Experiences of Community Gardening Participants in Different Garden Settings

by

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A thesis submitted in conformity with the requirements for the degree of Master of Arts
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2017

Abstract

Community gardens provide a number of social and civic benefits. While most community gardens are at street-level, rooftop might be used to replace green spaces that have been lost during development. Rooftop gardens can provide similar benefits to those provided by street-level gardens. However, there is a lack of research that compares experiences between street-level and rooftop garden participants, as well as urban and suburban contexts. Community garden participants were surveyed in Mississauga and Toronto, Canada to better understand how garden setting affects experiences. Respondents’ perceived benefits differed from those identified in the current literature, highlighting the need to examine a variety of gardens and participants. In the Mississauga gardens, community benefits were consistently identified. Members from Ryerson’s rooftop growing space identified broader challenges related to sustainability. Both garden types provide a range of benefits, but to contribute to local sustainability goals, there must be participation from a wider population.
Acknowledgments

This research project would not have been possible without the help of many individuals along the way.

I would first like to acknowledge the people that helped with survey distribution and for their generous willingness to collaborate. Special thanks to: Britt McKee and Anita Wong at Ecosource; Arlene Throness at Rye’s Homegrown; Caryn Thompson at South Riverdale Community Health Centre; and Mark D’Aguilar at Fort York’s Community Garden. All of their help during this project is greatly appreciated.

I would like to give special thanks to Dr. Tenley Conway for her continuous insight, support, and guidance from this projects’ start to its end. As well, thank you to my thesis committee, Drs. Andrea Olive and Sarah Wakefield, for their knowledge and input.
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Chapter 1

Introduction

Community gardens can be defined as a “grassroots initiative” that use parcels of land to grow food and flowers in urban environments that provide benefits for individuals and the larger community (Glover 2003, Corrigan 2011). Community gardens take on different forms, ranging from individual plots, collective plots, or a combination of both (Drake and Lawson 2014). In recent years, there has been increased interest in community gardening as a strategy to improve urban sustainability and to increase the resilience of urban food systems (Golden 2013). In this context, sustainability broadly refers to the environmental, economic, and especially the social considerations involved in urban growth and development (Ackerman et al. 2014). Community gardens contribute to sustainability by using local food production to provide numerous civic and social benefits (Beilin and Hunter 2011, Drake and Lawson 2014, Martin et al. 2016), while a more resilient urban food system can be described as a reshaping of current food system models into food related activities (production, distribution, consumption) that can occur at a local scale (Toth et al. 2016). Aside from larger goals, urban community gardens can provide a number of benefits to the individuals that participate in such programs (Levkoe 2006, Drake and Lawson 2014), as well as broader environmental benefits for the surrounding neighbourhoods.

Resident participation in community gardening programs has increased in in recent years, which is often attributed to individuals’ desires to find a deeper connection with nature and build connections in their community (Firth 2011). The expansion of community gardens has taken a
variety of garden forms and locations (Drake and Lawson 2014), such as plots in public parks (Gough 2013), culturally diverse neighbourhoods (Baker 2004), and on rooftop spaces when gardening spaces at street-level are no longer available (Whittinghill and Rowe 2011).

A parallel expansion has also occurred in the urban community gardening literature, which has highlighted a wide array of potential benefits that can occur from community gardening participation. Documented benefits include personal, social, and community benefits, which are then often tied into the larger goals of urban sustainability, environmental justice, and food security (Levkoe 2006, Wakefield et al. 2007, Ogawa 2009, Ackerman et al. 2014). While the actual contribution of community gardening to these larger goals is unclear, recent research suggest some positive impacts. For example, community gardens can address urban sustainability through the development of social capital (Levkoe 2006, Sadler et al. 2015, Middle et al. 2016.). Community gardens can also help improve access to environmental amenities for residents in lower-income areas, addressing an emerging issue within the environmental justice movement (Martin et al. 2016). As well, research suggests that there is a potential for the collaboration between municipal policymakers and local stakeholders to increase local food networks, which can help improve access to food in cities and provide improvements towards urban sustainability (Sadler et al. 2015). If, however, community gardens are going to meaningfully advance urban sustainability agendas or change urban food systems, then a wide swath of residents must be willing to participate in a variety of garden settings.

In highly developed urban areas, such as downtown cores and nearby periphery regions, lack of space for community gardens is a challenge. Green roofs are emerging as an effective method to replace green spaces that had been lost during the construction process (Whittinghill and Rowe 2011); in some cases, these rooftops are used for community gardens. Environmental benefits
provided by green roofs and rooftop gardens might include the reduction of urban heat islands in the summer (Wong et al. 2003, Ackerman et al. 2014) or improvement in urban stormwater attenuation (Whittinghill and Rowe 2011, Whittinghill et al. 2016). Rooftop gardens may also provide social benefits that are similar to those provided by gardens located at street-level (Whittinghill and Rowe 2011, Ackerman et al. 2014), such as the provision of a space where people can experience nature in the city or bond over a common interest in gardening. Finally, research on more intensive rooftop agriculture suggests that rooftop growing spaces have impressive potential for increasing resilience of local food systems (Haberman et al. 2014, Orsini et al. 2014).

While the urban agriculture literature suggests that street-level community gardens and rooftop gardens yield potentially similar personal, social, and community benefits, there are few research studies that directly compare the benefits and challenges experienced by participants in both garden types. This may be a reflection of the relatively low number of rooftop community gardens, although this number will likely increase due to growing interest in rooftop gardens in highly developed locations (Whittinghill and Rowe 2011).

While rooftop gardens are currently less common than street-level community gardens, Haberman et al. (2014) argue they should be examined as a way to develop local food systems. Research that illustrates the potential for rooftop farming in urban food networks is, however, mostly conceptual (Haberman et al. 2014, Orsini et al. 2014), with few studies examining the actual experiences of participants and managers who operate rooftop growing spaces (Ackerman et al. 2014). Understanding the benefits and challenges of rooftop gardening, as well as the experiences of participants and perceptions of local residents can potentially help create
solutions to address the larger goals of sustainability and resilient urban food systems, through a better understanding of these emerging spaces.

Building a case for community gardening programs in relation to urban sustainability and/or localized food systems requires participation in not only different types of space, but also from all levels of society, including segments whose experiences have gone relatively unexamined. Community gardens research has typically been limited to lower income populations in urban areas. The relationship between community gardening and social action influence approaches to developing community gardens, which have typically been used to target more vulnerable populations (high poverty, low income; Lawson 2004). While the experiences of low-income participants are important, having an understanding of participants’ experiences from a variety of income-levels, and demographics more generally would help inform policy decisions that address goals like urban sustainability across all levels of society. Martin et al. (2016) present a study that briefly examines urban gardening experiences from a site with members that come from the middle class, suggesting that different groups are starting to be considered in urban gardening research. Coupling diverse locations and demographic information with community gardening experiences can more clearly illustrate if and how residents from different segments of society benefit from community gardens, and perhaps inform unique strategies that target local neighbourhood requirements.

Finally, a majority of the current research on community gardens has been done with a qualitative approach (Guitart et al. 2012, Golden 2013), while there is a lack of research that explores experiences using quantitative or mixed methods. A quantitative method of analysis will allow for the statistical comparison of experiences between different groups of participants, in addition to complementing existing qualitative studies.
1.1 Goals and Objectives

The overall goal of this research is to compare the experiences of participants at community gardens located at sites that differ in urban form and socio-economic contexts. There are several objectives for this research:

1. Examine motivations, benefits, and challenges experienced by community gardeners.
2. Determine if participants at (1) urban vs. suburban settings and (2) street-level vs. rooftop gardens experience different benefits and challenges.
3. Examine if there is a relationship between income or birth location and participants’ experiences at respective community gardens.
4. Compare motivations, benefits, and challenges of participants in this study with those emphasized in the literature, specifically potential benefits and those valued by gardeners themselves.

This study examined two rooftop growing spaces and one street-level growing space in Toronto, and four street-level community gardens located in park spaces in Mississauga, all in Ontario, Canada. The gardens that were selected for this research study were those that revolved around individual food production, and in the case of one study site, medium-scale rooftop agriculture. This research relied on online and written surveys that were disseminated to community garden participants in order to address the previously listed objectives.
1.2 Overview of Thesis

This thesis begins with a literature review of community gardens and rooftop gardening research, focusing on the benefits and challenges associated with participants and the broader neighborhood (Chapter 2). Chapter 3 describes the study sites and methods used to examine participant experiences. Results of the surveys are then presented in Chapter 4, organized by the first three objectives. The discussion and conclusion chapter of this thesis compares the results of this study with previous findings, focusing on several points of difference (objective 4). Future research and management recommendations are also discussed. Appendixes including other results and survey questions also included in the thesis.
Chapter 2
Literature Review

2 Literature Review: Community Gardens and Rooftop Agriculture

This literature review summarizes key benefits and challenges present in current community garden literature. While research on rooftop community gardens is limited, a growing body of academic literature is focused on semi-intensive rooftop farming, and its’ potential to increase urban sustainability. This literature review will also discuss the benefits and challenges that are present in that literature, and conclude by identifying existing research gaps.

2.1 Benefits of Community Gardening

2.1.1 Individual Benefits

Participation in a community garden can provide individual benefits that contribute to individuals’ health and food security (Wakefield et al. 2007, Kingsley 2009, Carney et al. 2011). In urban areas, community gardens can act as a convenient way to access fresh fruits and vegetables (Alaìmo et al. 2008, Ober Allen et al. 2008). Unsurprisingly, improved nutrition and dietary habits are common benefits among a number of community gardening research studies (Alaìmo et al. 2008, Carney et al. 2011). Carney et al. (2011) found that members that used a community garden saw impressive increases in vegetable consumption in their households, suggesting that usage may not only improve individual health, but can also play a role in household or family nutrition.
Another common theme in the literature is that individuals that participate in a community garden on a regular basis often see improvements in their personal fitness (Kingsley 2009). In their Toronto research study, Wakefield et al. (2007) found that a number of interview participants believed they had increased their levels of physical activity through their involvement in a community gardening space.

Participation in a community garden can also help individuals manage their stress and other aspects of their mental health (Armstrong et al. 2000, Kingsley et al. 2006). Members not only feel a sense of relief or relaxation from spending time in a more natural setting, but they may also find comfort knowing that the produce that they eat at home comes from a natural source (Wakefield et al. 2007), without chemicals and that they grew it themselves (Carney et al. 2011).

Finally, improvements to individual and local food security are benefits that are closely related to ones’ participation in a community garden. Research has found that household and community growing can help increase the frequency of vegetable consumption. Kortright and Wakefield (2011) suggest that growing food at home not only contributes to improved individual nutrition, but can also aid in reducing household level food security at varying levels of income. In areas where people have issues with access to land, participating in a community garden allows them to grow food, directly aiding food security (Evers and Hodgson 2011).

As well, community gardens can help facilitate policies that influence local food security. In a case study of Flint, Michigan, Sadler et al. (2015) found that stakeholders involved with community gardening proposed the expansion of the number of community gardens as a method to increase food security and improve dietary habits, and suggest that advocacy efforts can help
influence municipal policy development (such as the revision of zoning codes), and aid in developing local food networks for more vulnerable populations.

2.1.2 Social and Community Benefits

Members that are involved with community gardening programs often benefit from a sense of social cohesion between people, and can use time at the garden to create new social networks (Armstrong 2000). Through the sharing of time, space, and gardening knowledge, members can strengthen the social ties within their neighbourhoods (Wakefield et al. 2007). For example, while individuals with disabilities may not participate in gardening activities as often as other members, their interactions with people in the gardens may still be positives ones (Kingsley et al. 2006). As well, members often join community gardens after moving from a different city or country, as they can provide a space where people can meet and form new friendships, which helps them adjust to their new locations (Armstrong 2000, Kingsley et al. 2006). Garden organizers often plan seasonal volunteer appreciation events that can help members feel a genuine sense of belonging for new and long term residents in their community (Levkoe 2006).

Community gardens provide a space where people, and especially youth, can develop important social and relationship building skills (Allen et al. 2008). Community gardens can act as a space to spend time with family, which can help strengthen family relationships. They also provide an opportunity for participants to teach their children about the importance of growing their own food, imparting their own values and practicing a hobby with their children (Carney et al. 2011).

Urban community gardens can be used as tools to increase the levels of pride within the local community, as members come out and invest their time and energy into building a space that
they can be proud of within their neighbourhood (Wakefield et al. 2007). As community gardens are often implemented in urban neighbourhoods that are lower income or have vulnerable populations (Guitart et al. 2012), the aspect of local pride is an important thing to consider within the larger framework of community health.

Given that the mandates or missions of community gardening organizations range across topics (stewardship, sustainable resource use, conservation, local economics, as well as environmental education and advocacy) (Gough and Accordino 2013), community gardens also provide a unique venue to educate local residents about aspects of community sustainability and crime reduction, or other issues of concern, and can attract a unique range of stakeholders (Armstrong 2000, Gough and Accordino 2013).

By looking at the various kinds of benefits they provide, community gardens establish themselves not only as a space where individuals can grow their own food, but rather a multifaceted personal, social, and civic space, where members can learn more about health and their local social landscapes. However, whether all of these benefits occur across diverse garden settings and are appreciated by gardeners themselves is less clear.

2.2 Challenges of Community Gardening

Within the community gardens literature, there are discussions of the various challenges that participants and garden organizers face. Ongoing challenges, organized into environmental and managerial themes are discussed below.

First, as some urban community gardens are located very close to urban infrastructure, members may have ongoing concerns about the effect of the urban environment on the produce that they
grow in their plots (Wakefield et al. 2007, Witzling et al. 2010, Kim et al. 2014). For example, the possibility of soil contamination and its’ subsequent effects on produce is a common health concern of community gardeners (Kim et al. 2014). Air pollution in areas of higher traffic can also create concern for members (Wakefield et al. 2007).

Second, access and securement of land is an ongoing challenge for community gardeners and managers. In urban areas, land used for community gardens is often not owned by the program organizers, resulting in worry from both managers and members that the spaces may not be there for future use, especially in areas that are undergoing development (Wakefield et al. 2007). In a survey of 445 community gardens in the United States, Drake et al. (2014) found that only one-fifth of the garden managers that responded said that the growing spaces were actually owned by the organizers. Additionally, finding a location for a community garden that meets the needs of most potential participants poses challenges, as the distances from a potential participants’ place of residence can be a factor that dissuades them from joining a gardening program (Kingsley et al. 2008).

Third, issues of member etiquette may be present within a community gardening space, as some members might be disrespectful of other peoples’ plots (stealing or destruction of plots), or do not comply with practices that the organizers have implemented, such as the maintenance of shared growing spaces or general tidiness of the space (Kingsley et al. 2006). While social interactions in community gardening spaces are generally positive, there is of course the potential for issues to arise among members.

Another set of challenges, specifically for community garden organizers, are often those related to issues of initial and ongoing funding, recruitment of new members, and keeping members on a
long term basis (Drake et al. 2014). Funding is a primary source of concern for garden managers particularly in lower income areas where members might not be able to supplement program funding with their own individual financial resources (Wakefield et al. 2007). Lack of support for community development programs also poses similar threats to community gardening programming. Overall, the literature suggests that community garden challenges are more management focused, and less challenges faced by individuals.

Finally, there exist challenges with respect to access of community gardening, as well as other community food programs. There is research (Kirkpatrick and Tarasuk 2009, Loopstra and Tarasuk 2013) that suggests that there are barriers for low-income families to community food programs, including community gardens. Often, low-income families lack awareness of community garden programs, or simply cannot afford the time to tend to a community garden plot.

2.3 Rooftop Gardening

In heavily developed urban areas, such as downtown cores, green roofs are can be an approach of replacing green spaces (and potential gardening spaces) that have been lost during the development process (Whittinghill and Rowe 2011). Green roofs and other rooftop growing spaces can provide benefits similar to those provided by street-level green spaces and gardens (Whittinghill and Rowe 2011, Ackerman et al. 2014).

There is little research examining rooftop spaces as community gardens – much of the rooftop agriculture literature is focused on larger scale commercial operations, including finding a place for intensive rooftop growing within the urban food system. As well, the literature on rooftop
gardens emphasizes engineering and environmental science considerations, with fewer studies examining participant experiences. The following section review what literature is present regarding community rooftop gardens used for food growing, as well as the more abundant literature examining intensive rooftop agriculture.

2.3.1 Benefits of Rooftop Gardens

Social benefits of rooftop gardens and green spaces are similar to those found in the broader community gardening literature. Both rooftop and street-level gardens can provide a space where people enjoy nature, which helps reduce individual stress levels in urban environments (Ackerman et al. 2014). Rooftop gardens can also help provide a social or cultural meeting space in areas where they might not otherwise exist (Ackerman et al. 2014). Like street-level community gardens, rooftop gardens can act as an educational space, where local residents learn a new skill or more about the urban food system, and this contributes directly to community development (Mees and Stone 2012, Ackerman et al. 2014). Some rooftop garden programs may have cultural aspects, and can help new immigrants reconnect with their cultures, through culturally appropriate food (Ackerman et al. 2014).

Urban rooftop gardens can also provide numerous environmental benefits. Common benefits of rooftop food gardens and farms in the urban agriculture literature include: the reduction of local air temperatures, primarily resulting in cooling during summer (Hien et al. 2007); reducing stormwater flows (Czemiel Berndtsson 2010); and decreased distances that food has to travel when sourced from rooftop farms (Peters et al. 2009). Finally, green roofs and rooftop gardens can contribute to biodiversity in urban spaces, through the provision of potential habitat (Oberndorfer at al. 2007, Orsini et al. 2014).
2.3.2 Challenges of Rooftop Gardening Spaces

In terms of challenges, rooftop gardens are much more complicated spaces to create and manage on a long term basis. Rooftop load limitations means that growing media must be used sparingly which may require greater amounts of nutrient inputs (Cohen and Reynolds 2014). However, the effect of large nutrient and fertilizer inputs on stormwater runoff quality is not fully understood (Ackerman et al. 2012, Whittinghill and Rowe 2012).

In a survey of rooftop gardeners and managers in New York City, Ackerman et al. (2014) identified a number of challenges that may be faced: regulation and permitting, finding appropriate sites for development, ongoing maintenance and labour costs, access to equipment and materials on a roof, and struggling with community outreach or participant recruitment. While not unique to rooftop locations, many of these challenges are magnified in rooftop settings.

2.4 Intensive Rooftop Agriculture

With regards to rooftop growing, there is a larger literature that focuses on the potential for intensive rooftop agriculture (e.g. Orsini et al. 2014, Specht 2014), rather than rooftop community gardens. The following sections summarize several reoccurring themes within this more intensive rooftop research.

The research on rooftop agriculture spaces suggests that new farming technologies, such as rooftop greenhouses and innovative growing systems have great potential to complement and increase urban food availability (Haberman et al. 2014, Orsini et al. 2014). Food grown in rooftop farms is commonly sold at farmers’ markets or at onsite events, contributing to
community health by providing a space where fresh food is available. Sometimes, these community farmers markets appear in areas where income levels are low, and food access is inconsistent due to reduced interest from larger supermarkets (Ackerman et al. 2014). However, there are numerous structural, managerial, and social challenges that arise from several areas that may pose issues for rooftop or food production.

A key issue that is presented in the literature as a barrier to rooftop gardens in general is securing initial and ongoing funding (Sanyé-Mengual et al. 2015). Unsurprisingly, larger scale rooftop agriculture operations require an even larger amount of capital to start (Thomaier et al. 2014). As a result of high overhead costs required to purchase competitive growing technologies, rooftop agriculture companies may experience low profit margins (Céron-Palma et al. 2012, Specht and Sanyé-Mengual 2015). Sanyé-Mengual et al. (2015), however, suggest that integrating social enterprises within rooftop farming would take away from the utility of a rooftop agriculture operation. They actually argue that the role of municipal governments should be as agents to help promote food production as opposed to social benefits with regard to rooftop farming spaces, which seems to minimize the role of rooftop community gardens.

As is the case with street-level community gardens, planning and implementation of rooftop agriculture projects also has a number of challenges (Mikulec et al. 2013, Drake and Lawson 2014). Creating a farming space on urban buildings requires cooperation from a very wide range of stakeholders such as: developers, city personnel, engineers, and planners (Thomaier et al. 2014). The necessary engagement of such a large number of stakeholders can pose challenges if one or more of these parties do not see or understand the benefit of a rooftop agriculture space.
Creating a rooftop farming space also means that other uses cannot be implemented once the growing system has been constructed (Céron-Palma et al. 2012), suggesting that any sort of social or community space will no longer be available. Thus, there is a trade-off between commercial ventures and aspects of urban community development. Adapting rooftop spaces to create even simple rooftop gardens presents organizers with issues regarding integration into existing building infrastructure (Ackerman et al. 2014), so implementation of new techniques present even more complicated issues. Finally, staffing and ongoing maintenance have been identified as ongoing challenges, as these jobs require a much greater level of knowledge and expertise than managing a street-level community garden space (Céron-Palma et al. 2012).

The academic literature on commercial rooftop agriculture has found that a prevalent barrier to these projects stems from social challenges, often related to the way that urban residents and consumers perceive methods that are used in these more advanced agricultural systems (Sanyé-Mengual et al. 2015, Specht et al. 2016). Specht et al. (2016) found that residents are generally in favour to having some form of rooftop gardens or communal growing space in their city. However, in the same study, residents were found to be much less receptive to closed agricultural systems (Specht et al. 2016), which are often used in more intensive rooftop operations.

The wide range of stakeholders involved with rooftop farming can also cause a number of different concerns for specific stakeholders. Food companies and local farmers may become distrustful of rooftop farming spaces; urban designers and public administration, as well as residents, may have inflexible opinions as to how urban rooftop farms might affect the urban landscape/aesthetics; and some groups, likely potential customers, might perceive some newer
growing techniques, such as aquaponics or soil-less growing media as unnatural, and might be less receptive to operations that employ new technologies (Sanyé-Mengual et al. 2015, Specht and Sanyé-Mengual 2015).

Since rooftop farms are expensive in the short and long-term, projects that take place in denser urban settings may potentially be perceived as drivers for gentrification, as producers may have to charge inflated prices for premium products (Specht and Sanyé-Mengual 2015). Increased produce prices may cause concern with regard to environmental injustice issues. For example, in the same way that lower income/higher risk neighbourhoods might experience decreased access to greenspace and environmental amenities (Jermé and Wakefield 2013), a gentrified food system would add to issues of food justice that already exist in urban areas, and expensive products from technologically advanced growing spaces might exacerbate problems for at-risk populations that already have difficulty accessing healthy food (Heynen et al. 2012). Thus, while academic research has emphasized intensive, often commercial, urban agriculture initiatives, they are not without downsides, as compared to rooftop community gardens.

2.5 Gaps in Community Gardens and Rooftop Agriculture Literature

While there is a substantial amount of academic literature that examines community gardening experiences, there are gaps that exist within current research.

There is a lack of research that examines the experiences of street-level and rooftop gardeners simultaneously. As well, there is also a lack of research that explores potential differences in gardening experiences between urban and suburban residents that participate in community gardening programs. Community gardens are popular in low income areas to address issues such
as the reduction of poverty and local food security. The academic literature is mostly reflective
of lower income areas (Guitart et al. 2012), and other areas like middle class neighbourhoods are
left underexamined, yet many recent community garden participants often come from the middle
class (Ogawa 2009).

Studies have also primarily been limited to qualitative research studies that have examined the
experiences of urban residents and managers (Kingsley et al. 2009, Drake and Lawson 2014).
Studies frequently use surveys and interviews with participants, which has allowed for a
thorough understanding and great insight into the different personal (Armstrong 2000, Kingsley
et al. 2009), social (Levkoe 2006, Wakefield et al. 2007), and cultural experiences (Saldivar-
Tanaka and Krasny 2003) that members have had in community gardens. However, there is a
lack of quantitative research present within community gardens research. For example, while
there are a few studies that examine the role of individual socioeconomic data and its’
relationship to community/ urban food programs (Kirkpatrick and Tarasuk 2009, Loopstra and
Tarasuk 2013), but the inclusion of demographic data into statistical analysis has not fully been
considered to understand how diverse populations experience community gardening.

With regards to the geographic scope of community gardens research, studies take place mainly
in lower income/ higher risk areas. As well, within community gardens research, many studies
are limited to lower income areas within large US cities, (Corrigan 2011, Guitart et al. 2014,
Poulsen et al. 2014). In this way, academic research that focuses on the utility of community
gardens is limited to specific experiences in the USA. While there is some research that is taking
place outside of the USA, in Canada (e.g. Baker 2004, Wakefield et al. 2007, Kirkpatrick and
Tarasuk 2009, Haberman et al. 2014) and Australia (e.g. Guitart et al. 2012, Guitart et al. 2014), community gardens research is generally reflective of the American context.

The case is slightly different for studies examining the potential of rooftop or more intensive agriculture in the city. American cities, such as New York City (Ackerman et al. 2014, Cohen and Reynolds 2014) are the focus, as well as some European studies that have researched the potential for rooftop agriculture (Orsini et al. 2014, Sanyé-Mengual et al. 2015a, Sanyé-Mengual et al. 2015b, Specht 2014). Thus, this study will add to the literature examining Canadian community gardening in different contexts.
Chapter 3
Study Area and Methods

3 Study Area and Methods

3.1 Study Area

Participants’ experiences with community gardening in suburban areas and denser urban areas were explored in the Southern Ontario municipalities of Mississauga and Toronto (Fig. 1). These municipalities were selected due to differences in urban form and the presence of community street-level and rooftop gardens. The City of Mississauga has extensive medium density, suburban-style development. The City of Toronto has a highly developed downtown core, with medium to high density development in periphery neighbourhoods. In total, seven food growing spaces were studied.
Figure 1: Map of study sites.
Toronto is the largest Canadian city with a population of approximately 2,620,000 people (Toronto 2011 Census Profile, Statistics Canada 2011). It has a population density almost twice that of Mississauga at 4150 people/square kilometer, and a land area of 630 square kilometers. Toronto is a densely populated urban centre with a high degree of development. In terms of housing composition, apartment buildings make up 58% of dwelling types. Toronto is a multicultural centre, and was home to 52% of all immigrants in the greater Toronto Area in 2006 (Toronto.ca). In 2011, immigrants represent 49% of people living in Toronto, with the most common ethnic groups being Chinese and Filipino (City of Toronto 2013a). In 2010, the average household income was approximately $87,000 and the median household income was $58,400 (City of Toronto 2013b). Approximately 19% of Toronto’s population fell below Statistics Canada’s Low Income Measure (City of Toronto 2013b).

Mississauga is Canada’s sixth largest city, with a population of approximately 713,000 people in 2011 (Statistics Canada, 2011). It is a primarily suburban city with some areas of higher density development. Single detached houses make up approximately thirty-eight percent of homes, and semi-detached and row houses make up an additional twenty-five percent of all private dwellings (Mississauga Census Profile, Statistics Canada 2011). The remaining thirty-seven percent are multi-story apartments and condos. Mississauga’s population density is approximately two-thousand four hundred people per square kilometer, with a land area of 290 square kilometers (Mississauga Census Profile, Statistics Canada 2011). In 2011, immigrants made up approximately 53% of residents in Mississauga. The most common ethnic group is South Asian/Indian (Region of Peel 2013a). In 2010, the average household income in Mississauga was approximately $95,000, and the median household income was $75,550 (City of Mississauga 2014). Just over 13% of Mississauga residents are considered low income (Region of Peel...
2013b). While Mississauga is a large city, the reliance on personal vehicles rather than the use of public transit makes the city suburban.

3.1.1 Mississauga’s Community Gardens

The four community gardens in Mississauga are in residential areas dispersed throughout the city (Figure 1). The sites are individual plot-based gardens that are managed by Ecosource, an environmental not-for-profit organization that operates in Mississauga. These gardens are located in municipal public parks, and members have open access to their plots during the summer growing season. Some of the gardens have other features in addition to the individual community garden plots (Table 1).

These community gardens, as well as an additional teaching garden, are located on public land, which were created through a partnership with the City of Mississauga and Evergreen (another environmental NGO; Ecosource.ca). The City of Mississauga and Ecosource have implemented a five year community gardens program that will run from 2014 – 2019, aiming to increase gardening spaces in local neighbourhoods supported by municipal funds (Ecosource, n.d). Details of the Mississauga community gardens that were surveyed can be found in Table 1.
Table 1: Age and descriptions of the four Mississauga community gardens. All information gathered from Ecosource’s website (www.ecosource.ca)

<table>
<thead>
<tr>
<th>Garden</th>
<th>Year Opened</th>
<th>Number of Individual Plots</th>
<th>Other Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hillside Garden</td>
<td>2009</td>
<td>30 (plus 5 communal)</td>
<td>First community garden in Mississauga on public park space</td>
</tr>
<tr>
<td>Garden of The Valley</td>
<td>2006</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Parkway Green</td>
<td>2011</td>
<td>40</td>
<td>Home to a community orchard which was planted by local students</td>
</tr>
<tr>
<td>Generation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malton Garden</td>
<td>2010</td>
<td>11 (plus 36 learning plots)</td>
<td>Produce from learning plots is donated to a local food bank</td>
</tr>
</tbody>
</table>

These gardens are primarily for individual use, but there are also shared spaces located in four separate neighbourhoods that members are responsible for tending and maintaining over the course of the growing season. The four community gardens are surrounded by slightly different populations (Table 2). In particular, the population density and percent of immigrants vary across the neighbourhoods. These sites were chosen with the goal of obtaining the most representative example of community gardening efforts that are taking place in Mississauga.
Table 2: Census tract information for the Mississauga neighbourhoods where the garden sites are located. Data was retrieved from Statistics Canada Census and National Household Survey (NHS) profiles.

<table>
<thead>
<tr>
<th>Garden Name (Neighbourhood)</th>
<th>Population (km²)</th>
<th>Area (km²)</th>
<th>Population Density (People/Km²)</th>
<th>Median Private Household Income</th>
<th>Percent Immigrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hillside (Clarkson)</td>
<td>2480</td>
<td>0.69</td>
<td>3594</td>
<td>79915</td>
<td>36%</td>
</tr>
<tr>
<td>Garden of The Valley (Central)</td>
<td>4920</td>
<td>0.62</td>
<td>7935</td>
<td>51134</td>
<td>45%</td>
</tr>
<tr>
<td>Parkway Green (Central)</td>
<td>5005</td>
<td>1.3</td>
<td>3850</td>
<td>71495</td>
<td>57%</td>
</tr>
<tr>
<td>Malton (North)</td>
<td>5235</td>
<td>0.84</td>
<td>6232</td>
<td>57537</td>
<td>62%</td>
</tr>
</tbody>
</table>

3.1.2 Toronto’s Gardening Spaces

The study sites in Toronto include two rooftop gardens and one street-level garden. The rooftop gardens are tended by volunteer members, but the street-level garden is based on individual member plots. Specifically, the two rooftop sites are: Rye’s Homegrown, a student urban agriculture organization that tends the rooftop garden at Ryerson University (www.ryerson.ca); and a small rooftop garden at the South Riverdale Community Health Centre (SRCHC), which patients at the centre can tend on gardening days (www.srchc.ca). Limitations to this study are that rooftop gardens were not organized around individual plots, which differ from the street-level gardens that were examined; no individual plot-based rooftop community garden could be located.
Members of a street-level community garden in Toronto were also surveyed in order to provide a contrast to the rooftop gardens. The street-level community garden is located at the Fort York historic site, a national heritage site located just west of Toronto’s downtown core (www.fortyork.ca). Similar to the gardens in Mississauga, members pay to rent an individual plot for the year. Details about the three Toronto gardening sites are provided in Table 3.

Table 3: Age and general descriptions of the three Toronto gardens

<table>
<thead>
<tr>
<th>Garden</th>
<th>Year Opened</th>
<th>Number of Plots</th>
<th>Other Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryerson Rooftop Farm</td>
<td>2011</td>
<td>No plots for individual use</td>
<td>Open to all Toronto residents</td>
</tr>
<tr>
<td>South Riverdale Community Health Centre</td>
<td>2000</td>
<td>5 raised beds (shared)</td>
<td>Open to all Toronto residents</td>
</tr>
<tr>
<td>Fort York Community Garden</td>
<td>2008</td>
<td>38</td>
<td>Some plots designated for community programs</td>
</tr>
</tbody>
</table>

The mandate of each garden site in Toronto differs. Ryerson’s urban rooftop farm sells produce to on-campus food operations, manages a small farmers market and provides food to local restaurants, as well as providing produce for members of an organized community supported agriculture (CSA) program. Volunteer drop-in sessions occur on the first Friday of every month during the summer growing season. There is no required time commitment, and volunteers can choose which sessions they want to attend. They do not receive produce, as it is all sourced to the previously mentioned on-campus programs. Participation is not limited to students and staff; local residents are free to participate. Volunteer events are coordinated by Rye’s Homegrown,
the on-campus Urban Agriculture Society, which comprises of students and staff who manage the rooftop farm.

The rooftop garden at South Riverdale Community Health Centre is primarily for patients that attend the centre, providing small harvests to those who volunteer, and acts as a rehabilitation space created by the centre for patient health programs. Volunteer gardening sessions are open to patients as well as Toronto residents, and operate on a drop-in schedule one day per week in the summer months. Alternatively, Fort York is an individually-based allotment style community garden, and the produce that members grow is theirs to keep.

Rye’s Homegrown operates at Ryerson University, which is located in the centre of downtown Toronto. The surrounding neighbourhood is a high-density mix of business, entertainment/retail, and residential buildings. It has the highest population density of the three Toronto neighbourhoods associated with the gardens in this study, as well as the highest percentage of immigrants (Table 4).
Table 4: Census tract information for the Mississauga neighbourhoods where the garden sites were located. Data was retrieved from Statistics Canada Census and National Household Survey (NHS) profiles.

<table>
<thead>
<tr>
<th>Garden/Neighbourhood</th>
<th>Population</th>
<th>Area (km²)</th>
<th>Population Density (People/km²)</th>
<th>Median Household Income ($)</th>
<th>Percent Immigrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryerson Rooftop Farm</td>
<td>4690</td>
<td>0.4</td>
<td>11,725</td>
<td>47230</td>
<td>40%</td>
</tr>
<tr>
<td>South Riverdale</td>
<td>2905</td>
<td>0.25</td>
<td>11,620</td>
<td>44737</td>
<td>34%</td>
</tr>
<tr>
<td>Fort York Community Garden</td>
<td>9225</td>
<td>2.16</td>
<td>4271</td>
<td>68524</td>
<td>31%</td>
</tr>
</tbody>
</table>

South Riverdale Community Health Centre is located just east of Toronto’s downtown core. It is a medium to high density neighbourhood, with a larger percentage of on-the-ground, detached homes and smaller condominium/apartment buildings. It has a similar population to the Ryerson neighbourhood. Median household income is lowest in this neighbourhood (Table 4). This program is open to any Toronto resident, so it is possible that some people that attend the weekly gardening sessions were not necessarily from the local community.

Fort York is located southwest of Toronto’s downtown core, close to the lakefront. It has the highest median household income of the three neighbourhoods (Table 4). It contains mixed land uses, such as sports and entertainment venues. High-density residential buildings are located close to Fort York Historic Site.
The neighbourhood where Fort York is located has the highest median household income and has the lowest population density of the three Toronto neighbourhoods. The percentage of immigrants does not differ greatly between these three study neighbourhoods (Table 4).

Together, the four Mississauga and three Toronto sites allow for an exploration of experiences between urban and suburban settings, street-level and rooftop gardens, and people with varied incomes and immigrant status.

3.2 Survey Methods

A survey was developed to gauge participants’ experiences and continued benefits, as well as the concerns and challenges, associated with using a community growing space (Appendix A). Additionally, areas of improved learning after starting in the garden (such as gardening and food literacy), participants’ gardening activities, and regarding individuals’ household demographic information were included in the survey. The first question in the survey loosely draws from the community gardening literature. However, I developed the remainder of the survey with no specific reference to the literature.

The first survey question asked participants to rank the importance they place on a number of community garden benefits that have been previously identified in the academic literature, using a 5-point Likert scale. These benefits can be broadly categorized into personal (Wakefield et al. 2007, Kingsley 2008), social (Armstrong 2000, Wakefield et al. 2007), and environmental (Whittinghill and Rowe 2011) benefits.

Questions that gauged the motivations for joining a community garden program, experienced and continuing benefits, and challenges, were designed as open-ended questions. These responses
were then coded into several themes, with a numeric identifier associated with each response. Respondents were also asked about their general gardening activities, such as the average time per week spent in the garden, or how far they lived from their garden. The final section of the survey asked respondents about their demographic backgrounds.

The survey was distributed to members of each gardening organization, with the goal of reaching all members. The method of survey delivery and return varied based on the members that used the specific gardens. Additionally, the timing of survey dissemination varied based on access to participants. In all cases, survey participants were given information letters and asked to provide informed consent. This research received approval from the University’s Research Ethics Board, and followed standard practices for informed consent and confidentiality.

In early autumn of 2015, paper surveys were distributed to members at the Hillside and Parkway Green gardens in Mississauga, at Ecosource’s end of season celebrations. Information and consent forms were provided, as well as a survey package with a pre-stamped envelope that members could use to return the completed surveys. However, member turnout was limited, resulting in only four members actually mailing the survey back. Thus, subsequent survey distribution in the Mississauga community garden sites was done entirely via email as a list of all participants was available. Specifically, an Ecosource staff member was responsible for distributing the email survey to their members. A reminder email was sent out a couple of weeks after the initial contact email. At the time of the survey, Ecosource had one-hundred sixteen community garden members in their listserv. A total of eighty-six members responded online, resulting in ninety total responses (eighty-six plus the four paper surveys).
At Ryerson University, a combination of paper and online surveys were also used. Rye’s Homegrown organizes a volunteer helping event on the first Friday of every month of the summer. A combination of students and neighbourhood residents attended these monthly sessions. During four of these events (one per month), survey packages were available for volunteers to complete and return. If members wished to complete the survey online, they were asked to provide an email address so the online survey could be sent to them. In total, twenty volunteers completed the online survey, and only two members chose to fill out a paper copy, resulting in a total of twenty-two surveys received from participants at Rye’s Homegrown.

Though there appeared to be some regular volunteers (some people attended the sessions every month), the total number of “members” that attend the sessions cannot be determined, as the monthly events were populated by individuals signing up via email with limited spots available. It is possible that some people only came for one session while others may be regular volunteers that consistently participate at each session.

At the South Riverdale Community Health Centre (SRCHC), some garden participants did not have reliable access to a computer, so survey distribution was done entirely with paper copies. Consent forms and survey packages were distributed at weekly gardening program sessions during the late summer of 2016, with a total of four sessions attended. However, sessions often had few participants. In total, only four members returned a survey. Like Ryerson, there is not a set number of garden members.

Finally, surveys were distributed to members at Fort York’s community garden entirely by email. A staff member responsible for managing the community garden agreed to distribute the invitation email with the survey link to their members. In total, sixteen members completed the
online survey. Table 5 provides a breakdown of the garden sites and number of participants in this research study.

Table 5: Garden locations and number of participants from each site.

<table>
<thead>
<tr>
<th>Garden Locations</th>
<th>Number of Responses</th>
<th>Number of members/ plots</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mississauga</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garden of the Valley</td>
<td>28</td>
<td>40 plots</td>
</tr>
<tr>
<td>Parkway Green Generation</td>
<td>29</td>
<td>45 plots</td>
</tr>
<tr>
<td>Malton Garden</td>
<td>7</td>
<td>11 plots</td>
</tr>
<tr>
<td>Hillside Garden</td>
<td>22</td>
<td>30 plots</td>
</tr>
<tr>
<td>Did not indicate</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Toronto</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ryerson Rooftop Farm</td>
<td>22</td>
<td>N/A – drop in sessions</td>
</tr>
<tr>
<td>South Riverdale Community Health Centre</td>
<td>3</td>
<td>N/A – drop in sessions</td>
</tr>
<tr>
<td>Fort York Community Garden</td>
<td>16</td>
<td>38 Plots</td>
</tr>
</tbody>
</table>

Paper surveys were entered into a database with the online survey responses. Responses to open-ended questions were given numeric identifiers based on common themes that were present in participants’ answers (Table 6). This process allowed for a quantitative statistical analysis of the open-ended questions, without limiting the types of benefits and challenges the respondents could choose from. Themes were identified using an iterative coding process on the text responses that respondents provided, and broad categories were used to group these responses (Table 6). For example, “access to healthy food” was one theme, as many respondents indicated having healthy food was a benefit. Respondents often provided long answers that included
several themes. These answers were given more than one numeric identifier, based on the represented themes.

Table 6: List of themes identified for open-ended questions examining motivations, benefits and challenges, as well as improved knowledge areas experienced by garden participants.

<table>
<thead>
<tr>
<th>Motivations/ Ongoing benefits</th>
<th>Challenges</th>
<th>Improved knowledge areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to organic food/ Grow your own food</td>
<td>Access to resources or quality of available resources</td>
<td>Organic food</td>
</tr>
<tr>
<td>Lack of growing space at home</td>
<td>Security issues</td>
<td>Nutrition and diet</td>
</tr>
<tr>
<td>Improvements in physical/mental health</td>
<td>Vandalism</td>
<td>Importance of exercise and physical activity</td>
</tr>
<tr>
<td>Social and community benefits</td>
<td>Lack of time to commit</td>
<td>Cooking skills</td>
</tr>
<tr>
<td>Reduces household food costs</td>
<td>Maintenance and upkeep of gardening space</td>
<td>Social skills</td>
</tr>
<tr>
<td>Feel closer to nature/ gardening is environmentally friendly</td>
<td>Etiquette of other members</td>
<td>Gardening skills</td>
</tr>
<tr>
<td>Hobby provision or skill learning</td>
<td>Lack of prior gardening knowledge</td>
<td>Environmental aspects</td>
</tr>
<tr>
<td>Other</td>
<td>Pests</td>
<td>Other</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>
3.3 Data Analysis

Simple summaries of Likert scale and categorical responses were calculated. Responses from participants at South Riverdale Community Health Centre were included in data summaries, but not in any statistical comparisons. Three comparisons were then made to determine if any differences in experiences existed between locations: 1) a comparison between the gardening spaces in Toronto and Mississauga to consider urban versus suburban contexts; 2) between Ryerson’s rooftop space and Fort York’s community garden to examine rooftop versus street-level gardening experiences in an urban area and; 3) one comparing the four Mississauga community gardens, to consider varied socio-demographic relationships when gardening. An additional comparison of the Mississauga gardens also looked at experiences in relation to income and birth location. Community gardening research has focused mainly on lower-income neighbourhoods, or more vulnerable populations (Corrigan 2011, Guitart et al. 2014, Poulsen et al. 2014), while recent immigration has been a focus of Canadian community gardens studies (Baker 2004, Levkoe 2006, Wakefield et al. 2007). Thus, I was interested in examining if experiences varied by income and immigrant-status.

The first step in the analysis was conducting a principle component analysis on the Likert scale question about community garden benefits to explore patterns within respondents’ level of agreement with specific benefits statements (Survey Question 1). This analysis was used to determine if responses to benefits statements were intercorrelated or if responses to different statements were unrelated to each other. However, PCA results indicate the benefits variables (i.e statements) were loaded primarily positively loaded on one component for Mississauga and Toronto, when examined in combination and separately (with the exception of two statements in
the Toronto-only comparison, Tables 7, 8 and 9, respectively). While this suggests responses to all statements were correlated, the total variance explained by component 1 was only 50% for Mississauga and Toronto combined, 33% for Toronto, and 50% for the Mississauga gardens. Thus, a numeric index was used to combine the Likert scale responses into a single variable for each participant to avoid issues of intercorrelation while capturing details of responses. The index is simply the total score of the respondents’ answers to the perceived benefits statements, with higher values indicating greater levels of agreement with more benefits. This index was calculated to reflect responses and their level of correlation, rather than just using component one from the PCAs, as it does not capture a substantial amount of variation in the responses.
Table 7: Principle component analysis results for Likert Scale benefits responses for Mississauga and Toronto participants combined

<table>
<thead>
<tr>
<th></th>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Connection to Nature</td>
<td>0.572</td>
</tr>
<tr>
<td>Beautification of parks</td>
<td>0.653</td>
</tr>
<tr>
<td>Stress relief</td>
<td>0.564</td>
</tr>
<tr>
<td>Spend time with friends and family</td>
<td>0.548</td>
</tr>
<tr>
<td>Meet new people</td>
<td>0.654</td>
</tr>
<tr>
<td>Hobby</td>
<td>0.6</td>
</tr>
<tr>
<td>Improve personal fitness</td>
<td>0.637</td>
</tr>
<tr>
<td>Improve diet</td>
<td>0.633</td>
</tr>
<tr>
<td>Healthy food</td>
<td>0.6</td>
</tr>
<tr>
<td>Reduce food costs</td>
<td>0.61</td>
</tr>
<tr>
<td>Increase biodiversity</td>
<td>0.816</td>
</tr>
<tr>
<td>Stormwater management</td>
<td>0.788</td>
</tr>
<tr>
<td>Reduce urban heat island</td>
<td>0.779</td>
</tr>
<tr>
<td>Sustainable food practice</td>
<td>0.705</td>
</tr>
<tr>
<td>Increase local food security</td>
<td>0.705</td>
</tr>
<tr>
<td>Initial Eigenvalues</td>
<td>6.585</td>
</tr>
<tr>
<td>% of Variance</td>
<td>43.9%</td>
</tr>
</tbody>
</table>
Table 8: Principle component analysis results for Mississauga participants’ responses to benefits statements.

<table>
<thead>
<tr>
<th>Mississauga Statements</th>
<th>Components</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Feel closer to nature</td>
<td>0.545</td>
</tr>
<tr>
<td>Beautify park space</td>
<td>0.691</td>
</tr>
<tr>
<td>Stress relief</td>
<td>0.603</td>
</tr>
<tr>
<td>Spend time with friends and family</td>
<td>0.581</td>
</tr>
<tr>
<td>Meet new people</td>
<td>0.687</td>
</tr>
<tr>
<td>Provides a hobby</td>
<td>0.747</td>
</tr>
<tr>
<td>Improved fitness</td>
<td>0.710</td>
</tr>
<tr>
<td>Improved diet</td>
<td>0.753</td>
</tr>
<tr>
<td>Better food</td>
<td>0.635</td>
</tr>
<tr>
<td>Reduce household food costs</td>
<td>0.632</td>
</tr>
<tr>
<td>Improve local biodiversity</td>
<td>0.838</td>
</tr>
<tr>
<td>Stormwater management</td>
<td>0.796</td>
</tr>
<tr>
<td>Reduce urban heat islands</td>
<td>0.775</td>
</tr>
<tr>
<td>Sustainable food practices</td>
<td>0.790</td>
</tr>
<tr>
<td>Improve local food security</td>
<td>0.767</td>
</tr>
<tr>
<td>Initial Eigenvalues</td>
<td>7.529</td>
</tr>
<tr>
<td>% of Variance</td>
<td>50.19</td>
</tr>
</tbody>
</table>
Table 9: Principle component analysis results for Toronto participant responses to benefits statements.

<table>
<thead>
<tr>
<th>Benefit Statement</th>
<th>Components 1</th>
<th>Components 2</th>
<th>Components 3</th>
<th>Components 4</th>
<th>Components 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feel closer to nature</td>
<td>0.674</td>
<td>0.384</td>
<td>0.319</td>
<td>0.118</td>
<td>0.112</td>
</tr>
<tr>
<td>Beautify park space</td>
<td>0.550</td>
<td>0.560</td>
<td>0.178</td>
<td>-0.271</td>
<td>0.031</td>
</tr>
<tr>
<td>Stress relief</td>
<td>0.471</td>
<td>0.215</td>
<td>0.072</td>
<td>0.471</td>
<td>-0.327</td>
</tr>
<tr>
<td>Spend time with friends and family</td>
<td>0.505</td>
<td>0.266</td>
<td>0.301</td>
<td>-0.239</td>
<td>-0.564</td>
</tr>
<tr>
<td>Meet new people</td>
<td>0.533</td>
<td>-0.204</td>
<td>0.483</td>
<td>-0.497</td>
<td>0.053</td>
</tr>
<tr>
<td>Provides a hobby</td>
<td>0.224</td>
<td>0.418</td>
<td>0.506</td>
<td>0.198</td>
<td>0.562</td>
</tr>
<tr>
<td>Improved fitness</td>
<td>0.613</td>
<td>-0.444</td>
<td>0.299</td>
<td>-0.381</td>
<td>0.172</td>
</tr>
<tr>
<td>Improved diet</td>
<td>0.309</td>
<td>-0.814</td>
<td>-0.032</td>
<td>0.020</td>
<td>0.232</td>
</tr>
<tr>
<td>Better food</td>
<td>0.446</td>
<td>-0.085</td>
<td>0.312</td>
<td>0.602</td>
<td>0.107</td>
</tr>
<tr>
<td>Reduce household food costs</td>
<td>0.566</td>
<td>-0.484</td>
<td>-0.117</td>
<td>-0.385</td>
<td>-0.066</td>
</tr>
<tr>
<td>Improve local biodiversity</td>
<td>0.813</td>
<td>0.025</td>
<td>-0.342</td>
<td>0.070</td>
<td>-0.019</td>
</tr>
<tr>
<td>Stormwater management</td>
<td>0.792</td>
<td>-0.121</td>
<td>-0.305</td>
<td>-0.154</td>
<td>-0.209</td>
</tr>
<tr>
<td>Reduce urban heat islands</td>
<td>0.827</td>
<td>-0.175</td>
<td>-0.045</td>
<td>0.134</td>
<td>-0.057</td>
</tr>
<tr>
<td>Sustainable food practices</td>
<td>0.384</td>
<td>0.468</td>
<td>-0.594</td>
<td>0.036</td>
<td>0.191</td>
</tr>
<tr>
<td>Improve local food security</td>
<td>0.510</td>
<td>0.173</td>
<td>-0.648</td>
<td>-0.254</td>
<td>0.313</td>
</tr>
<tr>
<td>Initial Eigenvalues</td>
<td>4.941</td>
<td>2.192</td>
<td>1.905</td>
<td>1.421</td>
<td>1.038</td>
</tr>
<tr>
<td>% of Variance</td>
<td>32.94</td>
<td>14.62</td>
<td>12.70</td>
<td>9.47</td>
<td>6.92</td>
</tr>
</tbody>
</table>
Comparisons in the benefit index were conducted across locations using ANOVAs. These tests were used to determine any statistically significant differences between the groups in each comparison. Crosstabulations analyses were then used to examine any potential location-based differences between motivations, benefits, and challenges that participants had experienced, derived from the open-ended survey questions. Cramer’s V was used as the test statistic for the crosstabulations analyses. Numerically coded themes from the open-ended questions were treated as binary variables.

For the four Mississauga gardens, income and immigrant-status for each census tract/neighbourhood were then examined in relation to the experience variables. This analysis was limited to the Mississauga gardens: it allowed me to look at the demographic variables while keeping the gardening organization and location relatively constant. Crosstabulations analyses (using Cramer’s V as a test statistic) were used to examine the relationships between experiences with Mississauga respondents’ income and birth location. For the comparison with income, respondents’ incomes were re-categorized into two groups, low-middle income ($24,000 - $49,999 per year) and middle-high income ($50,000 - $100,000+ per year), to provide a more robust sample for the crosstabulations analysis. Similarly for the crosstabulations analysis with birth location, respondents’ were categorized into two groups, those born in Canada and those born outside of Canada.
4.1 Description of Survey Participants

The 128 participants in this study come from a variety of different socioeconomic backgrounds. In Mississauga, the most common household income bracket was between $24,000 – 49,999 annually (reported by 23% of Mississauga participants), although considerable variation exists (Table 10).
Table 10: Demographic backgrounds of the individual garden sites. NOTE: The four survey participants from South Riverdale Community Health Centre chose not to indicate personal demographic information, and therefore no information for those participants is provided.

<table>
<thead>
<tr>
<th>City</th>
<th>Garden Site</th>
<th>Most Common Income Bracket (Annual Household Income)</th>
<th>Percentage of Respondents with a Post-Secondary Education</th>
<th>Average Age of Participants</th>
<th>Percent Immigrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mississauga</td>
<td>Hillside Garden</td>
<td>$75,000 - $99,999</td>
<td>72%</td>
<td>51</td>
<td>64%</td>
</tr>
<tr>
<td></td>
<td>Malton Garden</td>
<td>$25,000 - $49,999</td>
<td>57%</td>
<td>47</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td>Mississauga Valley Garden</td>
<td>$25,000 - $49,999</td>
<td>89%</td>
<td>50</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>Parkway Garden</td>
<td>$25,000 - $49,999</td>
<td>66%</td>
<td>48</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>Green Garden</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toronto</td>
<td>Ryerson’s Rooftop Farm</td>
<td>$50,000 - $74,999</td>
<td>59%</td>
<td>31</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>Fort York Garden</td>
<td>$75,000 - $99,999</td>
<td>88%</td>
<td>48</td>
<td>81%</td>
</tr>
<tr>
<td></td>
<td>South Riverdale</td>
<td>Did not indicate</td>
<td>Did not indicate</td>
<td>Did not indicate</td>
<td>34%</td>
</tr>
</tbody>
</table>

In Toronto, participants represented a range of household income brackets, varying from lower income ($0-$24,999 annually) to $100,000 + annually, with no income category representing more than 13% of the sample (Table 10). In general, participants in both cities were well-educated; 76% and 71% of participants in Mississauga and Toronto respectively had obtained a college degree or higher.
The average ages of participants for Mississauga and Toronto are 49 and 38 years old respectively. Some of the participants from Ryerson’s rooftop farm were students/young adults, which helps explain why the average age of the Toronto participants is lower. In the Mississauga gardens, participants’ ages varied from early thirties to early seventies.

There is a larger percentage of immigrants participating in the Mississauga study gardens than in Toronto (64% compared to 33%), which is reflected in the demographics of the census tracts surrounding the different sites. However, Mississauga’s participants travel a variety of distances to their community garden, with 34% of respondents living less than two kilometers from their garden and an equal number of respondents (34%) living between 5 and 10 kilometers from their garden, suggesting that the gardens are drawing on a relatively large area. A majority of respondents in Toronto live less than two kilometers from their garden. Of the few respondents who lived more than 10 kilometers from the garden, many were participants at Ryerson’s rooftop farm were likely students that may have been commuting from home.

Length of garden membership also differed by city. A majority of participants in Mississauga’s community gardens had been participating for more than one year; whereas a majority of respondents in Toronto’s gardening spaces had been a member for less than one year. However, a majority of Toronto participants who said that they had been involved for a short period of time were generally those that volunteered at Ryerson’s rooftop farm, where the monthly events were attended through a drop-in basis. A large percentage of Toronto participants that attended a garden for more than two years were members at the Fort York community garden, which is organized around the renting of individual plots.
4.2 Benefits, Motivations, and Challenges: Common Themes

4.2.1 Perceived Benefits of Community Gardens

The first question in the survey asked respondents to rank a number of personal, social, and environmental community gardens benefits on a Likert scale from 1 – 5 (1=least important, 5= Most important) in terms of importance to them (Table 11).
Table 11: Community gardens benefits as ranked by respondents. Respondents were asked to rank benefits on a scale from 1 – 5 (1= Not very important, 5= Very important).

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Very Important</th>
<th>Important</th>
<th>Neutral</th>
<th>Somewhat unimportant</th>
<th>Not Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthier food</td>
<td>65%</td>
<td>22%</td>
<td>15%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>Provides a Hobby</td>
<td>62%</td>
<td>24%</td>
<td>9%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Stress Relief</td>
<td>60%</td>
<td>23%</td>
<td>9%</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Beautification of park space</td>
<td>61%</td>
<td>19%</td>
<td>12%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>Connection to nature</td>
<td>58%</td>
<td>22%</td>
<td>15%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>Sustainable food practices</td>
<td>43%</td>
<td>36%</td>
<td>10%</td>
<td>7%</td>
<td>1%</td>
</tr>
<tr>
<td>Improved diet</td>
<td>38%</td>
<td>21%</td>
<td>22%</td>
<td>6%</td>
<td>1%</td>
</tr>
<tr>
<td>Increase local food security</td>
<td>38%</td>
<td>28%</td>
<td>15%</td>
<td>9%</td>
<td>4%</td>
</tr>
<tr>
<td>Increase local biodiversity</td>
<td>38%</td>
<td>26%</td>
<td>19%</td>
<td>6%</td>
<td>4%</td>
</tr>
<tr>
<td>Meet new people</td>
<td>30%</td>
<td>18%</td>
<td>10%</td>
<td>3%</td>
<td>36%</td>
</tr>
<tr>
<td>Reduce urban heat island effect</td>
<td>30%</td>
<td>24%</td>
<td>22%</td>
<td>15%</td>
<td>5%</td>
</tr>
<tr>
<td>Reduce household food costs</td>
<td>28%</td>
<td>20%</td>
<td>31%</td>
<td>11%</td>
<td>6%</td>
</tr>
<tr>
<td>Improve local stormwater</td>
<td>28%</td>
<td>22%</td>
<td>23%</td>
<td>15%</td>
<td>7%</td>
</tr>
<tr>
<td>management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increase physical fitness</td>
<td>25%</td>
<td>25%</td>
<td>27%</td>
<td>17%</td>
<td>3%</td>
</tr>
<tr>
<td>Spend time with friends and</td>
<td>24%</td>
<td>28%</td>
<td>26%</td>
<td>13%</td>
<td>6%</td>
</tr>
<tr>
<td>family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Overall, the benefits most frequently identified as important were access to healthier food and the provision of a space to practice a hobby. These common benefits primarily reflect the personal benefits associated with gardening, as well as some environmental benefits. The benefits that were the least important to participants were meeting new people, stormwater management, the reduction of urban heat islands, and increased physical fitness. However, even
these benefits with the most “somewhat” and “not important” responses still had over 50% of respondents indicate they were “important” or “very important”.

Answers to open-ended questions about motivations (Table 13) reflected the common benefits from the Likert scale benefits question, although there was a greater focus on individual benefits. Many respondents expressed a desire to grow their own food. Some of the responses expressing this include “I know what is going into my vegetables” or that community gardening “gives people that don’t live in a house an opportunity to have their own garden and grow vegetables”. Another common theme was the various family benefits that come from using a community garden. One member from Mississauga said there are “many benefits for families including teaching our children to grow their own food, to familiarize them with the idea of nature and natural food intake”.

A few respondents did identify broader community benefits of urban gardening programs. One respondent said that “community gardens provide food to lower income families”; and another member enjoyed “learning what other cultures like to grow and eat”. In terms of environmental benefits, one member said “local production of food is always better for the economy, environment, and in general better for the people around it”. The same member also said “I see community gardening, especially in urban areas, as playing a huge part in the future of sustainability”, but did not identify specific environmental benefits, such as the increase of local biodiversity or the reduction of urban heat islands.

In an open-ended question that asked about initial benefits participants experienced when they started at their garden, some respondents from Ryerson’s rooftop farm identified broader social and environmental aspects as well as innovative urban food systems. One member said “I think
that it brings people together, and helps people learn more about where their food comes from. It is great from the city’s perspective, as it helps manage rainwater and cools off the city in the summer”. Another respondent said that the rooftop garden was helpful for “teaching people about their food sources and getting people to think about food production. I think green space, improvements to air quality and energy efficiency and stormwater management are also important benefits”.

Respondents were asked to list on-going benefits that they had experienced during their time of involvement at their community garden. These benefits are not necessarily the reasons that respondents had for starting in a community garden, but include the benefits they had experienced once they had been involved in their garden for a while.

The ability to practice a hobby or learn a new skill was the most common on-going benefit. However, the closer connection to nature, social or community benefits, and access to healthy foods were also commonly identified by respondents (Table 12).
Table 12: Respondents’ continued benefits from using a community garden. Percentages in this table are representative of all participants.

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage of All Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to healthy/organic food</td>
<td>45%</td>
</tr>
<tr>
<td>Social/Community benefits</td>
<td>37%</td>
</tr>
<tr>
<td>Hobby/Skill learning</td>
<td>21%</td>
</tr>
<tr>
<td>Feel closer to nature/Environmentally friendly</td>
<td>15%</td>
</tr>
<tr>
<td>Physical/Mental health</td>
<td>12%</td>
</tr>
<tr>
<td>Lack of space at home</td>
<td>9%</td>
</tr>
<tr>
<td>Reduce household food costs</td>
<td>2%</td>
</tr>
</tbody>
</table>

One respondent stated “I really love growing my own food. I love all of the “work” associated with gardening – I just don’t consider it work! I look forward to talking with the other gardeners”. A respondent from Mississauga said “Parkway Green has brought people together from all different backgrounds - I like being part of that and meeting so many interesting people. Parkway Green sees no age, race or social class and I dig that”.

The least common benefits were the health aspects of gardening (such as the improvement in physical health or diet), and the reduction of household food costs (Table 13), which is similar to the initial motivations.

One interesting finding with respect to participants’ ongoing benefits is that the social/community benefits were found to be a very common benefit, with 37% of respondents indicating that they had enjoyed the social environment that the garden provides (Table 13). One respondent from Mississauga said it was “enjoyable spending of time with family and friends...”
while working in the garden”. Other respondents shared similar sentiments. However, in the Likert-scale benefits question (Table 11), the perceived importance of social benefits was ranked relatively low.

### 4.2.2 Participant Motivations for Starting in a Community Garden

A number of common themes were present in respondents’ answers to open-ended questions regarding the initial motivations that participants experienced during their time at a community growing space (Table 13).

#### Table 13: Common participant motivations for starting in a community garden.

<table>
<thead>
<tr>
<th>Motivations</th>
<th>Percentage of All Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to healthy/organic food</td>
<td>35%</td>
</tr>
<tr>
<td>Hobby/Skill learning</td>
<td>24%</td>
</tr>
<tr>
<td>Lack of space at home</td>
<td>19%</td>
</tr>
<tr>
<td>Social/Community benefits</td>
<td>14%</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
</tr>
<tr>
<td>Feel closer to nature/Environmentally friendly</td>
<td>7%</td>
</tr>
<tr>
<td>Physical/Mental health</td>
<td>4%</td>
</tr>
<tr>
<td>Reduce household food costs</td>
<td>2%</td>
</tr>
</tbody>
</table>

The most common motivation for starting in a community garden as indicated by participants was having access to food they felt was organic or healthier. The ability to practice a hobby and the lack of growing space at home were the next most common motivations (Table 13). Not surprisingly, these common motivations are aligned with the more commonly valued benefits. Only seven percent of respondents indicated that they were initially motivated to use a
community garden to feel closer to nature or to be environmentally friendly (Table 13). However, 15% of all respondents did indicate environmental stewardship as an ongoing benefit, suggesting that the gardening spaces can help facilitate some sort of environmental learning (Table 13).

In their statements, respondents often indicated one or more of these motivations as their reasons to participate. One respondent from Mississauga said “I grew up on a farm, and now live in an apartment. I missed being able to plant and believe in organic practices”. One participant said that “the ability to grow my own food free of chemicals” was influential in their participation in a community garden. Another participant said “I wanted to learn more about organic natural gardening, and in the process get some nice freshly grown organic produce to eat”.

Another common motivation was having the opportunity to practice a hobby or learn a new skill. Respondents often stated that they simply enjoyed gardening or had an interest in growing their own food. This motivation may have also been reflective of participants’ residences. Some respondents indicated that they lived in apartment buildings, and did not have a space to garden at home; this theme was the third most common among the motivations for starting in a garden (Table 12). One respondent said “I don’t have any outdoor space at home and I wanted to be able to eat good quality vegetables and fruits as well as find a way to deal with stress”. Another respondent shared a similar sentiment, stating “lack of space in our apartment and the keenness to learn how to grow our own fruits and vegetables” as their motivator for starting in a garden. These comments and many others like them reflect the value community gardening spaces can have in areas that have undergone significant urban development.
4.2.3 Community Gardening Challenges

The most common challenge indicated by participants was overwhelmingly access to quality resources (Table 14).

Table 14: Common challenges experienced by participants.

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Percentage of All Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to resources/ Resource quality</td>
<td>41%</td>
</tr>
<tr>
<td>Theft and security</td>
<td>16%</td>
</tr>
<tr>
<td>Maintenance and upkeep</td>
<td>12%</td>
</tr>
<tr>
<td>Etiquette of other members</td>
<td>12%</td>
</tr>
<tr>
<td>Other</td>
<td>12%</td>
</tr>
<tr>
<td>Lack of time to commit</td>
<td>11%</td>
</tr>
<tr>
<td>Pests</td>
<td>7%</td>
</tr>
<tr>
<td>Vandalism</td>
<td>5%</td>
</tr>
<tr>
<td>None</td>
<td>4%</td>
</tr>
<tr>
<td>Lack of prior gardening knowledge</td>
<td>2%</td>
</tr>
</tbody>
</table>

One prominent issue in Mississauga is inconsistent availability of water at the gardens. One respondent said, “Water access - bringing water from home when the spigot wasn't accessible was inconvenient and unfair for people who had accessibility issues. It would be great to figure out a way to work in a sprinkler system using the rain water because the water barrels don't really maximize rain water usage”. In addition to water issues, some respondents indicated soil quality as an issue. One respondent said, “The soil quality of the new garden plot is really poor. Lack of access to water makes for poor quality of grown vegetables - really takes away from the experience to have to drag gallons and gallons of water by hand from home. The new elevated garden plot heats up the soil which dries up the soil even faster”. Limited space and number of
plots was another issue that was indicated by respondents. One respondent had waited a number of years before they had a plot for the season, stating “a desperate lack of availability [of garden plots]. I was on the waiting list for almost five years at Fort York before I got my half plot. Not even a full plot”.

Security and theft issues were also challenges experienced by respondents that use the street-level gardens in Mississauga and Toronto. Representative comments within this category, included “folks who just maliciously take without asking” or “no lock on gates, theft of vegetables – even the entire plants”.

### 4.2.4 Areas of Improved Knowledge

Participants were asked to indicate if their involvement in a community growing space had helped improve their understanding of several subjects. This survey question was not open-ended; instead it asked respondents to simply select from a list which areas they had seen improved knowledge. Learning and improving gardening skills and knowledge was the most common subject area, not surprisingly (Table 15).
Table 15: Participants’ improved knowledge areas after participating in a community growing space.

<table>
<thead>
<tr>
<th>Subject Area</th>
<th>Percentage of All Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gardening skills</td>
<td>84%</td>
</tr>
<tr>
<td>Environmental aspects</td>
<td>73%</td>
</tr>
<tr>
<td>Organic food</td>
<td>72%</td>
</tr>
<tr>
<td>Nutrition and diet</td>
<td>56%</td>
</tr>
<tr>
<td>Exercise</td>
<td>47%</td>
</tr>
<tr>
<td>Social skills</td>
<td>46%</td>
</tr>
<tr>
<td>Cooking</td>
<td>42%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
</tr>
</tbody>
</table>

One member at Fort York’s community garden expressed the knowledge learned in the garden, such as “learning how to amend soil if it is not healthy. I have learned how to save seeds from the best fruits/vegetables of the year before to continue producing great fruit/vegetables the next season” (Quote taken from another survey question).

The next most common knowledge area was related to the environmental aspects surrounding community and urban gardens. In the Likert scale benefits question, the environmental benefits of community gardens, such as the reduction of urban heat islands in the summer, were relatively unimportant. However, 73% of respondents indicated that they had learned about some environmental aspects surrounding community gardens. These results suggest that community gardens can act as spaces where people can learn about environmental topics within an urban or suburban context, even if it not recognized as a benefit by participants. However, EcoSource is focused on environmental education, which might be reason for improved environmental
learning. Future research projects might examine environmental learning between participants from different community gardening organizations.

4.3 Comparisons between Gardening Sites

Three comparisons were carried out to examine the differences in the cumulative benefits index, as well as the motivations and challenges experienced by participants. These comparisons examined differences between urban and suburban contexts (Toronto/ Mississauga); rooftop versus street- level gardening spaces (Ryerson/Fort York); and between the Mississauga gardens.

4.3.1 Mississauga versus Toronto (Suburban versus Urban)

The average index value for the Likert benefits statements did not differ greatly between Mississauga and Toronto, and this difference did not yield a significant result (Table 16). With respect to motivations in the Mississauga/Toronto comparison, the ability to practice a hobby or learn a new skill was the only significant difference (Table 17).

Table 16: Average index value for the benefits statements in the Mississauga/ Toronto comparison.

<table>
<thead>
<tr>
<th>City</th>
<th>Average Index Value</th>
<th>P – Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mississauga</td>
<td>55</td>
<td>0.459</td>
</tr>
<tr>
<td>Toronto</td>
<td>59</td>
<td></td>
</tr>
</tbody>
</table>
Table 17: Crosstabulations results comparing participants’ motivations between Mississauga and Toronto sites. Cramer’s V was used as the test statistic (results less than 0.05 considered statistically significant).

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Test Statistic Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Food/Grow own food</td>
<td>0.054</td>
<td>0.546</td>
</tr>
<tr>
<td>Lack of space at home</td>
<td>0.060</td>
<td>0.504</td>
</tr>
<tr>
<td>Physical/Mental health</td>
<td>0.022</td>
<td>0.803</td>
</tr>
<tr>
<td>Social and community benefits</td>
<td>0.162</td>
<td>0.072</td>
</tr>
<tr>
<td>Reduce household food costs</td>
<td>0.085</td>
<td>0.351</td>
</tr>
<tr>
<td>Feel closer to nature/ Environmentally friendly</td>
<td>0.084</td>
<td>0.927</td>
</tr>
<tr>
<td>Hobby/Skill learning</td>
<td><strong>0.211</strong></td>
<td><strong>0.019</strong></td>
</tr>
<tr>
<td>Other</td>
<td>0.071</td>
<td>0.427</td>
</tr>
</tbody>
</table>

The percentage of respondents that identified hobby practicing as a motivation to start in a community garden was lower in Mississauga (17%) than Toronto (37% of Toronto respondents).

There were three significant results in the comparison of challenges between the Mississauga and Toronto gardening locations (Table 18).
Table 18: Crosstabulations results comparing the challenges experienced by participants between Mississauga and Toronto study sites. Cramer’s V was used as the test statistic (results less than 0.05 considered statistically significant).

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Test Statistic Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource access/quality</td>
<td>0.210</td>
<td>0.019</td>
</tr>
<tr>
<td>Security</td>
<td>0.149</td>
<td>0.097</td>
</tr>
<tr>
<td>Vandalism</td>
<td>0.150</td>
<td>0.095</td>
</tr>
<tr>
<td>Lack of time to commit</td>
<td>0.071</td>
<td>0.427</td>
</tr>
<tr>
<td>Maintenance and upkeep</td>
<td>0.022</td>
<td>0.810</td>
</tr>
<tr>
<td>Member etiquette</td>
<td>0.032</td>
<td>0.721</td>
</tr>
<tr>
<td>Lack of gardening knowledge</td>
<td>0.009</td>
<td>0.919</td>
</tr>
<tr>
<td>Pests</td>
<td>0.219</td>
<td>0.015</td>
</tr>
<tr>
<td>Other</td>
<td>0.515</td>
<td>0.001</td>
</tr>
<tr>
<td>None</td>
<td>0.042</td>
<td>0.643</td>
</tr>
</tbody>
</table>

The first concerns resource access/quality. The percentage of Mississauga respondents that indicated resource access as an issue was much larger than the percentage of Toronto respondents (34% and 8% for Mississauga and Toronto, respectively), which is likely due to water access challenges at several sites.

The presence of pests also came up as a significant result. However, only a small percentage of respondents from both Mississauga and Toronto indicated this as an issue (4% and 16% respectively). With respect to the “other” challenges, 34% of Toronto participants stated challenges that did not correspond to any other of the coding themes, whereas no participants in Mississauga identified challenges that were outside of the initial coding themes. For example, one respondent from Ryerson suggested that working on a rooftop might make people feel dizzy.
Another respondent identified maintaining awareness as a challenge, as it is out of sight and might go unnoticed by the majority of students at the University.

### 4.3.2 Rooftop versus Street-level Gardens (Ryerson versus Fort York)

In the Rooftop/street-level comparison, participants from Ryerson’s rooftop farm had a higher average index value for the Likert benefits statements compared to participants at Fort York (Table 19).

Table 19: Average index value for the benefits statements in the rooftop/ street-level garden comparison (Ryerson/Fort York).

<table>
<thead>
<tr>
<th>Site</th>
<th>Average Index Value</th>
<th>P – Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryerson</td>
<td>64</td>
<td>0.000</td>
</tr>
<tr>
<td>Fort York</td>
<td>55</td>
<td></td>
</tr>
</tbody>
</table>

One possible reason for this is that respondents from Ryerson’s rooftop farm more consistently identified the importance of community gardening and their role in developing sustainable local food systems and influencing urban sustainability as a whole. Responses indicate that they perceive the environmental benefits of urban gardening as having a greater importance than those at Fort York’s garden. This was also a reoccurring pattern in open-ended questions that asked participants about their motivations for starting in a community garden. One respondent at Ryerson’s rooftop farm said they had started “to be a part of a sustainable city movement”. Another stated that urban farming is important because “it is an accessible and organized way to procure good food in the short-term, learn about sustaining food sources in the long-term”. This broader environmental thinking was not communicated at Fort York’s community garden (which
is located at street-level), where members generally used the garden because they did not have a space to garden at home and simply wanted to have a space to practice a hobby or grow fresh food.

The only motivation that was statistically significant between the rooftop and street-level garden in Toronto (Ryerson v. Fort York) was the lack of space at home (Table 20).

Table 20: Crosstabulations results for participants’ motivations at the Ryerson and Fort York sites. Cramer’s V was used as the test statistic (results less than 0.05 considered statistically significant).

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Test Statistic Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Food/Grow own food</td>
<td>0.223</td>
<td>0.169</td>
</tr>
<tr>
<td>Lack of space at home</td>
<td><strong>0.362</strong></td>
<td><strong>0.026</strong></td>
</tr>
<tr>
<td>Physical/Mental health</td>
<td>0.193</td>
<td>0.235</td>
</tr>
<tr>
<td>Social and community benefits</td>
<td>0.310</td>
<td>0.056</td>
</tr>
<tr>
<td>Feel closer to nature/ Environmentally</td>
<td>0.293</td>
<td>0.071</td>
</tr>
<tr>
<td>Feel closer to nature/ Environmentally</td>
<td>0.293</td>
<td>0.071</td>
</tr>
<tr>
<td>Hobby/Skill learning</td>
<td>0.012</td>
<td>0.943</td>
</tr>
<tr>
<td>Other</td>
<td>0.250</td>
<td>0.124</td>
</tr>
</tbody>
</table>

Thirteen percent of respondents from Fort York garden indicated this as a motivating factor, compared to 3% of respondents from Ryerson that did. One respondent from the Fort York community garden said, “We live in a condominium, so we wanted to have our own gardens near us”. As well, since some of the participants at Ryerson’s rooftop farm were students, it was possible that they commuted from their homes, and lack of gardening space at those homes might not have been an issue. However, the Ryerson participants are not growing for themselves, so these motivations might be different from community garden participants that practice
growing in denser urban spaces. Future research should examine the role of density on motivations for participants’ involvement in a community garden.

There were several challenges with significantly different numbers of responses in the Ryerson/Fort York comparison. Three respondents from the Fort York garden (8% of the Fort York respondents) indicated security as an issue, whereas no one from Ryerson did (Table 21).

Table 21: Crosstabulations results for challenges experienced by participants at Ryerson and Fort York garden sites. Cramer’s V was used as the test statistic (results less than 0.05 considered statistically significant).

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Test Statistic Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource access/quality</td>
<td>0.025</td>
<td>0.875</td>
</tr>
<tr>
<td>Security</td>
<td><strong>0.343</strong></td>
<td><strong>0.034</strong></td>
</tr>
<tr>
<td>Lack of time to commit</td>
<td><strong>0.343</strong></td>
<td><strong>0.034</strong></td>
</tr>
<tr>
<td>Maintenance and upkeep</td>
<td><strong>0.475</strong></td>
<td><strong>0.030</strong></td>
</tr>
<tr>
<td>Member etiquette</td>
<td>0.229</td>
<td>0.159</td>
</tr>
<tr>
<td>Lack of gardening knowledge</td>
<td>0.193</td>
<td>0.235</td>
</tr>
<tr>
<td>Pests</td>
<td><strong>0.508</strong></td>
<td><strong>0.002</strong></td>
</tr>
<tr>
<td>Other</td>
<td><strong>0.390</strong></td>
<td><strong>0.016</strong></td>
</tr>
<tr>
<td>None</td>
<td>0.201</td>
<td>0.215</td>
</tr>
</tbody>
</table>

This is likely explained due to the fact that Ryerson’s urban farm is located on a secure rooftop, whereas Fort York’s garden is at street-level. One respondent from Fort York said “Luckily our community garden in Fort York is pretty private, but I could imagine that if you had plots in a more public place, some people might be inclined to steal some of the ripe fruits/veggies”.
Three participants at the Fort York garden (19% of Fort York participants) also indicated that finding time to commit to their plot a challenge, whereas no respondents from Ryerson did. Since volunteer sessions at Ryerson’s rooftop farm occur only once a month, it is possible that participants found it easier to commit a few hours’ time, whereas members at Fort York are fully responsible all the time for their plots.

Conversely, no participants at Fort York indicated maintaining their plot as a problem, but five Ryerson respondents (13% of Toronto participants) had highlighted this challenge. Some respondents understood that the urban farm much more complex in terms of setup and maintenance. One respondent stated that it is challenging to have to haul up bins of soil to the roof. Some of the respondents here belong to the staff that tends the garden, and might have a more detailed understanding of the limitations to using the rooftop. One respondent said “the weight of the soil on the roof and maxing the use of space” can be a challenge. Some of the rooftop farm staff were also surveyed, so it is possible that these challenges are reflective of their experiences.

Six respondents at the Fort York garden (38% of Fort York participants) identified pests as a challenge, whereas no one at Ryerson did. Aside from the Ryerson urban farm being located on a rooftop, this may be possible since volunteers at Ryerson have limited access to the space and it is ultimately not their responsibility.

With respect to the “other” challenges category, there were eleven respondents at Ryerson that identified challenges outside of the initial coded themes, and only two at Fort York that did so (50% of Ryerson participants and 13% of Fort York participants, respectively). The challenges that respondents identified that belong to the “other” category often considered the technical
difficulties of maintaining a rooftop garden, and that current urban infrastructure has not been
developed with urban gardens in mind. One respondent from Ryerson indicated these technical
issues, stating “The climate (a rooftop will have its own micro-climate that needs to be
understood), the accessibility, the logistics of getting the soils and tools to the rooftop and the
harvest back down [and] ensuring that the building is structurally sound”. Another Ryerson
respondent said “balancing the priorities of the building owner with the wish to have the garden
be an open, community space”, highlighting the issue of building usage within urban greening.
However one respondent from Fort York said “Of course space is always a challenge in the city,
but I think this could be addressed by making use of ALL the bare roofs of flat top buildings!”,
indicating that the sentiment of urban sustainability is shared by some on-the-ground gardeners
within the city.

No respondents from Ryerson or Fort York indicated vandalism as an issue.

4.3.3 Mississauga Community Gardens

The cumulative index for the Likert benefits statements was compared for each of the
Mississauga gardens (Table 22). While the average index value did differ between sites, there
was not enough variation for the differences in index values to be significant.
Table 22: Average index value for the benefits statements in the Mississauga gardens comparison.

<table>
<thead>
<tr>
<th>Garden</th>
<th>Average Index Value</th>
<th>P – Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hillside Garden</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>Malton Garden</td>
<td>60</td>
<td>0.153</td>
</tr>
<tr>
<td>Mississauga Valley Garden</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Parkway Green Garden</td>
<td>53</td>
<td></td>
</tr>
</tbody>
</table>

With respect to motivations, the lack of space at home was the only statistically significant difference between the four Mississauga gardens (Table 23).

Table 23: Crosstabulations results for participants’ motivations in the four Mississauga garden sites. Cramer’s V was used as the test statistic (results less than 0.05 considered statistically significant).

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Test Statistic Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Food/Grow own food</td>
<td>0.211</td>
<td>0.281</td>
</tr>
<tr>
<td>Lack of space at home</td>
<td><strong>0.350</strong></td>
<td><strong>0.014</strong></td>
</tr>
<tr>
<td>Physical/Mental health</td>
<td>0.359</td>
<td>0.359</td>
</tr>
<tr>
<td>Social and community benefits</td>
<td>0.309</td>
<td>0.309</td>
</tr>
<tr>
<td>Reduce household food costs</td>
<td>0.121</td>
<td>0.121</td>
</tr>
<tr>
<td>Feel closer to nature/ Environmentally friendly</td>
<td>0.885</td>
<td>0.885</td>
</tr>
<tr>
<td>Hobby/Skill learning</td>
<td>0.880</td>
<td>0.880</td>
</tr>
<tr>
<td>Other</td>
<td>0.186</td>
<td>0.394</td>
</tr>
</tbody>
</table>

The Hillside garden had the most respondents that indicated lack of space at home as a motivation to start using a community garden (41% of Hillside garden participants). No
respondents from the Malton community garden identified a lack of gardening space at home as a motivating factor.

With respect to participant challenges, resource access/quality and vandalism were shown as statistically significant in the Mississauga gardens (Table 24).

Table 24: Challenges in the Mississauga garden sites.

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Test Statistic Value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource access/quality</td>
<td>0.440</td>
<td>0.001</td>
</tr>
<tr>
<td>Security</td>
<td>0.494</td>
<td>0.0001</td>
</tr>
<tr>
<td>Vandalism</td>
<td>0.333</td>
<td>0.023</td>
</tr>
<tr>
<td>Lack of time to commit</td>
<td>0.249</td>
<td>0.149</td>
</tr>
<tr>
<td>Maintenance and upkeep</td>
<td>0.169</td>
<td>0.485</td>
</tr>
<tr>
<td>Member etiquette</td>
<td>0.065</td>
<td>0.947</td>
</tr>
<tr>
<td>Lack of gardening knowledge</td>
<td>0.133</td>
<td>0.676</td>
</tr>
<tr>
<td>Pests</td>
<td>0.250</td>
<td>0.146</td>
</tr>
<tr>
<td>None</td>
<td>0.158</td>
<td>0.540</td>
</tr>
</tbody>
</table>

Parkway Green garden had the highest number of respondents that indicated resource access as an issue (21% of all Mississauga participants). Hillside garden also had sixteen of their twenty-two respondents (19% of Mississauga participants) indicate this as a challenge.

Five respondents from Garden of the Valley indicated that vandalism was an issue that they had experienced, the most out of the four gardens.
4.4 Variations by Key Socio-Demographics in Mississauga Gardens

The cumulative benefits index for the Likert statements questions were examined between low-middle and middle-high income brackets (Table 25). The average index values for the middle to high-income brackets did not differ greatly, and differences between the two income groups were not statistically significant.

Table 25: ANOVA of average index values of the Likert statements question with Mississauga respondents’ income. Kruskall-Wallis H was used as the test statistic.

<table>
<thead>
<tr>
<th>Income Range</th>
<th>Average Index Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low- Middle ($24,000 – $49,999)</td>
<td>54</td>
<td>0.756</td>
</tr>
<tr>
<td>Middle-High ($50,000 - $100,000+)</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

Average index values for respondents born outside of Canada and those born in Canada were similar, and differences between groups were not statistically significant.

Table 26: ANOVA of average index values of the Likert statements question with Mississauga respondents’ birth location. Kruskall-Wallis H was used as the test statistic.

<table>
<thead>
<tr>
<th>Birth Location</th>
<th>Average Index Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outside Canada</td>
<td>58</td>
<td>0.225</td>
</tr>
<tr>
<td>Inside Canada</td>
<td>57</td>
<td></td>
</tr>
</tbody>
</table>
There were no significant relationships when examining participants’ income and their motivations for starting in a community garden (Table 27).

Table 27: Crosstabulations results for motivations and income information for participants in Mississauga garden sites. Cramer’s V was used as the test statistic (results less than 0.05 considered statistically significant).

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Test Statistic</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Food/Grow own food</td>
<td>0.175</td>
<td>0.216</td>
</tr>
<tr>
<td>Lack of space at home</td>
<td>0.027</td>
<td>0.848</td>
</tr>
<tr>
<td>Physical/Mental health</td>
<td>0.196</td>
<td>0.166</td>
</tr>
<tr>
<td>Social and community benefits</td>
<td>0.214</td>
<td>0.131</td>
</tr>
<tr>
<td>Reduce household food costs</td>
<td>0.008</td>
<td>0.954</td>
</tr>
<tr>
<td>Feel closer to nature/Environmentally friendly</td>
<td>0.094</td>
<td>0.504</td>
</tr>
<tr>
<td>Hobby/Skill learning</td>
<td>0.263</td>
<td>0.063</td>
</tr>
<tr>
<td>Other</td>
<td>0.053</td>
<td>0.706</td>
</tr>
</tbody>
</table>
Table 28: Crosstabulations results for motivations and birth location for participants in Mississauga garden sites. Cramer’s V was used as the test statistic (results less than 0.05 considered statistically significant).

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Test Statistic</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Food/Grow own food</td>
<td>0.220</td>
<td>0.053</td>
</tr>
<tr>
<td>Lack of space at home</td>
<td>0.213</td>
<td>0.062</td>
</tr>
<tr>
<td>Physical/Mental health</td>
<td>0.123</td>
<td>0.279</td>
</tr>
<tr>
<td>Social and community benefits</td>
<td>0.092</td>
<td>0.418</td>
</tr>
<tr>
<td>Reduce household food costs</td>
<td><strong>0.267</strong></td>
<td><strong>0.019</strong></td>
</tr>
<tr>
<td>Feel closer to nature/Environmentally friendly</td>
<td>0.161</td>
<td>0.157</td>
</tr>
<tr>
<td>Hobby/Skill learning</td>
<td>0.113</td>
<td>0.320</td>
</tr>
<tr>
<td>Other</td>
<td>0.024</td>
<td>0.836</td>
</tr>
</tbody>
</table>

Only two respondents said they started because they wanted to try and reduce their household food costs. There were no respondents born outside of the country that stated that cost reduction was their reason for participating in a gardening program.

A majority (fifty-two percent of Mississauga respondents) that did not consider the reduction of food costs when joining the gardens also indicated that they were born outside of Canada. This is in part because immigrants make up a large percentage of the Mississauga sample.

The challenge of maintenance and upkeep of gardening space and income was the only statistically significant relationship with income for the Mississauga sites related to challenges (Table 29).
Table 29: Crosstabulations results for challenges and income information for participants in Mississauga garden sites. Cramer’s V was used as the test statistic (results less than 0.05 considered statistically significant).

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Test Statistic Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource access/quality</td>
<td>0.119</td>
<td>0.402</td>
</tr>
<tr>
<td>Security / Theft</td>
<td>0.092</td>
<td>0.517</td>
</tr>
<tr>
<td>Vandalism</td>
<td>0.283</td>
<td>0.045</td>
</tr>
<tr>
<td>Lack of time to commit</td>
<td>0.127</td>
<td>0.370</td>
</tr>
<tr>
<td>Maintenance and upkeep</td>
<td>0.033</td>
<td>0.814</td>
</tr>
<tr>
<td>Member etiquette</td>
<td>0.232</td>
<td>0.101</td>
</tr>
<tr>
<td>Lack of gardening knowledge</td>
<td>0.137</td>
<td>0.332</td>
</tr>
<tr>
<td>Pests</td>
<td>0.137</td>
<td>0.332</td>
</tr>
<tr>
<td>None</td>
<td>0.243</td>
<td>0.086</td>
</tr>
</tbody>
</table>

Four lower-middle income participants indicated vandalism as a problem, but the vast majority of participants did not identify this as an issue.

The challenge of maintenance and upkeep of gardening space was also the only statistically significant relationship with respect to birth location for the Mississauga sites (Table 30).
Table 30: Crosstabulations results for challenges and birth location information for participants in Mississauga garden sites. Cramer’s V was used as the test statistic (results less than 0.05 considered statistically significant).

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Test Statistic Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource access/quality</td>
<td>0.080</td>
<td>0.485</td>
</tr>
<tr>
<td>Security</td>
<td>0.096</td>
<td>0.400</td>
</tr>
<tr>
<td>Vandalism</td>
<td>0.069</td>
<td>0.544</td>
</tr>
<tr>
<td>Lack of time to commit</td>
<td>0.167</td>
<td>0.144</td>
</tr>
<tr>
<td>Maintenance and upkeep</td>
<td><strong>0.365</strong></td>
<td><strong>0.001</strong></td>
</tr>
<tr>
<td>Member etiquette</td>
<td>0.083</td>
<td>0.465</td>
</tr>
<tr>
<td>Lack of gardening knowledge</td>
<td>0.083</td>
<td>0.465</td>
</tr>
<tr>
<td>Pests</td>
<td>0.027</td>
<td>0.810</td>
</tr>
<tr>
<td>None</td>
<td>0.100</td>
<td>0.380</td>
</tr>
</tbody>
</table>

Of the respondents that did indicate maintenance and upkeep as a problem, the largest percentage were born in Canada (7% of all Mississauga participants).
Chapter 5
Discussion

5 Discussion

This study aimed to explore if the benefits and challenges experienced by community gardening participants differed between suburban and urban spaces, as well as between street-level and rooftop growing spaces; and to see if two sociodemographic variables are related to participants’ experiences. The most variation existed in the Ryerson/ Fort York comparison, where a number of different challenges were identified by participants, as well as variation present in the perceived importance of community gardens benefits. The following sections explore the similarities and differences evident from the results, including how varied question structure impacted survey responses. Management implications and future research projects will be discussed.

5.1 Comparisons between Gardens

5.1.1 Experiences between Mississauga and Toronto Participants

There were only a few differences between the experiences of Mississauga and Toronto respondents, suggesting that participants in suburban and urban contexts perceive similar benefits, challenges, and motivations for participating in a community garden.

The opportunity to practice a hobby/ learn a new skill was a more common motivation for participants in Toronto than in Mississauga. A potential reason for this may simply be Toronto participants are more likely to live in an apartment or condominium, where there is no available
space for gardening. However, the lack of space at home was not significantly different as a motivation between Mississauga and Toronto respondents.

Access to resources and the presence of pests were challenges that differed between Mississauga and Toronto, with access to resources as a major challenge for participants in the Mississauga gardens due to the lack of a reliable water source. Drake and Lawson (2014) found that community garden managers frequently identified access to gardening materials as an issue, though not as big of an issue as funding and recruitment. Challenges such as these are not necessarily reflective of differences between urban and suburban contexts but rather logistical issues for organizations that manage specific community garden sites.

With regards to the issue of pests, there was a higher percentage of respondents from Mississauga that listed this as a challenge compared to the Toronto respondents. It is possible that since a majority of respondents from Toronto were from Ryerson’s rooftop farm, they may not have perceived pests as an issue because participants were only there occasionally to attend the volunteer sessions. Also, the rooftop location means that mammals and possibly some insect and bird species are less likely to be present. However, since the community gardens in Mississauga are located on large public green spaces, participants likely have to contend with the presence of a variety of animals.

5.1.2 Experiences between Street-Level and Rooftop Gardens

The most variation in this study was found in the comparison between Ryerson’s rooftop farm and Fort York’s community garden (rooftop vs. street-level gardens). Specifically, the perceived benefits of community gardening and the challenges experienced by participants significantly
differed between Ryerson’s rooftop farm and the Fort York community garden. The average index value for the Likert-scale benefits question was higher at Ryerson than at Fort York, suggesting that participants at Ryerson perceived a greater importance of common community gardens benefits. This higher perceived importance can perhaps be attributed to the fact that students and staff at a university might have a better understanding of environmental issues in more detail through coursework and other exposure to this information.

The only motivation that differed between the Ryerson and Fort York was the lack of space at home, with Fort York participants more likely to identify this as a motivation to participate. This difference may be attributed to the number of participants that attend the volunteer sessions at Ryerson who are students and may commute from outside of the city, whereas participants at the Fort York garden likely live in buildings nearby. Fifty-five percent of Ryerson respondents indicated that they used public transit to travel to the rooftop farm, whereas 63% of respondents from Fort York indicated that they walked to the community garden.

A number of identified challenges differed between Ryerson and Fort York, including issues related to security, lack of time, and pests more frequently listed by Fort York’s community garden participants. Drake and Lawson (2014) suggest that pests are just a part of the reality of participating in a community garden, and it is up managers to decide if security measures such as fences are required, at least with respect to animal pests.

Issues of maintenance also differed significantly between Ryerson and Fort York. This is likely due to the more complex issues of maintaining a rooftop gardening space, which is logistically more challenging than a simple plot-based garden. These challenges include transporting items like soil and growing media to the rooftop. At Ryerson, this was done by filling large bins and
going up to the roof in an elevator, which can be challenging even for able-bodied people and especially for older participants. Also, the layers of growing media were fairly shallow, so there is a possibility for damaging the roof surface. Additionally, some of the rooftop farm staff, and Ryerson’s urban agriculture coordinator, filled out the survey. It is possible that they are the individuals that identified more technical challenges, as volunteers do not have to deal with these issues on a consistent basis.

When asked about the challenges that they experienced in their time at a growing space, respondents from Fort York were more individually focused, listing issues such as pests and finding time to commit to their plot. While some participants at Ryerson’s rooftop farm identified some of these personal challenges, the broader challenge of urban sustainability was a clear theme. In particular, some respondents spoke to the challenge of integrating urban agriculture projects on a wider scale to potentially influence the urban food system.

For future research, it would be worth separating community gardens and rooftop agriculture as two separate subjects, because community gardening and rooftop agriculture organizations may have different mandates. Community-based organizations clearly differ from urban agriculture organizations such as Ryerson, so this would allow for a more detailed examination of both types of organizations, and their individual potential for influencing community growth or urban food systems as a whole.

5.1.2.1 Environmental and Sustainability Education in Higher Learning Institutions

One potential reason for the difference in attitudes concerning community agriculture might be that Ryerson’s rooftop farm is located at Ryerson University, and students may be more
regularly exposed to subject matter regarding urban sustainability, whether through coursework or ongoing environmental initiatives within the University.

The role of universities and other higher education institutions in urban sustainability initiatives has been rapidly growing. Thus, environmental and sustainable development education has been increasingly integrated into institutions of higher education through avenues such as course curriculums, research, and on-campus operations (Ramos et al. 2015). Slobbé et al. (2016) suggest that even within on-campus food services, there is potential for providing environmental education to students. With increased knowledge about environmental topics, it is possible that individuals who study or work in a university may be more familiar with the wider implications and challenges of urban food production. A couple of respondents from Ryerson’s rooftop farm said that they were motivated to participate in the program because they had to fulfill specific course requirements. Thus, the case of Ryerson University indicates that environmental coursework and on-campus programs may complement each other in developing an appreciation of urban agriculture and urban sustainability, more broadly.

The mandate of different organizations may also influence how their participants gain knowledge. Rye’s Homegrown, the on-campus organization responsible for creating and managing the Ryerson’s rooftop farm, encourages students not only to participate in the monthly volunteer events, but also various gardening programs that they operate on campus. Within their mission statement, some of the stated goals are to “prioritize food sovereignty and responsible ecology”; “aim to create community by building environments where traditionally siloed disciplines intersect and interact”; and “act as a focus for on-going discussion, experiment and development of a sustainable campus, and ultimately a sustainable city” (“Rye’s Homegrown
Out of the 100 respondents from the Fort York garden included in the study, 57 were women and 43 were men. The average age of respondents was 35 years, with a standard deviation of 16 years. The average time spent gardening per week was 2.5 hours, with a standard deviation of 1.5 hours. The average size of the garden plot was 10 square feet, with a standard deviation of 5 square feet. The average cost of the garden plot was $50 per month, with a standard deviation of $20 per month. The average number of community members who were members of the garden was 4, with a standard deviation of 2 community members.
plot maintenance as a challenge were born in Ontario. It is unclear as to why immigration status/birth location would influence the desire to reduce household food costs and maintenance challenges. While it may not necessarily be related to economic status, immigrant gardeners can use gardening and growing culturally appropriate foods as a way of reconnecting with their heritage (Saldivar-Tanaka and Krasny 2003, Baker 2004). In a survey of Latino community gardens in New York City, Saldivar-Tanaka and Krasny (2003) found that participants viewed the gardens not only as spaces to grow food, but as cultural gathering places as well. In this way, it is possible that while respondents in this study are able to afford a community garden, they too might understand the cultural value of their community garden.

The community garden research suggests that recent immigrants may seek out a community garden to aid in the potentially difficult transition to a new home, as they can meet people that share the same interests (Armstrong 2000, Kingsley et al. 2006). Though they might not have been recent immigrants, a sense of cultural learning was indeed present within the Mississauga responses. As well, immigrants can help bring cultural knowledge to community gardens (Baker 2004), which may provide a source of comfort for immigrants coming from the same country that are looking to grow culturally appropriate foods and establish roots in a new place. Community gardening organizations may also have cultural programs and events (Saldivar-Tanaka and Krasny 2004), which may help bring gardeners from diverse backgrounds together. When asked about the ongoing benefits of their participation, 37% of Mississauga respondents indicated that they experienced the social/community benefits of a community garden. Open-ended responses often indicated that respondents enjoyed spending time with people from their community; a few respondents said that they enjoyed meeting people from different cultural backgrounds, and learning about the foods that different cultures eat. Further research projects
might examine in more detail community gardening experiences with very recent immigrants versus longer-term residents. Nonetheless, the experiences of Mississauga’s community gardeners indicate that community gardens can act as sites for cultural learning.

Income was a significant factor that influenced respondents’ desire to practice a hobby, as well as the challenge of maintaining their garden plot. It is unclear why household income would have an influence on hobby practicing. It is possible that individuals or families that have lower household incomes or struggle with food insecurity may be less willing to spend money on a community gardening program (Kirkpatrick and Tarasuk 2009, Loopstra and Tarasuk 2013), as there may be a membership fee and ongoing costs to maintain a plot (time, gas for commuting etc.). One Mississauga respondent said that “Community gardens [provide] food to lower income families and provides ways of growing your own food free of chemicals”, suggesting that people in middle-high income neighbourhoods do understand the utility of community-based food programs for lower income populations, but may not appreciate the costs.

However, the average annual household income for the study neighbourhoods in Mississauga vary from middle to high income, so it is unlikely for there to be affordability issues associated with gardening programs, as nearly all respondents in this study would likely afford membership relatively easily, as well as the costs of additional resources.

5.2 Differences between Perceived Benefits of Community Gardens and Experienced Benefits

There were two questions in this survey that sought to explore the ways that respondents understood the benefits provided by community gardens. The Likert-scale question asked for
respondents’ perceived importance of a number of community gardens benefits that are commonly identified in the literature, while an open-ended question asked respondents to indicate the benefits they had experienced firsthand during their participation in a gardening program. Interestingly, while the responses from the open-ended questions about ongoing benefits are generally reflective of the benefits found in the community gardens literature, the levels of perceived importance for a number of frequently identified benefits contrast findings in the literature.

Hobby practicing, healthier food, and stress relief were the benefits of most importance in this study based on the Likert-scale questions. These on-going benefits were also commonly stated by respondents in open-ended questions used in the survey. These benefits are generally reflective of the benefits that have been found in community gardens research (Armstrong 2000, Kingsley et al. 2006, Wakefield et al. 2007). Respondents often stated that they wanted to learn more about gardening and have access to food that was grown personally, as they believe that it is fresher and healthier than food bought in a store. Personally grown food and access to fresher food is a benefit that is very prevalent throughout the community gardens literature (Armstrong 2000, Wakefield et al. 2007, Drake and Lawson 2014), For example, some individuals believe that food sold in grocery stores have been exposed to chemicals, and prefer to have food that is of higher quality to them (Corrigan 2011).

As well, stress relief is a benefit that has been widely cited in the community gardening literature (Wakefield et al. 2007, Kingsley et al. 2009, Van Den Berg et al. 2010). In open-ended questions about motivations and ongoing benefits, respondents in this study often indicated that they felt a
sense of accomplishment when they successfully grew their own food, and that the gardens provided a space where they could just relax and unwind.

There are a number of commonly cited benefits that were of lesser importance to respondents based on the Likert-scale questions. The improvement in personal fitness and diet are commonly stated benefits within community gardens literature (Wakefield et al. 2007, Poulsen 2008, Ohmer et al. 2009). However, respondents from this study indicated increased physical fitness was of lesser importance compared to many of the other benefits, nor was it as frequently stated in the open-ended motivations and ongoing benefits questions.

One potential explanation for this difference may be that the community gardening research is somewhat reflective of residents in lower income areas that may be more prone to health and dietary issues (i.e., disparate access to healthy food). Physical and mental health issues can proliferate in high poverty neighbourhoods, as factors such as stress and limited access to resources can make residents more vulnerable to disease and other health problems (Domínguez and Arford 2010). In low-income areas that are considered food deserts, healthy food might be more expensive and lower quality (Hendrickson et al. 2004), posing potential issues for diet and related health issues. Since the neighbourhoods examined in this research project are middle to high income, it is likely that they have better access to, and less difficulty affording, health foods. As well, respondents in this research study may also have less difficulty accessing medical assistance and can afford to attend fitness facilities, both of which can reduce health issues and the perceived need for additional exercise opportunities provided by community gardens.

Previous studies have also found that social benefits are common motivations for participating in a community garden (Armstrong 2000, Kingsley et al. 2008, Poulsen 2008, Drake and Lawson
2014), but respondents in this study indicated social benefits were relatively unimportant to them. Social and community benefits were also relatively infrequently stated as motivations for starting in a community garden.

Community gardens can provide spaces for immigrants to reconnect with their cultural identity (Saldivar-Tanaka and Krasny 2003, Wakefield et al. 2007), through the growing of culturally relevant food and meeting with people of the same background. If the respondents from this study are well-established and have friends and family in the area, they might not perceive these social benefits with high importance. However, respondents did go on to identify social and community benefits in open-ended questions regarding ongoing benefits, even though they did not consider them to be very important in the Likert-scale benefits question or as motivations. It is unclear why this difference exists.

Respondents also indicated environmental benefits such as stormwater management and the reduction of urban heat islands were of lesser importance to them, which contradict Drake and Lawson’s (2014) findings that environmental benefits are a commonly experienced benefit during participation in a community garden. It is possible that because these benefits are simply less tangible than individual benefits, such as personally grown food, participants might place a lower value on them. Additionally, the definition of “environmental benefits” may differ between the research studies. However, respondents did indicate that they had learned about the environmental benefits of community gardens, suggesting that community gardens can act as educational spaces for topics such as the environment.

The urban community gardening literature frequently finds that community gardens have an impact on household-level food security by providing a source of food in areas that are
considered food deserts (Corrigan 2011), or are otherwise low-income areas (Hancock 2001, Ohmer et al. 2009,). However, in this study, the reduction of household food costs was not of great importance to respondents, likely due to the participation of higher income households.

It also is possible that while research suggests that urban community gardens can aid in the reduction of household food costs, some studies may not be fully representative of residents’ realities, especially in underexamined populations, such as middle-income groups. While there are a number of studies that suggest community gardens can aid in improving household food security for vulnerable populations (Armstrong 2000, Corrigan 2011), there exists literature that also suggests that there are barriers to low-income families from using community gardens (Kirkpatrick and Tarasuk 2009, Loopstra and Tarasuk 2013). For example, in a study of low income families in Toronto, Loopstra and Tarasuk (2013), suggest that adults in low-income families do not have the time to commit to a community gardening program. As well, a considerable percentage of respondents from the same study indicated that community gardens were inaccessible to them, whether that is because of a lack of awareness of such programs, or that a garden was not present in their neighbourhood (Loopstra and Tarasuk 2013). Further research may be required to better understand what factors influence individuals’ perceptions of community gardens and their efficacy in reducing food costs, and if individuals living in lower income areas have experienced lower food costs as a result of participation in a community garden.

5.3 General Differences in Challenges

The most common challenges identified in this study were related to resource access and minor “crime” such as security of the gardens and theft of produce by outsiders or other members.
Challenges identified by participants in this study are similar to those presented in the community gardens literature. In a survey of community gardens managers, Drake and Lawson (2014) identified challenges related to materials, such as soil quality and water quality, parallel the most common challenge in Mississauga: having reliable access to a source of water. In this case, water is provided via a source that is usually located nearby (e.g. the outside tap at a school). Some respondents indicated that because their water source had been compromised (The school’s water they were using was under construction during the summer), they were forced to use rain barrels or bring water from home.

A way this study’s findings differed from the urban agriculture literature is related to concerns about contaminants and pollution. In a study of several community gardens in downtown Toronto, Wakefield et al. (2007) found that participants expressed concerns of airborne pollution and contaminants that could pose potential risk for food grown in the city. As well, there was mention of soil contamination as another potential issue for growing food in a primarily urban area (Wakefield et al. 2007). Brown and Jameton (2000) suggest that water and soil pollution can pose health risks for produce grown in urban areas. In a study of community gardens in New York, Mitchell et al. (2014) found that lead and other soil contaminants were present, although in very small quantities in all of their garden sites.

In this study, there was no mention of urban contamination as a deterrent for participation in a community garden. The Fort York community garden is located close to the Gardiner Expressway, but there were no respondents who expressed concern about airborne pollution. As well, the Mississauga gardens are located in public parks that are relatively close to arterial roads, but there were no respondents from Mississauga that identified pollution from vehicles as
a concern. One potential explanation might be that while residents potentially understand sources of pollution in urban areas, access to their own food could simply be more important to them.

As is the case with street-level gardens, urban air quality and the persistence of airborne pollutants may cause concern for consumers of rooftop-grown produce (Spetcht et al. 2014). Respondents at Ryerson did not identify these issues as problematic. However, since the volunteers do not actually take any of the produce home with them, they might be less concerned with the quality of the products. Further research might examine the attitudes of organizations and individuals that purchase produce sourced from rooftop growing spaces. As well, there are speculations about the effects of rooftop agriculture on the quality of runoff water due to the use of chemical fertilizers on rooftop farms and gardens (Ackerman et al. 2014, Spetcht et al. 2014). However, no respondents indicated this as a concern.

Unsurprisingly, the stated challenges at Ryerson’s rooftop farm greatly differed from those from the street-level community gardens. Challenges related to the technical issues of maintaining a rooftop growing space were common. These issues included mentions of rooftop weight limitations, differing microclimates on the roof, the logistics of moving soil and other resources up and down the building, and the cost of operating a rooftop growing space.

Future research on rooftop agriculture might examine management challenges in more detail, using surveys or interviews with urban agriculture organizations and managers. While there exists literature on more intensified urban agriculture efforts in European cities (Cerón-Palma et al. 2012, Spetcht et al. 2014, Sanyé-Mengual et al. 2015), there is opportunity to examine the potential for these systems within a Canadian / North American context. It would also be interesting to explore urban residents’ perceptions about semi-intensive urban agriculture,
including examining how those perspectives compare between vulnerable populations (low income etc.), and more affluent populations to provide an understanding of what populations benefit primarily from innovative food production practices such as rooftop agriculture, and how these operations could alter local food systems and food access, more generally.

5.4 Management Recommendations

Several management recommendations arose from this study, related to resource access, theft, as well as community development and programming. Guitart et al. (2012) found issues of access to water to be a concern with community gardening organizers, as well as petty theft, and other safety issues. This is a challenging issue, since community gardens do not always have a direct water source, as is the case with the Mississauga community gardens. Aside from careful site selection, alternative solutions such as rain barrels are needed (as was the case of Hillside garden in Mississauga) if the local water source is unavailable. Ideally, sites for community gardens should be well-researched before the garden is built. Aspects such as convenience, number of potential water sources, and possible threats to the site (such as development or construction) should be considered before a garden project is executed. While Ecosource manages gardens on municipal spaces that are likely protected from development, other organizers should be aware of issues of land tenure for a community garden site, as this is a persistent concern for managers as well as participants (Wakefield et al. 2007, Drake and Lawson 2014).

Theft of produce is also an issue that is potentially challenging to tackle. While theft is discouraging, this may just be another reality of community gardening. The simplest solution might be to practice stronger enforcement of membership conditions so that members clearly understand that they will be penalized if caught stealing other members’ produce. While this is
probably not the most desirable solution, it is important to maintain a sense of authority so that there is minimal theft. It might also be worth encouraging members to engage in active feedback with community garden managers, so that the managers are at least aware of ongoing issues in the garden and can intervene if possible.

Community gardens can also play a prominent role in improving community health. While the literature suggests that they can help enhance lower income communities by improving the aesthetic of vacant lots, and reducing the potential for crime (Armstrong 2000, Poulsen et al. 2014), results from this study suggests that there is a capacity for community building in affluent neighbourhoods as well through the social and cultural environment that community gardens facilitate. Respondents often stated that they enjoyed meeting people from their communities, sharing produce with fellow gardeners, and learning new things from each other as benefits they had experienced. In a case study of community gardens in Baltimore, Poulsen et al. (2014) found gardeners frequently shared food and advice with others, which helped develop social bonds between members. The experiences of respondents also suggest that community gardens can help engage local community members in cultural education, which can contribute to an overall healthy community.

Levkoe (2006) suggests that community gardens can help educate the wider community, as participants gain knowledge and empowerment, and can educate others about issues they care about. Respondents from this study often stated that they had learned new gardening techniques, and that they enjoyed passing on their skills and knowledge with other gardeners. When asked about their motivations and experienced benefits, some respondents stated that they wanted to
teach their family how to grow their own food. Similarly, at Ryerson’s rooftop farm, respondents frequently stated that there was a strong element of community engagement and education.

As well, events such as hands-on workshops facilitated by community gardening organizations can help bring local residents together, thereby building a stronger community (Levkoe 2006). Ecosource offers a number of workshops to help local residents increase their gardening knowledge, as well as issues such as food security and social justice (Ecosource 2017b). Rye’s Homegrown also aims to educate students and local residents about urban food issues and solutions, through volunteer sessions as well as various gardening courses (“Rye’s Homegrown Community Gardens”, 2017. Retrieved from: https://connectru.ryerson.ca/organization/RHG/about). In this way, participants from Mississauga and Toronto can educate their friends and family about these issues, becoming agents for environmental change in local settings. These two organizations are just examples of how community gardens and urban agriculture serve a greater purpose of empowerment and advocacy within local neighbourhood contexts. As well, organizations could develop programs or events that highlight the different cultures of its’ members, as well as collaborate with local cultural organizations, to further build a sense of community within the gardens.

5.5 Limitations

There are a couple of limitations to this research study. One is that no individual plot based rooftop gardens could be identified in Toronto, and might not exist as having a rooftop garden is logistically more difficult to organize. While there are several challenges (security, commitment, pests) that may be more commonly associated with traditional/ street-level community gardens
like Fort York, it is unclear how experiences of rooftop gardeners might differ from those that use street-level community gardens if organized in a similar manner.

Additionally, experiences for participants from four street-level gardens were examined in Mississauga, whereas only one street-level garden was examined in Toronto. Inclusion of additional street-level gardens in Toronto would have allowed for a more robust comparison of street-level gardens between Mississauga and Toronto.

Finally, housing type was not a demographic factor that was considered in this study. Future research projects should examine housing type as well as neighbourhood density and the influence of these demographic variables on the motivations of community gardening participants.

5.6 Conclusions

Community gardens provide a number of personal and social benefits for the participants that use them, as well as a number of broader community benefits. They can act as spaces for residents to enjoy a closer connection to nature, and help facilitate neighbourhood cohesion. In dense urban areas where potential green space may be lost due to land issues or development pressure, rooftop gardens are becoming more popular as alternative gardening spaces. There is extensive research that has examined the benefits of street-level community gardens in urban areas, but much less research has been done on the benefits of rooftop growing spaces. As well, community gardens research has been primarily limited to lower income neighbourhoods in urban areas.

This research project aimed to explore the differences in experiences between members of street-level community gardens and rooftop growing spaces; differences between suburban and urban...
community gardeners; and to explore if socioeconomic variables have any influence on the experience of community gardeners. Differences in perceived benefits, motivations, ongoing benefits, and challenges were examined between Mississauga and Toronto; Ryerson’s Rooftop farm and Fort York in Toronto; and within four street-level community gardens in Mississauga.

In general, participant experiences were similar between gardens in Mississauga and Toronto, despite differences in urban and suburban forms. Experiences between street-level gardens and Ryerson’s rooftop farm differed mainly in the types of challenges experienced, with the challenges at Ryerson more related to the management aspect of rooftop farming.

The main difference was with respect to challenges, with Mississauga respondents indicating access to resources as a consistent challenge, whereas respondents from Toronto did not indicate resource access as frequently. This difference is perhaps more reflective of organizational challenges rather than the challenges of community gardening in suburban versus urban contexts.

Respondents from Ryerson’s rooftop farm placed higher value on the benefits of community gardens, especially with respect to environmental benefits, and also identified broader challenges related to the future of urban sustainability and urban agriculture. It is possible that having an urban agriculture space at a university has allowed members to be exposed to topics such as urban sustainability through curriculum or other on-campus programs.

Respondents’ birth location and annual household income did not greatly influence their motivations or the challenges of participants. Birth location was significantly correlated with the reduction of household food costs, with a large percentage of respondents that were born outside of the country indicating that they did not seek out a garden to lower their food costs. As well,
results suggest that residents from middle to high income neighbourhoods generally do not rely on community gardens as a method of reducing household food costs. More generally, this research project suggests that individuals from higher income neighbourhoods may experience community gardening differently. For example, respondents were motivated less by the ability to reduce household food costs or the opportunity to improve their physical fitness.

There were some differences between recognized benefits (Likert-scale statements) and experienced benefits (open-ended questions), especially with respect to the provision of physical health benefits through using a community garden. In the Likert-scale benefits question, respondents also indicated social benefits had relatively low importance to them. But, social benefits were consistently identified in responses to open-ended survey questions, with many respondents stating their enjoyment of meeting people from the community. It is possible that this difference is due to a misunderstanding of the Likert-scale question. In particular, respondents from the Mississauga garden sites communicated aspects of cultural learning through interactions with gardeners of different backgrounds. This affirms findings in the literature, indicating that community gardens can help facilitate the strengthening of community through ways such as cultural learning.

In addition to access to personally grown food, social benefits such as meeting people from the local community and learning more about other cultures were commonly identified by respondents. This evidence reiterates findings in the literature which suggest that community gardens have an important role for improving community health. As well, there was of evidence that respondents learned about environmental topics during their time spent in the garden, in addition to cultural learning. This suggests that neighbourhood-based programs such as
community gardens can have potentially differing usages in areas that differ socioeconomically, and provide spaces where residents can learn about the role of community gardens in urban sustainability, as well as their own role as environmental agents in their own communities.

Access to resources (reliable access to water in particular), and minor “crime” such as theft of produce and vandalism were the primary challenges indicated by respondents in the street-level community gardens in Mississauga and Toronto. Challenges at the Ryerson rooftop farm are more reflective of the maintenance concerns associated with a more complex growing system, such as logistics and technical challenges. Challenges surrounding community gardening programs likely differ between organizations, such as the issue of water access in the Mississauga garden sites. Future research might explore the experiences of program managers in different urban contexts to gain a better understanding of challenges at the organizational level.

This research project highlights some of the utility of incorporating demographic information in understanding how community gardens might impact neighbourhoods of different socioeconomic backgrounds. In terms of applicability, this project can hopefully inform community based programming efforts at the municipal level, as well as increasing the efficacy of programming for environmental NGOs.

Finally, with respect to a changing urban food system, participants from Ryerson’s rooftop farm indicated that urban residents are at least open to adopting rooftop food growing in the downtown core. Attitudes expressed by Ryerson participants complements the literature, and suggests that there is support for rooftop food growing within urban areas and within the larger scheme of urban sustainability (Ackerman et al. 2014, Haberman et al. 2014). As well, some respondents from the Mississauga gardens identified addressing changes in local food systems as
important. These participant experiences suggest that there is social support for neighbourhood-based and more radical methods of urban food production and can inform further research on local food system reform and community cohesion. In order for the wider goals of local sustainability to be met, there has to be an increased attention on environmental programs such as community gardens, and widespread participation from a larger portion of society. This study’s exploration of community gardeners’ experiences in different setting contributes to a growing understanding of how varied groups may perceive community gardens.
References


Appendices

Appendix A: Mississauga community gardens survey

This survey is designed to collect feedback on your experiences as a community gardener at one of Ecosource’s community gardens in the City of Mississauga. Building on our experience facilitating community food growing spaces since 2006, and the results of our Growing Good Health survey in 2013, the questions in this survey are designed to gather your feedback on many different aspects of community gardening. These aspects include impacts of community gardening on your personal health, data about your annual harvest and how you use it, as well as important information about how you learn about gardening and what you would like to know more about.

This survey was undertaken in partnership with the University of Toronto Mississauga’s faculty of Geography in the summer of 2015. Graduate student Adrian Lue worked with support from Britt McKee and Anita Wong at Ecosource, and Dr. Tenley Conway at the University of Toronto Mississauga to research, design and implement the survey to our network of community gardeners across the city.

This survey will only take 15 minutes of your time. Your participation in this survey is greatly appreciated. The feedback you provide will help us continue to deliver high quality community food growing programs in Mississauga.

Section 1: Benefits of Community Gardens

1. On a scale from 1 – 5, please rank the following benefits of community gardening below (1 – not important at all, 5 – very important).
   - Learn more about nature/gardening
   - Gardens add beauty to parks and green spaces
   - Stress relief/ mood improvement
   - Spend more time with family/friends
   - Help me feel closer to the community/meet new people
   - An enjoyable hobby
   - Helps me stay in shape
   - Improve eating habits
   - Healthier/Fresher/Tastier food
   - Reduce household food costs
   - Increase biodiversity
   - Improve stormwater management
   - Reduce air temperatures and mitigate urban heat island effects
   - Improve sustainable food production practices
   - Increase local food security

2. What motivated you to start using the community garden?
3. In your experience, what are the benefits that community gardens provide?
4. If you have participated for more than one year, why have you continued to be part of the community garden?
5. In your experience, what are the ongoing challenges or concerns of using a community garden?

Section 2: Personal Gardening Activities and Post-Harvest Activities

6. What fruits, vegetables, herbs, and/or flowers/ornamentals did you grow in your garden plot this year? Please list all the plants that you typically grow.

7. What do you do with your harvest? Select all that apply.
   - Cook with it
   - Preserve it
   - Donate it to local food banks/community organizations
   - Share with friends/family
   - Other (please specify):

8. On average, how many pounds of fresh food do you harvest from your garden each week? Please answer to the best of your ability.
   - Less than 2 lbs
   - 2 – 4 lbs
   - 5 – 10 lbs
   - More than 10 lbs

9. What is your most successful crop? Why?
10. What is your least successful crop? Why?

11. How much does your harvest reduce your weekly grocery shopping during the growing season?
    - <25%
    - 25% – 50%
    - 50% - 75%
    - >75%

12. On average, how many meals per week do you cook using your garden harvest?

Section 3: Gardening and Food Knowledge

13. Do you think your gardening and food knowledge has improved since you started participating in a community garden? (Example – do you now know more about the importance of organic food? About a healthy diet? Etc.)
    - Yes
    - No

14. In your experience, what subject areas have community gardening helped you improve? Check all that apply.
    - Improves knowledge about organic food
    - Increases knowledge about healthy eating and nutrition
    - Better understand the importance of exercise and physical activity
    - Knowledge of cooking ingredients and techniques
    - How to work with others / improved social skills
    - Improved knowledge of gardening and gardening techniques
15. What have you learned a lot about in your time using a community garden?
16. What would you like to learn more about/see more of in your community garden

17. What resources have you used to improve your gardening and food knowledge/skills? Check all that apply.

- None
- Gardening Workshops / Classes at a community garden or nursery
- Friends/ Family/ Other Social Networks
- Internet Resources
- Books/ Library Resources
- University or College programs
- Other certificate programs
- Other (please specify)

18. Answer this question if you chose any option other than “none” in question 17. If you chose “none” as your answer to question 17, please proceed to question 19.

How have these resources helped you improve your knowledge in these subject areas? Briefly describe below.

19. Have you used any of EcoSource’s other programs to help you improve your gardening and food knowledge? Check all that apply.

- Iceland Teaching Garden
- Community garden and urban agriculture field trips
- Free garden workshop and training programs (if you have, please specify which one)
  - Seed to Fork Youth
  - Community Cultivators
  - Growing for our Good
  - ReRooted in Play
- Ecosource community events
- Other Ecosource volunteering opportunities
- Healthy Roots
- Other Ecosource workshops

Section 4: Participant Information

20. Which EcoSource community garden do you use? Please indicate the location of the garden below.

- Garden of the Valley (1275 Mississauga Valley Boulevard)
- Hillside Garden (1311 Kelly Road)
- Malton Community Garden (3540 Morning Star Drive Mississauga)
☐ Parkway Green Garden (4215 Central Parkway East)

21. How long have you been a member of your community garden?
☐ 6 months – 1 year
☐ 1 – 2 years
☐ More than 2 years

22. How far is your house from your community garden?
☐ 0 – 2 km
☐ 2 – 5 km
☐ 5 – 10 km
☐ 10 km

23. How do you usually travel from your house to your community garden?
☐ Walk
☐ Bike
☐ Take Public Transit
☐ Drive

24. Are you the only one in your household that uses your community garden plot?
☐ Yes
☐ No

25. If you are not the only person in your household who uses your garden plot, how many others in your household use it? Please provide the number and age of anyone that uses your plot.

26. Approximately how many hours do you spend at your plot per week during the growing season?

27. Approximately how many hours per week do you spend caring for shared spaces in the garden?

28. Approximately how much money do you spend on your garden over the course of the season?

Section 5: General Household Demographics

Please answer the following questions about you and your household.

29. What is your age?

30. What is your gender?
☐ Male
☐ Female

31. What is the highest level of education that you have received?
☐ No certificate, diploma, or degree
☐ High School certificate or diploma
☐ Trade or technical training
☐ University Bachelor’s degree
☐ Graduate degree (Masters or Doctorate)

32. Please indicate where you were born:
☐ Mississauga
☐ Ontario, but not Mississauga
☐ Canada, but not Ontario
☐ Outside Canada (please indicate country):

33. Please indicate your ethnicity. Check all that apply.
☐ British Isles
☐ European
☐ South Asian
☐ East and Southeast Asian
☐ Caribbean
34. What is your average annual household income in dollars?
   - $0 – 24,999
   - $25,000 – 49,999
   - $50,000 – 74,999
   - $75,000 – 99,999
   - $100,000 +
   - Prefer not to say

35. How many adults aged 18 – 44 live in your household?
   - 0
   - 1
   - 2
   - 3
   - 4 or more

36. How many adults aged 45 – 64 live in your household?

37. How many adults aged 65 or older live in your household?
   - 0
   - 1
   - 2
   - 3
   - 4 or more

38. How many children (18 years and younger) live in your household?
   - 0
   - 1
   - 2
   - 3
   - 4 or more
Appendix B: Information and consent form for Mississauga community garden participants

Dear Ecosource Community Gardener,

We are writing to ask for your help in a study examining peoples’ experiences growing food in a community garden. This study is part of an effort to examine benefits and ongoing challenges associated with different types of urban community gardening spaces.

We are asking an adult in your household that actively participates in the community garden to complete this questionnaire. It will only take 15 minutes of your time to complete.

Results from this survey will help to better understand the ongoing challenges to expanding urban agriculture and develop better support for growing. The survey asks about your motivations for using a community garden; the types of food you have grown, challenges you have experienced and some basic questions about you.

There are no known risks or benefits to you for assisting in this project. Your answers will be kept completely confidential. We will only release summaries of the results in which no individuals can be identified. Your address and name (if given) will be immediately separated from your completed questionnaire. Complete questionnaires will be stored in a secured office that is controlled by the researcher, and will be destroyed at the end of the research project. Participation in this survey is completely voluntary, and you may decline to answer certain questions. However, your response will help provide a more detailed understanding of participants’ experiences with community gardening. If you are interested, we can send you a summary of the research upon completion of the project.

Thank you for your time and consideration. If you have any questions, please feel free to contact us by email or telephone using the contact information below. You may also contact the Office of Research Ethics at the University of Toronto (ethics.review@utoronto.ca; 416 – 946 – 3273) if you have any questions about your rights as a participant.

Sincerely,
Adrian Lue
MA Student
adrian.lue@mail.utoronto.ca
905 – 569 – 4471
Experiences of Urban Agriculture Participants across Different Types of Community Gardens – Consent to Participate

Adrian Lue
M.A Candidate
University of Toronto Mississauga, Dept. of Geography
adrian.lue@mail.utoronto.ca
905-569-4471

You are invited to take part in a research study about the experiences of urban agriculture participants in different types of community gardens. This survey will only take 15 minutes to complete. There are no known risks associated with this research project. Taking part in this study is completely voluntary and your responses will be kept strictly confidential. Any reports using this data that are made available to the public will not include your name or any individual information by which you could be identified. Only the researchers involved in this study will have access to this information and this information will be destroyed once the study is completed.

If you have any questions about this research you can contact the researcher at the email address above. You may also contact the Office of Research Ethics at the University of Toronto (ethics.review@utoronto.ca; 416 – 946 – 3273) if you have any questions about your rights as a participant. Completing this survey indicates you are 18 years of age or older and indicates your consent to participate in the research. If you wish, you may keep a copy of this consent form.

Name (Please print):

Signature of Participant:

Date:
Appendix C: Survey questions for Ryerson, South Riverdale, and Fort York Participants

*Organization names were changed accordingly for each participant group. Only one survey is included here to reduce repetition.

This survey is designed to collect feedback on your experiences as a rooftop community gardener in the City of Toronto. The questions in this survey are designed to gather your feedback on many different aspects of community gardening, such as the benefits and challenges you have experienced in your time using a rooftop garden/community garden in a highly urbanized space. These include personal impacts of community gardening, perceived benefits of rooftop community gardens, as well as challenges and concerns that you have as a gardener in an urban space.

This survey will only take 15 minutes of your time. Your participation in this survey is greatly appreciated. The feedback you provide will help better understand the challenges surrounding urban and community agriculture.

Section 1: Benefits of Community Gardens

1. On a scale from 1 – 5, please rank the following benefits of community gardening below (1 – not important at all, 5 – very important).
   - Learn more about nature/gardening
   - Gardens add beauty to parks and green spaces
   - Stress relief/mood improvement
   - Spend more time with family/friends
   - Help me feel closer to the community/meet new people
   - An enjoyable hobby
   - Helps me stay in shape
   - Improve eating habits
   - Healthier/Fresher/Tastier food
   - Reduce household food costs
   - Increase biodiversity
   - Improve stormwater management
   - Reduce air temperatures and mitigate urban heat island effects
   - Improve sustainable food production practices
   - Increase local food security

2. What motivated you to start using Ryerson’s rooftop garden?
3. In your experience, what are the benefits that rooftop community gardens provide?
4. Why have you continued to be part of Ryerson’s rooftop garden?
5. In your experience, what are the ongoing challenges or concerns of using a rooftop community garden
Section 2: Gardening and Food Knowledge

6. Do you think your gardening and food knowledge has improved since you started participating in a community garden? (Example – do you now know more about the importance of organic food? About a healthy diet? Etc.)
   - Yes
   - No

7. In your experience, what subject areas have community gardening helped you improve? Check all that apply.
   - Improves knowledge about organic food
   - Increases knowledge about healthy eating and nutrition
   - Better understand the importance of exercise and physical activity
   - Knowledge of cooking ingredients and techniques
   - How to work with others / improved social skills
   - Improved knowledge of gardening and gardening techniques
   - Increased environmental awareness/knowledge
   - Other (please specify):

8. What have you learned a lot about in your time using a rooftop community garden?

9. What would you like to learn more about/ see more of in your rooftop community garden?

10. What resources have you used to improve your gardening and food knowledge/skills? Check all that apply.
    - None
    - Gardening Workshops / Classes at a community garden or nursery
    - Friends/ Family/ Other Social Networks
    - Internet Resources
    - Books/ Library Resources
    - University or College programs
    - Other certificate programs
    - Other (please specify)

11. Answer this question if you chose any option other than “none” in question 16. If you chose “none” as your answer to question 16, please proceed to question 18.
    How have these resources helped you improve your knowledge in these subject areas? Briefly describe below.

Section 4: Participant Information

12. How long have you been a member of your rooftop community garden?
    - 6 months – 1 year
    - 1 – 2 years
    - More than 2 years
13. How far is your house Ryerson’s rooftop garden/Ryerson University?
   - [ ] 0 – 2 km
   - [ ] 2 – 5 km
   - [ ] 5 – 10 km
   - [ ] 10 km

14. How do you usually travel from your house to your Ryerson’s rooftop garden?
   - [ ] Walk
   - [ ] Bike
   - [ ] Take Public Transit
   - [ ] Drive

15. Approximately how many hours do you spend at Ryerson’s rooftop garden during the growing season?

Section 5: General Household Demographics

Please answer the following questions about you and your household.

16. What is your age?

17. What is your gender?
   - [ ] Male
   - [ ] Female

18. What is the highest level of education that you have received?
   - [ ] No certificate, diploma, or degree
   - [ ] High School certificate or diploma
   - [ ] Trade or technical training
   - [ ] University Bachelor’s degree
   - [ ] Graduate degree (Masters or Doctorate)

19. Please indicate where you were born:
   - [ ] Mississauga
   - [ ] Ontario, but not Mississauga
   - [ ] Canada, but not Ontario
   - [ ] Outside Canada (please indicate country):

20. Please indicate your ethnicity. Check all that apply.
   - [ ] British Isles
   - [ ] European

21. What is your average annual household income in dollars?
   - [ ] 0 – 24,999
   - [ ] 25,000 – 49,999
   - [ ] 50,000 – 74,999
   - [ ] 75,000 – 99,999
   - [ ] 100,000 +
   - [ ] Prefer not to say

22. How many adults aged 18 – 44 live in your household?
   - [ ] 0
   - [ ] 1
   - [ ] 2
   - [ ] 3
   - [ ] 4 or more

23. How many adults aged 45 – 64 live in your household?
   - [ ] 0
   - [ ] 1
   - [ ] 2
   - [ ] 3
   - [ ] 4 or more
24. How many adults aged 65 or older live in your household?

□ 0
□ 1
□ 2
□ 3
□ 4 or more

25. How many children (18 years and younger) live in your household?

□ 0
□ 1
□ 2
□ 3
□ 4 or more
Appendix D: Information form for Ryerson, South Riverdale, and Fort York participants

*Organization names were changed accordingly for each participant group. Only one form is included here to reduce repetition.

Dear Ryerson Rooftop Gardener,

I am writing this letter to ask for your help in a study examining peoples’ experiences growing food in a rooftop community garden. This study is part of an effort to examine benefits and ongoing challenges associated with different types of urban community gardening spaces.

We are asking an adult in your household that actively participates in the community garden to complete this questionnaire. It will only take 15 minutes of your time to complete.

Results from this survey will help to better understand the ongoing challenges to expanding urban agriculture and develop better support for growing. The survey asks about your motivations for using a community garden, benefits and challenges you have experienced and some basic questions about you.

There are no known risks or benefits to you for assisting in this project. Your answers will be kept completely confidential. We will only release summaries of the results in which no individuals can be identified. Your address and name (if given) will be immediately separated from your completed questionnaire. Complete questionnaires will be stored in a secured office that is controlled by the researcher, and will be destroyed at the end of the research project. Participation in this survey is completely voluntary, and you may decline to answer certain questions. However, your response will help provide a more detailed understanding of participants’ experiences with rooftop gardening. If you are interested, we can send you a summary of the research upon completion of the project.

Thank you for your time and consideration. If you have any questions, please feel free to contact us at the address provided, by email (adrian.lue@mail.utoronto.ca) or by telephone (905 – 569 – 4471). You may also contact the Office of Research Ethics at the University of Toronto (ethics.review@utoronto.ca; 416 – 946 – 3273) if you have any questions about your rights as a participant.

Sincerely,

Adrian Lue (M.A. Candidate)