University of Glasgow
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Urban Agriculture in Post Industrial Cities: Addressing Food Insecurity in Glasgow and Detroit

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Abstract

As cities evolve in the post-industrial era, urban agriculture has the potential to address the challenges associated with food insecurity brought about by the loss of manufacturing and increased urban poverty. This project researched urban agriculture organizations in the cities of Glasgow and Detroit to determine the extent to which urban farming can reduce or eliminate food insecurity. The research was conducted in the form of case studies and interviews were conducted with participants. The goal of the semi-structured interviews was to gather first hand information about the experiences these initiatives have had while operating farms in urban areas. Key interview subjects included background on the organizations, information on day to day operations as well as questions about the participant's knowledge of food insecurity and how their organization approaches the topic. This research was necessary in order to expand the information available on urban agriculture and it relationship with food insecurity, a growing problem many cities face. The findings show that urban agriculture initiatives can face challenges when trying to directly influence food insecurity. However, their community impact and educational opportunities provide important indirect solutions to the challenge. Overall, urban agriculture programs provide indispensable support to the communities in which they work. With increased assistance from local governments and greater public awareness, these organizations can continue to positively impact the poor and food insecure communities.

Table of Contents

List of Figures

Chapter 2: Literature Review

Chapter 4: Results and Analysis

List of Tables

Chapter 3: Methodology

1. Introduction

In the years following World War II, many cities in the western world experienced an urban revival. Large numbers of people began to shift from rural communities to urban communities, resulting in increased development in city centers as well as more suburban sprawl (Nordahl, 2009). In the following years, the population shift from rural to urban areas continued. The trend crossed a threshold in 2008, when more than 50% of the world's population lived in cities (United Nations, 2015). The United Nations (2015) estimates that by 2050, more than 66% of the total population will live in urban metropolises, compared to 30% in 1950. In response to the demand for more housing and other infrastructure, agricultural uses like farms and gardens have been pushed to the periphery. Suburban sprawl, which will intensify as urban populations continue to swell, drives agricultural activities even farther from the city. As a result, the United States lost over four million farms from 1940 to 2000 and the United Kingdom experienced a 65% decline in the number of farms since 1945 (Nordahl, 2009 and Robinson, 2002).

Growing urban populations combined with the development practices of many cities has created challenges for the food system. In the mid 1900s, the Green Revolution industrialized agricultural production and increased the productivity of farmland. By 1990, global food production was three times what it was in 1950 (Vitiello, 2008). As production has increased, so too has the energy consumption of the agricultural system. In order to grow more produce, farmers have turned to oil and natural gas based fertilizers and pesticides. Globally, 70% of the freshwater supply and 30% of total greenhouse gas emissions can be attributed to agriculture (World Bank, 2010). The reduced supply of farmland close to metropolitan areas, has also contributed to the high use of energy. In the United States, the average crop is grown 1,500 miles away from its distribution point, leading to higher consumption of energy in order to package, cool and transport the good (Vitiello, 2008). The process of growing and transporting food over long distances also increases the cost of produce. This, combined with the increasingly

large number of people living in urban areas, will contribute to the levels of individuals and families suffering from poverty and food insecurity. Limited space in city centers has restricted the numbers of grocery stores and supermarkets available to inner city residents, making it a struggle to access fresh, healthy produce. At the 1996 World Food Summit, the Food and Agriculture Organization of the United Nations (1996) identified "the problem of ensuring safe, adequate, timely and affordable food for a growing and increasingly hungry population" as one of the most pressing issues facing the global population.

Detroit is the largest city in the state of Michigan, located in the northern United States, with an estimated 2016 population of just over 670,000 people (US Census Bureau, 2016). Detroit was once a world center for automobile manufacturing, however, deindustrialization and the decline of the auto industry in the late 1990s and early 2000s led to large decreases in population and business (Doucet, 2017). The city's population peaked at 1.85 million in 1950. The population had fallen to 713,000 by 2010 and recent estimates have shown that the population is now just over 670,000 (US Census Bureau, 2016). Glasgow, the largest city in Scotland and the fourth largest in the United Kingdom, had an estimated population of just over 600,000 in 2016. It experienced a peak population of 1.1 million people in 1938. However, the loss of the shipbuilding industry led to economic decline, as well as a fall in population (Understanding Glasgow, 2017). Glasgow experienced the loss of industry and population earlier than Detroit, and is further along in the regeneration process. However, the two cities remain similar in that they are both post-industrial cities that have experienced obstacles since the loss of industry. These obstacles include downturns in the economy and poverty.

Urban agriculture has been analyzed from many perspectives, however, there has not been sufficient research to determine if it can be used successfully to address food insecurity and the challenges that arise from it. Using the cities of Glasgow and Detroit,

this research wishes to answer the following central research question: *To what extent can urban agriculture reduce or eliminate food insecurity in post-industrial cities?*

In order to answer the research question, a literature review was conducted to explore and understand the existing research on post-modern cities, urban agriculture and food insecurity. The review also allowed for further insight into how the topics influence each other as well as how they evolve in an urban setting. The following chapter provides information on the methodology for the project, including research design. Chapter 4 describes the findings of the research and provides an analysis.

2. Literature Review

2.1 Post-Industrial Cities

Industrialization in the late 19th and early 20th centuries led to the development of many cities concentrated around industry and manufacturing. Manufacturing companies increased employment opportunities in cities, attracting large numbers of people looking for work and allowing urban economies to flourish. The time period marked a noticeable shift in population from rural to urban areas (Hinshaw and Stearns, 2014). Many cities around the world, including Detroit and Glasgow, became centers for manufacturing, attracting workers and visitors alike. In the mid 1900's, a shift had begun to occur in the industrial sector. Post-industrial cities are characterized by a trend of deindustrialization that brings about new economic characteristics.

A post-industrial city can be described as one in which the economy no longer relies on industry and manufacturing for employment or revenue. In his book, Daniel Bell (2001) described the shift from an industrial city to a post industrial one with four common themes. First, the economy shifts from relying on manufacturing and the producing of goods to a service based economy. Second, knowledge and ideas become the main economic growth factors. This leads to an increased need for educated workers thus causing a decline in demand for manual laborers such as those who would work in a factory. Finally, technology becomes a focal point of the economy and a leading employment sector, further diminishing the need for unskilled workers. Many developed countries have experienced post-industrialization in some form over the last half of the 20th century and beginning of the 21st century. In the United States, over 8 million manufacturing jobs were lost between the years of 1970 and 2000. It is estimated that each manufacturing job creates around two other jobs so the economy has actually lost around 16 million jobs (Collins, 2014). Similarly, the United Kingdom lost over 5 million manufacturing jobs in the same time period (Rhodes, 2017).

The city of Glasgow has experienced a common process of post-industrialization. Once called the "Workshop of the World", the city experienced one of the worst declines in the developed world. The industrial revolution solidified the city's world status as a capital for engineering and the shipbuilding industry (Mackenzie, 1999). Between 1876 and the early 1900s, employment expanded and around 20 shipyards operated on the banks of the Clyde. It is estimated that these shipyards employed around half of the British shipbuilding workers by 1870 and produced half of the total amount of products (Fraser, 2004) However, after World War I, competition in the shipbuilding industry increased and changing demand led to the decline of the business in Glasgow. In 1961, the city's population was reported to be 1.14 million. Over the next 40 years, it dropped to 579,000. At the same time, employment fell sharply, from 559,000 jobs in 1950 to 326,000 in 1996. (Cunningham-Sabot, 2013). This process of deindustrialization challenged the city's economy and began a period of limited investment, unemployment and population decline. The pronounced challenges brought about by deindustrialization can be attributed to a number of things. Specialization in manufacturing and industry left Glasgow unable to respond to changes in the market and swings in demand. For example, demand was shifting to more consumer based goods rather than producer goods, which are goods that are used by other producers such as steel (Pike, 2017). Glasgow struggled to adapt with the industrial changes occurring elsewhere in the world and that inability to change led to challenges the city would face for years to come.

In the early 1900's Detroit became known as "The Motor City" due to its large numbers of industrial automobile factories. Millions of immigrants and other workers moved to the city looking for employment in the manufacturing industry and the city experienced a peak population of nearly two million people in the 1950s (Welsh, 2017). The city's location helped it become one of the most important manufacturing hubs in North America. Strategically located near railroads and water transportation links, a product manufactured in Detroit could be shipped to consumers anywhere in the world. The Ford Motor Company was the leading automobile manufacturer and boasted the largest

integrated factory in the world. The Rouge River industrial plant employed over 100,000 people at one time and operated 120 miles of conveyor belt, allowing the company to manufacture automobiles almost as fast as they could be sold. Ford was also known to pay his workers relatively high wages which were then reinvested into the city's economy (Brooks, 2017). Thanks to the success of the Ford Motor Company as well as other automobile manufacturers like General Motors and Chrysler, Detroit became a city of economic prosperity. Like Glasgow however, increasing competition in the automobile industry and improving technology led to decline in Detroit's industry. Beginning in the 1960s, the auto industry and white working class families began to leave the city. Manufacturers found it was cheaper to operate in countries such as Mexico and China. Those that remained found that advances in machinery and other industrial technology meant fewer employees were required (Sugrue, 2014). An increase in international competition also affected the automobile market in the United States. Honda, a Japanese car company, became a large challenger to American companies in the 1970s. They were soon followed by Nissan and Toyota, also Japanese companies (Wong, 1990). By the beginning of the 21st century, Detroit had lost more than 90% of its industrial jobs and two thirds of its population. Much of the population loss was due to the migration of white, middle class families which resulted in an increased number of poor households in the city (Doucet, 2017). The city became the largest in America to declare bankruptcy when it did so in 2013 showing that deindustrialization has continued to affect the economy and community of Detroit.

2.2 Food Insecurity

According to the Food and Agricultural Organization of the United Nations (FAO), food security can be defined as "all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996). This definition provides four basic components that make up food security: food availability, access, utilization and stability. It also makes a clear distinction between continuous and temporary food insecurity. Another important

characteristic identified by the FAO is the requirement that sufficient food access is not limited to food for survival and must include food for active and healthy participation in society (Sassi, 2018). The first tenant of food security, food availability, occurs when individuals within a city, region or country can obtain satisfactory amount of safe and nutritious food within reasonable distance. Access refers to both the economic and physical aspects of acquiring food. From the economic standpoint, people must have the resources to maintain a nutritious diet. Factors such as income and product prices can have an effect on economic access to food. The physical dimension of access relates to the ability of every social group in every area to reach nutritious options. This dimension is connected to infrastructure and location of markets and storage facilities. Food utilization refers to the individual or household's ability to store and prepare food in order to receive the full nutritional benefits. Improved food utilization can be achieved through strong public health standards and nutrition education. The fourth component, stability, is reached when the three previous components are met and all people at all times have the ability to secure nutritious food products (Sassi, 2018). Based on the definition provided by the FAO, vast numbers of people lack the nutritious food they need to live an active and healthy life. According to the United Nations, 795 million people worldwide, just over 1 in 9, were considered undernourished in 2016 (Arulbalachandran, 2017). Food insecurity is a world problem, occurring in both developing and developed nations. In the United States, the United States Department of Agriculture estimates that more than 15 million households are considered food insecure as of 2017 (USDA, 2017). In 2016, it was estimated that around 8 million households suffered from food insecurity in the United Kingdom (McGuinness, 2016). Food insecurity is an issue that every level of society faces, from the global and national levels to single households and individuals.

Food insecurity and poverty are inextricably linked and, in Detroit and Glasgow, as well as other post-industrial cities, increased levels of poverty can be linked to the deindustrialization process. The United Nations defines poverty as "a condition characterized by severe deprivation of basic human needs, including food, safe drinking

water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services" (United Nations, 1995). Deindustrialization has contributed to the increasing levels of poverty in urban areas. The loss of manufacturing jobs and population led many cities, including Glasgow and Detroit, to go into economic decline. Urban decay, high crime rates and persistently low employment followed, resulting in large numbers of people suffering from poverty being located in post-industrial cities (Russo, 2009). Individuals in communities struggling from poverty may struggle to meet nearly every basic need. Many are forced to choose between purchasing food and paying for other things, such as living costs and medical expenses (Sassi, 2018). Access to produce and healthy food options is another challenge in poor urban communities. Lack of space in downtowns and city centers means large grocery stores are limited to areas where building space is available. Supermarkets may only be located in the wealthier parts of town, where there is more inclination to spend money on building upkeep, far away from poverty stricken communities. Mark Winnie writes, "while the failure of supermarkets to adequately serve lower income communities represents a failure of the marketplace, the marketplace is functioning rationally (as economists would say) by going to where the money is" (Winnie, 2008). Residents of poor neighborhoods may lack access to transportation options and are unable to travel to larger stores. Small corner stores are often the only supplier for some neighborhoods and many times, they are unable to meet a demand for fresh nutritious food. If healthy food is available, it is often priced higher than other options, leaving many to opt for less healthy alternatives such as fast food or prepared meals (Treuhaft, 2010). These situations are often referred to as urban food deserts, occurring in areas with few affordable, healthy options and an overabundance of poor choices (Winnie, 2008). Food insecurity and poverty in urban areas can be a continuous cycle, resulting in far reaching negative consequences.

Food insecurity can affect both the physical and mental health of the individual and community. The lack of reliable access to fresh, healthy food can be considered a health

crisis. Studies have shown that adults who suffer from food insecurity often experience poor overall health and well being, including increased rates of poor mental health and fatigue. Children suffering from food insecurity may experience cognitive issues, behavioral problems and depression. Health effects include poor oral health and increased rates of asthma and obesity (Gunderson and Seligman, 2017). Poor nutrition can lead to higher numbers of school absences in children as well as problems with concentration in all age groups. Food insecurity is also linked to higher rates of chronic disease such as heart failure, hypertension and diabetes (Brown, 2002). Among elderly adults, those with limited access to nutritious food had a 21% higher risk of high blood pressure, or hypertension, and a 50% higher risk of diabetes than those that were considered food secure (David, 2017). Increased problems with mental and physical health lead to higher health care costs, for both the individual and society as a whole. Poor health and low productivity can limit a person's employability, resulting in further issues with poverty. Often, food insecure people experience a continuing cycle of poverty and food insecurity (Sassi, 2018). Individuals and households suffering from food insecurity can experience numerous negative effects on their health and well-being, which often continues for generations.

2.3 Urban Agriculture

Urban agriculture offers a potential solution to many challenges faced by post-industrial cities, including food insecurity. Urban agriculture can be defined as "the growing, processing and distribution of food and nonfood plant and tree crops and the raising of livestock, directly for the urban market, both within and on the fringe of an urban area" (Mougeot, 2006; 4). While many city residents associate agriculture with rural areas, it has the ability to be successfully incorporated into the urban fabric. Cities do not have access to large swaths of land like those found in rural areas, making large scale food production impossible. However, agriculture can be implemented in a multitude of forms at smaller scales based on the needs of the surrounding population (Lovell, 2010).

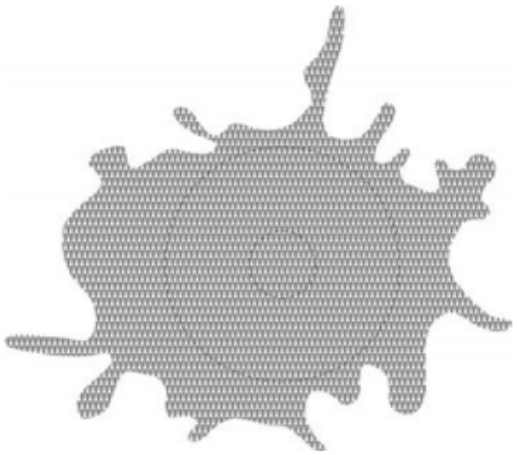

Figure 2.1: Established city with no CUPLs

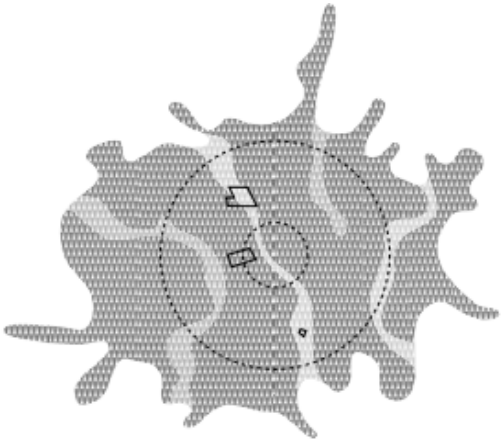

Figure 2.2: Identifying continuous landscapes

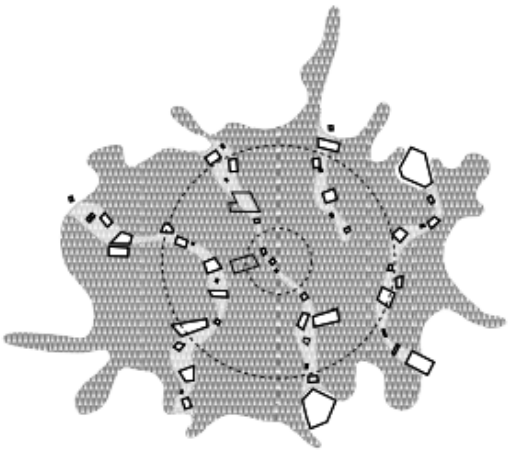

Figure 2.3: Inserting productive urban landscapes

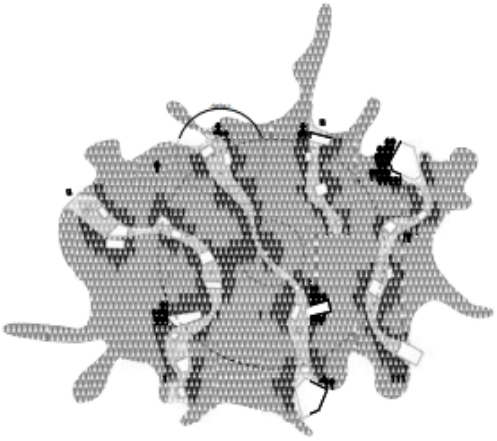

Figure 2.4: Feeding the City

Source: (Viljoen et al., 2005)

According to Bhatt and Farah (2009), agriculture can be included in the components of municipal plans, urban design schemes and neighborhood development projects, making it possible to incorporate productive growing into the policies and practices of a community. Some areas may decide to regulate urban agriculture on a city wide bases, using the practices to transform the urban fabric. Though there are not many precedents for this, architect Andre Viljoen created Continuous Productive Urban Landscapes, an urban design strategy that incorporates economic and environmental aspects of urban agriculture and sustainability to create a continuous green city. He proposed a network of open spaces throughout the city and connecting to the rural outskirts. The spaces would provide room for growing food as well as recreation and other uses. They would also be

designed to fit in with the surrounding built environment (Viljoen et al, 2005). Illustrated examples of Continuous Productive Urban Landscapes can be seen in Figures 2.1 - 2.4. This approach has not been directly applied to an urban setting, however, parts of it have been used to guide policies and practices in cities such as Havana, Cuba and Portland, Oregon (Lovell, 2010).

Urban agriculture can also be implemented at the neighborhood and single parcel level. Neighborhoods within the city are often an effective size to implement agricultural practices. This scale provides the necessary levels of support from residents while limiting the production to a feasible area. Neighborhoods are generally small enough to be walkable by those who live there, allowing residents to access and take part in the urban agriculture ventures. Figure 2.5 shows an example of a neighborhood farming initiative in Portland, Oregon. Single parcels may include vacant land or private property. This scale is the smallest and urban agriculture practices can range from small entrepreneurial farms to backyard gardens for personal use. These smaller farms can often be the most useful in an urban area. Because they have limited land, farms on single plots can generally produce only a few high value crops, allowing them to directly match the needs of the community around them. Backyard gardens do not necessarily provide food for the community, but they can decrease the demand placed on the agricultural system by providing the family with fresh food they did not have to purchase (Lovell, 2010). Figure 2.6 shows a small scale, backyard garden. Though space can be limited in

Figure 2.5: Neighborhood level urban agriculture initiative in Portland, Oregon. (Source: Popovitch, 2014)

cities, urban agriculture is adaptable and can be used in a variety of available areas.

Figure 2.6: Small scale backyard garden. (Source: Garden Dreams, 2018)

Urban agriculture projects offer a potential solution to the large numbers of urban poor suffering from food insecurity and other associated challenges. Agriculture ventures in urban areas, regardless of scale, provide increased access to fresh, healthy food that would otherwise be unavailable or expensive. Produce grown on urban farms can be distributed to the community faster than that grown in rural areas. The production of food in close proximity to the target populations cuts back on transportation and storage needed during the process, allowing lower income families to purchase produce at more affordable prices. In areas where food deserts occur, urban agriculture may provide the only source of fresh produce (Vitiello, 2008). Growing produce within the city also improves the health of residents. Urban agriculture projects can increase resident's knowledge about health and nutrition. Some programs teach people how to prepare fresh produce in order to receive the full benefits. Research has shown that "individuals who participate in community gardens were 3.5 times more likely to consume fruits and vegetables at least 5 times per day than those who did not participate" (Alaimo et al., 2008). Urban agriculture, at all scales, can impact the levels of food insecurity. Families who grow produce in a backyard garden consume the produce directly, improving their personal food security. Community gardens and other urban agriculture ventures may distribute produce for free or sell it at the local

markets, both increasing food security and improving the economy of the neighborhood (Brown, 2002). Urban agriculture also provides social benefits to the surrounding communities. Community gardens, urban farms and other forms of agriculture can improve the physical appearance of homes, community buildings and vacant lots. The improved appearance results in residents and other members of the community feeling more pride in their neighborhood leading to decreased rates of vandalism and other crimes (Vitiello, 2008). Food production can create new employment opportunities for residents who struggled to find work. Programs can also provide opportunities for members of the community to socialize and interact. Individuals who volunteer or work with urban agriculture ventures can benefit physically as well. They have further opportunity for recreation that comes with gardening and growing food outdoors (Lovell, 2010). The benefits provided by urban agriculture come together to create an empowered community where residents work together to improve their health and well being.

Environmental problems such as climate change and increased energy consumption can also be addressed using urban agriculture. Often, urban areas experience higher temperatures than nearby rural areas. Temperatures can range from .6° to 12° C warmer. Also known as the Urban Heat Island effect, the warmer temperatures can be contributed to higher levels of human activity and increased emissions. Increased planting, including agriculture on vacant parcels and rooftops, would provide more shade as well as decrease emissions and sunlight radiation (Ackerman et al., 2014). As stated previously, vacant lots negatively impact the physical appearance of neighborhoods. They also negatively impact the environmental health of an area. Debris from run down or demolished buildings such as glass and building materials often remain on the land. Vacant lots also attract the dumping of trash, which may contain toxic substances that proceed to run into the water supply (Knizhnik, 2012). Converting vacant lots into spaces for urban farming leads to cleaner spaces and decreased negative environmental effects. Other underutilized spaces such as rooftops can also be used for urban agriculture and provide environmental benefits such as decreased energy usage for the building. Urban farming on spaces such

as vacant lots and rooftops will further benefit cities by mitigating the negative effects of stormwater runoff. Many cities face problems with rainwater runoff caused by modern development practices such as large areas of impervious pavement, causing water to pick up sediment and pollutants and carry them into overflowing storm drains and waterways (Knizhik, 2012). Plants and vegetation used in urban agriculture and other greening processes take up water for growth and nutrients, decreasing the amount that runs into the drainage system. Ackerman and his colleagues (2014) found that green roofs can reduce stormwater runoff by at least 50% and, in some cases, up to 100%. Another study based in Philadelphia found that vacant lots cleared of debris and planted with a simple ground covering of grass resulted in a 30% decrease in stormwater runoff (Yang and Myers, 2007). Urban agriculture may further reduce stormwater runoff. Practicing agriculture in cities may also have an effect on energy usage, not only in the city itself but throughout the food system. Vitiello (2008) notes that the global food system is directly responsible for around 21% of fossil fuel consumption and is indirectly responsible for even more. In developed countries like the United States and the United Kingdom, the food system is one that covers a vast geography. The average agricultural product in America is grown over 1,500 miles away (Vitiello, 2008). Development of suburbs and commercial property outside city centers has also decreased available farm land, resulting in increased driving for both the product and the consumers to reach supermarkets and other food distribution centers. Local food production, in the form of urban agriculture, has the potential to reduce the energy consumption that currently occurs in the food system. It would allow fresh food to travel smaller distances, reducing the need for long term transportation and the fossil fuels that accompany it. Urban agriculture would also lead to lower levels of packaging, processing and refrigeration (Vitiello, 2008). Practicing urban agriculture would result not only in better physical and mental health for residents. It would also result in healthier natural environments, providing lasting benefits to those who live and work in the city.

3. Methodology

As the previous chapter shows, much research has been completed on food insecurity and the impacts it has on cities and communities. There is also a large area of existing research on urban agriculture in terms of community development and the environmental benefits it may have on a metropolitan location. However, the research into the effects of urban agriculture on food insecurity is limited. The studies that have been published focus on cities in the developing world, or feature research that took place ten years or more in the past. This dissertation seeks to determine the extent to which urban agriculture can impact food insecurity in developed, western cities. The post-industrial cities of Glasgow and Detroit were chosen as the subject areas. In order to answer the key study question, the research will explore the existing urban agriculture systems in both subject cities. The research will also seek to determine if there is an existing issue with food insecurity and to what extent it impacts the residents of each city.

3.1 Research Approach

The research took the form of an exploratory case study in which semi-structured interviews were conducted. The guided interviews were used to examine and compare the the format of urban agriculture programs in each city as well as the extent to which they addressed food insecurity. Following approval from the Ethics team at the University of Glasgow School of Social and Political Sciences, urban agriculture programs in both Glasgow and Detroit were selected to participate in the study. Subjects were chosen based on their position within the programs, either as leaders or as staff who were experienced with the history and daily operations of the organization. Invitations to participate were sent through email. Invitations also included a Plain Language Statement in which the purpose of the research was clearly stated as well as why the participant was chosen. Individuals from ten organizations were invited to take part in the research, five organizations were invited from Glasgow and six were invited from Detroit. Of the five invited to participate in Glasgow, two organizations responded they were available and

interviews were organized. Two people responded that their schedule was filled and therefore, they could not participate and one organization failed to respond. Two organizations also took part from those invited in Detroit while two did not respond to the invitation. One organization responded that their schedule was filled and they were unable to take part in the study.

All participants were asked to sign a consent form and interviews were recorded. Once informed consent was obtained, the interviews took place over the course of 20 to 30 minutes. Interviews conducted in Glasgow took place at the offices or location of operation for the urban agriculture program. Interviews with urban agriculture programs located in Detroit were conducted over the phone. A sample of the questions asked over the course of the interviews are included in Table 3.1.

Table 3.1: Interview Questions

Part 1: Introduction to Organization How long has the organization been operating? What are the goals of the organization? What is the target population? What is your (the interviewee) role within the organization?
Part 2: Food Insecurity Do Glasgow/Detroit/target neighborhoods struggle with food insecurity? Does the organization have policies in place to address this? If so, has there been a noticeable impact?
Part 3: Urban Agriculture What produce does the organization grow? How is this dispersed to the target population? Has the organization faced challenges associated with growing produce in an urban setting? Has the target population been receptive to the initiative?
Part 4: Relationship with the government and other urban agriculture organizations Is the local government involved/supportive of the organization? Do they provide funding or other forms of support? Have local policies impacted the way the organization operates? Is there something the local government could do to further support the organization or urban agriculture as a whole? Does the organization partner with or work with other urban agriculture initiatives in the area?

The qualitative data collected during interviews was then analyzed and formulated into a report, along with secondary data from source such as newspaper articles and organization websites. The analysis was used to compare and contrast the organizations and how they impacted their target population. The research also looked at the similarities and differences in food insecurity and urban agriculture between the cities of Glasgow and Detroit. Additionally, the analysis sought to determine if the urban agriculture organizations studied had a noticeable impact on food insecurity in each city.

The data collected over the course of this project is qualitative, an encompassing term that refers to studies aimed at discovering how people "understand, experience, interpret and produce the social world" (Mason, 1996). Qualitative research can take many forms, but this project was focused on a case study approach. The urban agriculture organizations were the subject of the study and the data was collected through interviews. The research completed in this project can also be described as exploratory research. Exploratory research is best used for studying a specific topic, "characterized by a lack of detailed preliminary research … and/or by a specific research environment that limits the choice of methodology" (Streb, 2010: 327). This form of research does not attempt to provide a final conclusion. Rather, it explores an existing problem and offers a better understanding of the issue as well as possible solutions. While there is not a lack of research on urban agriculture, there is an absence of research on how it relates to and affects food insecurity. There is also a lack of research on urban agriculture in the cities of Glasgow and Detroit.

For this study, interviews were chosen as the best form of research due to many factors. Time available to complete the research was limited, narrowing down the opportunities to establish and complete a more detailed study. The project was approved by the ethics committee in May 2018. This also marked the start of a review of available literature. Interviews were conducted over the months of June and July and the analysis was conducted over the course of August 2018. A lack of available funding made travel

between the two cities as well as a more detailed data collection system more challenging as well. This form of research also allows for large amounts of information to be gathered about the topic. A small scale set of individual interviews contributes in depth information that other forms of research, such as online questionnaires, may not be able to provide. The person taking part in the study has more opportunity to share their unique experiences, thoughts and ideas over the course of an interview. Interviews completed in person or over the phone, as opposed to those sent through the mail or online, allows the researcher to ask further questions and gain more details if needed.

4. Results and Analysis

4.1 Glasgow Results

Urban Roots

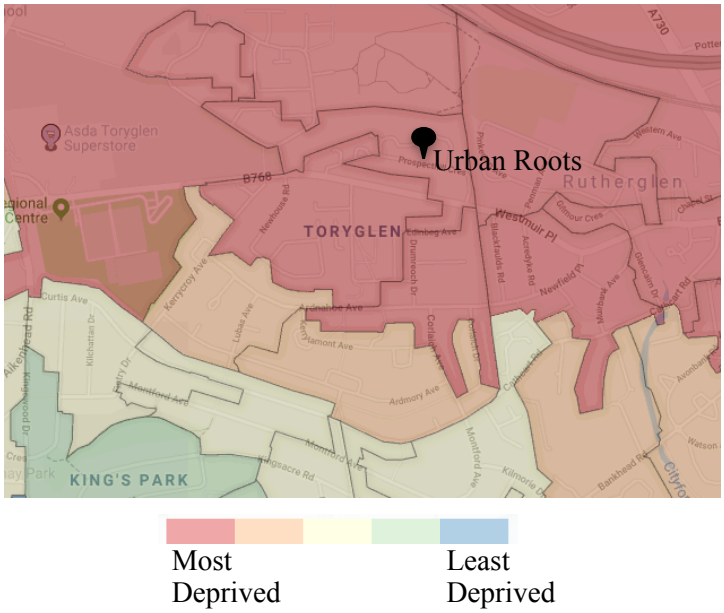

Figure 4.1: Levels of neighborhood deprivation around Urban Roots (Source: Scottish Index of Multiple Deprivation, 2018)

Urban Roots is a community gardening initiative in the Toryglen neighborhood of Glasgow. The area is located on the south side of the city that has experienced a decline in population since 2000. Toryglen has a higher percentage of older individuals and 51% of the households in the neighborhood are single parent. Rates for unemployment and disability are higher than average in this part of the city (Glasgow Center for Population Health, 2018). Figure 4.1 shows the levels of deprivation in the neighborhoods surrounding the farm headquarters. Urban Roots, formerly called the Toryglen Gardening Club, was founded by residents in an attempt to improve the visual and environmental aspects of the neighborhood. Projects included planting flowers and bulbs as well as organizing community gardens to grow food. In 2009, the club received funding that allowed it to become an official charity, which was renamed Urban Roots (White and Bunn, 2017). In order to understand the background of Urban Roots and its role in Glasgow's urban agriculture community, as well as the effect the organization has on food insecurity, I spoke to Chris Croal, the Information and Communications Officer for the organization.

Today, Urban Roots uses community gardens to focus on health improvement and environmental education. On program goals and outcomes, Croal says:

> *"We [Urban Roots] work in many locations across the south side, mainly focusing on areas of economic deprivation. However, we encourage participants from all walks of life to volunteer in the gardens and take part in the educational opportunities we offer. The main goals of Urban Roots are health improvement and environmental education."*

In addition to the gardens owned and operated by Urban Roots, volunteers from the organization also help manage and operate community gardens owned by others, such as housing associations, churches or community groups. Croal notes:

> *"Some of the community groups we help may face management and maintenance issues related to operating community gardens. Our staff steps in to support these gardens and help members of the organization learn how to care for and maintain their gardens."*

When asked about the levels of involvement from the community, Croal identified Pollokshields and Govan, two south side neighborhoods, as areas where Urban Roots sees more engagement from the community and new volunteers while Toryglen volunteers are generally a core group of people who participate regularly. Volunteer opportunities and community participation is important to Urban Roots because it allows residents and participants to feel ownership of the community gardens. They are a large factor in the success of the gardens and it has a positive impact on the larger community. In addition to the produce they receive from their work, Croal adds that they get a chance to socialize and receive skills training at no cost to themselves. At the time of the interview, Croal estimated that Urban Roots employed ten members of staff and had around 100 regular volunteers.

Gardens in the Urban Roots network generally grow fruits and vegetables such as potatoes and onions as well as herbs. According to Croal:

> *"The produce grown in our gardens is offered to volunteers who come to the work sessions and participants in the education programs. We have tried to sell the produce in the past but the attempts have not been successful. The time involved in picking and packaging does not allow us to do much. The time involved in growing is also a limiting factor."*

The organization has also had problems with vandals. The gardens run by Urban Roots are generally open and accessible. In some instances, this has led to crops being damaged and, in one case, a greenhouse set on fire. Croal admits that vandalism is something that comes with working in a neighborhood setting with little to no fences or security. Further challenges associated with running community gardens includes access to funding and space as well as the soil quality of urban lots. As more urban agriculture initiatives form in the city, competition for funding increases. Due to the uncertainty, the future of programming and employment at Urban Roots can, at times, be difficult to plan for.

These factors also affect how Urban Roots addresses food insecurity in the neighborhoods where they operate. When asked about the levels of food insecurity among the populations that take part in the program, Croal commented:

> *"It can be hard for our staff to determine exact numbers of individuals or families who suffer from long term food insecurity. Considering that we work in areas of economic deprivation, I can say that there are volunteers and participants who struggle with food poverty but there are no official numbers on that. Unfortunately, Urban Roots is unable to grow enough produce to address this problem on a large scale but we do distribute food from the gardens to volunteers."*

In addition to operating community gardens, the charity also provides education opportunities to local residents and schools. These sessions provide participants with life skills that cover a variety of topics which include growing their own produce and cooking classes that promote health and nutrition. Croal says that though Urban Roots is not in a position to address food insecurity in a direct way, education on healthy eating and living can also make a difference. Charities and local organizations can help to a small degree but he believes action will have to come from a higher level in order to make a more substantial impact on food insecurity in Glasgow.

South Seeds

South Seeds began as a volunteer led organization in the late 2000s that focused on increasing food production and the consumption of healthy foods in the Govanhill neighborhood. Govanhill is located on the south side of Glasgow. The area has a large number of homes that are considered overcrowded and one third of the neighborhood is part of an ethnic minority, higher than the city's average.

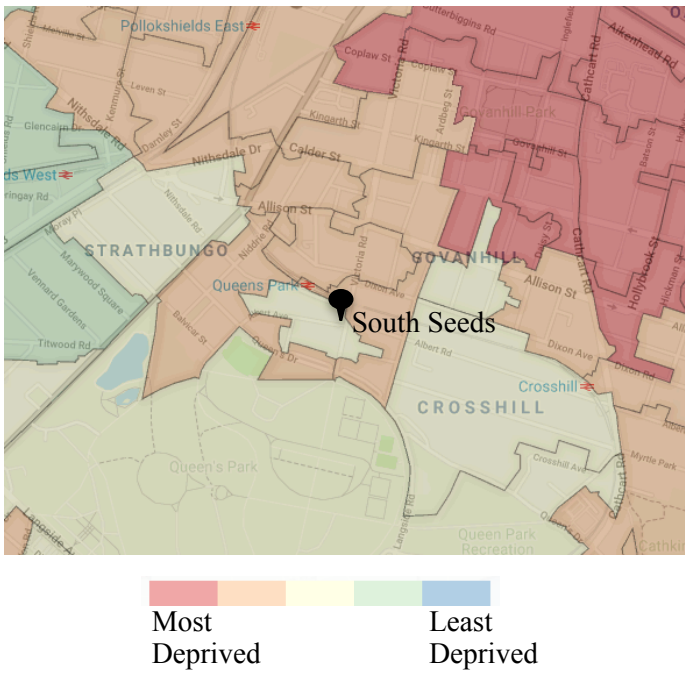

Figure 4.2: Levels of neighborhood deprivation around South Seeds (Source: Scottish Index of Multiple Deprivation, 2018)

25% of the Govanhill population at or above working age is considered income deprived (Statistics, 2014). Levels of neighborhood deprivation for the areas surrounding South Seeds can be seen in Figure 4.2. Since the start, a key goal of South Seeds has been to increase the community's knowledge and access to fresh produce. Like Urban Roots, members of South Seeds wanted to improve the visual and physical aspects of Govanhill,

using community gardening as a starting point (White and Bunn, 2017). In 2011, the organization became an official charity and, in the following years, grew quickly. Lucy Gillie, the general manager of South Seeds, participated in this research and told me about the charity's experiences with urban agriculture.

South Seeds now grows produce in three gardens around Govanhill. Gillie explains how the organization operates:

> *"The Croft [one of the gardens operated by South Seeds] has twenty four raised beds. At the beginning of the season, people apply for a bed, which they will cultivate through the season. At the end of the season, around October, there is a community celebration and the process begins again around April, the beginning of the next growing season. We maintain and nourish the beds over the winter. We also operate a children's garden as well as one more community garden that holds open sessions. The children's garden teaches kids in the neighborhood about the growing process and allows them to get hand on experience in gardening. We grow a lot of potatoes in this garden because the children enjoy digging them up and taking them home at the end of the season. The remaining garden is geared toward groups of participants who want to learn about gardening but may not have been able to take part in The Croft. The produce we grow here is distributed to volunteers who take part in the open sessions."*

Participants choose what they grow on their beds, but the organization provides suggestions based on what is good to grow and what has been successful in the past. All the produce grown in the Adopt a Raised Bed scheme is taken home by the participants. Gillie says the charity receives four times as many applications as there are beds so there is a selection process. She also estimates that around 500 people have participated in the process over the years. Gillie believes that those who participate in South Seed's urban gardening programs have a better image of their neighborhood and the people who live

around them. They are able to make connections to other residents and gain more pride in the area.

The South Seeds office is located on a main road in the neighborhood and target the 30,000 residents who live in the surrounding areas. Gillie says:

> *"The people who live in the neighborhoods around our office on Victoria Road are very diverse. We interact and work with people from all social classes, including those from different income levels, religious beliefs, family structure and cultural background. I think community gardening is a great way for people to come together, learn how to garden and get to know more about how food is grown. It also allows us to bring these different groups together to create more of a community, where people feel comfortable and friendly with their neighbors, whom they might not have the chance to interact with otherwise."*

Urban agriculture is also important in this part of the city because the majority of residents live in victorian flats with very little outdoor space. The organization also runs a program that educates people on energy usage in their homes and how they can reduce their energy bills. There are many people who participate in both the energy saving program as well as the community gardens that suffer from debt and poverty. Unfortunately, people who suffer from poverty and food insecurity can be hard to target. Gillie mentions that their energy services take place in the colder months when people find it hard to imagine working outside. People also have to work around other commitments, such as jobs and family.

Gardening in an urban area can be difficult due to a number of reasons. South Seeds has lost two gardens over the course of their operations because of changing land ownership. Gillie says that some landlords can be helpful in setting up agreements with the group to use the land that is currently not in use. It is also beneficial to the landlord because they do not have to deal with maintenance such as mowing and weeding. However, when the

land changes ownership, the new landlords may not feel the same. Organizations that garden on urban lots can face problems with contaminated soil which is why South Seeds gardens in raised beds. The beds restrict how much produce can be grown because they have limited space but Gillie notes that they are easy to maintain and harvest. Running the charity from day to day can also be a challenge because funding is year to year, which creates a tentative future for South Seeds.

4.2 Detroit Results

Oakland Avenue Farm

Oakland Avenue Farm began with one individual in 1999. Reverend Bertha L Carter noticed a large homeless population in the North End Historic District and began distributing food from the back of her van. The food items generally came from the excess products of meat packing houses and bakeries owned by the grocery store chain, Kroger. The North End was once a thriving neighborhood that was well known for its music scene. Popular acts like James Brown and Etta James held performances there and Motown stars Diana Ross, Aretha Franklin and Smokey Robinson were born there. However, since the downturn in Detroit, the North End has lost population and seen an increase in abandoned lots. Residents that remain struggle to maintain their homes and keep up with the taxes (Mixon, 2017). A deprivation map has

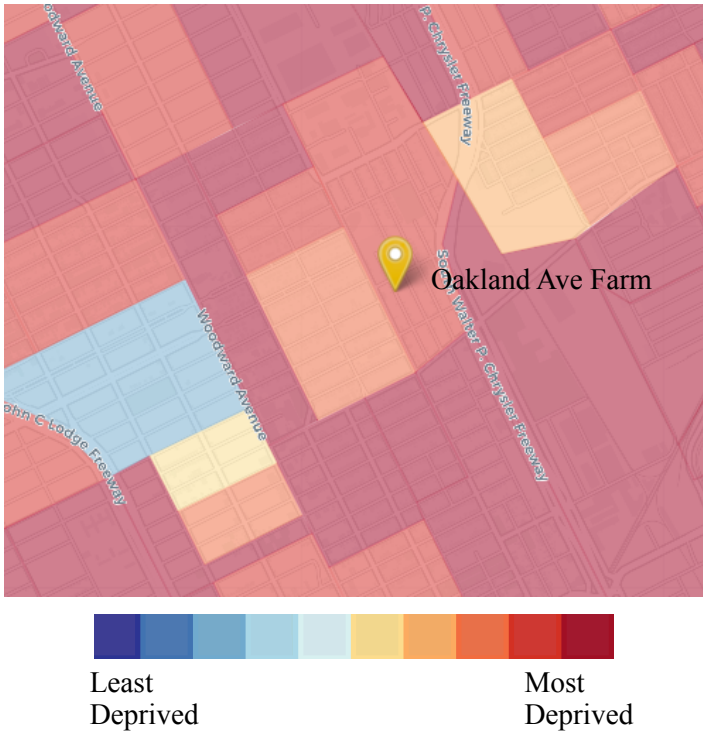

Figure 4.3: Levels of neighborhood deprivation around the Oakland Avenue Urban Farm (Source: Neighborhood Atlas, 2018)

been provided in Figure 4.3 for the neighborhoods around the Oakland Avenue Farm. Reverend Carter sought to address some of these issues and began the St. John's Evangelistic Temple of Truth Church and School of Wisdom which allowed her to provide jobs and begin youth development programs to the community. In 2000, the program evolved into the North End Christian CDC, a non profit organization. Nine years later, the organization partnered with the Greening of Detroit, another community group in the city who focuses on planting trees and providing education about the natural environment, to open the Oakland Avenue Urban Farm. Over the following years, the garden has expanded to a total of six acres of urban agricultural space. Natosha Tallman, the Administrative Assistant and Program Coordinator for the farm spoke with me about the current state of the organization and its goals for the North End neighborhood and the city of Detroit.

On the goals of the organization and it's current operations, Tallman says:

> *"Here at the Oakland Avenue Urban Farm, we seek to cultivate healthy food, sustainable communities and active cultural environments. Our target population is residents of the historic North End neighborhood, though we place a special focus on hard to hire individuals and children. We also operate with the needs of food insecure members of the community in mind. Over the last few years, the North End has been experiencing an influx of higher income households and gentrification. However, the community is still largely filled with long time residents who are seniors on a budget, as well as low income renters. The staff and volunteers here at the farm aim to provide fresh, locally grown produce to these residents at an affordable price."*

In order to accomplish their goals, the urban agriculture initiative has had to purchase more land to increase the amount of produce they could grow. Tallman explains:

> *"We wanted to extend the growing season so we purchased and built greenhouses on the farm. This lets us grow and distribute some form of produce all year."*

In order to finance these projects, the Oakland Avenue Urban Farm receives funding from other community organization such as the W.K Kellogg Foundation and The Kresge Foundation. They have also been the recipient of grants from the United States Department of Agriculture and the Community and Public Art: Detroit and Eastern Market Association. Donations from private citizens and funds from the farmers market also help.

Community involvement has been an important part of the organization since it began. Tallman says that when it first started growing food, the farm allowed the community to decide what forms of produce the organization would grow and distribute. The founders of the farm wanted to grow food that was needed as well as culturally appropriate for the area. The three most popular crops are tomatoes, beans and greens (Garrett, 2017). Other crops include strawberries, blueberries, yellow squash and cucumbers. Tallman says:

> *"The produce grown here is distributed to the community through a community farmers market, also located on the Oakland Avenue Urban Farm. We opened the farmers market in 2011 and money from sales has allowed us to fund other projects and provide employment and job training to those in need. Over the years, the market has expanded to include five stands at Chrysler automotive plants around the city of Detroit. We also sell the produce wholesale to local restaurants."*

Tallman noted that the organization has had issues in the past with sourcing enough water to care for the produce. In response, a water collection system was constructed on one portion of the farm. It was built alongside a community arts space in order to make it educational as well as visually appealing. When asked about finding and purchasing land, Tallman said that because the North End area has a high number of vacant and derelict plots, the organization has not had problems expanding. The community has welcomed the farm and has been very receptive of the initiative.

Tallman credits the success of the farm with the community that has sprung up around it. She says the City of Detroit, while not directly involved, has been very supportive. Members of the community are also invested in the continued prosperity of the urban farm. Though the farm began by addressing food insecurity, it now includes job training and employment resources. Volunteers on the farm can become paid employees, allowing them to gain experience and training that will help with employability later on. In the future, the organization hopes to help members of the community further by providing access to safe, affordable housing. In the meantime, the Oakland Avenue Urban Farm will continue to build a community around healthy food, community pride and culture.

D-Town Farm

D-Town Farm is a community self determination project located in River Rouge Park, a park on the southwest side of the city. River Rouge Park is the largest park in the city of Detroit, making it possible for D-Town farm to expand from a quarter acre to seven acres. It is now considered the largest urban farm in the state of Michigan. The term community self determination refers to the practice of a group of people, often underserved by local governments, come together to improve the livelihood of those in the community and preserve their rights (Thurer, 2008). A map of neighborhood deprivation for the areas around D-Town Farm has been provided in Figure 4.4. In the case of D-Town Farm, the organization also seeks to

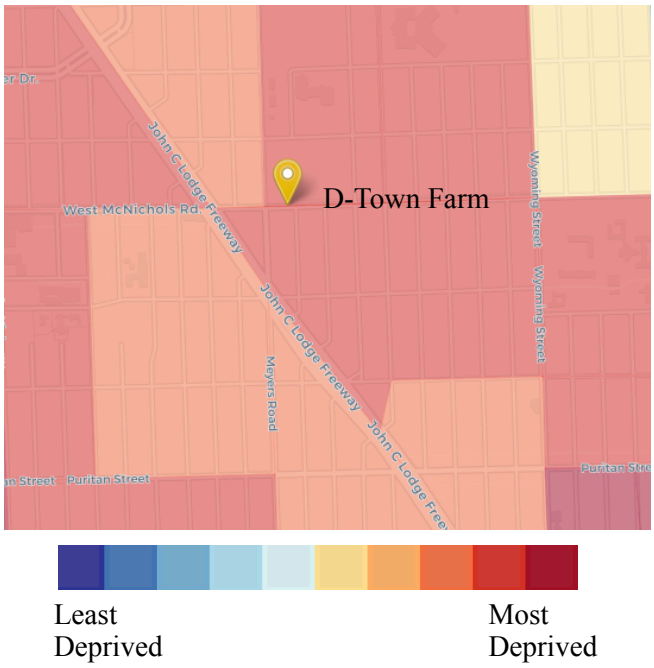

Figure 4.4: Levels of neighborhood deprivation around D-Town Farm (Source: Neighborhood Atlas, 2018)

preserve the cultural and ethnic traditions of Detroit's black community. D-Town Farm was founded in 2006 by Malik Yakini, an activist in Detroit who wanted to address the limited food access residents of Detroit faced. Yakini, and other citizens, formed the Detroit Black Community Food Security Network (DBCFSN) to increase the black community's involvement in the urban agriculture movement. D-Town Farm is the farm project of the non-profit organization. Shakara Tyler, an employee of D-Town Farm and a food systems scholar from Michigan State University, spoke to me about the organization's work with urban agriculture and food justice.

Through D-Town Farm, the DBCFSN seeks to use the land as a community building tool, specifically for black communities in Detroit. Tyler says,

> *"We focus on using the land as an avenue to increased self sufficiency and liberation from the capitalist systems. We believe the farm can bring us back to our cultural lineage and show people that we can provide for ourselves. Here at D-Town Farm, we also work to provide fresh, affordable food to all the low income populations around the city."*

In order to address the goals of the farm, over 30 varieties of produce are grown and distributes, with a special emphasis placed on culturally significant crops like collard greens, okra and watermelon. Tyler mentions that the organization classifies these crops as afro-indigenous crops. D-Town Farm has also organized a committee that provides suggestions and votes on the forms of produce grown on the farm. Produce is sold at multiple markets across the city as well as wholesale to restaurants. The farm also operates a roadside stand every Saturday and Sunday.

The services provided have been well received by residents in the neighborhoods surrounding the farm as well as people from other parts of the city. However, Tyler comments:

"Unfortunately, the levels of community involvement from areas directly surrounding the farm are low and we're currently working to improve that. The farm does welcome volunteers but they generally come from other neighborhoods in Detroit as well as other states. We sometimes even have volunteers from other countries. They come because they want to learn about our work and the things we are trying to do for the black community."

These volunteers split the farm work with the five person farm staff, which the organization has nicknamed the D-Town Farm Hands. When asked about the farm staff's experience with people suffering from food insecurity, Tyler said the organization does notice food insecure families using services and buying produce but, like previous research participants have mentioned, determining exact numbers of those suffering from food insecurity is a challenge. However hard it is to gather exact numbers of those who are food insecure, Tyler can say that there is a lack of grocery stores in Detroit neighborhoods and, therefore, a lack of fresh, healthy food available to purchase. Addressing this issue remains one of the key goals of the organization. Further challenges faced by the organization include access to water as well as land use agreements and land leasing. The farm operates on a portion of leased land in a park owned and operated by the Detroit Recreation Department, who ultimately has control of what happens there. D-Town has been welcomed by the City of Detroit thus far, however the lack of land ownership can be limiting and provides a small amount of uncertainty.

In addition to the proceeds from the many markets where D-Town sells produce, Tyler says the organization also receives funding from various private entities as well as grants and other forms of charitable donations. On the future of D-Town Farm, Tyler says:

"We would like to expand our land in order to increase food production. Expanding would help us a lot because the farm can feed more people and increase our profit from food sales. Then we can decrease our reliance on grants and other forms of third party funding and our staff and volunteers can spend

more time working on the farm. Spending less time applying for grants would also give us more time to increase community involvement from the surrounding areas."

4.3 Analysis

The research interviews completed for this project explored the practices of urban agriculture in both Glasgow and Detroit, as well as the extent to which growing food in the city can have on levels of food insecurity. Though all organizations are involved in urban agriculture in some form, their experiences are unique and each interview provided distinctive information on farming in Glasgow and Detroit. Identifying commonalities among the participant responses, as well as any differences in experience, is valuable in understanding the state of urban agriculture as well as how the organizations can learn from each other. All participants emphasized the importance of community involvement in their organizations. One respondent from Glasgow explained,

"We began on the basis of improving the neighborhood through community engagement and evolved into a community gardening charity so working with the residents in the neighborhood is still a major day to day goal of ours."

This research shows that while urban agriculture organizations focus on growing fresh produce, their efforts have an effect on many different areas of a neighborhood. Volunteers who take part in activities with these organizations feel more connected to their neighbors and develop a pride in their community.

It is interesting to note that while the participants from Glasgow focused mainly on community involvement, participants from Detroit placed a large emphasis on empowering minority populations through food, concentrating largely on the black community. This is an important distinction because it has impacted how urban agriculture initiatives in Detroit evolve and operate. The black community has always been instrumental in the progression of the city. Black culture created the sounds of Motown and black workers acted as the backbone of the city. However, as Detroit has

declined and the wealthier families fled the city, many black families were faced with increasing poverty and the consequences associated with it (Doucet, 2017). Both the Oakland Avenue Urban Farm and D-Town Farm responded that while their target populations included all community groups, they placed a special emphasis on low income individuals in the black community. This distinction is important because it changes how they produce food and what they produce. When asked about how they decide on what forms of produce to grow, both Glasgow respondents replied that they grew what has proven to be successful in the growing environment, such as potatoes and leafy greens. In Detroit however, the urban agriculture organizations also grow foods that are culturally significant to the black community, such as okra and collard greens.

Another key difference between the participants from Glasgow and Detroit concerns how they distribute the produce grown on the farms. The research on Glasgow organizations shows that both Urban Roots and South Seeds have struggled to sell produce or distribute it on a large scale. The produce grown on these farms is generally distributed to volunteers and workers. In Detroit, however, the produce grown on both the Oakland Avenue Urban Farm as well as D-Town Farm is sold both in farmers markets as well as wholesale to places like restaurants. There may be many reasons that make it possible for urban farms in Detroit to sell produce while those in Glasgow struggle to do so. The interviews show that both farms in Detroit are rather large, allowing them to grow more. In comparison, the participating farms in Glasgow were smaller, generally operating on single parcels over multiple neighborhoods. The population of Detroit may also be more open to purchasing fresh, locally grown produce at farmers markets due to the limited availability of other food options in the city.

Food Insecurity

Determining the possible impact urban agriculture can have on food insecurity was a major goal of this research project. Unfortunately, poverty and food insecurity can be sensitive topics to research. Those suffering from a food insecurity may not be

comfortable sharing their circumstances. Some may not even be aware that an inability to purchase or access fresh, healthy food is a problem. In the case of this research, all participants responded that they had interacted with individuals who suffered from food insecurity, but that they were unable to provide exact numbers or even estimates of how many food insecure people took part in the organizations services. One respondent stated,

> *"I can personally say that I have worked with people who would be considered food insecure during my time here. But in many cases, people like this would not necessarily tell us this information. While we try to distribute our produce in a way that reaches people who don't have enough healthy food, we are limited in our efforts."*

Another participant stated:

> *"People who suffer from food insecurity are normally also suffering from poverty. In our case, they can be hard to reach and involve in the farm programming we do because many of our work sessions or educational opportunities are during the day. In my experience, people who are in poverty will not have time to participate due to other obligations like work. As much as we try to help, accessing and learning about fresh produce can be pretty low on the list for many."*

Overall, the research shows that while the participants do believe they interact with people who suffer from food insecurity, the organizations do not focus solely on that because it is difficult to quantify and address. However, it is important to note that while the urban farming initiatives who took part in this project may not be able to make a direct impact on those who lack food security, they can make an indirect impact in the form of education and volunteering.

The educational aspect of community gardens and urban farms is an important factor in addressing food insecurity, though its effects may be harder to determine than those that occur from directly distributing food to consumers. As mentioned previously in the

research, some urban farms find it difficult to sell or otherwise dispense the produce they grow on a large scale. However, the education opportunities these organizations provide allows participants to gain knowledge and life skills they can utilize in their home lives and into the future. For example, Urban Roots holds classes where people from the community can learn how to cook and prepare a healthy meal using the fresh produce grown in the organization's gardens. All the organizations who participated in this research also welcome volunteers from the surrounding neighborhoods to take part in the growing and harvesting of produce. Opportunities such as these allow those who are suffering from food insecurity, as well as others, to learn about the process of growing fresh produce and how to prepare it for consumption. The knowledge gained in these education sessions can be utilized by individuals and families to make a difference in the way they eat and think about food. The possibility of creating healthier lifestyles for those who live in these communities should not be ignored but rather emphasized and expanded in all urban agriculture projects.

Overall, the research showed that urban agriculture is more established in Detroit than Glasgow. This may be due to a number of factors, one of which may be the large amounts of vacant land in and around the city. In 2012, it was estimated that at least 20 square miles of the city's total 139 square miles was considered vacant land. This number was expected to increase to 40 square miles over the coming years (Nolan, 2017). In comparison, the Scottish Vacant and Derelict Land Survey of 2017 found that the city of Glasgow had 449 hectares of vacant land, about 1.7 square miles (Scottish Government, 2017). After declaring bankruptcy, the city of Detroit placed many vacant and derelict lots up for auction, allowing citizens and businesses to buy them for an affordable price. Urban farming became a popular way to utilize the land available while also helping the people who live in the community.

During an interview with Shakara Tyler, from D-Town Farm, she commented:

> *"Urban agriculture in Detroit is a pretty involved system. There are farms that are strictly for profit, there are those of us that consider ourselves charities and there are others that are run on a private basis - by single families or even a small group of neighbors. Another way to separate them is to look at those who focus on social justice, like D-Town and those who focus on other goals."*

Another factor that has allowed the success of urban agriculture initiatives in Detroit is the fact that alternative food sources and access to affordable produce is a needed service in much of the city and the surrounding areas. Detroit is located in Wayne County, the most food insecure county in the state of Michigan. It is estimated that at least 35% of households within the county live below the poverty line (Pfleger, 2018). As such, residents are welcoming of community gardens and other urban farming organizations because it increases their access to fresh, healthy food in a convenient way.

Detroit has become a leading example in both the United States as well as around the world for urban agriculture and growing in the city. Though improvements could be made, the system of food production is well established and well known. Glasgow does not have as much vacant land available, however, the city could learn much from urban farms in Detroit. Increased support from the city government as well as a formalized network that brings the farms together could improve communication and possibly allow for more sales and distribution of produce around the city.

5. Conclusion

The purpose of this study was to determine the extent to which urban agriculture practices could affect the numbers of food insecure individuals and families in the post-industrial cities of Glasgow and Detroit. In order to do this, the research took the form of case studies using established urban agriculture organizations in each city. In Chapter 1, Glasgow and Detroit were introduced and a background on modern cities and their challenges was provided. The central research question was also posed in this chapter. Chapter 2 provided a review of the literature on post-industrial cities, food insecurity and urban agriculture. In Chapter 3, the research methods were described, including the design of the project and a sample interview questions posed to those who took part in the research. In the following section, Chapter 4, the results of the research were described and a detailed analysis was completed. Finally, Chapter 5 presents conclusions on the main research question as well as recommendations for urban agriculture organizations and further research on the topic.

The findings of this research analyzed the processes of urban farming in both Glasgow and Detroit and tried to determine if these practices could be used to reduce or eliminate food insecurity. The literature review showed that as Glasgow and Detroit declined and lost manufacturing, their populations declined and rates of poverty increased. Food security, and the lack of it in populations who suffer from poverty, is an associated challenge. The literature review defined food security as all people having access to safe, nutritious food that meets their dietary needs. After expanding on the possible impacts food insecurity can have on individuals and society, the review moved into urban agriculture. The review showed that urban agriculture can take many forms and is growing in popularity in developed countries. However, there has not been much research completed on the possible impact urban agriculture practices can have on food insecurity.

The research was completed with established urban agriculture organizations in each city. The findings found that though the organizations were spread out between the two cities as well as within both Glasgow and Detroit, they had the common goal of bringing their community together around growing produce. Some focused more on feeding low-income groups than others, but all participants mentioned that this was an important factor of the initiative. It was clear, through analyzing the interviews, that urban agriculture can have wide ranging social benefits for they neighborhoods and cities they are located in. Many respondents emphasized the fact that their organizations work with people from all social backgrounds and commented that growing produce on a community basis has been welcomed in their communities. The results also showed that urban agriculture as a tool to help low-income groups is more established in Detroit than Glasgow, for a number of reasons. However, though the Glasgow organizations have struggled to sell and distribute the produce they grow on a large scale, they still have an effect on food insecurity and poverty. The findings prove this can be done through community involvement and education opportunities. Overall, the research shows that urban agriculture can have a positive effect on food insecurity, though that effect may be small or difficult to quantify. Both Detroit and Glasgow have space available for urban farming, though increased support from the government would help with the success in both cities. The local government in Detroit has been supportive of urban agriculture but it could increase this support by making it easier for urban agriculture organizations to purchase land. It could also make zoning changes to allow for extended agriculture production around the city. The government in the city of Glasgow could also make some changes in order to support urban agriculture. One such measure would be establishing a council or group that includes representatives from urban agriculture organizations around the city. For example, Detroit has established the Detroit Food Policy Council which discusses food policy in the city and brings people in the profession together to address challenges. They also gather data and publish reports on everything from food poverty to community information. Officials in Glasgow could also make it easier for urban agriculture organizations to purchase or lease land to operate on and create more

public investment opportunities in order to encourage a sense of ownership from community members. The research has shown that when people feel invested in their community gardens, such as the community around the Oakland Avenue Urban Farm, the organization is more likely to succeed. Overall, the findings of the research support the facts in the literature review. Urban agriculture organizations are generally successful because they fill a niche need in cities, that of outdoor space and community involvement opportunities. They can be used to feed the residents of the city, however, this can be a struggle to do on a large scale. In the future, with the recommended changes and improved public awareness, urban agriculture may be a viable tool to addressing food insecurity to a larger extent. The Detroit participants, Oakland Avenue Urban Farm and D-Town Farm, are already experimenting with large scale distribution and Glasgow could be following.

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