Examining Urban Agriculture in Toronto

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Table of Contents

Executive Summary

This report focuses on the density of urban agriculture in Toronto. To begin with, the group reviewed literature to determine the current setup of food production and distribution in the city. As a result of our initial research, it appears that Toronto is lacking a strong focus on agriculture. In collaboration with Fresh City Farms, the group reveals the current spatial pattern of community gardens and urban farms, two major sites of food production in Toronto. The team made use of various scholarly literature, websites, suggestions from Fresh City Farms, Toronto's Open Data resource, QuantumGIS (QGIS) and the Google search engine to come up with the data necessary to complete this assignment. In QGIS, team members plotted locations for both community gardens and urban farms by digitizing. These spatial and attribute data were gathered through Google searches and the 'Toronto Community Garden Network' webpage. The address and contact information in relation to the plotted points were recorded in order to properly identify the establishments. In addendum to this report, the team has also uploaded maps with corresponding tables, via fusion tables, of contact information for community gardens and urban farms onto Google Sites.

Link: https://sites.google.com/site/torontourbanfarms/

Subsequent to the mapping process, this report makes use of David Hulchanski's (2006) research on the Three Cities model in Toronto. Through this framework, this report offers an analysis section that describes the possibility of discriminatory practices in the distribution of public goods, in this case, community gardens and urban farms, based on incomes, as measured by census tracts. The team suspects this as a result of a clustering of community gardens in certain regions of the downtown core (City #1, in Hulchanski's terms) and few to no community gardens in some of the middle (City #2) and peripheral (City #3) regions of Toronto. We conclude that the results align partially with our hypothesis, as the densest bundles of community gardens are in relatively more affluent areas. Further, this report includes sections that communicate the process of our research.

Introduction

Food production in North American cities is heavily dependent on industrial agriculture. However, such a system is environmentally unsustainable, detrimental to human health and contributes to the wide gap of social inequality through uneven distribution practices. There is significant impact from industrial agriculture on the environment. Fertilizers used in the process create toxic runoff of nitrogen, which then travels to nearby water bodies and drives out the sea life as it depletes the oxygen in the water. A large amount of land is needed for agriculture, much of which is eroded through unsustainable practices, affecting the soils. Water is damaged through the irrigation of fields. The process is also energy inefficient because industries, like factory farming, require a lot of grains to act as animal feed. In turn, a lot of energy is needed to convert grain into the animal products seen on the market. Additionally, more energy is spent through the transporting, processing and packaging of these meat products for consumption.

Another issue is with genetically modified crops. Although the crops become resistant to pesticides and herbicides, resulting in a higher yield of the harvest, it presents the risk of various acute and chronic diseases in humans. Meanwhile, high-speed meat production leads to an increased threat of foodborne pathogens. Moreover, excessive use of antibiotics in meat agriculture creates resistant strains of microbes in humans. These health problems are concerning because food is supposed to nourish the body, not damage it.

Then, on the global scale, although millions of people worldwide suffer from undernutrition as a result of inadequate food amounts and range, there is a prevalence of overnutrition in more developed countries, such as Canada, because of the overwhelming amount of meat and meat products being consumed. Part of this issue is a major disconnect between people and their food, particularly in urban areas. Since many city residents do not follow traditions and habits of growing and harvesting their own foods, they are largely separated from the process of farming. At the same time, cities, such as Toronto, do not consider local agriculture as a priority. This is evident through our maps in later sections. Consequently, this produces an insufficient number of food production sites in Toronto. (However, it should be noted that this is not true for all urban areas.) Unsurprisingly, urban residents depend on store-bought foods produced from industrial agriculture. Many of these store-bought goods are contributing to overnutrition, particularly in terms of calories, fats and refined sugars. This is one of the main reasons why North Americans experience obesity-related illnesses. Further, socioeconomic factors underlie this occurrence, too, as poorer urban residents experience increased rates of obesity due to

overnutrition of bad sources of calories and fats more so than wealthier urban residents, for a number of reasons. One example would be the ability to afford fresh produce that is nutrient dense. It is apparent that the more nutrient dense products in grocery stores are more expensive than the nutrient poor foods sold at a fraction of the cost.

Moreover, since industrially produced goods are more inexpensive than organic, local and fresh foods, those who are of low-socioeconomic status are thus limited to buying what they can afford. Unfortunately, the nutrient dense foods happen to cost more than what the average Torontonian can afford to eat on a regular basis. Further, urban food production sites in Toronto are dispersed unequally, where community gardens cluster more densely in the downtown core with a slight shift towards the west end of the city, which is discussed in more detail in another section of this report.

In the context of Toronto, the city hopes to establish a stronger agricultural industry. As such, the City of Toronto has drawn an Urban Agriculture Development Strategy, outlining several key components that they are planning to address (City of Toronto, 1999). The main strategies include:

1) Allocate more land within the city for agriculture
2) Initiate programs directed at encouraging urban agriculture
3) Initiate programs directed at encouraging rooftop gardening
4) Link local farmers with commercial and community markets in the city
5) Integrate food production into urban design
6) Assessments of land for potential as future agricultural sites
7) Brownfield remediation and re-adaptation
8) Food waste recovery
9) Urban agriculture as a climate change mitigation strategy
10) Create a City of Toronto Urban Agriculture Commission

Although this process may or may not be considered successful today, there is observable evidence revealing that the city could drastically improve the density of urban agriculture in Toronto. The team works in alliance with Fresh City Farms to illustrate some elements of the status quo.

Client and Purpose

The team's project is oriented towards the goals of our client, Fresh City Farms. Fresh City Farms is a for-profit business that is focused on growing fresh and organic produce. Their main objective is to reconnect and reintroduce the role of farming and food cultivation in the city (Fresh City Farms, 2014). Since farming has become largely separated from many urban dwellers' daily lives, it is important to re-

establish the relationship between people and food. The company works to challenge the status quo in a number of ways. Plots of land are available for purchase on Fresh City's property for farming purposes. Clients who are interested in growing and harvesting their own food have the opportunity to do so. Fresh City also offers a delivery service, allowing clients to receive fresh, local produce at their door. The business has grown tremendously throughout the years, and as such, the team hopes to add to the success and goals of Fresh City Farms through the products of this project.

In accordance with the intentions of Fresh City Farms, the project's main purpose is to identify and analyze sites of urban food production in Toronto. The results include maps of urban farms and community gardens in the city, where food is grown and available to the public (Note: some publicly available locations may be more restrictive than others). By spatially locating these amenities, the team is able to assess any noticeable patterns. It also gives a good idea of food deserts in the city. However, that is not the focus of this research.

Moreover, our data provides a resource for initiatives, like Fresh City Farms, because they will be able to spatially locate the major sites of food generation in Toronto. Subsequently, the data can be used to further the objectives of the business. For instance, if Fresh City or another start-up company wishes to get more involved in this industry, they could access our data (via Google Sites) to see what the trends are in terms of the spatial locations of food growth and perhaps target the areas that are underserviced. We hope to increase the potential for urban food growth in Toronto through our spatial data and analysis by assisting, in some way, projects that are aimed at this goal.

Research Questions and Hypothesis

Our research is premised on exploring the density of urban agriculture by locating community gardens and urban farms that produce vegetables and crops for public cultivation and consumption. The main research questions informing our process are:

- *How many sites for urban agriculture exist in Toronto?*
- *Where are the sites located?*
- *Are there any observable patterns in the locations of the sites?*

From our research questions, we hypothesize that lower-income areas, mostly the peripheral regions of the city of Toronto (Hulchanski, 2006), are largely unable to access agricultural sites. By inaccessible, we mean that it is not within walking distance, i.e. 5 km. This includes both community gardens and urban farms. We hypothesize this because there tends to be environmental racism and

discriminatory practices in the siting 'public goods' (Pearsall & Pierce, 2010). In this case, those goods are farming amenities.

According to Hulchanski's research, the team hypothesizes that there are less urban farms and community gardens in what is called City #3, which are areas that have experienced the most significant income decreases from 1970 to 2005. City #3 is the peripheral region, or inner suburbs, of the city, as depicted by the maroon hue in **Figure 1**.

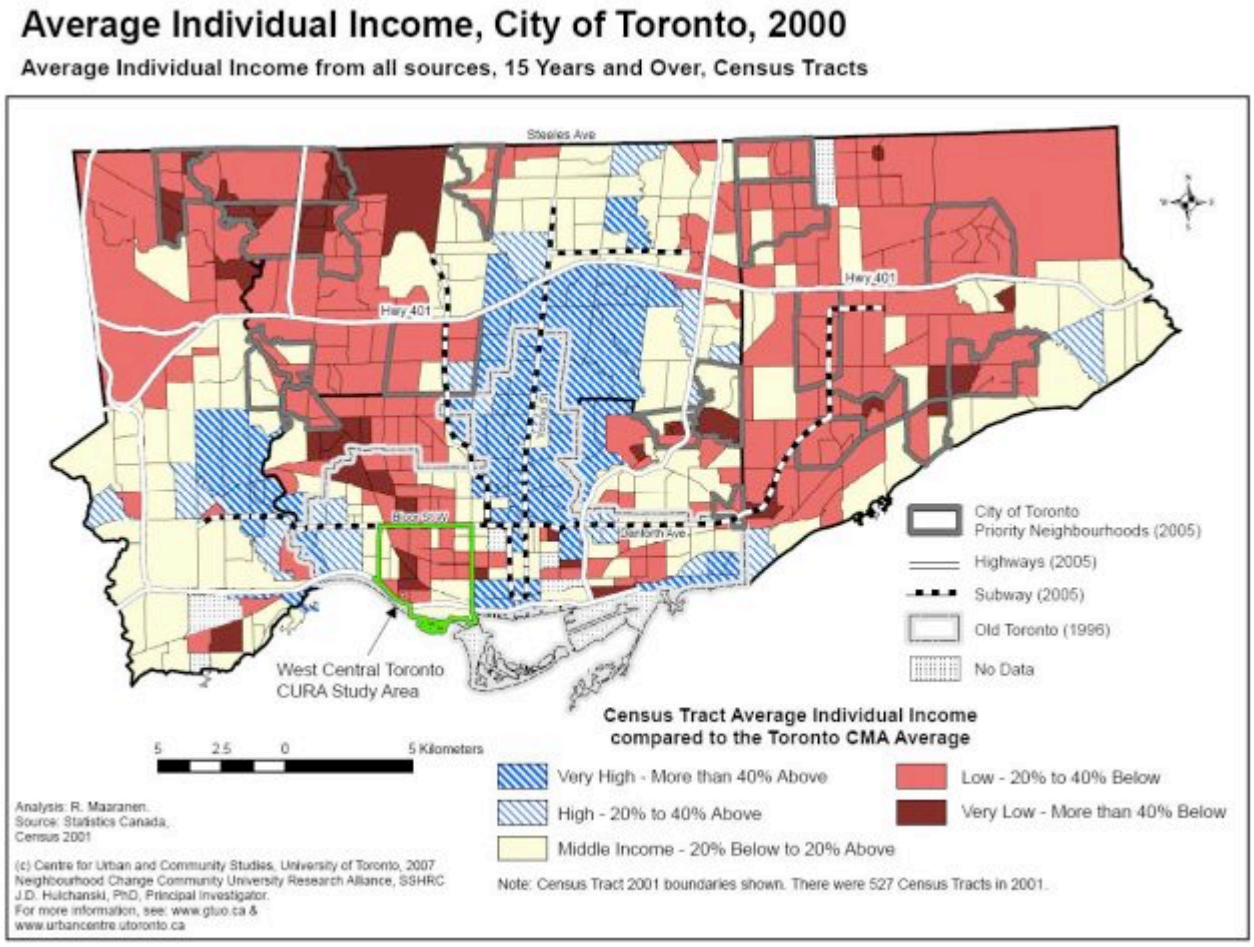


Figure 1. Three Cities Map (Hulchanski, 2006).

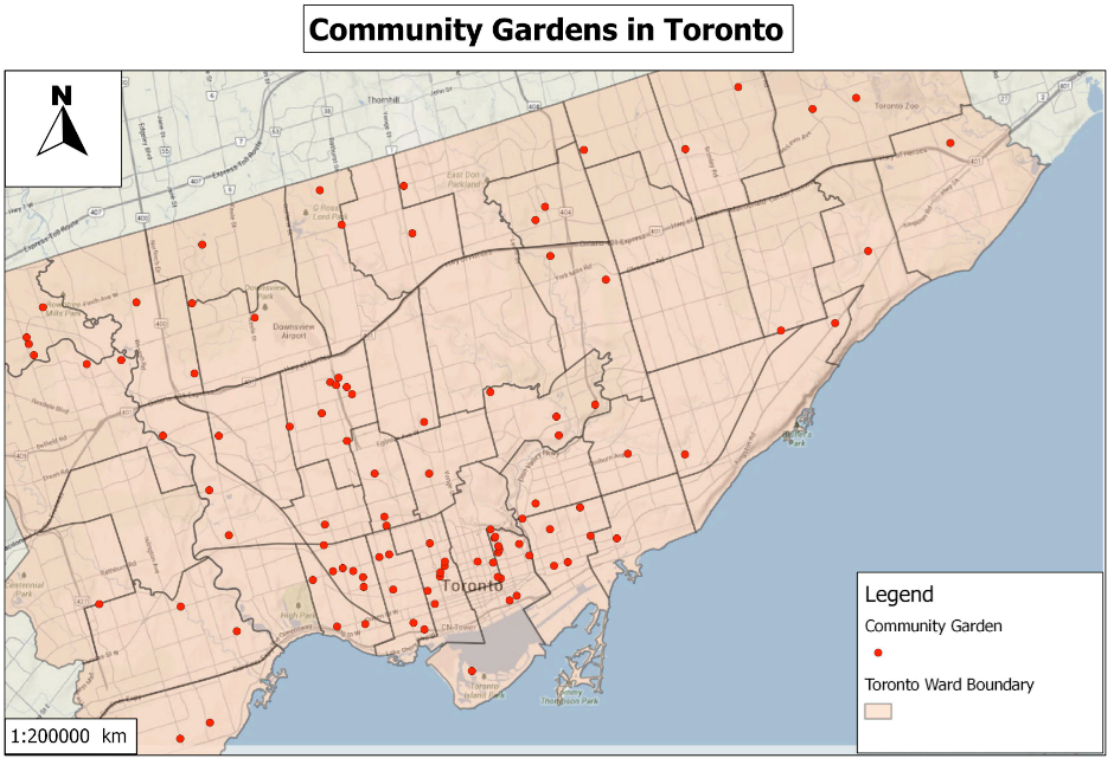
Methodology

In terms of background information, the team looked into existing literature on urban agriculture, the negative impacts of industrial agriculture, and documents related to urban agriculture specifically in Toronto. From there, we contacted various sources prior to this stage of the process to determine the current situation in the city. We encountered some minor setbacks to the research

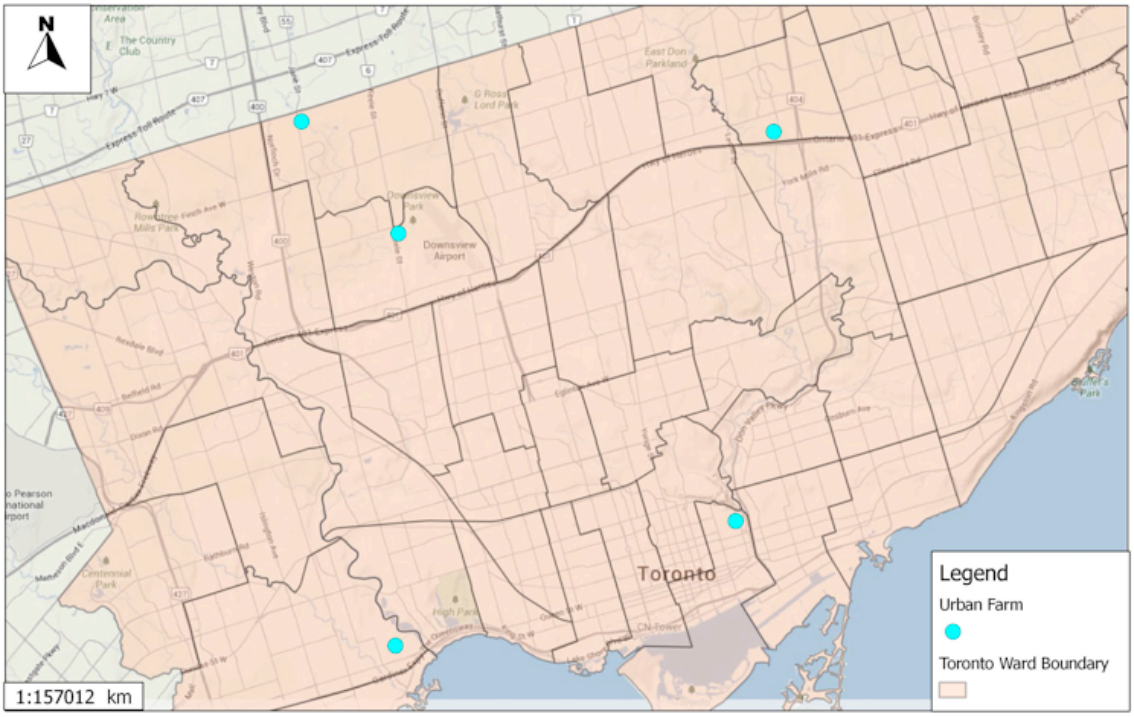
process, which is elaborated on in a later section. Nonetheless, the team aggregated the necessary data in order to produce the maps for this project.

For the final maps produced, the team used Open Data from the City of Toronto's website to obtain ward layers, which were laid on top of the Google Physical layer in QGIS. Spatial and attribute data for urban farms and community gardens were obtained through Google searches and manually added to all the maps produced for this assignment. Following verifications of the sites, the team digitized the locations onto separate maps, which were then converged into one maps to show all the locations obtained. Finally, the team uploaded three maps, one of community gardens, one of urban farms, and one for a combination of both, along with corresponding name, address and contact information onto Google Sites.

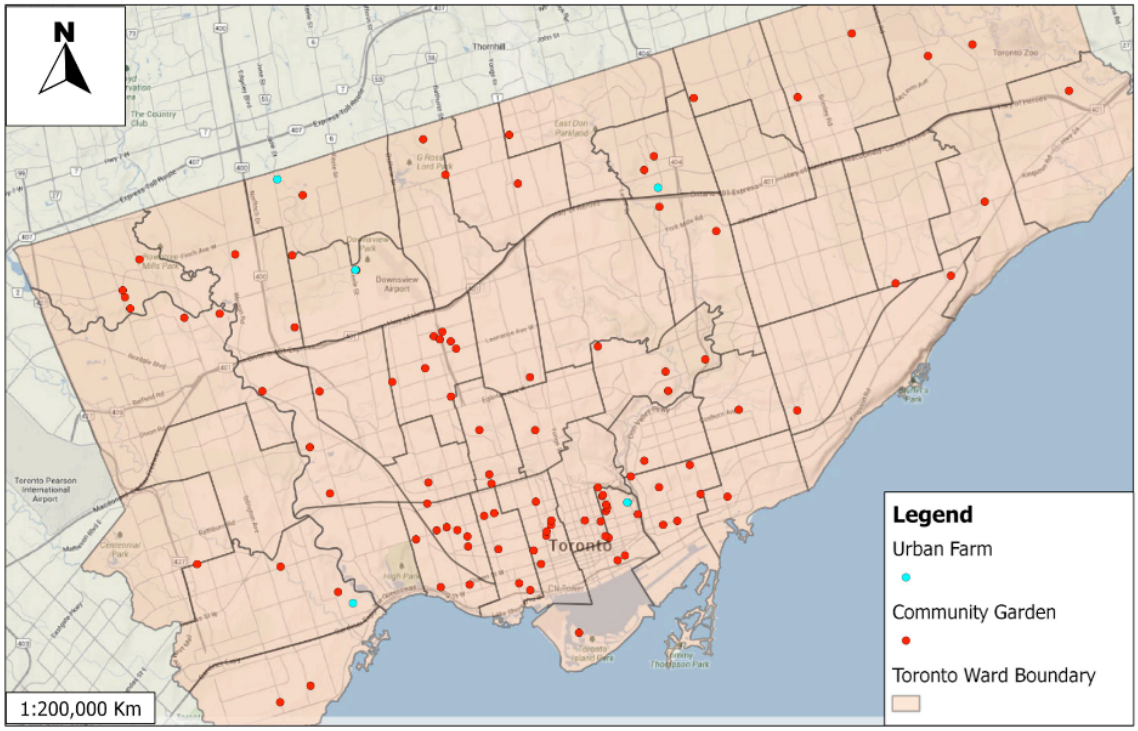
Produced Maps



Urban Farms in Toronto



Urban Agriculture in Toronto



Analysis

From the maps generated (see above), there is a recognizable spatial pattern in terms of the provision of community gardens in the city. Drawing on Hulchanski's depiction of the Three Cities, it seems that the team's hypothesis partially relates to the outcome displayed through the maps. The areas with the most number of community gardens are in the downtown region, on the southern tip of the city. **Figure 2** highlights the four wards that appear to encompass the most number of community gardens. What this clustering illustrates is that the distribution of community gardens across the city is uneven. In line with Hulchanski's framework of the Three Cities, it can be concluded that City #3, the peripheral areas of the city, has the least proportion of community gardens. We describe our hypothesis to be only partially correct because this does not apply to urban farms, especially in light of the very few numbers of them.

As was mentioned previously, we suspect that this spatial dispersion of community goods demonstrates discriminatory practices. It should be noted that the siting of public goods are determined through plans made by particular individuals in charge of such decisions. A whole host of factors may contribute to this outcome, such as the political and/or social influence that certain powerful populations in areas with more community gardens have, as compared to other areas with fewer amenities. Since the siting of community gardens may often depend on a collective community effort to start one up, it therefore is telling when certain wards or neighbourhoods see higher instances of community gardens. Further, because the practice of farming and food literacy skills are viewed more as constructed through leisure than as a necessity of daily living (Levkoe, 2011), some populations, i.e. the affluent who (arguably) have more leisure time, are able to allocate the time and effort towards establishing a community garden in their area. For example, for a low-income individual or family who spends much of their time working, taking care of their family and other housekeeping activities, it is very difficult to come up with the spare time to argue or initiate a community garden in their area. In this sense, certain populations are disadvantaged. Through spatially demonstrating this distribution, it is evident that there is a biased layout of community gardens, particularly because community gardens are not difficult to implement in most neighbourhoods. Many areas have the suitable soils and conditions for them.

Additionally, the relatively few number of community gardens and urban farms, especially urban farms, in Toronto illustrate that the city is not heavily invested in providing sites of food production for the public. This is likely a result of the disconnect between urban citizens and farming practices. Unfortunately, urban areas like Toronto do not consider farming practices significant because of

valuable real estate prices. As such, there is very limited spaces that stakeholders are willing to designate to farming, which helps to explain why the density of urban agriculture is not higher than it is currently.

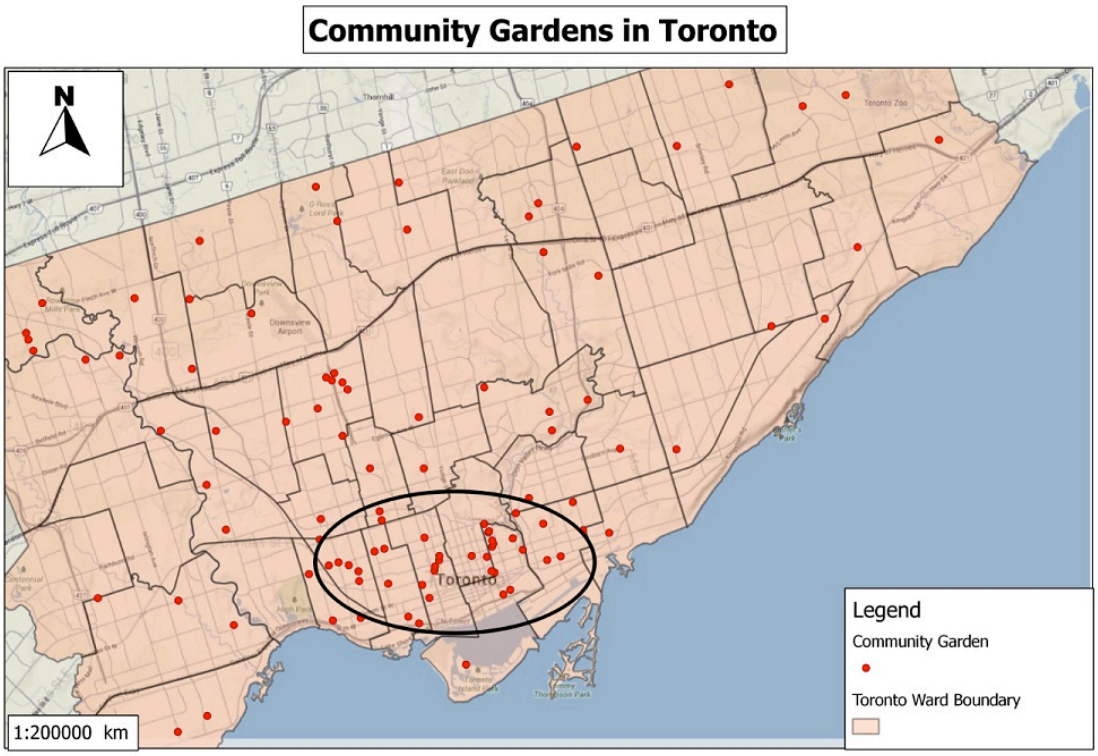


Figure 2. Wards exhibiting high clustering of community gardens circled.

Challenges, Difficulties and Issues Encountered in Research Process

The team encountered several challenges during the research process. Specifically, these difficulties include contact communication issues, incomplete spatial and attribute data, unavailable data and fragmented data.

When the team contacted Toronto and Region Conservation Authority (TRCA) and Fresh City Farms for available data in regards to this project, no responses were received. With adequate time allotted, the team then opted to conduct what we believed was the necessary research on our own. The team gathered attribute data for most of Toronto's community gardens from the Toronto Community Garden Network (TCGN) website. We chose to obtain attribute data from TCGN because it had the most recent data (updated as of 2013) compared to community gardens listed in the City of Toronto's website (which were updated in 2012). While TCGN had all of Toronto's community gardens visually displayed on a map, they did not have all of the corresponding addresses, postal codes or contact information for

those sites. We then looked for this data elsewhere, such as by researching the community gardens' websites one by one to determine whether or not they were suitable for the purpose of our project. When the team could not find the required attribute data from these websites, we then entered the community garden name in the Google search engine. Unfortunately, this last step proved to be in vain. Some data is still unavailable, and hence, "N/A" is written in place of missing data.

Furthermore, although contact information was found for some of the community gardens, the team still could not find addresses or postal codes for certain gardens. The team discovered that this was because some gardens did not have their own addresses, but were located at intersections, "west of…" an address, or on certain streets that did not have their own addresses.

When we tried to find urban farms in Toronto, the team did not discover any open sourced maps or data readily available that display names of urban farms nor their locations. The team then resorted to Google Maps and search for "farms" located in Toronto. However, most of the generated results were misleading because many of these "farms" did not actually grow food or simply encompassed the word "farm" in their establishment title. The team had to isolate the suitable locations from unsuitable ones by delving into the websites of each individual result. This process was tedious and time consuming because the needed data was fragmented. Although the team did not encounter such difficulty with community gardens, thanks to TCGN, there was no consolidated map of all urban farms in Toronto. Thus, the main issue we experienced was with filtering through the massive list of Google hits when searching for "urban farms".

Limitations and Future Research

Since this project has a very limited time span and limited resources, there are a number of shortfalls to what the team is able to produce. First, because the team depends on data available on the Internet and what Fresh City Farms communicated, there is no data of non-documented and personal plots of land used for urban agriculture. This means that instances of personal private property used for food growth cannot be taken into account and thus neglected in our research. Unfortunately, this excludes many cases of individual or smaller scale farming in the city. Second, since there was insufficient time to thoroughly confirm the existence, productivity and accessibility of the sites plotted onto the produced maps. The team does not, and cannot, know for sure that all of those sites are open, available and currently supports food production. Compared to a long-term study and with more resources, the team cannot confirm this with each site in Toronto within the span of this project. Even though City of Toronto's Open Data provides many resources that are available for public use, the

website does not have a file that lays out sites of urban agriculture in Toronto. As such, the team could only extract available information from the Internet, which means that there could be discrepancies or errors in the data, despite our best efforts.

For future research, the team proposes a more in-depth investigation into urban agriculture sites in Toronto. This would require more resources and time. From a review of the Chicago study conducted on urban agriculture in the city, the team recommends the methods employed within that work. The Chicago study uses a combination of: 1) visual analysis of satellite images and aerial photos of previously documented urban agriculture sites and 2) manual extraction and classification of undocumented sites from high-resolution aerial images from Google Earth (Taylor & Taylor Lovell, 2012). The Chicago study employs a wide-ranging strategy that incorporates many forms of data acquisition to come up with updated and comprehensive maps of urban agriculture. The team suggests that future researchers into this current project take up some of the approaches used in the Chicago study. Some points for consideration include:

- Assess the existence and availability of the sites. I.e. is each site currently open and available for food production?
- What are the hours of operation? This determines how accessible a site is. If the site has very limited hours, then it would be difficult for all residents to access it at any time.
- What types of food is being produced at the site? This offers researchers the ability to determine the variety of food sources that public sites are able to provide for citizens. It also allows researchers to analyze what requires change and upgrading in order to offer citizens more abundant and diverse food choices.
- Who is accessing these sites and who is able to access them? This includes an assessment of its openness to the public, whether there are restrictions based on residents' home address locations. For example, sometimes, resources are confined to a limited region within specified boundaries. It also allows researchers to understand the portion of the public that uses these amenities. With that knowledge, analysis can be performed to determine those who are more dependent on these services in order to figure out ways to improve the service.
- What difficulties are encountered at each site? The information obtained from this question could be wide-ranging. It asks for any difficulties or issues observed at each site. Thus, the answer may differ from site to site, depending on unique factors, such as location, surrounding neighbourhood, pest issues, user issues, etc.

Conclusion

This report explains some of the prominent issues with industrial agriculture, which includes environmental and human health impacts. As such, the team has collaborated with Fresh City Farms, whose main goal is to challenge the status quo of urban agriculture by strengthening the relationships that people have with farming and food. This report compiles maps of urban farms and community gardens in the city of Toronto. Through some analysis, we discuss some of the spatial patterns exposed in the generated maps. We suspect that discriminatory practices of siting environmental goods are part of the process of establishing the locations for community gardens. The maps also illustrate that Toronto is not heavily invested in providing an abundance of urban agriculture sites, especially for many of the peripheral regions of the city.

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