

GROWING VEGETABLES IN METRO VANCOUVER:
AN URBAN FARMING CENSUS

by

Marc Howard Schutzbank

BA, The University of Pittsburgh, 2010
BSBM, The University of Pittsburgh, 2010

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE

in

The Faculty of Graduate Studies
(Integrated Studies in Land and Food Systems)

THE UNIVERSITY OF BRITISH COLUMBIA
(Vancouver)

October 2012

© Marc Howard Schutzbank, 2012

ABSTRACT

Increasing food insecurity, lack of sustainable food systems, and a desire to participate in the food system are prompting the growth of various forms of urban agriculture: community gardens, urban homesteads, and urban farms. Urban farms, as distinct from other urban agriculture projects, are defined by the sale of their product. They raise produce and grow ornamentals to sell in neighbourhoods, all while building urban food networks that connect communities to their food.

Resilient localized food production systems must be economically, socially, and environmentally sustainable to succeed in a changing environment. Research on urban agriculture has largely focused on community gardens and their social benefits, leaving little known about entrepreneurial urban farms. This study examines the business models and economics of Metro Vancouver's urban farms through a newly developed tool, the 'Urban Farming Census.' The use of this semi-structured interview tool revealed revenues, costs, financing, and sales models of urban farmers as well as their community connections and benefits. The Urban Farming Census was applied during the 2010 and 2011 growing seasons, capturing the first attempts by Vancouver's urban farming organizations growing sustainable businesses.

In 2010, eight urban farms produced \$128,000 worth of produce on 2.31 acres, supporting 17 paid employees. In 2011, ten urban farms sold \$170,000 worth of produce on 4.19 acres, supporting 30 paid employees. Urban farms do more than sell produce; they educate their communities about food production and provide space for individuals and communities to explore their intergenerational, multicultural food cultures.

PREFACE

The research in this thesis was done according to the guidelines of the University of British Columbia Behavioral Research Ethics Board (BREB). Interviews and surveys administered were approved by BREB. Certificate of approval number: H11-00856.

Research conducted in Chapter 3 contributed to the publication of the following article:

Schutzbank, M., Roehr, D., & Kunigk, I. (2011). An Introduction to Canadian Urban Agriculture. *Environment & Landscape Architecture of Korea*, 279.

TABLE OF CONTENTS

Abstract.....	ii
Preface.....	iii
Table of Contents	iv
List of Tables	vii
List of Figures.....	viii
List of Photos	ix
Acknowledgements	x
Dedication	xi
1. Introduction.....	1
Research Questions.....	6
2. What is Urban Agriculture?	7
Location	8
Primary Activities.....	8
Market Engagement.....	9
Scale	10
3. A Brief History of Modern Urban Agriculture in the United States	15
Allotment Gardens	15
School Gardens	16
War-time Victory Gardens.....	18
Community Gardens	20
Entrepreneurial Gardens.....	20
Detroit, Michigan.....	22
New York, New York.....	27
The Regulatory Environment	29
Synthesis	30
4. The Context of Today's Urban Agriculture	32
Food Security	32
Higher Food Prices and Poverty	33
Health	35
Perceptions of Safety	39
Sustainable Food Systems.....	40
Sustainable Food Systems: The Environment	40
Sustainable Food Systems: Social.....	43
Sustainable Food Systems: Economic	44
Food Citizenship.....	50
Urban Agriculture as a Solution.....	54
5. Case Selection: Metro Vancouver	56
Agricultural activity and awareness in Metro Vancouver.....	57
Metro Vancouver food policies and plans	58
6. Methodology	62

Research Questions.....	62
The Urban Farming Census	63
Semi-Structured Interview Creation	63
Participants.....	64
Survey Execution.....	65
Limitations	66
Methods: Researcher as Participant	66
7. Results and Discussion.....	71
General Farm Characteristics and Demographics.....	71
Knowledge, Attitudes, and Perceptions	74
Business Structure	75
Farming Operations.....	78
Production.....	78
Processing	81
Distribution.....	82
Land Type.....	82
Institutional Sites	84
Residential Sites.....	85
Commercial Sites.....	86
Urban Farm Revenue.....	87
Farm Organization.....	91
Grant Revenue	91
Food Revenue	93
Other Revenue.....	98
Business Expenses.....	99
Labour Costs.....	103
Production Expenses	104
Selling, General and Administration (SGA) Expenses	106
Synthesis of Expenses	106
Farm Returns	107
Urban Farm Financial Viability	110
Non-Economic Benefits of Vancouver’s Urban Farms.....	111
Food Education	111
Community Development.....	114
Environmental Awareness.....	116
The Non-Economic Benefit	117
8. Conclusion	119
The Census in Context.....	121
Limitations	122
Urban Farming in Context	124
Urban Farm Goals and Missions	126
Metro Vancouver’s Urban Farming Census 2010-2011	127
Non-Profit and For-Profit Farms	127
Land.....	129
Revenue Generation.....	130
Costs and Expenditures.....	131

Are Urban Farms a Good Financial Investment?: A Net Present Value (NPV) Analysis.....	133
The Broader Value of Urban Farming.....	138
How Metro Vancouver Municipalities can Support Entrepreneurial Urban Farms	140
Future Study	146
9. Afterword.....	147
Bibliography	148
Appendix A: The Census Questionnaire	165
Appendix B: Example Tenancy Agreement	185

LIST OF TABLES

Table 1	Forms of Urban Agriculture.....	12
Table 2	Non-Profit vs. For-Profit Urban Farms in 2011.....	78
Table 3	A Snapshot of Vancouver’s Urban Farms as of 2011.....	85
Table 4	Assumed Urban Farm Income Statement.....	138
Table 5	NPV Values of Assumed Urban Farming Investment.....	139

LIST OF FIGURES

Figure 1	Urban Agriculture and the Context of Our Food System.....	22
Figure 2	Food Insecurity in the United States 1998-2010.....	34
Figure 3	Per Capita Health Care Expenditures and Level of Obesity.....	37
Figure 4	Changing Number and Size of U.S. Farms.....	45
Figure 5	Comparison of Off and On Farm Income Across Farm Size.....	47
Figure 6	Timeline of Relationship Building.....	71
Figure 7	Age of Urban Farmer Owners/Managers.....	73
Figure 8	Experience of Urban Famers Prior to Urban Farming.....	74
Figure 9	2010-2011 Total Urban Farming Revenue.....	90
Figure 10	2010-2011 Revenue of Farms > 25K.....	91
Figure 11	2010-2011 Revenue of Farms < 25K.....	92
Figure 12	2010-2011 Food Revenue Streams.....	96
Figure 13	2010-2011 Expenses of Urban Farms with Revenue > 25K.....	103
Figure 14	2010-2011 Expenses of Urban Farms with Revenue < 25K.....	104
Figure 15	Square Foot Production Expenses vs. Total Farm Area.....	107
Figure 16	2010-2011 Urban Farming Profit.....	111

LIST OF PHOTOS

Photo 1	George Putnam School; Boston, Massachusetts.....	32
Photo 2	D-Town Farms; Detroit, Michigan.....	24
Photo 3	Earthworks Urban Farm, Detroit, Michigan.....	25
Photo 4	The Brooklyn Grange, Queens, New York, New York.....	28
Photo 5	Map of the Vancouver, Richmond and North Vancouver.....	56
Photo 6	Sprouts grown in Vancouver, BC,	72
Photo 7	Packed CSA boxes in Vancouver, BC.....	72
Photo 8	Farmers transform lots; Vancouver, BC.....	72
Photo 9	Food is delivered to a central pick-up location by bicycle; Vancouver, BC...72	
Photo 10	Food grown on an underutilized parking lot Vancouver, BC.....	72
Photo 11	Farmers Building lasagne beds; Vancouver, BC.....	80
Photo 12	Raised beds allow for better drainage; Vancouver, BC	80
Photo 13	Students help construct season extension infrastructure; Vancouver, BC....	109
Photo 14	Volunteers help build raised compost best.....	109
Photo 15	Volunteers prepare land for a fence; Vancouver, BC.....	109

ACKNOWLEDGEMENTS

This work is truly the work of a community. The urban farmers who are now my friends, colleagues, and role models have been an inspiration to my own entrepreneurial ventures and building a lifestyle around food. Thank you to all of the farmers that participated and connected with me during your busy growing season. Your work is the driving motivation for this project. I thank you first and foremost for your passion, your help, and your friendship.

I am indebted to my parents who supported me as I went on this journey. Thank you Dad; you always had time to look at a paper and to debate the construct of a sentence or idea. Thank you Mom; we have turned the kitchen upside down in the search of a perfectly prepared meal, a true homage to all of our food producers. Thank you to my friends who have endured poorly constructed poetry and rants about our food system at all times.

Dr. Andrew Riseman, my supervisor, has turned a critical eye on my work, always pushing and asking for more. His advocacy for me and for work of this nature has been constant and a tremendous blessing.

Daniel Roehr, my co-supervisor and Dr. Kent Mullinix, my committee member, have helped to nurture this work, sharing their knowledge of landscape architecture and food systems, to ensure that this work would be a useful document for professionals in the field.

Dr. Wendy Mendes and Dr. Art Bomke, gave crucial feedback and helped steer me through the final thesis defense. Through their critical comments and suggestions, they have helped ensure that this document will be useful for practitioners.

I would like to thank the United States and Canadian Governments who supported me through the Fulbright Grant. I'd like to thank the Foundation for International Exchange Between Canada and the United States who administers, fundraises, and executes that grant program. Your support of my projects and other urban farms here in Metro Vancouver is a testament to Fulbright's goal to cultivate strong relationships between our two countries.

I'd like to thank the Faculty of Land and Food Systems for their enduring financial and social support. The excitement you had for this project, helped to make my work more meaningful.

I'd lastly like to thank Green College residents and staff for the debates, discussion, and dinners prepared with produce that I grew.

DEDICATION

*For my parents who didn't balk at their son becoming a farmer instead of a
doctor; and*

*for my friends who cannot now go into a grocery store without
some angst; and*

*for the farmers in urban and rural places who till the land
and provide us with nourishment.*

1. INTRODUCTION

The deadly irony of our global food system is that while 925 million people are undernourished, 1.33 billion people are overfed (Kelly et al., 2008). We are both ‘stuffed, starved,’ and searching for alternatives (Patel, 2008). As the world’s cities grow and expand, millions utilize urban agriculture as a means of providing locally produced food to share, buy, and barter within their communities. In 1996, the United Nations Development Program estimated that roughly 800 million people were involved in some form of urban agriculture (Smit, Ratta, and Nasr, 1996). In North America, urban agriculture has once again captured the imagination of urban residents as a means of producing local, healthy produce and building locally resilient communities (Kameshwari, Pothukuchi and Kaufman, 1999). At the turn of the 20th century, municipalities set aside land for urban farmers, encouraging the unemployed and destitute to farm for their families and profit on the surplus (Bassett, 1981). Today, urban agriculture is driven by the sustainability agenda of many cities in North America (City of Vancouver, 2010; Goldstein et al., 2011; The New York City Council, 2011). Urbanites are demanding that their cities develop and support a local food system. Individuals and non-governmental organizations are using urban agriculture as a tool to increase food security. Consumers are purchasing locally produced food, looking for ways to mitigate the environmental, social, and economic unsustainability of the current industrial food system. Students, teachers, health officials, and others are recognizing that urban agriculture provides a way to connect with the food system, while teaching students how to eat healthily and build community around food. Municipalities are developing local food system strategies that incorporate urban agriculture as a means of building resilient

communities and achieving long-term societal goals (City of Vancouver, 2010; Goldstein et al., 2011; The New York City Council, 2011). Consumers are voting with their ballot and their dollars. They are demanding that their representatives and markets support urban agriculture (Cotton et al., 2009; Darby et al., 2008; Fishler, 2012; Hu et al., 2011).

The dominant food system is a result of many interacting local and global factors, the foremost of which is globalization and the shift from locally produced and eaten food, to a global food system. Over half of the world's population lives in cities, forcing our food system to change and adapt to that new reality. 'Food miles' have become a popular measurement of just how far our food has to travel. The food for an average American household travels over 1500 miles from the farm, through the supply chain, to the plate (Pirog and Benjamin, 2003). The distances our food travels is emblematic of the disconnect we have with our food. It is corporations that largely produce and process food, far away from the home. In the United States, four firms control 80% of beef packing, more than 60% of pork packing, and 80% of soybean crushing; three firms control 55% of flour milling (Hendrickson and Heffernan, 2007). In Canada, four firms control 78% of flour milling, 100% of the oilseed, 78% of frozen food, 79% of oil and tea, and 79% of animal slaughter (Harrison and Rude, 2004).

With an increased corporate presence in the food system, the corporations that feed us largely decide the menu. Using mechanized systems to process foods requires highly regular inputs demanding industrialized and mechanized farms dependent on modern hybrids and fertilizers. Though modern agriculture has increased yields tremendously, the resultant pollution has overloaded the ecosystem's ability to cycle nutrients and poisons. It depends

upon employees completing route work, deprived of a humane work environment (Gouveia and Juska, 2002). Our food systems are dependent upon expensive petro-chemicals and an industrial process that can grow, process, and deliver food with a stable shelf life. The food we eat is directed by what can be grown in mass quantities, produced cheaply, and shipped easily.

The dominant industrial food system is directly leading to increased health care costs and an international epidemic. In America, 68% of the adult population is overweight or obese, as are 59% of Canadians (Flegal et al., 2010; Tjepkema, 2006). The impacts of obesity in these two countries alone harm quality of life of over 150 million people and the health care costs of an obese population put undue financial strain on this system.

The crisis of our food system is inciting a demand for change (Foley et al., 2011). One way consumers are trying to enact change is to purchase locally produced food, whether from a farmer nearby or picked in a backyard. In 2008, home-scale vegetable seed sales increased dramatically, overtaking flower seed sales (Tavernise, 2011). According to the National Gardening Association, almost 1/3 of U.S. households have a vegetable garden of their own (2009).

Farmers have caught onto the trend. Since 1996, the number of U.S. farmers markets has increased 300% (USDA, 2011). Increasingly, individuals are looking to connect to their food by purchasing it directly from the farmer. These direct-to-market sales have doubled from 1997 to 2007, and are estimated at 1.2 billion dollars (Martinez et al., 2010).

Large retailers are responding to the increased demand of local food. During the height of

the summer season, Wal-Mart sources roughly 20% of its produce from local sources (Martinez et al., 2010). Consumers indicate that they want to support local family farms and are backing up their words with their purchases (Cotten et al., 2009; Darby et al., 2008; Fishler, 2012; Hu et al., 2011).

Food is the way by which the human world is inexorably connected to the environment. Wendell Berry argues, “eating is an agricultural act” (2003, p. 321). The choices we make about the food we eat have an indelible impact on the environment and on our communities. Through food, communities can support local economic development and healthier environments, as well as individual health.

Urban agriculture is one response to the challenges of our current food system. Understanding the successes and failures of urban farming organizations will help producers, planners, entrepreneurs, lenders, and eaters work together to develop more robust local food systems that can provide increasing amounts of food for urban residents. This can be done while bringing the means of food production closer to the consumer, both physically and emotionally.

When financial and other interests are not aligned, it is difficult, if not impossible to move those agendas forward. This is not to say that financial interests should trump other concerns, but rather a realization that they often do. Urban farms must be financially sustainable if they are to exist. The services they provide must be monetized so as to provide the resources necessary to train and employ those who work in this field. The food system, like any other system, must be sustainable and resilient to achieve longstanding success.

Without financial and economic success, urban farms will fail to achieve the lasting societal

impacts inherent in many of their missions. The aim of this thesis is to explore the economic viability of urban farming in Metro Vancouver, British Columbia.

The City of Vancouver, surrounding municipalities, and the Metro Vancouver, the regional authority, are developing local food strategies that include provisions for urban food production. The Urban Farming Network Society, an organization that promotes urban agriculture in Vancouver, has convened a series of meetings between entrepreneurs, policy makers, funders and enthusiasts. In 2010, during an initial meeting, parties around the table asked: “How much money do urban farmers make?” “What are their business models?,” “How can we support this industry in our communities?” Despite the fact that urban farming is part of a vision for future sustainability, as evident in Vancouver’s desire to be the Greenest City by 2020, there is not a comprehensive understanding of the economic, social, and environmental impacts of urban farming. There are no data-driven assessments detailing yields, activities, costs, business structures and overall economic viability of Vancouver’s businesses. The impacts and outcomes of Metro Vancouver’s urban farming initiatives are currently ill defined. This thesis will look at the definitions of urban agriculture and urban farming, highlighting the inherently local nature of these organizations. By exploring the history of urban agriculture in the United States, I will look to understand the current context for the growth of urban agriculture today. In doing so, I will argue that urban agriculture is a consolidated response to three key failures of our food system: a failure to provide all with food security, a failure to develop environmentally, socially, and economically sustainable systems, and a failure to address critical issues of food citizenship. Ultimately, I will explore how urban farmers in the Metro Vancouver region are attempting to solve these problems through entrepreneurial urban farming.

RESEARCH QUESTIONS

This Urban Farming Census is the first attempt to quantify the economic viability of urban farms in the Vancouver region. The census aims to answer the following questions:

1. Are Metro Vancouver's urban farms financially viable? Specifically,
 - a. What are the business models that are most often used?
 - b. Which of Metro Vancouver's urban farm models generate the largest returns?
 - c. What are the major costs and revenue streams of urban farmers?
 - d. What are the relevant municipal policies and programs that apply to urban farmers?
2. How do urban farms in Metro Vancouver contribute to the community? Specifically,
 - a. How do farmers see their contribution to society and their role in environmental stewardship?
 - b. Who are urban farmers and what are their characteristics?

2. WHAT IS URBAN AGRICULTURE?

I saw a man, an old Cilician, who occupied
An acre or two of land that no one wanted,
A patch not worth the ploughing, unrewarding
For flocks, unfit for vineyards; he however
By planting here and there among the scrub
Cabbages and white lilies and verbena
And flimsy poppies, fancied himself a king
In wealth, and coming home late in the evening
Loaded his board with unbought delicacies.
- Virgil, The Georgics (29 B.C.)

Urban agriculture is a broad ranging term utilized by the United Nations to mean:

“[A]n industry that produces, processes and markets food and fuel, largely in response to the daily demand of consumers within a town, city, or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and reusing natural resources and urban wastes to yield a diversity of crops and livestock” (Smit et al., 1996).

Though this is the standard definition used by researchers and policy officials across the world, the broadness of the definition makes both research and regulation difficult without further refinements. The local context around social, economic, and environmental factors should lead researchers to develop particular definitions to suit the needs of farmers and other stakeholders. This need for local authority has led many researchers to refine this definition, separating forms of urban agriculture along a spectrum of four criteria: location, activities, market orientation, and scale of production (Food and Agriculture Organization, 2007; Kaufman and Bailkey, 2000).

LOCATION

Location is often the single most important determinant for urban agriculture. It determines the operation's characteristics: land tenure, relationship to market, and relationship to stakeholders, among others. Researchers characterize urban agriculture along a variety of location definitions: distance from an urban center, land tenure, or administrative zoning (Mougeot, 2000).

PRIMARY ACTIVITIES

Urban agriculturalists are involved in wide ranging activities: food production, distribution, processing, as well as community engagement. These activities can be used to differentiate forms of urban agriculture. For home gardeners or community garden plot holders, food production is a primary activity alongside recreation, education of friends and youth, and community engagement (Armstrong, 2000; Brown and Jameton, 2000; Hancock, 2001). In North America, urban farms that grow and sell high value crops also endeavour to engage residents on issues of sustainability and healthy eating (Kaufman and Bailkey, 2000). The Center for Sustainable Food Systems, at the University of British Columbia in Vancouver, promotes the concept, "no one thing does just one thing," which could be a motto for urban agriculture across North America (UBC, Cultivating Place, 2009). In the process of growing local produce and raising livestock for food or other purposes, urban agriculturalists educate and train inner city youth, often developing educational programming around agriculture and related topics. In competing for land in urban spaces, urban agriculture in North America has found a competitive advantage in providing community services in addition to produce (Kaufman and Bailkey, 2000).

Despite the diversity of urban agriculture missions, many articulate primary goals that characterise the organization. For example, some may focus on personal growth and development, towards building community through agriculture, or income generation. Thus, primary activity can be used to categorize the various forms of urban agriculture.

MARKET ENGAGEMENT

Another differentiating factor of urban agriculture is the level of market engagement. Urban agriculture projects may engage in micro-scale production for in-home use or have larger scale production for commercial sales. Personal gardens at home or in community plots are estimated to be the largest form of urban agriculture though exact data on the number of gardeners in the United States and Canada does not exist. It is estimated that over one million people grow food in community gardens, with an estimated five million people “extremely interested” in having a plot in a community garden (The National Gardening Association, 2009). Though individual gardeners represent a significant portion of urban agriculturalists, commercial enterprises are playing an increasing role in North America. Feenstra compiled the first study of entrepreneurial urban agriculture in 1999. Her work shows that while urban agriculture’s economic contributions are important, they exist as part of a suite of social benefits accrued to individuals participating in urban agriculture (Feenstra, McGrew, and Campbell, 1999). A 2000 report by Kaufman and Bailkey explored entrepreneurial urban farms across the United States. They identified a variety of activities that urban agriculturalists participated in from food production to community development. The level of market engagement typically distinguishes home and community gardens from commercial urban farms.

SCALE

The scale of production also differentiates forms of urban agriculture. Clearly there is a difference between small garden plots and acreage developed by some urban farmers. Scale of production is largely dependent upon the three other criteria: location, purpose, and level of market integration. Location determines the price and/or availability of land, which determines the scale of the production. Potential farm activities may be regulated in certain zones, limiting the size of the organization. At a certain scale, the effort necessary to organize labour will grow, requiring full time management, which may be supported through revenue generation or large-scale market activities. The scale of the operation correlates with the capacity of the organization to support all its activities. Small backyard plots might support food production, but cannot host the community programming of many urban farms. The scale of the operation will influence the character of the organization (Food and Agriculture Organization, 2007).

These four criteria: location, primary activities, market engagement, and scale, distinguish types of urban agriculture. Urban agriculture comprises three different types of programs: urban homesteading, community gardens, and urban farms (Table 1) (Advocates for Urban Agriculture, 2010). By definition, urban homesteaders garden on private backyards (Coyne and Knutzen, 2008; Reynolds, 2010). Urban homesteaders are informal participants in an urban food system. According to a 2008 survey, 31% of all U.S. households (36 million) garden (The National Gardening Association 2009). An additional 10 million households planned to have a vegetable garden. In the past five years, seed companies have seen demand increase for vegetable seeds (Higgins, 2009; Wallup, 2010). These micro-growers

are a critical component of a resilient local food system (The National Gardening Association 2009).

Community gardens are located on publicly accessible land and farmed either as individual plots or collectively for private or shared consumption (Schukoske, 1999). Community gardens are collectively managed and often are built upon democratic agreements and conditions for participation. Urban homesteading on the other hand, is often a private affair. Community gardens often organize processing workshops and communal work events. They operate on both public and private land. Often there is municipal or foundational support for the infrastructure needed for the site.

In North America, urban farms are most often located on underutilized land and are largely considered secondary land use. The land is often repurposed from industrial, parkland, or residential zones into agriculture zones (Schutzbank et al., 2011). The key distinguishing feature of urban farms is the goal to produce crops and products for sale (Brown and Carter, 2003). For this study, urban farms are identified by five criteria:

- 1) grow and sell food products;
- 2) grow most of their crops in urban areas;
- 3) urban farmers grow on a series of small land parcels (i.e., < 2 acres each);
- 4) urban farm land is converted from residential, commercial, industrial, or park land use to agricultural use; and
- 5) the urban farm identifies as a entrepreneurial urban farming venture (Stolhandske, 2011).

These five criteria give flexibility to the definition of urban farming, while at the same time propose clear distinctions between the two other forms of urban agriculture (i.e., community

gardens and urban homesteads).

Table 1: Forms of Urban Agriculture

	Urban Homesteads	Community Gardens	Urban Farms
Land Access	Private	Public	Private or Public
Land Type	Residential	Re-purposed from other land type (residential, park land, etc.)	Re-purposed from other land type (residential, park land, etc.)
Market Engagement	None	None / Secondary Purpose	Primary Purpose

The greatest difficulty with these definitions is not the distinction between these three forms of urban agriculture, but rather distinguishing between peri-urban and urban agriculture. To date, there has been limited success separating urban and peri-urban farming primarily because definitions of ‘urban’ differ across political and cultural boundaries. Brook and Dávila (2000, p. 3) point out the transitory nature of urban and peri-urban spaces:

“As a city expands in area, so the zones representative of 'urban' and 'peri-urban' increase. The peri-urban zone is in a state of rapid change. Land that earlier met the definition of 'peri-urban' becomes 'urban' and truly rural land now becomes 'peri-urban'. Consequently, all agricultural activities are likely to be transient in character...”

Though definitions can be helpful, they can also unnecessarily constrain urban agriculture. Making new policy that allows for flexible interpretation is difficult and may not be possible in bureaucratic systems. Municipalities must engage their communities to develop a clear understanding of their desires and needs, thereby using local context to inform meaningful policy.

As municipalities in North America develop regulations around urban agriculture, it is notable that many other nations and cities have long histories with it. Much of the scholarly

work around urban agriculture has been conducted in the Global South. Vancouver's urban farmers have similar challenges to urban farmers in the Global South, including land ownership, sales, and governmental regulation. The knowledge and experience of researchers, policy officials, and agriculturalists in the developing world are not to be overlooked or dismissed. It is also important to recognize that local needs will structure how communities interact and understand urban agriculture. Staking a place between the lessons learned in the developing world and new local endeavours is essential for further scholarly work on urban agriculture in North America. Bridging this gap is beyond the scope of this study.

The current definition of urban agriculture is strongly linked to its history in the Global South. Luc Mouoget's work at the Canadian International Development Research Centre (IDRC) helped shed light on the demographics and practices of urban agriculturalists in the developing world. However, the IDRC's work largely does not include the experiences of urban agriculturalists in North America. Though the United Nations definition encapsulates much of the urban agriculture we see in Canada and the United States, its focus on the 'daily demand' of urban customers may not be particularly accurate. Urban agriculture may satisfy some produce and food needs of an urban area, but it often acts as a small supplement to food purchased through a conventional system. Furthermore, urban agriculture in North America is often used as a method to educate and build community. Food is the medium used to achieve non-production goals (Armstrong, 2000; Hanna and Oh, 2000; Welsh and MacRae, 1998).

As municipalities seek to develop guidelines and definitions that categorize and explain

urban agriculture, it is critical for governments to think about the economic, social, and environmental roles urban agriculture can play. How governments define and regulate urban agriculture, and urban farming in particular, will limit and define the role of urban agriculture.

3. A BRIEF HISTORY OF MODERN URBAN AGRICULTURE IN THE UNITED STATES

Urban agriculture is not a modern novelty. Scholarship focusing on the history of urban agriculture in the United States reveals how urban agriculture has been a critical component of the food system, not only in terms of food production, but also in relation to charity and community development (Lawson, 2004; Bassett, 1981). I choose to focus on the United States because Americans are leading the way in documenting and discussing the history of urban agriculture in North America; the literature is more robust. The multiple interests and goals served by urban farms in the United States are resonate in Vancouver's urban farms. Programs in the United States often serve as examples of urban farms, and its leaders are mentors for the budding urban farming sector in Vancouver. It is valuable to understand how and why urban agriculture programs have operated in the past in order to understand how modern urban farms might achieve these objectives.

ALLOTMENT GARDENS

The history of allotment gardens follows the boom and bust of the North American economy. In the wake of the economic crisis of 1893, factory workers across the United States found themselves without employment. In 1894, Detroit made underutilized city land available to the working poor and unemployed. Over 455 acres of small family farms were built with an initial public investment of \$3,600. These 'P-Patch' farms would reap \$14,000 worth of turnips, potatoes, beans, and a variety of other vegetables (Spires et al., 1898; Lawson, 2004). Through national charitable organizations, knowledge of these programs soon spread across the United States, prompting a number of other states and municipalities to duplicate

Detroit's work. In March of 1895, New York's Association for Improving the Condition of the Poor, in association with two large donors, aggregated 350 acres to be parceled out to the unemployed. A paid superintendent facilitated the tilling of the land, parceling out seeds and common tools ("To Cultivate Vacant Plots," 1985). Following successes on the east coast, urban agriculture projects grew and expanded across other metro areas in the United States. Charitable advocates saw these gardens as a method for self-improvement: "The self-respecting man who is able-bodied does not want charity; he wants work, that he may earn sufficient food and shelter for his family" (Spires et al., 1898). Allotment gardens were not seen as a panacea for urban ills, but as an effective emergency measure to minimize the potential for labour revolution and instil the hardworking agrarian moral ethic into hundreds of new Americans (Lawson, 2004). As the economy began to rebound during the first decade of the 20th century, urban farmers found their leases turned over to developers, as landowners found more lucrative investments (Bassett, 1981).

SCHOOL GARDENS

Congruent to the development of allotment gardens at the turn of the 20th century, educators worked diligently to implement garden programming into urban schools across the nation. In the early 1900s, the *Nature-Study Movement* recognized an increasing disconnect between education and the environment: "It is a fact however, that our teaching has been largely exotic to the child; that it has begun by taking the child away from it's natural environment; that it has concerned itself with subject matter, rather than with the child" (Bailey, 1903, p. 21).



Photo 1: George Putnam School, Boston, MA
 Site of the first schoolyard garden in the United States. Photo circa 1920. Source: City of Boston Archives.

This concern, echoed in our modern era, became a driving force of the school garden movement. In 1891, the first school garden opened in Boston, Massachusetts (Photo 1). By 1905, schoolyard gardens were increasingly integrated into school curricula. As the school garden movement expanded across the U.S., the *Progressive Movement* began to co-opt the schoolyard garden concept as part of a larger endeavour to train and model behaviour for young citizens. The gardens promoted, “city beautification, the reduction of juvenile delinquency, improved public health and nutrition, Americanization of immigrants, and the creation of good workers and citizens” (Trelstad, 1997, p. 164). The school garden became the centerpiece municipal project geared to stymie social ills and reclaim underutilized lands. In Wooster, Massachusetts, officials engaged a “Good Citizen Factory”, a mock city in a troubled part of town where children were offered an opportunity to self-organize around individual garden plots (Floody, 1912). A ‘mayor’ was elected, and ‘police’ drafted to

protect the gardens. With the energies of children wrapped up in their gardens, juvenile crime was reported to decrease 50% (Floody, 1912, p. 150). In addition, according to an article in the *Nature-Study Review*, the “Good Citizen Factory ... beautified the community... raised the health rate 72 per cent... [And] produced, according to the estimation of the Judges, \$2,341 worth of vegetables, and enhance[d] the value of property \$50,000” (Floody, 1912, p 150).

WAR-TIME VICTORY GARDENS

In 1918, urban gardening shifted to reflect a wartime mandate. During the war, these ‘Victory Gardens’ became a way for the American family to participate in the war effort. Gardens minimized domestic use of commercial produce and the use of rail lines for domestic distribution. Thus, more produce could be quickly moved from the farms to the coasts to support the war effort. U.S. President Woodrow Wilson called upon the nation to participate: “Everyone who creates or cultivates a garden helps, and helps greatly, to solve the problem of the feeding of the nations... This is the time for America to correct her unpardonable fault of wastefulness and extravagance” (Wilson, 1919). To support individual gardens, Woodrow Wilson funded the United States School Garden Army with \$250,000:

Under proper supervision this army of boys and girls may easily produce \$250,000,000 worth of food which will reach the consumer in perfect condition without cost from transportation or handling and without loss through deterioration on the markets... many millions of dollars may be produced and saved for investment in bonds or war savings stamps, and the children engaged in work will be benefitted physically, mentally, and morally (Franks, 1919, p 3)

Many wartime gardens were built upon the existing infrastructure of school gardens. This continued well into the 1920s. Flush with funding from municipalities and the federal government, teachers were able to access pamphlets, brochures, seeds, and assistance at all levels of government (Lawson, 2004).

In the wake of WWI, government funding and municipal support for school gardens all but disappeared as the nation entered the great depression. “Relief” gardens were established to provide for the urban poor. These large plots were often 50’ x 150’ and emphasized food production. Citing a 1935 report, Lawson (2004, p. 160) estimates that, over “2.3 million families participated on nearly four hundred thousand acres of land, producing food valued at more than \$36 million.” Such self-provisioning threatened commercial growers. As a result, heavy lobbying shifted support from the victory gardens to the food stamp program. This also resulted in cuts to the financial support of the relief gardens. It would not be until WWII that the government would once again support gardening on a national scale.

As WWII intensified in Europe and Asia, North Americans were asked to participate by growing their own vegetables. Victory Gardens re-emerged in Canada and the United States providing moral and material support for the war. Gardens allowed families to support themselves, again freeing commercially produced vegetables, canned goods, and canning materials to be used directly for the war effort (Bassett, 1981, p 7). As the War Food Administrator, Marvin Jones, explained, “Food is just as necessary as guns, tanks, and planes. Home gardeners produced over 40% of the fresh vegetables this year...” (USDA, 1945). Victory Gardens also became a means of educating the public about healthy eating. At the time, poor nutrition and fitness led to a significant number of rejections by the selective service. Victory Gardens provided a low cost method to increase physical fitness and improve the nation’s diet (Boswell, 1942; Hardy, 1948). Yet, as the war came to an end, federal support for the gardens decreased. Despite the lack of federal action, many of these ‘war’ gardens became community spaces and gardens that persist to this day (Lawson 2004).

COMMUNITY GARDENS

In the aftermath of WWII leading into the modern era, state and local governments and non-profit groups utilized urban agriculture as a strategy towards urban renewal. Municipalities opened underutilized and vacant land for garden spaces. Organizations such as the Green Guerrillas in New York sprouted across the states, hosting community gardens and connecting urbanites to gardening activities. In 1977, the United States Department of Agriculture (USDA) funded the Urban Growers Program, which sponsored over 200,000 gardeners occupying over 800 acres in 23 major cities (Hynes and Howe, 2004, p 5). The program, though successful, was ultimately cut from the budget in 1993. In its stead, municipalities, non-profits, and other organizations have taken the lead in promoting gardening in cities across North America (Kaufman and Bailkey, 2000).

ENTREPRENEURIAL GARDENS

Without block grants from the federal government, garden programs began to look for new revenue streams to support their work. In 1993, the year the Urban Growers Program was discontinued, Frohardt (1993) completed a case study on five entrepreneurial gardens in the United States. In that study, she documented the unique ways that community gardens financed their operations. The sale of vegetables and value-added products, such as jams and salad dressings, became a means of generating income. Lawson and McNally (1995) completed a survey of 22 urban gardens across the United States, noting the variability of operation size and scope and the impact that had on the organization's budget. They observed that most of the urban agriculture programs were financially insecure. They identified common concerns around long-term land availability, business acumen, and the

operational sustainability of the project. Four years later in what is one of the first systematic appraisals of entrepreneurial urban farms, these same problems were shown to be true in urban agriculture projects on the west coast (Feenstra et al., 1999). The immense variation in programs, goals, and operations in each of the different urban agriculture projects was also documented. Kaufman and Bailkey (2000), corroborated these same obstacles: a significant scepticism around urban agriculture and the reality of underfunded and understaffed projects whose stakeholders lack business backgrounds and management experience (Kaufman and Bailkey, 2000)

Despite these obstacles, urban agriculture has continued to grow and develop. Non-profit and municipal projects show that urban agriculture is reality in cities across North America. In 2000, an estimated 70 entrepreneurial urban farms existed, though researchers acknowledge that figure is probably an underestimate. New capital is flowing into cities from government programs and foundations to support urban agriculture (USDA, 2012a; W.K. Kellogg Foundation, 2012).

A number of investigators are estimating the ability for urban agriculture to provide fresh produce to urban residents. Using a model that looks at land available for agriculture and three different growing scenarios, these studies estimate that urban agriculture can supply a significant amount of food. It is estimated that in Cleveland, urban agriculture could support 100% of honey consumption, 94% of egg consumption, and 68% of fruit and vegetable consumption (Grewal and Grewal, 2011). Research indicates that just by repurposing abandoned properties, Detroit's urban agriculture could supply 76% of demanded vegetables and 42% of demanded fruits (Colasanti et al., 2010, p 51). Kwantlen's Institute for

Sustainable Horticulture used a similar technique to estimate the ability to support fresh produce consumption in Surrey, BC. Their results show that by developing agriculture on peri-urban land zoned for that purpose, 100% of consumer demand for eggs, lamb, and 24 vegetables could be supplied (Mullinix et al. 2012). Research in Toronto and Philadelphia has focused on the regional ability for the city to feed itself a healthy diet. They looked at the operational requirements and businesses necessary to develop a truly local food system, advocating for a tightly linked local food chain, systematic training, municipal support for land leasing, policy development, and infrastructure development (Kremer, 2011; Nasr et al., 2010).

Projects focusing on the potential of urban agriculture have helped municipalities envision their urban centres and boarders as places for food production. In addition, the work of academics, governments, and urban farmers has lead to the growth of urban farms across the United States and Canada. Two cities in particular, Detroit and New York, are at the center of new developments in urban agriculture

DETROIT, MICHIGAN

In the wake of the recent U.S. mortgage crisis and the insolvency of the automotive industry, urban agriculture is seen as a means of reinventing Detroit. Today, much of Detroit is vacant: just over $\frac{1}{3}$ of the city's 139 square miles are abandoned properties (Colasanti et al., 2012). Officially, the unemployment rate is 28%, double the national average and more than 40% of the population lives below the poverty line (Pothukuchi, 2011). Businesses and individuals are abandoning properties, leaving them for the city to maintain. There has been

increasing demand for food bank and government provided services. Food insecurity is a critical issue.

Urban agriculture presents a unique opportunity for Detroit. By increasing private and non-profit urban agriculture sites, Detroit provides space for residents to grow their own food, and minimizes the liability of abandoned property. With over 200 agriculture projects and several multi-acre urban farms in development, city leaders look to solve two problems at once: significant levels of food insecurity and health and safety risks associated with abandoned sites. All this is done by redefining itself along an axis of food production (Gallagher, 2012).

D-town Farm, born of The Detroit Black Community Food Security Network, is dedicated to “building food security in Detroit’s Black community by promoting urban agriculture, healthy eating habits, co-operative buying, and encouraging young people to participate in agriculture” (Detroit Black Community Food Security Network, 2010). Located on two acres of city land leased for \$1 per year, D-Town farmers grow 37 different varieties of vegetables and deliver programs, events, and workshops. Produce is sold throughout the community: to schools, to individuals, and to other outlets. Sales and grants support the organization. Malik Yakini, (Photo 2) chairman of the Network explains, “what we’re doing is reframing agriculture for African Americans, so that we can again see it as an act of self-determination and self-empowerment, as opposed to an act where our labour is exploited to enrich someone else” (Democracy Now!, 2010). D-Town Farm exemplifies the social capital development dimension of urban agriculture. They provide jobs, while also providing a place of connection and commitment to the community. Financial success is an important

outcome, but only as a means to providing resources for community capacity building.



Photo 2: D-Town Farms, Detroit, MI

Malik Yakani, chairman of the Detroit Black Community Food Security Network standing in a brassica patch of D-Town Farm.
Source: Catherine Porter

Earthworks Urban farm is a faith-based organization that grows vegetables on 1.5 acres of land in Detroit (Photo 3). Primarily associated with the Capuchin Soup Kitchen, the organization provides food for those who need it, hosts classes and workshops for budding urban gardeners, and sells its produce through a number of youth farm stand markets (Earthworks Urban Farm, 2012). Earthworks' mission is aligned with both protecting the Earth and communal learning through a connection to the land. Though Earthworks sells a small portion of fresh produce and value-added products, the organization sees its sales as secondary. Most of their produce is not sold, rather it is returned to the community through the soup kitchen and its youth programing.



Photo 3: Earthworks Urban Farm, Detroit, MI. A hoop house provides season extension for Earthworks Urban Farm's production during the cooler spring and fall months. (Source: Earthworks Urban Farm).

Urban agriculture is a tool by which communities can heal their economic and social wounds. Farming is the medium of exchange, rather than a particular end goal. Working with the land, eating healthy vegetables: all of this is done within a framework of community, where individuals have a chance to grow something for themselves and their neighbours. These projects are about empowerment as much as they are about vegetables (Earthworks Urban Farm, 2012; The Greening of Detroit, 2012; Detroit Black Community Food Security Network, 2010).

Detroit is home to other forms of urban agriculture. Hantz Farms proposes to aggregate thousands of underutilized acres to grow high value hard wood crops (Hantz Farms Detroit, 2012). Part of the goal of Hantz farms is to increase land prices by increasing scarcity of land. With so many vacant parcels, property values in Detroit have plummeted. John Hantz, the financier behind Hantz Farms, sees urban agriculture as a way of reviving property values

though scarcity (Dolan, 2012). His proposals are not well received by a large section of the city: fears of a land-grab, racial animosity, and frustration abound. Despite community concern, Hantz Farms is in the process of working with the city to purchase 200 acres of vacant parcels to grow hard-wood crops (Newsom, 2012).

Michigan State University also has plans for a large-scale urban food production site in Detroit. In the next three years, MSU will invest \$1.5 million dollars to turn Detroit into a “world hub for food system innovation” (Sands, 2012). The new university collaboration will investigate methods to produce food in urban settings, including vertical farming, small scale production and the incubation of small local businesses (Gallagher, 2012).

Detroit’s urban agriculture projects are varied, each with a different mission, operational focus, and target audience. Whether towards community engagement or economic renewal, these farms are the means to support those goals.

Urban agriculture requires rethinking the intersection between food systems and urban design. Farms and cities have always seemed to be contradictory ideas (Howard, 1902). However, building community and policy around these ‘new’ ideas is essential to the development of urban agriculture. Already, the State of Michigan has a ‘Right to Farm Act,’ which allows farming and the sale of produce on any farm that adheres to a set of state developed general farming principles. However, these laws can restrict the ability of the city to regulate urban farming, leaving residents and practitioners in a murky regulatory environment. Detroit is addressing this by drafting urban agriculture legislation that supports long-term provision of city land, streamlines the permitting process, and develops tax abatements for urban farms (The City of Detroit, 2010). With interest from commercial and

community growers, and university research, Detroit sees urban agriculture as a means of economic and community development in an era of economic uncertainty.

NEW YORK, NEW YORK

In one of the largest cities in the world and the fourth most dense in the United States, urban agriculture has found a place. In the 1970s, New York City created the GreenThumb program to facilitate the creation and running of community gardens. In the 1980s, some of these sites were threatened due to increasing development pressures. Though initial efforts to connect regulatory practices with community needs were difficult and strained, the government eventually worked closely with community groups to secure land for many community gardens.

To date, New York City estimates that GreenThumb is the largest urban gardening program in the United States, “providing assistance and support to over 600 gardens and nearly 20,000 garden members on over 32 acres throughout the city” (City of New York Parks and Recreation, 2012). The Big Apple houses 1000 community garden plots and roughly 15-30 urban farms, depending on the definition, that grow and sell produce (Urban Design Lab at Columbia University, 2012). Urban agriculture is increasingly popular, with hydroponic commercial rooftop and greenhouse operations in development on a number of sites throughout the five boroughs (Foderaro, 2012). The Brooklyn Grange is one of those new farms. Located in Queens, the Brooklyn Grange is a partnership between a for-profit venture and a restaurant in the area. High value crops are grown six-stories above ground level on a 40,000 square foot space. In 2012, the Brooklyn Grange will open a new rooftop site in the

Navy Yard through a grant program with the U.S. government and private financing (Photo 4).



Photo 4: The Brooklyn Grange sustainably grows produce for sale on an acre of rooftop space on the Standard Motors building located in Queens, New York City. Photo Credit: Anastasia Cole Plakias, <http://brooklyngrangefarm.com>

Added Value is a 2.5-acre youth driven project in Brooklyn operated in collaboration with the University of Cornell and Heifer International. Added Value runs a youth internship program training new farmers and educates the community about food systems, food access, security, and obesity. In addition to growing and selling food, Added Value leads programs in their gardens for school children, connecting students to healthy foods and ways to take charge of their diet by growing and cooking their own foods.

The City is moving forward with plans to increase and support urban agriculture. The New York City Council has authorized the City to integrate urban agriculture into the city's growth plans and regulatory framework (The New York City Council, 2011). To date, over 5,000 ground level acres have been identified as suitable for farming, with roughly 1,000 acres owned by the New York City Housing Authority and over 1,800 acres of rooftops suitable for urban agriculture (Urban Design Lab at Columbia University, 2012). The city is

committed to streamlining incentives for rooftop food production and eliminating regulatory barriers to establishing new urban farms (The New York City Council, 2011).

THE REGULATORY ENVIRONMENT

Detroit and New York City are two examples of cities where urban agriculture has a strong and growing presence. Despite that growth, urban agriculture has largely avoided governmental regulation. A study of urban agriculture policy across 16 cities in the United States showed that few policies exist specific to urban farming, though policies specific to community gardens exist. Only six cities had particular requirements surrounding the sale of produce (Cleveland, Chicago, Denver, Philadelphia, San Francisco, and Seattle). It is clear that regulations around urban agriculture are largely absent and in need of updating (Goldstein et al., 2011).

Traditional municipal power structures do not lend themselves to complex, crosscutting issues such as food policy. The inherent isolation of municipal roles and responsibilities makes it difficult to develop broad ranging solutions to complex environmental and social issues (Mendes, 2008). Though there is much citizen interest in urban agriculture and sustainability issues in general, municipalities are not necessarily organized to implement the ‘green’ agenda. When it comes to urban agriculture, various departments must work together: engineering, licensing, zoning, etc. (Wendy Mendes, personal communication, April 18, 2012). Even when all of the different municipal departments cooperate, regulators are largely without clear knowledge about urban agriculture. Architectural requirements, economic impacts of different zoning regulations, environmental impacts of different

industries are part of the expertise of many city planners and policy makers. Crop production is not. Re-learning how to effectively allow and regulate these activities represents a significant learning curve for many city officials and the bureaucracy as a whole (Mendes, 2008).

Municipalities working to design, implement, or enhance the sustainability of their local food system face critical public barriers when developing policy. Work by Pothukuchi and Kaufman point out that these barriers largely come from the fact that urbanites take their food system for granted and that there is a pervasive gap between urban and rural policies and conceptions (1999). This barrier is exactly the one that many urban farms seek to remove (Feenstra et al., 1999; Kaufman and Bailkey, 2000; Kremer 2011).

Municipal and citizen concerns over food security, sustainability and community development are driving cities to financially and legally support urban agriculture. As the history of urban agriculture shows, cities have played and currently play a critical role in providing land and facilitating the growth of these enterprises (Feenstra et al., 1999; Kaufman and Bailkey, 2000; Kremer 2011; Urban Design Lab at Columbia University, 2012; Colasanti et al., 2010; Grewal and Grewal, 2011).

SYNTHESIS

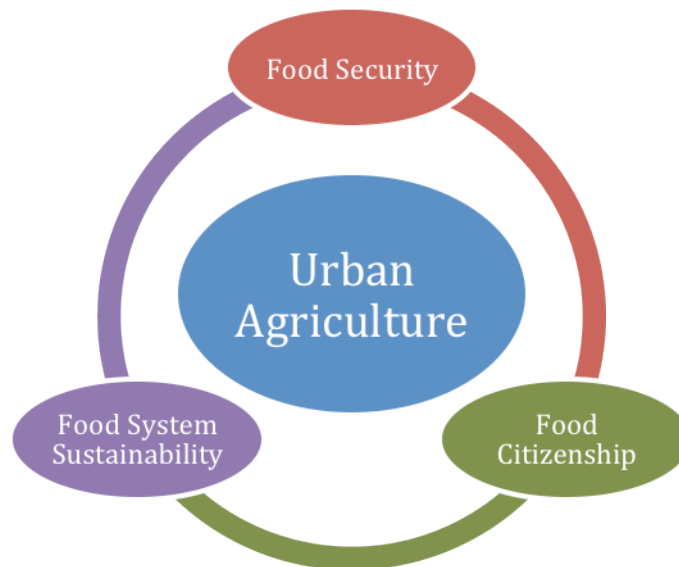
Throughout the various eras of urban agriculture, from allotment and school gardens to gardens organized around war and for relief, every organization has contributed more than vegetables. None of these gardens were organized or operated solely for economic or social benefits. It was, and is, impossible to separate these outcomes. Food production becomes

the medium by which communities address critical issues, including: moral development, community building, social resiliency, and interpersonal engagement. The food produced undoubtedly supports household economics, but the financial benefit is only a piece of the larger impact. Urban agriculture provides a contact point for urbanites to connect to the natural world and provides communal activity that brings people together. The realization of multiple outcomes of urban agriculture is the critical lesson of past urban agriculture movements. Urban agriculture connects food, community and the environment. Designing urban agriculture through a singular lens of food production or social benefit fails to see the larger impacts such projects have on our communities and limits our ability to fully see and appreciate their potential.

4. THE CONTEXT OF TODAY’S URBAN AGRICULTURE

Urban agriculture, and urban farming in particular, is able to play a constructive role in addressing some of the failures of our conventional food system. With 81% of Canadians and 82% of Americans living in an urban setting, urban environments must be a part of any food system solution (Central Intelligence Agency, 2012). It is essential, however, to realize that urban agriculture is not the solution, it is a solution (Fig 1). This chapter explores the problems of our current food system: a failure to provide all with food security, agriculture that is unsustainable economically, socially, and environmentally, and the critical disconnect we have with our food, our food producers, and the land from which food is grown. I then look at the ways that urban agriculture addresses these problems.

Figure 1: Urban Agriculture and the Context of Our Food System



FOOD SECURITY

Our understanding of food security has evolved over time. Initially, the concept focused on global food supply and demand: a macro-viewpoint. More recently, the definition has shifted

the focus towards individuals' perceptions and experiences with their food system (Simon, 1996; Welsh and MacRae, 1998). Food security is:

“A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2002).

Food insecurity refers to those situations where individuals fail to achieve food security.

Three aspects of food security are examined: high food prices and poverty, access to healthy foods, and perceptions of food safety.

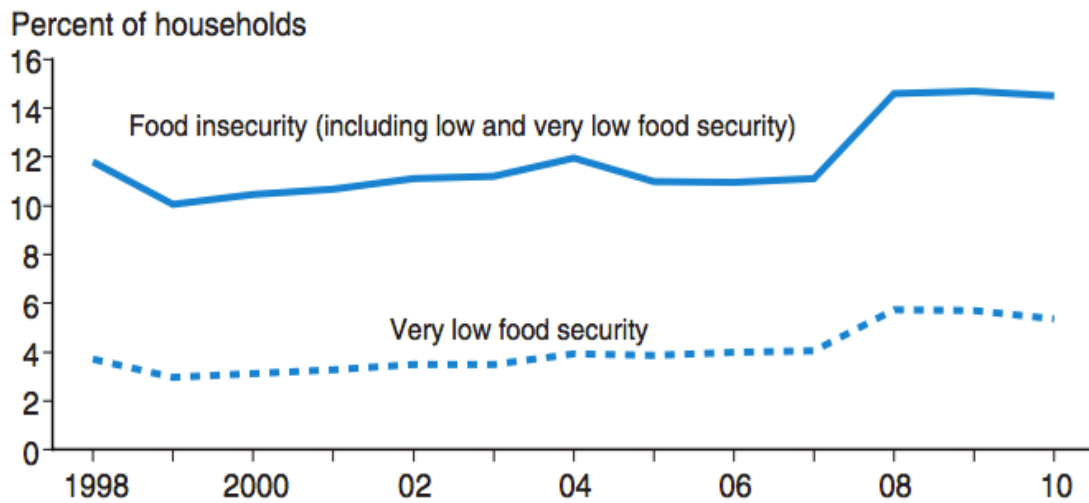
HIGHER FOOD PRICES AND POVERTY

High food prices negatively impact food security. In 2008, and again in 2010, increasing demand for grain and soy for biofuel production along with rising oil prices pushed world food prices to their highest level since international recording began (Food and Agriculture Organization, 2011; Headey and Fan, 2008; Mitchell, 2008). Higher food prices have been associated with the ‘Arab Spring’ in the Middle East and North Africa, where volatile prices have decreased both food and personal security (Breisinger et al., 2010).

In the United States and Canada, the recession beginning in 2008 has impacted food security. The Economic Research Service (ERS) of the USDA defines food insecurity as households that “were, at times, uncertain of having, or unable to acquire, enough food for all household members because they had insufficient money and other resources for food” (Coleman-Jensen et al., 2011, p. 4-5). Over 14% of the American population has been food insecure since 2008 (Fig. 2). In a one-month period in 2011, 851,014 Canadians received food bank assistance; an increase of 26% from the 2008 recession (Food Banks Canada, 2011). In the United States and Canada, single parent households and ethnic minorities are, on average,

more likely to be food insecure (Coleman-Jensen et al., 2011; Power, 2004). Food insecurity tracks closely with the general economic climate. Devising strategies to help individuals provide for themselves during economic downturns can be a critical function of urban agriculture (Coleman-Jensen et al., 2011).

Figure 2: Food Insecurity in the United States 1998-2010



Food insecurity has increased in the United States as the economic climate has soured. (Source: Coleman-Jensen et al., 2011, p. v)

Just as in times past, urban agriculture is a cost saving strategy for many families. In conversations with urban gardeners, many indicated that, “we didn’t farm because we were hippies, we farmed because we had three mouths to feed and it was cheap!” (Personal interview, Ocean Elier, March 12, 2010). Food savings are significant for urban gardeners, often bringing savings of \$700 per family during the growing season (Brown and Carter, 2003). Finding new methods to minimize the impacts of volatile food prices is critical for low-income families. Urban homesteads and community gardens allow individuals to access healthy food more affordably than that at a supermarket or convenience store (Coyne and Knutzen, 2008; Lawson, 2005). Supplementing diets with homegrown produce can ensure a

family's self-determination, providing enough food to eat during difficult economic times.

Local production often cuts out the middlemen, reducing the scale, complexity, and cost of the food supply chain. This allows local food chains (e.g. CSA shares, farmers markets) to outcompete retail supermarkets, and in doing so, they often market to customers outside traditional distribution channels, expanding the market (Claro, 2011; Priog and McCann, 2009). When inner city residents often pay more for the same foods than do their suburban counterparts, it is critical to find new ways to equitably provide for these consumers (Chung and Myers, 1999; Latham and Moffat, 2007). Urban agriculture's varied marketing channels is one way to cost effectively provide for local markets.

What we learn from high food prices is two fold. First, the current system leaves those who are the most destitute without means of acquiring healthy, affordable food. The least well off are the most marginalized in our conventional food system (Latham and Moffat, 2007; Food Banks Canada, 2011; Coleman-Jensen et al., 2011). The second lesson is that there are easy, affordable ways to achieve increased food security by 'growing your own,' or purchasing food from local outlets. Urban agriculture can help provide inner city residents with food that is affordable, accessible, and healthy.

HEALTH

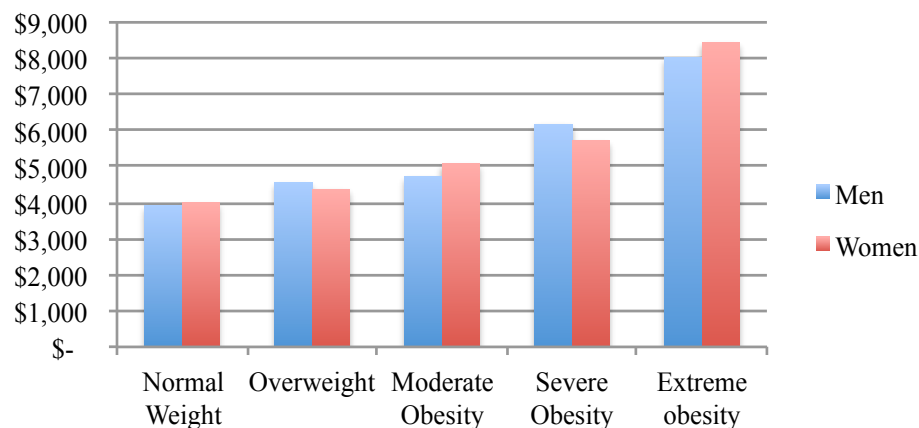
Health is of critical concern when it comes to food security, particularly in economically challenging times. As food prices increase, households shift consumption to less nutritious foods and decrease the diversity of food purchases (Brinkman et al., 2010). Households of low socioeconomic status eat fewer vegetables and less fresh produce than do their more

affluent counterparts. Whereas the real price of fruits and vegetables has increased 10% over the past twenty years, the prices of Pizza Hut pizza and Coca-Cola have decreased 17% and 35%, respectively (Christian and Rashad, 2009).

It is not just the poor who are suffering reduced health effects of their food choices. Due to a dearth of exercise and a lack of healthy food options, obesity has become epidemic in the United States and Canada where 68% and 59.1% of their respective populations are overweight or obese (Flegal et al., 2010; Tjepkema, 2006). Children are the most at risk in our current food system. Children receive 10-15% of their daily calories from sweetened beverages (Wang et al., 2008). Increased margins on processed foods create incentives to market those goods to families and particularly to children. Sweetened beverages are found in schools where marketing arrangements bring sodas and fruit juices into the classrooms. Fruits and vegetables do not enjoy the same sort of access (Nestle, 2007). Increased rates of obesity, cardiovascular diseases, and type II diabetes, are all linked to the increased consumption of sugared, fatty, processed foods (Malik and Hu, 2012; Malik et al., 2006; Moreno and Rodríguez, 2007; Petty, 2004; Wang et al., 2008). It is clear that our food system is promoting and distributing foods that are leading directly to the obesity epidemic that is occurring today.

This epidemic burdens our society. The impacts of obesity harm both the economy and quality of life of over 150 million people. In 2006, it is estimated that Canada spent six billion dollars on health care costs directly related to obesity; costs were expected to increase to eight billion by 2008 (Anis et al., 2010). Estimates in the United States indicate that obesity related health care costs were as high as \$147 billion in 2008 (Finkelstein, et al. 2009). In the United States, obesity is estimated to increase health care costs by a factor of 2.05, increasing the average per capita cost of healthcare to \$8,017 from \$3,915 (Fig. 3) (Andreyeva et al., 2004).

Figure 3: Per Capita Health Care Expenditures and Level of Obesity



Though urban agriculture may not be directly attributable to reduced obesity, it is part of a suite of solutions to increase access to healthy and nutritious foods, while also providing a means of recreation and exercise (Source: Andreyeva et al., 2004)

Eating fruits and vegetables is directly linked to better health outcomes. Increasing fruit and vegetable consumption reduces the incidence of cancer, prevents coronary heart disease, and decreases chances of a stroke (Van Duyn and Pivonka, 2000). Vegetable consumption also prevents cataract formation, chronic obstructive pulmonary disease, and a host of other chronic diseases (Van Duyn and Pivonka, 2000).

The benefits of eating a diet rich in vegetables cannot be overstated. Research clearly shows that gardeners are more likely to eat vegetables than non-gardeners (Alaimo et al., 2008; Carney et al., 2011). Not only do they eat more vegetables, but they also reduce their consumption of other sweet foods and drinks which can contribute to weight gain and an unhealthy diet (Blair et al., 1991).

In addition to directly impacting the diet of gardeners, urban agriculture creates social incentives to healthy eating. While processed foods employ advertisements estimated to be worth \$15 billion in 2005 (Schor and Ford, 2007), vegetables are largely without sponsors. Urban agriculture can fill that void. Programs connecting participants to food growing has shown to increase the vegetable consumption of those individuals (Alaimo et al., 2008; Carney et al., 2011). Familiarity is crucial when it comes to trying new foods, as proven by food advertisers' success in marketing their products (Cook, 2007). Urban agriculture helps increase familiarity of fresh produce by bringing it closer to the consumer.

In addition to the positive dietary impacts of local food production, gardening is also a recommended physical activity for all ages. Sedentary lifestyles in the United States have been shown to have significant negative impacts on health (Matthews et al., 2008). On average, Canadians are sedentary for nine and a half hours each day (Colley et al., 2011). Finding ways to reduce this behavior is crucial to mitigating the obesity epidemic. Gardening provides one avenue for greater health for all ages.

PERCEPTIONS OF SAFETY

Consumers are concerned with the safety of their food. In 2010, an outbreak of *Salmonella enteritis* infected over 2,000 individuals in the United States (Center for Disease Control, 2010). In 2009, the Chinese government executed two milk producers selling contaminated milk that led to the sickness of over 300,000 children (LaFraniere, 2009). Lax international food regulations concern North American consumers. Chinese food imports are increasing rapidly, yet federal oversight remains incapable of checking 99% of all food shipments (Becker, 2008). Public reports of food tampering and poor regulation are increasingly worrisome to consumers. In 2008, the Leopold Center for Sustainable Agriculture reported that there was an increased belief that the U.S. food system was ‘very unsafe,’ from 5% in 2007 to 26% in 2008 (Pirog and Rasmussen, 2008, p. 29). The lack of trust in our food system is driving consumers to seek alternatives to conventionally grown food.

Consumers trust their regional and local food systems embedded within their community to a greater extent than they do the global food system (Pirog and Rasmussen, 2008). When localized, the farm, farmer, and consumer are all integrated into a perceivable and manageable social structure that facilitates trust (Hinrichs, 2000). Urban agriculture facilitates consumer knowledge about the food system and increases the opportunity they have to personally connect with it. Home gardeners know exactly what fertilizers and pesticides are used in the garden, if they are used at all. Therefore, urban-based food systems help redistribute power back to the individual and away from anonymous global actors. This in turn builds trust in a now personalized food system.

SUSTAINABLE FOOD SYSTEMS

Food is the nexus between the environment and society, forming the basis of our economy.

Land is the first human source of wealth. In writing about the natural origins of economics,

Prof. Margaret Schabas quotes the French Romantic Du Pont, writing in 1910:

“Agriculture is the only human labour with which the Sky cooperates without ceasing and which is a perpetual creation. We strictly owe the net product to the soil, to Providence and to the beneficence of the Creator, to his rain that beats down and changes it to gold” (Schabas, 2005).

The clear connection between economic, social and environmental concerns has driven strong interest in sustainable agriculture. In this next section, I will look at some of the driving forces for urban agriculture as related to the sustainability of our current agricultural system.

SUSTAINABLE FOOD SYSTEMS: THE ENVIRONMENT

In a post-industrial world, agriculture is as mechanized and capitalized as any other industry.

Its impact is as impactful as any other industry extracting natural resources. As a result,

agriculture has an indelible impact on our environment. Globally, our food system

expropriates 38% of the non-ice portion of the Earth’s surface (FAO, 2011). Cropland and

pasture have supplanted 69.9% of global savannahs, 49.5% of grasslands, 47% of temperate

deciduous forests, and 28.7% of tropical forests (Ramankutty et al., 2008). Where nations

were once built by legions of small landholders, the Green Revolution brought forth large

mechanized farms. The spread of chemical fertilizers and pesticides, introduction of hybrid

seed, and mechanized practices drastically increased the amount of food produced globally.

While these changes greatly expanded food production, it did so at the expense of

environmental, social, and economic sustainability.

Use of chemical fertilizers has led to the belief that farms no longer need to rely on the soil fertility. Yet, nutrients come from somewhere. Phosphate, a critical plant nutrient is shipped around the world to enable farmers to grow crops. Supplies are decreasing as mines are depleted. The Global Phosphorous Research Initiative estimates that phosphorous supply will be insufficient to meet the demand sometime in the next 30-40 years (Cordell et al., 2009; Elser and White, 2010). Even as prices increase and nations identify phosphorus as a 'strategic mineral,' farmers often over-apply fertilizers to account for climactic variability and to ensure a rich harvest (Ramankutty et al., 2008). Nitrogen, necessary for most of the commodity crops in the United States, is typically applied as a synthetic fertilizer produced with fossil fuel inputs. As oil prices increase, so too will the price of fertilizer, in turn increasing food prices (Elobeid et al., 2011). Much of the applied fertilizer runs off agricultural lands and causes eutrophication, algal blooms that reduce oxygen available for marine animals. Eutrophication has increased dramatically in coastal waterways as excess nitrogen and phosphorous run off diminished farmland soils (Cordell et al., 2009; Elser and White, 2010). This reduces the quality of our environment, degrading waterways for use as fisheries, trade, other ecosystem services, as well as recreation. In the United States, these external costs are estimated to be between \$5.7 and \$16.9 billion annually (Tegtmeier and Duffy, 2004).

Agriculture has a significant impact on climate change. It is estimated that it contributes approximately one third of all anthropogenic greenhouse gas emissions (Foley et al., 2011). As forests are cut down to make way for larger farms, the potential to sequester carbon in natural sources decreases. Finding ways to produce more food for a growing population will require every innovation humans have at their disposal, while ensuring that solutions do not

cause other problems. Our industrial food system has significantly harmed our environment.

It is unclear if urban agriculture can solve these environmental issues. These are complex problems that require a suite of varied solutions. Urban agriculture creates spaces to publically discuss and debate these issues. Rarely is it clear where food comes from or how it is grown. The impacts of eating are virtually invisible: the poor wages paid to immigrant labourers, the applied pesticides, the agricultural run-off, etc. When farming is happening within communities, there is the potential to educate consumers about the impacts of their food choices. Urbanites can visually and tactilely participate in the growing and eating of their own food, understanding the impacts of their eating, and constraining those impacts within a local sphere (Connell et al., 2008). When individuals are faced with the realities of food production, they can begin to understand the impacts of their food choices. Urban agriculture forces the issue to light by bringing these activities into populated regions and creating space for dialogue.

Urban agriculture has the potential to address the imbalance in our nutrient cycles. Currently, soil amendments are mined, transported, and placed on distant fields. Food crops absorb these nutrients, are harvested, and shipped to the city, where the nutrients pass into the waste stream, separated from both original source and place of use. Instead of shipping nutrients to the farms, food to the city, and creating unused waste, urban agriculture offers a method to close the nutrient loop and to match our geographical and ecological footprints. Already, food scraps are being composted and used on urban plots. This recycles those nutrients and helps urban farmers grow vegetables without synthetic fertilizers.

Vermicompost, worm produced compost, is an incredibly potent source of fertility that can be produced in small batches within a home or restaurant using what is typically considered ‘waste’. New York City estimates that by 2016, they will divert 24% of the city’s waste to compost (Department of Sanitation New York City, 2012; The City of New York, 2011).

Finding ways to educate and promote environmental consciousness is critical to the development of sustainable food systems. Urban agriculture promotes education of environmental issues, while transforming vacant and concrete lands into biologically productive spaces.

SUSTAINABLE FOOD SYSTEMS: SOCIAL

Our food systems are dependent upon people with specialized knowledge of both place and practice. However, there are fewer individuals who have this farming experience. In the 1900s, 20% of citizens were farmers. Now, famers account for only 2% of the Canadian population, and less than 1% of the American population (Dimitri et al., 2005; Statistics Canada, 2006). Now, famers account for only two percent of the Canadian population, and less than one percent of the American population (Dimitri et al., 2005; Statistics Canada, 2006). Not only are their fewer farmers, they are also older. The average age of farmers is 52 and 59 years in Canada and the United States, respectively. For every farmer under the age of 35 in both countries, there are six farmers over the age of 65 (Statistics Canada, 2006; USDA, 2007). With a rapidly aging farmer population, there is concern that new farmers will not have the experience to maintain production levels. This fear of failed knowledge transfer has attracted the attention of the Canadian government in a recent report entitled,

“Young Farmers: The Future of Agriculture” (Miller, 2010). In it they begin to document the concerns of rural farmers and young farmers coming into the industry.

Local gardens, community plots, and urban farms can help introduce ‘farming’ to those not born into it and help educate urbanites both as young farmers and as entrepreneurs. In 1992, ‘Food from the Hood,’ began working in low-income communities in Los Angeles (Feenstra et al., 1999). Students run and lead the organization, learning both practical horticultural skills and training in business practices. Through the sale of their salad dressings, they have generated over \$250,000 for college scholarships. They have had the opportunity not only to provide for themselves, but also to learn the business of farming, and to raise public awareness of the food system.

The truth is that there is a clear lack of information about the food system. In a survey of high school students, only 13% knew that less than 2% of individuals lived on farms (Harmon and Maretzki, 2006). There is a clear disconnect from the urban environments where most of the population lives and the rural ones that produce a majority of food consumed. Finding ways to educate and train future farmers is critical to food supply and security. Urban agriculture is one way to engage, recruit, and train new farmers.

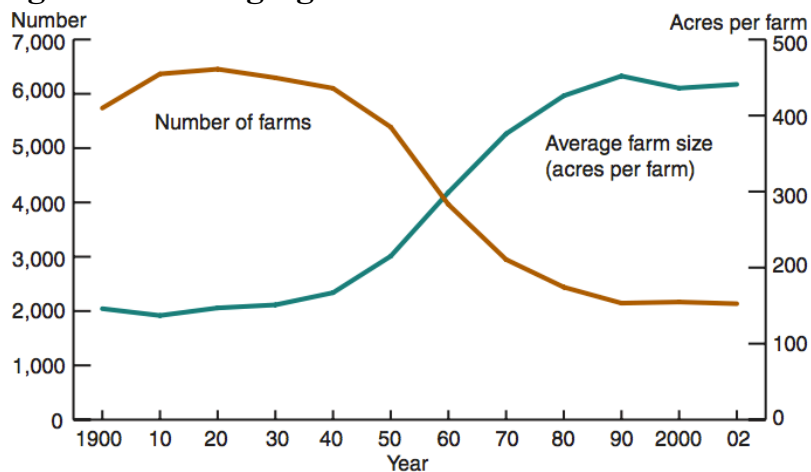
SUSTAINABLE FOOD SYSTEMS: ECONOMIC

The story of modern agriculture is one of consolidation and commodification. Fertilizers and tractors supplanted manpower, mechanizing farm processes and imposing consistency over the land. New genetically enhanced seeds and petroleum-based pesticides led to remarkable increases in supply. Large farms boasted tremendous yields with minimal marginal costs.

Savings were passed to customers as lower prices and farmers made profits by increasing yields. However, the share of the food dollar farmers receive is steadily declining. In the 1920s, farmers in the United States received approximately 40 cents of every dollar of commodity food sales (Ogren, 1953). In 2008, farmers received 11.3 cents of every dollar (Cannin, 2011). The strategy was to get big and get big fast.

Farms consolidated, taking advantage of capital investments that reduced labour and increased efficiency. As a result, the size of the average farm increased with a corresponding reduction in the total number of farms (Fig. 4). Farms became increasingly productive, growing more food than was previously thought possible. In 2009, U.S. farm output was “170% above its level in 1948, growing at an annual rate of 1.63%” (United States Department of Agriculture, 2012b). In addition, farms became more specialized, focusing on one major commodity, rather than several.

Figure 4: Changing Number and Size of U.S. Farms



As the number of farms decreases, the average farm size expands, absorbing those farms that leave the industry. Source: (Dimitri et al., 2005)

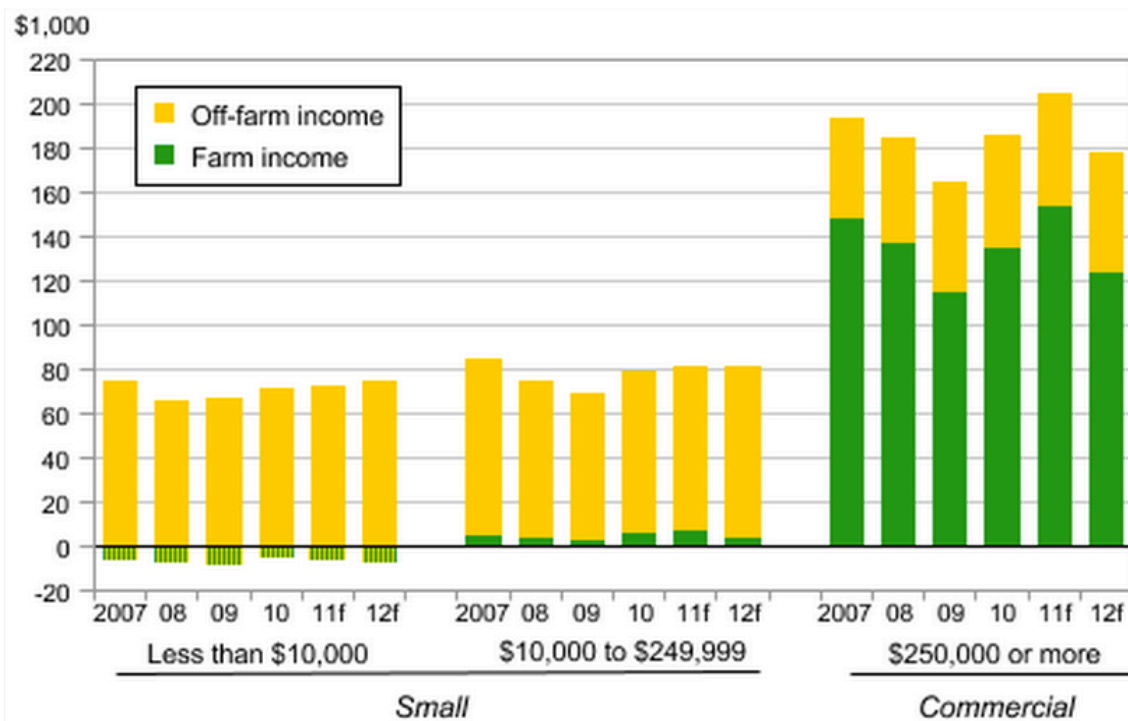
These large farms support large, global markets. The U.S. has increased exports dramatically. In 1990, farm exports totalled \$40 billion, whereas the forecasted exports for 2012 are \$131 billion (Economic Research Service (ERS): USDA, 2012a; Hanrahan, Canada, and Banks, 2011).

The food system followed suit, aggregating and consolidating along with primary producers. In an analysis of the total market share of the top four firms in a number of food industries (CR₄), it is clear that a small number of corporations hold a significant proportion of an individual market, particularly in the United States: beef packing (83.5%), soy bean processing (79.9%), pork packing (66%), pesticides (59%) flour milling, (53.6%), and proprietary seeds (53%) (ETC Group, 2008; Hendrickson and Heffernan, 2007; Howard, 2009; Martinez, 2007). As the concentration of market share increases among fewer firms, competition decreases and the market becomes increasingly oligopolistic and monopolistic. Processors are able to dictate the terms and conditions of farm products and farming methods, reducing individual control and resilience within a farming system (Abourezk, 1975). Monopolies can and do exert economic pressure on legislative bodies, spending money to ensure that legislation benefits their interests. This is capital that individual farmers, consumers, and other stakeholders in the food system do not have.

The 'yeoman farmer,' the quintessential symbol of self-determination, able to make her own way in the world, is a dying breed. Most often farmers support themselves through employment outside the farm. To be clear, many large farms (crop sales > \$250,000) in the United States and Canada earn returns that are comparable with non-farm households, but small farms do not (Schnepf, 2008). Large farms substitute capital intensive technologies

and inputs for labour, and have succeeded in generating significant income by increasing their capacity, lowering marginal costs, and increasing quantity produced. Small farms, on the other hand, do not have the same access to capital to make that substitution and most often rely on off-farm income. An average farm, where one household member reports farming as the major occupation and has sales of less than \$250,000, receives just 3% of their income from the farm (Fig. 5) (Economic Research Service (ERS): USDA, 2012b).

Figure 5: Comparison of Off and On Farm Income Across Farm Size.



For small farming businesses, farming does not pay the bills. Off farm income is necessary as efficiencies of scale and size are not possible for small farmers. (f=forecasted) Source: (ERS: USDA 2012)

In Canada, off-farm income is also significant. Almost 95% of income derived by farm families comes from off-farm work (Statistics Canada, 2011). In British Columbia, the Ministry of Agriculture assists farmers by producing the ‘Planning for Profit’ series which estimates costs and revenues for a given farming model utilizing data from a number of farms. For a small five-acre mixed vegetable farmer, the Ministry of Agriculture estimates

that such a business will ‘earn’ -\$758 per year after paying for full operating expenses including wages and financial services.

Though these large farms are important to the global food system, smaller localized food systems can better support healthy individuals and local economies. Large corporate growers and processors aggregate wealth; moving it away from families and small businesses and towards large corporations (Domina and Taylor, 2009; Heffernan, 1999). Systems so dependent upon outside inputs are not resilient to change. Heffernan (1999, p. 19) asks pertinent questions about an industrial and consolidated system in the face of a potential U.S. depression: “Will food products get to the stores on a regular schedule? Will my neighbour be able to get a replacement engine from England for his New Holland combine if it breaks down during harvest? Will the seed, chemicals and fertilizer, coming from all parts of the world, get to the farmer in time?” Local food businesses can help local communities control their food supply, while supporting the economic growth of the region. Urban agriculture can be one answer to finding new business models for agriculture.

In a resurgence of farm-to-customer business models, small farmers are finding new ways to support themselves. Since 1996, there has been a 300% increase in the number of farmers markets in the United States (USDA, 2011). At farmers markets, customers pay the full food dollar to the farmer, rather than to the food processor or wholesaler. Farmers are forward integrating, forming co-ops to market combined yields to restaurants and institutional kitchens that demand higher volumes of produce.

Small and medium farms are selling produce directly to the consumer. Though they supply roughly \$1 for every \$20 dollars of total agricultural sales, this accounts for \$1 for every \$8

of produce sold directly to the consumer (Bond et al., 2008). Schools, hospitals and other institutions are beginning to purchase locally produced foods. These direct to market sales have increased dramatically in the United States in the past decade, growing 118% from 1997 to 2007 (Martinez et al., 2010). As consumers buy from local farms, those farms in turn increase their own spending to supply demand. Instead of sending food dollars outside the community, they accrue to the community itself, supporting the general economic conditions (Abourezk, 1975). Empirical evidence shows that local Iowan purchases of vegetables, fruits, and meats increases labour, employment, and labour incomes within Iowa due to the increase of direct to market facilities and local meat slaughtering and facilities (Swenson, 2009).

Urban agriculture has already proven itself financially viable in a number of communities across the United States (Feenstra et al., 1999; Kaufman and Bailkey, 2000). A typical business includes resourceful leaders, strong customer relationships and an innovative marketing mix. One particular model includes selling CSA (community supported/shared agriculture) boxes. Instead of receiving payment for food products during the growing season, consumers pay at the beginning of the season, committing to a weekly share of produce. In the United States, there are currently over 3,600 CSA programs (Galt, 2011). These CSA models are growing and are favoured by many urban farmers.

To date, the financial success of urban agriculture across Canada and the United States is relatively unknown. There are snapshots of the industry, but there are not enough data to evaluate the general viability of urban farming. The legal and geographic context of urban farming is a critical part of each project's success, which makes it difficult to generalize

urban farm success. Despite the lack of formal evidence, researchers and writers are beginning to informally recognize that urban farming is succeeding, if only by its presence, in a number of major cities across North America. ‘CityFarmer.info,’ a website that aggregates information on urban agriculture, has seen an uptick in the amount of articles related to the financial success of urban farms. Another website, ‘Seedstock.com,’ looks strictly at urban farming businesses. At this point, urban farming is a new venture. Its success will depend on the will of entrepreneurs and the forethought of communities and governments. The opportunity is there, how urban farmers proceed will determine its success.

FOOD CITIZENSHIP

With a majority of the population living in cities, few understand the connection between food and the environment. Wendell Berry argues:

“Most of us, for example, not only do not know how to produce the best food in the best way – we don’t know how to produce any kind in any way. Our model citizen is a sophisticate who before puberty understands how to produce a baby, but who at the age of thirty will not know how to produce a potato” (Berry, 2003)

For many urbanites, there is a serious disconnect between our food and its production. In both informal and more rigorous surveys, children regularly fail to understand the basics of their food system (Harmon and Maretzki, 2006; Hynes, 1996; Neumark-Sztainer et al., 1999; Smith, 2010). Students in the first grade failed to name tomatoes, cauliflower, or other vegetables when shown (Smith, 2010). In a study of high school students in Pennsylvania, 76% of students did not know that tortilla chips were made of corn (Harmon and Maretzki, 2006). When given a list of foods and asked to match their origin, 42% failed half the time. Most often missed were ‘buffalo’ wings, margarine, mutton, cheese, butter, yogurt, and

cream. Our disconnection to our food system is evident by the lack of information many have about the food they eat every day.

However, the public is exposed to a lot of information about brands. Everyday, the average American watches 2.8 hours of television (U.S. Bureau of Labor Statistics, 2012). Children are more likely to know Ronald McDonald than they are to know Ronald Regan (Schlosser, 2005). This influx of media supporting fast and processed foods influences the food choices of both children and adults. In a report conducted by the Yale Rudd Center for Food Policy and Obesity, researchers concluded that the fast-food industry spent \$4.2 billion dollars in advertisements (Harris et al., 2010). As a result, the average preschooler saw 2.8 TV ads for fast food a day, children (6-11 years) saw 3.5; and teens (12-17 years) saw 4.7 (Harris et al., 2010). Through television and marketing, children spend more time with brands than they do with vegetables or with nature. Watching television is the most popular leisure activity, outpacing socializing, reading and thinking, and gardening (U.S. Bureau of Labor Statistics, 2012). The connection that individuals have with a fast-food company's brand or marketing figure is significant enough to influence purchasing behaviour, and individuals who have a greater connection to the brand are more likely to be overweight or obese (American Academy for Pediatrics, 2012; Robinson et al., 2007; Story et al., 2002). The sad truth is that vegetables do not have a spokesman and fruits are not advertised during the super bowl. This lack of connection with healthy fruits and vegetables decreases the likelihood that individuals will choose these foods over marketed and branded foods. There is simply a lack of understanding about, and connection with, healthy food.

Many of the problems described above, food insecurity and food system unsustainability, can

be seen as a result of society's alienation from our current food system. In a Marxist critique, McClintock (2010) argues that we can understand the current disconnect through lenses of metabolic rift. In particular, the roles of ecological and individual rift highlight the themes of our flawed food system. Ecological rift is explained by the ability to substitute agricultural and ecosystem services for capital. As a result, ecosystems are transformed according to a system of capital, rather than an underlying ecological order. The current food system substitutes fossil fuels for mineral nutrients, assuming that they are perfect substitutes, even when this is clearly false. This is the rift: the disconnection between ecological reality and that of an imposed economic system. According to this theory, the degradation of agricultural lands, the exploitation of resources such as phosphorous and other micronutrients occurs precisely because we are alienated from the land.

We are also disconnected from our food in a profoundly social way. Individually, we do not have a relationship with our food, or the farmers that produce it. When food is a commodity, something to be bought and sold, it loses the properties that build strong communities (Kingsolver, 2008; Pollen, 2006; Schlosser, 2005). The average American spends 33 minutes preparing, serving, and cleaning-up for all meals during the day, and then only 20 minutes enjoying each meal (Hamrick et al., 2011). In these timeframes, the types of food that can be prepared are limited, as is the time to connect with family, to build relationships, and to engage in cultural traditions.

Food citizenship argues for the transformation of consumers into 'food participants' or citizens of the food system, where individuals participate in the creation of "democratic, social and environmentally sustainable food systems" (Wilkins, 2005). This implies both

obligations and rights. Citizens have a right to nutritious, culturally appropriate, and healthy food, but this can only come about through the development and support of food systems that are ecologically, socially and economically sustainable.

Urban agriculture is helping people connect not only to their food, but also to their communities. For example, through the work of the University of British Columbia and the Vancouver School Board, students are having the opportunity to move their classroom outside, as undergraduate and graduate students explore ideas of sustainability and food production with elementary and secondary school students (Rojas et al., 2011). These students are seeing their relationship with food differently, gathering knowledge and skills necessary to be a food citizen. In Berkeley public schools, food procurement policy and a strong curriculum component helps to bring healthy food to the community, while at the same time individuals can build knowledge around the food system and its operations. Students and families alike are able to identify and prepare healthy food (Rauzon et al., 2007). Armed with knowledge and experience, passive consumers are transformed into food citizens. Urban agriculture helps to build that opportunity through knowledge acquisition and community development.

Urban agriculture and farming can transform the communities in which they are located. Patricia Hynes (1996) details American community gardens and farms, exploring the role of the garden in transforming often-unsafe spaces into vibrant community centers. Gardens become places of intergenerational and cross-cultural sharing and learning, allowing individuals to embrace their food culture and explore their personal understanding of food with others. Communities congregate around gardens, reducing vandalism and property

maintenance costs. In addition, vacancy rates decrease as people choose to stay in the neighbourhood longer. Fewer social problems arise because people know each other and seem to be able to resolve conflicts more easily (Baker, 2004, p. 322).

Gardens root individuals to place, helping people to recognize the inherent connection between our food and our environment. As a result, community members strive to keep their community gardens maintained, and as individuals gain respect for the space, crime decreases, and property values increase (Brown and Carter, 2003). By returning production to a community and giving them ownership over public space, individuals are able to determine for themselves their relationship to the land. Urban agriculture empowers individuals to be both good food citizens and citizens in general.

URBAN AGRICULTURE AS A SOLUTION

Though the problems of our centralized and industrial food system are many, it also offers benefits. Industrialization allows millions to pursue endeavours off of the farm. The United States and Canada feed much of the world, a direct result of industrialization and supporting policies and programs. Urban agriculture is not meant to supplant the current food system, but rather to add to it in the places where it has failed. For some problems, urban agriculture can be a solution, but for others, additional solutions must be developed and adopted.

Already, entrepreneurs, customers, and neighbours are looking towards urban agriculture as a way of addressing the problems in our food system. On rooftops and on underutilized properties, citizens are growing food for sale and making a living. Lufa Farms in Montreal uses hydroponic technologies to grow on top of large buildings, making use of heat

inefficiencies in buildings, all while lowering the building's energy footprint (Rifkin, 2011). In Chicago and Milwaukee, Growing Power provides locally grown food, job opportunities, training, and a connection with the land and soil (Growing Power, 2012). In addition to produce sales, urban farms are looking to monetize the full suite of services they provide. Grants and public support for land tenure are helping to make that happen. As urban agriculture projects grow in scope and size, more research is needed to show how they address critical failures in our food system. To duplicate and expand these programs, research must outline and detail specific methods of providing fresh, healthy foods to families and how these programs address issues of sustainability and food citizenship.

5. CASE SELECTION: METRO VANCOUVER

Metro Vancouver, Canada is one place where urban agriculture has been growing steadily. The region has mild climate with an average temperature of 11°C and a 220 day growing season most suitable for cool season crops. This is the longest growing season in Canada (Whiting and Lai, 2008). Metro Vancouver is situated in southwest British Columbia and is comprised of 24 local authorities. This study focuses on urban farms located in three continuous Metro Vancouver municipalities: City of Vancouver (population 603,502), City of Richmond (population 190,473), and City of North Vancouver (population 48,196)



Photo 5: Map of the City of Vancouver (1), the City of Richmond (2), and the City of North Vancouver. (Source: Metro Vancouver)

(Statistics Canada, 2011b).

AGRICULTURAL ACTIVITY AND AWARENESS IN METRO VANCOUVER

In the 1880s, as demands for immigrant labour increased as a result of mining activities and the building of the railroads, Chinese labourers began to farm in the lower mainland. As their small market gardens expanded, they became a significant source of produce for the region, providing and distributing 90% of the province's vegetables and 55% of the potatoes by 1921 (Anderson, 1991). Today's urban farmers largely utilize the business strategies of the Chinese market gardeners at the turn of the century: grow labour intensive vegetables and develop community relationships to ensure a ready demand for the product. Chinese farmers, distributors and retailers are a critical, yet underreported piece of the local food movement due to language barriers and ethnic segregation that insulates the community (Gibb, 2011).

In the 1970s, concern over increasing urban sprawl led to the creation of the Agricultural Land Reserve (ALR). Administered by the independent Agricultural Land Commission, the reserve is a response to provincial-wide concern over the loss of agricultural lands to urban sprawl. The ALR sequesters land to be held in trust solely for agriculture (Provincial Agricultural Land Commission, 2002). The reserve holds 4.7 million hectares of agricultural land and has not substantively changed in size since its inception almost 40 years ago (Mendes et al., 2008). However, urban pressure has changed the distribution of lands in the reserve to more rural areas and away from urban centers.

In 2007, City Farm Boy began operation in Vancouver. Ward Teulon, owner and operator,

began farming a number of backyards, selling his produce through a community supported agriculture (CSA) model to customers in the neighbourhood. Teulon was the first of a number of urban farmers who began their operations in the past five years. At the University of British Columbia, the historic UBC Farm was threatened with development. In 2008, thousands of students, alumni, and community members came together to advocate for the protection of the farm (Personal interview, Andrew Rushmere, November 8, 2010). Begun in 1915, and one of the most successful university farms in North America, the farm is a hub for urban agriculture. It is a resource for farmers across Metro Vancouver and was the venue for training many of Vancouver's urban farmers.

Vancouver's urban farmers and advocates joined together as the Urban Farming Network Society in November 2010. The network was conceived as a hub where farmers, customers, policy makers, and entrepreneurs could learn to act as allies for one another. The organization was formalized as a society in 2012. To date the Urban Farming Network boasts over 30 members, including 15 urban farmers, along with consumers and policy makers.

METRO VANCOUVER FOOD POLICIES AND PLANS

While urban farming businesses have begun to grow food, municipalities are building a framework for urban agriculture through the Metro Vancouver Regional Food System Strategy. Through the document, Metro Vancouver municipalities are committed to the following objectives:

1. Increase the capacity to produce food close to home.

2. Improve the financial viability of the food sector.
3. Encourage people to make healthy and sustainable food choices.
4. Enable access to healthy, culturally diverse and affordable food.
5. Build a food system consistent with ecological health.

The role of the regional authority is largely to offer a framework around these goals to “enable collaboration among different agencies and groups to shape the regional food system” (Metro Vancouver 2011).

Municipalities are implementing specific policies related to urban agriculture. They do this through zoning and land use by-laws that specify how property can be used for food production, processing, distribution, and waste management. In addition, they are building municipal infrastructure, such as parkland or community centers that host urban agriculture projects. New community plans incorporate urban agriculture, and many cities are looking to host urban agriculture on municipal land (Metro Vancouver, 2011).

Over the past decade, the City of Vancouver has increasingly become involved in food systems planning. In 2003, City council adopted an official mandate to create a “just and sustainable food system,” leading to the creation of Vancouver Food Policy Council supported by city staff (Mendes, 2008; Fodor, 2011). In 2007, the City built upon previous work with the creation of the Vancouver Food Charter, which facilitates the development of a coordinated municipal food policy.

Since 2009, the City of Vancouver has been moving forward on a new sustainability plan: to make Vancouver the greenest city by 2020. In the Greenest City Action Plan, the City has

dedicated itself to increasing the impact of urban agriculture through the development of new community gardens and urban farms (The City of Vancouver, 2012). The City has developed an urban farming technical team, tasked with developing new policies to support growing and selling food within city limits.

A number of recent studies have focused on the role of urban agriculture in Vancouver. Fodor (2011) argues that community centered food assets are successful ways to address issues of food security, while providing space for community engagement and cultural exploration through food. Seto (2011) identified that outreach and support is necessary to utilize urban agriculture as a means of community development. This thesis explores the role of urban farming in the context of recent work in Vancouver.

Richmond, situated just south of Vancouver, is host to a number of peri-urban farms and holds a large portion of region's Agricultural Land Reserve. The City commissioned a report on urban agriculture as the first step in developing specific policy initiatives around urban agriculture (The City of Richmond, 2011). As a part of the City's commitment to developing agricultural initiatives, the City sponsored an Incubator Farm Plot project began in 2011, providing land for new farmers to develop their own business. In addition, the City of Richmond supports Kwantlen University's Farm School and the training of new farmers. As the City of Richmond continues to develop its urban agriculture portfolio, this research will allow it to better understand how urban farms help address the goals of Metro Vancouver's Regional Food Strategy.

The City of North Vancouver has begun to formally support urban agriculture projects. The City's policies, reflected in a resolution passed by Council, supports food production on

municipally owned land; ensures urban agriculture is a priority, even as density increases; and supports non-profit organizations that focus on developing food security (City of North Vancouver, 2011). A key part of its strategy is supporting Loutet Park Urban Farm on municipal land. Loutet Park Urban Farm is an attempt by the City and urban farmers to independently assess the financial viability of such urban farms.

As Metro Vancouver municipalities address issues of sustainability, data regarding urban farming and urban agriculture will be critical for understand the impacts of these policies and initiatives.

6. METHODOLOGY

To ensure that local governments and entrepreneurs are central to this work, I applied a framework of Community Based Action Research (CBAR) throughout the course of this research. CBAR is “a systematic approach to investigation that enables people to find effective solutions to problems they confront in their everyday lives” (Stringer, 2007).

Researchers give up authority to decide what should be researched and how it should be researched. Instead, they work as facilitators and connectors, working with stakeholders to achieve a shared set of goals.

In the process of defining and learning about Metro Vancouver’s urban agriculture, I met with all of the recognized urban farmers in the city. In preliminary conversations with farmers and the Urban Farmer’s Network, it was suggested that it would be possible to collect data from the entire sector through this research. As a community, it was decided that this project would take the form of a census, surveying urban farms in the Cities of Vancouver, Richmond and the North Vancouver, aggregating information about the models, revenues and costs of these urban farming businesses.

RESEARCH QUESTIONS

In collaboration with researchers, government officials, and farmers, the following research questions were devised:

1. Are Metro Vancouver’s urban farms financially viable? Specifically,
 - a. What are the business models that are most often used?
 - b. Which of Metro Vancouver’s urban farm models generate the largest returns?

- c. What are the major costs and revenue streams of urban farmers?
 - d. What are the relevant municipal policies and programs that apply to urban farmers?
- 2. How do urban farms in Metro Vancouver contribute to the community? Specifically,
 - a. How do farmers see their contribution to society and their role in environmental stewardship?
 - b. Who are urban farmers and what are their characteristics?

THE URBAN FARMING CENSUS

SEMI-STRUCTURED INTERVIEW CREATION

To answer the research questions, a census was developed comprised of a semi-structured personal interview. The interview script was developed in partnership with the Urban Farming Network Society and informed by the goals and indicators of Metro Vancouver's Regional Food System Strategy and the City of Vancouver's Greenest City Action Plan. In the census, questions were either closed-ended or open-ended. Closed-ended questions are typically quantitative in nature (e.g., "how much?" or "how many?") and aimed to delineate the financial status of the organization. Open-ended questions are typically qualitative, and were designed to elucidate business structures, aspirations, organizational goals, and reasons farmers became involved in this work. Questions were asked multiple times to ensure validity and an adequate response rate. The mixed methods approach allowed a formal structure to capture quantitative data points on finances, while creating opportunity for probing more deeply into urban farm business structures and operations.

Draft census questions were compared and aligned with the current agricultural census in Canada and the United States, paying particular attention to questions regarding small farms. These censuses served as a structured basis for the types of questions used in this research. Validity and appropriateness of the questionnaire were determined by congruence with agricultural censuses as well as by experts with Metro Vancouver and the Urban Farming Network Society. Final versions were tested with urban farmers to ensure comprehension and community support.

PARTICIPANTS

Research participants were selected based on five criteria: 1) they grow and sell fresh foods; 2) they self-identify as producing most of their crops in urban areas; 3) they grow on a series of small land parcels (i.e., < 2 acres); 4) the land used was converted to agricultural use from residential, commercial, industrial, or park land; and 5) they identify as an entrepreneurial urban farming venture (Stolhandske, 2011). Both for-profit and non-profit operations were included in the census target population.

Census participants were engaged in a number of ways. Introductory emails and follow-up phone calls were made to introduce this research and the census. Via various means, I identified Metro Vancouver's urban farmers. I introduced myself to them at various events or through the Urban Farming Network Society. I would volunteer with urban farms. Through those engagements I was able to formally aggregate the most complete list of urban farms to date. In 2010, eight of nine identified farms participated in the study (n=8). In 2011, three additional organizations were identified. Of these, one farm failed to meet the

criteria established, and a second farm was unable to participate in the project during the second year. As a result, in 2011, ten farms participated in the census (n=10).

To protect identities, all data were stripped of identifying information; a number identifies each farm. Despite these efforts, small pieces of information still make it possible for many of the urban farmers to recognize their peers. This was reviewed by the urban farmers and found to be acceptable. Ensuring that people outside of the community would not be able to recognize the particular organizations was the objective of keeping identities private.

SURVEY EXECUTION

Every farmer was formally interviewed. Interviews were completed in spaces designated by the farmer. Often this would be in the farmer's home or in a quiet coffee shop. Interviews began with a description of the project and my own personal history, where I would explain the importance I placed on economic, social and environmental sustainability. This interaction often sparked conversation and storytelling, with farmers sharing experiences or feelings. I then began formal questioning. Interviews were audio recorded. I took notes to highlight points of interest. Additionally, I spoke with farmers during tours, farm work, or coffee meetings about concerns regarding their farm and sales. During these events, I took notes afterward.

Formal interviews lasted two to three hours. Often, follow up interviews and observations of the organization's sales and other business operations were made. During the course of normal business, I observed farmers interacting with stakeholders: customers, landowners, etc. All business records, enterprise budgets, and accounting data were freely shared with

me.

Interview records and notes were transcribed soon after the engagement, typically the same day. After verification by the farmers, all financial data were entered into a spreadsheet for analysis.

LIMITATIONS

Gathering financial data from subject organizations was not simple. Records were often lost, if kept at all. Few subject farmers kept their own records in the first year of the census. As we worked together, many of the urban farmers developed new record keeping systems, thereby increasing the reliability of the data. However, it was clear that the values reported were based on the personal recollections of the urban farmers.

To ensure that my relationships with urban farmers would not bias my findings, I endeavoured to create a research methodology that minimized any personal influence on the character of the data. The financial health of the organizations is a standard quantitative analysis, and thus less prone to bias. It is aggregated and reported in a standard fashion. I duplicated questions and observed the urban farms during their daily operations to corroborate interview data. These internal validation techniques helped to minimize researcher bias.

METHODS: RESEARCHER AS PARTICIPANT

I believe the work of the university and of graduate students is to connect with the communities of which they are a part. Just as the Nature-Study movement concerns itself

with the connection of education to the “objects and events with which [we] live,” CBAR is also concerned with connecting research to reality (Bailey, 1903). The work of a CBAR researcher should be:

“A participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview. It seeks to reconnect action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people. More generally it grows out of a concern for the flourishing of individual persons and their communities” (Reason and Bradbury, 2001, p.1)

Embodied in my research process was a belief that my own work would support the work of urban farmers. I would not be an outside researcher, but an informed participant. Farmers needed to understand that my interest in urban farming was to support the initiatives of farmers, not to gather data solely for personal use and gain. Building relationships with urban farmers was critical to building trust within the community. To that end, I broke bread and shared the bounty of my own garden with every research participant. As farmers would share with me, I would share with them, building a community around a shared goal to understand Metro Vancouver’s urban farming sector. I worked in the fields with subject farmers, taking on hard tasks, and helping them with the difficult work they do. During interviews, farmers would also interview me, to better understand their sector and to see how their business compared to others. I became a consultant to all of the farmers, helping evaluate farm operations. Though urban farmers often work together, it was difficult to do so during the busy spring and summer farming season. I was one of the few individuals to work on every farm and see the production, harvests, and sales of every organization. I was able to benchmark the processes used on each farm and to help farmers address such issues as: irrigation, quality, and sales.

By working alongside farmers, I helped bridge the gap between academic research and

community development. The farmers of this community became my friends and colleagues. We have built what Rojas (2009) calls a ‘community of learners’, where experts and professionals in various fields work together to understand a particular topic. In the context of this work, this approach allowed each actor, with his or her particular perspective, to add to a more full understanding of urban farming in Metro Vancouver. The farmers understood their businesses and business needs; the investigator had a background in finance and political science; the City understood the regulatory environment. These relationships were critical to the gathering of appropriate data and viewpoints that impacted this community of learners.

Connecting these varied viewpoints required relationship building. It was not enough to share a document or a phone call. By working in the fields with farmers I became a part of the farming community. I am a researcher as well as a participant. In the course of completing this work, I was heavily involved with four of subject urban agriculture organizations. This unique perspective allowed me to understand the trials and tribulations of participants and to truly empathize with the challenges to urban farming. I volunteered on executive boards and worked as a farm hand. I was thus able to see urban farming from both a management and labour perspective, giving me a fuller view of these operations. Without developing these personal relationships, it would not have been possible to so completely be involved in all aspects of Metro Vancouver’s urban farming sector.

By participating with the urban farmers, I could empathize with farmers and policy officials as they developed regulations around this ‘new’ business. This empathy helped me to more clearly understand the data that I collected, placing it in context of the work of the urban

farming community. As a researcher and participant, I was not only able to gather sensitive financial data, but I was also able to understand how farmers saw their role in their communities. It also helped me to gather information that did not routinely come forth in the interview process. In small conversations, texts, and emails, farmers shared details of their operations to help me better understand their business and work. Many of these types of conversations informed this report.

This work represents the first snapshot of the financial health of urban farms in Vancouver. My personal involvement with each farm informed and characterized the nature of this work. Without the close relationships and ability to empathize with urban farmers, the information received from the organizations would not be as complete. This work will be more useful to practitioners and policy officials because of that detail.

My bias towards the success of urban farms helped ensure that the data reflects the financial realities of the urban farmers. Without a critical analysis of the financial viability of urban farms it is not possible to build stronger and more successful businesses. Below is a timeline of my formal involvement with various urban farming organizations. Not included are informal meetings with various policy officials and events related to urban farming.

Farm Relationships	Policy Relationships
--------------------	----------------------



7. RESULTS AND DISCUSSION



Photo 5, 6, 7, 8, 10: A selection of urban farms in Vancouver. Clockwise from top right: sunflower sprouts; a weekly produce share; transformation of a residential yard; bicycle deliveries; raised beds on a parking lot.

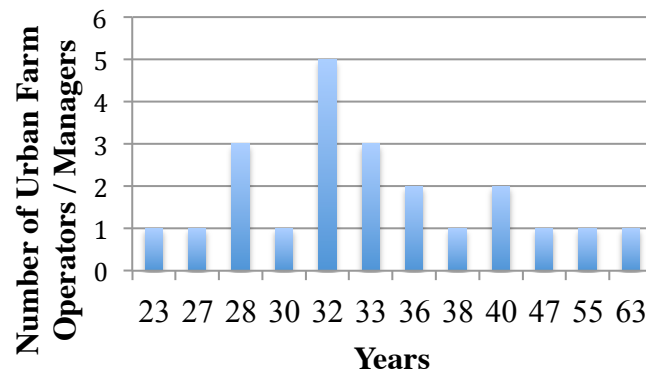
GENERAL FARM CHARACTERISTICS AND DEMOGRAPHICS

In 2010, eight farms participated in the urban farming census. In 2011, ten farms participated. Through various enterprise models (i.e., sole proprietorships, projects of charities, corporation, etc.; Table 2), they each were committed to the production and sale of produce

All enterprises were new, having begun operations within past five years. In 2010, 2.31 urban acres were under cultivation, increasing to 4.19 acres in 2011.

In 2010, 17 individuals constituted the management teams for eight urban farms in the study area. In 2011, 22 farmers managed ten farms. These owners/managers directed the activities of the business, often working in tandem with advisors or a board of directors (in the case of a non-profit). These farmers were involved in all aspects of the business: operations, sales,

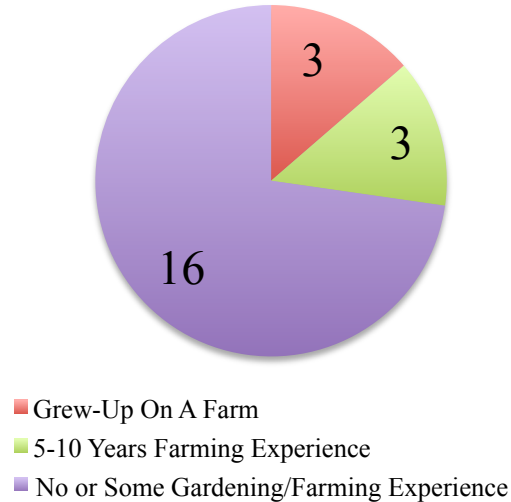
Figure 7: Age of Urban Farmer Owners/Managers



business development. The median age of owners/managers was 33 years (in 2011); only four farmers were 40 years or older (Fig. 7).

Of the 22 farmers, ten were female and 12 were male. Though many urban farmers have experience in recreational gardening, few came to farming with experience in entrepreneurial farming. Just less than three quarters of urban farmers (17) reported having ‘little to no experience farming/gardening prior to urban farming’ (Fig. 8).

Figure 8: Experience of Urban Famers Prior to Urban Farming



In 2010, surveyed urban farms employed 17 individuals working as farm hands or owners/managers; in 2011, 30 people were employed. Farm hands primarily worked under the direction of an owner or manager and were not part of business development or strategic planning. On average, urban farm owners/managers and employees reported working just over 60 hours a week during the peak season (March through September). However, during the interviews, farmers said that they under-reported their hours as they remembered other activities including sales calls or other administrative tasks. Paid employees often worked more hours than their contracts specified. In other words, labour was often an in-kind donation to the farm.

The University of British Columbia plays a significant role for urban famers.

Owners/Managers are often alumni or current students (31%) and regular visitors to UBC Farm (30%). Several faculty members in the Faculty of Land and Food Systems serve as informal advisors to urban farmers. There are a large number of young, female student interns, as well as a few older interns. One urban farm hosted older individuals looking to

gain new skills after retiring from their professional careers.

KNOWLEDGE, ATTITUDES, AND PERCEPTIONS

Vancouver's urban farmers are passionate about what they do and about their community.

They support each other through monthly potlucks and regular communication via text messaging, email, and social media. They also freely offered help in providing produce to other farms that suffered crop failure or other difficulties.

Though many people came to this work for different reasons, there are two clear themes for becoming an urban farm: 1) lifestyle, and 2) a desire to connect with the environment.

Farmer 8 explained what they enjoy about the urban farming lifestyle:

“I’m here playing with my son, and then I do some weeding. Then my partner comes home – I might do some cooking, and then I’ll work on the tomatoes for 15 minutes. After dinner I might go for a walk, say hello to one of my landowners and do another 20 minutes in the garden just farting around.”

Part of the lifestyle relates to the tangible work that urban farmers do. Many came to urban farming after pursuing other careers, as Farmer 1 related:

“I am a schoolteacher by training. In my job I was teaching about world trade, agriculture, and the intersection between the two. I didn’t feel that I had the skills or credentials to be teaching these things. I knew it at this academic level, but I couldn’t see it in my own life; it was an abstraction. I would teach these things that were so far from my own life.”

Despite the difficulties of starting a new business and financially supporting themselves, participants are generally satisfied with their work. Farmers indicated that they are intellectually challenged by tasks such as identifying the source of crop damage or increasing yields without synthetic chemicals. At the same time they like the sociability of gardening in a community and sharing their harvests with customers. Farmer 11 explained:

“I mean what’s not to love, I go to the farmer’s market and share my [harvest]. People come over to me, they give me money, and then they tell me how wonderful I am and how wonderful my product is.”

Many urban farmers feel a deep emotional connection to their work. It's not just about a job, but rather it is a way of life. As Farmer 1 stated:

"I never wanted to have a 'job.' I've wanted to just live my life. Farming was and is a way to integrate my values, my passions, and my love for the earth. I work in community with people and together we have a clear impact on our world. It is a really rooted and integrated way of living."

Many farmers are concerned with society's relationship with the environment. As Farmer 2 stated,

"We live in uncertain times. I have two children...and my base instinct is to feed my family. I needed to be able to support myself."

Other farmers feel a deep environmental connection. Farmer 9 says,

"I farm because there is no other option. The way that our society takes from the environment is not sustainable, farming gives me a way to nurture the soil and the Earth."

Many feel that they are "contributing to a just and sustainable food system," at the same time that they are able to provide for their own needs.

BUSINESS STRUCTURE

Urban farms may operate as sole proprietorships, corporations, or non-profits, however many do not have a formal legal structure. Participant farms utilized informal organizational structures because of the small scale of their operations and the lack of clear regulatory environment.

Urban farms are small. The mean area occupied by participant urban farms was .33 acres. In 2011, six of ten farms were smaller than 1/3 of an acre in total. They are run by one or two individuals and supported by volunteer labour. They sell to a small number of customers who are friends or part of the farmer's social network. The small scale of the business lends itself to a level of informality. As Farmer 2 stated:

“You know, we really just got into this to see if we could do it. In the end, it just really paid for itself, I got to eat these fantastic vegetables and shared them with my friends and family. They’re almost bigger advocates of this kind of thing than I am.”

These farmers conducted their work in small spaces amongst friends: a neighbourhood activity.

Those that had a legal entity operated under the municipal radar as sole proprietorships or corporations without a business license:

“Last year, I had a sole proprietorship under my landscaping business license. This year I didn’t get a business license because I wasn’t landscaping; it just wasn’t valid for what I was doing and there was no option to get one that did.”

Some farmers contracted administrative activities to other organizations, allowing focus on their primary interests: growing and selling produce. Another farmer stated,

“We used to talk about this stuff [business licenses] but we stopped worrying about it because nothing really happened.”

All urban farms operate seasonally and only reach peak activity starting around June and lasting until September. The seasonal nature of the work reduces the presence of urban farmers during the winter season as employees and owners engage in other activities. The transient nature of this industry combined with a lack of legal structure led many farmers to adopt informal business practices.

Four farms had a corporate structure that enabled them to explore unique partnerships with both investors and granting agencies. This model required more transparency, as records were public and accounting protocols more clearly established. The formality (and cost) of establishing a corporate board, non-profit or other, increases legitimacy and helps a farm signal their dedication to urban farming over the long term.

Farming as a non-profit society has been a successful strategy for several urban farms in this

study. Exclusive opportunities were available to non-profit urban farms including grant financing and production on institutional land. Farmer 10 stated,

“We’re looking to become a non-profit next year because we want to be growing on larger institutional space and they will not work with us if we are not a society.”

Successful non-profit organizations must develop clear mission statements and an organizational structure able to receive grants and other public support. One organization in this study was dedicated to providing jobs to people with barriers to employment, empowering their employees to build a stable life around agriculture. Another farm provided food to the food bank. One farm used market gardens as outdoor classrooms, facilitating teachers connecting students to traditional curricula through new pedagogies in the garden. These urban farms are committed to their work and supporting their communities.

Table 2: Non-Profit vs. For-Profit Urban Farms in 2011

	Acres	Food Revenue	Food Revenue / Acre	Number of Farms	Crop Sales of top producer
Non-Profit	2.11	\$91,462.81	\$43,275.81	Four	\$ 60,000
For-Profit	2.13	\$86,703.06	\$40,796.21	Six	\$ 23,603

Despite the advantages conferred to non-profit urban farms, they are largely generating similar revenue per acre (Table 2). However, on a similar land base, the top producing non-profit farm is generating much more food product revenue. Non-Profit farms are leveraging their ability to receive grants and tenure on public land. They then invest that capital in people and systems to grow and distribute more produce. Participant for-profit farms lacked the organizational capacity and capital to grow as quickly as their non-profit counterparts.

Many urban farmers were evaluating the strategic benefits of non-profit status. The

incentives for becoming a non-profit can be quite substantial. Non-profit organizations built farms on public land in partnership with city governments, the regional health authority, and other institutions, financing their project through grants and donations. Though for-profit organizations may be able to take advantage of these programs over time, it is currently more difficult. Public financing for new for-profit farms is not likely, despite the significant interest in urban food production. Non-profit farms leverage public support to secure grants and investments to build on public land. Municipal governments, the regional health authority, and public landowners have indicated their interest in working with non-profit urban farms.

FARMING OPERATIONS

Regardless of the mission and focus of the particular urban farm, all grow and sell produce. Urban farming is predicated on three sequential operational stages: production, processing, and distribution. Production refers to the actual growing of vegetables. Processing refers to harvesting, sorting, packaging, and any secondary value-added treatments (e.g., canning). Distribution refers to the ways in which urban farmers sell and deliver those products. All three steps in this chain must be developed for urban farmers to be successful.

PRODUCTION

All the urban farmers surveyed were growing crops in soil using organic methods. As such it was necessary to ensure high soil fertility levels and that the land is well prepared for crop cultivation. This requires an initial investment, as the land is usually not ready for agricultural use. Urban farmers generally must remove sod or remove landscaping. To

prepare the land, soil was brought in and/or farmers would use a less expensive overwintering composting method referred to as lasagne gardening (Photo 10, 11). Farmers indicated that new sites were often acquired just in time for the growing season, forcing them to purchase compost or topsoil to prepare the beds. This is often a large expense for urban farms, though mainly in the form of labour.



Photo 11, 12: (Left) Urban Farmers and interns begin the process of killing the grass to develop beds later in the season. Layers of food scraps and carbon rich sources such as newspaper and sawdust will follow. Many farmers prefer to lay cardboard during the fall and winter season, allowing the materials to compost and nutrients to mineralize for plant uptake. (Right) Raised beds allow drainage on this poorly drained site. This is a clear example of a well-landscaped farm in the back of this residential property.

As Farmer 6 says,

“You know the first year, you’re removing turf, you’re adding mushroom manure, you’re tilling, you’re doing all this work that’s really time consuming and the inputs are expensive.”

Many farmers utilize crop rotations that include cover cropping with nitrogen fixing legumes as a means of reducing the cost of soil amendments and reducing dependency on imported nutrients. However, for farmers growing intensively in containers without crop rotations, these nutrients must be added during crop production. As Farmer 7 says,

“We’ve really gone to town on those soils and have needed to bring in nutrients: blood meal, feather meal, alfalfa pellets, worm castings.”

Soil nutrition is a critical part of production. Farmer 10 paraphrased Will Allen of Growing Power in the United States,

“We’re not growing vegetables, we’re growing soil. Give me good soil and I can do anything, but I need rich soil.”

All surveyed farmers use organic growing techniques. No synthetic fertilizers are used on any of the urban farms in this study. However, none of the farms surveyed were certified organic due to the difficulties and costs of the certification process. As Farmer 8 said,

“My customers know how I grow, I don’t need to have a third party come in to say the same things that my customers see everyday.”

SEED AND PLANTS

Plants are often started from seed, which forms the next critical part of production. Seeds are largely purchased or donated from West Coast Seeds (Delta, British Columbia, Canada) and Johnny’s Selected Seeds (Waterville, Maine, United States) because of West Coast Seeds’ proximity to the region and Johnny Selected Seeds’ wide variety and high quality. However, a number of farms are attempting to save seed or source them from other local farmers.

Farmers often start seedlings in makeshift greenhouses or other temporary facilities:

“You should see my bedroom right now,” one urban farmer reported, “I have grow lamps and plastic covering everything, tomatoes, cucumbers... everything. I’m just ready for the police to barge in at anytime looking for marijuana, I’ll hand them a cucumber.”

Farmers indicated that a professional greenhouse space might be a better alternative.

CROP PLANNING

Though many farmers had a detailed production plan, it was clear that changes in weather, consumer preferences, irrigation, difficulties with homeowners, and other barriers forced farmers to change their plans. Farmers reported learning to be responsive to unanticipated

circumstances necessitating a change in production plans. Farmer Six explained:

“We’re pretty observant with that sort of stuff... oh we have too much of that, or oh, we don’t have enough of that. Last year we had too much Swiss chard.... And we adapted, and this year, I think oh man, we don’t have enough Swiss chard, but then we harvest it and I think, man we have too much Swiss chard. I think we should plant another bed of Swiss chard. And then it bolts... it was just horrible to watch that chard.”

As farmers gain confidence in their production skills, their plans can be more dynamic and account for unforeseen problems. Despite the growth of these businesses, crop failure is a perennial concern. Farmer 7 explained,

“We had 3 spinach crops fail, a strawberry crop failure, and then our tomatoes got some disease and our peppers got white fly. (Whitefly [*Trialeurodes vaporariorum*] is an agricultural pest that causes direct and indirect crop loss through feeding or through the transmission of disease.)”

Though urban farmers experience set backs, they are growing food more successfully every year. In conversations with farmers, I estimate they grow at least two to three times as much food as they sell. Production is not the bottleneck, processing and distribution is.

PROCESSING

Processing is often completed on the farm site and without much infrastructure. Typically, after the harvest, garden hoses supply potable water for water baths where farmers clean and prepare the vegetables for market. In 2010, only one farm used refrigeration while in 2011, two farms did so. Without the ability to process vegetables for sale, urban farmers choose to sell fresh produce. In addition, regulation of processed vegetables differs from sales of direct produce. Farmer 2 explained how the regulations are unclear:

“Let’s take jams, for instance, the rules say that you don’t actually have to make them in a food safe kitchen, but you do have to do a pH test. The rules do not stipulate if we have to outsource the test.... We’re just going to do proper due diligence for a few items that we might actually want to have in retail stores and leave it at that.”

In regard to regulation and operations, fresh produce is much simpler for small organizations

to produce and sell. There is a lot of interest in developing value-added products, not only because they have a higher profit margin, but also because, as Farmer 2 continues,

“There’s no waste. It is really stressful when there is waste. I feel a deep personal responsibility for the food that I grow. It cannot go to waste and processing allows that to happen.”

Until farmers are able to adopt food processing regulations, or the regulations change, processing will remain out of reach for many urban farms.

DISTRIBUTION




















































Once the produce is grown and processed, it is ready for distribution. Often this involves customers coming to a location to pick up pre-paid vegetables in the form of a CSA, or at a farmer’s market. Some farms will deliver to restaurants, and in a few cases, farmers sell to retail stores. Farms use a wide variety of marketing channels to move produce to consumers (see ‘Food Revenue’ for details).

LAND TYPE

Metro Vancouver’s urban farms are a reflection of the type of land on which they farm. The zoning and land tenure the farm holds will determine the character of the farm. None of the farms interviewed in 2011, own title to the land on which they farm. Table 3 highlights the differences in type of farmland and briefly looks at farm operations.

Real estate in Metro Vancouver is extremely expensive. As a result, urban farmers are constantly looking for innovative solutions to provide free land tenure. Largely, urban farmers have entered into three types of land tenure relationships: institutional sites, residential, and private donation.

Table 3: A Snapshot of Vancouver's Urban Farms as of 2011

	Land Tenure	Zoning and Land Type	Land (sq ft)	Revenue Streams	Management, Staff, Volunteers	Weekly Hours	
						Employees / Owners	Volunteers
Farm 1 <i>Est. 2002</i>	Institutional Lease	RA	34138	Markets, Grants	     	125	60
Farm 2 <i>Est. 2011</i>	Residential	RS – Unused Lawn	33054	Markets	  x Many	70	20
Farm 3 <i>Est. 2011</i>	Residential	RS – Unused Lawn; RA	23151	CSA, Markets	 	60	0
Farm 4 <i>Est. 2011</i>	Institutional Lease	P - Parkland	22140	Markets, Grants	      x Many	40	30
Farm 5 <i>Est. 2009</i>	Institutional Lease	RT - Unused Lawn	21780	CSA	        x Many	312	50
Farm 6 <i>Est. 2010</i>	Residential	RS – Unused Lawn	14520	CSA	   	160	0
Farm 7 <i>Est. 2010</i>	Privately Donated	M1 - Parking Lot	14005	Markets, Restaurants, Grants	     	142	0
Farm 8* <i>Est. 2006</i>	Residential, Rooftops	RS – Unused Lawn	9100	CSA, Markets, Other	 	48	0
Farm 9 <i>Est. 2011</i>	Residential	RS - Unused Lawn	5470	CSA, Markets	 	160	6
Farm 10 <i>Est. 2009</i>	Residential	RS – Unused Lawn	3330	CSA, Markets	     x Many	80	115
Farm 11 <i>Est. 2009</i>	Privately Donated	CD1 - Unused Lawn	2151	Markets, Restaurants, Retail	    	100	0
Farm 12* <i>Est. 2010</i>	Owned	RA	1800	Camps, CSA, Markets	  x 15 Part Time  x Many	80	95
		Average Size of Farm	15386		2011 Total Urban Farmers: 22 Owners/Managers; 26 Farm Hand/Employees	63 average weekly hours	376 weekly hours



= One Non-Profit Board



= One Owner/Manager



= One Farm Hand / Employee



= One Consistent Volunteer

Total Land Farmed:
2010: 2.31 Acres
2011: 4.19 Acres

RA: Agricultural; RT: Two Family Dwelling Districts; RS: One Family Dwelling District; M1: Industrial District; CD1: Comprehensive Development District; P: Parkland

* - Data for this farm is the year 2010

- **Retail:** Produce sold to retail locations.
- **Camps:** Farms host children's programming during the summer.
- **Restaurants:** Produce sold to local restaurants.
- **Construction:** Gardens are built for clients.
- **Markets:** Produce sold at Farmers' or Pocket Markets.
- **CSA:** Customers pay up front fee for weekly boxes of produce through the season.

INSTITUTIONAL SITES

Institutional sites are public spaces owned by the government or other large public institutions and leased or licensed to urban farmers for a nominal fee. Three farms (1, 4, and 5) surveyed operate on this type of land. Institutional land space is often desirable as municipalities and other public institutions own many large urban lots. Larger continuous land parcels are often best for farming, thus making institutional relationships promising for urban farms. Currently, institutions, particularly governments, require farmers to partner with or be non-profit organizations, providing opportunities for community engagement and development. However, specific terms of programming are not usually specified. According to census respondents, this arrangement is largely to avoid criticism surrounding the ceding of public resources for private enterprise.

The relationships between institutional land owners and farms were quite informal, as Farm 5 indicated, “We’ve really only had something formally in writing once. The rest of the time it has just been over email... no one really knows who can put the seal of approval on things like this.” Similarly Farm 10 described their relationship, “We don’t have any legal obligations to our [landowner], we are part of a team on this adventure. They have land and we can farm it.” Many farmers are still learning what sorts of relationships they need in order to be financially sustainable for both the farm and the institution.

Many institutions such as school boards and hospital systems are interested in bringing urban farmers onto their land to not only provide healthy, sustainably grown vegetables, but to also facilitate educational or therapeutic programming. One respondent farm worked closely with

the Vancouver Health Authority to provide horticulture therapy to residents at long-term care facilities. Another will be working with the Vancouver School Board to farm on secondary school land. The school will gain an outdoor classroom and training for teachers to utilize the space to deliver curricula. The farmer will gain a sizable space for crop production. At the time of this writing, these relationships are still in development. Parties are interested, but the institutions are unsure how to value and price the benefits of having an urban farm on site. Developing clarity around the value of these services will be critical to the financial viability of these operations.

RESIDENTIAL SITES

Residential sites are made available to urban farmers by homeowners. In return for land, water, and perhaps storage facilities, residents receive a well-tended vegetable garden as well as a weekly produce box, just as the farm's CSA members do. Farmers rarely solicit for land, as the demand for farming services is high. Farmers reported receiving frequent communiqués from residents offering their yards. Backyard farmers surveyed had an average of seven donated lots. They expect this number to grow in coming years as they develop larger markets and need more land to support operations. Farmers reported a desire for large, sunny, contiguous spaces close to other farm plots that have access to fresh, potable water.

As with institutions, relationships between farmers and homeowners were rarely formalized by a contract, though many urban farmers asked for a three-year commitment. These relationships were, as Farm 6 explained,

“more like partnerships. We really cannot afford to buy land, and to tell you the truth, we cannot afford to rent or lease it either. Our landowner relationships are something that we think quite critically about.”

However, farmers indicated that issues of insurance and the legality of selling vegetables were not formally addressed. All discussions with landowners remained informal.

The informality of these relationships speaks to the trust urban farmers have with their landlords. Landowners allow farmers to operate on a valuable piece of property without a formal contract or any formal obligations. Urban farmers minimize transaction costs of leasing land by developing relationships with landowners rather than legal contracts. Yet, despite this trust, there can be difficulties. In 2011, one farm was in danger of losing its most profitable and beautifully landscaped gardens because the home was being sold:

“This is really tough for us; we’ve put so much into this site and now it is growing beautifully. We really manage this site well... I guess we’ll need to figure it out.”

These urban farms exist solely as a result of homeowner interest. Farmers do not have control over the land; they are fortunate benefactors. Though mutualistic relationships are a valuable form of social capital, they do not necessarily lend themselves to long-term business development. Farmers are still learning how to navigate these relationships.

COMMERCIAL SITES

Privately owned commercial lands are made available by businesses. As with institutional land, these tend to be larger in size and more suitable for larger scale production and have space for storage or processing. Neither Farm 4 nor Farm 7 paid rent for their commercial sites. Benefits other than cash rents may accrue to the landowner however. For example, there may be an incentive if the land is reclassified as non-profit or recreational, which results in a property tax reduction. Non-profit Farm 7 ensured that its farms were able to be

reclassified as recreational. Tax benefits are the primary incentive for corporate land conversion, but positive media attention is another advantage for corporations who host farms. Finding ways to monetize these indirect benefits will be critical for urban farmers' success.

Regardless of the type of land ownership, no Metro Vancouver urban farmer surveyed paid for the land they farmed. Though this benefits the bottom line, urban farmers are without recourse in case of disagreement. Thus, landowners and farmers must trust each other for the successful operation of these entrepreneurial ventures. In the future, formal contracts will need to be developed as these operations expand, especially if they are on public land.

URBAN FARM REVENUE

Urban farm revenue can be categorized as food revenue, grant revenue, and other revenue. Food revenue includes the sale of produce, honey, flowers and processed foods. Grant revenue includes grants and donations. Other revenue includes consulting, educational program and other sources. Varied revenue streams are demonstrative of the multifunctional nature of urban farms. It was evident that urban farms did not just provide food.

In 2010, only two of the eight farms surveyed had operated for more than two years. Despite the newness of these organizations, urban farms generated \$400,000 in total gross revenue. Almost half was in the form of grants. Roughly a third of total gross revenue, \$130,000, was generated from produce sales. Grant money was used to build infrastructure on new farms and to hire and train new staff. In 2011, eleven farms brought in a total of \$400,000 in the form of grants, food and other revenue. Over the two years, 'other revenue' decreased as a source of revenue as urban farms focused on farming or moved out of the industry (Fig. 9).

Two farms (8 and 12) together generated over \$100,000 in total revenue in 2010, but they did not participate in the census in 2011. One significantly changed their business model, focusing on summer camps to the exclusion of growing and selling food, and the second farm was unable to complete the 2011 census.

Figure 9: 2010-2011 Total Urban Farming Revenue by Source

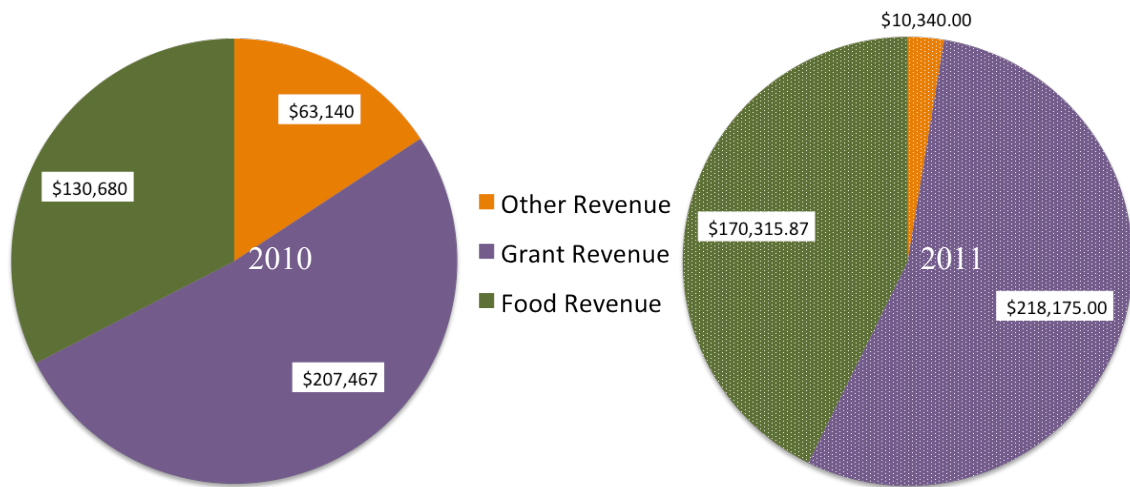


Figure 10: 2010-2011 Revenue of Farms > 25K

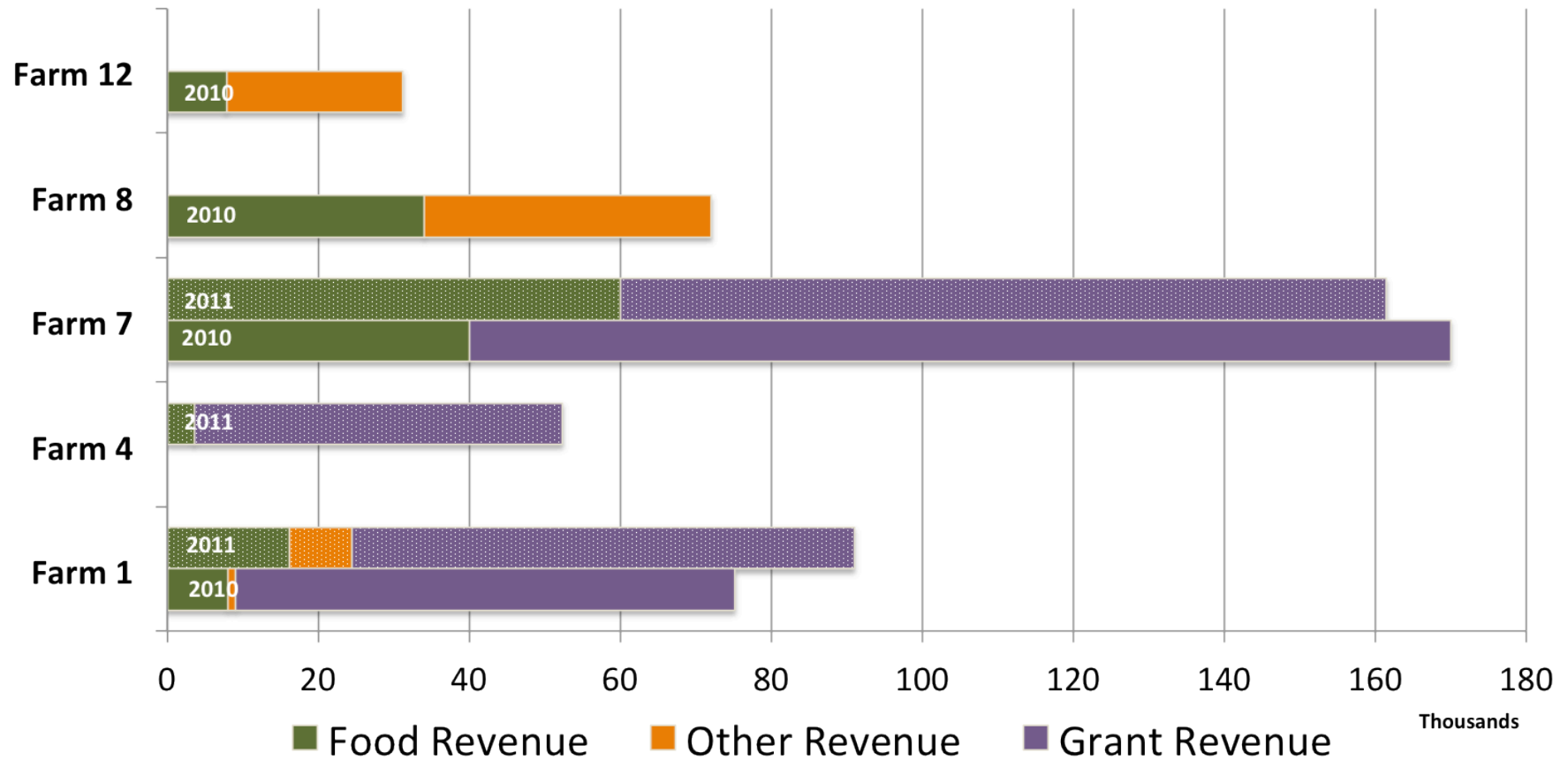
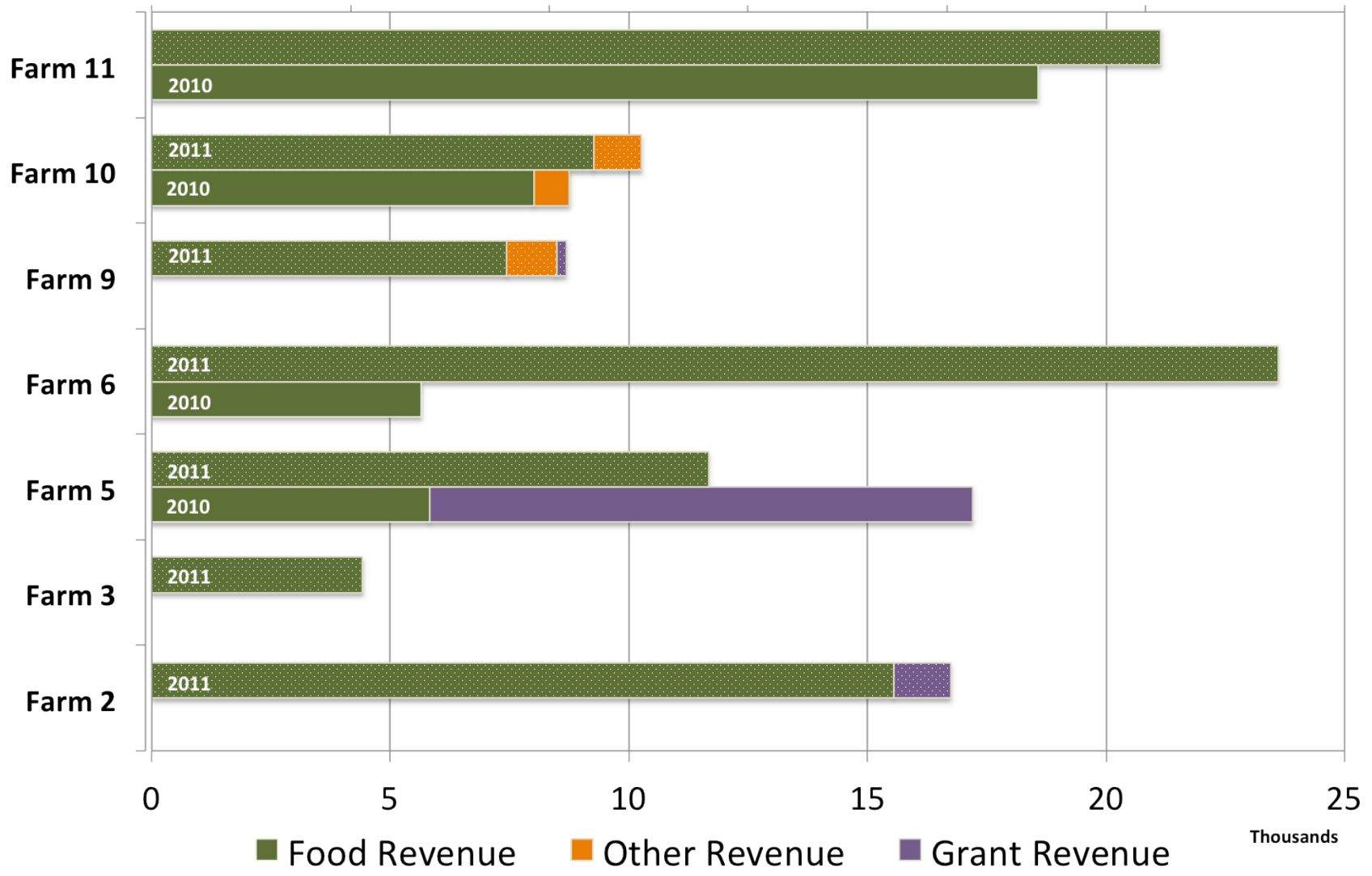


Figure 11: 2010-2011 Revenue of Farms < 25K



FARM ORGANIZATION

There is significant variation among farms as to how they legally organize and generate revenue (Table 3). Farms 1, 4, 5 and 7 were organized as non-profit societies and/or affiliated with charities. These organizations had both the staffing and organizational infrastructure to allow for successful grant writing, and the farming skills to grow and sell food. In contrast, Farm 8 generated significant revenue through crop sales, consulting and journalism.

Many non-profit farms structure their revenue streams by linking production costs with crop sales and community engagement with grant revenue. Farmer 7 explained,

“We could do this whole farm with one farmer, but that’s not the point, we want to create a business that provides jobs for people who might not be able to get one. Grants help us to do that, but as we build our operations, eventually our food sales will be able to do it [support operations].”

Non-profit urban farms support overall larger food sales, more employment, and more robust operations than their for profit counterparts. Farm 7, a non-profit growing on roughly a quarter-acre, accounted for 35% of all food sales recorded in the 2011 census. Though other farms had significant sales, the scale and operational efficiencies of Farm 7 proved successful.

GRANT REVENUE

As Vancouver seeks to become the Greenest City by 2020, there is increasing public support and financing for urban farming projects. VanCity (Vancouver, BC), a credit union interested in supporting local food initiatives, the Real Estate Foundation (Vancouver, BC), a

non-profit supporting wise use of land resources, and the City of Vancouver, in particular, support urban agriculture projects with broad community engagement components. In the two years of this census, Vancouver's urban farms raised over \$400,000 through local grants and other donations. The provision of healthy food and a vision for a greener city is making urban farmers indispensable to Vancouver politicians and funders who are looking to support the Greenest City Initiatives. In 2012, VanCity donated \$1 million dollars towards food initiatives through their 'Envirofund' program. Vancouver's Urban Farming Society was one recipient along with a number of other census participants. The Vancouver based Radcliffe Foundation has supported the development of urban farms on a number of public sites with a \$475,000 grant in 2012, while the Real Estate Foundation has committed over \$100,000 to urban farming projects. Another farm signed agreements in 2011 with public institutions and in 2012 was supported with over \$150,000 in grants. These grants are often tied to helping farms scale up their operations or supporting community services, such as educational programming for students or providing food for the food bank.

Many farms used grant money to support the growth of their operations, hiring staff, as well as purchasing the necessary materials for expansion: season extension infrastructure, soils, tools, and transportation. Grants help to support the initial costs of building a farm, improving the soil, and providing the basis for future production. Many urban farmers see grants as a capital injection, not as a way of funding ongoing operations. Farmer 7 explains:

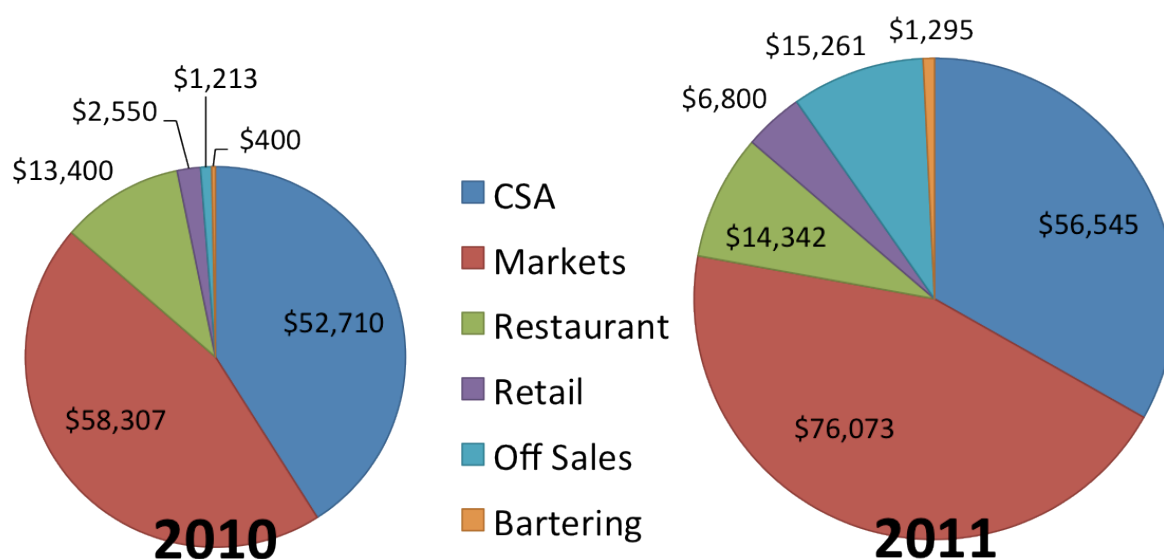
“Sure we'll take grants and donations for all capital expenses, and charitable work, but our goal is to support the operations of the farm by selling produce.”

As these farms grow and evolve, the expectation is that sales will support the enterprise and grants become less critical.

FOOD REVENUE

In 2010, eight urban farms sold \$130,000 worth of produce from 2.31 cultivated acres (Fig. 9). In 2011, land under cultivation increased by almost 100%, to 4.19 acres, but food revenue increased by only 30% (\$170,000). Though the land area increased, much of that land is not in full production, but is banked for future growth. This result shows the increasing ability for urban farms to generate revenue from food sales. Based on 2011 Urban Farm Census data, an average one-acre urban farm would generate \$40,000 in gross food revenue. Revenue per acre is an estimate based on total revenue divided by total area. The total area included new underdeveloped sites and land within its first few years of production. New land is less productive until farmers build soil fertility and necessary infrastructure. New sites often require the development of irrigation systems, harvesting procedures, and staff to appropriately process and deliver produce. Since the ‘per-acre’ revenue includes underdeveloped and new land, the ‘per-acre’ revenue potential may be significantly underestimated. Urban farmers sell their produce through five main distribution channels: CSAs, farmers markets, restaurants, retail, and uncategorized sales (Fig. 12).

Figure 12: 2010-2011 Crop Sales Revenue by Category



COMMUNITY SHARED AGRICULTURE (CSA)

CSA (Community Supported/Shared Agriculture) is a risk sharing arrangement where farmers charge an up front fee for a weekly share of produce delivered throughout the growing season. Six urban farms offered CSA programs in 2010, accounting for 41% of total sales or \$52,000. In 2010, 117 boxes of produce were produced weekly for customers and landowners. In 2011, seven urban farms offered CSAs, sharing their harvest with 127 subscribers. CSAs formed a smaller share of crop sales revenue in 2011, representing a third of gross crop receipts (\$56,000). In 2010, customers were charged an average of \$29 per week. The average price per CSA share was just over \$27 per week in 2011.

The benefits of a CSA program to urban farmers are three fold: 1) farmers receive revenue at the beginning of the season, allowing them to purchase growing materials; 2) it minimizes the risk and stress of selling at market, and 3) the relationship between customer and farmer is transformed from a point-of-sale transaction, to a long-term commitment. As Farmer 10

explained,

“It’s so fun being someone’s farmer. It’s such a gift to connect at the very base level of our food system. We grow food in the soil of our neighbourhood, and then to bike it over to a community garden in the neighbourhood where our pick-up site is. It’s all grown in the hood; all for the community.”

FARMERS MARKETS

Farmers markets represented another significant marketing channel. In 2010, urban farmers sold \$58,000 worth of vegetables at farmers markets (Fig. 12). In 2011, market revenue increased 30% to \$76,000. Much of that increase was due to the sales of two farms. Farmers markets offer the best returns for urban farmers due to premium pricing and direct sales to customers. Farmer 11 said,

“It’s insane that this is my job, I get to spend five hours at the farmers’ market having people spread praise on my sprouts and worshipping my farming skills. Then, I give them sprouts and they give me money.”

In 2010, vendor sales at Vancouver farmers markets totalled 4.9 million dollars. Urban farm sales were just over 1% of that. Though Metro Vancouver urban farmers currently have a small market presence, waitlists for CSAs and frequent interest in urban food indicate unsatisfied demand.

Farmers markets require a significant investment in time and energy. Markets require farm staff to support the booth, sell to customers, and maintain orderly accounting. The job begins around 4:00 or 5:00 in the morning for some and does not end until afternoon. Farmers are not guaranteed sales as customers have a host of reasons that may keep them home: weather, distance, lack of knowledge, etc. Farmer 7 reported,

“We actually had the product to sell 100K, but we couldn’t due to poor attendance and sales at the markets. A lot of stuff went to compost. I don’t know why that happened. Our sales were half, at every market, what they had been in the year previous. It was a little rough.”

Markets provide a way for farmers to move large amounts of produce to a diverse group of

people. It allows farmers to establish their brand through public signage and to tell their story directly to the consumer. Though sales are not guaranteed, established farms can begin to draw a set of regular customers.

RESTAURANTS, RETAIL, OFF SALES, AND BARTER

Restaurant sales contribute significantly less than other marketing channels, representing just 10% of sales in 2010 and 8% in 2011. This is surprising due to high levels of interest in local food by restaurants. In 2011, the Canadian Chef and Foodservice Association's Canadian Chef Survey indicated that the top four of ten "hottest trends" in food service were: 1) locally produced food and locally inspired dishes, 2) sustainability, 3) nutrition and health, and 4) organics. Despite this, restaurants have not been a significant part of Metro Vancouver's urban farmers' revenues.

Restaurants need a steady and diverse product supply. Many urban farms are still developing processing methods, refrigeration, and a means to deliver their produce to restaurants, making restaurant sales difficult for many farmers. Farmers markets and CSA shares allow for minimal processing and have limited delivery needs, making these channels simpler for urban farmers. Restaurant sales often require complicated logistics, delivering fresh produce multiple times a week. To date, urban farms are still learning how to supply restaurants from a logistics point of view. Furthermore, farmers are learning how to develop a marketing strategy that works for themselves and for restaurants. As one Vancouver chef, interested in purchasing from urban farms put it:

"Before you start selling to restaurants, you need to think critically about being able to meet my needs: growing the produce that I need, at the time that I need it."

Busy urban farmers have not hired individuals to specifically handle sales and marketing, making it difficult for them to implement a coherent strategy. Many farmers indicated they had neither the time nor the energy to build relationships with chefs. As Farmer 10 related,

“It takes a while to get together with a chef and show him our stuff, then she thinks about it for a bit, and then finally makes a decision. In that time, I can sell everything that is ready at the market.”

In addition, retailers often demand wholesale prices for their typically large retail orders.

Though some stores are willing and able to pay a premium for urban produce, many require formal organic certification that urban farmers are unable to provide. In summary, restaurants and retail stores are interesting outlets that might provide a significant source of income for urban farmers in the future, but for now, they are only a minor source of revenue.

Off-sales describes sales to passers-by, farm-gate sales, or other sales that are not otherwise categorized. Generally, these are fairly small (i.e., <1%) and an insignificant portion of overall farm revenue. Many urban farms are interested in generating sales at the farm-gate, but current by-law regulation is unclear regarding the legality of such sales. One farm reported interest in building neighbourhood market gardens that serve the local community through open farm-gate sales, connecting local residents to their food producers.

Bartering refers to trades urban farmers make for food. One organization held a staff strategy meeting, paid for with produce. Others have bought items on Craigslist in exchange for vegetables. One farmer even had their roof repaired in exchange for produce. Despite these exchanges, no participant plans to use bartering as a major economic strategy for their business.

OTHER REVENUE

An important secondary revenue stream for many farmers includes hosting fee-based group tours and field trips, speaking engagements, summer camps, or vegetable landscaping. These ‘Other revenue’ sources represented over 50% of revenue for Farm 8 and 12 in 2010 (Figs. 10, 11).

There is often opportunity for developing farm-related businesses to supplement produce sales. Many farmers were interested in teaching courses or providing consulting services, but there was little time available to do so during the growing season. Farm 8 was able to capture a niche market for journalism and consulting for a number of clients throughout Vancouver. This has been a successful revenue stream. These contracts provide a ready stream of income, regardless of the growing season. As Farmer 8 stated:

“The problem with this business is that it’s just so damn seasonal. You’re only busy for a short period of time, and if the weather sucks, then it really does affect your business, which is why some of these other projects are really helpful.”

Farm 12 saw ‘other revenue’ opportunity as a more stable and secure revenue stream:

“It’s our summer camps that are helping pay the mortgage; it’s just a lot more than any of the [food] markets.”

In larger organizations, other revenue streams would come under the purview of ancillary business units. These off-shoots of the urban farm are interesting places of connection between traditional food production and secondary entrepreneurial activities. For example, it is a strategy adopted by both Kwantlen Polytechnic University and the UBC Farm, whereby students pay a fee for farm classes and supervised fieldwork. Students form a ready supply of labour and income for these programs. Other small farms across the United States and Canada have similar programs (Kaufman and Bailkey, 2000). Finding ways to link food

production with other business opportunities available in urban areas can be a viable way to increase and diversify revenues.

Another opportunity may be in waste management. Surveyed urban farmers indicated interest in picking up restaurant wastes in exchange for a tipping fee and developing organic composts. As one urban farmer said:

“It’s one thing to grow food, but it’s another to do it with what’s considered waste by most of the city.”

A number of farms have started to discuss possible opportunities to manage their own soil fertility through inclusion of composted urban waste.

Many farmers are not able to invest the time or money needed to develop secondary revenue streams in addition to crop production, evidenced by the decrease in ‘Other Revenue’ observed in 2011 (Fig. 9). However, urban farmers are interested in diversifying programming to generate other sources of revenue. To do so, these farms must first develop the organizational capacity to successfully carry out more complex operations. As interest in urban farming continues, those organizations that successfully connect food production to secondary business enterprises will not only create viable businesses, but will also connect urban residents to their food production in new and innovative ways.

BUSINESS EXPENSES

Urban farmers are labour and crop rich, but cash poor. As a result, they limit cash transactions, favouring trade, barter, and other methods of payment. Land rent is paid for in goods and services such as landscaping, weekly produce, public relations, and/or other non-monetary benefits. Common cash costs include labour, growing expenses (e.g., seeds, plant

materials, soil, tools, etc.), and costs I refer to as ‘selling, general and administration’ (SGA) expenses (e.g., fuel, marketing, signs, website, etc.).

Figure 13: 2010-2011 Expenses of Urban Farms with Revenue > 25K

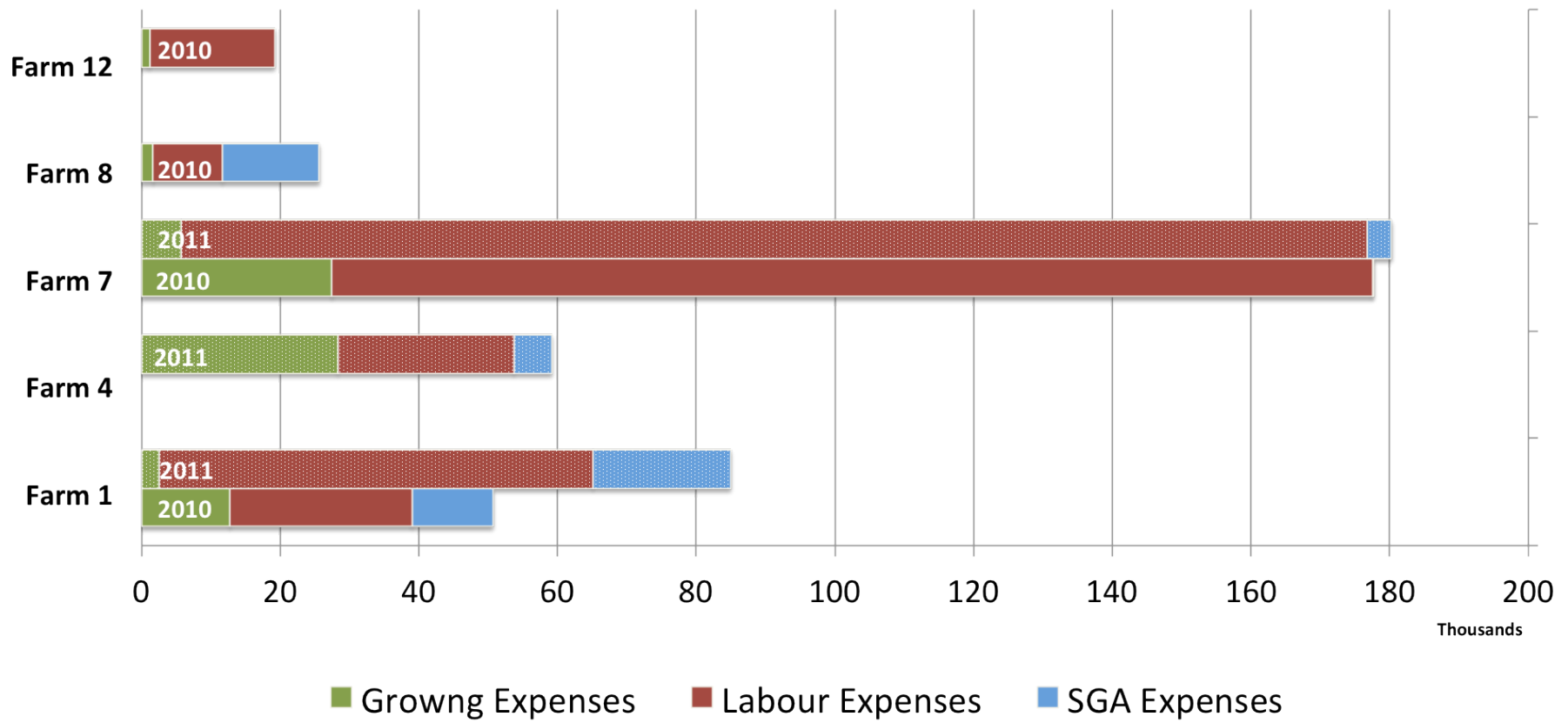
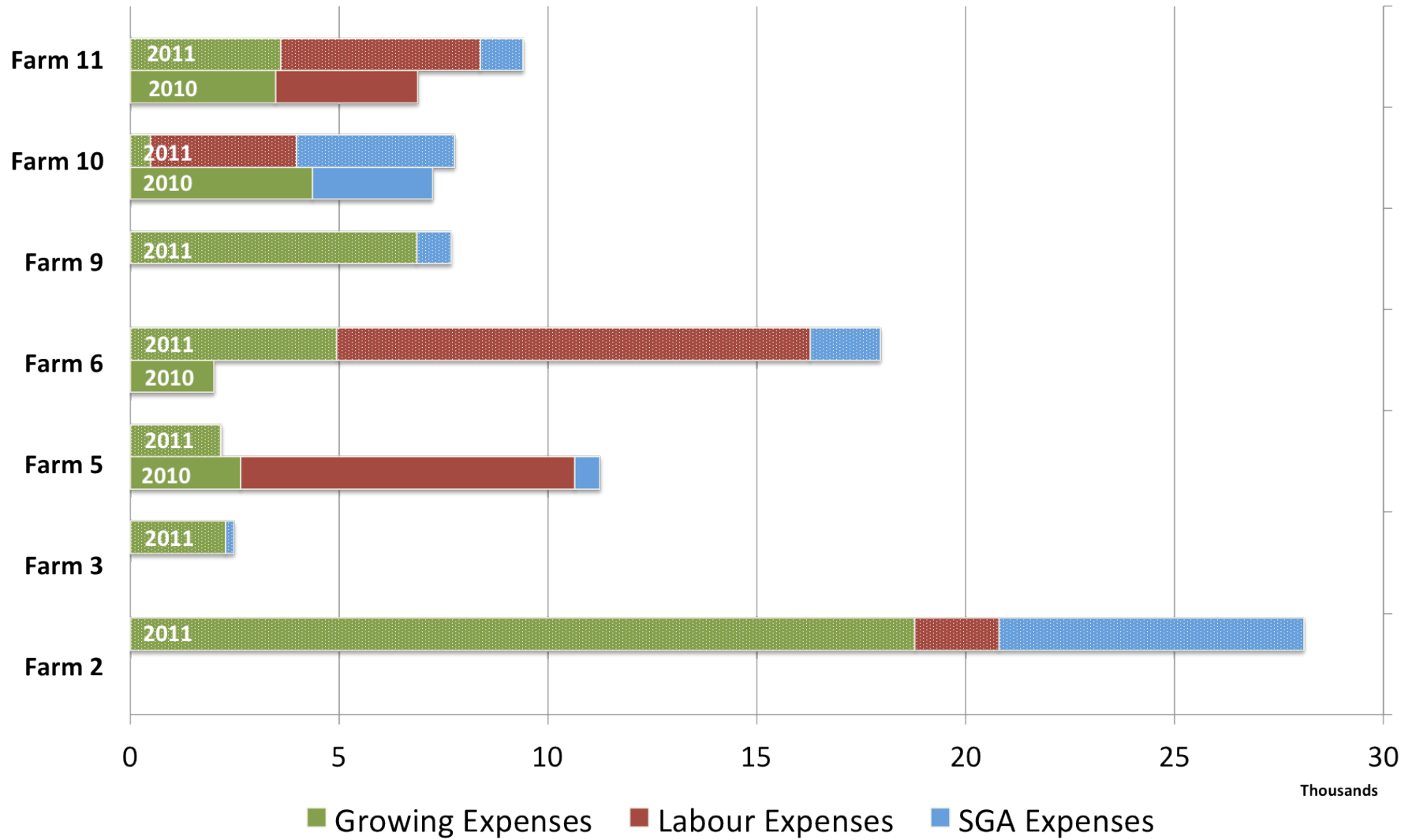


Figure 14: 2010-2011 Expenses of Urban Farms with Revenue < 25K



LABOUR COSTS

Farmers and their paid employees worked 63 hours/week on average (Table 3) while volunteers donated an average of 380 hours a week per farm, a donation valued at almost \$100,000 over the course of the season.

In both years, only one farm had a farm manager on salary, though a number of farms have part time contractual work. Salaried or contracted farm managers routinely worked hours beyond the level of compensation. These farmers donated their additional time. Some farm managers worked as contract farmers, earning \$1000 - \$3000 a month. Farm employees, unlike owners or salaried farm managers, were paid an hourly wage of \$10 to \$20 commensurate with experience. Weekly paid labour hours varied between farms due to efficiency of operations and management of labour. As farms continue to understand their specific needs, operations will become more efficient and labour descriptions will become clarified.

In 2010, the eight urban farms surveyed hired 17, regular part-time or full-time employees, providing \$215,000 in wages. In 2011, ten urban farms hired 30 employees, paying a total of \$272,000 in wages (Table 3; Figs. 13 and 14). As a whole, wages are the single largest expense for urban farms. The large payrolls are a result of two grant based non-profit farms, accounting for 83% of all paid wages. Other smaller farms have much lower labour expenses, mostly because owners are not paid until all expenses are paid. Owners/Managers largely volunteer their time, receiving any pay after revenues are generated and all costs of the business have been serviced. They are compensated by 'return to management,'

generally the operating profit. This is the case for a majority of farms surveyed, all but two urban farms paid owners/managers from operating profit. Some owners/managers are never paid, using the funds to celebrate or grow the organization. As Farmer 6 explained:

“We really just put it all to a big beer fund. We pay one farm manager and then the rest of us donate our time. We want this to be a traditional business that can pay employees for their work, but right now, we’re just learning how our business works. This whole project is paying it’s own way right now. As we understand exactly how our business works, we’ll look into paying ourselves for our work”

PRODUCTION EXPENSES

Production expenses include usual crop cultivation as well as initial investments to new land: soil, soil amendments, irrigation infrastructure, and tools. Urban farms do not account for capital or start up costs, merging them into operating expenses. The census followed this convention of surveyed farmers. The start-up expenses for an urban farming operation were quite minimal. For those individuals working in backyards or on donated or free land, the minimal needs are: labour, seeds and a few tools – many farms obtained these items through donation or inexpensively sourced from a local hardware shop.

The amount spent on production is dependent on farmer, the type of land, and the production methods utilized. As a result, these expenses vary widely. As Farmer 12 states:

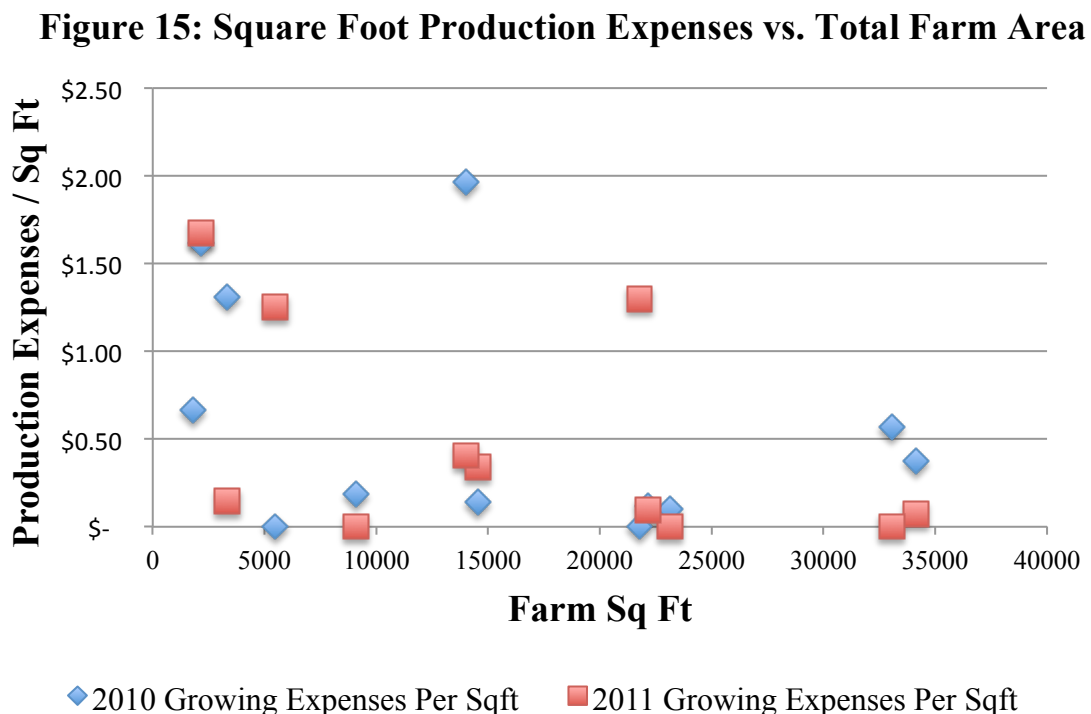
“We built all of this with some volunteers over a few days with a whole lot of beer. We didn’t have any big costs in 2010. This entire fence, all the logs, the uprights, that whole shed there, I built from 100% recycled materials and a lot of volunteer help.”

Other farms, with aesthetic requirements or support from institutions required farmers to spend more money on infrastructure. Overall, annual production expenses in 2010-2011 ranged from \$465 to \$28,316 per farm (Figs. 13, 14). Some farms’ expenses were solely related to production, while others had only minimal production expenses, comprised of just 3% of all expenses (Figs.13, 14). Farms often completed a significant amount of their

operations using free or donated tools and with repurposed or recycled materials:

“There is nothing like the face of an intern that is so excited to work with us, who goes through the interview process and goes to the orientation, who then goes to the shed to see what we farm with and then their face falls in shock... that’s a classic moment. ‘You do all this, with that?’

There are two key points regarding costs. First, on a per unit area basis, urban farm installation costs are not capital intensive as long as beneficial land tenure agreements are in place. Second, urban farmers use a variety of mechanisms to support their production enterprises. Some methods are cost intensive, others more time intensive. Farmers willing to invest time and labour in activities such as resource scavenging incur decreased costs. The size of the field is not closely related to production costs per sq. ft., largely as a result of diverse growing methods and the fact that farmers are still learning how to operate their businesses efficiently (Fig. 15; 2010 $R^2 = .218$; 2011 $R^2=.290$).



SELLING, GENERAL AND ADMINISTRATION (SGA) EXPENSES

SGA expenses are not directly related to crop cultivation, but are critical to enterprise operations. SGA expenses were generally low, though there were some exceptions. Farms 1, 2, 8 and 10 had SGA expenses greater than 20% of their total expenses. Farm 1's high SGA was directly related to its secondary food security mission and associated programming. Farm 2's SGA is directly related to vehicle costs and other enterprise necessities (i.e., distribution and marketing: farmer's market tables, banners, etc.). Farm 8 constructed raised beds for clients across Metro Vancouver as an ancillary business, these costs were categorized as SGA expenses. Farm 10 invested in capacity to better sell their produce at market (e.g., market tents, vehicles, etc.)

Some farms included fuel in their SGA accounting, as most of the vehicle use was for business support (e.g., to move produce from the growing site to the customer). However, few farms kept records regarding the use of their personal vehicle for business.

Owners/Managers typically chose to personally subsidize the cost of fuel for their business.

SYNTHESIS OF EXPENSES

The intersect between business and community engagement is most clear when looking at the ways that urban farmers afford to keep their business afloat. With interns and other free labour sources, urban farms are able to reduce labour costs. In doing so they provided an educational service to community members.

However, the use of volunteer labour allows urban farmers to externalize the true costs of their operation, making it difficult to account for the financial viability without incorporating

the contextual importance of community. Without community input and development, these projects will have to replace volunteers with paid labour, donated land with leased land, etc. Finding the nexus between financial viability and community development is a critical function for urban farmers.



Photo 13, 14, 15: (Left) Students help construct season extension infrastructure and learn carpentry; (Center) Volunteers help build raised compost best; (Right) Volunteers prepare land for a fence.

FARM RETURNS

Revenue less expenses is the net profit of a farm. Understanding how much urban farming businesses can generate in net profit is essential to understanding their financial viability and can help identifying pathways to success.

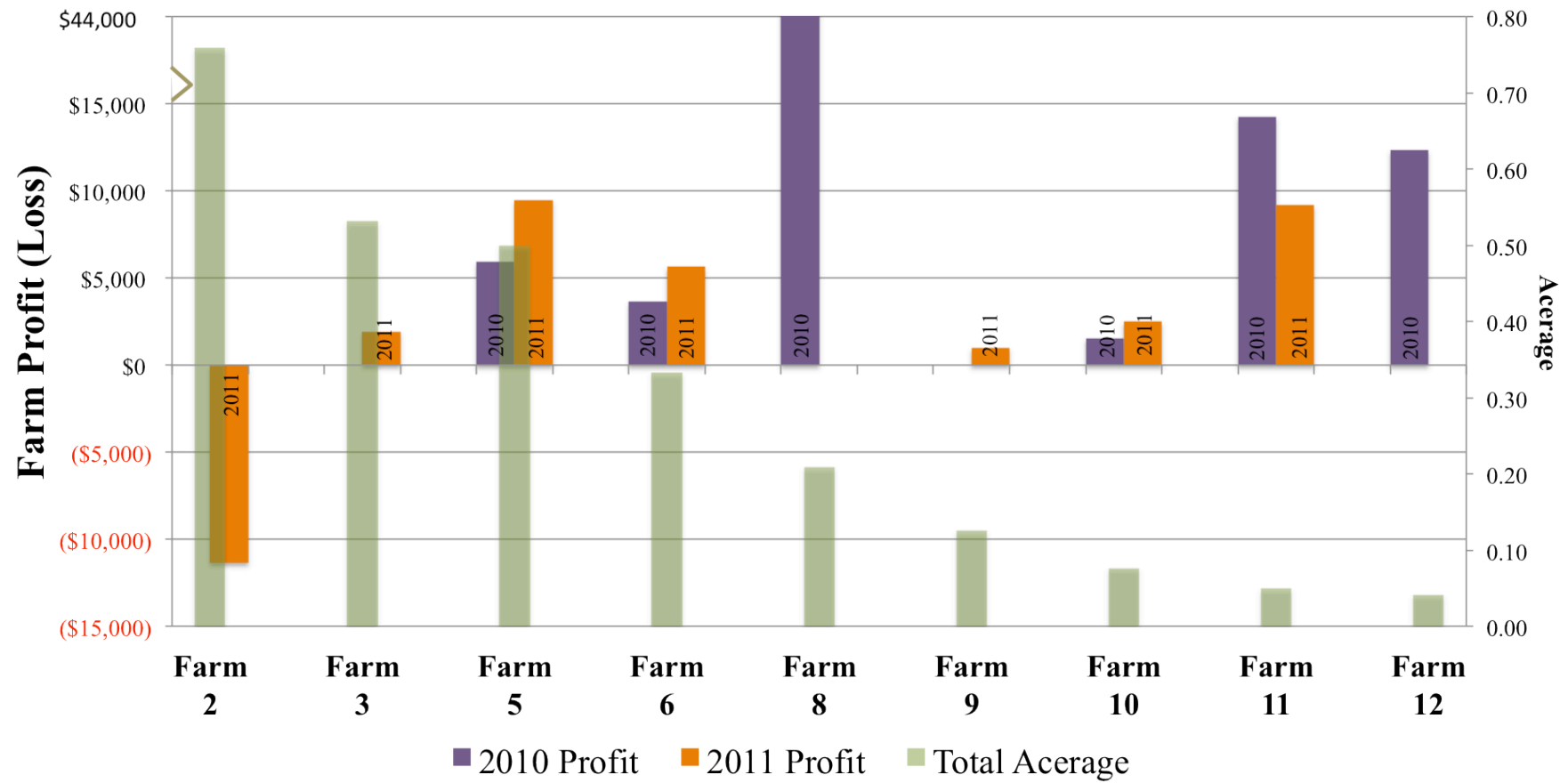
In 2010, six urban farms generated a net total of \$81,679 in total profit, on average returning \$13,613, with none showing losses (Fig 15). On average, farms with revenue mainly derived from crop sales generated \$14,214 per acre in 2010. In 2011, six farms generated \$18,362 in net profit and one farm generated \$11,345 in losses. On average farms with revenue mainly derived from crop sales generated \$6,021 per acre. Only one farm generated a loss in either 2010 or 2011. In 2010, half of all survey urban farm profit came from one operation due to revenue generated from ‘other sources.’ Annual returns varied widely amongst farms due to ‘other revenue’ sources and the sale of high value crops. In 2010, three farms with

significant other revenue sources or that sold high value crops generated more than \$200,000 per acre. The sale of high value crops and the utilization of secondary revenue streams has a positive impact on the bottom line. Scaling-up these business could make them much more profitable.

In 2011, cold, wet, weather was a significant problem for a number of urban farmers. Three farms began operations in 2011. Of those new farms, two showed a profit (Farm 3 and Farm 9), while one had a significant loss (Farm 2). Farm 2's loss was primarily due to expenses associated with of a new piece of land that will be farmed in 2012; that loss was expected by the owner due to heavy investment in 2011.

Initial results suggest that the size of the farm is not correlated to generating profit. Rather, the type of production, i.e. high value crops, such as sprouts, and the presence of secondary revenue streams, are greater predictors of increased net profit.

Figure 16: Urban Farming Operating Profit 2010-2012



URBAN FARM FINANCIAL VIABILITY

Urban farms are generating revenues over their stated expenses and able to financially support their operations. However, the urban farmers surveyed often subsidizing their businesses. While they pay their employees competitive hourly wages, between \$10 and \$20, they often fail to pay themselves for their own labour. Urban farmers knowingly subsidized their businesses. Farmers indicated that a significant amount of expenses are not accounted and are primarily associated with owner labour and vehicle use. If these uncounted expenditures are regarded as donations, then all farms were profitable in 2010, including those farms in their first year of operations. In 2011, only one farm incurred a loss, while the rest of the farms were profitable.

Most farm operators were able to both support their operations and receive a small monetary return. In addition, owners, farmers, farm hands and interns regularly received fresh produce as a form of compensation. Estimating the value of non-monetary compensation was beyond the scope of this work.

Despite data supporting the viability of urban farms, it is critical to remember that data were often incomplete. Many participant urban farms did not kept detailed records of their enterprises. The data presented are farmer estimates and there is no independent way to assess their accuracy. Typically estimates do not include owner subsidies, and probably underestimate real costs. Accounting methods varied for every study farm. As a result, what one farm may consider a production expense; another might consider a sales cost. It was necessary to assign such costs to consistent categories for analysis. However, as is evident

from the community-based models of most enterprises, urban farmers are interested in more than showing a profit; they are also about connecting to the community.

NON-ECONOMIC BENEFITS OF VANCOUVER'S URBAN FARMS

Vancouver's urban farms, based on small lots with simple technologies, are not an economic boon for their owners. However, as these enterprises mature and better understand their markets, there is great potential to facilitate the growth of resilient communities through self-sustaining businesses. In conversations with urban farmers, they highlighted a number of non-monetary benefits along three themes: food education, community development, and environmental awareness.

FOOD EDUCATION

Urban farmers utilize urban spaces such as front yards, which can show communities how healthy fresh vegetables can be grown at home. Urban farmers indicated that one of their most important roles is to demonstrate what it means to grow and eat healthy foods. As Farmer 10 explained:

“Every time that someone drops their kid off at school or catches a bus, they see us. They see the food growing, the re-align their spending priorities and want to buy the food that we're growing. There are these folks who think they can't afford to eat local healthy organic food because it's got all this stigma attached to it. With us they're like, 'please sell me your garlic or kale, I'll pay what you need me to pay to help support you.'”

Rarely do people see food crops growing in the field. Food is either in the produce aisle or, increasingly, already prepared. Urban farms are places of learning about vegetables and their cultivation for many individuals, including neighbours, interns, customers, and passers-by. Urban farmers move vegetables from an abstraction on the dinner plate and allow them to become tangible parts of a healthy perception of reality and diet. During one of my site

visits, a family stopped next to the garden during harvest. Two children, six, and nine years-old, pointed at the carrots still in the ground, “What’s that, they asked?” one of the farmers told them to pull it out of the ground and see for themselves. When the carrot was finally revealed, the children were thrilled, begging their mother to let them eat it.

Urban farms play host to transformative experiences that can have life-long impacts. They are places of exploration that connect children to vegetables, helping to promote healthy eating by associating vegetables with novel and fun experiences.

One critical relationship for urban farms was between their farmers and customers. Instead of a purely financial transaction, CSAs and farmers markets substantially create a community around food. Farmers are celebrated for their knowledge and ability to grow wholesome and high quality vegetables. Customers often request specific vegetables varieties and work directly with their farmer to get the kinds produce that they want. Farmer 6 explained,

“Last year we had people tell us that they wanted more of the Asian greens that we were growing, so we grew them.”

Urban farmers empower individuals to make the food choices they want, rather than being passive consumers at the grocer store.

Urban farmers see their operations as ways to connect neighbourhoods with healthy food as well as a vehicle for transferring the skills necessary for residents to feel confident to grow their own food.

“Sometimes people will come out and really do not know how to plant a beet. We help them, and hold their hand for a while, but honestly, it’s just putting the seed in the ground. It’s going to grow itself.”

The fact is that most people do not have the knowledge or confidence necessary to grow their own food. Urban farms provide a way to garner knowledge passively by having a farm be a

part of their daily life or by actively engaging and learning from the farming process.

Interns and volunteers participate in hands on learning, preparing them for future work in agriculture. Farmer 1 explained,

“One of our interns went on to do some work in the United States. Now she’s back with these amazing ideas about agriculture. Already she’s helping us in our mission, connecting with corporate volunteers and helping to make this happen.”

Other interns from urban farms have gone on to start their own farms or are planning to do so. Farmer 10:

“I hear our interns talking all the time about how many front lawns they are going to convert – we’re just excited to see that they’re getting all of this energy from working with us. Hopefully we’ll be able to hire them in the future.”

As urban farms grow and become able to support more employees, it may be that some pursue rural agricultural enterprises. This is particularly critical to an industry where the average British Columbian farmer is 53 years old.

When individuals can see how farmers grow and sell food, they become active participants in their food system, asking for particular products, ensuring that farmers are using organic methods, and getting involved themselves. This participation is critical to the development of a food system where people will accept higher priced, higher quality produce. Metro Vancouver’s urban farmers see their operations as ways for people to become comfortable and knowledgeable about sustainably growing food. Often, farmers hear that organic, local food is too expensive, but another perspective reveals that our food is just too cheap. The amount of time and energy required to farm is significant, but unfortunately people do not see or understand that work. As a result it is difficult to value the produce. Through urban farming, urban residents may be able to gain an appreciation for the role of farming in our society. Urban farms are driving this agenda by bringing food production into the realm of

‘normal urban life.’ As Farmer 12 explains:

“Right now kids and adults don’t know what a carrot looks like when it’s coming out of the ground. If they don’t understand it, they’re not going to appreciate it. If they don’t appreciate it, they’re not going to value it. And if they don’t value it, they certainly are not going to pay what it costs to grow it.”

Farms provide a living laboratory for communities to learn what it takes to bring food from field to fork. Urban farms are spaces to educate and to share an essential part of life: food provisioning and eating.

COMMUNITY DEVELOPMENT

Urban farms create space for communities to interact with their food, to engage their neighbours, and to build social capital. These spaces can transform the way we interact with one another and with the environment. Urban farmers often see their work as bringing the community together around a topic of incredible importance: our environment and our diet.

Farmer 1 explained:

“We had twelve teenage boys who came every day at nine in the morning to volunteer. Sometimes, they were here before me. Their parents would kick them out of the house and say, ‘go do something useful, it’s the summer time.’ Initially, they were individually walking down the road and we looped them in. ‘Hey what’s up? You want to volunteer with us?’ And they did. So how do you quantify twelve teenage kids coming everyday?”

Urban farms become places where volunteers have a chance to connect with the experiences of elders and other community members. Farmer 10 explained:

“Students want to bring their grandmothers and other elders into this space to show them the work that they are doing. All of the elders come from different backgrounds and the students help to translate the stories and knowledge of the elders for the community. They are empowered by their histories and by the knowledge of their elders. It’s wonderful to know that our gardens have a part in that.”

Urban farms are safe havens for community engagement. Whereas neighbours can and do have contentious views on politics or other subjects, gardening can be a common denominator. Urban farms can be a comfortable and emotionally safe place to have a

conversation and to engage with neighbours who might look or speak differently:

“One day, this little old Chinese lady just comes hobbling along; she’s watching me. Shaking her head, she says, ‘no, no, no, no, no,’ and she starts pulling my transplants out and separating them. Obviously she had planted a lot of choy in her day so she started showing me how to plant it. And until I started planting the way that she did, she continued showing me. So I got shown how to plant choy, all without a word. I couldn’t speak Mandarin and she couldn’t speak a word of English, so we just used sign language. She was quite pleased with herself!”

Urban farms in Metro Vancouver are often a place of inter-racial discussion and activity.

During my time visiting study farms, Asian men and women often came to the farm, looked at the work and laughed silently as they explained in Mandarin and with hand gestures, how to grow gai-lan and other Asian greens. They brought cold beers, donuts, and other snacks in hopes of trying a beet. The farmers I observed would often oblige. One of the farmers estimates that “there is something [for the Asian visitors] to seeing these white Canadians trying to grow all of these Asian vegetables.” Stereotypes dissolve or dissipate in the garden. There is a shared goal to grow crops well and everyone is entitled to his or her opinion, whether it is how to plant choy, proper soil management, or the best time to water. It can be a place or subject of debate and discussion amongst people of different cultures and backgrounds.

Urban farmers are consistent visible figures in public spaces, and people come to expect them during the season. Their presence encourages community members to use and respect these places. This can help transform blighted parks and other areas into community spaces.

Farm 10 had a plot in a backyard adjacent to an underutilized schoolyard garden:

“As the initial maintenance money ran out [for the school garden], the garden was no longer maintained. It really just went to hell. It was clear that it wasn’t being well used or stewarded. During the spring and summer many homeless people would sleep there every day and night. There were needles. There were condoms. When we were asked to take this space, this place was completely different. Now we are fully reclaiming this space and the condoms and needles are gone. The school has been overjoyed. They say, ‘I’m not sure you’re making enough money for what you’re offering our school.’”

Urban farmers combine economic activity with community development by working in the public view. Urban agriculture, unlike much of contemporary agriculture, is a public activity. It encourages questions and dialog because the work is highly visible.

Engagements across ethnic and generational lines occur on a regular basis. Indeed, farmers often designate one individual to handle ‘community requests,’ in addition to their regular responsibilities. These sorts of community and social benefits do not lend themselves to economic analysis or reward to those providing the service. It is clear, though, that urban agriculture provides benefit to the community and society.

ENVIRONMENTAL AWARENESS

Urban farmers are inspired by the environment and see their work as a means of nurturing their own and other’s connection to nature. Urban farming also facilitates farmers and customers to connect with the reality of growing food in all types urban landscapes. As Farmer 9 said,

“I really see our customers amazed at the fact that we could even do this in the city, to take away the grass and really grow amidst the traffic and city life.”

All of the urban farmers in this study used “organic” farming techniques. Though none were certified organic, they did not use synthetic fertilizers, pesticides or herbicides in their practice and embraced an organic production philosophy. Hand weeding is a common activity for urban farmers. Study farmers made a concerted effort to minimize transport by fossil fuel-powered vehicles, often carrying their harvest to the farmers markets or to the CSA pick-up site by bicycle. Farmer 11 explained,

“It’s a great selling point, but you have to remember that I’m carrying three to four hundred pounds to the market by bike. People love it, and it’s a wonderful way to show people that it can be done, but it’s definitely hard work.”

Urban farming helps to capture the imagination of residents and encourages them to envision a city populated by local businesses growing and delivering products without fossil fuel powered vehicles or otherwise compromising the environment.

The belief that agriculture is ‘rural’ and not part of an urban landscape is quite pervasive.

Urban agriculture helps to shed light on alternative realities and possibilities. Farm 12 reflected on designing their farm with nature in mind:

“[we] started from scratch, where there was just blackberries and so much potential to do anything. We could have put in the sidewalk or built anything, but we wanted to leave this natural element. It’s funny, some people will look at that tall grass there and say, ‘Hey, that is unkempt and it looks bad,’ but they just say that because that’s what they’ve been told, and that’s what they’ve been brought up to believe. If you think about it though, it’s beautiful. What’s wrong with it being tall? The kids love to play in it, as do the rest of the creatures around here.”

There is a place between heavy urban development and the wild. Urban farming can help to establish that middle ground. Urban farms provide habitat and enhance the urban ecosystem.

THE NON-ECONOMIC BENEFIT

Ultimately, people join CSAs or purchase from urban farmers because the food is preferred.

Farmer 6 explained,

“We don’t tell them about our other mission, we just let them taste our food, the whole ‘generating jobs for people with barriers to employment’ is just an aspect of what we do. But at the end of the day we really grow amazing food.”

This seems the overwhelming reason that people patronize urban farms. The food is delicious because it is carefully grown and handled. Customers often participate in the growing or distribution of crops, adding to its ‘deliciousness,’ and value. Customers actually engage in, and enrich their food system at the most fundamental level. Urban farms build social capital. Residents learn about their environment, healthy food, and most importantly they connect with their neighbours. Communities increasingly want these experiences and

urban farms play an important role in manifesting them.

8. CONCLUSION

Urban farming is woven into the history of North America. It has long been a place to educate and train youth to participate in civic culture. Through Mayor Pingree's farms in Detroit at the turn of the 20th century, and charitable groups across the country, urban farming was seen as a path to self-determination. Welfare was conceived as giving a man a piece of land and advice on how to farm (Spires et al., 1898). Teachers have utilized urban farms to prepare students physically and mentally, exposing them to a relationship with land and the food that comes from it. Urban vegetable and fruit gardens were spaces to learn the rules of society, to develop a work ethic, and to build something tangible (Bailey, 1903; Floody, 1912; Trelstad, 1997). Gardens played a valuable role in war times minimizing domestic demand for commercially produced crops (Franks, 1919; Lawson, 2005; Wilson, 1919). Victory and Liberty Gardens of yesteryear fed North Americans through two world wars (Bassett, 1981; Boswell, 1942; Lawson, 2004; Lawson, 2005; Trelstad, 1997). As the wars ended and communities looked for new outlets to connect with one another, urban farming became a community endeavour (Hynes and Howe, 2004). Cities like Detroit, New York, and countless others have invested in greening their communities and building new ways to supply urban residents with produce grown in the urban environment (Feenstra et al., 1999; Kaufman and Bailkey, 2000).

Researchers are just starting to understand the complex and far reaching ramifications of urban agriculture on our communities. We know, to a certain extent, that small community plots, home-grown gardens, and commercial enterprises are a response to the crisis of our contemporary food system. Obesity, prevalent in North America particularly in school age

youth, is a constant reminder that our food system impacts our health (Malik and Hu, 2012; Malik et al., 2006; Moreno and Rodríguez, 2007; Petty, 2004; Wang et al., 2008). The fact that food prices are ever increasing, while so many are already food insecure, inspires individuals to take to the soil to grow their own (Food and Agriculture Organization, 2011; Headey and Fan, 2008; Mitchell, 2008; Coleman-Jensen et al., 2011; Food Banks Canada, 2011). Urban agriculture can and does form a safety net for many individuals. It promotes food security in an important, but clearly different way than does food stamps and other forms of welfare programming. It gives agency to the individual and encourages self-determination (Hynes, 1996; Hynes and Howe, 2004; Brown and Carter, 2003; McClintock, 2010; Welsh and MacRae, 1998; Wilkins, 2005).

The tremendous disconnect that we have with our food is disturbing. Most people do not understand our food's relationship to the natural environment or what it takes to produce it. Food has become yet another urban throughput (Condon et al., 2010). Urban agriculture is one way to nurture good food citizens, self-determinate eaters that participate in a community of growers. Coming to understand the ecological cycles and links between plant growth and food production, of decay and waste through urban agriculture, is one way to develop a realization of our society's metabolic rift, and with it, our current food system's lack of sustainability (McClintock, 2010).

It is clear that the impacts of our current food system are adversely transforming our environment. Through eutrophication, conversion of land to agricultural, the reduction of habitat, and greenhouse gas emissions, our world is changing more rapidly than ever before. All are often a result of our food system (Foley et al., 2011; Horrigan et al., 2002;

Ramankutty et al., 2008). Finding ways to mitigate the negative impacts our food system has on the environment is a crucial endeavour. It remains unclear, the extent to which urban agriculture can contribute, but this work reinforces that it has a role to play.

Our aging farmers are retiring faster than appropriately skilled younger farmers are available to replace them. Urban agriculture offers a way to engage young and enterprising individuals to learn about farming and to prepare them to produce food for the future (Miller, 2010).

Urban farming can be a financially viable means of producing the kinds of products, notably fruits and vegetables that a healthy diet demands. Direct to market sales, in conjunction with high value crops, can be a profitable combination for small farmers on urban land (Martinez et al., 2010).

Urban agriculture can be a part of addressing the current ills of our food system and society. Its ability to connect people to the land and to fresh produce can, and is, having an impact on the choices people make and how they relate to food and agriculture (Growing Power, 2012; Hynes, 1996; Kaufman and Bailkey, 2000; Lawson, 2005; McClintock, 2010; Rojas et al., 2011; Wilkins, 2005).

THE CENSUS IN CONTEXT

Again, urban agriculture is increasingly becoming of interest to the developed world, capturing the imagination of city planners and investors. Current work seeks to estimate available land and yield potential to estimate how much food could be grown on urban sites (Colasanti, 2010; Grewal and Grewal, 2011; Mullinix et al., 2012). Others have looked at the functional requirements of local food systems (Kremer, 2011; Nasr et al., 2010). This work

has been used in southwest British Columbia to examine the economic potential of growing fruits and vegetables for direct-to-market programs in Surrey and provide a birds eye view of a nascent industry (Mullinix et al., 2012). While this research assessed the potential for urban farming, more local data is needed to deliver stronger models.

The power of this census is that it records what happened on actual urban farms in Metro Vancouver. It captured nearly all (> 80%) of the area's urban farms over two seasons. This will assist municipalities interested in the potential of and opportunity for urban agriculture. With such information city staff can better visualize, plan, and create policies for effective integration of urban agriculture into their communities.

Tools such as this Urban Farming Census can facilitate collection of important data for evaluation of the viability and stability of urban agriculture enterprise. Just as nations compile census information for the rural agribusiness sector, it is critical to begin doing the same for the urban agriculture sector emerging in North America.

LIMITATIONS

This study is limited in three key ways: 1) data consistency and scope, 2) limited timeline, and 3) scale. Few farmers kept detailed records of operational costs, crop yields, inputs, or other factors that influenced production and economic viability. Accounting accuracy was varied and most income was estimated. Farmers did not keep detailed records of their cash flows. Expenses were relatively easy to calculate after looking through bank statements (assuming all expenses were captured in these statements). Categorizing expenses was not something urban farmers routinely did. To facilitate more accurate urban farming censuses,

it would be desirable to help urban farmers use a more consistent system for recording, analyzing, and sharing their enterprise budgets.

Vancouver's urban farms are new. Nine of the ten farms interviewed in 2011 were established within the previous three years. As a result, the business data collected represents initial record keeping efforts. Their largely untested organizational structures changed rapidly in response to the needs of the business. Revenues and costs will undoubtedly change as farmers come to understand what they must do in order to be successful.

This work encompassed a limited time duration (two seasons), analyzing only the initial efforts of urban farms. Longer-term data collection is needed to more fully understand the full scope and trajectory of urban farming. As more data are collected, conclusions can become more reliable. The findings reported here are a snapshot of rapidly changing urban farms in Vancouver. Over the course of this two-year study, some farms were already discussing shutting down, while others were planning to expand their mission and the amount of land they farmed. It is important to realize that the newness of these urban farms, along with the restricted number of seasonal data points, limits the reliability of any conclusions regarding the long term viability of urban agriculture in and near Vancouver.

This census captures only Metro Vancouver's specific context. Without collecting data on urban farms across Canada and the United States, it is difficult to compare these operations with others that exist in different geographical, political and demographic contexts.

Expanding the geographic reach of this census by including farms across the U.S. and Canada would capture very useful data.

URBAN FARMING IN CONTEXT

Vancouver's urban farms are a very small component of our food system, a fact that critics often point out. In comparison with the rest of the province, Vancouver's urban farms make up less than 0.1% of the total land area devoted to growing vegetables (Ali and Lucier, 2011; USDA 2007; Statistics Canada, 2010). It is valuable to remember that they need not satisfy all a city's food demand.

Urban farms can and do play an important role in our food system. While, urban farms are unlikely to satisfy all of a municipality's produce needs, they can produce a fair and meaningful amount. Though an analysis of the potential for urban agriculture in Vancouver is outside the scope of this work, for Detroit it was estimated that between 31% and 76% of vegetables and 17% and 42% of fruits could be supplied from urban agriculture during the year (Colasanti et al., 2012). In Cleveland, researchers estimated that 22% to 50% of annual fruits and vegetables consumed could be grown on fields in the urban environment (Grewal and Grewal, 2011). Work in Surrey, British Columbia indicates that if the 3,400 acres of underutilized agricultural land were put into agricultural production, 100% of annual demand for eggs, honey, and 24 fruit and vegetable crops could be satisfied (Mullinix et al., 2012).

Urban farms can produce *some* food in the city, but one of the most prevalent questions is, "Should they?" and "Is this an economic or judicious use of high-value space?" Edward Glaeser (2011), advances the argument that urban farms increase urban sprawl and reduce urban density (Glaeser, 2011).

In this research, Vancouver's urban farms largely operated on temporary underutilized spaces. Rarely do urban farms supplant other development in the short term. This is

especially true in Vancouver. Underutilized parking lots, rooftops, and residential yards are the spaces Vancouver's urban farmers are utilizing. Urban farms do not compete with housing or densification; instead they operate in the spaces in-between large projects. In any city, the efficient use of space is dynamic. For example, as more bike lanes are built and used, less parking is needed. Parking lots become obsolete, but it takes time to aggregate enough space to begin a large development project. Vancouver's urban farms are nimble, and establish in these underutilized spaces. Eventually 'under-utilized' spaces within a city are developed, but even after these spaces are conceived as a new project, they must go through a regulatory and planning process that takes time. As a result, there is both physical space and time to develop transitory urban farms. Furthermore, some spaces are conducive to urban agriculture regardless of current development pressure. Rooftops, sections of parking lots, and portions of residential yards – these are areas that are being developed in Vancouver. Urban farms conceived as community spaces and parks can also greatly add to a neighbourhood. Urban farms need not push residents away, rather they can use land unsuitable for other development and provide valuable goods and services to communities until development pressures change and the land is utilized for another purpose.

On a per square foot basis, most urban farms are not able to financially compete with other businesses, such as retail stores, coffee shops or cafés. There are exceptions. If the three most productive urban farms were able to scale their operations to an acre of land, each farm would generate between \$200,000 and \$250,000 in gross revenue during the growing season. Many of Vancouver's urban farms are scaling up in 2012. Farm 7 will be growing on just over four acres, while Farm 5 has doubled their farming space to one acre.

Despite the possibility that some urban farms can compete financially with forms of other urban development, they generally are not in competition for land. Urban farms often look for different types of land than do cafés or other retail businesses. Rooftops, parking lots, and other underutilized urban spaces are more suitable to urban farms than busy hubs more suitable for retail.

Financial success aside, urban farmers often operate their businesses with a keen eye towards community development. They are part farm, part community amenity, and part educational entity. Capturing the value of these community development operations is critical to fully appreciating the impacts of urban farming. It is often not the direct economic contribution that generates the most excitement and energy surrounding urban farms. Rather, it is the peripheral benefits accrued to both the community and individuals involved in urban agriculture. Feenstra (1999) observed:

“The economic development potential for these [entrepreneurial community] gardens is modest, but important. Successful projects create immediate employment opportunities in low-income areas. More important, they play a critical role in preparing low-income residents for better quality jobs over the long term. They do so by providing educational opportunities, developing leadership and life skills, instilling a sense of control, and in other ways, contributing to a higher quality of life” (Feenstra et al., 1999, p. 34).

As the urban farming sector in Vancouver grows and the City of Vancouver moves forward with its Greenest City by 2020 strategy, more work is needed to evaluate Vancouver’s urban farms in light of the goals of the city and the multifaceted benefits these farms can provide.

URBAN FARM GOALS AND MISSIONS

Metro Vancouver’s urban farms are most successful when they have established and operate under a clearly conceived and articulated mission. This corroborates other research indicating that successful urban farms include mission components addressing non-food

production issues such as poverty reduction, self-reliance, and sustainability (Kaufman and Bailkey, 2000). Only three of the surveyed urban farms, all of which were non-profit organizations, had formal mission statements. Without a clearly articulated mission, farms tend to engage in activities that require resources but not move the organization forward. Though a farm can adopt varied goals (e.g., urban landscaping, food security, economic development, and education), it seems critical that urban agriculture organizations develop a set of priorities and objectives to direct their operations.

Metro Vancouver's for-profit urban farms are small and largely focus on crop production and sales. Though small, many of these farms are content with the size and scope of their operations. They tend to be secondary sources of income for the owners/managers. A number of owners are thinking critically about how to increase revenues via expanded enterprises, such as waste collection, farm tours, and food processing. However, lack of business experience, staff, and funding make it difficult for urban farms to grow beyond a small, easily managed scale (Feenstra et al., 1999; Kaufman and Bailkey, 2000).

METRO VANCOUVER'S URBAN FARMING CENSUS 2010-2011

NON-PROFIT AND FOR-PROFIT FARMS

The literature on North American urban farms is scarce, particularly regarding the financial viability of these organizations. There is a particular lack of financial information on for-profit urban farms. Most research focuses on not-for-profit farms dedicated to various aspects of food security, sustainability, and community development. Metro Vancouver has a number of for-profit urban farms that also benefit the community. They have much smaller operating budgets than their non-profit counterparts. Metro Vancouver's for-profit farms did

not have significant expansion plans at this point.

This study revealed four factors that discourage for-profit farms from expanding. First, the legality of these organizations is in question, which increases investment risk. Though the City of Vancouver has agreed not to enforce bylaws relating to urban farming (until the City has developed a clear policy on urban farming), these businesses operate in an uncertain legal environment. The City is actively involved in promoting urban agriculture, but has only recently begun to develop the legal framework for such enterprises. Though for-profit organizations are able to navigate these bureaucratic uncertainties, Vancouver's non-profit organizations were typically the first to test any legal boundary and were the first ones to implement larger-scale urban farms in Vancouver. Second, for-profit farming organizations are largely growing on land without specific land tenure agreements. Without assurance that the land will be available in the long term, it is not wise to invest the capital required to scale up operations. Third, urban farmers are still acquiring the requisite production and business management skills. Urban farmers are learning how to develop crops plans and execute them. Though they have foundational horticultural skills, learning to rotate market crops is a new skill for many. Urban farmers must either develop these skills or hire expertise. Fourth, access to sufficient capital necessary to prepare and operate on larger land parcels (i.e., materials and labour) is limited. For-profit urban farmers typically need substantial capital infusions to expand their operations. Many for-profit farms have foregone social enterprise grants, looking instead to develop low-cost, small businesses that do not require outside financing. Though many urban farmers have the skills necessary for the informal businesses they have created, they do not have the skills necessary to finance and grow a large-scale urban farm. As the region's regulations change, some farmers in this study indicated they

will continue to look at a variety of expansion opportunities including aquaponics, hydroponics, or producing high value crops like strawberries.

Farming as a non-profit corporation has been a successful approach for many urban farming organizations. Business, governmental, and community interest in urban farms that focus on community benefits as well as the production of local fresh produce, has led to financial and political support. Grants are increasingly available to these kinds of urban farms. In 2012 and into the 2013 growing season, over five acres of new Vancouver-based urban farms will be in production, all run by non-profit organizations. Vancouver's non-profit urban farms have been successful at aligning their missions with the goals of the City of Vancouver and various funding agencies. Missions often reflect themes of food security, sustainability, and community development. Larger farms are able to attract the business acumen that other farms lack (Feenstra et al., 1999; Kaufman and Bailkey, 2000). With the experience and confidence that comes with organizational structure, some farms are successfully leasing land from the City of Vancouver and other institutions.

LAND

In 2011, no Metro Vancouver urban farm, primarily growing and selling produce, owned its land. This is the reality of urban farming in Metro Vancouver. What is more, these farms, like those in other locals, do not pay rent for their land (Hynes, 1996; Kaufman and Bailkey, 2000). As many American cities restructure due to the severe loss of manufacturing industry and population, brownfields, and vacant lots become available for urban agriculture (The City of Detroit, 2010). Vancouver has a strong economy, and land is valued at a premium. Only by utilizing residentially or commercially zoned land for urban farming as secondary or

accessory uses have urban farms been able to find land for production. For those farmers interested in developing new sites in Vancouver, it is critical to find low cost methods of obtaining and preparing appropriate land for farming. While paying market value for land is not financially feasible for Vancouver's urban farmers, farming land as an accessory or secondary use is possible and transforms underutilized space into productive farmland and green space for commercial or residential landowners. In doing so, urban farms navigate the difficulty of high land costs by providing services: landscaping or produce for landowners. In turn, farmers receive the right to grow on that land. For example, farmers may landscape gardens for a fee providing produce to homeowners. Instead of grants and other public financing used to rent or lease the land, urban farms are paid fees for the execution of a service such as landscaping or other community-based programming.

REVENUE GENERATION

Urban farms support themselves through three types of revenue: crop sales, grants, and services. These should link directly to the mission of the farm, though many farms engage in enterprises that do not directly connect to their mission. For example, Farm 10 primarily generated revenue from food sales, though they are dedicated to educating communities through innovative neighbourhood farms. Urban farms must focus their operations, and ensure their operations are funded by appropriate mission focused revenue.

Non-profit farms were typically able finance capital improvements and initial operating expenses through grants. However, these farms hoped to move away from grant dependency and evolve into a farming operation supporting itself through crop sales or other fee-for-service operations. This increased focus towards food sales and other revenue is different

from many other urban farms (Feenstra et al., 1999; Kaufman and Bailkey, 2000).

In addition to production-focused businesses, some farms are interested in developing community oriented fee-for-service programs. In this model, the food grown on site becomes secondary, as the financial incentive is to use the farm as a basis for fee-for-service programming. Farm 12, for example, hosted camps. Farm 5 held horticulture therapy sessions. Farm 10 taught food literacy to public school teachers and students. These farms are currently developing business models to better reflect fee-for-service programs.

Urban farms grow and sell food through a diversity of distribution methods. Vancouver's urban farms primarily use two distribution channels: CSAs and farmers markets. In 2010, six of eight farms generated most of their revenue from CSAs, with five of those farms generating over 70% of their revenues from CSAs. In 2011, five of ten farms generated most of their revenue from CSAs. CSA's represent a risk-minimizing strategy that maximizes cash flow while protecting farmers from market fluctuations, adverse weather conditions, and other unforeseeable problems. Vancouver farmers stated that farmers markets are time intensive and risky, but offer higher returns. Farms that generated the most revenue in 2010 and 2011 primarily generated it through sales at farmers markets. Established urban farmers often advised new farmers to think about starting with a CSA. Once established, new farmers should work with local farmers markets or farm-gate sales to sell the extra produce they will inevitably produce.

COSTS AND EXPENDITURES

Vancouver's urban farms incur a spectrum of costs. Start-up costs can be significant on

marginal land. Understanding why costs vary so much across farms is critical to understanding the sector's growth potential. For example, construction costs for raised beds, soil, and irrigation systems are expensive. However, many of Vancouver's urban farmers have reduced these costs by recycling or repurposing old materials, borrowing, trading and finding alternatives to expensive options. Data suggests that some farmers are better than others at minimizing their infrastructure and production costs, though neither the type of farm, nor the size of the farm suggests a particular proclivity to do so. The more informal farms, those without external stakeholders such as granting organizations or without formal partnerships with landowners, were able to minimize their costs more than those organizations with external stakeholders. Less rigid organizations, with limited food sales, most often used recycled goods. Those organizations with capital financing from granting organizations found it unnecessary to spend the time to look for low cost alternatives.

One significant difference among farms surveyed related to how they managed labour costs. Many of Vancouver's urban farms are a unique hybrid of volunteer activities and entrepreneurial ventures. Therefore, labour is often highly "subsidized." Owners often donated their labour, vehicles, and paid for business expenses without reimbursement. If these farms paid for their donated labour, etc., they would not likely be solvent. Vancouver's urban farms are able to attract such a large amount of donated labour because they largely operate within a gray zone between commercial enterprise and avocation.

Both for-profit and non-profit urban farms use a labour structure that includes donated labour. As a result, even for-profit urban farms act similarly to non-profit ones, where volunteer labour of a board of directors and other members is a necessary part of the

organization. The owner and volunteer subsidy of labour is necessary for many of the urban farms, but at the same time, connects the farm to the community through training and the increased participation of the community. As these farms grow and develop, it is unclear how labour provision and expense will change. It may be that in the near future, non-profit urban farms will have to develop clearer policies regarding interns and other volunteer labour because of funder and/or government reporting requirements. For-profit urban farms do not have the same pressures. Both may also begin developing well-delineated programs for volunteers and interns as a way to increase the efficiency of their labour force.

ARE URBAN FARMS A GOOD FINANCIAL INVESTMENT?: A NET PRESENT VALUE (NPV) ANALYSIS

Are urban farms a good financial investment? The answer will vary per type and structure of any given farm. However, with a few assumptions, one can estimate the potential return of an urban farm over time.

Assume that the enterprise is a small for-profit urban farm operating on donated plots, either residential or commercial, public or privately owned. Landowners receive landscaping services as well as a half share of produce as rent. On commercial sites, assume the landowner rezones farmed land as a public park. The landowner receives the tax benefit. All plots are in close proximity to each other. Finally, assume the entrepreneur is a reasonably skilled farmer and marketer able to execute an urban farm plan without problem.

This analysis uses net present value (NPV), to estimate the return on investment given a particular ‘discount rate.’ The discount rate is based on the opportunity cost of another

investment. Assume an investor could receive an 8% rate of return on another investment, such as individual stock, mutual funds, etc. As urban farms often operate as social enterprises, it is expected that an urban farm investment would be comparable to other social enterprise investments. VanCity offers a number of term deposits connected to community development having a 2.0% rate of return for investments over 60 months. A number of socially responsible funds from IA Clarington Investments, in partnership with VanCity, yielded (YTD) 2.0% to 7.6%. As it is unclear what the alternative investment would be for potential urban farm owners, I have chosen 8% as a reasonable rate of return for the 10-year alternative investment. Positive NPV values show that the urban farm investment makes a greater than 8% return while negative values indicate that the alternative investment has a greater return.

In the first year of business, assume the owner secures sites through long term (>10 years) formal agreements with landowners. This is possible in Vancouver as a result of the work that the City has done to encourage urban farming and the interest of both landowners and residents to support these activities.

Further, assume that establishment costs, including soil, seed, and labour, is supported by an initial cash outlay and in-kind donations of labour. Also, website development, initial gas and cell phone costs are subsidized by the owner. Revenue in the first year is zero as work starts in the fall but produce is not harvested until the spring.

In Year 1 the farm is assumed to have 25 CSA customers who pay \$25/week for 20 weeks of produce plus a \$100 farm improvement fee for a total of \$600 / CSA share (CSA Revenue = \$15,000). In addition, the farm is cautious the first year and sells five less CSA member

shares than the land base would support. All excess produce is sold at farm-gate stands (Market Revenue = \$3000).

Costs include farm labour, which is estimated to work full time, paid at \$10.25/hr. during the 20-week season. In addition, labour is required five weeks before the season begins to set up the farm and five weeks after the season to prepare the farm for the following year. A critical assumption is that labour is needed for 30 hours a week. The person hired must have the ability to grow and manage an urban farm. Owners might need to invest some time in hiring and training the right candidate.

Website costs, harvesting materials, fuel are included in SGA expenses. Growing costs are estimated to be \$0.30/sq ft, in line with other farms of its size and type.

In Year 2 the farm has 30 CSA customers paying \$27/week for 22 weeks of produce plus a \$100 farm improvement fee for a total of \$700/CSA share. In addition the farm sells extra produce through farmers markets and farm-gate sales (\$4000). There is one full time employee paid \$15/hr. during the 30-week season. SGA expenses include signage on the farm, as well as a website and a few advertisements for farm-gate sales. Production costs are \$0.30/sq. ft. The farm grows 0.05 acres in Year 3, resulting in a \$700 establishment expense due to the purchase of soil, amendments, and infrastructure, the same rate of the initial establishment cost.

In Year 3 the farm has expanded 0.05 acres and has ten more CSA customers paying \$700/CSA share. The increase in the number of CSA members and price is consistent with Metro Vancouver urban farms. In addition, farm-gate sales have increased (to \$5000) and

warrant the addition of one part-time employee for 12 hours a week at \$10.25/hr., minimum wage, for the entire 30-week season. Again, production expenses are \$0.30/sq. ft.

In Years 4-10, the farm is able to support 50 CSA customers at \$700/CSA share as well as \$6000 worth of produce sold at the farm-gate. Production costs are the same as in Year 4.

From these assumptions, what follows is a breakdown of annual revenues and expenses, and the net present value of the urban farm investment (Tables 4, 5).

Table 4: Assumed Urban Farm Income Statement

	Year 0	Year 1	Year 2	Year 3	Years 4-10
Revenue					
Total Land (acres)	0.15	0.15	0.20	0.25	0.25
Revenue					
CSA	\$ -	\$15,000	\$21,000	\$28,000	\$35,000
Farm-gate	\$ -	\$3,000	\$4,000	\$5,000	\$6,000
Revenue Total	\$ -	\$18,000	\$25,000	\$33,000	\$41,000
Expenses					
Wages	\$ -	\$12,300	\$18,000	\$21,690	\$21,690
SGA	\$500	\$1,000	\$700	\$700	\$700
Growing Expenses	\$2,614	\$1,960	\$2,614	\$3,267	\$3,267
Establishment Expenses	\$2,100	\$700	\$700	\$ -	\$ -
Expenses Total	\$5,214	\$15,960	\$22,014	\$25,657	\$25,657
	\$(5,214)	\$2,040	\$2,986	\$7,343	\$15,343

Table 5: NPV Values of Assumed Urban Farming Investment Costs

Revenues		25% Less	Expected	25% More
	15% Less	\$69,197	\$30,939	\$(7,318)
	Expected	\$101,662	\$63,405	\$25,147
	15% More	\$134,127	\$95,870	\$57,612

Ultimately, under the assumptions made, this analysis indicates that urban farming can generate a reasonable rate of return, greater than the alternative investment at 8%. However, the value of the investment shows a significant sensitivity to increased costs, particularly production costs. However, even if labour costs increase 25%, owners will first make a return in their third year, and will have a positive NPV, but only if no other cost increases occur. Thus, it is critical to keep costs down and budgeting accurately. Substituting in-kind donations for cash costs (e.g. wages, soil amendments, etc.) can help to minimize fluctuations in costs. Expenses are much more uncertain than revenues as they can be affected by changes in weather, crop availability, gas prices, etc. Revenue is less variable, especially as CSA revenue is established at the beginning of the season and payments are made in advance. Given these assumptions, urban farms are an alternative long-term investment for individuals who have the ability to manage an urban farm during the season or have the expertise to direct a manager in their stead. One of the most critical assumptions is that the farm has skilled labour capable of efficiently managing an urban farm including the ability to ensure that the crop and financial plan accounts for losses and unexpected changes in weather.

THE BROADER VALUE OF URBAN FARMING

Though analysis indicates the possibility for urban farms to compete financially with other investments, it is critical to see this as just one means of calculating the value of urban farms. The types of jobs that Vancouver's urban farms generate can help train and employ both the young and those with barriers to employment. Urban farming jobs are seen as a perfect fit for many at-risk people in our communities. Food from the Hood, in Los Angeles, produces salad dressings and other value-added products, providing jobs for inner-city students (Feenstra et al., 1999). Detroit's food networks are training people to grow their own food, participate in a local economy built around food, and support themselves in a declining economic environment (Detroit Black Community Food Security Network, 2010).

For cities looking to rebuild an urban core, urban farms can stabilize a community, forming a central hub where people purchase healthy produce, while connecting with their neighbours and the land. For example, one of Vancouver's urban farms is in a neighbourhood rife with drugs and crime. The farm became a place where people stop to take a look, converse, and work together. Though data on crime reduction has not been collected, there is anecdotal evidence that the farm has helped lead to positive changes in this regard. Another Vancouver farm reclaimed space close to a public school that was littered with used hypodermic needles and where homeless people would sleep. Once the farm was established, the needles disappeared, as did the homeless people. These observations are in concurrence with the growing body of literature connecting crime reduction to urban agriculture (Brown and Jameton, 2000; Hynes, 1996; Hynes and Howe, 2004; Kuo, F.E., and Sullivan, 2001; Vietor, 2010).

Urban farms are transforming blighted neighbourhoods, while creating ‘green collar’ jobs. In Vancouver, one urban farm that employs seven farmers is planning to increase their workforce 300% in 2012. These farms are creating new employment opportunities suitable for at-risk people and others.

Vancouver’s urban farms are at the forefront of educating communities about healthy eating. Neighbours see vegetables growing and participate in their cultivation and harvest. This increases the likelihood that participating individuals will eat more fruits and vegetables (Armstrong, 2000). Anecdotal evidence regarding positive dietary changes of children engaged with Vancouver’s urban farms is reflective of literature that suggests that urban agriculture leads to healthier eating habits (Brown and Jameton, 2000; Brown and Carter, 2003). More research is needed to understand what particular aspects of urban farming encourage positive dietary change.

Through urban farming, neighbourhoods can become centers of food system literacy. During the course of this study, in conversations with farmers, many asked about the different vegetables being grown, how they are grown, and how they could purchase them. In the conventional food system, problems emanating from food production are easily ignored because food production is not *seen*. The choices to use organic or conventional methods, natural or synthetic fertilizers and pesticides, or how to irrigate are decided away from the urban consumer, whose predilections should substantially drive the agricultural process. When food production is brought into the local sphere, it forces these issues into view and promotes an internal dialog about an individual’s food system. The work of urban farmers in Vancouver brings consumers into the reality of food production, relieving the disconnect

between consumer and producer and increasing consumer awareness regarding the ecological, economic, and social impacts of their food choices. The information brought forth through this study highlights the valuable and important roles that urban farms can play in connecting individuals to their food system and to each other.

Though this study focuses on the financial viability of Metro Vancouver’s urban farms, business is one of several roles these organizations play in our communities. As research continues in this field, it is critical that more work be done evaluating the impacts of urban farms on crime reduction, development of social capital, and on the enhancement of urban environments.

HOW METRO VANCOUVER MUNICIPALITIES CAN SUPPORT ENTREPRENEURIAL URBAN FARMS

The recommendations below detail how the Cities of Vancouver, Richmond, and North Vancouver can work with urban farmers to achieve their sustainability objectives.

- 1. Allow neighbourhood urban farms if they are “accessory use” or under two acres in size.*
- 2. Develop sample tenancy agreements for landlords and urban farmers.*
- 3. Use municipal resources to host and support urban agriculture and urban farms on municipal property.*
- 4. Allow farm-gate sales of vegetables, eggs, and honey between 0700 and 2100.*
- 5. Publically offer opportunities for urban farmers to sell produce on municipal land.*

- 1. Allow neighbourhood urban farms if they are “accessory use” or under two acres in size.**

None of Metro Vancouver’s urban farms reside on sites intended for urban agriculture. They

constitute secondary or accessory use occupying parking lots, residential yards, other commercial property, or parks. Municipalities should principally allow urban farming on residential, commercial, or industrial zones so long as the farm is either an accessory use or smaller than two acres. This would allow urban farmers to work with large landholders to farm large yards (< 2 acres in size). Farmers would be authorized to convert underutilized parking lots, roofs, and underutilized spaces without going through a rezoning or permitting process that could constitute substantial political and financial barriers. In addition, it would allow urban farms to work directly with landowners to develop hospital, schoolyard, and neighbourhood farms without bureaucratic involvement.

Though the current municipal governments in the study region are invested in urban farming and urban agriculture, this might not always be the case. Once a city becomes involved in issuing permits, the increased bureaucracy and political difficulties can stymie further action. Ensuring that landowners may choose to enter into agreements with urban farmers, without going through a costly rezoning process, is critical for allowing urban agriculture to thrive. Principally allowing urban farms on all zoned land will maintain their ability to quickly move among vacant, abandoned, or other available sites.

Other cities have developed similar by-laws. The City of Seattle allows urban agriculture on all commercially and industrially zoned properties as accessory use without an administrative conditional use (ACU) permit. In addition, if the site is on residentially zoned land and smaller than 4,000 sq. ft., no ACU is necessary (Department of Planning and Development: City of Seattle, 2010). Some of Vancouver's urban farms are already larger than 4,000 sq. ft., making this size recommendation unsuitable. Furthermore, such a small size will

discourage urban farms from residential production, precisely the place where urban farms have their largest potential to integrate food production, community gathering, and entrepreneurial ventures.

The City of San Francisco principally permits farms under one acre (43,560 sq. ft.) in any zone without an ACU, provided that the farm meets a minimum standard of physical and operational standards: compost is set back from living units and decks, fencing is wood, ornamental, or if chain link, must be covered by vegetation in three years, limiting the use of mechanized equipment to initial site preparation and screening the machinery from view (Newsom, 2011). San Francisco's legislation allows small urban farms to grow throughout the city, while larger urban farms (> 1 acre), regardless of zone, require an ACU permit. San Francisco's legislation provides crucial support for urban farms, though it makes larger urban agriculture susceptible to burdensome regulation.

Urban farmers in these jurisdictions are still looking to understand the ramifications of these policies, which were enacted in the cities of Seattle and San Francisco in 2010 and in 2012 respectively. Further research is needed to better ascertain the impacts of these policies. The recommendation to allow principally allow urban farms under two acres in size on all land types will make it possible for Metro Vancouver to achieve its core goal of increasing urban food production through urban farming.

2. Develop sample tenancy agreements for landlords and urban farmers.

None of Metro Vancouver's urban farmers have developed formal relationships with their landowners. Trust, relationship building, and interested residents account for the success of urban farmers who use rent-free land. However, disputes and miscommunication occur

under the best of circumstances. Urban farmers and their landowners would benefit from clear contracts outlining obligations and expectations.

Urban farms are largely in the public realm. Even when located on private land, they are garden spaces that neighbours view. Compost piles, untended plots, and general untidiness can have negative impacts on neighbours and the landowners. Surveyed urban farmers indicated that landowners and neighbours would benefit from explicit guidelines, possibly created by the Urban Farming Network Society, that accurately describe the environment of an urban farm. Municipalities could aggregate these recommendations and incorporate them in sample tenancy agreements.

One of the largest concerns of urban farm neighbours is the belief that urban farms will be noisy, host loud machinery, and otherwise be a nuisance. One way to reduce concern is to educate residents on the minimal amount of machinery used by urban farmers and create guidelines on the storage of agricultural equipment. Keeping agricultural equipment enclosed and screened from site can reduce anxiety of neighbours and ensure that the residential character of the neighbourhood is maintained.

Developing sample tenancy agreements and other resources for landowners and farmers can help set expectations and protect both parties from unforeseen conflicts. An important aspect of this policy is to model positive behaviours and standards. By developing sample tenancy agreements, urban farms neighbours will have a clearer understanding of the conditions and activities associated with urban farming. Homeowners, by virtue of ownership, have most of the power in this relationship. Developing sample agreements can help farmers better understand and articulate their vested interests. Cities can support the development of this

information and help citizens connect to the relevant farming organizations. The Sustainable Economies Law Center in Oakland California has a template that can help urban farmers structure their agreements (Sustainable Economies Law Center, 2010) (Appendix B).

3. Use municipal resources to host and support urban agriculture and urban farms on municipal property.

As urban farms continue to grow, they are beginning to reassess their business relationships with landowners and develop new ways to generate revenue from landscaping services. Municipalities can model these types of relationships. For example, the City of Vancouver might sponsor urban farmers on city owned parkland. As this is land already budgeted for maintenance, the City could use that money to pay farmers to ‘maintain’ the park while also producing food. Maintenance could include programs for local residents, educational activities, cooking demonstrations, and workshops on growing food. The City can pay urban farmers for their community work, while allowing them to sell their produce to the neighbourhood. Organizations such as Vancouver’s Urban Farming Network, as well as individual farms, could help develop a model arrangement. Municipalities should develop and promote model land arrangements with urban farmers, to ensure that urban farmers are compensated for the full value of their farms and work.

4. Allow farm-gate sales of vegetables, eggs, and honey between 7:00 am and 9:00 pm.

Food sales at the site of production are called farm-gate sales. They are informal ways urban farmers can sell produce to their neighbours, but this is not currently legal. Allowing neighbourhood farm-gate sales would help spur urban farming throughout the city.

As part of farm-gate sales, it is critical to ensure that signage is also allowed. Allowing signs

to promote sales as well as promote the story behind the urban farm can help connect residents to the work occurring in their neighbourhood. Signs promoting the sale of produce should be out only during sales hours.

Farm-gate sales offer a unique way for urban residents to purchase local food who do not travel to farmers markets for a number of reasons: time conflicts, distance, atmosphere of the markets, lack of signage, and/or knowledge (Colasanti, Conner, and Smalley, 2010).

Bringing local food outside of the construct of a farmer's market or CSA arrangement makes fresh food more accessible to urban residents. This helps to serve two goals of the City of Vancouver: "grow more food in the city," and "make local food more accessible" (The City of Vancouver, 2012, p. 66). Allowing farm-gate sales reaches 'eater's' where they live, connecting neighbours around the food that is produced right in their community as well as providing an important marketing option for urban farmers.

5. Publically offer opportunities for urban farmers to sell produce on municipal land.

Buying produce from urban farmers is unusual for most urban residents. There is not only a knowledge gap, but also a lack of familiarity with these informal market transactions. As a leader in the sustainability movement and largest municipality in the Metro Vancouver region, the City of Vancouver, can, by virtue of its position in the region, can legitimize urban farming and model ways that individuals and large organizations can support it.

Municipalities can model innovative methods of farm sponsorship. They can host weekly CSA pick-up sites and pocket markets that promote urban and local food production on municipal land. By developing these programs, municipalities can highlight new ways for urban residents to purchase local produce as well as provide a platform for farmers to

showcase their farms, produce, and values to a new audience.

In addition, municipalities can play a unique role in developing long term produce contracts with urban farms. Purchasing local produce for municipal cafeterias, catered events, or any public event would be a powerful way to signal that the city is financially and politically, supporting urban farmers and can be a model for other organizations. The municipality will be able to showcase its work on sustainability, while farmers will gain an important customer.

FUTURE STUDY

Over the next five years, the Vancouver Urban Farming Census should continue paying particular attention to the limitations outlined in this thesis. A system of record keeping to record data in simple and uniform ways should be developed closely with urban farmers and promoted. It would be valuable to empirically estimate the crop production potential on underutilized lands in Vancouver if put into small-scale production.

Continuing the Census will help the City of Vancouver track changes and advances in urban agriculture as the City moves towards its Greenest City goals. The Census will act as a rich repository of longitudinal data. Such data will enable municipalities to track the revenues and expenditures of urban farmers, and demonstrate the economic viability of urban farms. Moreover, in collecting this data, the City will have a more informed idea of how well its policies have been working in practice. It can form a model for other work in other municipalities and serve as a framework for a national urban agriculture census.

9. AFTERWORD

Urban farms highlight the connection and dependence of our food system on the land and the environment. They empower urbanites to learn about their food system, teaching them that growing food is a miracle, dependant upon the environment and the careful tending of the garden. Education obtained in the garden is profound and important, often connecting us to our cultural roots, as well as helping us to eat more healthily. Urban farms inspire new farmers and can play a significant role in providing food to our cities long into the future.

Building local food systems is important not only because of the benefits it provides to our communities, but because it brings new appreciation to work so often ignored and treated as insignificant: agricultural production. Farming is critical to our society, yet we have such little personal understanding and connection to the land and the process by which it is farmed. Connecting our food production to urban spaces is critical to teaching urbanites about the impacts of our food systems. Urban agriculture and urban farming in particular can play that important role.

Prof. Michael Hamm articulates a vision for a sustainable food system:

“How about a food system in which we know where a significant percent of our food comes from? How about one in which the production, processing, distribution, and waste handling were consistently done in an environmentally sensitive manner? How about one in which the democratic principles under which [the United States] was founded are made stronger and not weakened through consolidation and monopolization? How about one in which the farmers who grow our food are honoured as heroes and not marginalized as commodity producers? How about one in which every consumer and person working in the food system has the opportunity to reach their potential and is not limited by less than living wage jobs, poor nutrition, and substandard education? How about one in which food is a right and working honestly is a responsibility?”

Urban agriculture can help to build that food system. Already Metro Vancouver’s urban farmers are doing their part.

BIBLIOGRAPHY

- Abourezk, J. (1975). Agriculture, Antitrust and Agribusiness: A Proposal for Federal Action. *South Dakota Law Review*, 499(Summer), 499–513. Retrieved from http://heinonline.org/HOL/Page?handle=hein.journals/sdlr20anddiv=33andcollection=journalsandset_as_cursor=1andmen_tab=srchresults
- Advocates for Urban Agriculture. (2010). *Plan for Sustainable Urban Agriculture in Chicago*. Retrieved from <http://auachicago.files.wordpress.com/2010/03/aua-plan-updated-3-4-10.pdf>
- Alaimo, K., Packnett, E., Miles, R. A., and Kruger, D. J. (2008). Fruit and vegetable intake among urban community gardeners. *Journal of nutrition education and behavior*, 40(2), 94–101. doi:10.1016/j.jneb.2006.12.003
- Ali, Mir and Lucier, Gary. Vegetable and Melons Outlook: February 2011. Outlook No. (VGS-342-01) 33 pp, February 2011. <http://www.ers.usda.gov/publications/vgs-vegetables-and-pulses-outlook/vgs-342-01.aspx>
- American Academy for Paediatrics. (2012). Familiarity With Television Fast-Food Ads Linked to Obesity. *Press Release*.
- Anderson, K. J. (1991). *Vancouver's Chinatown: Racial discourse in Canada, 1875-1980*. Montréal: McGill-Queen's University Press.
- Andreyeva, T., Sturm, R., and Ringel, J. S. (2004). Moderate and severe obesity have large differences in health care costs. *Obesity research*, 12(12), 1936–43. doi:10.1038/oby.2004.243
- Anis, A. H., Zhang, W., Bansback, N., Guh, D. P., Amarsi, Z., and Birmingham, C. L. (2010). Obesity and overweight in Canada: an updated cost-of-illness study. *Obesity reviews : an official journal of the International Association for the Study of Obesity*, 11(1), 31–40. doi:10.1111/j.1467-789X.2009.00579.x
- Armstrong, D. (2000). A survey of community gardens in upstate New York: implications for health promotion and community development. *Health and place*, 6(4), 319–27. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11027957>
- Bailey, L. H. (1903). The Nature Study Movement. Proceedings of the National Educational Association.
- Baker, L. E. (2004). Tending Cultural Landscapes and Food Citizenship in Toronto's Community Gardens. *Geographical Review*, 94(3), 305–325. doi:10.1111/j.1931-0846.2004.tb00175.x

- Bassett, T. (1981). Reaping on the Margins: A Century of Community Gardening in America. *Landscape*, 25(2), 1–8. Retrieved from <http://www.geog.illinois.edu/people/bassett/documents/TomBassettLandscape1981.pdf>
- Becker, G. S. (2008). Food and Agricultural Imports from China. *CRS Report to Congress*.
- Been, V., and Voicu, I. (2006). The Effect of Community Gardens on Neighboring Property Values The Effect of Community Gardens on Neighboring Property Values. *New York University Law and Economics Working Paper*.
- Berry, W. (2003). The Pleasure of Eating. In N. Wirzba (Ed.), *The Art of the Commonplace: The Agrarian Essays of Wendell Berry* (p. 352). Berkeley, CA: Counterpoint Press.
- Blair, D., Giesecke, C. C., and Sherman, S. (1991). A dietary, social and economic evaluation of the Philadelphia Urban Gardening Project. *Journal of Nutrition Education*, 23(4), 161–167.
- Bond, C. A., Thilmany, D., and Bond, J. K. (2008). Understanding consumer interest in product and process-based attributes for fresh produce. *Agribusiness*, 24(2), 231–252. doi:10.1002/agr.20157
- Boswell, V. R. (1942). *Victory Gardens* (p. 11). Retrieved from <http://www.victorygardenfoundation.org/VGhistory/Dept of AG VGs.pdf>
- Breisinger, C., Rheenen, T. van, Ringler, C., Pratt, A. N., Minot, N., Aragon, C., Yu, B., et al. (2010). Food Security and Economic Development in the Middle East and North Africa: Current State and Future Perspectives. IFPRI Discussion Paper. Washington, D.C.
- Brinkman, H.-J., de Pee, S., Sanogo, I., Subran, L., and Bloem, M. W. (2010). High food prices and the global financial crisis have reduced access to nutritious food and worsened nutritional status and health. *The Journal of nutrition*, 140(1), 153S–61S. doi:10.3945/jn.109.110767
- Brook, R. M., and Dávila, J. D. (Eds.). (2000). *The peri-urban interface: a tale of two cities* (p. 251 + vii. pp.). School of Agricultural and Forest Sciences, University of Wales and Development Planning Unit, University College London. Retrieved from http://www.bartlett.ucl.ac.uk/dpu/latest/publications/dpu-books/tale_of_two_cities.pdf
- Brown, K. H., and Jameton, A. L. (2000). Public health implications for urban agriculture. *Journal of public health policy*, 21(1), 20–39. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/10754796>
- CDC. (2010). Investigation Update: Multistate Outbreak of Human Salmonella Enteritis

- Infections Associated with Shell Eggs. *Salmonella*. Retrieved January 3, 2012, from <http://www.cdc.gov/salmonella/enteritidis/#investigation>
- Canning, P., Charles, A., Huang, S., Polenske, K. R., and Waters, A. (2010). *Energy Use in the U.S. Food System*.
- Carney, P. a, Hamada, J. L., Rdesinski, R., Sprager, L., Nichols, K. R., Liu, B. Y., Pelayo, J., et al. (2011). Impact of a Community Gardening Project on Vegetable Intake, Food Security and Family Relationships: A Community-based Participatory Research Study. *Journal of community health*. doi:10.1007/s10900-011-9522-z
- Central Intelligence Agency. (2012). CIA World Factbook. *The World Factbook: Urbanization*.
- Christian, T., and Rashad, I. (2009). Trends in U.S. food prices, 1950-2007. *Economics and human biology*, 7(1), 113–20. doi:10.1016/j.ehb.2008.10.002
- Chung, C., and Myers, S. L. (1999). Do the Poor Pay More for Food? An Analysis of Grocery Store Availability and Food Price Disparities. *Journal of Consumer Affairs*, 33(2), 276–296. doi:10.1111/j.1745-6606.1999.tb00071.x
- City of New York Parks and Recreation. (2012). The Community Garden Movement. Retrieved June 10, 2012, from <http://www.nycgovparks.org/about/history/community-gardens/movement>
- City of North Vancouver. (2011). *Food Security and Urban Agriculture Strategy*. City of North Vancouver.
- City of Richmond. (2011). *City of Richmond: Urban Agriculture Assessment*. City of Richmond. Retrieved from <http://www.ci.richmond.ca.us/DocumentView.aspx?DID=7965>
- City of Vancouver. (2010). *Vancouver: 2020 A Bright Green Future*. Vancouver.
- Claro, J. (2011). Vermont Farmers markets and Grocery Stores: A Price Comparison.
- Colasanti, K. (2010). Assessing the local food supply capacity of Detroit, Michigan. *Journal of Agriculture, Food Systems, and Community Development*, 41–58. doi:10.5304/jafscd.2010.012.002
- Colasanti, K. J. A., Conner, D. S., and Smalley, S. B. (2010). Understanding Barriers to Farmers' Market Patronage in Michigan: Perspectives From Marginalized Populations. *Journal of Hunger and Environmental Nutrition*, 5(3), 316–338. doi:10.1080/19320248.2010.504097
- Colasanti, K. J. A., Hamm, M. W., and Litjens, C. M. (2012). The City as an “Agricultural

- Powerhouse”? Perspectives on Expanding Urban Agriculture from Detroit, Michigan. *Urban Geography*, 33(3), 348–369. doi:10.2747/0272-3638.33.3.348
- Colley, R. C., Garriguet, D., Janssen, I., Craig, C. L., Clarke, J., & Tremblay, M. S. (2011). *Physical activity of Canadian adults: Accelerometer results from the 2007 to 2009 Canadian Health Measures Survey* *Physical activity of Canadian adults: Accelerometer results from the 2007 to 2009 Canadian Health Measures Survey. Health Reports*. Retrieved from <http://www.statcan.gc.ca/pub/82-003-x/2011001/article/11396-eng.htm>
- Coleman-Jensen, A., Nord, M., Andrews, M., and Carlson, S. (2011). *Household Food Security in the United States in 2010* (p. 29).
- Condon, M. Patrick, Kent Mullinix, Arthur Fallick, and Mike Harcourt. 2010. Agriculture on the edge: Strategies to abate urban encroachment onto agricultural lands by promoting viable human-scaled agriculture as an integral element of urbanization. *International Journal of Agricultural Sustainability*, 8 (1 & 2), 104.
- Connell, D. J., Smithers, J., and Joseph, A. (2008). Farmers markets and the “good food” value chain: a preliminary study. *Local Environment*, 13(3), 169–185. doi:10.1080/13549830701669096
- Cooke, L. (2007). The importance of exposure for healthy eating in childhood: a review. *Journal of human nutrition and dietetics : the official journal of the British Dietetic Association*, 20(4), 294–301. doi:10.1111/j.1365-277X.2007.00804.x
- Cordell, D., Drangert, J.-O., and White, S. (2009). The story of phosphorus: Global food security and food for thought. *Global Environmental Change*, 19(2), 292–305. doi:10.1016/j.gloenvcha.2008.10.009
- Cotten, A., Haynes, D., Wells, W., Lovegrove, M. E. W., and Bauer-Leffler, S. (2009). *Maryland Policy Choices: 2010; Public Opinion and Policy Choices* (p. 31). Baltimore, MD.
- Coyne, K., and Knutzen, E. (2008). *The Urban Homestead* (p. 308). Port Townsend, WA: Process Media.
- Darby, K., Batte, M. T., Ernst, S., and Roe, B. (2008). Decomposing Local: A Conjoint Analysis of Locally Produced Foods. *American Journal of Agricultural Economics*, 90(2), 476–486. doi:10.1111/j.1467-8276.2007.01111.x
- Democracy Now! (2010). Detroit Urban Agriculture Movement Looks to Reclaim Motor City. *Democracy Now!* Democracy Now! Retrieved from http://www.democracynow.org/2010/6/24/detroit_urban_agriculture_movement_looks_to
- Department of Planning and Development: City of Seattle. (2010). *Urban Agriculture:*

- Seattle Permits*. Seattle, WA. Retrieved from <http://www.seattle.gov/DPD/Publications/CAM/cam244.pdf>
- Department of Sanitation New York City. (2012). New and Emerging Conversion Technology. *NYC.gov*. Retrieved June 8, 2012, from http://www.nyc.gov/html/dsny/html/emerging_technology/new_emerging_convtech_DSNY.shtml#Studies
- Detroit Black Community Food Security Network. (2010). Statement of Purpose. *About Us*. Retrieved June 15, 2012, from <http://detroitblackfoodsecurity.org/about.html>
- Dimitri, C., Effland, A., and Conklin, N. (2005). *The 20th Century Transformation of U.S. Agriculture and Farm Policy*. *USDA: Economic Information Bulletin* (Vol. June, p. 14). Retrieved from <http://www.ers.usda.gov/publications/eib3/eib3.htm>
- Dolan, M. (2012, July 5). New Detroit Farm Plan Taking Root. *The Wall Street Journal*. Retrieved from <http://online.wsj.com/article/SB10001424052702304898704577479090390757800.html>
- Domina, D. A., and Taylor, C. R. (2009). The Debilitating Effects of Concentration In Markets Affecting Agriculture (p. 78).
- ETC Group. (2008). Who Owns Nature? Corporate Power and the Final Frontier in the Commodification of Life (p. 50). Ottawa, Ontario.
- Earthworks Urban Farm. (2012). Earthworks Urban Farm.
- Economic Research Service (ERS): U.S. Department of Agriculture. (2012a). *Outlook for U.S. Agricultural Trade*. Washington, D.C. Retrieved from http://www.ers.usda.gov/media/528908/aes-02-23-2012_1_.pdf
- Economic Research Service (ERS): U.S. Department of Agriculture. (2012b). Farm Household Income. *Farm Household Well-being*. Retrieved June 2, 2012, from <http://www.ers.usda.gov/topics/farm-economy/farm-household-well-being/farm-household-income.aspx>
- Elobeid, A., Carriquiry, M., Fabiosa, A. F., Mulik, K., Hayes, D. J., Babcock, B. A., Dumortier, J., et al. (2011). Greenhouse Gas and Nitrogen Fertilizer Scenarios for U.S. Agriculture and Global Biofuels. Ames, Iowa.
- Elser, J., and White, S. (2010). Peak Phosphorus, and Why It Matters. *Foreign Policy*. Retrieved from http://www.foreignpolicy.com/articles/2010/04/20/peak_phosphorus
- FAO. (2002). The State of Food Insecurity in the World 2001. Rom.

- FAO. (2011). ResourceSTAT. *FAOSTAT*. Retrieved December 21, 2010, from <http://faostat.fao.org/default.aspx>
- Feenstra, G. W., McGrew, S., and Campbell, D. (1999). *Entrepreneurial Community Gardens: Growing Food, Skills, Jobs and Communities*. Oakland, CA: University of California Division of Agriculture and Natural Resources Communication Services.
- Finkelstein, E. A., Trogon, J. G., Cohen, J. W., and Dietz, W. (2009). Annual medical spending attributable to obesity: payer-and service-specific estimates. *Health affairs (Project Hope)*, 28(5), 822–831. doi:10.1377/hlthaff.28.5.w822
- Fishler, A. (2012). Is Local Farming Still Popular in 2012? More Than Ever. *PBS Food*. Retrieved June 21, 2012, from <http://www.pbs.org/food/features/food-trends-2012-local-farming/>
- Flegal, K. M., Carroll, M. D., Ogden, C. L., and Curtin, L. R. (2010). Prevalence and trends in obesity among U.S. adults, 1999–2008. *JAMA : the journal of the American Medical Association*, 303(3), 235–41. doi:10.1001/jama.2009.2014
- Floody, R. J. (1912). The Worcester Garden City Plan; or. The Good Citizens' Factory. *The Nature Study Review*, 8 No. 1(9), 145–150. Retrieved from http://www.archive.org/stream/naturestudyrevie08ameruoft/naturestudyrevie08ameruoft_djvu.txt
- Foderaro, L. W. (2012, June 5). Huge Rooftop Farm Is Set for Brooklyn. *The New York Times*. Retrieved from <http://www.nytimes.com/2012/04/06/nyregion/rooftop-greenhouse-will-boost-city-farming.html>
- Fodor, Z. (2011). *People Systems in Support of Food Systems: The Neighbourhood Food Justice Network Movement in Vancouver, British Columbia*. University of British Columbia.
- Foley, J. A., Ramankutty, N., Brauman, K. A., Cassidy, E. S., Gerber, J. S., Johnston, M., Mueller, N. D., et al. (2011). Solutions for a cultivated planet. *Nature*. doi:10.1038/nature10452
- Food Banks Canada. (2011). Hunger Count. Retrieved November 25, 2011, from <http://foodbankscanada.ca/getmedia/dc2aa860-4c33-4929-ac36-fb5d40f0b7e7/HungerCount-2011.pdf.aspx>
- Food and Agriculture Organization. (2007). Profitability and sustainability of urban and peri-urban agriculture.
- Food and Agriculture Organization. (2011). FAO Food Price Index. *FAO Food Price Index*. Retrieved May 30, 2011, from <http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/>

- Franks, J. H. (1919). *The United States School Garden Army*. Washington, D.C.
- Frohardt, K. E. (1993). Case studies of entrepreneurial community greening projects (p. 14). Philadelphia, PA.
- Gallagher, J. (2012, April 13). Michigan State proposes 100-acre, \$100-million urban-farming research center in Detroit. *The Detroit Free Press*. Detroit. Retrieved from <http://www.freep.com/article/20120413/NEWS01/120413045/Michigan-State-proposes-100-acre-100-million-urban-farming-research-center-in-Detroit>
- Galt, R. E. (2011). Counting and Mapping Community Supported Agriculture (CSA) in the United States and California: Contributions from Critical Cartography/GIS. *ACME: An International E-Journal for Critical Geographies*, 10(2), 131–162.
- Gibb, N. (2011). *Parallel alternatives: Chinese-Canadian farmers and the Metro Vancouver local food movement*. Simon Fraser University. Retrieved from <https://theses.lib.sfu.ca/thesis/etd6663>
- Glaeser, E. L. (2011, June 11). The Locavore's Dilemma: Urban Farms do More Harm than Good to the Environment. *The Boston Globe*. Boston, MA.
- Goldstein, M., Bellis, J., Morse, S., Myers, A., and Ura, E. (2011). *Urban Agriculture: A Sixteen City Survey of Urban Agriculture Practices Across the Country*. *Cities*. doi:10.1023/A:1007558805953
- Gouveia, L., and Juska, A. (2002). Taming Nature, Taming Workers: Constructing the Separation Between Meat Consumption and Meat Production in the U.S. *Sociologia Ruralis*, 42(4), 370–390. doi:10.1111/1467-9523.00222
- Grewal, S. S., and Grewal, P. S. (2011). Can cities become self-reliant in food? *Cities*, 29(1), 1–11. doi:10.1016/j.cities.2011.06.003
- Growing Power. (2012). Growing Power. www.growingpower.org. Retrieved June 16, 2012, from www.growingpower.org
- Hamrick, K. S., Andrews, M., Guthrie, J., Hopkins, D., and McClelland, K. (2011). *How Much Time Do Americans Spend on Food ? Time*. Retrieved from <http://www.ers.usda.gov/Publications/EIB86/EIB86.pdf>
- Hancock, T. (2001). People, partnerships and human progress: building community capital. *Health Promotion International*, 16(3), 275–280. doi:10.1093/heapro/16.3.275
- Hanna, A. K., and Oh, P. (2000). Rethinking Urban Poverty: A Look at Community Gardens. *Bulletin of Science, Technology and Society*, 20(3), 207–216. doi:10.1177/027046760002000308

- Hanrahan, C. E., Canada, C., and Banks, B. A. (2011). *U.S. Agricultural Trade: Trends, Composition, Direction, and Policy*. Washington, DC. Retrieved from <http://www.fas.org/sgp/crs/misc/98-253.pdf>
- Hantz Farms Detroit. (2012). Hantz Farms Detroit. Retrieved July 15, 2012, from <http://www.hantzfarmsdetroit.com/>
- Hardy, M. C. (1948). Follow-Up of Medial Recommendations: Results of a Health Check-up of a Group of Well Children in Chicago. *JAMA: The Journal of the American Medical Association*, 136(1), 20–27. doi:10.1001/jama.1948.02890180022005
- Harmon, A. H., and Maretzki, A. N. (2006). A Survey of Food System Knowledge, Attitudes, and Experiences Among High School Students. *Journal of Hunger and Environmental Nutrition*, 1(1), 59–82. doi:10.1300/J477v01n01_05
- Harris, J. L., Schwartz, M. B., Brownell, K. D., Sarda, V., Ustjanauskas, A., Javadizadeh, J., Weinberg, M., et al. (2010). *Fast Food FACTS: Evaluating Fast Food Nutrition and Marketing to Youth* (p. 208).
- Harrison, D., & Rude, J. (2004). *Measuring industry concentration in Canada's food processing sectors*. Ottawa, Ontario.
- Headey, D., and Fan, S. (2008). Anatomy of a Crisis: the Causes and Consequences of Surging Food Prices. *Agricultural Economics*, 39, 375–391. doi:10.1111/j.1574-0862.2008.00345.x
- Heffernan, W. (1999). *Consolidation in the Food and Agriculture System* (p. 19). Retrieved from <http://www.foodcircles.missouri.edu/whstudy.pdf>
- Hendrickson, M., and Heffernan, W. (2007). *Concentration of Agricultural Markets* (p. 4). Columbia, MO. Retrieved from <http://www.foodcircles.missouri.edu/07contable.pdf>
- Higgins, A. (2009, June 15). Recession Leads to More People Buying Seeds, Trying to Grow Vegetables. *The Washington Post*. Washington, D.C. Retrieved from http://www.washingtonpost.com/wp-dyn/content/article/2009/06/14/AR2009061402741_2.html
- Hinrichs, C. C. (2000). Embeddedness and local food systems: notes on two types of direct agricultural market. *Journal of Rural Studies*, 16(3), 295–303. doi:10.1016/S0743-0167(99)00063-7
- Horriagan, L., Lawrence, R. S., and Walker, P. (2002). How sustainable agriculture can address the environmental and human health harms of industrial agriculture. *Environmental health perspectives*, 110(5), 445–56. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1240832andtool=pmcentrezandrendertype=abstract>

- Howard, Ebenezer. *Garden Cities of Tomorrow*. London: S. Sonnenschein and Co., Ltd. 1902.
- Howard, P. H. (2009). Visualizing Consolidation in the Global Seed Industry: 1996–2008. *Sustainability*, 1(4), 1266–1287. doi:10.3390/su1041266
- Hu, W., Batte, M. T., Woods, T., and Ernst, S. (2011). Consumer preferences for local production and other value-added label claims for a processed food product. *European Review of Agricultural Economics*, 39(3), 489–510. doi:10.1093/erae/jbr039
- Hynes, H. Patricia. (1996). *A Patch of Eden: America's Inner-City Gardeners* (p. 185). White River Junction, Vermont: Chelsea Green Publishing Company.
- Hynes, H.P., and Howe, G. (2004). Urban Horticulture in the Contemporary United States: Personal and Community Benefits. *Acta Horticulturae*, 643, 171–181. Retrieved from <http://www.nchh.org/Portals/0/Contents/Article0820.pdf>
- Katherine H. Brown, and Carter, A. (2003). *Urban Agriculture and Community Food Security in the United States: Farming from the City Center to the Urban Fringe* (p. 29). Venice, California. Retrieved from <http://www.foodsecurity.org/PrimerCFSCUAC.pdf>
- Kaufman, J., and Bailkey, M. (2000). Farming Inside Cities : Entrepreneurial Urban Agriculture in the United States. *Policy*.
- Kelly, T., Yang, W., Chen, C.-S., Reynolds, K., and He, J. (2008). Global burden of obesity in 2005 and projections to 2030. *International journal of obesity (2005)*, 32(9), 1431–7. doi:10.1038/ijo.2008.102
- Kingsolver, B. (2008). *Animal, Vegetable, Miracle: A Year of Food Life* (p. 368). Perfection Learning.
- Kremer, P. (2011). Local Food Systems as a Strategy for Sustainability: Analysis of a Scale Dependent Sustainable Urban Food System. A Case Study in Philadelphia. Production. University of Delaware.
- Kuo, F.E., and Sullivan, W. (2001). Environment and crime in the inner city: Does vegetation reduce crime? *Environment and Behavior*, 33(3), 343–367.
- LaFraniere, S. (2009, November 25). 2 Executed in China for Selling Tainted Milk. *The New York Times*, p. A10. New York City. Retrieved from <http://www.nytimes.com/2009/11/25/world/asia/25china.html?ref=melamine>
- Latham, J., and Moffat, T. (2007). Determinants of variation in food cost and availability in two socioeconomically contrasting neighbourhoods of Hamilton, Ontario, Canada.

- Health and place*, 13(1), 273–87. doi:10.1016/j.healthplace.2006.01.006
- Lawson, L. (2004). The Planner in the Garden: A Historical View into the Relationship between Planning and Community Gardens. *Journal of Planning History*, 3(2), 151–176. doi:10.1177/1538513204264752
- Lawson, L. J. (2005). *City Bountiful: A Century of Community Gardening in America* (p. 635). Berkeley, CA: University of California Press.
- Lawson, L., and McNally, M. (1995). Putting teens at the center: Maximizing public utility of urban space through youth involvement in planning and employment. *Children's Environment*, 12(2), 209–221.
- Malik, V. S., and Hu, F. B. (2012). Sweeteners and Risk of Obesity and Type 2 Diabetes: The Role of Sugar-Sweetened Beverages. *Current diabetes reports*. doi:10.1007/s11892-012-0259-6
- Malik, V. S., Schulze, M. B., and Hu, F. B. (2006). Intake of sugar-sweetened beverages and weight gain: a systematic review. *The American journal of clinical nutrition*, 84(2), 274–88. Retrieved from <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3210834&tool=pmcentrez&rendertype=abstract>
- Martinez, S., Hand, M., Pra, M. D., Pollack, S., Ralston, K., Smith, T., Vogel, S., et al. (2010). *Local Food Systems Concepts, Impacts, and Issues* (p. 80). Washington, D.C. Retrieved from http://www.ers.usda.gov/media/122868/err97_1_.pdf
- Martinez, S. W. (2007). The U.S. Food Marketing System: Recent Developments, 1997–2006.
- Matthews, C. E., Chen, K. Y., Freedson, P. S., Buchowski, M. S., Beech, B. M., Pate, R. R., and Troiano, R. P. (2008). Amount of time spent in sedentary behaviors in the United States, 2003–2004. *American journal of epidemiology*, 167(7), 875–81. doi:10.1093/aje/kwm390
- McClintock, N. (2010). Why farm the city? Theorizing urban agriculture through a lens of metabolic rift. *Cambridge Journal of Regions, Economy and Society*, 3(2), 191–207. doi:10.1093/cjres/rsq005
- Mendes, W. (2008). Implementing Social and Environmental Policies in Cities: The Case of Food Policy in Vancouver, Canada. *International Journal of Urban and Regional Research*, 32(4), 942–967. doi:10.1111/j.1468-2427.2008.00814.x
- Mendes, W., Balmer, K., Kaethler, T., and Rhoads, A. (2008). Using Land Inventories to Plan for Urban Agriculture: Experiences From Portland and Vancouver. *Journal of the American Planning Association*, 74(4), 435–449.

doi:10.1080/01944360802354923

- Metro Vancouver. (2011). *Regional Food System Strategy*. Retrieved from <http://www.metrovancouver.org/planning/development/AgricultureAndFood/Documents/RegionalFoodSystemStrategy.pdf>
- Metro Vancouver. (2011b). *About Us*. Retrieved from <http://www.metrovancouver.org/about/Pages/default.aspx>
- Miller, L. (2010). Young Farmers: The Future of Agriculture. Report of the Standing Committee on Agriculture and Agri-Food. Communication.
- Mitchell, D. (2008). *A Note on Rising Food Prices* (No. 4682). Retrieved from <http://oldweb.econ.tu.ac.th/archan/RANGSUN/EC 460/EC 460 Readings/Global Issues/Food Crisis/Food Price/A Note on Rising Food Price.pdf>
- Moreno, L. A., and Rodríguez, G. (2007). Dietary risk factors for development of childhood obesity. *Current opinion in clinical nutrition and metabolic care*, 10(3), 336–41. doi:10.1097/MCO.0b013e3280a94f59
- Mougeot, L. J. A. (2000). Urban Agriculture: Definition, Presence, Potential and Risks. In N. Bakker, M. Dubbeling, S. Gundel, U. Sabel-Koschella, and H. de Zeeuw (Eds.), *Growing Cities, Growing Food: Urban Agriculture on the Policy Agenda. A reader on Urban Agriculture* (pp. 1–42). Feldafing, Germany: German Foundation for International Development. Retrieved from <http://www.trabajopopular.org.ar/material/Theme1.pdf>
- Mullinix, K., Fallick, A., Dorward, C., Schutzbank, M., Webster, S., Krishnan, P., Pond, E., et al. (2012). *Surrey's Underutilized ALR Lands: An Analysis of their Economic and Food Production Potential in Direct Market Agriculture*. Retrieved from http://www.kwantlen.ca/__shared/assets/Surrey_s_Underutilized_ALR_Lands23391.pdf
- Nasr, J., Macrae, R., Kuhns, J., Danyluk, M., Kaill-vinish, P., Michalak, M., and Snider, A. (2010). *Scaling up Urban Agriculture in Toronto. Agriculture*.
- Nestle, M. (2007). *Food Politics* (2nd ed., p. 486). University of California Press. doi:10.1371/journal.pmed
- Neumark-Sztainer, D., Story, M., Perry, C., and Casey, M. A. (1999). Factors influencing food choices of adolescents: findings from focus-group discussions with adolescents. *Journal of the American Dietetic Association*, 99(8), 929–37. doi:10.1016/S0002-8223(99)00222-9
- Newsom, Gavin Urban Agriculture (2011). Retrieved from http://www.sf-planning.org/ftp/files/legislative_changes/new_code_summaries/101537_Urban_Agri

culture.pdf

- Newsom, Gregg. (2012, June 22). Detroit City Planning Commission preemptively challenges land sale to Hantz Farms. *Detroit Evolution*. Detroit.
- Ogren, K. E. (1953). *The farmer's share of the consumer's food dollar*. (p. 8). Washington, D.C. Retrieved from <http://digital.library.unt.edu/ark:/67531/metadc6259/>
- Patel, R. (2008). *Stuffed and Starved: The Hidden Battle for the World Food System* (p. 416). New York City, New York: Melville House Publishing.
- Petty, R. D. (2004). Obesity and the Role of Food Marketing: A Policy Analysis of Issues and Remedies. *Journal of Public Policy and Marketing*, 23(2), 153–169.
- Pirog, R., and Benjamin, A. (2003). Checking the food odometer: Comparing food miles for local versus conventional produce sales to Iowa institutions. Ames, Iowa.
- Pirog, R., and Rasmussen, R. (2008). *Food, Fuel and the Future: Consumer Perceptions of Local Food, Food Safety and Climate Change in the Context of Rising Prices* (p. 47). Retrieved from <http://www.leopold.iastate.edu/sites/default/files/pubs-and-papers/2008-09-food-fuel-and-future-consumer-perceptions-local-food-food-safety-and-climate-change-context-rising-p.pdf>
- Pollen, M. (2006). *The Omnivore's Dilemma: A Natural History of Four Meals* (p. 464). Penguin Press.
- Pothukuchi, Kameshwari, and Kaufman, J. L. (1999). Placing the food system on the urban agenda : The role of municipal institutions in food systems planning. *Agriculture and Human Values*, 16(2), 213–224. Retrieved from <http://newruralism.pbworks.com/f/PothukuchiKaufman.pdf>
- Pothukuchi, Kami. (2011). *The Detroit Food System Report*. Detroit, MI. Retrieved from http://www.clas.wayne.edu/multimedia/usercontent/File/SEED/2DetFoodReport_2009-10lores.pdf
- Power, E. M. (2004). *The Determinants of Healthy Eating Among Low-Income Canadians: Scoping Paper*. Retrieved from http://catspaw.its.queensu.ca/bitstream/1974/1223/7/EMP_Final_Determinants_single.pdf
- Priog, R., and McCann, N. (2009). Is Local Food More Expensive? A Consumer Price Perspective on Local and Non-Local Foods Purchased in Iowa (p. 16).
- Provincial Agricultural Land Commission. (2002). How the ALR was Established. *Agricultural Land Reserve*.

- Provincial Agricultural Land Commission. (2012). *Provincial Agricultural Land Commission: Annual Report*. Retrieved from [http://www.alc.gov.bc.ca/publications/2011-12 Annual Report.pdf](http://www.alc.gov.bc.ca/publications/2011-12%20Annual%20Report.pdf)
- Ramankutty, N., Evan, A. T., Monfreda, C., and Foley, J. A. (2008). Farming the planet: 1. Geographic distribution of global agricultural lands in the year 2000. *Global Biogeochemical Cycles*, 22(1). doi:10.1029/2007GB002952
- Rauzon, S., Studer, N., Martin, A., Crawford, P., and Wang, M. (2007). *The School Lunch Initiative Evaluation Project: Progress Report Year One* (p. 43). Berkeley, CA. Retrieved from http://edibleschoolyard.org/downloads/year_one_progress.pdf
- Reason, P., and Bradbury, H. (2001). Introduction: Inquiry and Participation in Search of a World Worthy of Human Aspiration. In P. Reason and H. Bradbury (Eds.), *The Handbook of Action Research* (pp. 1–14). London/Thousand Oaks, CA: Sage Publications.
- Reynolds, K. (2010). Urban Agriculture as Revolution: An Action Research and Social Movement Analysis of Food Production in Alameda County, California. University of California Davis. Retrieved from <http://www.cityfarmer.org/Reynolds2010UrbanAgRevolution.pdf>
- Rifkin, G. (2011, May 18). Cash Crops Under Glass and Up on the Roof. *The New York Times*. Retrieved from <http://www.nytimes.com/2011/05/19/business/smallbusiness/19sbiz.html?pagewanted=all>
- Robinson, T. N., Borzekowski, D. L. G., Matheson, D. M., and Kraemer, H. C. (2007). Effects of fast food branding on young children's taste preferences. *Archives of pediatrics and adolescent medicine*, 161(8), 792–7. doi:10.1001/archpedi.161.8.792
- Rojas, A. (2009). Towards Integration of Knowledge Through Sustainability Education and its Potential Contribution to Environmental Security. In S. Allen-Gil et al (Ed.), *Addressing Global Environmental Security Through Innovative Educational Curricula* (pp. 131–153). Springer Science + Business Media B.V. Retrieved from <http://www.springerlink.com/content/k4514t2tw7781m08/fulltext.pdf>
- Rojas, A., Valley, W., Mansfield, B., Orrego, E., Chapman, G. E., and Harlap, Y. (2011). Toward Food System Sustainability through School Food System Change: ThinkandEatGreen@School and the Making of a Community-University Research Alliance. *Sustainability*, 3(5), 763–788. doi:10.3390/su3050763
- Sands, D. (2012, June 28). Detroit Urban Farming Gets Boost From New Michigan State University Agricultural Innovation Initiative. *Huffington Post*. Detroit, MI. Retrieved from http://www.huffingtonpost.com/2012/06/28/detroit-urban-farming-msu-agriculture_n_1632793.html

- Schabas, M. (2005). *The Natural Origins of Economics* (p. 230). Chicago: The University of Chicago Press.
- Schlosser, E. (2005). *Fast Food Nation*. New York: Harper Perennial.
- Schnepf, R. (2008). *The U.S. Farm Economy* (p. 6). Washington, D.C. Retrieved from <http://fpc.state.gov/documents/organization/105186.pdf>
- Schor, J. B., and Ford, M. (2007). From tastes great to cool: children's food marketing and the rise of the symbolic. *The Journal of law, medicine and ethics : a journal of the American Society of Law, Medicine and Ethics*, 35(1), 10–21. doi:10.1111/j.1748-720X.2007.00110.x
- Schukoske, J. E. (1999). Community development through gardening: state and local policies transforming urban open space. *New York University Journal of Legislation and Public Policy*, 3(2), 351. Retrieved from http://heinonlinebackup.com/hol-cgi-bin/get_pdf.cgi?handle=hein.journals/nyulpp3§ion=22
- Schutzbank, M., Roehr, D., and Kunigk, I. (2011). An Introduction to Canadian Urban Agriculture. *Environment and Landscape Architecture of Korea*, 279.
- Seto, D. (2011). *Diversity and Engagement in Alternative Food Practice: Community Gardens in Vancouver, B.C.* University of British Columbia. Retrieved from https://circle.ubc.ca/bitstream/handle/2429/39820/ubc_2012_spring_seto_darlene.pdf?sequence=3
- Simon, M. (1996). Food security: a post-modern perspective. *Food Policy*, 21(2), 155–170. Retrieved from <http://www.sciencedirect.com/science/article/pii/0306919295000747>
- Smit, J., Ratta, A., and Nasr, J. (1996). *Urban agriculture. Food, jobs and sustainable cities*. New York: United Nations Development Program.
- Smith, A., and Mackinnon, J. B. (2007). *The Hundred Mile Diet: A Year of Local Eating* (p. 272). Random House Canada.
- Smith, B. (2010). Jamie Oliver's Food Revolution. ABC.
- Spires, F. W., Lindsay, S. M., and Kirkbride, F. B. (1898). *Vacant-Lot Cultivation* (p. 33). New York. Retrieved from <http://ia600305.us.archive.org/35/items/vacantlotcultiva00speiuoft/vacantlotcultiva00speiuoft.pdf>
- Statistics Canada. (2006). Farm population and total population by rural and urban population, by province, (2001 and 2006 Census of Agriculture and Census of Population). Ottawa. Retrieved December 23, 2011, from <http://www40.statcan.ca/l01/cst01/agrc42a-eng.htm>

- Statistics Canada. (2010). *A Snapshot of the Canadian Vegetable Industry, 2010*. Ottawa, Ontario.
- Statistics Canada. (2011). *Statistics on Income of Farm Families*. Ottawa.
- Statistics Canada. (2011b). *Focus on Geography Series, 2011*. Ottawa
- Stolhandske, S. (2011). *Urban Farming in Vancouver*. Simon Fraser University. Retrieved from <https://theses.lib.sfu.ca/thesis/etd6439>
- Story, M., Neumark-Sztainer, D., and French, S. (2002). Individual and Environmental Influences on Adolescent Eating Behaviors. *Journal of the American Dietetic Association*, 102(3), S40–S51. doi:10.1016/S0002-8223(02)90421-9
- Stringer, E. T. (2007). *Action Research* (Third., p. 361). Thousand Oaks, California: Sage Publications.
- Sustainable Economies Law Center. (2010). Sample Agreement to Use Property for Food Garden. Retrieved July 30, 2012, from <http://www.theselc.org/wp-content/uploads/2011/03/Sample-Agreement-for-urban-ag.pdf>
- Swenson, D. (2009). Investigating the Potential Economic Impacts of Local Foods for Southeast Iowa (p. 27). Ames, Iowa.
- Tavernise, S. (2011, September 8). Vegetable Gardens Are Booming in a Fallow Economy. *The New York Times*.
- Tegtmeier, E. M., and Duffy, M. D. (2004). External Costs of Agricultural Production in the United States. *International Journal of Agricultural Sustainability*, 2(1), 1–20. doi:10.1080/14735903.2004.9684563
- The City of Detroit. (2010). *Urban Agriculture and Food Security, Detroit Works Project*. Retrieved from <http://www.scribd.com/fullscreen/52005808>
- The City of New York. (2011). *PlaNYC* (p. 197). New York City. Retrieved from http://nytelecom.vo.llnwd.net/o15/agencies/planyc2030/pdf/planyc_2011_planyc_full_report.pdf
- The City of Vancouver. (2012). *Greenest City: 2020 Action Plan*. City of Vancouver.
- The Greening of Detroit. (2012). Urban Agriculture and Openspace at The Greening of Detroit. *The Greening of Detroit*. Retrieved October 10, 2012, from <http://detroitagriculture.net/>
- The National Gardening Association. (2009). *The Impact of Home and Community Gardening In America*. Retrieved from <http://www.gardenresearch.com/files/2009->

Impact-of-Gardening-in-America-White-Paper.pdf

- The New York City Council. (2011). *FoodWorks: A Vision to Improve NYC's Food System* (p. 86). New York City. Retrieved from http://www.council.nyc.gov/html/food/files/foodworks_fullreport_11_22_10.pdf
- Tjepkema, M. (2006). Adult obesity. *Health Reports*, 17(3), 9–25. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=byhand&AN=22167394&site=ehost-live>
- To Cultivate Vacant Plots. (1985, March 24). *The New York Times*. New York.
- Trelstad, B. (1997). Little Machines in Their Gardens: A History of School Gardens in America, 1891 to 1920. *Landscape Journal*, 16 no. 2(Fall), 161–173. Retrieved from <http://lj.uwpress.org/content/16/2/161.full.pdf+html>
- U.S. Bureau of Labor Statistics. (2012). Time spent in leisure and sports activities for the civilian population by selected characteristics, 2011 annual averages. *American Time Use Survey Summary*.
- USDA. (2007). *2007 Census of Agriculture*. Retrieved from http://www.agcensus.usda.gov/Publications/2007/Full_Report/index.asp
- USDA. (2011). Farmers Market Growth: 1994-2011. Washington, D.C. Retrieved January 10, 2012, from [http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateS&leftNav=WholesaleandFarmersMarkets&page=WFMFarmersMarketGrowth&description=Farmers Market Growth&acct=frmrdir_mkt](http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateS&leftNav=WholesaleandFarmersMarkets&page=WFMFarmersMarketGrowth&description=Farmers%20Market%20Growth&acct=frmrdir_mkt)
- United States Department of Agriculture. (1945). *The Facts About 1945 Victory Gardens* (p. 2). Retrieved from [http://www.victorygardenfoundation.org/VGHistory/Facts about 1945 VGs.pdf](http://www.victorygardenfoundation.org/VGHistory/Facts%20about%201945%20VGs.pdf)
- United States Department of Agriculture. (2012a). USDA Grants Support Local Efforts to Fight Hunger and Food Insecurity. *Newsroom*.
- United States Department of Agriculture. (2012b). Agricultural Productivity in the U.S. *Economic Research Service*.
- University of British Columbia. (2009). *Cultivating Place* (p. 15). Vancouver, BC. Retrieved from <http://www.landfood.ubc.ca/cultivatingplace/wordpress/wp-content/uploads/2009/12/Cultivating-Place-v28.pdf>
- Urban Design Lab at Columbia University. (2012). *The Potential for Urban Agriculture in New York City*. Retrieved from http://www.urbandesignlab.columbia.edu/sitefiles/file/urban_agriculture_nyc.pdf

- Van Duyn, M. A., and Pivonka, E. (2000). Overview of the health benefits of fruit and vegetable consumption for the dietetics professional: selected literature. *Journal of the American Dietetic Association*, 100(12), 1511–21. doi:10.1016/S0002-8223(00)00420-X
- Vancouver Farmers markets. (2011). *2010 Annual Report*. Retrieved from http://www.eatlocal.org/pdf_files/2010AnnualReport.pdf
- Vancouver Farmers Market. (1999). *The East Vancouver Farmers Market Society*. Vancouver, BC. Retrieved from www.eatlocal.org
- Vietor, F. (2010, December 14). What U.S. Municipalities Can Learn From San Francisco's Urban Farming Movement. *The Huffington Post*. Retrieved from http://www.huffingtonpost.com/francesca-vietor/what-us-municipalities-ca_b_796714.html
- W.K. Kellogg Foundation. (2012). W. K. Kellogg Foundation. *wkkf.org*.
- Wallup, H. (2010, March 19). Vegetable seed sales jump as grow your own takes root. *The Telegraph*. London. Retrieved from <http://www.telegraph.co.uk/gardening/7471941/Vegetable-seed-sales-jump-as-grow-your-own-takes-root.html>
- Wang, Y. C., Bleich, S. N., and Gortmaker, S. L. (2008). Increasing caloric contribution from sugar-sweetened beverages and 100% fruit juices among U.S. children and adolescents, 1988-2004. *Paediatrics*, 121(6), e1604–14. doi:10.1542/peds.2007-2834
- Welsh, J., and MacRae, R. (1998). Food Citizenship and Community Food Security: Lessons from Toronto, Canada. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, 19(4), 237–255. doi:10.1080/02255189.1998.9669786
- Whiting, D., & Lai, C. (2008). Climate Variable Mapping and Agriculture - Metro Vancouver.
- Wilkins, J. L. (2005). Eating Right Here: Moving from Consumer to Food Citizen. *Agriculture and Human Values*, 22(3), 269–273. doi:10.1007/s10460-005-6042-4
- Wilson, W. (1919). Address to the Nation. *The American Presidency Project*.

APPENDIX A: THE CENSUS QUESTIONNAIRE

This questionnaire aims to better understand the impacts of urban farming in Vancouver. Currently there is little formal understanding about this sector. There are no data regarding yields, methods of business, the amount and type of labor required for an urban farm, and the economic, social, and environmental benefits of these programs. This census aims to gather that data and make it available for current urban farmers to learn from their peers, for city officials to have a better idea about the kinds of activities currently in practice by urban farmers, and for customers to learn more about how the local food system operates.

In interviews with you, I'll be asking you the questions that are listed below and we will fill out this form together. These questions mainly refer to the 2010 season. Feel free to send me any records that you have for the 2010 season. I'll be glad to organize that data for use in the Census. The census is broken down into four separate sections: Business Models and Administration, Crops and Other Products, Community Connections and Environmental Impacts.

Before I begin, I'd like to collect just a little bit of information on who you are and where your farm sites are located. This information will be separated from the rest of the census ensuring your anonymity.

BACKGROUND INFORMATION

1. What is your name? _____
2. What is the name of your Business?

3. What neighborhoods are your sites in?

4. Phone Number: (____) ____ - _____
5. Email Address: _____

BUSINESS MODELS AND ADMINISTRATION

DEMOGRAPHICS

1. *Did you grow up on a Farm?* ☐ Yes ☐ No
2. *What is your age?* ____|____
3. *How would you describe your ethnicity?*
☐ Caucasian ☐ Asian ☐ African-Canadian ☐ Hispanic ☐ Other: _____
4. *How would you describe your status in Canada?*
☐ Citizen ☐ Landed/Permanent-Immigrant ☐ American ☐
Other: _____

FARM INFORMATION

5. *In what year did your farm first begin production?* ____ ____ ____ ____
6. *Has it operated every year since?* ☐ Yes ☐
No: _____
7. *When does your produce production season start each year?* When do you begin preparing the Earth? _____ Month
8. *When do you first begin sales?* When do customers first receive produce?
_____ Month
9. *When does your produce sales season end?* When is your last product sold?
_____ Month
10. *When does your farming season end?* When is your land put to rest?
_____ Month

BUSINESS MODELS AND GOALS

11. *What is your organization's mission? If you have a mission statement, what is it? If not, how would you describe your organization's mission?*

12. *Does your organization have a business plan?* ☐ Yes ☐ No
May I have a copy? ☐ Yes ☐ No
How would you describe your business operations?

13. *Does your organization keep business records?* ☐ Yes ☐ No
May I have a copy? ☐ Yes ☐ No
How would you describe your record keeping?

14. *Are you a formally established:*
☐ Sole Proprietorship ☐ Partnership ☐ Limited-Liability Corporation ☐ Informal
☐ Other: _____ Why?

REVENUES AND COSTS

15. *In what ways did you generate revenue?*

<input type="checkbox"/> Farmers markets (FM)
%/\$ _____ Total Revenue
\$ _____ FM Fees Annually

\$ _____ Average Rev. / Market Day 2010
\$ _____ Average Sale 2010
_____ Weekly Hours Devoted to FM

Prepared by: Marc Schutzbank

Date: _____

Names of 2011 Farmers markets (Back)
 \$ _____ FM Revenue 2009
 % _____ Est. Revenue Increase in 2011
☐ CSA
 %/\$ _____ Total Revenue 2010
 # _____ Number of Shares 2010
 \$ _____ Price per Share 2010
 # _____ Weekly Hours Devoted to CSA
 %/\$ _____ Total Revenue 2009
 # _____ 2009 Shares
 % _____ Est. Revenue Increase in 2011
 # _____ Est. 2011 Shares

☐ Restaurant Sales (RS)
 %/\$ _____ Total Revenue 2010
 # _____ 2010 Restaurants
 # _____ Weekly Hours Devoted to RS
 %/\$ _____ Total Revenue 2009
 # _____ 2009 Restaurants
 % _____ Est. Revenue Increase 2011
 # _____ Restaurants 2011

☐ Barter (B)
 %/\$ _____ Estimated 2010 Value
 \$ _____ Average amount of barter 2010
 # _____ Weekly Hours Devoted to 2010
 %/\$ _____ 2009 Value
 % _____ Est. Revenue Increase in 2011

☐ Seminars/Speaking Engagements (S)
 %/\$ _____ Total Revenue 2010
 # _____ of Paid Engagements
 # _____ Weekly Hours Devoted
 %/\$ _____ Total Revenue 2009
 # _____ 2009 Paid Engagements
 % _____ Est. Increase in Revenue 2011
 # _____ Est. Paid Engagements 2011

☐ Landscaping (LS)
 %/\$ _____ Total Revenue 2010
 # _____ Lots
 # _____ Weekly Hours Devoted
 %/\$ _____ Total Revenue 2009
 # _____ Lots in 2009
 % _____ Est. Increase in Revenue 2011
 # _____ Est. Lots in 2011

☐ Waste Management (WM)
 %/\$ _____ Total Revenue 2010
 # _____ Customers 2010
 # _____ Weekly Hours Devoted
 %/\$ _____ Total Revenue 2009
 # _____ Customers 2009
 % _____ Est. Revenue Increase in 2011
 # _____ Est. Engagements 2011

☐ Grants (G)
 %/\$ _____ Total Revenue 2010
 # _____ Grants
 # _____ Weekly Hours Devoted to G 2010

☐ Other:

6. %/\$ _____ Total Revenue 2010

7. # _____ Customers 2010

8. # _____ Weekly Hours Devoted 2010

9. %/\$ _____ Total Revenue 2011

10. # _____ Customers 2011

11. Customers 2011

16. *What non-revenue generating activities is your farm organization involved in ?*
(volunteer programs, education, work parties with other farm etc.) *Why?*

17. *What is your total farm revenue (before costs)?* \$ _____

18. *What percentage of your total household income comes from the farm?* _____ %

19. *What are your total farm expenses for the 2010 season?* \$ _____

Operating Expenses

Paid Labor(<i>after initial site build</i>)	\$ _____
Compost (<i>after initial site build</i>)	\$ _____
Fertilizer and Lime(<i>after initial site build</i>)	\$ _____
Herbicides, insecticides, fungicides	\$ _____
Seeds and Plants	\$ _____
Fuel	\$ _____
Rental/Leasing of Land	\$ _____
Tools/Tool maintenance	\$ _____
Maintenance of capital infrastructure	\$ _____
Overhead (<i>Electricity for the business, telephone, (office supplies)</i>)	\$ _____
Other Costs: _____	\$ _____
Other Costs: _____	\$ _____
Other Costs: _____	\$ _____

Development Expenses (*incurred in the development of a site*)

Paid Labor(<i>after initial site build</i>)	\$ _____
Compost	\$ _____
Soil	\$ _____
Fertilizer	\$ _____
Animal Infrastructure	\$ _____
Land Costs (Including in-kind donation)	\$ _____
Irrigation	\$ _____
Other Costs: _____	\$ _____
Other Costs: _____	\$ _____
Other Costs: _____	\$ _____

PAST REVENUES

20. *What were your revenues for 2009?* \$ _____

21. *What were your non-capital costs for 2009?* \$ _____

22. What was the value of total assets (tools, land, investments, etc.) \$ _____

FUTURE REVENUES

19. What do you expect your 2011 revenues to be? \$ _____

In three years? \$ _____

20. What do you expect your 2011 costs to be? \$ _____

In three years? \$ _____

21. What do you expect your total assets to be worth at season's end?

\$ _____

In three years? \$ _____

23. What are the **positive** aspects, i.e. High profit margin, fun, to each of your revenue streams? What are the **negative** aspects, i.e. barriers to entry, time to prepare to each of your revenue streams?

<i>FM/+</i>	<i>Fm/-</i>	<i>CSA /+</i>	<i>CSA/-</i>
<i>RS/+</i>	<i>FS/-</i>	<i>B/+</i>	<i>B/-</i>
<i>S/+</i>	<i>S/-</i>	<i>LS/+</i>	<i>LS/-</i>
<i>WM/+</i>	<i>WM/-</i>	<i>G/+</i>	<i>G/-</i>
<i>Other/+</i>	<i>Other/-</i>	<i>Other/+</i>	<i>Other/-</i>

24. How would you describe your target market? (Demographics, potential size of the market)

25. Do you have any competition for that market? (Other urban farmers, other farmers?)

26. How many full-time people, does your organization employ?

27. How many part-time people, does your organization employ?

28. Do your employees have job descriptions? What are they? What are their wages?

Farmer _____

Employee1 _____

Employee2 _____

Employee3 _____

For additional employees please continue on back of form.

29. How many hours per week do you and your employees log: _____ Total hrs.

30. How many hours/% of time does your organization spend on the following tasks
(including all paid employees)?

Farm Work: _____ hrs/% **Administrative Tasks:** _____ hrs/% **Sales:** _____ hrs/%

MARKETING

31. *What are ways that you describe your products? Are you certified by any third parties, do you use labels of any sort, etc.*

☐ Organic ☐ Local ☐ Fresh ☐ 3rd Party Label: _____

32. *In what ways do you advertise for your farm?*

☐ Flyers ☐ Banner ☐ Signage on site ☐ Facebook ☐ Twitter ☐

Newspaper

☐ Website ☐ Blogs ☐ Email Lists ☐ E-Newsletters ☐

Other: _____

33. *How do you monitor your sales/costs? May I have a copy of that information?*

34. *If a third party would come in to monitor your operation, what would you want to have quantified?*

LAND

35. How many sites are on your farm? *Include all growing spaces, greenhouses, aquaponics, etc.* (1/8 Acre = 5445 sqft = 505 m² ; ¼ Acre = 10890 = 1011; ½ Acre = = 21780 sqft = 2022 m²)

Do you have:

☐ Greenhouses _____ sqft/m² ☐ High Tunnels _____ sqft/m²
☐ Low Tunnels _____ sqft/m² ☐ Cold Frames _____ #

36. *What are the key aspects of a piece of land when taking on a new piece of land?*

Soil

☐ Very Important ☐ Important ☐ Moderately Important ☐ Of Little Importance ☐ Unimportant

Access to Water

☐ Very Important ☐ Important ☐ Moderately Important ☐ Of Little Importance ☐ Unimportant

Sun Exposure

☐ Very Important ☐ Important ☐ Moderately Important ☐ Of Little Importance ☐ Unimportant

Close to Markets

☐ Very Important ☐ Important ☐ Moderately Important ☐ Of Little Importance ☐ Unimportant

Close to Home

☐ Very Important ☐ Important ☐ Moderately Important ☐ Of Little Importance ☐ Unimportant

Close to Other Sites

☐ Very Important ☐ Important ☐ Moderately Important ☐ Of Little Importance ☐ Unimportant

Relationship with Owner

☐ Very Important ☐ Important ☐ Moderately Important ☐ Of Little Importance ☐ Unimportant

Storage Space

☐ Very Important ☐ Important ☐ Moderately Important ☐ Of Little Importance ☐ Unimportant

Other activity around the site

☐ Very Important ☐ Important ☐ Moderately Important ☐ Of Little Importance ☐ Unimportant

37. *What is your relationship to your land? Are you mainly a(n):*

☐ Owner ☐ Contract Lessee ☐ Non-Contracted Renter ☐ Contracted Donation
☐ Non-Contracted Donation ☐ Other: _____

38. *Does your business have a limited liability relationship with your properties?*

☐ Yes ☐ No

39. *How do you acquire your land?*

40. *If you bought any land primarily for farming what was the total size and price paid for that land?*

41. *Before a site is ready to begin farming, what are common inputs that must be added to the land? What is the cost of those inputs for an average piece of land? (Compost, fencing, greenhouses, low-tunnels, fertilizer, non-animal infrastructure, irrigation etc.)?*

\$ _____ *Average Value of Inputs* _____ *sqft/m²*

42. *How many hours do you spend on a typical site to prepare it for growing? (Including volunteers?)* _____ *hrs* _____ *sqft/m²*

43. *Where do you keep your tools?*

CROPS AND OTHER PRODUCTS

CROPS

44. *What crops do you grow? How much land did you grow this crop? What average price did you charge? (Average Early Season, Average Mid Season, Average Late Season)? What is your total harvest of this crop during the season*

45. *Discuss your crop rotation, harvesting, and processing schedule and methods:*

46. *Which crops were the easiest to grow? Why?*

47. *Which crops were the most difficult to grow? Why?*

48. Which were your 3 most profitable crops? Why?

49. Which were your most **popular** sales crops?

50. Which were your 3 least **profitable** crops? Why do you think this was?

51. Which were your **least popular** crops? Why do you think this was?

APIARY

52. Do you keep bees? ☐ Yes ☐ No

53. What was the average number of hours/week you worked with apiary related tasks?
_____ hrs.

54. What was your capital investment for your apiary? \$ _____

55. What are your monthly operating costs for the apiary (type and amount)?
\$ _____

56. How much honey did you harvest? _____ lb/kg/_____

57. What is your price per lb/kg? \$ _____ per lb/kg/_____

58. How much honey did you sell? _____ lb/kg/_____

EGGS/POULTRY

59. Do you keep laying hens? ☐ Yes ☐ No Do you keep poultry chickens? ☐ Yes ☐ No

60. What was the average number of hours/week you worked with chicken related tasks?

61. What was your capital investment for your chickens?

62. What are your monthly operating costs for your chickens (type and amount)?

\$ _____

63. Number of laying hens: _____

64. Number of dozen eggs/week: _____

65. Price per dozen eggs: \$ _____

53. Available Poultry / season: _____/lb/kg/ _____

52. Poultry Price: \$ _____/lb/kg/ _____

VERMICULTURE

53. What were your initial capital expenses in establishing a worm farm?

54. What is the monthly operating expense for your worm farm?

55. How many worms/wormtubes did you sell?

56. Price for worms/wormtubes?

57. Do you use these worms as a part of your fertility program? ☐Yes ☐No

58. If so what is the dollar value of your farm's worm use, and how do you use them?

59. Do you sell any other animal products? ☐ Yes: _____ ☐ No

60. How many hours during the week do you spend completing tasks relating to the animals?
_____ hrs. What are those
tasks? _____

66. *What were the capital costs related to the animals?* \$ _____

67. *What were these costs?*

68. *What are the monthly operating costs for this project?* \$ _____.
What were these costs?

69. *What is the price charged for your product?* \$ _____/unit

70. *How many units did you sell?* _____

72. Do you create and sell processed foods? ☐ Yes ☐ No

73. What products do you make and sell? How much does it cost for you to make one product? What is the % of inputs produced on farm? How much did you produce? What is your average price? How many did you sell in 2010?

74. Are you aware of the regulations regarding food processing and sales? ☐ Yes ☐ No

75. Do you process your products in accordance with legal requirements? ☐ Yes ☐ No

76. Do you use a certified kitchen? ☐ Yes ☐ No

77. Are you food safe certified? ☐ Yes ☐ No

78. How many hours do you spend on processed food products?

79. When in the season do you process your food?

80. What are the benefits of producing and selling processed products?

81. What are the difficulties of producing and selling value added products?

COMMUNITY CONNECTIONS AND INDIVIDUAL IMPACTS

82. Did you have volunteers on your farm? ☐ Yes ☐ No

83. How many volunteers did your farm have? # _____

84. How many volunteer hours did your farm log? _____ hrs.

85. What are the benefits/costs to working with volunteers?

86. What education do you have in farming? (*lived on a farm, courses, etc.*)

87. Did you or any of your operators donate lectures, education demonstrations, etc.?

☐ Yes ☐ No

If so, how many and to what groups? _____

88. If you donated any of your food, what is the dollar value of that donation?

89. How would you describe your relationship with your community? How important is your relationship with your community and why?

90. What organizations or networks do you belong to? Do they support you? If so how?

91. What services/resources are most beneficial?

92. What services/resources would you most like to see available through your networks?

93. Who are your key allies in supporting your business? How do they help you?

94. Why did you choose to become an urban farmer?

95. How satisfied are you with your job as an urban farmer?

☐ Very Dissatisfied ☐ Dissatisfied ☐ Neutral ☐ Satisfied ☐ Very Satisfied

96. What benefits do you receive as an urban farmer?

97. What is difficult about being an urban farmer?

98. Why are you motivated to be an urban farmer?

99. What do you think the impact of your business has on the community?

100. What is the local impact of your work?

101. Is there a larger, more global impact?

102. What do you see as the future of Urban Farming?

ENVIRONMENTAL IMPACTS

103. *How do you transport your people, product,*

104. *How many km do you travel weekly for business?* _____ *km*

What percentage of your total travel is by:

Car _____% Bicycle _____% Walking _____% Other _____%

105. Did you manage soil/crop fertility, if so, how and how much? *Examples include rotating crops, inter-planting, permaculture principles, inorganic fertilizer and/or supplements, organic fertilizer, manure (kind?), compost, legumes, winter cover crop, etc.).*

106. Did you compost on site, if so how much did you create?

☐ Yes: _____ yds/___ ☐ No

107. Do you consider yourself organic? Why? *(Do you consider yourself organic under Canada Organic Standards?)*

108. What practices or policies do you choose based on environmental concerns?

109. Did you conduct a soil test?

110. What materials do you use for packaging?

111. What ways do you practice sustainable business principles?

112. *What other information or questions would you like to provide?*

APPENDIX B: EXAMPLE TENANCY AGREEMENT

Sample Agreement to Use Property for Food Garden

Prepared by the Sustainable Economies Law Center, Oakland, CA

(Please note: This Sample Agreement was prepared by the Sustainable Economies Law Center to provide guidance and ideas to individuals wishing to enter into an arrangement to use land for food growing. This Sample Agreement does not constitute legal advice, nor will it be applicable to every situation. Each person who uses this Agreement as a model should adapt it to their own purposes, preferably in consultation with an attorney. Many legal issues come up when growing food in urban areas, particularly when that food will be sold. This Sample Agreement does not address every legal issue or scenario, and its thoroughness should therefore not be relied upon. That said, happy gardening!)

This Agreement is made between _____ (“Owner”) and _____,

(collectively referred to as “Gardeners”). Owner owns a [vacant lot/home] located at _____ (referred to as the “Property”).

Gardeners are a loose affiliation of friends with an interest in farming and a desire to plant a vegetable garden on Owner’s Property. Owner supports Gardeners’ desire to grow food, and allows Gardeners to use the Property on the following terms:

1. **Agreement:** Owner Agrees to allow Gardeners to use the Property for the purpose of growing a food garden. As consideration for the right to use Owner’s Property to garden, Gardeners agree to:

(Examples: “Pay Owner \$1.00,” “Pay Owner \$200 per month.” or “Allow Owner to consume produce grown on the Property,” etc.)

2. **Section of Property to be Used by Gardeners:** Owner agrees that Gardeners may conduct gardening activities on the portions of the Property described as follows (or shown in the attached Map of Property):

Optional (if the Property is also a home): Gardeners acknowledge and understand that Property is Owner’s home. Gardeners agree to respect Owner’s privacy and personal space, and therefore agree not to enter onto portions of the Property that are not designated for use by Gardeners.

3. **When Gardeners May Have Access to the Property:** Owner agrees to allow Gardeners to be on the Property on the following days of the week and during the following hours:

4. **Who May Be on the Property and Take Part in Gardening Activities:** Owner agrees that Gardeners may invite guests onto the Property to visit the garden or to help with the garden, as long as at least one of the Gardeners is with the guests at the garden. If Gardeners wish to give anyone else regular and unsupervised access to the garden, Gardeners must first receive Owner’s permission. Owner encourages Gardeners to invite and include neighbors in the garden project. Gardeners may invite neighbors to periodic “garden parties.” Owner may take part in gardening activities as much or as little as Owner wishes.

5. **Use of Produce:** All fruits, vegetables, and herbs grown on the Property will be consumed by the Gardeners, shared with Owner, given to neighbors or friends, or donated to charity. Gardeners will not sell the produce and do not intend to profit from the arrangement. Owner may consume produce from the garden, but agrees not to take more than is reasonably needed for personal consumption.
6. **Design and Appearance of the Garden:** Gardeners agree to maintain a tidy appearance on the Property, which includes removing dead plants and leaves and clearing debris. Gardeners agree to regularly water, weed, cultivate, and otherwise maintain the garden. Gardeners will adhere, roughly, to the design and layout provided to Owner and attached to this Agreement.
7. **Construction of Raised Beds:** Gardeners may construct raised beds on the Property. If the Owner so requests, Gardeners shall remove the raised beds on the termination of this Agreement.
8. **Construction of Greenhouses:** Gardeners may, if they wish, construct one or more small greenhouses or hoophouses on the Property. If any permits or approvals are required for the construction of any greenhouse, Gardeners must see to it that such permits and approvals are obtained prior to construction. If the Owner so requests, Gardeners shall remove any greenhouses on the termination of this Agreement.
9. **Where Gardeners Will Store Tools and Other Items:**

10. **Arrangement for Access to Water:**

11. **Gardeners' Access to Bathrooms:**

12. **Arrangement for Managing Waste and Compost:**

13. **Arrangement for Parking:**

14. **Use of Pesticides, Herbicides, and Other Chemicals:** Gardeners agree to avoid use of chemicals, and use organic farming methods as much as possible. Prior to using any non-organic pesticides or herbicides, Gardeners shall consult with Owner and receive Owner's permission.
15. **Testing and Remediation of Soil:** Owner warrants that, to Owner's knowledge, nothing toxic has been dumped and lead-based paints have not been used on the Property. Gardeners agree to conduct a standard soil test through the UMass Amherst Soil Testing Lab. Should dangerous toxins or heavy metals be found in the soil, then this Agreement will be suspended and Gardeners will not begin gardening until the Owner and Gardeners feel satisfied that the soil has been remediated or that Gardeners have found a way to avoid plant contact with contaminated portions of the soil.

16. **Animals:** Unless and until Owner agrees to allow animals on the Property, Gardeners agree not to keep bees, chickens, goats, or other kinds of animals on the Property.

17. **Avoiding Nuisance:** Gardeners will take care to ensure that water run-off, dust, visitors, and noise do not bother neighbors. Should neighbors complain that the gardening activities are a nuisance, Gardeners agree to cooperate with Owner to find a solution that will reduce or eliminate the nuisance.

18. **Costs:** Unless otherwise specified or agreed to by the parties, Gardeners shall be responsible for all costs related to the garden, including but not limited to, soil, tools, water, seeds, seedlings, and fertilizer. Owner shall be responsible for the following costs:

19. **Acknowledgment of Risks:** Gardeners acknowledge and understand that there are risks and dangers involved in entering onto the Property for the purpose of gardening. This includes, but is not limited to: risk of injury from lifting heavy objects, falling or tripping on uneven surfaces or debris, risk of food borne illness arising from eating vegetables, strain from digging, bending, kneeling, and so on. **Gardeners assume all risk of loss, injury, and illness, however caused, arising in connection with gardening on Owner's Property.**

20. **Reduction of Risk:** Gardeners will take care to remove hazards from the Property, including but not limited to holes, sharp objects, or items that could cause people to trip and fall. Gardeners will use care in lifting, using ladders, and other activities that could result in strain or injury. Gardeners will carefully supervise any visitors to the Property, especially if visitors are children. (Optional: Prior to beginning to garden on the Property, Gardeners agree to construct fencing around the perimeter of the Property, at Gardeners' own expense.)

21. **Agreement to Release Owner from Liability:** As consideration for the privilege of gardening on Owner's Property, **Gardeners agree not to make a claim against or sue Owner for injury, loss, or illness that Gardeners may experience in connection with gardening in Owner's yard.** Gardeners agree to indemnify, hold harmless, and defend Owner from all claims, liability, or demands that Gardeners or any third party may have or in the future make against Owner for injury, loss, or damage arising from the gardening on Owner's Property or consuming food grown on the Property. This is intended to be a complete release, discharge, and waiver of any and all actions, causes of action, or lawsuits against Owner arising in connection with Gardeners' presence on Owner's Property for gardening purposes.

22. **Insurance:** Gardeners agree to carry the following insurance in connection with their activities on the Property:

Owner agrees to carry the following insurance in connection with the Property:

23. **Damage to the Property:** Should Gardeners' activities result in any damage to the Property or to structures on the Property, Gardeners agree to repair such damage at Gardeners' own expense, or Gardeners agree to compensate Owner for the value of property damaged.

24. **Handling Disputes:** If a dispute arises between Owner and Gardeners, and that dispute cannot be resolved through discussion, then parties agree to attend at least one mediation session. Parties will share the cost of the mediation.

25. **Duration of this Agreement:** This Agreement will be effective and Gardeners may begin gardening on _____ (date). This Agreement will terminate on _____ (date), unless the Agreement is terminated sooner by Owner or Gardeners. When this Agreement is terminated, Gardeners will cease to garden on the Property. Alternatively, Gardeners and Owner may agree to renew this Agreement at any time and for any duration they choose. Such renewal will be agreed to in writing.

26. **Termination by Owner:** Under the following circumstances, Owner may terminate this Agreement early, so long as he/she provides three months notice of termination to the Gardeners:

- a. Owner decides to sell or develop the Property;
- b. Owner or Gardeners are found to be in violation of the law as a result of the gardening operation;
- c. Gardeners fail to comply with the terms of this Agreement, even after their failure to comply is pointed out to them, and they are given a reasonable time to correct the problem; or
- d. _____

27. **Termination by Gardeners:** Gardeners may terminate this Agreement at any time with two weeks notice to Owner.

28. **Responsibilities and Rights on Termination:** At the expiration or termination of this Agreement, Gardeners will remove all of Gardeners' possessions from the Property. Owner will not require removal of the plants, but Gardeners may remove them if they plan to plant them elsewhere. Gardeners may remove raised beds and greenhouses, and must do so if the Owner requests that they be removed. If Gardeners brought soil onto the Property for use in the garden, Gardeners may remove that soil upon termination of this Agreement. Gardeners will leave the Property in tidy condition.

By signing below, parties agree to adhere to the terms and conditions of this Agreement.

Owner Signature: _____ **Date:** _____

Print Name: _____

Gardener Signature: _____ **Date:** _____

Print Name: _____

Gardener Signature: _____ **Date:** _____

Print Name: _____

Gardener Signature: _____ **Date:** _____

Print Name: _____