are related to two broad issues: non-farmer ownership of ALR land and under-resourced and supported small-scale farmers.

Tackling these critical issues can be done in a manner which will not detriment Surrey's existing agriculture sector. It will require an integrated, systems approach that addresses economic, social, and political factors related to small-scale farmers, landowners, and the wider community in Surrey. In this section, specific strategies and recommendations to address these issues will be advanced. They are based the analysis and research results presented in this report, our discussions with landowners and farmers, and a review of the related literature.

Moving forward, we suggest that Surrey conduct additional stakeholder consultation to refine and discuss these recommendations with a broader community than was reached in our own consultation process and strike a task force to determine priority actions and next steps.

New, Small-scale Farmers

New, small-scale farmers, those most likely to realize the potential of Surrey's small underutilized agricultural lands, currently face significant barriers to establishing and maintaining their farm businesses. Access to water, labour and land is constrained, and financing, technical support, small farm equipment, and opportunities for value added processing are limited. More broadly, the market for local foods and support for the local food and agriculture community in Surrey is underdeveloped. Bringing Surrey's available underutilized land into agricultural production will be significantly enhanced if the municipality plays supporting and enabling roles to ameliorate these challenges facing small-scale farmers.

Challenge 1.0: Water for Agricultural Operations

The ability to meet agricultural water needs (including crop irrigation, stock watering, and other uses) on new farms has been identified as a major challenge. Currently, water access for agriculture in Surrey's ALR is constrained by the BC *Water Act,* Surrey's *Waterworks Regulation and Charges Bylaw 16337, as well as infrastructural limitations*. As discussed in Part One of this report, under Bylaw 16337 the municipal water that serves parts of Surrey's ALR is allowed to be used for residential, aesthetic, and cleaning processes, and select agricultural industries, including greenhouse production (Part 3 – General Provisions, Section 14). Pending a change in this policy, therefore, future farmers on Surrey's underutilized ARL will rely on ground and surface water to fulfill their irrigation needs. Surface water, however, is constrained under the Water Act by the Ministry of Environment, currently which reports that the limited number of surface water licenses that were ever available for Surrey's watershed have already been allocated[26]. The issuance of new licenses, therefore, will only be possible in the event that current licenses are revoked or given up by their holders.

With neither City nor surface water legally available for irrigation, groundwater currently remains the only alternative for new farmers. While this is route is less restricted in terms of the legislation, however, the expense of installing new ground water wells is not one that many new farmers will be able to bear. Cost aside, recent studies indicate that ground water contamination may present additional challenges in some parts of the municipality. An exploration of this potential issue is outside the scope of this study, but warrants further investigation.

With respect to water availability and appropriateness of the legislation surrounding the use of water for agricultural purposes, the City of Surrey has the opportunity to take both direct and indirect action to support the establishment of new farms.

Specific recommendations include:

1.1 Conduct a review of *Waterworks Regulation and Charges Bylaw 16337* in light of its impact on the viability of small-scale agriculturalists and new farmers.

While any changes to the Bylaw would ultimately depend on regulatory/budgetary fit and infrastructural capacity, City staff and Council are encouraged to consider allowing exceptions to Part 3 (Section 14) and Part 11 (Sections 80, 81, and 82) to allow for small-scale agriculturalists to use city water for crop and stock irrigation purposes. Exceptions could be unconditional or based on conditions such as:

[26] Caitlin Dorward, personal communication November 2011

- The production of a "Water Smart Agricultural Plan" including (but not limited to) on-farm water conservation techniques, water conserving irrigation technology, and plant demand irrigation scheduling techniques employed on farms seeking approval for irrigating with City water; or,
- A "transitional" phase provision in which newly established farms could be granted permission to irrigate with City water for the first two to three years of operation, or until such time as the expense of installing a groundwater well could be borne by the farmer.

1.2 Collaborate with the Ministry of Environment (Water Stewardship Division) to explore opportunities to promote the sharing of existing ground and surface water resources among established and new farmers.

Suggestions include:

- Investigate the feasibility of developing shared ground-water well systems wherein farmers pool resources to develop a well system that could service multiple small agricultural parcels (overall reducing costs to individual farmers). The City could consider developing a model system on City owned land and sponsoring or subsidizing their development for privately owned underutilized parcels.
- Identify existing surface water license allocations which may not be maximizing their allowable use of surface water and could potentially share their license with neighbouring new farmers.
- Investigate the potential for or feasibility of prioritizing small-lot farmers when assigning water allocations if and when they come available.

Addressing the water access challenge is a critical and ultimately political/policy action that must be taken if Surrey is serious about retaining its agricultural character, attracting farmers to its underutilized ARL lands, and realizing the economic and food production potential inherent in them.

Challenge 2.0: Shortage of Skilled, Knowledgeable, Small-scale Farmers

Our findings indicate that the full integration of human-scale agriculture on currently underutilized ALR lands in Surrey has the potential to create approximately 2,500 jobs. The availability of skilled, knowledgeable farmers to fill these positions, however, is currently severely limited. Canada's last Census of Agriculture reported that the average age of farmers in this country has risen to 52 and the number of farmers under the age of 35 has steadily declined to 9.1%. Nationally, only 1.5% of our population is currently involved in agricultural production.[27]

These nation-wide trends are troubling indications of the health of the sector, but arguably unsurprising given the lack of institutionalized support and education about careers in agriculture, and especially small-lot, direct-market farming. Surrey has the opportunity to take a proactive approach to the ensuring the future viability of agriculture in the municipality by fostering the education of new farmers.

Specific recommendations include:

2.1 Publicly celebrate Surrey farmers and promote small-scale agriculture as a legitimate career path within Surrey, akin to professions such as medicine, engineering, or education.

The Surrey Board of Trade, Post-Secondary sector, and the School District are potential key partners in such an initiative.

[27] Statistics Canada, 2006

2.2 Develop and promote a "Farm School" or other formal education programs to prepare people from all walks of life for careers in agriculture.
Kwantlen Polytechnic University's *Richmond Farm School* is a successful local model that could be replicated in Surrey.

2.3 Provide support to link future or inexperienced farmers with established farms seeking interns or employees.
Develop a Surrey database or support grass roots efforts.

Challenge 3.0: Constraints to Accessing Agricultural Land for Farming

The ability of new farmers to access agricultural land is consistently identified as the greatest barrier to the establishment of new farms in this region. Surrey is no exception, as ALR land in the municipality is frequently owned by non-farmers and, when available to purchase, is so expensive as to not be economically feasible for most new farmers[28]. As described in the report, discussion with Surrey Realtors revealed that an acre of land in the ALR valued at up to $200,000 per acre, and closer to $500,000 per acre if it is situated on the urban-rural edge.

As land ownership becomes less feasible, Surrey has a role to play in supporting means by which farmers can access land under alternative tenure arrangements. Specific recommendations include:

3.1 Assist with the establishment of an independent organization or civic department which could serve to connect willing landowners to farmers seeking land.
Specific responsibilities of the organization or department could include:

- Maintaining a "land and space" inventory of available land for farming and food system services;
- Facilitating lease negotiations between farmers and land-owners by approaching owners of underutilized land to inform them of the opportunity to make it available for small-scale agriculture, or playing a "match-maker" role between landowners and farmers whose goals and priorities are compatible;
- Providing template tenure agreements for leases, licenses, profit a prendres, and memorandums of association;
- Educating farmers around "urban friendly farming" practices that are most suitable to farming in areas that have become dominated by rural residences (i.e: livestock size and number limits, manure/compost management practices, hours of operation, farm vehicle and equipment restrictions, etc.); and,
- Facilitating succession planning and land transfer agreements.

Farmland Access: Legal Agreement Types and Options*

Lease: Gives a person all of the use and occupation rights of a landowner to a property or portion of a property for a determined period of time in exchange for rent.

License: Gives a person permission to do something on or with someone else's property.

Profit a Prendre: Gives a person the right to enter another's land and take something from it (such as crops).

Memorandum of Understanding: An agreement between at least two persons that obliges each party to do or not do specified things.

*Adapted from *Gorusuch, "A Guide to Farmland Access Agreements"*

[28] Koopmans, 2010

3.2 Make city-owned land available for agriculture on a long-term basis.

Almost 700 acres of city-owned land in the ALR is currently underutilized for agricultural production. This land could be used for the establishment of long term farm leases, as well as incubator farm land wherein new farmers can access small tracts of land, and the equipment and infrastructure required to kick-start their farm businesses for 1-3 years. Restrictive covenants registered to the title of Surrey-owned properties could be used to protect this land in perpetuity for farming.

3.3 Conduct a further, comprehensive examination into the extent of agricultural land under-utilization on *all* Surrey agricultural land (including all ALR lands and those zoned municipally for agriculture).

This study examined only the persistence and nature of underutilization of ALR land on those ALR parcels identified as underutilized in the Ministry of Agriculture and Lands 2004 Agricultural Land Use Inventory. A further, comprehensive inventory is recommended to determine whether the extent of underutilization is larger than was determined in this study.

3.4 Identify strategies to stem speculation on agricultural land.

Although the ALR program has effectively stemmed the loss of agricultural land in Surrey, it has not changed the highly speculative nature of land values for non-agricultural use of ALR land in the Reserve. Alternative mechanisms must be investigated and developed to ensure that in the future, agricultural land remains affordable for agriculture. A potential suggestion is to lobby for a third tax class which would tax un-farmed parcels in the ALR at *higher* than residential rates.

Challenge 4.0: Limited Technical Support, Equipment, and Infrastructure for New Farmers

Even after new farmers overcome the barrier of land access, they typically encounter a host of challenges in establishing their farm and ensuring its economic viability. Like all new business owners, new farmers often struggle in their early years with covering the cost of farm machinery and equipment, and perfecting their agricultural practices with limited technical experience or education.

Currently, the Provincial Ministry of Agriculture offers little in the way of technical farm extension services, particularly for small-scale farmers using organic or alternative practices on mixed-crop operations. Surrey has the opportunity to address this gap by taking a lead role in supporting new farmers with technical support, equipment, and infrastructure.

Specific recommendations include:

4.1 Establish an Agricultural Development Office, with permanent full time staff, dedicated to providing technical extension services for small-scale farmers.

The establishment of this Office could be led solely by the City of Surrey, or by the City of Surrey in partnership with neighbouring municipalities (Richmond, Delta, Langley, etc.) so that costs could be shared and staff/Extension Agents made available to provide support and coordination across the region. Potential roles of this department include:

- Undertaking a needs assessment with small-scale farmers to determine what support they require; Conducting applied research on small-scale production; and,
- Developing educational and outreach material to support small-scale farm production, processing, distribution, and sales.

4.2 Make City of Surrey owned land available for small-scale agriculture research and demonstration.

4.3 Assist with the establishment of a farm machinery and implement cooperative, or lending library, so that farm-members can pool resources to collectively own and borrow large farm equipment at an affordable cost for all.

The co-operative/library could be funded and managed by the City of Surrey or established with the City's support with the goal to ultimately become self-sustaining.

4.4 Conduct a review of Zoning By-law 12000 in light of its impact on the potential for establishing food-system services on non-arable ALR land.

Part 10 (B-9), Permitted Uses in the General Agriculture (A-1) Zone, for example, limits the ability to establish farm supplies and equipment retail stores or cooperatives. Although these services are not appropriate for arable ALR land which can support soil-based agriculture, they might be located strategically on non-arable ALR land which has become unavailable for farming after being paved or otherwise damaged. Other provisions of the by-law may be similarly limiting.

Challenge 5.0: Limited Financing Available for New Farmers

Many of the small-scale farmers entering the field today come from non-agricultural backgrounds and find themselves "starting from scratch" rather than inheriting the family farm. The high price of land, infrastructure, and other inputs is a substantial barrier, especially for young people entering careers in agriculture. Although Canada's banks do provide support and loans for farmers, few are targeted at and designed specifically for the small-scale agriculture sector. Surrey has an opportunity to take on this niche role and galvanize support from financial and other institutions to do the same.

Specific recommendations include:

5.1 Incorporate agriculture and food systems into amenity contribution categories, requiring that that new urban development supports Surrey's small-lot farms and farmers.

5.2 Explore Community Trust Farming as means to acquire land for under-capitalized farmers.

Under a Community Trust Farming model, land acquired by municipalities is legally protected for agriculture in perpetuity (via a covenant or land trust consignment) with the goal of supporting crop production for local needs, value-added processing, and educational opportunities and to provide a broad range of farmers and citizens with resources and direction to create sustainable agriculture that is integrated with the community.

5.3 Work with the financial sector to develop a mico-loans program for new small-scale farmers.

Challenge 6.0: Constraints to Value-Added Processing

Reducing barriers to value-added food processing will not only support local farmers, but also increase the year-round availability of local foods in the Lower Mainland. Food processing in BC, however, has undergone significant changes in the past twenty years and currently has "only a remnant" of its previous processing capacity[29]. Thus, while the growing local food movement has opened up opportunities for locally produced products to replace imported items, the loss of processing infrastructure and facilities, means most producers interested in adding value to their farm produce through processing must do so in home kitchens. This severely limits the potential for local agriculture to expand and provide food to Surrey residents year round.

[29] Zbeetnoff Agro-Environmental Consulting, and Lions Gate Consulting, 2008

While this micro-scale of processing can help farm profitability by creating saleable products for off-season (winter) markets and increasing farm stand diversity during the growing season, farmers are limited in pursuing it by Health Authority regulations, ALC legislation, and City by-laws.

Specific ways that Surrey is encouraged to take action include:

6.1 Identify non-arable land on which "Agricultural Enterprise Zones" could be established to stimulate the co-location of agricultural and food system services.

6.2 Assist with the establishment of a cooperative hub for small-scale food processing and storage.
A shared-use processing facility could provide small-scale food producer-processors with the opportunity to use modern equipment for their processing needs, without high startup costs.

6.3 Conduct a review of Zoning By-law 12000 in light of its impact on the potential for small scale food processing in Surrey.
Part 10 (B-9), Permitted Uses in the General Agriculture (A-1) Zone, for example, limits the ability to establish small-scale food processing facilities. Although such facilities would not be an appropriate use of arable ALR land, which can support soil-based agriculture, they might be located strategically on non-arable ALR land which has become unavailable for farming after being paved or otherwise damaged. Other provisions of the by-law may be similarly limiting.

6.4 Lobby the Province to have the income generated from on-farm value added processing eligible as farm income for tax assessment purposes.

6.5 Encourage local health authorities to work with small-scale farmers to re-develop small-scale food processing guidelines that are appropriate for their scale.
Under the *Guidelines for the Sale of Food at Temporary Food Markets,* vendors of low risk foods such as dried fruit, jam, jelly, pickles, and most baked goods, are not required to submit an application before commencing sales. High risk foods such as prepared meals, canned vegetables or beans, juice, and processed meat, however, must be processed and packaged in inspected and licensed premises, and require the acquisition of a permit before commencing sales. These rules can prove challenging and inflexible for small-scale farmers who lack the economy of scale that warrants that is necessary to afford the use or construction of these facilities.

Challenge 7.0: Under-Developed Markets for Local Food

The models of agricultural potential presented in this report are based on small-scale (human-intensive), direct market agriculture, which is the scale of agriculture most suitable for the small parcels of underutilized land identified in the research. The success of these farms will depend on many factors, not the least of which is the demand for the products they grow or raise. Although it was beyond the scope of this study to evaluate the size or nature of the market for local food in Surrey, evidence noted during the field work and in discussion with City staff indicates that it is currently developed. Certainly, the "local food movement" has not reached the critical mass and widespread appeal that is currently being seen in other metropolitan areas, including neighbouring Vancouver.

Vancouver citizens have developed and appreciation for and culture around local food. Unlike the City of Surrey, however, Vancouver lacks the capacity to ever satisfy this demand from within its own borders. For Surrey to capitalize on its capacity for local production, it will need to foster connections to

developed markets for local food and, over the longer term, promote and celebrate a culture of local food among its own residents.

Specific recommendations of how Surrey can play a role in developing local food markets and a public appreciation for Surrey farms include:

7.1 Lead by example, supporting local farmers and encouraging healthy eating at the Local Government level by:

- Developing a local food purchasing policy at the municipal level;
- Working with neighbouring municipalities, such as the City of Vancouver, encouraging them to purchase Surrey produce to fulfill their own local food purchasing mandates.
- Developing a "Buy Surrey campaign" and directory of local food and farms for Surrey consumers and institutional buyers.

7.2 Support farm gate sales in the ALR.

Specific recommendations include:

- Clarify by-laws surrounding farm gate sales in the ALR and ensure City staffs across all departments are familiar with them.

7.3 Develop a comprehensive farmers' market strategy and suite of supportive policies.

The report and strategy should:

- Identify strategic locations, including city-owned land and non-arable farmland, for seasonal outdoor farmers markets and a permanent, indoor farmers market facility; and
- Include "Farmer First Policies" which ensure that priority at farmers markets is given to Primary Producers in the local area.
- Include recommended amendments to the Surrey Zoning By-law 12000 to remove restrictions and allow the use of non-arable ALR land for outdoor farmers markets.

7.4 Investigate the feasibility of providing property or business tax benefits to retailers that devote a certain percentage of their store's floor space to local farm produce.

7.5 Foster broad-based public support and understanding for local food and agriculture.

- Develop material and campaigns to increase public awareness about the importance and benefits of local agriculture.
- Allocate resources to train City staff across all departments about how their work can enable and support the agri-food system.
- Foster opportunities for increased positive interface between farmers and the general public to heighten empathy and understanding of the issues facing agriculture.

Non-Farmer Landowners

Our field-based research revealed that many of the owners of Surrey's underutilized ALR lands are not agriculturalists. Their perspectives and attitudes about the agricultural potential of their land are varied. Some are interested in farming their own land but lack the impetus, knowledge, or support to do so; some are interested in having someone else farm their land; and, others have no interest in using their land for agriculture at all. Realizing the agricultural potential of this land will depend on the development of policy and programs which promote and support these landowners to work with new agriculturalists, offer incentives to those who do, and ultimately penalize those who are unwilling.

Challenge 8.0: The Non-Agricultural Use of Surrey's ALR

Our field work revealed that at least 29% of Surrey's ALR (6,347 acres) is being used for non-agricultural purposes, including rural residences with extensive ornamental lawns and gardens, commercial businesses, truck parking, and other light industrial uses. Some of these uses are legal, while others do not comply with either Surrey City by-laws or the Agricultural Land Commission Act. Over half of this land (3,802 acres) could feasibly be used for agriculture.

A serious effort to curb legal and illegal non-agricultural use of Surrey ALR land will require increased enforcement of current bylaws and policies, as well as adjustments that more fully support agricultural uses and prevent non-agricultural uses, and the promotion of agricultural land uses to non-farmer landowners.

Specific recommendations include:

8.1 Consider stronger regulations around, or penalties for, non-agricultural use of Surrey's ALR land.
The zoning by-law permits the use of ALR parcels for a wide variety of non-agricultural purposes, including but not limited to commercial and hobby kennels, horse riding, training, and boarding, hunting and wilderness survival training, and golf courses. Surrey is encouraged to review the zoning bylaw in partnership with the ALC, with the intent to limit permitted use of ALR property to commercial agricultural uses only.

8.2 Limit home-plate size, scale, and placement in the ALR.
Current legislation does little to limit the size and placement of residential dwellings and associated landscapes and outbuildings on ALR property. This policy gap has allowed for the construction of estate homes that permanently alienate large swaths of ALR land from agriculture. Since recent attempts to address this issue at the regional level have not been successful, Surrey now has the opportunity to take a leadership role at the municipal level and is encouraged to set progressive policy that will serve as a clear indication of its commitment to local agriculture.

8.3 Strengthen enforcement of existing rules pertaining to permitted activities on A1, A2, A3, and other zones in the ALR.
We suspect that many of the non-farm uses seen on properties visited during the field work have not been approved by the City or are in violation of the zoning bylaw. Examples include truck and multiple vehicle parking and the dumping of fill and waste materials. The extent of this issue should be investigated by Surrey by-law enforcement.

8.4 Consider amendments to Bylaw 16337 that would restrict the use of City water for non-essential and non-agricultural uses in the ALR.

While restricting the use of City water for agricultural purposes, the Waterworks Regulation and Charges Bylaw 16337 currently allows the use of city water for normal household requirements as well as "*less essential, aesthetic-enhancing purposes such as lawn and garden irrigation, car washing and other cleaning processes"* (Part 3, Section 14). Surrey should consider restricting the use of city water for this second category of non-essential uses as a disincentive for non-farm use of ALR lands.

8.5 Ensure BC Assessment is reviewing and monitoring Surrey residents claiming farm class status for tax assessment purposes.

Results from the mail survey administered to landowners of underutilized ALR parcels suggested that some landowners may be reaping the tax benefits associated with BC Assessment's "farm class" property status without generating the amount of farm income required to achieve it. We encourage Surrey to ensure that BC Assessment identifies properties receiving farm class status tax rates and confirms on an annual basis that the level of agricultural production on their properties warrants it.

Challenge 9.0: Landowners' Unwillingness to Allow Agricultural Use of their ALR Land

Informal discussions with landowners held while conducting the field work revealed that they have a wide range of attitudes towards the use of their properties. While some landowners expressed goals to eventually develop their own small farming operations on their land or interest in making their land available to a farmer, others made it clear that they saw no agricultural value in their property and would see it as an imposition to allow another party to farm it.

The following specific actions are recommended to realize the economic, job creation and food production potential of the land examined in this study,

9.1 Educate landowners in the ALR about the benefits of leasing land to farmer.

Many landowners are unaware that leasing their farmland can provide significant tangible and intangible benefit, including an income from the land through the collection of rent form the farmer, a reduction in costs and time associated with maintenance of their land, considerable tax-benefits, potential access to fresh produce, as well as the satisfaction of supporting a new farmer. Communicating these benefits to landowners through promotional and educational materials will raise awareness and interest among non-farmer landowners about the opportunity to make their land available to small-scale farmers.

9.2 Develop additional incentives for allowing the agricultural use of ALR land by leasing to farmers.

More work is needed to understand the array of incentives that Surrey may be able to use to encourage non-farmer landowners to make their land available to farmers. Ideas include:

- Developing group insurance schemes;
- Offering reduced residential utility rates to landowners leasing to farmers;
- Offering municipally guaranteed farmland rents to reduce the perceived risk to landowners that a farmer may default on their rent.

9.3 Lobby the Province to make changes to the Assessment Act which would encourage landowners to enter long term leases with farmers.

Achieving farm class status on land leased to a farmer currently requires that the farmer uses the land to generate income from primary agricultural production. To more fully support and protect farmers who lease land, as well as encourage landowners to make their land available to farmers on a long term or permanent basis, this legislation could be made more restrictive. Specifically, the Act could stipulate that if landowners are not farming the land themselves, they can only achieve farm class status if they:

- Enter *long term leases with tenant farmers;* or,
- Register a restrictive covenant on the title of their land, preserving it for agriculture in perpetuity.

Note that these recommendations are summarized in table form in

Table 1 (page 9).

7.0 EXPLORING SUSTAINABLE AGRI-FOOD SYSTEMS: INNOVATIVE PRACTICES FROM ACROSS NORTH AMERICA

> *The Food System: If you want to go to Canada, but are driving towards Mexico at 100 mph, slowing down to 30 won't help. You are still going in the wrong direction. You need to turn around and go in the right direction.*
>
> *(William McDonough cited in Bedford 2007)*

The analysis thus far has been aimed at strengthening municipal planning and policy for local, small lot agriculture on underutilized Agricultural Land Reserve (ALR) lands in Surrey as the municipality is particularly interested in exploring ways it can encourage and support agriculture on underutilized parcels, curtail their loss from the agricultural land base, enhance local and regional economies, support the next generation of agriculturalists, all with a view to strengthening food security in Surrey.

To support these objectives, and connect Surrey's local efforts to those taking place at regional scales, we undertook an extensive review of local and regional food systems, plans, food system assessments and related strategic documents from across North America and the United Kingdom. Through this review, we examined a range of innovative practices, planning models and strategic directions that may be valuable in creating guidelines and planning tools to support and enhance the economic value and overall sustainability of Surrey's agri- food system, particularly at the local and regional scales.

The examples reviewed offer insights into one or more of the following core themes:

- Regional and bio-regional agri-food systems, local food plans and food system assessments;
- Relevance to planners and policy makers who see municipalities as strategic leaders in encouraging and supporting local-scale, human-intensive, direct-market agriculture; and,
- Knowledge transfer on the potential economic, health, policy, planning and cultural benefits to communities associated with a greater emphasis on promoting local and regional agri-food systems.

A "local foods" movement is sweeping Canada and the United States, as evidenced by the growing assortment of initiatives which are seeking to support local family farms and offer a safe and steady supply of locally grown foods to communities. Municipal governments in British Columbia are not as yet at the forefront of this community-based momentum, and as a consequence, many local groups and coalitions are expressing frustration that their efforts are lacking critical cohesion by politicians and planners. While food policy councils are being established, and significant stakeholder values identification is occurring around the types and amount of infrastructure and support that is required to nurture and sustain local food initiatives, there is little evidence as yet to suggest that these initiatives are building toward the type of comprehensive locally and regionally focused food systems that engender face-to-face connections between local farmers and consumers, support a locally grown food economy, and strengthen the social networks of local communities by (re-)connecting people to their food and the land.

The work of the Kandiyohi County Local Food System Steering Committee in Minnesota illustrates many of the key attributes and benefits of this growing movement. Their report notes that successful local food systems rely on grass-roots participation, from the ground up. Once in place, local food systems help to develop local businesses and generate local employment. Successful local food initiatives are

also linked to food and agricultural policies that promote food production, processing, distribution, and consumption. The end result is economic development that keeps food dollars within the region, rather than sending them elsewhere, and family farms receiving the support they need to thrive locally.

After decades of what can be called a "cheap food regime," the prices of food and fuel began to increase exponentially in 2006, soaring 43% in a single year (Brooke 2008; Marchione 2008). ***West Central Minnesota loses $1,000,000,000 per year through the purchase of non-local foods*** *(Meter 2005a). When consumers perceive the "lower food prices" of global products on their supermarket shelves, the real costs of food production become mere fetishes for the price tag on display. The price tag obscures the fact that we pay for our food thrice-fold: at the store, through taxes that support farmer subsidies, and to clean up the environment and treat our modern diet's health risks (Pretty 2005).*

A June 2011 article in The Vancouver Sun, citing the B.C. Agricultural Council, highlights a comparable structural problem affecting British Columbia's agricultural sector. Farming is a $2.5-billion industry in British Columbia, yet, according to Statistics Canada, in 2010 the industry lost $87 million. It was the only province in Canada to have negative income last year, the worst performance in the country. A significant challenge is that currently the province's agriculture sector is tied heavily to global markets that see us export a large proportion of our agricultural production (particularly berries and hothouse commodities) while we import the majority of the food we consume. Local farmers who do not benefit from controlled markets and subsidies are finding it increasingly difficult to make a living as land prices skyrocket, their share of commodity price increases stagnate, building and fuel costs continue to rise, and their succession plans collapse as siblings do not follow their parents into the family farm.

The picture is not altogether without hope. As the following review illustrates, there are initiatives emerging which appear to hold promise. Planners and decision-makers in Surrey are encouraged to review the attached reference sources, with particular attention drawn to the 2011 Urban Agriculture Policy Plan for the City of Minneapolis which includes in the appendix, a review of examples of urban agriculture from cities across the United States that suggest innovative policy and planning strategies (http://www.minneapolismn.gov/cped/planning/plans/cped_urban_ag_plan).

The case studies below in our opinion offer Surrey planners, politicians, researchers and other interested parties an array of ideas and approaches that may have relevance to the sustainability of Surrey's agri-food system. The template highlights key features of the particular study as they pertain to the focus of the Surrey project, and extrapolates how the particular model, tool or approach identified in the study might be useful in compiling a tool-kit that municipalities could use to enhance and support sustainable agriculture throughout British Columbia.

Local Food Systems

Grassroots or Independent Reports and Initiatives

- **Transforming the Oakland Food System: A Plan for Action**
  Oakland Food Policy Council; Oakland, California
  (Profiled below)
- A Plan for Atlanta's Sustainable Food Future
  The Atlanta Local Food Initiative; 2008

Government-Led Reports and Initiatives

- **Multnomah Food Action Plan: Grow and Thrive 2025**
  Multnomah County Office of Sustainability; Portland, Oregon; December 2010
  (Profiled below)
- **FoodWorks A Vision for NYC's Food System**
  The New York City Council; New York, New York, November 2010
  (Profiled below)
- **Local Food and Farms: Growing Story County**
  Ken Meter and the Story County Planning and Zoning Department; Story County, Iowa; September 2010
  (Profiled below)
- **Minneapolis Urban Agriculture Policy Plan**
  Minneapolis City Council; Minneapolis, Minnesota; April 2011
  (Profiled below)
- Portland Plan: Food Systems
  The City of Portland Bureau of Planning and Sustainability; Portland, Oregon; December 2010

LOCAL FOOD SYSTEMS	Transforming the Oakland Food System: A Plan for Action *Oakland Food Policy Council; Oakland, California*
Synopsis	**The purpose of the study is two-fold:** Provide the City and community with an initial comprehensive evaluation and key baseline information on each element of the food system in Oakland; Assess the potential for increasing consumption of local and regional foods among City residents **Five goals guided the Plan For Action:** Food Security Urban Agriculture and Waste Reduction Economic Development Agricultural Preservation Public education and capacity Building
Relevant Excerpts	**10 Key Recommendations in the Plan:** **Protect and expand urban agriculture:** Create zoning definitions and operating standards for both civic and commercial urban agriculture. **Encourage accessible and affordable farmers' markets:** Advocate for the development of zoning regulations to protect and expand farmers' markets. **Promote use of food assistance programs at farmers' markets**: Promote use and acceptance of food assistance program benefits at farmers' markets. **Develop "environmentally preferable purchasing protocols":** Partner with the City of Oakland to develop and implement new RFP standards and language prioritizing and outlining Environmentally Preferable Purchasing Protocols" (EPP) and nutrition standards for all City contracts, phased in over five years. **Expand composting and food scrap recycling:** Develop a City-wide waste management contract that expands composting and food scrap recycling. **Develop a "fresh food financing initiative":** Develop a "Fresh Food Financing Initiative" (FFFI) that will provide financing, technical assistance, and location assistance to new food enterprises in underserved communities. **Encourage healthy mobile vending:** Expand mobile vending regulations to include additional areas of Oakland and encourage fresh food vending. **Synthetic pesticide- and gmo-production free zones:** Build upon the GMO-ban successes of Marin, Trinity, and Mendocino Counties to inform Alameda Countywide policies on pesticide and GMO-free zones. **Scale up local purchasing:** Scale up purchasing from local producers, and formalize the collaborations between and aggregation of small farmers. **Strengthen community-government links:** Build relationships between residents, community leaders, and key government representatives.

LOCAL FOOD SYSTEMS	Multnomah Food Action Plan: Grow and Thrive 2025 *Multnomah County Office of Sustainability; Portland, Oregon; December 2010*
Synopsis	The Multnomah Food Action Plan serves as a framework to guide collaboration and stakeholder efforts for improving the local food system in Portland, Oregon. The Food Action Plan builds upon existing work of the community by providing a roadmap with a shared community vision and shared goals. This Plan is also a call to action and identifies key collaborative actions for the community that are critical for achieving the stated goals. The plan touches on four themes: local food, healthy eating, social equity, and economic vitality.
Relevant Excerpts	**The following *Local Food* goals have particular relevance to Surrey:** Goal 1: Protect and Enhance the Agricultural Land Base **Minimize expansion of the Urban Growth Boundary:** Strengthen overall farmland protection through regulation, zoning, incentives and disincentives to minimize the conversion of agricultural land to other uses. **Increase acreage of urban food producing land:** Inventory and increase the acreage of urban food producing by promoting regulations, zoning, incentives and disincentives that enhance the acreage of urban farms, orchards, community gardens, parking easement gardens, and school gardens. **Establish an agricultural land trust:** Establish an organization that permanently protects food production land within the Urban Growth Boundary. **Develop incentives for food producing land:** Create incentives for the lease of land to small farmers, use of property as community gardens, and for the donation or sale of agricultural land to a land trust or public agency. **Promote integrated land use:** Establish multipurpose land use (i.e. for education, recreation, or special events) at the margins of the Urban Growth Boundary that offers flexibility, but maintains land as a working farm. **Promote policy education:** Educate the community so members are aware of and support protection of land for food production Goal 2: Support Small and Mid-Scale Farms **Increase opportunities for farmers:** Promote access to land, capital, training, and direct marketing opportunities for new and existing farmers through policies and programs (e.g. farmer incubator networks, an online information clearinghouse, and small business training). **Strengthen local processing and distribution capacity:** Support establishment of approved processing facilities, including USDA organic, for small to midsized producers to increase regional capacity. **Increase local purchasing by the retail sector:** Secure commitment by retail grocers and restaurants to support and purchase from local farmers by identifying and overcoming existing barriers to purchases. **Inventory and establish community assets:** Inventory and establish community assets that support small and midscale farm food production, processing, and distribution (land, commercial kitchens, cold storage, distribution facilities, etc.) **2.5 Develop and use local influence:** Harness local influence to ensure that federal, state, and local laws, regulations, and policies support small and midscale farmers.

LOCAL FOOD SYSTEMS	FoodWorks: A Vision for NYC's Food System The New York City Council; New York, New York, November 2010
Synopsis	This report outlines a plan for key legislative changes, public and private investments, infrastructure improvements, and partnerships to improve the NYC food system. Each section includes a number of goals, specific strategies and a series of tangible initiatives or proposals to provide a blueprint for long-term food system change. The Plan illustrates methods to integrate the key elements of the food system (agricultural production, processing, distribution, consumption, and post-consumption) required to move from "food system insecurity" to "opportunity".
RELEVANT EXCERPTS	**AGRICULTURAL PRODUCTION** **GOAL 1:** ***Preserve and increase regional food production.*** ***Strategy: Strengthen regional food supply channels.*** **Proposals:** • Reorient federal farm subsidies to support healthy, sustainable food production. • Improve the New York State Farmland Protection Fund. • Encourage new farmers. • Build a permanent wholesale farmers market. • Expand and support farmers markets. • Expand the electronic benefits transfer (EBT) program and acceptance of the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) benefits at farmers markets. • Expand and support community supported agriculture (CSA). **STRATEGY:** ***Leverage the city's economic power to support regional producers.*** **Proposals:** • Track and encourage regional food procurement. • Support farmers in the upstate watersheds. **GOAL 2:** ***Increase urban food production.*** **STRATEGY:** ***Better use existing space for urban food production.*** **Proposals:** • Protect community gardens. • Ensure urban farms are counted in the Census of Agriculture. • Create a searchable database of city-owned property. • Identify city-owned properties with roofs suitable for urban agriculture. • Waive the Floor to Area Ratio (FAR) requirements and height restrictions for certain rooftop greenhouses. • Change the state green roofs tax credit to encourage food-producing green roofs. • Change water rates to encourage green roofs. • Streamline the green roof permit application process. **STRATEGY:** ***Restore food and horticultural knowledge.*** **Proposals:** • Ensure garden education is available citywide. • Support urban agriculture technology development.

RELEVANT EXCERPTS	

POST- CONSUMPTION

GOAL 11: ***Decrease waste throughout the food system.***

STRATEGY: ***Improve the net environmental impact associated with food procured by city agencies and institutions.***

Proposals:
- Reduce packaging on food procured by city agencies.
- Identify alternatives to polystyrene foam in city food programs.
- Discourage bottled water consumption.

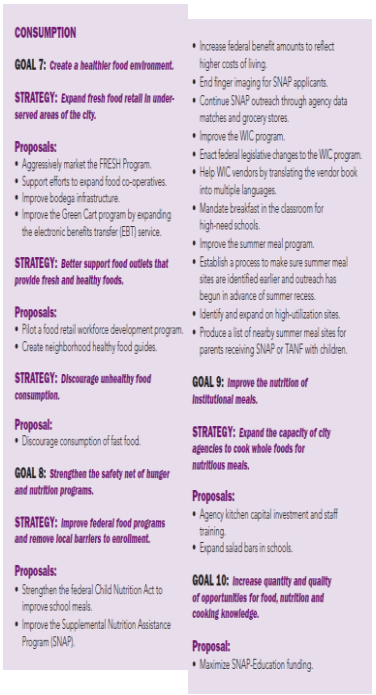
GOAL 12: ***Increase resource recapture in the food system.***

STRATEGY: ***Increase residential, commercial, and governmental composting.***

Proposals:
- Establish a voluntary household composting program.
- Explore citywide composting of food waste.

STRATEGY: ***Increase recycling of waste related to food processing and packaging.***

Proposals:
- Encourage restaurant grease recycling.
- Increase citywide recycling of food-related packaging.



CONSUMPTION

GOAL 7: ***Create a healthier food environment.***

STRATEGY: ***Expand fresh food retail in underserved areas of the city.***

Proposals:
- Aggressively market the FRESH Program.
- Support efforts to expand food co-operatives.
- Improve bodega infrastructure.
- Improve the Green Cart program by expanding the electronic benefits transfer (EBT) service.

STRATEGY: ***Better support food outlets that provide fresh and healthy foods.***

Proposals:
- Pilot a food retail workforce development program.
- Create neighborhood healthy food guides.

STRATEGY: ***Discourage unhealthy food consumption.***

Proposal:
- Discourage consumption of fast food.

GOAL 8: ***Strengthen the safety net of hunger and nutrition programs.***

STRATEGY: ***Improve federal food programs and remove local barriers to enrollment.***

Proposals:
- Strengthen the federal Child Nutrition Act to improve school meals.
- Improve the Supplemental Nutrition Assistance Program (SNAP).
- Increase federal benefit amounts to reflect higher costs of living.
- End finger imaging for SNAP applicants.
- Continue SNAP outreach through agency data matches and grocery stores.
- Improve the WIC program.
- Enact federal legislative changes to the WIC program.
- Help WIC vendors by translating the vendor book into multiple languages.
- Mandate breakfast in the classroom for high-need schools.
- Improve the summer meal program.
- Establish a process to make sure summer meal sites are identified earlier and outreach has begun in advance of summer recess.
- Identify and expand on high-utilization sites.
- Produce a list of nearby summer meal sites for parents receiving SNAP or TANF with children.

GOAL 9: ***Improve the nutrition of institutional meals.***

STRATEGY: ***Expand the capacity of city agencies to cook whole foods for nutritious meals.***

Proposals:
- Agency kitchen capital investment and staff training.
- Expand salad bars in schools.

GOAL 10: ***Increase quantity and quality of opportunities for food, nutrition and cooking knowledge.***

Proposal:
- Maximize SNAP-Education funding.

LOCAL FOOD SYSTEMS	Local Food and Farms: Growing Story County Ken Meter and the Story County Planning and Zoning Department; Story County, Iowa; September 2010
Synopsis	In October 2008, the Story County Board of Supervisors established a local food system steering committee called the "Grow Story County Committee" comprised of local stakeholders, food systems experts and citizens to discuss issues and opportunities in the Story Country Region, including: public education of local food issues; institutional purchasing of local foods; regional collaboration on food system issues and policies; recruiting and retaining more local food growers; niche farming opportunities; feasibility for a regional food processing facility; allowing for small acreage farming; and fostering more equitable access to healthy foods. *Local Food and Farms* is a strategic planning initiative to lay the foundation for a successful local food system in Story County through 2015. It is a flexible, living document, designed to be reviewed, edited, and updated annually by the Story County Board of Supervisors. It is intended to provide step-by-step, concrete guidance to the Board, applicable committees, and Story County Departments and staff regarding local food systems and Story County's role(s). The plan identifies obstacles and establishes strategic steps to overcome defined obstacles. In addition, responsible parties and times to achieve positive impact toward fulfilling the mission identified in this strategic plan are identified.
Relevant excerpts	**Many obstacles identified in the report are relevant to Surrey. For example:** *OBSTACLE 3: Accessing Farmland by Aspiring Local Farm and Food Producers* Accessing an appropriate size and affordable tract of farmland is one of the most difficult tasks for aspiring farmers. Local farm and food production in Story County is characterized by smaller acre production per farm. Based on current information, local food producers in Story County farm anywhere from one to 100 acres. Accessing productive farmland at this scale is difficult for aspiring farmers as many tracts of productive farmland are sold in larger acre holdings. SOLUTION STRATEGY 3.1: Support leasing public land for local food and farm production. SOLUTION STRATEGY 3.2: Undertake comprehensive review and assessment of adopted plans and regulations to define barriers. *OBSTACLE 5: Systems for Distributing Local Food* The existing systems for distributing food rely on direct farmer delivery in which smaller volumes are transported direct to market by the farmers. These farmers are unable to access wholesale markets, in part because of inadequate systems of distribution. In addition, producers must meet requirements established by wholesale markets which can prohibit distribution in some venues. Small-scale farmers are often unable to sell their produce and processed meats directly to local markets such as grocery stores, schools, hospitals, prisons, and other institutional dining facilities. Food production and processing are very centralized in America, with most of our food grown and distributed by large-scale or corporate farms—some located in other nations. SOLUTION STRATEGY 5.1: Support initiatives which further the distribution and related facilities for local food, such as collaborative marketing strategies, and possibilities of establishing farmers' cooperatives.

LOCAL FOOD SYSTEMS	Minneapolis Urban Agriculture Policy Plan Minneapolis City Council; Minneapolis, Minnesota; April 2011
Synopsis	The subject of this plan is how urban agriculture (the local production, processing, distribution, and consumption of food in the urban environment) can be better supported as an urban land use. This plan explores and builds upon several land use related recommendations found in *The Homegrown Minneapolis Report*. It also expands on several policies found in the Comprehensive Plan. The steering committee that guided the development of the plan developed eight overarching goals that encompass the land use specific Homegrown Minneapolis recommendations and also relate to more broad topics such as encouraging ecological sustainability. Many issues covered in the plan provide background information and address a variety of topics related to urban agriculture, but the recommendations focus primarily on land use related actions. With the goal of promoting urban agriculture, it examines existing urban agriculture policies and facilities (farmers markets, community gardens, etc.), outlines issues and opportunities (organized by the plan goals outlined by the steering committee), and presents a series of recommendations to be pursued.
Relevant excerpts	**The report makes the following key recommendations:** Defining several urban agriculture related activities, such as market gardens and urban farms, in the zoning code and altering some of the existing zoning that related to community gardens and farmers' markets; Incorporating urban agriculture into long range planning and encouraging it to be integrated with new construction projects as appropriate; and Reviewing the City owned land inventory to make land that is not desirable for development, but well-suited for urban agriculture available.
	The report identifies the following key mechanisms to promote systems change and lead to healthier lives: Plan for food over the long term. Plan for resiliency and redundancy. Foster economic transactions that improve soil, water, and air quality and reduce greenhouse gas impacts. Protect farmland in urban, suburban and rural areas. Grow new farmers. Plan and build storage and distribution networks that create local efficiencies. Create "value networks" that allow large and small firms to flourish. Invest in those who are most vulnerable. Create public and private incentives for quality. Emphasize equity investment for emerging local firms.

Regional Food Systems

Grassroots or Independent Reports and Initiatives

- **Michigan Good Food Charter**
  The C. S. Mott Group for Sustainable Food Systems, the Food Bank Council of Michigan and the Michigan Food Policy Council; Michigan; May 2010
  (Profiled below)
- **The 25% Shift: The Benefits of Food Localization for Northeast Ohio and How to Realize Them**
  Masi, Schaller, and Shuman; Ohio; December 2010
  (Profiled below)
- **The New Mainstream: A Sustainable Food Agenda for California**
  The Vivid Picture Project; California; December 2005
  (Profiled below)
- **It Takes a Region: Exploring a Regional Food Systems Approach**
  Northeast Sustainable Agriculture Working Group; September 2010
  (Profiled below)
- The Good Food for All Agenda: Creating A New Regional Food System for Los Angeles
  The Los Angeles Food Policy Task Force; Los Angeles, California; 2010
- Is Local Enough? Some Arguments for Regional Food Systems
  Kate Clancy and Kathryn Ruhf; January 2010

Government-Led Reports and Initiatives

- **The Farm to Plate Strategic Plan: A 10 Year Strategic Plan for Vermont's Food System**
  The Vermont Sustainable Jobs Fund; Ongoing project
  (Profiled below)
- Metro Vancouver: Regional Food Systems Strategy
  Metro Vancouver Regional District; Metro Vancouver, BC; February 2011
- Go To 2040: Promote Sustainable Local Food (Subsection), and
  Food Systems Strategy Paper
  The Chicago Metropolitan Agency for Planning; Metropolitan Chicago, Illinois
- Eating Here: Greater Philadelphia's Food System Plan
  Delaware Valley Regional Planning Commission; Philadelphia, Pennsylvania; 2008
- Washington Agriculture Strategic Plan 2020 and Beyond
  Washington State Department of Agriculture; Washington; February 2009

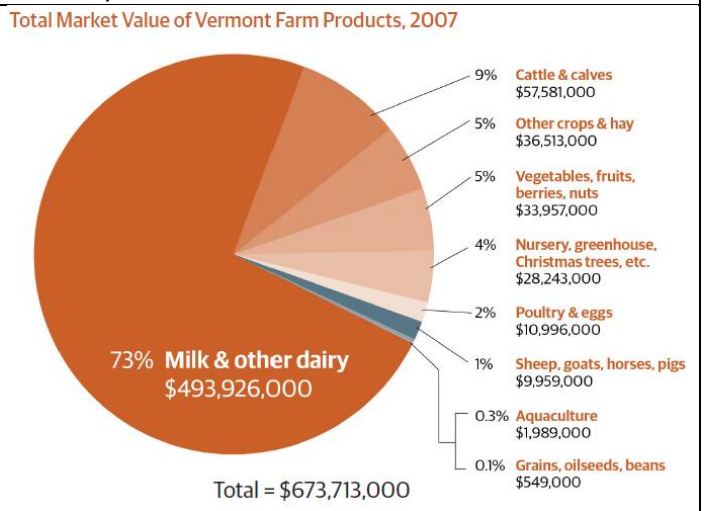
REGIONAL FOOD SYSTEMS	The Michigan Good Food Charter The C. S. Mott Group for Sustainable Food Systems, the Food Bank Council of Michigan and the Michigan Food Policy Council; Michigan; May 2010
Synopsis	The Michigan Good Food Charter presents a vision for Michigan's food and agriculture system to advance its current contribution to the economy, protect the natural resource base, improve residents' health and help generations of Michigan youth to thrive. The charter is centered on "good food" and the steps that can be taken by the state to significantly expand the portion of Michigan's food and agricultural system that provides good food for everyone in Michigan. The charter advances a believe that Michigan needs a locally integrated food system; one with a dynamic blend of local, regional, national and globally produced good food, and outlines this vision and a sequence of steps that can be taken take over the next 10 years to move Michigan in this direction.
Relevant excerpts	**On the challenge and opportunities facing Michigan farmers:** "The bulk of Michigan's agricultural production is currently oriented toward commodity production. But the only way to compete in a commodity market is by selling at the lowest price. Michigan farmers are efficient, but they can't compete effectively against products from places with significantly lower land and labor costs. Today some farmers, processors, distributors and others in the food system seek new, more diverse and more lucrative markets that can simultaneously preserve natural resources, enhance public health and foster vibrant communities. "
	Selected Agenda Priorities Identified in the Report Encourage institutions – including schools, hospitals, colleges and universities – to use their collective purchasing power to influence the food supply chain to provide healthier food and more foods grown, raised and processed in Michigan. Establish Michigan as "the place to be" for culturally based good food that is locally grown, processed, prepared and consumed. Amend Michigan's General Property Tax Act to exempt certain on-farm renewable energy installations. Provide financial incentives for farmers and for development of food system infrastructure to support institutional local food purchasing programs. Develop a farm-to-institution grant program to provide planning, implementation and kitchen or cafeteria equipment grants to maximize the use of locally grown, raised and processed foods in institutional cafeterias. Ensure that all state and higher education business, work force and economic development programs include farming and agriculture in their target audiences for programmatic development, training, investment and technical assistance. Examine all of Michigan's food- and agriculture-related laws and regulations (food safety, production, processing, retailing, etc.) for provisions that create unnecessary transactions costs and regulatory burdens on low risk businesses and ensure that regulations are applied in a way that acknowledges the diversity of production practices. Develop systems for collecting and sharing production and market data and other data relevant to regional food supply chain development.

REGIONAL FOOD SYSTEMS	The 25% Shift: The Benefits of Food Localization for Northeast Ohio and How to Realize Them Masi, Schaller, and Shuman; Ohio; December 2010
Synopsis	The study analyzes the impact of the 16-county Northeast Ohio (NEO) region moving a quarter of the way toward fully meeting local demand for food with local production. It suggests that this 25% shift could create 27,664 new jobs, providing work for about one in eight unemployed residents. It could increase annual regional output by $4.2 billion and expand state and local tax collections by $126 million. It could increase the food security of hundreds of thousands of people and reduce near-epidemic levels of obesity and Type-II diabetes. And it could significantly improve air and water quality, lower the region's carbon footprint, attract tourists, boost local entrepreneurship, and enhance civic pride. This strategy could potentially transform the structure and the sustainability of Surrey's agriculture. With a shift toward increased local production for local consumption, a significant portion of the wealth generated from agriculture will remain in the local and regional economies, and could have a significant multiplier effect.
Relevant Excerpts	Standing in the way of the 25% shift are formidable obstacles. New workforce training and entrepreneurship initiatives are imperative for the managers and staff of these new or expanded local food enterprises. Land must be secured for new urban and rural farms. Nearly a billion dollars of new capital are needed. Consumers in the region must be further educated about the benefits of local food and the opportunities for buying it.
	To overcome these obstacles, we offer more than 50 recommendations for programs, investment priorities, and policies. In a period of fiscal austerity, we argue, the priority must be to create "meta-businesses" that can support the local food movement on a cash-positive basis. For example: • To mobilize consumers in the region to buy local food, we suggest creating local debit, credit, and gift cards, and purchasing platforms that better connect local food businesses to one another and to government procurement agencies. • To increase the competitiveness of local food businesses, we recommend the creation of local business alliances that facilitate peer learning and new kinds of delivery services, local-food malls, and joint procurement cooperatives. • To make more capital available to local food businesses, we propose establishing new revolving loan funds, municipal food bonds, and a local stock market. • To support a new generation of local food entrepreneurs, we recommend deployment of a network of food-business incubators and "food hubs" operating in concert within a network of enterprise support.
	A shift toward increased local production for local consumption could have a significant impact on local and regional markets, particularly as illustrated in the Ohio example below, for meeting institutional demand for food. Potential economic, health and community benefits flow from this increased focus on creating and strengthening Surrey's local food system.

REGIONAL FOOD SYSTEMS	The New Mainstream: A Sustainable Food Agenda for California The Vivid Picture Project; California; December 2005		
Synopsis	The Roots of Change Council charged the Vivid Picture project team with developing: A vision for a sustainable food system for California An outline of possible implementation strategies for achieving the vision Indicators of success in achieving the vision The 22 goals of a sustainable food system which form the backbone of the vision for 2030 for California are values-based descriptions, written in opportunities-based language, describing the benefits that sustainable food and agricultural systems can provide. The goals serve to guide the development of sustainability indicators, the land use, value chain recommendations, and the implementation strategies required. The process was based on extensive consultation. The project team concluded that in order for the state's entire food system to become sustainable, sustainability would have to become the dominant, mainstream paradigm, dramatically affecting the foundations of the current food system. The project team acknowledged that a small, imperfect but growing sustainable food system existed, but only as a "niche" on the edges of the conventional food system. Moving sustainability from niche to mainstream will depend on a large number of stakeholders understanding that their interests are best served by shifting the system to a successful sustainable model. The Roots of Change Fund, a foundation collaborative involving significant partnership with non-funder colleagues, offers rich examples and discussion of how foundations can engage in highly focused and cumulative grant-making and cross-sector collaboration with diverse stakeholders to move toward solutions-focused systems change.		
Relevant Excerpts	**Economic Goals:** Provide opportunities for food, fishing and farming operations to be profitable Characterized by many locally owned and operated food and farming businesses Encouraging business structures and forms of capitalization that provide investment and ownership opportunities to workers and community members Allow businesses of all sizes to participate in the system as long as they are abiding by sustainable practices and principles	**Social Goals:** Promote food choices that lead to healthy eating Provide easy access to healthy food from retail outlets for all eaters Provide affordable food for all eaters Provide eaters with foods produced and processed as close to home as possible Encourage eaters to know where, and by whom their food is produced Honor and draw on the diversity and richness of different food cultures	**Environmental Goals:** Support and increase biodiversity in plant and animal products (including marine species) Conduct farming so that water, air, forests, and soil resources are enhanced and biodiversity and wildlife habitat are increased – so that food production continues in perpetuity Recycle the wastes and reduce the use of petroleum and other non-renewable inputs

REGIONAL FOOD SYSTEMS	It Takes a Region: Exploring a Regional Food Systems Approach Northeast Sustainable Agriculture Working Group; September 2010
Synopsis	This working paper elaborates a clear understanding of regionalism and regional food systems, including terminology and definitions. The goal is to present a mix of vision *and* practicality through: a) engendering a healthy debate on "local" and "regional"; b) bringing to the forefront the research that needs to be done to describe the present reality and likelihood of success of different models; and (c) proposing the development of transition scenarios toward a "re-regionalized" food system. We encourage Surrey to take a leadership role in establishing and promoting a Regional Food System (and systems approach) to enhance and support food security, increase resilience, reduce GHGs from Agriculture, increase local and regional jobs and businesses. See Food (and Ag) as a legitimate municipal system and given a more substantive role in municipal planning and governance infrastructure. Make direct link to improving the Sustainability Charter.
Relevant excerpts	A regional food system is more than a "bigger" local food system. It is also more than a "scaled-out" local food system (i.e., more local food system "nodes"). A regional food system operates at various scales and geographies to supply some significant portion of the food needs of its population. In most cases community-based" food production will address a small portion of that need, with extremely important direct and indirect benefits. But not all food production is—or ever will be—local. Thinking regionally provides the opportunity to frame food production and food needs in a larger context—within locales and regions, as well as among and across regions however they may be described and bounded.
	Regional Food System Dimensions These four dimensions -food supply, natural resource sustainability, economic development, diversity - are key elements of a regional food system model. We believe there are others to be described over time. Underpinning these descriptors is a set of values that include stewardship, equity, conservation, and opportunity. For example, economic development should strive to support new business relationships based on fairness and transparency throughout the supply chain - models referred to as value chains or values-based food supply chains. Trade should exemplify the principles of domestic fair trade, addressing the treatment of all workers in the food system.
	A hallmark of a regionally focused food system is that economic returns stay within the region. Making that happen requires addressing markets, new business models, branding, infrastructure, financing, and trade. A regional food system is comprised of multiple market options for farms of all sizes that include local markets as well as broader regional supply chains, thereby providing farmers with more market opportunities that play out through various supply chain structures.

REGIONAL FOOD SYSTEMS	The Good Food for All Agenda: Creating A New Regional Food System for Los Angeles The Los Angeles Food Policy Task Force; Los Angeles, California; 2010
Synopsis	The Los Angeles Food Policy Task Force convened in November 2009. The Task Force has worked to develop a Good Food for All Agenda with specific action steps and recommendations for how to advance the Agenda. The Agenda seeks to increase access to Good Food for everyone, improve public health, create quality jobs and small food enterprise opportunities, increase equity in our communities, and improve environmental sustainability throughout the region.
Relevant Excerpts	**Priority Action Areas and Specific Action Steps Identified in the Report:** **Promote A Good Food Economy** Develop plans with partners for Los Angeles Regional Food Hub. Establish incentives and develop policies for food producers to meet demand for Good Food. Conduct a Foodshed Assessment. Link public investment to creation of good jobs and small food enterprises. Review and update regulations to enhance the Good Food system. **Build a Market for Good Food** Develop City and County Good Food procurement policies and urge school districts to participate. Integrate Good Food Criteria into Green Business Certification Programs. Promote the Good Food brand. **Eliminate Hunger in Los Angeles** Increase Food Stamp Program enrollment. Require full EBT and WIC participation at farmers' markets. Promote funding opportunities and technical assistance for farmers' markets. **Ensure Equal Access to Good Food In Underserved Communities** 12. Support the CRA/LA's efforts and strengthen Market Opportunities: Incentives for Food Retailers. 13. Link public investment in healthy food retail to responsible retailers. 14. Urge Congress and CA Legislature to approve and fund Healthy Food Financing Initiatives and develop innovative healthy food retail proposal. 15. Incorporate public health strategies into land use documents. **Grow Good Food in Our Neighborhoods** 16. Streamline permitting and public land leases for community gardens. 17. Expand joint-use agreements with school/community gardens. 18. Introduce Healthy Food Access Components in affordable housing developments. **Establish a regional food policy council to strengthen the good food agenda**

<table>
<tr><td>REGIONAL FOOD SYSTEMS</td><td colspan="2">The Farm to Plate Strategic Plan: A 10 Year Strategic Plan for Vermont's Food System
The Vermont Sustainable Jobs Fund; Ongoing project</td></tr>
<tr><td>Synopsis</td><td colspan="2">The Farm to Plate plan assessed Vermont's food system as a driver of the state's economy, finding that total economic output is at least $2.7 billion annually, while employing over 55,500 people at nearly 11,000 private sector businesses across the state. The Farm To Plate Strategic Plan outlines a wide range of policy and planning strategies that are intended individually and collectively to: increase economic development in Vermont's food and farm sectors; create jobs in the food and farm economies; and improve access to healthy local foods</td></tr>
<tr><td rowspan="4">Relevant Excerpts</td><td colspan="2"><u>The Economic Scope of Vermont's Food and Farm Sector:</u>
The market value of Vermont farm products was estimated at nearly $674 million in 2007. Dairy production alone accounted for 73% (nearly 494 million) of that total.23 Vermont had 6,984 farms that provided employment for 19,735 people (including farm operators).
 
</td></tr>
<tr><td colspan="2">High Priority Strategies and Objectives:</td></tr>
<tr><td>Improve access to viable and affordable agricultural land and secure tenure for farmers (ownership and leases).</td><td>Land use mapping: Create and update a land use statewide spatial LiDAR database of agricultural land usage and an inventory of agricultural land that captures information on soil type, current land use, accessibility to roads, proximity to market areas, etc. Call attention to publicly owned land locations conducive to food production adjacent to publically owned buildings.

Infill farming: Support legal research on embedding new farming activity in established and developing residential areas on productive agricultural land owned by non-farmers. This effort should be coordinated with existing farmland access programs and should be included in the web-based Vermont Food Atlas.</td></tr>
<tr><td>Improve access to viable and affordable agricultural land and secure tenure for farmers (ownership and leases).</td><td>New incubator farm programs: Establish additional farm incubator programs (providing land, technical assistance, equipment sharing) in underserved areas of the state. Develop a matchmaking database of existing farmers who want to host and mentor new farmers on a portion of their property (this is another form of farm incubation).</td></tr>
</table>

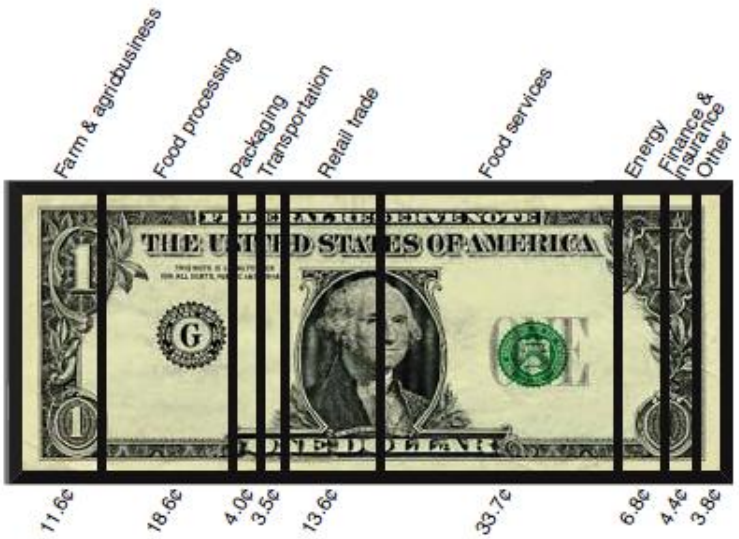
Food Systems Assessments

Grassroots or Independent Reports and Initiatives

- **Kandiyohi County: Local Food System Assessment**
  University of Minnesota Morris, Centre for Small Towns; Minnesota; March 2009
  (Profiled below)
- **Charting Growth to Good Food**
  Wallace Centre at Winrock International; United States; April 2009
  (Profiled below)
- **Cultivating Resilience: A Food System Blueprint that Advances the Health of Iowans, Farms and Communities**
  Angela M. Tagtow, and Susan L. Roberts JD, MS, RD; Iowa; February 2011
  (Profiled below)
- How Food Secure is Vancouver in a Changing World?
  The Vancouver Food Policy Council; Vancouver BC; July 2011
- Mapping the Minnesota Food Industry
  Ken Meter and The Blue Cross and Blue Shield of Minnesota Center for Prevention; Minnesota; October 2009

Government-Led Reports and Initiatives

- A Food Systems Assessment for Oakland, CA: Toward A Sustainable Food Plan
  Oakland Mayor's Office of Sustainability and University of California, Berkeley, Department of City and Regional Planning; May 2006
- Northern Colorado Regional Food System Assessment
  Boulder, Larimer, and Weld Counties, Colorado; March 2011

Food Systems Assessments	Kandiyohi County: Local Food System Assessment University of Minnesota Morris, Centre for Small Towns; Minnesota; March 2009
Synopsis	The purpose of the Kandiyohi County Local Food System Assessment was to facilitate building stronger local communities in regard to cultural, social, economic, and environmental development of the food system. The report notes that successful local food systems rely on grass-roots participation, from the ground up. Once in place, local food systems help to develop local businesses and generate local employment. Successful local food initiatives are also linked to food and agricultural policies that promote food production, processing, distribution, and consumption. The end result is economic development that keeps food dollars within the region, rather than sending them elsewhere, and family farms receiving the support they need to thrive locally.
Relevant Excerpts	*Following a series of focus groups in 2007 to identify assets and opportunities, as well as needs and challenges to the local food system, the following six priorities based were identified:* Prepare for food emergencies from natural, terroristic, or other disasters Provide enhanced local economic opportunities for farmers, processors, distributors, food wholesalers/retailers, and waste and composters to receive a fair living wage from participating in the food system Create a food system that improves local natural resources Provide networking opportunities for residents to develop collaborative solutions to challenges in the local food system Create educational opportunities for residents and local leaders to take action and improve the local food system Provide education and the necessary skills to maximize the available food resources to improve the health of Kandiyohi County residents
	Distribution of Food Dollars: At the turn of the 21st century, 80% of the $618 billion spent on food produced in the U.S. was absorbed by transporting, processing, and distributing food. Only 20% served as a return to farmers (USDA 2000). The figure below illustrates why local farmers, local markets, and local businesses demand support to keep food dollars at home. 

Food Systems Assessments	Charting Growth to Good Food Wallace Centre at Winrock International; United States; April 2009
Synopsis	The goal of the Charting Growth Project was to develop indicators of good food, for use by WKKF's FAS Initiative. Its objectives are to: Define healthy, green, fair and affordable as attributes of the system for WKKF. Develop a broadly credible set of national indicators of good food for WKKF and simple, readily comprehensible ways to display them. Use the indicators to assess the current availability of good food in the United States. Although many people have worked on indicators of sustainability and sustainable development, applications to food systems are relatively new. A small team reviewed the related literature and interviewed numerous experts on food systems and WKKF's selected food attributes to develop definitions, indicators, and measures. Many of the people we interviewed and other stakeholders gave useful feedback on an earlier draft of the definitions, indicators and measures. We incorporated many of their suggestions in a draft that was posted on the Wallace Center website for public comment in December 2008. In late January, we posted a questionnaire on the Wallace Center website and distributed an invitation to review the draft indicators to FAS Project Directors, the FAS Policy Fellows listserv, additional Wallace Center contacts, and on the Community Food Security Coalition's listserv.
Contribution To The Surrey Study	If Surrey were to decide to organize a component of the City's Sustainability Charter around a series of Sustainable Food Indicators, the approach developed by researchers at the Wallace Center at Winrock International may be of value
Relevant Excerpts	**Selected Goals, Indicators and Measures Relevant to Surrey:** ***Goal: Population Health*** ***Indicator:*** *Direct farmer-to-consumer sales are growing in value.* ***Measure:*** Value of agricultural products sold directly to individuals for human consumption. Explanation: Direct sales are usually whole and minimally processed foods that provide essential nutrients to the diet and do not cause diet-related disease under normal circumstances (part of our definition of healthy food). Of total direct sales, a relatively large proportion is fruits and vegetables. Direct sales have other benefits related to the "fair" and "green" attributes as well (e.g., farmers retain more of the revenue than through other marketing mechanisms, and greenhouse gas emissions may be lower because of less packaging and refrigeration. They also may improve community health by keeping more money in a local economy. ***Goal: Environmental Quality*** ***Indicator:*** *The amount of land under Integrated Pest Management (IPM) is increasing.* ***Explanation:*** Integrated Pest Management is designed to improve environmental impacts, using natural and ecological practices, and optimize economic benefits of pesticide use, using them only when necessary.

Food Systems Assessments	Cultivating Resilience: A Food System Blueprint that Advances the Health of Iowans, Farms and Communities Angela M. Tagtow, and Susan L. Roberts JD, MS, RD; Iowa; February 2011
Synopsis	The Iowa Food System Blueprint measured the health of Iowa's food system and made recommendations for research, programs and policies to ensure a food system that supports healthier Iowans, communities, economies, and the environment. The report card framework was constructed using a matrix with food system sectors (production, transformation, distribution/marketing/retail, food access/consumption, and waste management) on a vertical axis and key domain areas based on a series of goal statements (economic, environment, fair food and farming, and food access and health) on the horizontal axis. Using a participatory process, food system stakeholders identified key indicators within each domain crossed with each food system sector that best supported the goal of ensuring a just and diverse food system that supports healthier Iowans, communities, economies and the environment. In addition, the indicators had to meet the following criteria: Valid and measurable; Reliable and credible source; Timely and collected and reported consistently to establish trends; Publicly available, transparent and understandable; Available at the state level (county level also preferred); and Relate to the Iowa Food Systems Council goal statements.
Relevant Excerpts	Iowans recognize the vulnerabilities and challenges of our food system. Their observations include the bleeding of food dollars out of Iowa; continued loss of Iowa's natural resources, such as soil and water needed for growing food; the great distances that food travels and the heavy dependence on fossil fuels to grow, harvest, process and transport food; and the manner in which food is grown and processed and the effects on food safety, health and nutrition. Iowans are puzzled on how a majority of our landscape is dedicated to agriculture, yet very little food is grown that directly feeds Iowans. Iowans are anxious about the significant dependence on other states and countries that put food on our plates; and how erratic weather conditions and foodborne diseases will impact our food supply and public health.
	Selected Recommendations Relevant to Surrey: ***Assess, develop and implement online resources to assist with development of Iowa commercial kitchens for value-added food processing. For example:*** Tools for accessing available licensed kitchen space, database of available licensed kitchens, start-up materials, funding opportunities, legal considerations such as user agreements and insurance requirements for commercial, commissary and co-op kitchen rentals, food safety training; and licensing requirements. ***Assess, develop and adopt financial incentives for small and mid-sized food processors in Iowa, especially fruit and vegetable processors. For example:*** Property tax abatement programs, food enterprise development parks, streamlined fees and permitting processes, sales tax exemptions such as those provided to large processors, tax credits for on-farm processing modernization or expansion, low-interest loans, grants; and low-cost or no-cost job training for food workers.

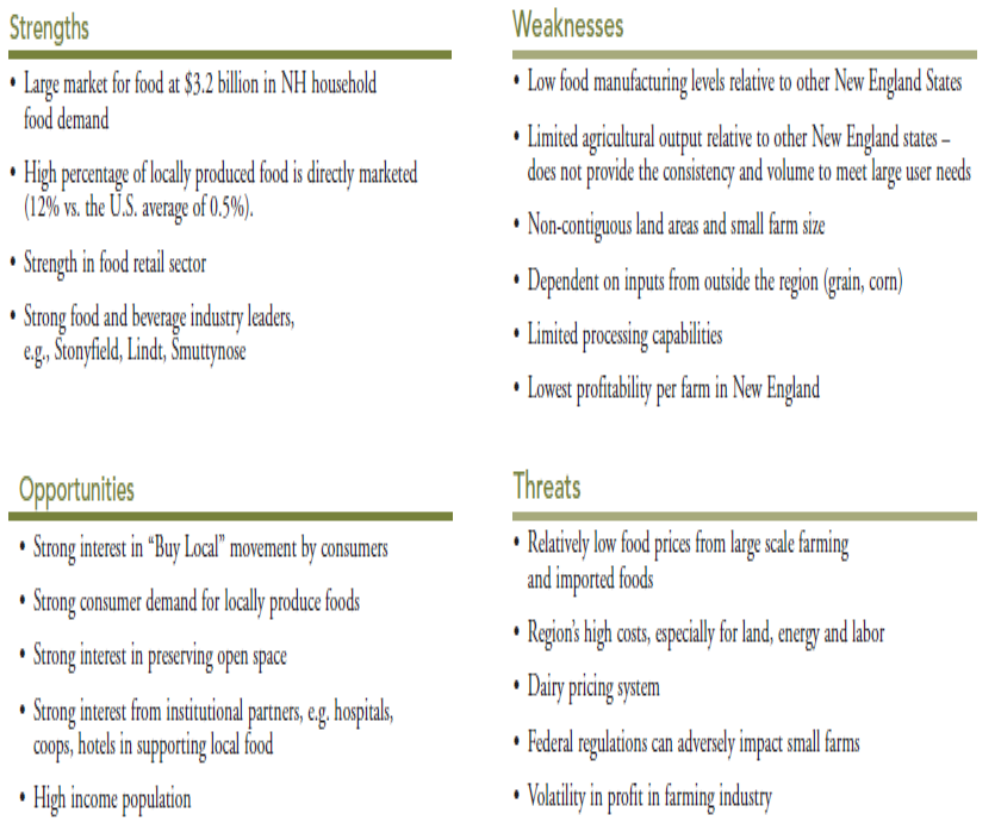
Contributions to Local & Regional Economies

Grassroots or Independent Reports and Initiatives

- **Home Grown: The Economic Impact of Local Food Systems in New Hampshire**
  Food Solutions New England, University of New Hampshire; New Hampshire; April 2010
  (Profiled below)
- **Why Local Linkages Matter: Findings from the Local Food Economy Study**
  Sustainable Seattle; Seattle, Washington; 2005
  (Profiled below)
- **Market Forces: Creating Jobs Through Public Investment in Local and Regional Food Systems**
  Union of Concerned Scientists; Cambridge, Massachusetts; July 2011
  (Profiled below)
- **From Farm to Fork: A Guide to Building North Carolina's Sustainable Local Food Economy**
  Centre for Environmental Farming Systems Report; North Carolina; April 2010
  (Profiled below)
- The Economic Impact of Fruit and Vegetable Production on Southwest Iowa Considering Local and Nearby Metropolitan Markets
  Dave Swenson, Department of Economics, Iowa State University; Iowa; January 2010
- Finding Food in Farm Country: The Economics of Food and Farming in SE Minnesota
  Hiawatha's Pantry Project; Lanesboro Minnesota

Government-Led Reports and Initiatives

- Building Louisville's Local Food Economy: Strategies for Increasing Kentucky farm income through expanded food sales in Louisville
  Louisville Metro Economic Development Department; Louisville, Kentucky; July 2008

Local & Regional Economies	Home Grown: The Economic Impact of Local Food Systems in New Hampshire Food Solutions New England, University of New Hampshire; New Hampshire; April 2010
Synopsis	What are local, healthy foods, and the food system that supports them, worth? *Home Grown* presents one way to answer that question. Its analysis is purposefully focused on specific subsectors of the food system and their real and potential direct contribution to economic output and employment. In this sense, *Home Grown* presents a conventional look at some of the economic value of local food systems and concludes that the local food system contributes to the New Hampshire economy and that it could contribute much more. *Home Grown* points to significant direct economic potential of local agriculture and food manufacturing that could be realized in the Granite State. This is all good news and gives sufficient cause to develop policies and practices designed to achieve such a goal. But as important as the direct contribution of local food systems' are to employment and economic output, the benefits of increasing their economic vitality extend to many other factors impacting quality of life and sustainability in New Hampshire. Profitable farm enterprises serve as a bulwark against sprawl while maintaining an open, working landscape that helps sustain the entrepreneurial, rural character that we cherish and that attracts tourists. It also supports efforts such as farm-to-institution initiatives that are responding to a rapid growth in demand for local, healthy food and contribute to sustainable community development. This analysis shows that significant employment benefits within a strategic public food policy environment can be achieved.
Relevant Excerpts	

Local & Regional Economies	Why Local Linkages Matter: Findings from the Local Food Economy Study Sustainable Seattle; Seattle, Washington; 2005
Synopsis	The report describes the dollar flows and economic linkages of food-related businesses in the Central Puget Sound region of Washington State. The analysis shows that locally directed spending by consumers more than doubles the number of dollars circulating among businesses in the community. This means that a shift of 20% of food dollars into locally directed spending would result in a nearly half billion dollar annual income increase in King County alone and twice that in the Central Puget Sound region. The report makes the case that the emerging local food economy represents a fundamentally different way of organizing production and consumption. Whereas market efficiency is the focus of the industrial food economy, relationship-building is the focus of community economies. Practices in community building and care of the community's resources are key to the vitality of the local food economy. A model of a relationship-based economy is presented which shows that the more dollars circulating locally, the greater the number of community linkages and the greater their strength. The research indicates that locally directed buying and selling connects the community's resources to its needs resulting in relationships that serve to restore the land and regenerate community.
Relevant Excerpts	"A shift of 20% of our food dollars into locally directed spending would result in a nearly half billion dollar annual income increase in King County alone and double that in the Central Puget Sound region."
	Important Research Questions Identified in the Report: Does spending our food dollars locally make a difference economically? What are the goals, strategies, practices and challenges of local food economy businesses? What are the critical economic linkages for developing a sustainable regional food system? How do local economic linkages contribute to environmental and community sustainability? What are the strategies for strengthening the local food economy based on the analyses?
	Strategies For Sustainably Growing The Local Food Economy Identified in the Report: Create a Shared Understanding of What is Local Set Goals for Transitioning to a Sustainable Regional Food System Develop Food Value Chains Based on relationships Give Transition Support to Mid-Sized Farms and Local Independents Build a Distribution System Keyed to Local Foods Establish the State's First Sustainable Agricultural Preserve Increase Access and People's Buying Power Change Public Policy to Champion the Local Food Economy Engage the Community in Growing the Local Food Economy

Local & Regional Economies	Market Forces: Creating Jobs Through Public Investment in Local and Regional Food Systems Union of Concerned Scientists; Cambridge, Massachusetts; July 2011
Synopsis	When strolling through a local farmers market you may well be struck by the many ways in which the food offered for sale differs from typical mass-produced and-marketed food products. For starters, healthful produce items dominate the farmers market, and they are typically fresher and more flavorful than supermarket produce. Moreover, the presence of the farmers puts a face on who grew the food and reflects where and how it was grown. Less apparent to the casual shopper, however, are the important economic benefits that farmers markets—and the local and regional food systems behind them —can provide to rural and urban communities alike. In this report, the Union of Concerned Scientists (UCS) explores the recent remarkable growth of farmers markets and other manifestations of local and regional food systems, describes key features of these systems, evaluates their economic and other impacts on the communities in which they operate, and offers surprising data on their potential to create jobs in those communities. Finally, the report addresses some challenges that local and regional food systems must meet if they are to grow further, and it recommends public policies that could help promote and expand these systems in the future. Supports the contention that municipalities are well positioned to support and enhance local food systems development, and the economic benefits that can accrue to the region.
Relevant Excerpts	We believe that the following aspects of local and regional food systems justify their public support: • Local and regional food systems can provide regional employment opportunities for farmers and economic development in local communities. • Local and regional food systems have the potential to reduce the environmental footprint of our overall food system. • Local and regional food systems can promote healthier eating habits—for example, by encouraging greater consumption of fruits and vegetables. • Local and regional food systems promote community development by fostering greater connections among urban and rural populations.

Local & Regional Economies	From Farm to Fork: A Guide to Building North Carolina's Sustainable Local Food Economy Centre for Environmental Farming Systems Report; North Carolina; April 2010
Synopsis	This action guide is the product of a yearlong "Farm to Fork" initiative, involving well over 1,000 North Carolinians interested in becoming actively engaged in food and farming issues. Participants in this process included people and organizations working in the fields of agriculture, commercial fishing, community organizing, education, faith, finance, local government, nutrition, philanthropy, planning, public health, public policy and youth outreach. The intent of this guide is to provide key action ideas for building a sustainable food economy in North Carolina at the state and local levels that will lead to significant economic development, stewardship of natural and agricultural resources, and better health and nutrition for all North Carolina residents.
Relevant Excerpts	**Core recommendations in the Report:** ENGAGE Decision Makers in Strategic Food-Systems Planning and Implementation COORDINATE Food-Systems Policies and Regulations GROW New and Transitioning Farmers and Secure Prime Farmland EXPAND Local Market Opportunities CULTIVATE Community Gardens STRENGTHEN local government initiatives ADDRESS public health and food access disparities INCREASE consumer education and outreach PROMOTE farm-to-school programming and engage youth
	Replacing references to "state" with "provincial", the following represent 11 game-changer ideas that would provide a coordinated focus across British Columbia that could harness the local and regional efforts of innovative and progressive municipalities, and they could be acted upon immediately: Establish and implement a statewide food policy council Appoint a state-level food-systems ombudsman Dedicate permanent and significant funding for an Agricultural Development and Farmland Preservation Trust Fund Help network direct-marketing initiatives statewide Establish goals for state procurement of local food Develop a model farm-to-institution program that addresses barriers to procurement for institutional markets Fund a statewide coordinator and other activities of the N.C. Community Garden Partners Expand and strengthen public / private partnerships to address food insecurity in low-income communities Launch an "Eat 10% Local, Sustainable Food" campaign Develop a model farm-to-school pre-service teacher instruction program Develop a teen-focused social network around food systems

Planning and Policy

Grassroots or Independent Reports and Initiatives

- **Policy Guide on Community and Regional Food Planning**
  American Planning Association; May 2007
  (Profiled below)
- **The Planner's Guide to the Urban Food System**
  University of Southern California; School of Policy, Planning, and Development; January 2008
  (Profiled below)
- **Regional Food Systems Infrastructure**
  National Association of Development Organizations Research Foundation; Washington, DC; December 2010
  (Profiled below)
- Good Planning For Good Food: How The Planning System In England Can Support Healthy And Sustainable Food
  Sustain: The alliance for better food and farming; London, England
- Planning for Agriculture in New York: A Toolkit for Towns and Counties
  American Farmland Trust; Saratoga Sptings, New York; 2011
- Do Government Policies Grow Local Food?
  Shermain D. Hardesty; Choices Magazine; 2010
- Planning Regional Food Systems: A Guide for Municipal Planning and Development in the Greater Golden Horseshoe
  Ontario Farmland Trust; Ontario; 2009
- Seeding the City: Land Use Policies to Promote Urban Agriculture
  National Policy and Legal Analysis Network; October 2011

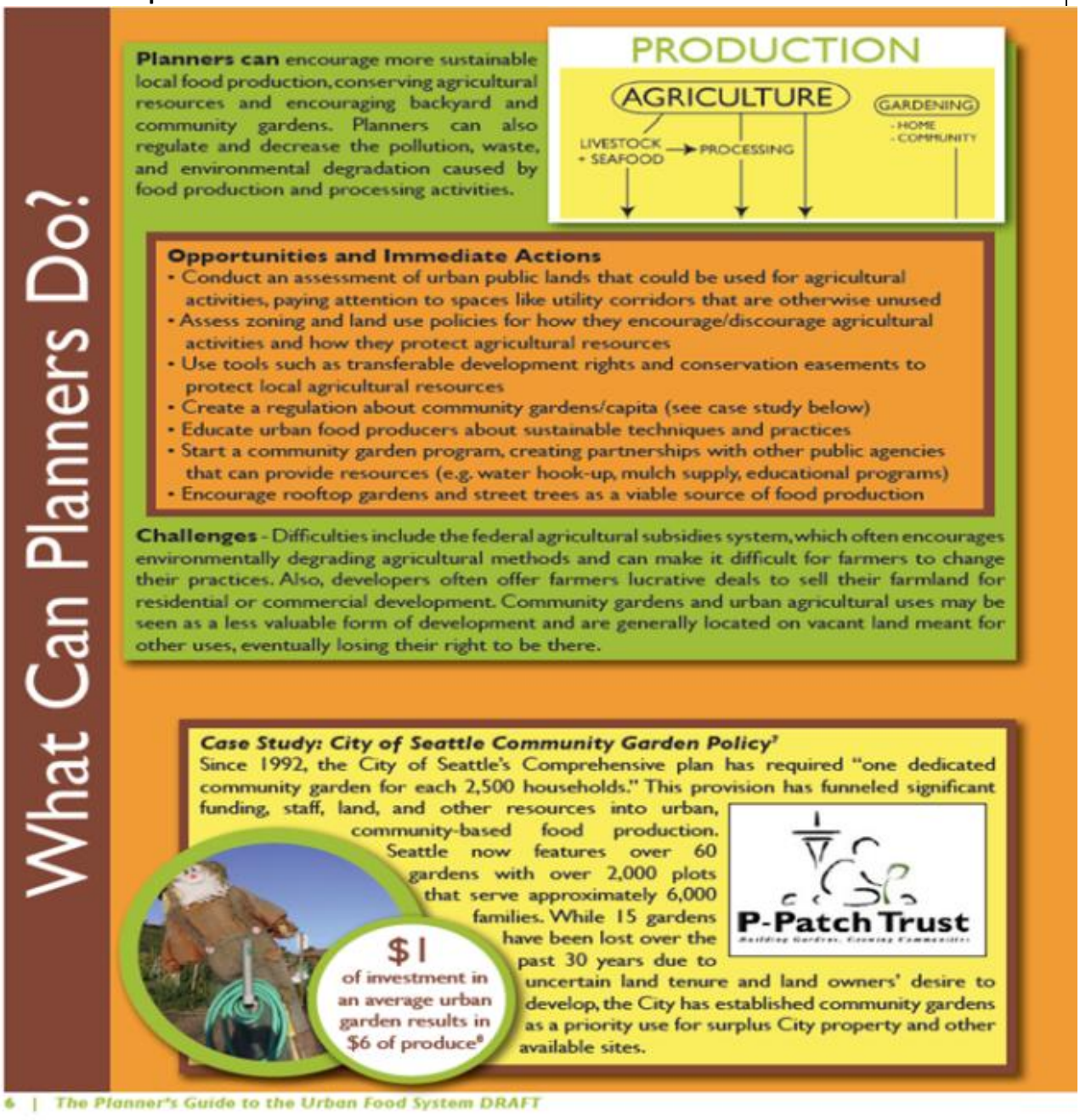
Government-Led Reports and Initiatives

- Municipal Implementation Tool #018 - Food System Planning
  Delaware Valley Regional Planning Commission; Philadelphia, PA; April 2010

Planning & Policy	Policy Guide on Community and Regional Food Planning American Planning Association; May 2007
Synopsis	Food is a sustaining and enduring necessity. Yet among the basic essentials for life — air, water, shelter, and food — only food has been absent over the years as a focus of serious professional planning interest. This is a puzzling omission because, as a discipline, planning marks its distinctiveness by being comprehensive in scope and attentive to the temporal dimensions and spatial interconnections among important facets of community life. This policy guide seeks to strengthen connections between traditional planning and the emerging field of community and regional food planning. As such, two overarching goals are offered for planners: Help build stronger, sustainable, and more self-reliant community and regional food systems, Suggest ways the industrial food system may interact with communities and regions to enhance benefits such as economic vitality, public health, ecological sustainability, social equity, and cultural diversity.
Relevant Excerpts	Several reasons explain why planners have paid less attention to food issues when compared with long-standing planning topics such as economic development, transportation, the environment, and housing. Among these reasons are: A view that the food system — representing the flow of products from production, through processing, distribution, consumption, and the management of wastes, and associated processes — only indirectly touches on the built environment, a principal focus of planning's interest; A sense that the food system isn't broken, so why fix it; and, A perception that the food system meets neither of two important conditions under which planners act — i.e., dealing with public goods like air and water; and planning for services and facilities in which the private sector is unwilling to invest, such as public transit, sewers, highways, and parks.
	The Policy Guide on community and regional food planning presents seven general policies, each divided into several specific policies. For each specific policy, a number of roles planners can play are suggested. The seven general policies are: Support comprehensive food planning process at the community and regional levels; Support strengthening the local and regional economy by promoting local and regional food systems; Support food systems that improve the health of the region's residents; Support food systems that are ecologically sustainable; Support food systems that are equitable and just; Support food systems that preserve and sustain diverse traditional food cultures of Native American and other ethnic minority communities; Support the development of state and federal legislation to facilitate community and regional food planning discussed in general policies #1 through #6
Planning & Policy	The Planner's Guide to the Urban Food System *University of Southern California; School of Policy, Planning, and Development; January 2008*
Synopsis	Why have Urban Planners Ignored Food? Arguing that urban residents and policymakers have a false sense that nothing is wrong with the food system (www.toronto.ca/health/tfpc_hs_report.pdf) partly because

	urbanites have little interaction with the production and processing phases of the food system, the report challenges planners to better understand food systems issues by paying closer attention to 3 basic values: Equity; Economic Efficiency; and Ecological Integrity. Useful Guide from a Planner's perspective on actions, strategies and policy frameworks that can be applied to understanding and promoting local food systems. Also contains good reference material specifically oriented to Planners.

Relevant Excerpts



Planning & Policy	Regional Food Systems Infrastructure *National Association of Development Organizations Research Foundation; Washington, DC; December 2010*
Synopsis	Many regional development organizations (RDOs) and councils of governments are exploring how they can develop and support regional food systems infrastructure. Promoting small- and mid-sized agricultural operations offers numerous benefits to a region, including sustained economic development, protection for regional farmland; reduced vehicle miles traveled (VMT) and greenhouse gas emissions. Sourcing food that is locally or regionally grown fosters a better understanding of food safety and supply issues. Strengthening connections between farmers and area consumers can advance community nutrition and healthy living programs (e.g. farm to school projects).
Relevant Excerpts	**Regional Development Organizations** are uniquely positioned as neutral organizations that can form relationships and promote alliances among various stakeholders. Many organizations serve both rural and urban areas, further allowing them to make connections between the suppliers and consumers. Food systems issues intersect with many aspects of RDOs' other responsibilities, including economic development strategies, small business development, transportation and land use planning, and support for sustainable communities. The following checklist highlights some ways RDOs can support food systems infrastructure in their regions: **Act as a convener:** Capitalize on existing relationships with other regional entities, local governments, state agencies, elected officials, transportation and land use planners, economic development practitioners, small business owners, farmers and ranchers, school districts, hospitals, grocery store and restaurant owners, distributors, public health organizations and other stakeholders to develop the regional dialogue. **Develop a robust database:** Work with partners to collect and analyze data that highlights the region's key issues. **Form a working group:** Evaluate the existing conditions of the regional food systems and identify the region's opportunities and challenges. **Perform a regional food assessment:** Document regional agricultural and food systems data and outline strategies for strengthening connections between regional producers and consumers. See the Mid-Ohio Regional Planning Commission's *Central Ohio Local Food Assessment and Plan*, a noteworthy example for such an assessment (http://www.morpc.org/energy/center/LocalFoods.asp). **Create a regional food systems plan:** Complement and fortify existing regional goals and strategies related to sustainable economic development, transportation planning and land use planning. **Provide technical assistance:** Assist local governments seeking to develop land use policies and zoning ordinances that support regional food systems. **Offer guidance:** Direct farmers and food producers to available programs.

Community Health

Grassroots or Independent Reports and Initiatives

- **Linking Future Population Food Requirements for Health with Local Production in Waterloo Region, Canada**
  Ellen Desjardins, Rod MacRae and Theresa Schumilas; Waterloo, Ontario
  (Profiled below)
- Healthy Eating and Food Security: Promising Strategies for BC
  Andrea Ottam, Dieticians of Canada; British Columbia; April 2010

Government-Led Reports and Initiatives

- **Healthy and Sustainable Food for San Francisco**
  Office of the Mayor: Executive Directive 09-03; San Francisco, California; July 2009
  (Profiled below)
- Towards a Healthy and Sustainable Food System For Toronto
  Toronto Public Health; Toronto, Ontario; May 2010
- Healthy Eating and Food Security for Urban Aboriginal Peoples Living in Vancouver
  Provincial Health Services Authority; British Columbia; September 2011

Community Health	Linking Future Population Food Requirements for Health with Local Production in Waterloo Region, Canada *Ellen Desjardins, Rod MacRae and Theresa Schumilas; Waterloo, Ontario*
Synopsis	This case study of Waterloo Region (WR), Canada, had two objectives. First, we estimate the quantity of locally grown vegetables, fruits, legumes, and whole grains needed to help meet the Region of Waterloo population's optimal nutritional requirements currently and in 2026. Secondly, we estimate how much of these healthy food requirements for the WR population could realistically be produced through local agriculture by the year 2026. Results show that a shift of approximately 10% of currently cropped hectares to the production of key nutritious foods would be both agriculturally feasible and nutritionally significant to the growing population. We supplement our findings with some agronomic considerations and community-level strategies that would inform and support such change. The methodology of this study could be applied to other regions: more such analyses would create a broader picture of the diverse qualitative and quantitative agricultural shifts that could synchronize optimal land use with dietary recommendations, thus informing coordinated policy and planning.
Relevant Excerpts	An important finding from this research is that a shift towards significantly greater production of healthy local food in Waterloo Region can be achieved with a relatively small change in agricultural land allocation. For a selected number of foods insufficiently consumed at present, local agriculture could partially fulfill the additional needs in a more optimal consumption scenario for a projected population in 2026. The amount of land required to feasibly produce these selected foods, beyond what is already grown, was estimated to be about 10% of currently cropped area in Waterloo Region. Because of the size of the population and its nutritional requirements, and because of the geographical realities that limit the types of crops that can be grown, Waterloo Region will still depend upon imports of fruit and vegetables, some grains and legumes to meet its optimal needs. However, significantly more of these foods could be grown locally. A shift in agricultural production would require technical and financial supports, particularly from the provincial government. Change would be gradual, and a coordinated and guided plan would be needed to meet the optimal targets. Regional and rural planners are crucial in this process, to identify and change municipal/local zoning bylaws as required to enable particularly more horticultural production and processing. Finally, this study suggests the need for an expanded infrastructure for food processing, storage, and distribution. These data can inform the work of local organizations, food systems stakeholders, public health and regional planners to pave the way for change, and encourage local farmers and food entrepreneurs to act upon the inherent business opportunities. In so doing, such collective actions can potentially enhance the region's health and agricultural prosperity.

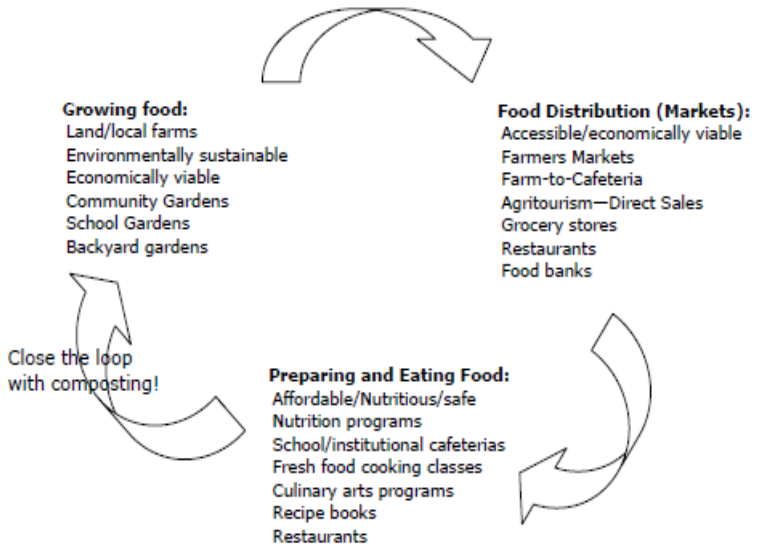
Community Health	Healthy and Sustainable Food for San Francisco ***Office of the Mayor: Executive Directive 09-03;*** ***San Francisco, California; July 2009***
Synopsis	**The City declares its commitment to increasing the amount of healthy and sustainable food.** Access to safe, nutritious, and culturally acceptable food is a basic human right and is essential to both human health and ecological sustainability. The City and County of San Francisco recognizes that hunger, food insecurity, and poor nutrition are pressing health issues that require immediate action. Further we recognize that sustainable agricultural ecosystems serve long-term economic prosperity and ability of future generations to be food self-sufficient. In our vision, sustainable food systems ensure nutritious food for all people, shorten the distance between food consumers and producers, protect workers health and welfare, minimize environment impacts, and strengthen connections between urban and rural communities. The long-term provision of sufficient nutritious, affordable, culturally appropriate, and delicious food for all San Franciscans requires the City to consider the food production, distribution, consumption and recycling system holistically and to take actions to preserve and promote the health of the food system. This includes setting a high standard for food quality and ensuring city funds are spent in a manner consistent with our social, environmental and economic values.
Relevant Excerpts	The following are a selection of the **principles** that guide this Directive on Healthy and Sustainable Food: a. To ensure quality of life, as well as environmental and economic health in San Francisco, the food system must promote public health, environmental sustainability and social responsibility. b. Eliminating hunger and ensuring access to healthy and nutritious food for all residents, regardless of economic means, is a concern of all city departments. Investments should be allocated to ensure no San Franciscan goes hungry. c. San Francisco's neighborhood food environments must allow residents the opportunity to make healthy food choices and reduce environmental causes of diet related illnesses. d. To reduce the environmental impacts associated with food production, distribution, consumption, and disposal, whenever possible, city resources will be used to purchase and promote regionally produced and sustainably certified food. e. Food production and horticulture education will be encouraged within the City and, to the extent feasible, on City owned land, through urban agriculture including community, backyard, rooftop, and school gardens; edible landscaping, and agricultural incubator projects. f. The City and County shall promote economic opportunities in the food sector that create green jobs and local food businesses. g. The ability of the City and County to reduce the environmental impacts of the food system depends on the region's fertile farmland. The City and County shall support policies that conserve the region's prime agricultural land. h. The City and County shall promote regional agriculture through increasing marketing opportunities for regionally grown agricultural products in San Francisco.

Case Examples

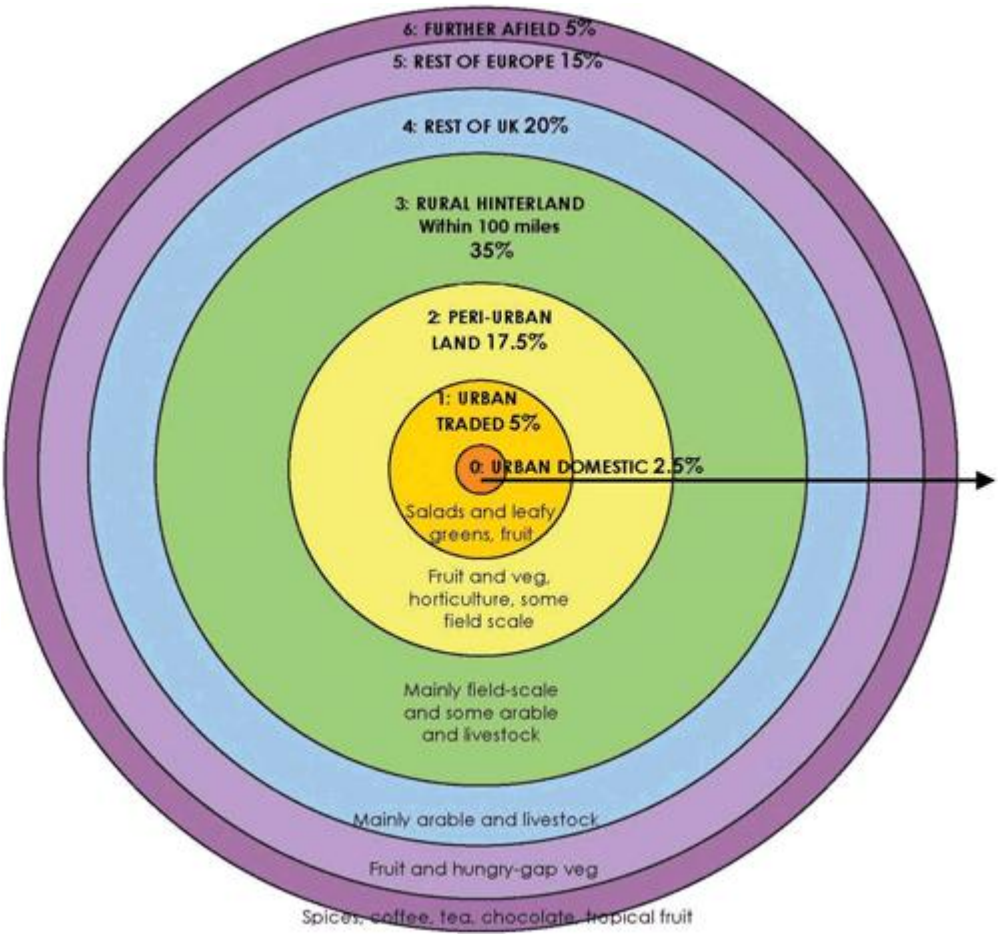
Grassroots or Independent Reports and Initiatives

- **Geraldson Community Farm: Conceptual Management Plan**
  Florida West Coast Resource Conservation and Development Council;
  Manatee Country, Florida; September 2006
  (Profiled below)
- Ground Up: Cultivating Sustainable Agriculture in the Catskill Region
  Columbia University Urban Design Seminar; New York, New York; Spring 2010
- Re-Imagining Cleveland: Ideas to Action Resource Book
  Neighbourhood Progress, Inc.; Cleveland, Ohio; 2008
- New City Market: A Food Hub For Vancouver
  Local Food First Visioning Report; Vancouver BC; April 2010
- Regional Food Hubs: Understanding the scope and scale of food hub operations
  Jim Barham, USDA Agricultural Marketing Service; USA; April 2011
- A California Network of Regional Food Hubs
  Regional Food Hubs Advisory Council; California, USA; September 2010

Case Examples	Geraldson Community Farm: Conceptual Management Plan ***Florida West Coast Resource Conservation and Development Council;*** ***Manatee Country, Florida; September 2006***
Synopsis	On March 1, 2005, the Manatee County Board of County Commissioners (BCC) voted to purchase the approximately 20-acre Geraldson Farm in Bradenton for the creation of a community farm. With the Geraldson Farm purchase, the County has the opportunity to integrate two priorities: the preservation of natural areas such as environmentally sensitive lands with the preservation of green space in productive agriculture. Productive agriculture also provides an opportunity for greater social benefit by providing fresh, healthy food for diverse community members, and an excellent opportunity for education / demonstration at these facilities.
Contribution To The Surrey Study	**Potential Demonstration / Education /Extension Service Model for Surrey** **Major Program Areas:** • ***Community Farm Building*** Developing and demonstrating different models of community farm operation in our 4-county area by providing technical assistance, project development, consulting, and community farm incubation services. • ***Agricultural Economic Development*** Addressing the need for viable business opportunities in the creation of a vibrant local food system by developing a network of strong entrepreneurs pursuing their passions through business ventures. • ***Agricultural Integrated Water Resources Management*** Addressing the need for water conservation in the growing of food and horticultural products by taking a business-friendly approach to integrated water resources management in agricultural operations. • ***Community-Identified Food and Agriculture Projects*** Creating opportunities for inspired community members to contribute by assisting in the development of partnership-based community food and agriculture projects.
Relevant Excerpts	The Florida West Coast Resource Conservation and Development (RC&D) Council is a nonprofit organization that promotes strong communities and sustainable agriculture by bringing people together to create healthy local community food systems. *Goals:* The RC&D has prioritized creating secure, healthy, affordable agricultural and food systems that reflect economic, environmental and social sustainability. *Need: F*armland is diminishing rapidly due to the urgent need for housing and increasing land values. To keep agriculture viable, it is critical that we build a strong agriculture-community connection which contributes to a vibrant local economy and stable local food system. Agriculture is a valuable local resource that preserves our open space, protects our rural heritage, increases local economic prosperity, helps conserve natural resources, and provides food security at the local and national level. A secure, healthy and affordable agricultural-food system reflects an economic, environmental and social balance in the community.
	Demonstration / Education /Extension Service

	The Agriculture and Natural Resources Department/Extension Service envisions a demonstration and education area for the community that will eventually encompass the following: Best Management Practice, Demonstration Gardens, Organic/Non-organic, Small Farms, Flowers, Vegetables, Community Garden Plots, Community Kitchen, Master Gardeners or other volunteers to conduct tours, assist with gardens etc. **COMMUNITY FOOD SYSTEM DIAGRAM** 

Case Examples	Growing Communities - Manifesto For Feeding The City **London, UK**
Synopsis	Growing Communities works on the assumption that we are moving into an energy and resource constrained future. As a society, it makes sense to respond accordingly by reducing the amount of energy, fossil fuels and resources it takes to feed us and to create a food system that is sustainable and resilient.
Relevant Excerpts	Our current food and farming system requires us to put in between 5 and 10 calories for every 1 we get out. That means the energy we get out in the form of food is up to 10 times less than it has taken to grow it. And the way we put those 10 calories in is through fossil fuels – mainly oil and gas – in the form of artificial fertilizers and pesticides, in on-farm machinery and in the energy required to process that food and get it from the farm to our plates. Our current food system also accounts for at least 30% of global greenhouse gas emissions and its dependence on cheap fossil fuels makes it extremely vulnerable to fluctuations in the supply and price of oil and gas. Food distribution is based around long centralized supply chains which function best when supplied by large monoculture farms. On an individual basis we are increasingly disconnected from our food, where it comes from and the people that produce it. Most of us lack basic skills or understanding of growing, preparing and cooking food – all of which increases our dependency on a fragile food system. The food traded should be: Farmed and produced ecologically As local as practicable Seasonal Mainly plant based Mainly fresh and minimally processed From appropriately scaled operations (which gravitate to the small rather than to the large scale) And the system as a whole needs to: Trade fairly Involve environmentally friendly and low-carbon resource use Promote knowledge Strive to be economically viable and independent Foster community Be transparent and promote trust throughout the food chain

	"The Food Zones" 

Bio-regional Food System Planning for British Columbia

The analysis of Surrey's underutilized agricultural lands suggests that they have significant potential to contribute to the economic, agricultural and community vitality of the municipality and the region. These findings and related research suggest a promising line of inquiry around two related but separate concepts that are being developed by the Sustainable Agri-food Systems Working Group within the Institute for Sustainable Horticulture at Kwantlen Polytechnic University. The concepts: Municipally Enabled and Supported Agriculture (MESA), and Bio-regional Agri-food Systems reinforce the belief that local-scale, human-intensive, direct-market agriculture can (and should) complement British Columbia's current agri-food system.

With municipalities taking a leadership role in promoting the enhancement of the sustainability and increased resilience of the food system, there is a greater likelihood of establishing and maintaining a series of linked and inter-dependent bio-regional food systems that will strengthen the economic, health, and agricultural prosperity of British Columbians.

Funding support recently secured from the Real Estate Foundation of B.C. will enable the Institute for Sustainable Horticulture to advance these concepts and fully engage municipalities and stakeholders in a comprehensive initiative to foster prudent agricultural land and resource use and the sustainability of agriculture and communities in southwest British Columbia. The following conceptual framework and subsequent text illustrates how this research will be undertaken, optimally with significant input from Surrey. We invite feedback on these ideas and concepts.

Keystone Attributes in the Design of Regional Agri-food Systems

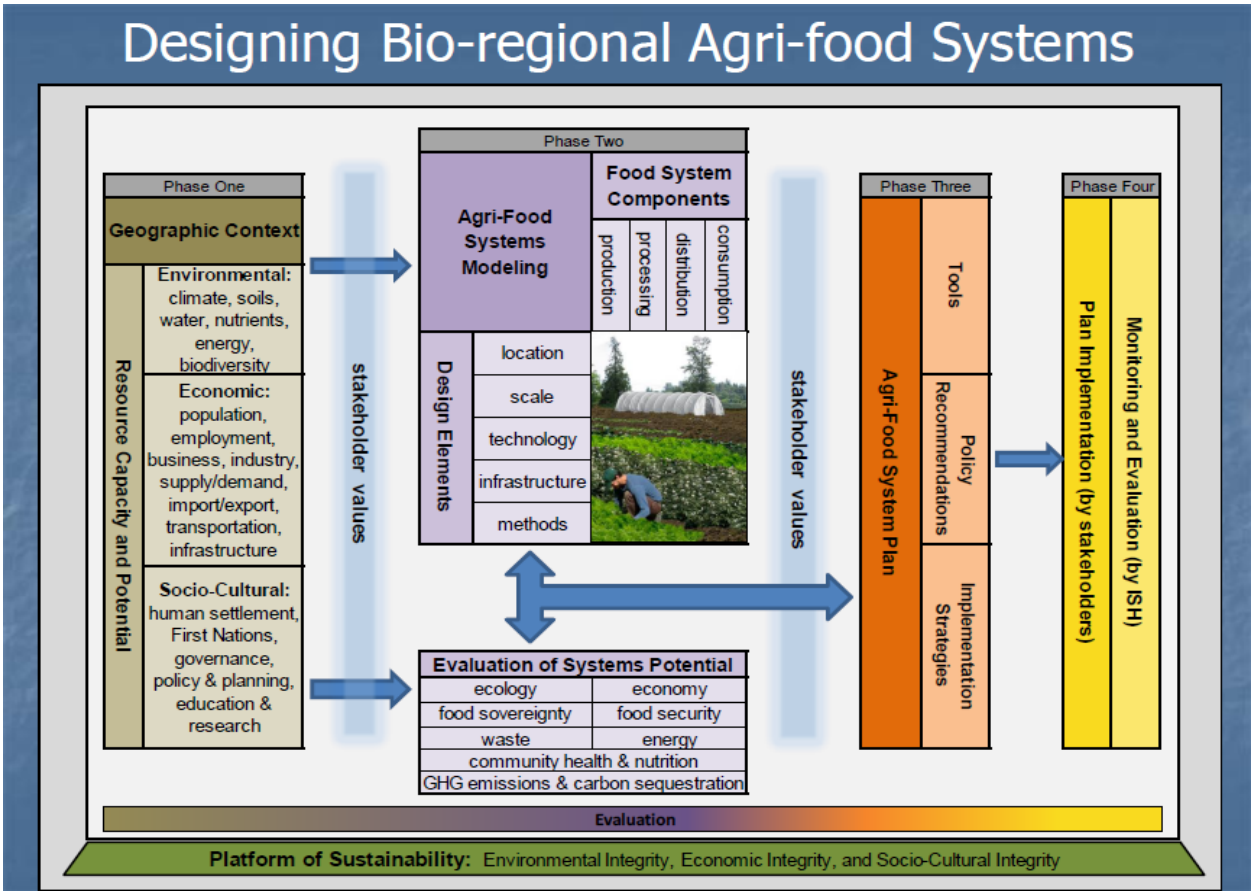
1. Built on a platform of Sustainability:
    i. Environmental Integrity
    ii. Economic Integrity
    iii. Socio-cultural Integrity

2. Comprising full spectrum of food systems dimensions
    i. Production
    ii. Processing
    iii. Distribution
    iv. Consumption
    v. Waste Management

3. Contextualized with Stakeholder Values Identification and Scenario Planning; reinforced with insights from benchmark studies

4. Demonstrable contributions to:
    i. Local / Regional Economies
    ii. Community Heath & Nutrition
    iii. Urban Planning and Design
    iv. Energy Systems
    v. Governance Structures
    vi. Food Security / Self-Reliance
    vii. Food System Assessment

5. Illustrated, documented and evaluated:
    i. Modeling
    ii. Planning
    iii. Implementation



APPENDICES

Appendix 1: Survey Package

Survey Package Part A) Stakeholder Engagement Information Letter

Kwantlen POLYTECHNIC UNIVERSITY
INSTITUTE FOR SUSTAINABLE HORTICULTURE

Potential for Enhanced Small Lot, Local Scale, Direct Market Agriculture in Surrey

The Institute for Sustainable Horticulture at Kwantlen Polytechnic University is currently working with the City of Surrey to carry out a baseline analysis of the municipality's agricultural land. Research results will inform the city's goal to develop municipal policies and strategies to enhance agriculture, stimulate the local economy, and connect the small lot agriculture to local, direct markets in urban centres.

To best address the research goals, the research team is engaging with stakeholders, including landowners, to determine their values and opinions surrounding agriculture. We invite you to participate in this process by completing the enclosed short survey and attending a stakeholder forum in August, 2011.

Participation in both processes is completely voluntary and very much appreciated. Your responses will remain absolutely confidential and anonymous. Completed surveys can be mailed to the research team using the stamped, addressed envelope included in this package. An invitation to the stakeholder forum, and RSVP information, is also attached.

A project summary report will be available by November, 2011, on the ISH website (www.kwantlen.ca/ish) or in hardcopy summary form by request. For further information about this project, or to request a summary report, please contact the principle investigator:

Dr. Kent Mullinix,
Director - Sustainable Agriculture and Food Security
Institute for Sustainable Horticulture
Kwantlen Polytechnic University
12666- 72nd Ave, Surrey, BC V3W 2M8
604.612.1252
kent.mullinix@kwantlen.ca
www.kwantlen.ca/ish

Survey Package Part B) Forum Invitation

Kwantlen POLYTECHNIC UNIVERSITY
INSTITUTE FOR SUSTAINABLE HORTICULTURE

You are invited to participate in …

A Stakeholder Forum on the Potential for Enhanced Small Lot, Direct Market, Local Scale Agriculture in Surrey

August 17th 2011, 6:00 – 8:00 PM
Kwantlen Polytechnic University Conference Centre
Surrey Campus, 12666- 72nd Ave, Surrey, BC V3W 2M8

The Institute for Sustainable Horticulture at Kwantlen Polytechnic University is currently working with the City of Surrey to engage with local stakeholders, including residents and owners of Surrey's rural residential and agricultural lands to determine values and opinions surrounding agriculture and agricultural land use. We invite you to participate in our research and learn about Surrey's local food system by attending this stakeholder forum.

The forum agenda includes:

- Introductory remarks by Principle Investigator Dr. Kent Mullinix (Director, Sustainable Agriculture and Food Security, Institute for Sustainable Horticulture)
- Keynote address by an urban farmer
- Presentation of "urban friendly farming" models
- Breakout discussions and feedback

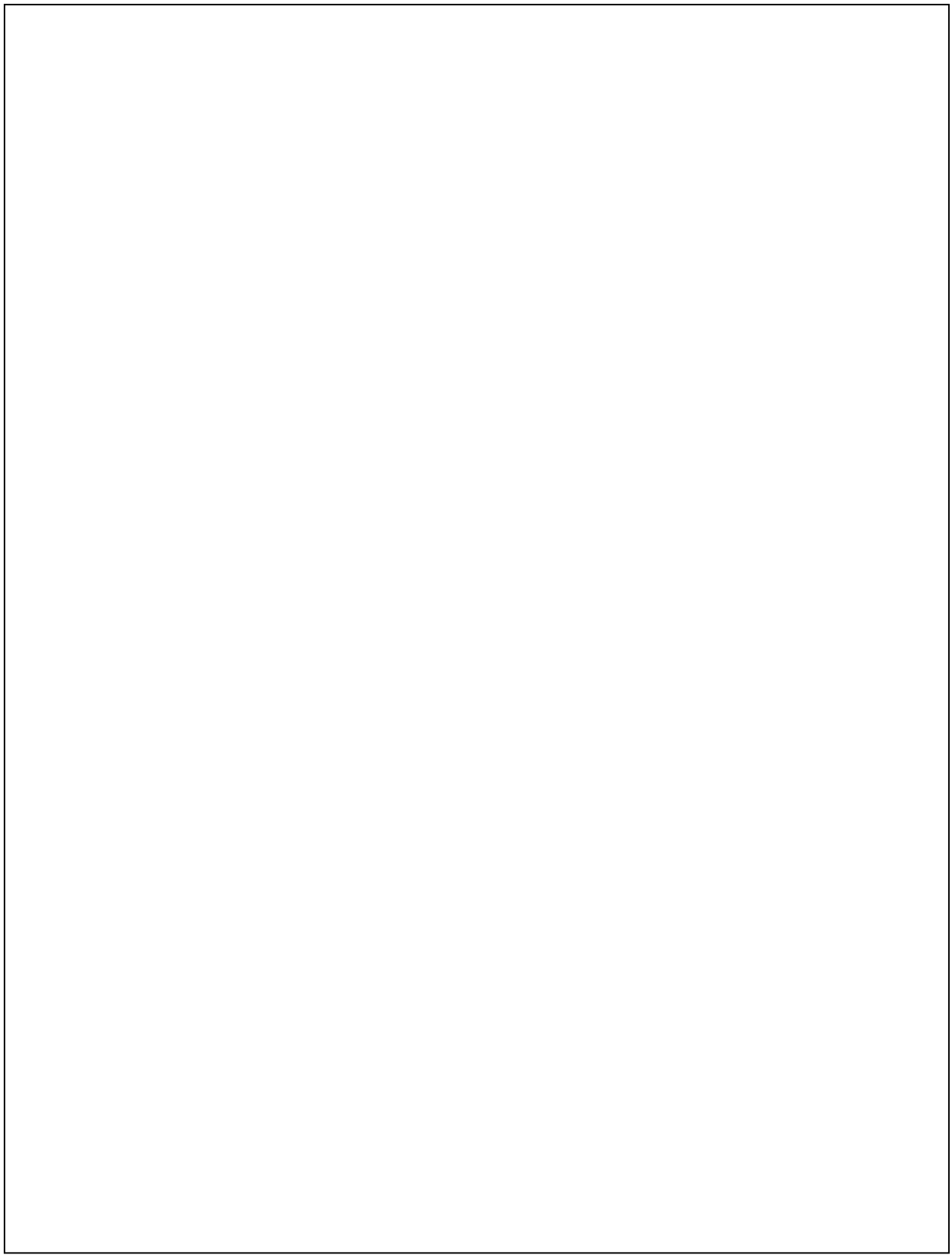
Snacks and refreshments will be provided.

Your RSVP is requested by August 1st, 2011. To RSVP, please complete the information below and mail it to us (along with your completed survey) using the stamped, addressed envelope included in this package. Alternatively, you may send your RSVP via email to:

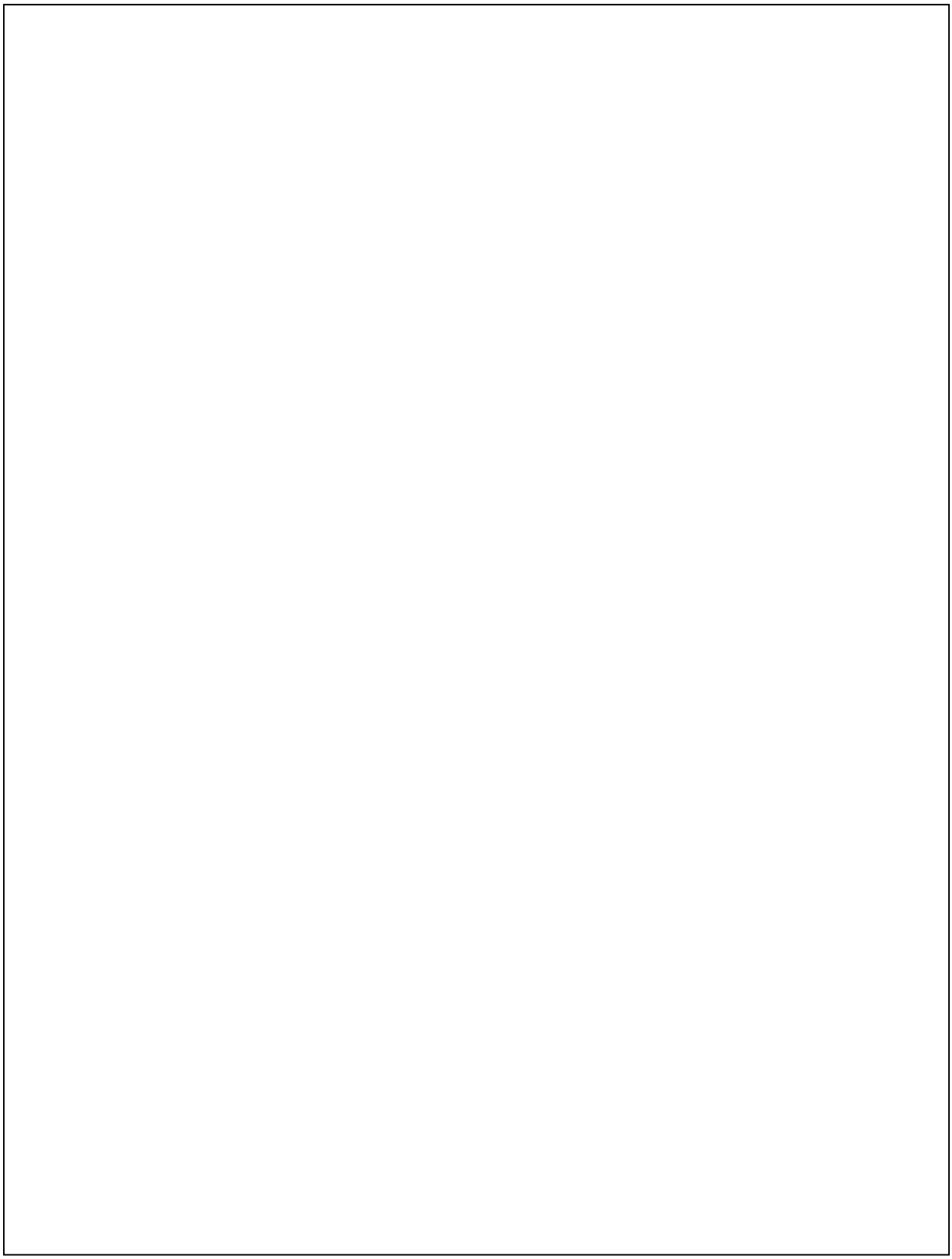
Caitlin Dorward, Project Coordinator: caitlin.dorward@kwantlen.ca

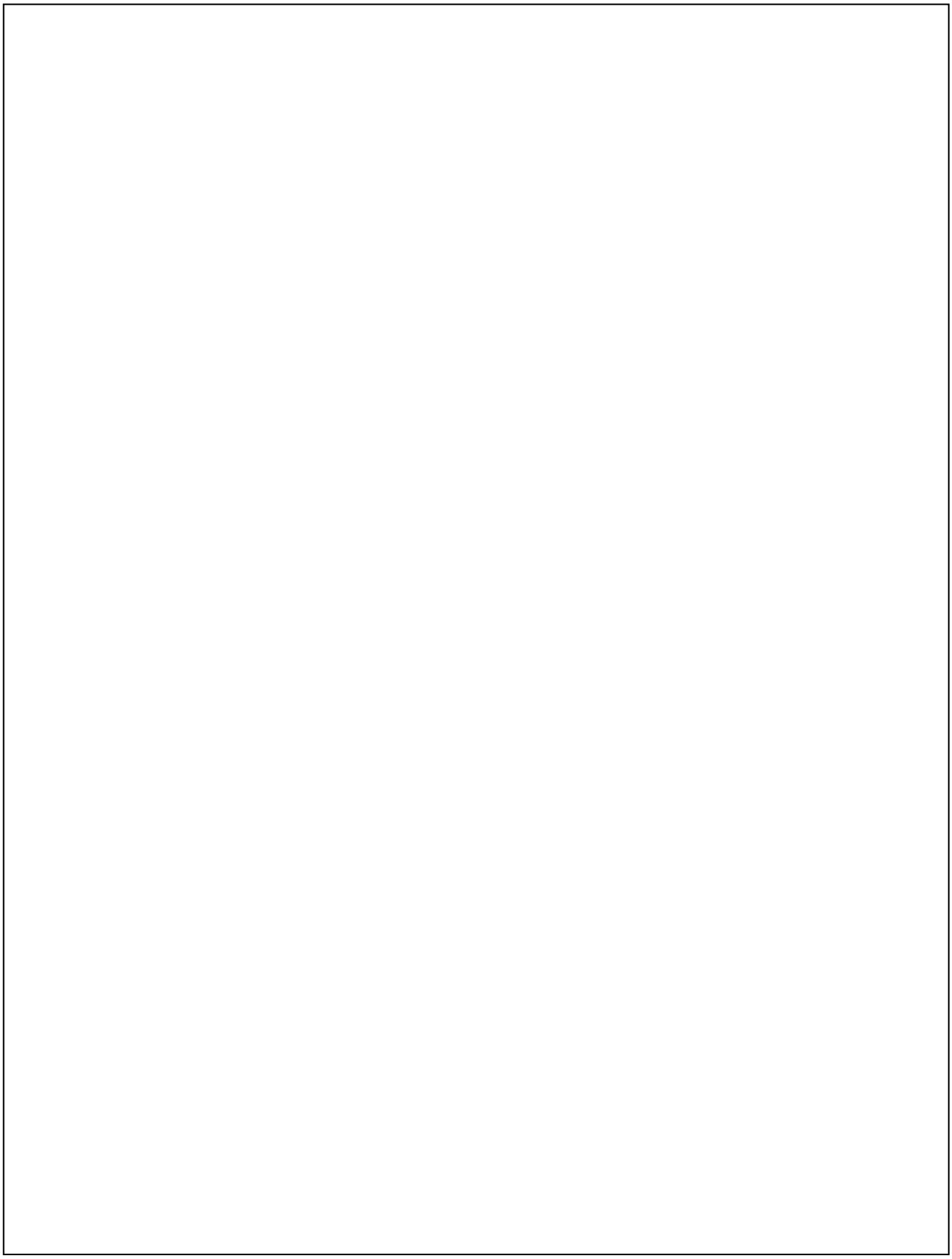
A reminder and event updates will be sent to all registrants two weeks prior to the event.

Survey Package Part C) Survey Instrument



Appendix 2: Tabulated Survey Results





Appendix 3: Stakeholder Focus Group Minutes

Potential for Enhanced Small Scale Agriculture: Stakeholder Focus Group MINUTES

Wednesday, August 17th, 2011, 6:00 – 8:00pm
Office of Research and Scholarship, Room A2400
Coast Capital Savings Library, Arbutus Building
Kwantlen Polytechnic University, 12666 – 72nd ave, Surrey

6:00pm **Introductory remarks by Principle Investigator Dr. Kent Mullinix (Director, Sustainable Agriculture and Food Security, Institute for Sustainable Horticulture)**

- Introductions to research team and focus group participants
- Institute for Sustainable Horticulture focus on small scale sustainable agriculture
- Project overview; Surrey's interest in and concerns about the ALR

6:30pm **Discussion of agricultural potential of unused ALR land in Surrey**

- Overview of field work methods and findings
- 3500 acres of underutilized land (16% of total ALR)
- Four generalized types:

1 – Market (< 0.5 acres) – Green City Acres (Curtis Stone) farms on 0.75 acres, SPIN (small plot intensive), organic vegetable and micro greens, CSA model and restaurants, earns over $50 000.

2 - Micro (0.5-2 acres) – Cropthorne Famer (Ladner, BC) farm on 2.5 acres on leased residential land, free range eggs and organic vegetables, sell at farmers markets and CSA, 2 farm managers and 1 summer intern

3 - Small (over 2 acres) – Glen Valley Organics (Abbotsford, BC) – leasing 12.5 acres 4 full time and 1 half time employees, free range eggs and organic vegetables

4 - Non-arable land (structure based agriculture or pre and post farming services) – SOLEfood Farm, Vancouver BC, hundreds of planers built on unused hotel parking lot, sell to farmers market, subscription customers

- Introduction to case example small scale farms

7:00pm **Break for snacks and refreshments, and browsing of farm model displays**

7:15pm **Facilitated discussion on key project questions**

- **<u>Are you interested in farming your land or leasing it to a farmer? Why or why not?</u>**
- **<u>What currently prevents or discourages you from farming your land or leasing it to a farmer?</u>**

- No, too old to farm the land. In terms of leasing, I can't trust people these days. Don't want a whole bunch of people coming on the land. Is there help to supervise it all.

- Very interested in farming – reclaim the land on a hobby farm. The hobby farm was bought by family to help feed 6 six kids. Why not? Security – there are kids on the property.

- Would like to do farming but work full time. Leasing – the area available is bit difficult to access.

- Having a second driveway where leasers could get in and out without clogging the main drive way.

- Have an organization help with leasing, security issues, liability issue, that exist.

- Knowledge necessary, time consuming, property tax (scaled to the size of the land), equipment,

- For how much can you lease the land out for? What would make it worth while? Depends on what it would cost the land owner? $400 per acre per year – cost more in liability insurance. Per month maybe but not per year. The stress of people, vehicles coming and going. But, by changing from agriculture to residential you could save $$ in taxes.

- Farm sales? Can you see right from your lane or do you need to go to a market? Preference to sell right off the farm. You are allowed to on A1 but you need to get a business license to sell at the farm gate. There are bylaws of what you can sell. Do you need to have parking or washroom available for the customer.

- **What would you need /what would encourage you to do agriculture on your land? What, specifically, could the City of Surrey offer that would support you?**

- Stay out of the way!

- Issue of what people are growing (mushroom farmers growing weed) – need for watchdog. Conditions: time (when are these people showing up? 4 am?), are they committed farmers (what is their true intent), farmers would have to be serious,

- Incentives? Decreased utility rates, regulations,

- Property tax is low for agricultural land. Capital gain for farmers.

- Grants from City to help people start up – education and courses.

- Advice on what is best to grow on their land (extension).

- Have students/university go to land to prune the trees.

- Couple with an educational program (apprenticeships).

- **Has the evening's discussion and presentation changed your opinion on the agricultural potential of your land or interest in seeing it farming?**

- This has not really changed my mind but has given new ideas.

- Very informative

- **<u>Do you believe that small lot, local scale, direct market agriculture sector in Surrey is possible?</u>**

- Unsure due the logistics of how the land would be grown and taken off the land. Worried about lots of people coming to and from the land.

- Yes absolutely possible to sell to markets or supermarkets.

- **<u>Would any of you be interested in piloting this on your land?</u>**
    - Two participants are very interested

OTHER ITEMS

Shared Stories:

In Germany, towns provided land where people could build small huts to spend their time in the evenings or weekends to grow food and to socialize. Community garden, small holdings. Community bathrooms

Problems Addressed:

Organic certification – quality control.

Truck parking on ARL land – as long as people have permit in than truck parking is permitted. Right on dykes to the river (buildings need to stay 50 m). Trailers/containers used as office space because they are not considered building.

Water and Drainage: water usage, water rights to creeks, upgrades to sewers, need to do these updates to get these up and running. Well water

Chemical Use on Farms – contaminates water

Bylaws – lack of enforcement

7:50pm Closing remarks, END OF SESSION.

Appendix 4: Economic Potential of One Acre of Underutilized Land in the Surrey, BC, Under Four Cropping Scenarios

Production of 10 Most Profitable Crops on 1 acre *Assume each crop grown on 1/10th of the total area available (0.1 Acre)						
Crop	**Yield/ Acre**	**Yield/ 0.1 acres**	**Labor/ Acre**	**Labour / 0.1 Acres**	**Contribution Margin / Acre**	**CM on 0.1 Acres**
Spinach	10,965	1,097 lbs	117.17	11.72 hours	$ 83,097	$ 8,310
Tomatoes	131,484	13,148 lbs	5,423.33	542.33 hours	$ 70,094	$ 7,009
Pak Choy	15,300	1,530 lbs	208.75	20.88 hours	$ 58,077	$ 5,808
Snow Peas	8,713	871 lbs	753.33	75.33 hours	$ 56,126	$ 5,613
Chinese Cabbage	31,875	3,188 lbs	52.00	5.20 hours	$ 46,532	$ 4,653
Beets	16,830	1,683 lbs	400.00	40.00 hours	$ 37,533	$ 3,753
Pumpkins	25,585	2,559 lbs	120.17	12.02 hours	$ 37,266	$ 3,727
Cabbage	27,115	2,712 lbs	282.67	28.27 hours	$ 36,230	$ 3,623
Radishes	16,830	1,683 lbs	322.85	32.28 hours	$ 35,175	$ 3,517
Turnips	32,190	3,219 lbs	511.82	51.18 hours	$ 29,689	$ 2,969
TOTALS		***31,689 lbs***		*819.21 hours* ***0.41 FTE Labour*** ***Plus 1 FTE Manager***	*CM Total* *(Less Fixed Costs)* ***Total***	*$ 48,982* *$ 3,335* *$ 45,647*

Production of 10 Most Labour Intensive Crops on 1 acre *Assume each crop grown on 1/10th of the total area available (0.1 Acre)						
Crop	**Yield / Acre**	**Yield/ 0.1 acres**	**Labor/ Acre**	**Labour / 0.1 Acres**	**Contribution Margin / Acre**	**CM on 0.1 Acres**
Tomatoes	131,484	13,148 lbs	5,423.33	542.33 hours	$ 70,094.01	$ 7,009
Snow Peas	8,713	871 lbs	753.33	75.33 hours	$ 56,125.76	$ 5,613
Turnips	32,190	3,219 lbs	511.82	51.18 hours	$ 29,689.13	$ 2,969
Apple(Jonagold)	9,956	996 lbs	433.83	43.38 hours	$ 11,235.17	$ 1,124
Beets	16,830	1,683 lbs	400.00	40.00 hours	$ 37,533.47	$ 3,753
Garlic	2,916	292 lbs	355.83	35.58 hours	$ 12,777.70	$ 1,278
Carrots	20,145	2,015 lbs	347.00	34.70 hours	$ 28,747.85	$ 2,875
Radishes	16,830	1,683 lbs	322.85	32.28 hours	$ 35,174.59	$ 3,517
Bell Peppers	7,905	791 lbs	302.50	30.25 hours	$ 22,973.46	$ 2,297
Potatoes	16,703	1,670 lbs	299.25	29.93 hours	$ 23,334.91	$ 2,333
TOTALS		***26,367 Lbs***		*914.97 hours* ***0.46 FTE Labour*** ***Plus 1 FTE Manager***	*CM Total* *(Less Fixed Costs)* ***Total Profit***	*$ 32,769* *$ 3,335* ***$ 29,434***

Production of 10 Most Highly Consumed Crops on 1 acre *Assume each crop grown on 1/10th of the total area available (0.1 Acre)						
Crop	**Yield / Acre**	**Yield/ 0.1 acres**	**Labor/ Acre**	**Labour / 0.1 Acres**	**Contribution Margin / Acre**	**CM on 0.1 Acres**
Potatoes	16702.5	1,670 lbs	299.25	29.93 hours	$ 23,334.91	$ 2,333
Apple(Jonagold)	9956.333	996 lbs	433.83	43.38 hours	$ 11,235.17	$ 1,124
Eggs	3876	388 dozens	94.00	9.40 hours	$ 11,289.14	$ 1,129
Lettuce	19099.5	1,910 lbs	257.25	25.73 hours	$ 17,389.08	$ 1,739
Yellow Onions	27871.5	2,787 lbs	255.81	25.58 hours	$ 22,840.14	$ 2,284
Tomatoes	131484.4	13,148 lbs	5,423.33	542.33 hours	$ 70,094.01	$ 7,009
Carrots	20145	2,015 lbs	347.00	34.70 hours	$ 28,747.85	$ 2,875
Cabbage	27115	2,712 lbs	282.67	28.27 hours	$ 36,230.24	$ 3,623
Table Grapes	5100	510 lbs	210.05	21.01 hours	$ 13,233.23	$ 1,323
Cucumbers	12431.25	1,243 lbs	111.44	11.14 hours	$ 23,212.56	$ 2,321
TOTALS		***26,135 Lbs produce*** ***1,243 Doz eggs***		*771.46 hours* ***0.39 FTE Labour*** ***Plus 1 FTE Manager***	*CM Total* *(Less Fixed Costs)* ***Total Profit***	*$ 25,761* *$ 3,335* ***$ 22,426***

Production of All Crops on 1 acre *Assume each crop grown on 1/32nd of the total area available (0.03 Acre)									
Crop	**Yield / Acre**	**Yield/ 0.032 acres**		**Labor/ Acre**	**Labour/ 0.032 Acres**		**Contribution Margin / Acre**	**CM on 0.03 Acres**	
Spinach	10,965	351	lbs	117.17	3.75	hours	$ 83,097	$	2,659
Tomatoes	131,484	4,208	lbs	5423.33	173.55	hours	$ 70,094	$	2,243
Pak Choy	15,300	490	lbs	208.75	6.68	hours	$ 58,077	$	1,858
Snow Peas	8,713	279	lbs	753.33	24.11	hours	$ 56,126	$	1,796
Chinese Cabbage	31,875	1,020	lbs	52.00	1.66	hours	$ 46,532	$	1,489
Beets	16,830	539	lbs	400.00	12.80	hours	$ 37,533	$	1,201
Pumpkins	25,585	819	lbs	120.17	3.85	hours	$ 37,266	$	1,193
Cabbage	27,115	868	lbs	282.67	9.05	hours	$ 36,230	$	1,159
Radishes	16,830	539	lbs	322.85	10.33	hours	$ 35,175	$	1,126
Turnips	32,190	1,030	lbs	511.82	16.38	hours	$ 29,689	$	950
Carrots	20,145	645	lbs	347.00	11.10	hours	$ 28,748	$	920
Hazelnuts	2,125	68	lbs	104.17	3.33	hours	$ 28,159	$	901
Kale	6,375	204	lbs	150.42	4.81	hours	$ 23,530	$	753
Potatoes	16,703	534	lbs	299.25	9.58	hours	$ 23,335	$	747
Pears	12,089	387	lbs	216.50	6.93	hours	$ 23,326	$	746
Cucumbers	12,431	398	lbs	111.44	3.57	hours	$ 23,213	$	743
Bell Peppers	7,905	253	lbs	302.50	9.68	hours	$ 22,973	$	735
Yellow Onions	27,872	892	lbs	255.81	8.19	hours	$ 22,840	$	731
Pole Beans	5,712	183	lbs	200.00	6.40	hours	$ 20,634	$	660
Cauliflower	6,843	219	lbs	119.64	3.83	hours	$ 18,411	$	589
Lettuce	19,100	611	lbs	257.25	8.23	hours	$ 17,389	$	556
Sweet Corn	17,213	551	lbs	99.25	3.18	hours	$ 9,922	$	317
Asperagus	3,825	122	lbs	200.00	6.40	hours	$ 15,992	$	512
Table Grapes	5,100	163	lbs	204.05	6.53	hours	$ 13,233	$	423
Garlic	2,916	93	lbs	355.83	11.39	hours	$ 12,778	$	409
Eggs	3,876	124	dozens	94.00	3.01	hours	$ 11,289	$	361
Apple(Jonagold)	9,956	319	lbs	433.83	13.88	hours	$ 11,235	$	360
Brussels Sprouts	8,976	287	lbs	246.00	7.87	hours	$ 11,015	$	352
Zucchini	8,436	270	lbs	114.66	3.67	hours	$ 8,964	$	287
Broccoli	6,630	212	lbs	222.10	7.11	hours	$ 8,780	$	281
Lamb	467	15	lbs	51.40	1.64	hours	$ 4,502	$	144
Honey (One Hive/Acr	85	85	lbs	1.74	1.74	hours	$ 538	$	538
TOTAL		***16,248***	***Lbs food***		*404.21*	*hours*	*CM Total*	*$*	*27,740*
		319	***Doz eggs***		***0.20***	***FTE Labour***	*(Less Fixed Costs)*	*$*	*3,335*
TOTALS		***85***	***Lbs Honey***		***Plus 1***	***FTE Manager***	***Total Profit***	***$***	***24,405***

Appendix 5: Economic Potential of City-Owned Underutilized Land in Surrey, BC, Under Four Cropping Alternatives (Total Area = 684 Acres)

Production of 10 Most Profitable Crops on City of Surrey Owned Underutilized Land (684.68 Acres)
***Assume each crop grown on 1/10th of the total area available (68.468 Acres)**

Crop	Yield/ Acre	Yield/68.46 acres	Labor/ Acre	Labour/68.46 Acres	Contribution Margin / Acre	CM on 68.46 Acres
Spinach	10,965	750,752 lbs	117	8,022 hours	$ 83,097	$ 5,689,505
Tomatoes	131,484	9,002,472 lbs	5,423	371,325 hours	$ 70,094	$ 4,799,197
Pak Choy	15,300	1,047,560 lbs	209	14,293 hours	$ 58,077	$ 3,976,411
Snow Peas	8,713	596,527 lbs	753	51,579 hours	$ 56,126	$ 3,842,818
Chinese Cabbage	31,875	2,182,418 lbs	52	3,560 hours	$ 46,532	$ 3,185,939
Beets	16,830	1,152,316 lbs	400	27,387 hours	$ 37,533	$ 2,569,842
Pumpkins	25,585	1,751,754 lbs	120	8,228 hours	$ 37,266	$ 2,551,507
Cabbage	27,115	1,856,510 lbs	283	19,354 hours	$ 36,230	$ 2,480,612
Radishes	16,830	1,152,316 lbs	323	22,105 hours	$ 35,175	$ 2,408,334
Turnips	32,190	2,203,951 lbs	512	35,043 hours	$ 29,689	$ 2,032,755
				560,895 hours	CM Total	$ 33,536,922
				280 FTE Labour	*(Less Fixed Costs)*	*$ 2,283,408*
TOTALS		***21,696,576 Lbs***		***plus 137 FTE Manager***	***Total Profit***	***$ 31,253,514***

Production of 10 Most Labour Intensive Crops on City of Surrey Owned Underutilized Land (684.68 Acres)
***Assume each crop grown on 1/10th of the total area available (68.468 Acres)**

Crop	Yield / Acre	Yield/ 68.468 acres	Labor/ Acre	Labour / 68.468 Acres	Contribution Margin / Acre	CM on 68.46 Acres
Tomatoes	131,484	9,002,472 lbs	5,423	371,325 hours	$ 70,094	$ 4,799,197
Snow Peas	8,713	596,527 lbs	753	51,579 hours	$ 56,126	$ 3,842,818
Turnips	32,190	2,203,951 lbs	512	35,043 hours	$ 29,689	$ 2,032,755
Apple(Jonagold)	9,956	681,690 lbs	434	29,704 hours	$ 11,235	$ 769,250
Beets	16,830	1,152,316 lbs	400	27,387 hours	$ 37,533	$ 2,569,842
Garlic	2,916	199,618 lbs	356	24,363 hours	$ 12,778	$ 874,864
Carrots	20,145	1,379,288 lbs	347	23,758 hours	$ 28,748	$ 1,968,308
Radishes	16,830	1,152,316 lbs	323	22,105 hours	$ 35,175	$ 2,408,334
Bell Peppers	7,905	541,240 lbs	303	20,712 hours	$ 22,973	$ 1,572,947
Potatoes	16,703	1,143,587 lbs	299	20,489 hours	$ 23,335	$ 1,597,695
				605,976 hours	*CM Total*	*$ 22,436,010*
				303 FTE Labour	*(Less Fixed Costs)*	*$ 228,341*
TOTALS		***16,909,419 Lbs***		***plus 137 FTE Manager***	***Total Profit***	***$ 22,207,669***

Production of 10 Most Consumed Crops on City of Surrey Owned Underutilized Land (684.68 Acres)
***Assume each crop grown on 1/10th of the total area available (68.468 Acres)**

Crop	Yield / Acre	Yield/ 68.468 acres	Labor/ Acre	Labour / 68.468 Acres	Contribution Margin / Acre	CM on 68.46 Acres
Potatoes	16,703	1,143,587 lbs	299	20,489 hours	23,335	$ 1,597,695
Apple(Jonagold)	9,956	681,690 lbs	434	29,704 hours	11,235	$ 769,250
Eggs	3,876	265,382 dozens	94	6,436 hours	11,289	$ 772,945
Lettuce	19,100	1,307,705 lbs	257	17,613 hours	17,389	$ 1,190,596
Yellow Onions	27,872	1,908,306 lbs	256	17,515 hours	22,840	$ 1,563,819
Tomatoes	131,484	9,002,472 lbs	5,423	371,325 hours	70,094	$ 4,799,197
Carrots	20,145	1,379,288 lbs	347	23,758 hours	28,748	$ 1,968,308
Cabbage	27,115	1,856,510 lbs	283	19,354 hours	36,230	$ 2,480,612
Table Grapes	5,100	349,187 lbs	210	14,382 hours	13,233	$ 906,053
Cucumbers	12,431	851,143 lbs	111	7,630 hours	23,213	$ 1,589,318
		17,894,126 Lbs produce		*528,205 hours*	*CM Total*	*$ 17,637,791*
		851,143 Doz eggs		***264 FTE Labour***	*(Less Fixed Costs)*	*$ 228,341*
TOTALS				***plus 137 FTE Manager***	***Total Profit***	***$ 17,409,450***

Production of Alll Crops on City of Surrey Owned Underutilized Land (684.68 Acres) *Assume each crop grown on 1/32nd of the total area available (21.4 Acres)						
Crop	Yield / Acre	Yield/ 21.4 acres	Labor/ Acre	Labour/ 21.4 Acres	Contribution Margin / Acre	CM on 21.4 Acres
Spinach	10,965	234,651 lbs	117	2,507 hours	$ 83,097	$ 1,778,282
Tomatoes	131,484	2,813,766 lbs	5423	116,059 hours	$ 70,094	$ 1,500,012
Pak Choy	15,300	327,420 lbs	209	4,467 hours	$ 58,077	$ 1,242,846
Snow Peas	8,713	186,448 lbs	753	16,121 hours	$ 56,126	$ 1,201,091
Chinese Cabbage	31,875	682,125 lbs	52	1,113 hours	$ 46,532	$ 995,781
Beets	16,830	360,162 lbs	400	8,560 hours	$ 37,533	$ 803,216
Pumpkins	25,585	547,519 lbs	120	2,572 hours	$ 37,266	$ 797,486
Cabbage	27,115	580,261 lbs	283	6,049 hours	$ 36,230	$ 775,327
Radishes	16,830	360,162 lbs	323	6,909 hours	$ 35,175	$ 752,736
Turnips	32,190	688,855 lbs	512	10,953 hours	$ 29,689	$ 635,347
Carrots	20,145	431,103 lbs	347	7,426 hours	$ 28,748	$ 615,204
Hazelnuts	2,125	45,475 lbs	104	2,229 hours	$ 28,159	$ 602,609
Kale	6,375	136,425 lbs	150	3,219 hours	$ 23,530	$ 503,540
Potatoes	16,703	357,434 lbs	299	6,404 hours	$ 23,335	$ 499,367
Pears	12,089	258,702 lbs	217	4,633 hours	$ 23,326	$ 499,173
Cucumbers	12,431	266,029 lbs	111	2,385 hours	$ 23,213	$ 496,749
Bell Peppers	7,905	169,167 lbs	303	6,474 hours	$ 22,973	$ 491,632
Yellow Onions	27,872	596,450 lbs	256	5,474 hours	$ 22,840	$ 488,779
Pole Beans	5,712	122,237 lbs	200	4,280 hours	$ 20,634	$ 441,570
Cauliflower	6,843	146,430 lbs	120	2,560 hours	$ 18,411	$ 393,995
Lettuce	19,100	408,729 lbs	257	5,505 hours	$ 17,389	$ 372,126
Sweet Corn	17,213	368,348 lbs	99	2,124 hours	$ 9,922	$ 212,323
Asperagus	3,825	81,855 lbs	200	4,280 hours	$ 15,992	$ 342,220
Table Grapes	5,100	109,140 lbs	204	4,367 hours	$ 13,233	$ 283,191
Garlic	2,916	62,392 lbs	356	7,615 hours	$ 12,778	$ 273,443
Eggs	3,876	82,946 dozens	94	2,012 hours	$ 11,289	$ 241,588
Apple(Jonagold)	9,956	213,066 lbs	434	9,284 hours	$ 11,235	$ 240,433
Brussels Sprouts	8,976	192,086 lbs	246	5,264 hours	$ 11,015	$ 235,727
Zucchini	8,436	180,536 lbs	115	2,454 hours	$ 8,964	$ 191,829
Broccoli	6,630	141,882 lbs	222	4,753 hours	$ 8,780	$ 187,888
Lamb	467	9,986 lbs	51	1,100 hours	$ 4,502	$ 96,344
Honey (One Hive/Acı	85	323,170 lbs	2	6,615 hours	$ 538	$ 368,126
		10,865,773 Lbs food		*275,767 hours*	*CM Total*	*$ 18,559,980*
		213,066 Doz eggs		***138 FTE Labour***	*(Less Fixed Costs)*	*$ 228,341*
TOTAL		***323,170 lbs honey***		***plus 137 FTE Manager***	***Total Profit***	***$ 18,331,639***

Appendix 6: Economic Potential of All Underutilized ALR Land (Total Area = 3,802.1 acres)

Production of 10 Most Profitable Crops on All Underutilized Land (3,802.1 Acres)
***Assume each crop grown on 1/10th of the total area available (380.21 Acres)**

Crop	Yield/ Acre	Yield/ 380.21 acres	Labor/ Acre	Labour / 380.21 Acres	Contribution Margin / Acre	Contribution Margin on 380.21 Acres
Spinach	10,965	4,169,003 lbs	117	44,548 hours	$ 83,097	$ 31,594,421
Tomatoes	131,484	49,991,674 lbs	5,423	2,062,006 hours	$ 70,094	$ 26,650,445
Pak Choy	15,300	5,817,213 lbs	209	79,369 hours	$ 58,077	$ 22,081,431
Snow Peas	8,713	3,312,580 lbs	753	286,425 hours	$ 56,126	$ 21,339,575
Chinese Cabbage	31,875	12,119,194 lbs	52	19,771 hours	$ 46,532	$ 17,691,856
Beets	16,830	6,398,934 lbs	400	152,084 hours	$ 37,533	$ 14,270,602
Pumpkins	25,585	9,727,673 lbs	120	45,689 hours	$ 37,266	$ 14,168,789
Cabbage	27,115	10,309,394 lbs	283	107,473 hours	$ 36,230	$ 13,775,099
Radishes	16,830	6,398,934 lbs	323	122,750 hours	$ 35,175	$ 13,373,731
Turnips	32,190	12,238,770 lbs	512	194,598 hours	$ 29,689	$ 11,288,105
				3,114,711 Total Hours	Total CM	$ 186,234,053
				1,557 FTE Labour	*(Less Fixed Cos*	*$ 12,680,370*
TOTALS		***120,483,369 Lbs***		***plus 760 FTE Manager***	***Total Profit***	***$ 173,553,682***

Production of 10 Most Labour Intensive Crops on All Underutilized Land (3,802.1 Acres)
***Assume each crop grown on 1/10th of the total area available (380.21 Acres)**

Crop	Yield / Acre	Yield/ 380.21 acres	Labor/ Acre	Labour / 380.21 Acres	Contribution Margin / Acre	Contribution Margin on 380.21 Acres
Tomatoes	131,484	49,991,674 lbs	5,423	2,062,006 hours	$ 70,094	$ 26,650,445
Snow Peas	8,713	3,312,580 lbs	753	286,425 hours	$ 56,126	$ 21,339,575
Turnips	32,190	12,238,770 lbs	512	194,598 hours	$ 29,689	$ 11,288,105
Apple(Jonagold)	9,956	3,785,497 lbs	434	164,948 hours	$ 11,235	$ 4,271,724
Beets	16,830	6,398,934 lbs	400	152,084 hours	$ 37,533	$ 14,270,602
Garlic	2,916	1,108,502 lbs	356	135,291 hours	$ 12,778	$ 4,858,209
Carrots	20,145	7,659,330 lbs	347	131,933 hours	$ 28,748	$ 10,930,221
Radishes	16,830	6,398,934 lbs	323	122,750 hours	$ 35,175	$ 13,373,731
Bell Peppers	7,905	3,005,560 lbs	303	115,014 hours	$ 22,973	$ 8,734,741
Potatoes	16,703	6,350,458 lbs	299	113,778 hours	$ 23,335	$ 8,872,167
				3,478,825 hours	Total CM	$ 124,589,520
				1,739 FTE Labour	*(Less Fixed Cos*	*$ 12,680,370*
TOTALS		***100,250,240 Lbs***		***plus 760 FTE Manager***	***Total Profit***	***$ 111,909,150***

Production of 10 Most Highly Consumed Crops on All Underutilized Land (3,802.1 Acres)
***Assume each crop grown on 1/10th of the total area available (380.21 Acres)**

Crop	Yield / Acre	Yield/ 380.21 acres	Labor/ Acre	Labour / 380.21 Acres	Contribution Margin / Acre	Contribution Margin on 380.21 Acres
Potatoes	16,703	6,350,458 lbs	299	113,778 hours	23,335	$ 8,872,167
Apple(Jonagold)	9,956	3,785,497 lbs	434	164,948 hours	11,235	$ 4,271,724
Eggs	3,876	1,473,694 dozens	94	35,740 hours	11,289	$ 4,292,244
Lettuce	19,100	7,261,821 lbs	257	97,809 hours	17,389	$ 6,611,503
Yellow Onions	27,872	10,597,023 lbs	256	97,262 hours	22,840	$ 8,684,050
Tomatoes	131,484	49,991,674 lbs	5,423	2,062,006 hours	70,094	$ 26,650,445
Carrots	20,145	7,659,330 lbs	347	131,933 hours	28,748	$ 10,930,221
Cabbage	27,115	10,309,394 lbs	283	107,473 hours	36,230	$ 13,775,099
Table Grapes	5,100	1,939,071 lbs	210	79,863 hours	13,233	$ 5,031,406
Cucumbers	12,431	4,726,486 lbs	111	42,370 hours	23,213	$ 8,825,647
				2,933,180 hours	CM Total	$ 97,944,506
		92,023,731 Lbs produce		***1,467 FTE Labour***	*(Less Fixed Cos*	*$ 12,680,370*
TOTALS		***1,473,694 Doz eggs***		***plus 760 FTE Manager***	***Total Profit***	***$ 85,264,136***

Production of All Crops on All Underutilized Land (3,802.1 Acres) *Assume each crop grown on 1/32nd of the total area available (118.8 acres)									
Crop	Yield / Acre	Yield/ 118.8 acres		Labor/ Acre	Labour/ 118.8 Acres		Contribution Margin / Acre	CM on 118.8 Acres	
Spinach	10,965	1,302,642	lbs	117	13,919	hours	$ 83,097	$	9,871,958
Tomatoes	131,484	15,620,344	lbs	5,423	644,292	hours	$ 70,094	$	8,327,169
Pak Choy	15,300	1,817,640	lbs	209	24,800	hours	$ 58,077	$	6,899,540
Snow Peas	8,713	1,035,045	lbs	753	89,496	hours	$ 56,126	$	6,667,740
Chinese Cabbage	31,875	3,786,750	lbs	52	6,178	hours	$ 46,532	$	5,527,978
Beets	16,830	1,999,404	lbs	400	47,520	hours	$ 37,533	$	4,458,977
Pumpkins	25,585	3,039,498	lbs	120	14,276	hours	$ 37,266	$	4,427,164
Cabbage	27,115	3,221,262	lbs	283	33,581	hours	$ 36,230	$	4,304,152
Radishes	16,830	1,999,404	lbs	323	38,354	hours	$ 35,175	$	4,178,741
Turnips	32,190	3,824,113	lbs	512	60,804	hours	$ 29,689	$	3,527,069
Carrots	20,145	2,393,226	lbs	347	41,224	hours	$ 28,748	$	3,415,245
Hazelnuts	2,125	252,450	lbs	104	12,375	hours	$ 28,159	$	3,345,326
Kale	6,375	757,350	lbs	150	17,870	hours	$ 23,530	$	2,795,352
Potatoes	16,703	1,984,257	lbs	299	35,551	hours	$ 23,335	$	2,772,188
Pears	12,089	1,436,160	lbs	217	25,720	hours	$ 23,326	$	2,771,112
Cucumbers	12,431	1,476,833	lbs	111	13,239	hours	$ 23,213	$	2,757,652
Bell Peppers	7,905	939,114	lbs	303	35,937	hours	$ 22,973	$	2,729,248
Yellow Onions	27,872	3,311,134	lbs	256	30,390	hours	$ 22,840	$	2,713,409
Pole Beans	5,712	678,586	lbs	200	23,760	hours	$ 20,634	$	2,451,332
Cauliflower	6,843	812,889	lbs	120	14,213	hours	$ 18,411	$	2,187,225
Lettuce	19,100	2,269,021	lbs	257	30,561	hours	$ 17,389	$	2,065,823
Sweet Corn	17,213	2,044,845	lbs	99	11,791	hours	$ 9,922	$	1,178,692
Asperagus	3,825	454,410	lbs	200	23,760	hours	$ 15,992	$	1,899,802
Table Grapes	5,100	605,880	lbs	204	24,241	hours	$ 13,233	$	1,572,107
Garlic	2,916	346,361	lbs	356	42,273	hours	$ 12,778	$	1,517,991
Eggs	3,876	460,469	dozens	94	11,167	hours	$ 11,289	$	1,341,150
Apple(Jonagold)	9,956	1,182,812	lbs	434	51,539	hours	$ 11,235	$	1,334,738
Brussels Sprouts	8,976	1,066,349	lbs	246	29,225	hours	$ 11,015	$	1,308,614
Zucchini	8,436	1,002,227	lbs	115	13,622	hours	$ 8,964	$	1,064,918
Broccoli	6,630	787,644	lbs	222	26,385	hours	$ 8,780	$	1,043,041
Lamb	467	55,438	lbs	51	6,106	hours	$ 4,502	$	534,842
Honey (One Hive/Ac	85	10,098	lbs	2	207	hours	$ 538	$	63,874
		60,320,274	***Lbs food***		1,494,376	hours	CM Total	$	101,054,169
		1,182,812	***Doz eggs***		***747***	***FTE Labour***	*(Less Fixed Cos*	$	*12,680,370*
TOTALS		***10,098***	***lbs honey***		***plus 760***	***FTE Manager***	***Total Profit***	***$***	***88,373,799***

REFERENCES

References for Report Body

Allen, W. (2011, January 27). Growing Out of Hunger. (B. A. Dialogue, Interviewer) Vancouver, British Columbia, Canada.

Anonymous Real Estate Agents. (December 2011). (K. Mullinix, Interviewer)

Baron, C. (2011, December 2). Drainage and Environmental Manager, City of Surrey Engineering Department. (C. Dorward, Interviewer)

BC Centre for Disease Control - Food Protection Services. (2011). Temporary Food Markets: Guidelines for Sale of Foods at Temporary Food Markets. Provincial Health Services Authority.

BC Ministry of Agriculture and Food, Ministry of Environment. (1983). Land Capability Classification for Agriculture in British Columbia. Kelowna.

BC Ministry of Agriculture and Lands. (2005). City of Surrey Agricultural Land Use Inventory. Victoria: Ministry of Agriculture and Lands.

BC Ministry of Agriculture and Lands. (2009). City of Surrey Agricultural Overview. Victoria: Sustainable Agriculture Management Branch.

BC Ministry of Environment. (2011, July). Water Allocation Fees. Retrieved December 2, 2011, from Ministry of Environment - Water Stewardship: http://www.env.gov.bc.ca/wsd/water_rights/cabinet/schedule_1_fees_water_Oct-2011.pdf

BC Provincial Agricultural Land Commission. (2002). How the ALR was Established. Retrieved November 2011, from Provincial Agricultural Land Commission: http://www.alc.gov.bc.ca/alr/Establishing_the_ALR.htm

BC Provincial Agricultural Land Commission. (2011). Archived Decisions. Retrieved November 2010, from Provincial Agricultural Land Commission: http://www.alc.gov.bc.ca/application_status/Archived_decisions.htm

Brown, J. (1998). Early Agriculture in Surrey. Retrieved 10 25, 2011, from Surrey's History: http://www.bcexplorer.org/surrey/EarlyAgric.html

Certified Organic Associations of British Columbia. (2011). Search by Region. Retrieved 02 22, 2011, from Certified Organic Associations of British Columbia.

City of Surrey. (2008). Surrey Sustainability Charter. City of Surrey.

City of Surrey. (2010). Business Licensing Data. Surrey, British Columbia: City of Surrey - By-Law and Licensing Section .

City of Surrey - Economic Development Office. (N.D.). City of Surrey Agriculture Sector Profile. Surrey, BC: City of Surrey.

City of Surrey - Engineering Department. (2010). The Development of a Strategic Plan for Lowlands Flood Control. City of Surrey .

City of Surrey - Engineering Department. (2010). The Implementation of a Strategic Plan for Lowlands Flood Control. City of Surrey.

City of Surrey - General Manager, Engineering. (2009). Corporate Report 5225-60: Serpentine and Nicomekl Lowlands Flood Control Project Update. Surrey: City of Surrey.

Community Farms Program. (2009). Who We Are. Retrieved November 15, 2011, from Community Farms Program: http://www.communityfarms.ca/program.shtml

Curran, D., & Stobbe, T. (2010). Local Government Policy Options to Protect Agricultural Land and Improve the Viability of Farming in Metro Vancouver. Metro Vancouver.

Desjardins et al. (2009). Linking future population food requirements for health with local production in Waterloo Region, Canada. Agriculture and Human Values. Volume 27, Number 2, 129-140.

Grewal, Sharanbir S. & Grewal, Parwinder S. (2011). Can Cities Become Self Reliant in Food? Cities. 2011.06.003.

Intervale Centre. (2011). The Intervale Centre. Retrieved November 15, 2011, from What We Do: http://www.intervale.org/programs/index.shtml

Koopmans, Kevin. (2010). Supporting New Small Scale Farmers in Abbotsford: Feasibility Study. In Partnership with Community Futures South Fraser.

Laven, B. R. (2008). Surrey, BC: An Overview of Development Trends. Dalhousie University, School of Planning. Halifax: The Suburbs Project.

Local Food First. (2011). Projects: New City Market. Retrieved November 15, 2011, from Local Food First: http://localfoodfirst.org/projects/new-city-market/

Metro Vancouver. (2011). Regional Food System Strategy. Metro Vancouver.

O'Hara, J. K. (2011). Market Forces: Creating Jobs Through Public Investment in Local and Regional Food Systems. Cambridge, MA: Union of Concerned Scientists Publications.

Province of British Columbia. (2002). About the Agricultural Land Reserve. Retrieved 10 25, 2011, from Provincial Agricultural Land Commission: http://www.alc.gov.bc.ca/alr/alr_main.htm

Province of British Columbia. (2002). How the ALR was Established. Retrieved 10 21, 2011, from Provincial Agricultural Land Commission Website: http://www.alc.gov.bc.ca/alr/Establishing_the_ALR.htm

Provincial Agricultural Land Commission. (2011). Annual Report 2009/10 and 2010/11. Burnaby, BC: Provincial Agricultural Land Commission.

Runka, G. (2006). BC's Agricultural Land Reserve: It's Historical Roots. Post World Planners Congress Seminar: Planning for Food. Vancouver: Ministry of Agriculture.

Smith, B. (1998). Planning for Agriculture. Provincial Agricultural Land Commission.

Statistics Canada. (2006). Census of Agriculture. Ottawa: Government of Canada.

Stobbe, T., Geerte, C., & van Kooten, G. (2009). Hobby Farms and Protection of Farmland in British Columbia. Canadian Journal of Regional Science, 393-410.

Vann Struth Consulting Group and Eric Vance and Associates. (2008). City of Surrey Economic Development Strategy. Surrey, BC: City of Surrey .

What's SPIN. (2011). Retrieved July 20, 2011, from SPIN Farming: http://spinfarming.com/whatsSpin/

Zbeetnoff Agro-Environmental Consulting and Lions Gate Consulting Inc. (2008). Hope Small Scale Food Processing Facility: Feasibility Analysis. Fraser Basin Council. http://www.fraserbasin.bc.ca/publications/documents/08_Hope_Small_Scale_Food_Processing_Report.pdf

Zbeetnoff Agro-Environmental Consulting and Quadra Planning Consultants. (1999). Surrey Agriculture Plan: Phase 2 Report. Surrey, BC: City of Surrey .

References for Geographic Information System (GIS) Data:

Soils layers obtained from: Ministry of Environment Knowledge Management Branch

City of Surrey layers, including land use data, obtained from: City of Surrey – GIS Section

References for Production Budgets Used in Analysis

Apple. "Jonagold Apple Establishment." Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Fraser Valley, B.C. 1994. Agdex 211 – 810. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/tree_fruits/jonaest.pdf. Accessed October 5, 2011.

Asparagus. "Fresh Asparagus – Fraser Valley." British Columbia Ministry of Agriculture, Food and Fisheries. Fraser Valley, B.C. 2001. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/vegetables/asparagus_summer_2001.pdf. Accessed October 23, 20011.

Beets. “Five Acre Mixed Vegetable Operation: Full Production” Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Bell Peppers. “Five Acre Mixed Vegetable Operation: Full Production” Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Broccoli. “Five Acre Mixed Vegetable Operation: Full Production” Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Brussels Sprouts. “Five Acre Mixed Vegetable Operation: Full Production” Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Cabbage. “Five Acre Mixed Vegetable Operation: Full Production” Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Carrots. “Five Acre Mixed Vegetable Operation: Full Production” Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Cauliflower. “Five Acre Mixed Vegetable Operation: Full Production” Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Chinese Cabbage. “Chinese Cabbage.” Planning for Profit. British Columbia Ministry of Agriculture and Food. Fraser Valley, B.C. 1998. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/vegetables/chncabge.pdf. Accessed October 5, 2011.

Cucumbers. “Five Acre Mixed Vegetable Operation: Full Production” Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Garlic. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Lettuce. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Hazelnuts. "Hazelnuts." Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Fraser Valley, B.C. 1993. Agdex 242 - 810 http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/herb_specialty/sc4.pdf. Accessed October 30, 2011.

Honey. "Honey Production." Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 1993. http://www.al.gov.bc.ca/busmgmt/budgets/budget_pdf/specialized_ls/honeyvi.pdfAccessed October 5, 2011.

Kale. "2008 Maryland Vegetable Enterprise Budgets." Maryland Cooperative Extension. Maryland, U.S.A. 2008. http://stmarys.umd.edu/files/VegBudgets%20June%2015.pdf. Accessed October 23, 2011.

Lamb. "Twenty Acre Mixed Livestock Operation: Broilers, Layers/Eggs, Sheep, Beef: Full Production." Planning for Profit. British Columbia Ministry of Agriculture and Lands. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed%20livestock.pdf. Accessed October 30, 2011.

Egg Production. "Twenty Acre Mixed Livestock Operation: Broilers, Layers/Eggs, Sheep, Beef: Full Production." Planning for Profit. British Columbia Ministry of Agriculture and Lands. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed%20livestock.pdf. Accessed October 30, 2011.

Pak Choy. "2008 Maryland Vegetable Enterprise Budgets." Maryland Cooperative Extension. Maryland, U.S.A. 2008. http://stmarys.umd.edu/files/VegBudgets%20June%2015.pdf. Accessed October 23, 2011.

Pears. "Pears Central Axe – Okanagan Valley." Planning for Profit. Ministry of Agriculture, Food and Agriculture. Okanagan Valley, B.C. 2001. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/tree_fruits/pears_summer_2001.pdf. Accessed October 24, 2011.

Pole Beans. "2008 Maryland Vegetable Enterprise Budgets." Maryland Cooperative Extension. Maryland, U.S.A. http://stmarys.umd.edu/files/VegBudgets%20June%2015.pdf. Accessed October 23, 2011.

Pole Beans. "Pole Beans." Department of Agricultural and Resource Economics North Carolina State University. http://legacy.ncsu.edu/classes/are201005/budgets/pdf02/plbn944b.pdf. Accessed October 23, 2011.

Potatoes. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Pumpkins. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Radishes. "Enterprise Budget: Radishes, Organic, Fresh Market." Oregon State Extension Service. Willamette Valley Region, Oregon. 2007. http://arec.oregonstate.edu/oaeb/files/pdf/EM8929.pdf. Accessed October 27, 2011.

Snow Peas. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Spinach. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Sweet Corn. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Table Grapes. "Mixed Tree Fruit and Table Grape." Planning for Profit. British Columbia Ministry of Agriculture, Food and Fisheries. Kelowna, B.C. 2002. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/specialty_organic/mixed_tree_fruit_grape.pdf. Accessed October 26, 2011.

Turnips. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008.

http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Tomatoes. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Yellow Onions. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

Zucchini. "Five Acre Mixed Vegetable Operation: Full Production" Planning for Profit. British Columbia Ministry of Agriculture, Fisheries and Food. Vancouver Island, B.C. 2008. http://www.agf.gov.bc.ca/busmgmt/budgets/budget_pdf/small_scale/2008mixed 20veg.pdf. Accessed October 5, 2011.

References of Production Budgets Consulted in Analysis (Ultimately Not Used)

"2008 Maryland Vegetable Enterprise Budgets." Maryland Cooperative Extension. University of Maryland. http://stmarys.umd.edu/files/VegBudgets%20June% 2015.pdf. Accessed October 12, 2011.

"Agricultural Alternatives: Enterprises." Agricultural Alternatives: Cooperative Extension. Penn State University. http://agalternatives.aers.psu.edu/publications.cfm#FMM. Accessed September 27, 2011.

"Crop Budgets." University of Kentucky, College of Agriculture. March 4, 2011. http://www.uky.edu/Ag/CDBREC/budgets.html. Accessed September 23, 2011.

"Crop Decisions – Cost and Returns." University Extension. Iowa State University. http://www.extension.iastate.edu/agdm/cdcostsreturns.html#pricesyields. Accessed Ocotber 20, 2011.

"Crop Enterprise Budgets." School of Economic Sciences. Washington State University. http://extecon.wsu.edu/pages/Enterprise_Budgets. Accessed October 20, 2011.

"Current Cost and Return Studies." Agricultural and Resource Economics. University of California, Davis Campus. http://coststudies.ucdavis.edu/current.php. Accessed October 3, 2011.

"Diver, S., Kuepper, G., & Born H." Organic Tomato Production. The National Sustainable Agriculture Information Service. https://attra.ncat.org/attra-pub/viewhtml.php?id=33. Accessed October 17, 2011.

Dartt, B., Black, R., Stevens, H. & Morrone, V. "Staff Paper." Vegetable Production Budgets. Department of Agricultural Economics. Michigan State University. 2002. https://www.msu.edu/user/blackj/. Accessed September 27, 2011.

"Enterprise Budgets." Agricultural and Resource Economics. North Carolina State University. http://www.ag-econ.ncsu.edu/extension/Ag_budgets.html Accessed September 27, 2011.

"Enterprise Budgets." Clemson University, Cooperative Extension." http://www.clemson.edu/extension/aes/budgets/. Accessed September 27, 2011.

"Fresh Market Vegetable Budgets." Center for Dairy Profitability. University of Wisconsin. http://cdp.wisc.edu/Freshmarket.htm. Accessed October 1, 2011.

"Ohio Enterprise Budgets: 1999 Specialty Budgets." Department of Agricultural, Environmental and Development Economics. Ohio State University. http://aede.ag.ohio-state.edu/Programs/FarmManagement/Budgets /scrops/index.htm. Accessed October 3, 2011.

"Oregon Agricultural Enterprise Budgets." Oregon State University. http://arec.oregonstate.edu/oaeb/. Accessed September 27, 2011.

"Organic Production Practices: Northeastern United States." New Jersey Agricultural Experiment Station. Rutgers University. http://aesop.rutgers.edu/~farmmgmt/ne-budgets/organic.html. Accessed October 3, 2011.

References Used for Food Consumption Statistics

"Food Statistics 2009." Statistics Canada. Catalogue no. 21-020-X. May 2010. http://www.statcan.gc.ca/pub/21-020-x/21-020-x2009001-eng.htm. Accessed October 26, 2011.

"Food Availability (Per Capita) Data System." Economic Research Service (ERS), U.S. Department of Agriculture (USDA). July 2011. http://www.ers.usda.gov/Data/FoodConsumption. Accessed October 26, 2011.