

Building Livelihood and Food Security through Social Enterprise: A Case Study of Garden Hill First Nation Community in Manitoba, Canada

By

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Abstract

This thesis investigates the opportunities and strategies for achieving food security in First Nations in Northern Manitoba, based on a case study in Garden Hill First Nation (GHFN). Working together with Meechim Inc., a local food social food enterprise established in GHFN, these opportunities were investigated through interviews, household surveys, a field trial, and document reviews.

Two livelihood assets, social and natural assets, were found to dominate in GHFN with a need to improve financial, physical, and human assets. Meechim Farm Social enterprise with GHFN Employment and Training program tried to address these issues. For instance, the skill and education of farm workers were greatly increased, and some basic infrastructure was put in place for farming in the first year but experienced low yields due to poor soil fertility. Research on soil capacity in GHFN showed fish guts could amend this poor soil to fertile soil, to provide good yields.

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Glossary

Band is a community of First Nations people for whom land has been reserved by the Crown (Aboriginal Affairs and Northern Development Canada [AANDC], 2012.

Band council member is a member of the governing or administrative body of a band

Reserves are villages or settlements whose legal title lies with the Crown, but set aside for the benefit of a group of First Nations peoples. Most First Nations reserves in Canada are remote. (AANDC, 2012)

Sharing circles are face-to-face round table discussions facilitated by a researcher. These discussions are usually informal and are centered on finding solutions to a problem.

Chapter 1

Introduction

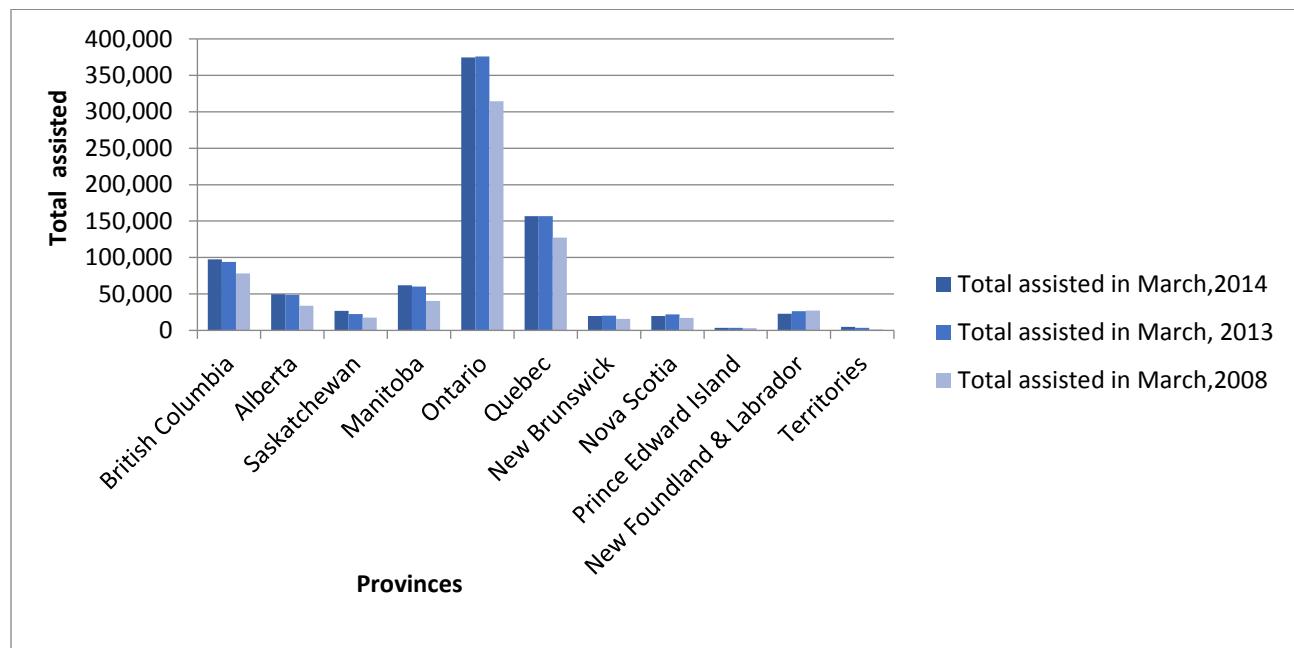
1.1 Background

In a finite world, in which human population growth rates exceed the rate of food production growth rates, the conundrum is how to have enough food for all in a sustainable way. Results of a recent study conducted by the Food and Agricultural Organization (FAO) showed that 842 million people around the world could not meet their nutritional needs from the year 2011 to 2013, as well as 868 million from 2010 through to 2012 (FAO, IFAD, & WFP, 2013), which is expected to get worse with growing populations. Clearly, food security is breached. Food security is defined as: "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 1996, p.1).

While food insecurity is more common in poor countries, conditions of hunger and limited access to healthy food still persists in wealthy countries (Patel et al., 2014). In Canada, food insecurity was recognized as a problem in the early 1980's when community-led programs began responding to hunger needs of people within various communities (Tarasuk, 2005).

These programs eventually became known as food banks, increased through the 1990s, and today constitute the major response to the problems of food insecurity in Canada (Tarasuk, 2005). Over the years, the number of people who depend on food banks has soared in numbers (Fig 1.1), presenting a real concern to provinces in the country.

Figure1. 1: Food bank use in Canada



Data source: Food Banks Canada, 2014

In fact, four million people in Canada have inadequate access to food, simply because they do not have the resources to meet their food needs (Food Banks Canada, 2014). This is especially true for First Nations' communities who struggle to meet their food needs. For instance, the 2004 Canadian Community Health Survey showed that 33% of Aboriginal households off reserve were food insecure, compared to 9% of non-aboriginal households in Canada (Health Canada, 2007).

Recent studies also show that First Nations' communities in Northern Manitoba lack economic and physical access to healthy foods (Thompson et al., 2012). The inadequate access to healthy and nutritious food has caused severe psychological and physical issues in the communities (Tonn, 2011). The lack of control in community development in rural communities in Northern Manitoba further weakens livelihoods, causing high levels of food insecurity (Thompson et al., 2012). Problems linked with food access in remote communities in Manitoba include: high transportation costs, difficulty in travelling on ice-winter roads, high poverty rates, and high costs of foods at the Northern Stores (Northern Food Prices Project Steering Committee, 2003).

Moreover, the inadequate access to safe and nutritious foods in these communities has led to cases of diabetes and many other health related problems (Thompson et al., 2010). In fact, type 2 diabetes among First Nations' populations is four to five times higher than the rest of Canada (Government of Manitoba, 2003). However, food security in these regions may not be a top priority for governments or non-governmental organisations (Patel et al., 2014). Thus, creative solutions are needed to combat rising demands on food resources. One way to do this is through the use of social enterprise and entrepreneurship (Popierlarski & Cotugna, 2010). According to the Social Enterprise Council of Canada (n.d),

Social enterprises are businesses owned by non-profit organizations, that are directly involved in the production and/or selling of goods and services for the blended purpose of generating income and achieving social, cultural, and/or environmental aims. Social enterprises are one more tool for non-profits to use to meet their mission and contribute to healthy communities (para. 2).

Thus, social enterprises seek to add to social and economic development through the goods and services they provide, to help improve quality of life (McElnea, 2005). In Northern Manitoba, a local food social food enterprise called “Meechim Inc.” has been established in the GHFN (GHFN) community to help curb food insecurity problems in the community. The aim of this place-based local food social enterprise is to boost food production through the creation of a community gardening program, commercial poultry farm, community kitchen, among others. In particular, community gardens are becoming more common, and produce more than just food (Draper & Freedman, 2010) because they are not just places for food production, but where people come together to learn, share, interact and connect to their social and ecological communities (Moquin, 2014). If established for the purposes of enhancing food or health security, community gardens are effective tools for community members to effect change and build pathways to economic development (Draper & Freedman, 2010). The focus of this research was to engage in participatory research with “Meechim” as a way of creating sustainable food systems in GHFN.

1.2 Purpose and Objectives

The purpose of this study was to explore ways to achieve food security in GHFN community though social enterprise.

The study had the following objectives:

1. To explore strategies by which Meechim Inc. can boost the local food economy.

2. To develop best practices to establishing a viable commercial garden with community members.
3. To understand the role of traditional and ancestral sustenance activities and commercial activities in sustainable food production.

1.3 Research Contributions

There has been a steady increase in rates of food insecurity in Northern First Nations' communities in Manitoba, despite government initiatives and interventions to curb the situation. A 2012 survey revealed that three quarters (75%) of households experience food insecurity, leaving the other quarter food secure (Thompson et al., 2012). The stated goal of Meechim Inc. according to Aki Energy (2015) is: "To locally produce and sell healthy, affordable food in the community through Meechim Inc., a local food social enterprise". Through the establishment of a viable vegetable and commercial poultry farm, the research measures the gap between supply and demand of nutritious and healthy foods in GHFN. My thesis considers how local based farm enterprises and a commercial kitchen help to improve the socio-cultural, natural, physical, and capital assets of the community.

This research hopes to inform GHFN and Meechim about their program impact in restoring a sustainable local food economy that is self-reliant and providing employment opportunities for community members. Furthermore, this study sought to engage community members in exploring application of all available resources in maximizing local food production, which also includes seeking sources for local and traditional foods. Cornwall and Jewkes (1995) explained that engaging local people in the process of planning and researching helps to

minimize cost and ensures effectiveness in the long term. Ultimately, this will help members of the GHFN seek out solutions in line with their needs. This study aims to contribute to expanding the knowledge base of solutions in fighting First Nations' food insecurity. The findings from this study will, as well, help to develop a better understanding of the role that social enterprise driven initiatives can play in community economic development, while laying a possible foundation for greater projects.

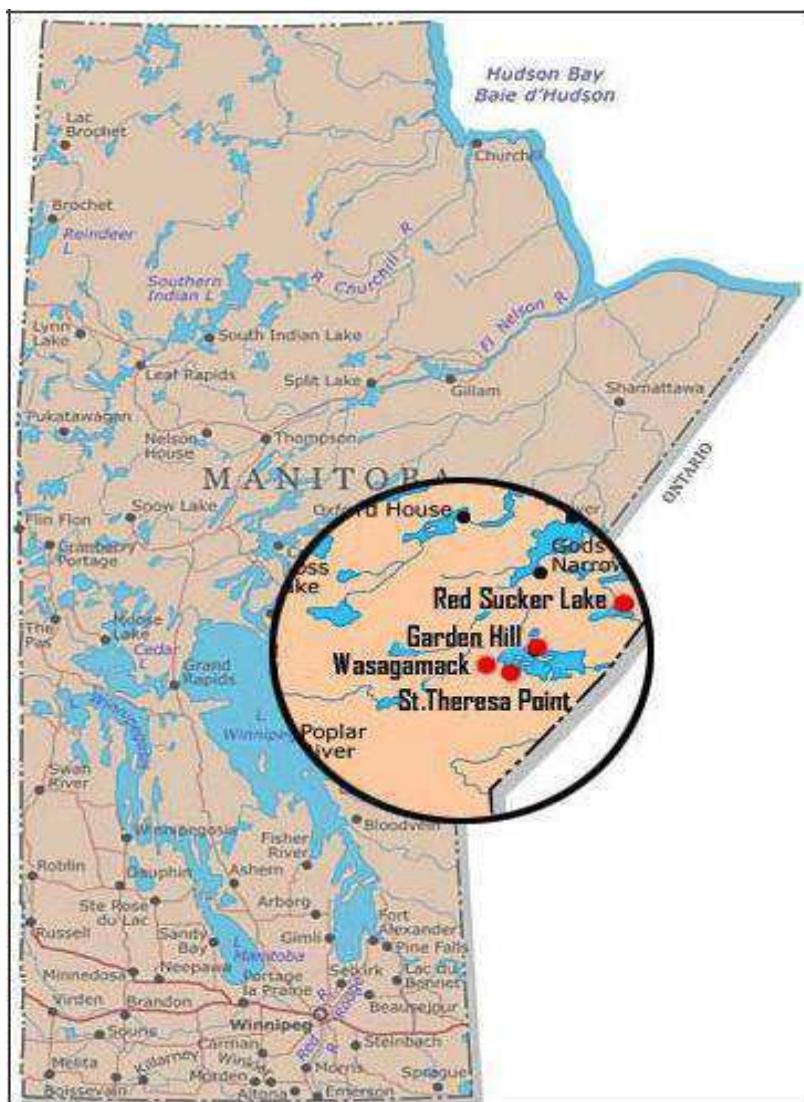
1.4 Study Area

The field study for this research was conducted in GHFN's community in Northern Manitoba, Canada. It is only accessible by winter ice roads, boats, and by plane in the summer. GHFN (GHFN) has a population size of about 2,776 (Statistics Canada, 2012), and its surrounding communities include St. Theresa, Wasagamack and Red Sucker Lake. The major means of transportation are cars, snowmobiles, vans, and trucks (Statistics Canada, 2007).

The community takes its drinking water from Island Lake, which is then chlorinated by a nearby treatment plant, and distributed through a standard pipe system (Government of Manitoba, 2005). Commercial fishing and trapping forms the economic base of this community (Government of Manitoba, 2005). Health care is provided by the Garden Hill nursing station. Only 24.1% (≥ 15 years old) of its labour force are gainfully employed, and only 18.7% of adults have completed secondary school (Statistics Canada, 2007).

As shown in figure 1.2, the remoteness of GHFN affects the prices of healthy foods, most especially due to continued increases in shipping costs (Zahariuk, 2013). Members of this community are impoverished, and are severely food insecure (Zahariuk, 2013).

Figure1. 2: Map showing Location of Garden Hill First Nation



Source: Four Arrows Regional Health Authority

1.5 Organisation of Thesis

The thesis is organized into seven chapters. Following the introduction, chapter two examines literature on food insecurity issues in Canada, community economic development, community gardening, social enterprises, and community gardening. Chapter three further outlines the research design and methods, data collection techniques, and process of data analysis. The fourth chapter details results related to opportunities and strategies developed to help boost the local food economy, while chapter five outlines my findings related to best practices to spurring local food production. Chapter six include the role of traditional food in sustainable food production. Finally, chapter seven outlines concluding remarks and recommendations.

Chapter 2

Literature Review

This chapter details issues discussed in several literatures including: community economic development, role of social enterprises in community economic development, food governance, food insecurity, and community gardening as a strategy to alleviate food insecurity.

2.1 Community Economic Development in Canada

Community economic development (CED) can be described as a process by which members of the community can proffer sustainable creative solutions to their economic problems, that can foster long term community economic growth (Hernandez, 2013). In the United Kingdom, CED is often referred to as social enterprise activities, while in other areas of the world, CED is seen as a carefully designed and more developed plan (Leach, 2013). Community economic development (CED) requires that representatives of the community are involved in building selected areas of the community's economy (Douglas, 1994). For CED, communities must identify, address and come up with solutions for themselves, which they perceive to be important to their social and economic well-being and that of the community (Douglas, 1994). Community economic development (CED) is a community based intervention program that seeks to change the type and location of economic activities, while building a framework that supports the production of goods and services in a community (Douglas, 1994).

Community economic development (CED) started in Canada, United Kingdom, and the United States largely as a movement to counteract inefficient neoliberal capitalism (Hernandez, 2013). The start of CED was in response to international and national economic activities pressure on local areas and their economic future to try to better control external economic forces

(Hernandez, 2013). The CED movement is largely a proactive response by social justice activists, environmentalists, and voluntary organisations to promote environmental sustainability and greater social equity (Hernandez, 2013). The last 25 years have seen non-profit, voluntary organisations become a strong feature in CED efforts across Canada (Douglas, 1994). These voluntary groups are established to help solve problems affecting the local economy, and in Canada they are generally referred to as community economic development organisations (Douglas, 1994).

According to Hernandez (2013), approach to CED requires four main characteristics. First, CED should be place-based: economic and social activities should be concerned in solving needs, which characterizes a particular geographical location. To build local economy and local resilience, CED requires using traditional knowledge and resources. Second, CED is participatory in nature: this is enshrined in the belief that people have the right to participate in decisions or activities that affect them, and so it is important to develop goals by engaging communities in the decision process. Third, CED should be sustainable: This relates to what is being produced, and how it is being produced? And so, sustainability in the context of CED is simply establishing economic activities that sustain the long-term viability the community. And lastly, CED recognizes existing assets: This focuses on assets and the strengths of a community, upon which plans can be built on. The future of local or rural communities in Canada has been the concern of many basic and applied researchers over the decade, and the discourse has been centred on how to build sustainable rural economies (Bessant, 2005). Many community-based organisations have been created in response to the unique problems and conditions touching rural livelihoods (Bessant, 2005), but few of these exist in First Nations.

2.1.1 Role of Social Enterprises in Community Economic Development

Social enterprises have been recognized as a critical component of community economic development (CED), especially when its services to communities are considered (Department of Trade and Industry, 2002). As stated in the first chapter: "Social enterprises are businesses owned by non-profit organizations, that are directly involved in the production and/or selling of goods and services for the blended purpose of generating income and achieving social, cultural, and/or environmental aims" (Social Enterprise Council of Canada, 2014, n.d, para.2). These are businesses with a social justice objective that are used to alleviate or ease conditions of the impoverished in the society (Henderson, 2014).

Social enterprises could also take the form of community enterprises, big organisations operating nationally or internationally, and collective organisations such as co-operatives (Department of Trade and Industry, 2002). They are a blend of the voluntary and private sectors, and often times get support from the public sector (Henderson, 2014). A social enterprise is primarily a business established by a non-profit organisation with two main objectives: 1) to confront and meet a social need in a community, and 2) to help the business generate substantial earnings in the marketplace (Henderson, 2014).

Community based social enterprises explore ways through which money and benefits from economic activities goes back directly to the community (Department of Trade and Industry, 2002). This is of great value especially when the social enterprises are based in poor communities (Department of Trade and Industry, 2002). Studies on community social enterprise developments are disorganized, even when aspects (e.g. high levels of community participation,

close social networks) of the community show the potential for creation of a social enterprise (Anderson and Jack, 2002). However, a case study by O'Shaughnessy, Casey, and Enright (2011) showed that rural social enterprise contend with social and access issues related to isolation.

The province of Manitoba in Canada is home to numerous social enterprises (Henderson, 2014). Manitoba's social economy has been integrated into its cultural and economic fabric, so that there is some local financing and public support for social enterprises (Henderson, 2014). A case example is Assiniboine Credit Union (ACU), a community economic driven union that has over a 100,000 members, and provides support and funding to local social enterprises (ACU, n.d) but there are no credit unions with branches in any First Nation communities in Manitoba. To effectively capture the role a social enterprise plays in CED, I will use Neechi Foods Co-op Ltd, a social enterprise based in Manitoba, as an example. Neechi's guiding principles (referred to as Neechi principles) what sums up CED, they are:

1. The use of locally produced goods and services;
2. Production of goods and services for local use;
3. Local re-investment of profits;
4. Long-term employment of local residents;
5. Local skill development;
6. Local decision-making;
7. Promotion of public health;
8. Improvement of the physical environment;
9. Promotion of neighbourhood stability;

10. Promotion of human dignity; and
11. To support organizations adhering to these principles

(The Canadian CED Network, n.d, para 3)

2.2 Food Governance: A Shift from Global Food Systems to Local Food Systems

The modern global food system is defined by large-scale integration of agricultural products and markets (Campbell, 2008). This sort of characterization has led to high dependency on imported foods, and re-orientation in local agricultural activities (Abate, 2008). In spite of the presence of international organisations such as the FAO, Codex Alimentarius, and World Trade Organisation (WTO) to fight world hunger, there is still no formal regulatory organisation that governs the production and consumption of food (Busch, 2010). Rather, what exists is a food network that is governed by many different public and private players, including those tasked with assessing food quality, food productivity, nutritional value, and packaging (Busch, 2010).

Further, this food network is governed by a series of different standards, regulations, and laws between countries (Sarris and Morrison, 2009), that inhibits innovations needed to achieve global food security (Busch, 2010). The major players in this agro-food system are mostly multi-national food processing and retail capital and political advocates of free trade (Winter, 2002). Research shows that the increase in this type of food governance has serious negative impacts on two fundamental aspects of global food governance: environmental sustainability and food security (Fuchs & Kalfagianni, 2010). Evidently, every phase of the human food supply chain -- from food production to food sale -- leaves negative footprints on the environment and fosters food insecurity, through the establishment of private standards and initiatives (Fuchs & Kalfagianni, 2010).

In developing countries, this has been exacerbated by underinvestment in agriculture by government and international donor agencies (Cohen & Clapp, 2009). For instance, official development assistance (ODA) funds for agriculture declined from 18 percent in 1979 to 3.5 percent in 2004 (World Bank, 2007). In fact, the World Bank's agricultural loans declined from 30 percent in 1980 to 3 percent in 2007 in developing countries (World Bank, 2007). This is in sharp contrast to industrialized countries that spend \$300 billion each year on agricultural subsidies for their agricultural production and trade (Cohen & Clapp, 2009). This intensification of agriculture by industrialized countries has upped the push towards a more globalized food system, fuelled by agreements such as the North American Free Trade Agreement (NAFTA) and the General Agreements on Tariffs and Trade (GATT) (LaTrobe & Acott, 2000).

These have enabled private actors create a strong presence in the food system by creating their own standards and initiatives (i.e., competition policy, food safety, etc.,) in input sales, marketing, and food retailing (Cohen & Clapp, 2009). This development in global food governance is largely a function of the structural influence of agri-food corporations and perceived rights of retail food corporations as political actors, which gives them the right to govern (Fuchs & Kalfagianni, 2010). In other words, the more sophisticated and globalized the food system becomes, the more susceptible it is to risks, contestation, and crisis (Mardsen et al., 2009).

In response to this, the local food concept was developed to alleviate the economic, environmental, and social concerns of global food governance (Abate, 2008). This concept is

based on the creation of sustainable food systems in small geographical areas, where there is a close relationship between producers and consumers (Abate, 2008). Such a system allows for rural food governance, which is focused on creating strategies and action for the re-localisation of food, and advocating for different food production and consumption networks (Little et al., 2012). And, there is a growing shift towards this system of food production, especially among rural geographers who have developed a growing interest in the re-emergence of market control or territoriality in agro-food markets, and respacing of rural development (Winter, 2006).

The expansion of this complex and global-centered food chain was the point at which alternative discourse around local food systems (LFS) emerged, and forms the basis upon which efforts at LFS have been directed (Feagan, 2007). The term "local food system" is used to describe a method of food production and distribution that is geographically localized rather than national/international" (Grace Communication Foundation, n.d, para 2)

Table 2: 1: Characteristics of global and local food systems

| Global food systems | Local food systems |
|--------------------------------------|--|
| Corporate profits | Community well being |
| Technocratic rules | Democratic participation |
| Economics of price | An economic sociology of equality |
| Monoculture | Bio-diversity |
| Commodities across space | Communities in space |
| Large scale production | Small scale production |
| Big structures | Voluntary actors |
| Intensification | Extensification |
| Relations across distance | Relations of proximity |
| Industrial models | Natural models |
| Market economy | Moral economy |
| Resource consumption and degradation | Resource protection and regeneration |
| TNC's dominating | Independent artisan producers prevailing |
| Homogenization of food | Regional palates |

Sources: Hinriches et al., 1998 and Lang, 1999, as cited in Hinrichs, 2003.

Given this, shorter food chains, including where you buy from the producer, have been directly linked to food localization (Feagan, 2007), Renting, Mardsen, and Banks (2003) point out, this reduction in the length of the food system chain can positively improve economic and social viability of regions. Direct agricultural markets, which are premised on face-to-face interaction

between producer and consumer, often are the basis for local food systems (Hinrichs, 2000). This is in contrast with industrialized, large-scale system of food production and marketing under the increasing control of powerful transnational corporations (Hinrichs, 2000). Therefore, in contrast to the interactions between producers and consumers involved in the global food system are anonymous and distant, local food systems are connected and in near-by places (Lyson & Green, 1999).

Local food systems take the form of farmers' market, community supported agriculture (CSA), vegetable box schemes, and cooperative distribution and delivery programs, and these are becoming more prominent in several industrialized nations (Festing, 1998; Groh & McFadden, 1997). Although the term "local" connotes geographic distance, there is no general agreement on the distance between producers and consumers (Waltz, 2011). Definitions on geographic distance between producers and consumers are different depending on regions, companies, consumers, and local food markets (Waltz, 2011).

2.2.1 Local Food Systems in United States

Food and place are connected in diverse ways and central to our life world (Kloppenburg et al., 1996), and just as Feagan (2007) opined, "Good food doesn't like to travel" (p. 23). Therefore, growing interests in LFS has been the force behind sustainable agriculture, taking into consideration its connection between local, direct agricultural markets and organic and low input farming (Hinrichs, 2000). Historical trends towards urban environments have 1 percent of Americans living on farms in the year 2000, compared to nearly 40 percent that lived on farms in

the early 1900s, when foods bought and consumed were grown locally (Pirog, 2009). In the past, knowledge of the type and quality of foods were gained as a result of direct contact with farmers (Martinez, 2010). The US food system, however, witnessed a shift from local to national and global food sources after World War II, which was spurred by improvements in refrigerated trucking and lower transportation costs and connected to the growth of the suburbs (Martinez, 2010). This led to significant growth of the US food market, perpetuated by large imports and exports of food products (Martinez, 2010). But recent developments in the mainstream food system have shown growth in LFS or relocalization of food system (Martinez, 2010), evidenced by demand for locally produced foods (Keeling-Bond et al., 2009). A 2006 national survey showed that a growing number of consumers buy foods directly from farmers through one of following: farmers market, community shared agriculture, or directly from the farmers (Zepeda and Li, 2006).

These growing interests can be attributed to several movements, including environmental groups advocating for geographic consideration when making food choices and food security groups seeking to enhance the access to safe, healthy and nutritious food for all consumers (Guptill and Wilkins, 2002). And the recent defeat of the Multilateral Agreement on Investment (MAI) spearheaded by these movements, have begun a new wave of aggression towards these institutions of corporate globalizations, such as the World Bank, International Monetary Fund, and the World Trade Organisation (Blaikie, 2000).

This aggression was exemplified recently in Seattle by a diverse group of protesters, clamouring for a world where decisions for each state/country are in the best interests of the

environment, cultural diversity, and food safety, and are not circumvented by policies of global organisations (Blaikie, 2000). Further, challenges in the global food systems, brought on by the dominance of large corporations, have contributed to efforts to expand demand for local food (Martinez et al., 2010). Such is the case in Iowa often regarded as the “agricultural state” in the US. Early settlers in Iowa were intrigued by the richness of soil in this area and suitability of the climate to agriculture, hence its apparently limitless potential for agriculture (Hinrichs, 2003). Today, it is the most agriculturally-developed state in the US due to its land transformation service to agriculture (Hinrichs, 2003). This agricultural intensification was facilitated by scientific improvement and mechanization, leading to the industrialization of farming, and solidifying Iowa’s position in the “export-oriented grain livestock meat complex” (Hinrichs, 2003, p. 38). This underpinned a widespread ideology within Iowa to feed the world, even though a whole range of food stuff was also being imported (Hinrichs, 2003).

This change in Iowa’s agriculture greatly contributed to demographic and social challenges in the state (Iowa State University, 2015), and underlies the increasing conflict in Iowa over impacts of industrialization of its meat industry on the environment and economy (Thu & Durrenberger, 1998). Due to these problems, the mid 1980s saw the emergence of Iowan Agriculture and Food Movements, such as the "Practical Farmers of Iowa," which was formed in the 1980s, and has helped shaped the trajectory of food system localisation through their themed ideology, “A Practical Agriculture for Iowa” (Hinrichs, 2003). Just like anywhere else in the world, food system localisation in Iowa started with direct marketing (LaTrobe & Acott, 2000),

as a way to combat the economic problems of commodity agriculture during the 1980's farm crisis (Hinrichs, 2003). Thus, we have seen a rise in the growth of farmers' market in Iowa, from 50 to 60 markets in the 1980s to around 120 in the mid-1990s (Hinrichs, 2003). While this growth has not been without challenges, particularly through contradictory politics of food system localisation, there is hope for a sustainable food future just as a prominent Iowan newspaper rightly enunciated:

Perhaps the most exciting trend in Iowa's food system is the growing local food movement. Five years ago, you would have been hard-pressed to find "Iowa grown" food on a menu or in a store. But that is changing. The proliferation of farmers' markets, the producers diversifying what they raise and how they sell it are indicators of the change. Menus featuring Iowa-grown food and institutions promoting "all Iowa" meals are important signs of this trend. We are slowly, but steadily changing the food culture of Iowa (Hamilton, 2001, p. 9).

2.2.2 Local Food Systems in Canada

Another example of efforts at promoting LFS is in Waterloo, Ontario, Canada, where revisions to the Regional Office Plan (ROP) now includes specific land use policies regarding food production (Desjardins, Lubczynski, & Xuereb, 2011). This redirection in policies was premised on the notion that land use planning is vital in the redirection of food systems that leads to improved health, small to mid-size farm viability, environmental sustainability, and community engagement (Desjardins et al., 2011). The population of Waterloo is nearly 500,000 (Desjardins, MacRae, & Shumilas, 2010) and is expected to double over the next twenty years, increasing the demand for food (Region of Waterloo Planning Department, 2005).

Hence, the economic viability of agriculture became an important criterion for safeguarding these lands (Desjardins et al, 2010). The increase in industrial activities led to a realization for the need for policy changes that incorporates food related issues, and this in turn is increasing public awareness and involvement in initiatives, especially among urban planners, that aim to strategically revitalize local food chains (Desjardins et al., 2011).

A brief look at the region's foods system shows that it is heavily vested in global trade: for instance, most of its beef production goes into processing plants, which is converted into frozen burger patties for export. Also, a sizeable portion of its fresh meat is imported from Alberta and New Zealand (Cummings, H., et al, 2005). This type of food system, together with continued increase in population, not only consumes potential farmland, but also contributes to greenhouse gas emissions and air pollution (Desjardins et al., 2011). In addition to established environmental concerns in the Waterloo region, Statistics Canada (2004) concluded that community members have insufficient access to healthy foods. The statistics indicated that in the year 2003, over half (58%) of its citizens were eating inadequate portions of vegetables and half of its residents were overweight. Unhealthy foods became more affordable and convenient, as direct markets were inaccessible and farmers had little or no opportunities to sell their produce and local foods both in the City and Country (Region of Waterloo Public Health, 2013). Thus, in combating these issues, it was reasonable to adopt a food systems approach, which would help improve dietary needs of residents, access to local foods, and rural prosperity and viability (Buzby, 2006; CDC, 2009; Hawkes, 2007).

These land use policies were adopted as a strategy for regional planning towards increasing agricultural capacity to supply produce, grains, and legumes, as well as to boost the local food economy (Desjardins et al, 2010). Efforts towards achieving sustainable food production in the Waterloo region are currently being established, but will require adequate regional infrastructure and human resources (Desjardins et al, 2010). And, as shown in Table 2.2, local agriculture has the potential to meet current and future challenges facing the region.

Table 2: Potential of local agriculture in Waterloo Region

| Category | Foods | Current production: Percentage of yearly Consumption sourced locally | Projected estimate of percentage that could be sourced locally |
|--|---|---|---|
| Seasonal, with limited processing potential. | Lettuce, melon, bok choy, asparagus, sweet peppers. | Less than 5% | 10% |
| Seasonal, with processing potential | Strawberries, other berries, cabbage, green beans, field tomatoes, squash, sweet corn, broccoli | Less than 10% | 20% |
| Seasonal, but consumed primarily in the processed form | Peas. | Less than 10% | 40% |
| Seasonal, with storage and processing capacity. | Apples, carrots, potatoes | Less than 25% | 50% |
| Seasonally independent | Oats, Rye, white beans. | Less than 20% | 100% |

Source: Desjardins, MacRae, & Shumilas, 2010

2.2.3 The Local Food Economy in Canada

The primary forces that can help spur the development of local food economies include; health and nutritional issues, environmental concerns, community and economic development, farmland preservation, and the creation of green spaces (Abate, 2008). There are several terms or practices associated with local food economies, for example; community food systems, community gardens, food sheds, and food circles (Abate, 2008). In Canada, farmers' markets are an integral part of the food economy, they are situated at the intersection of the local food system and social economy (Wittman, Beckie, & Hergesheimer, 2012). Farmers markets are organized by grassroots organisations, with occasional assistance from the government or private sector, and they offer a non-profit social infrastructure for each participating farmer (Wittman et al., 2012). As opposed to established for-profit food models, farmers' markets control who is allowed entry to market space based on rules developed by community members (Wittman et al., 2012).

The most remote and economically poverty-stricken communities in Canada are the First Nation's reserves (Fieldhouse & Thompson, 2012). They are generally without adequate infrastructures for food production, and processing, and they lack good transportation systems, all of which contribute to high rates of food insecurity in these regions (Fieldhouse & Thompson, 2012). And so, for communities like these, many food intervention systems have been established. A prime example is the Northern Healthy Foods Initiative created by Manitoba provincial government, designed to tackle increasing rates of food insecurity in these regions (Fieldhouse & Thompson, 2012). Also, for these local communities, particularly in Northern

Manitoba, harvesting of country foods to be consumed domestically is critical in ensuring food security, and is a strong part of their culture (Usher, Duhaime & Searles, 2002; Willow, 2005 in Fieldhouse & Thompson, 2012). “The term country food refers to the mammals, birds, fish, plants, and waterfowl/seabirds harvested from local stock” (Fieldhouse & Thompson, 2012, p. 3)

2.3 Food (In) Security

According to Food and Agricultural Organisation (2009), more than one in seven people in today’s world do not have access to nutritious foods, and have forms of micro-nutrient malnourishment. The increase in population and food consumption growth simply means global food demand will continually be on the rise (Godfray et al., 2010). Food availability is integral in ensuring food security (FAO, 2013). The supply of sufficient food to a community is necessary, but does not guarantee people will have adequate access to food (FAO, 2013). Food availability comes not only from agricultural production, but also from forest products, fisheries, and aquaculture (FAO, 2013). Products from these alternative sources are highly nutritious, with an estimated 20 percent of animal protein derived from aquatic animals (FAO, 2013).

In 1996, FAO declared “poverty as a major source of food insecurity” (p. 1), and that focus on its eradication will ensure all people have access to food. FAO (2013) went further to state that access to food is premised on two pillars: Economic and physical access. It further explains that economic access is determined by food prices, disposable income, and access to social support, and physical access determined by availability and quality of infrastructures, and food storage facilities.

2.3.1 Food (In) Security in First Nations Communities in Canada

Food insecurity is an important determinant of health, and is estimated to have affected one in ten Canadian households in 2004 (Kirkpatrick & Tarasuk, 2008). Several international commitments to ensuring food security for all Canadians have been made by the Canadian government (Power, 2008). An example of such a commitment is the International Declaration of Human Rights (1948), and World Food Security (2002) (Power, 2008). Also, commitments to ensuring food security among aborigines living in First Nation's communities were made at the International Labour Convention (169) (1989) (Power, 2008). Despite these commitments, there is little evidence to show that they guide policies or decision-making (Power, 2008).

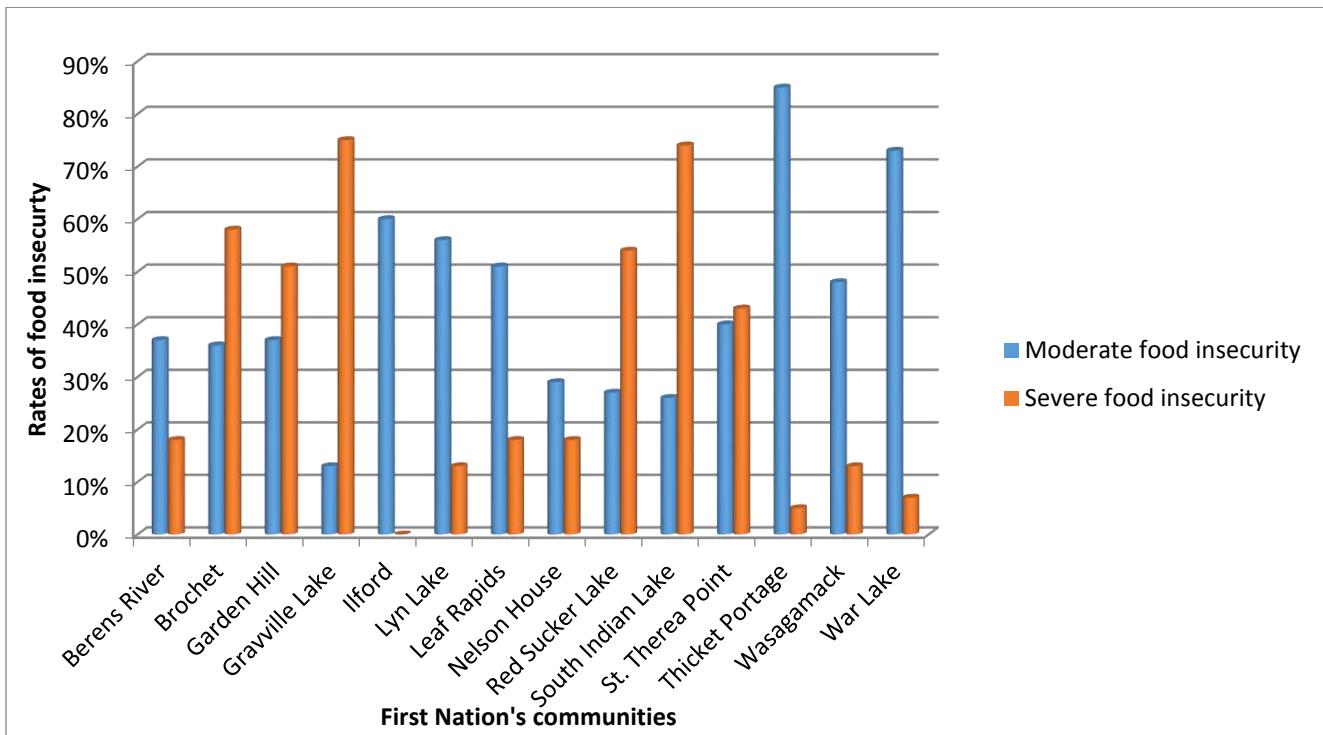
Achieving food security has been a challenge in many Canadian and Manitoba First Nations communities (Zahariuk, 2013). The pillars of food security include: food access, food availability, and food literacy, upon which food security rests have been broken (Government of Manitoba, 2003; INAC, 2003; NRI, 2011; Thompson et al., 2010; Thompson et al., 2011; Thompson et al., 2012). The remoteness of these communities and access problems continue to plague many First Nations communities in Canada and Manitoba (Zahariuk, 2013). Twenty-three northern communities in Manitoba lack all season road access, and depend on air or rail transportations (Zahariuk, 2013). And so, the remoteness of these communities increases the cost of healthy food.

Food insecurity has been recognised as a serious public health issue in Canada, and can be linked to several food-related health problems such as diabetes, obesity, high blood pressure, depression, heart disease, low immunity levels, and anemia (Fieldhouse & Thompson, 2012).

Several cases of food-related health problems have been reported in Indigenous communities (Reading & Wien, 2009 as cited in Fieldhouse & Thompson, 2012). First Nation's communities are very poor and have been economically marginalized, hence; do not have the right infrastructure for food production, food processing, and food transportation (Fieldhouse & Thompson, 2012). Factors, such as these, make these communities highly vulnerable to food insecurity (Fieldhouse & Thompson, 2012). Furthermore, many First Nations communities have difficulties in obtaining clean drinking water; in fact, more than 3000 First Nations households lack running water (Zahariuk, 2013).

In tackling the issue of food insecurity among Indigenous communities in Canada, and the world over, several food intervention systems are being established (Fieldhouse & Thompson, 2012). These include: community gardening, livestock rearing, and promoting local leadership to build partnerships with businesses, government and non-governmental organisations (Fieldhouse & Thompson, 2012).

Figure 2. 1: Food insecurity rates in 14 First Nation's communities



Source: Thompson et al., 2012

2.4 Community Gardening: One answer to Food insecurity and a Tool for Community Economic Development

The key to regional dynamism and resilience is through economic stimulation at the local level, and such economic stimulation are achieved by designing regional or local level interventions (Braun, Herman, & Paton, 2014). The last two decades have witnessed a shift in developmental policies from exogenous or external intervention to an endogenous, partnership related one (Garcilazo, 2009; Storper, 1997 as cited in Braun et al., 2014).

“Endogenous development can be described as an integrated process of economic growth and structural change” (Braun et al. 2014, p.1). An aspect to this is economic, which is defined by particular set of production systems that supports local entrepreneurs to improve productive

factors (Braun et al., 2014). Endogenous development is often seen as a place based approach created around local needs that includes community participation in the developmental process (Braun et al., 2014). This place-based approach to development is more than just improving the local production system, but develop a system that incorporates every aspect of the local community (Braun et al., 2014). And so, this development strategy serves not only to support the local productive system, but also cultural and social aspects that improves the total well-being local community or region (Vázquez-Barquero, 2002 as cited in Braun et al., 2014).

One of such economic stimulation is through community gardening. Most community gardening programs have been carried out in urban settings, and very few studies on how a community gardening project can affect food security issues in a rural setting (Kirkpatrick & Karasuk, 2009; Moron, 2006 as cited in Carney et al., 2011). The advantages of a community based gardening project goes beyond food security, this is because they provide fresh vegetables and also involves a considerable amount of physical exercise in the cultivation process (Carney et al., 2011). Community gardening strengthens family and social relationships, since the process involves providing support and advice, and so everyone benefits from what the project has to offer (Carney et al., 2011). Community gardens can be broadly defined as plots of lands or space where different people come together to grow food or plants (Okvat & Zautra, 2011).

Community gardens are essentially bottom up, community based, collaborative endeavour to grow food locally (Okvat & Zautra, 2011). Also community gardens require the leadership and involvement of area residents in the cultivation process, even if it is being tended by different individuals or a group of citizen volunteers (Okazat & Zautra, 2011). Community

gardening helps promote, and relies on the flow of knowledge, resources and social capital among gardeners, and between gardeners and the community (Firth, Maye, & Pearson 2011; Glover, Parry, & Shinew, 2005 as cited in Moquin, 2014). Community gardening provides an avenue through which individuals can advocate for their social and ecological communities (Krasny & Tidball, 2009b as cited in Moquin 2014).

Community gardens are a form of public health promotion enterprises that help promote healthy nutrition and physical exercise especially in communities that lack the physical and economic access to fresh and healthy foods (Alaimo, Packnett, Miles, & Kruger, 2007; Blair, Giesecke, & Sherman, 1991; Patel, 1991 as cited in Alaimo, Resichl, & Allen, 2010). Zick et al. (2013), in their review of impacts of community gardens, concluded that they add certain social benefits to communities as well as health and nutritional benefits. Community gardens are also affiliated with community kitchens that help in capacity building, which does not limit it to only cultivation, but also preparation and nutrition (Mundel & Chapman, 2010 as cited in Moquin, 2014). Furthermore, community gardens create jobs as well as training opportunities; also produce can be sold at farmer's market or local restaurant which provide a form of economic incentive to gardeners (Okvat & Zautra, 2011). Community gardening if well implemented could make food production more sustainable, and help achieve community development. In other words, "Gardens and gardeners cultivate community" (Moquin, 2014, p.3).

Chapter 3: Research Methodology and Methods

This chapter details methods and procedures employed in achieving research objectives mentioned in chapter 1. The methods and methodology are described in greater detail in the sections below.

3.1 Introduction

The desire to bring about change in a community requires the participation of community members in that process. The purpose of this study is to increase the food security status of GHFN through the creation of strategic food enterprises. Achieving this goal required participation of community members. Consequently, the research employed a Community-based participatory research (CBPR) design to meet this goal. CBPR has emerged as a collaborative approach through which economic and social needs of communities in remote and rural areas are addressed (Ritchie et al., 2013). In fact, several literatures have recommended the need for collaborative research in addressing needs of geographically isolated communities (Israel et al., 2008; Lightfoot et al., 2008 as cited in Ritchie et al., 2013). According to Israel et al. (1998), CBPR is a partnership approach to research "that equitably involves, for example community members, organizational representatives, and researchers in all aspect of the research process" (p. 177).

Community-based participatory research (CBPR) emphasizes partnerships with communities, which is in contrast with the positivist philosophical framework that assumes that a phenomenon may be isolated from its context for the purpose of research or study (Holkup, Tripp-Reimer, Salois, & Weinert, 2004). The term "community based research" implies that the

research was conducted in the community, as opposed to anywhere else (Blumenthal, 2011), and this is usually characterized by community members collaborating with university researchers to address a concern (Ritchie et al., 2013) but could be very limited. Blumenthal (2011) further identified two pillars upon which CBPR rests. The first pillar is ethical, which is premised on the history of exploitation of low income communities, and the need to respond. Second is community empowerment. Therefore, in order to satisfy the specific objectives of this research, and the main purpose of the study, I employed the nine guiding principles of CBPR as proposed by Israel et al. (2008). They are:

- CBPR recognizes the community as a unit of identity.
- CBPR builds on strengths and resources within the community.
- CBPR encourages equal collaboration, in which all parties participate throughout the research process.
- CPBR integrates knowledge and learning for the mutual benefits of all partners.
- CBPR promotes an empowering process and capacity building that attends to social inequalities.
- CPBR focuses on positive aspects of health and includes Eco health.
- CBPR requires the development of a system that is iterative and cyclical.
- CBPR requires that result findings are disseminated to all partners (in this case, it would be Aki energy, Meechim, community members, and University of Manitoba) and including them in the wider dissemination process.
- CBPR seeks commitment to sustainability, and so involves a long-term process.

In conducting this research, and in line with the aforementioned principles of CBPR, the “case study” strategy of inquiry was employed. This approach became necessary considering the high food insecurity rates in many Manitoba First Nations communities’ (Thompson et al., 2012). Therefore, this approach was employed to address general food insecurity issues in Manitoba First Nation Communities. According to Creswell (2003), case studies provide a frame to look at a process or activity, like a food social enterprise:

Case studies are strategies, in which the researcher explores in depth a program, an event, an activity, a process, or one or more individuals. The case(s) are bounded by time and activity, and researchers collect detailed information using a variety of data collection procedures over a sustained period of time (p.15).

Thus, I made use of both qualitative and quantitative methods to achieve my objectives. The quantitative phase sought to develop best practises to establishing a commercial garden with community members. This included a field trial, which is particularly useful for obtaining information about how crops respond to different fertilizer application (Kristoffersen, Greenwood, Sogn, & Riley, 2006). Studies on how different fertilizer regimes impact crop yields provides needed information for all communities, particularly those on marginal land and poor communities (Onyango, Harbinson, Imungi, Shibairo, & Krooten, 2012). Fertilizer use is often disorganized or deficient in these communities (*Ibid*). Therefore, part of this study design evaluated the effect of soil amendments on crop yield. The qualitative phase explored strategies though which Meechim can boost the food economy, and analyzed relationships between community-based mapping and sustainable food production.

This analysis was done in collaboration with community members to record their traditional land use and occupancy through the use of maps. Just as Warren (2004) alluded to, “maps are more than pieces of paper, they are stories, conversations, lives and songs lived out in place and inseparable from the political and cultural contexts in which they are used” (p. 4). This approach gave GHFN an opportunity to retell oral stories of traditional land use practices, which would serve as an opportunity to promote community development initiatives, aimed at building livelihood and food security (Thompson, 2015). Table 3.1 shows the connection between the research objectives and methods.

Table 3. 1: Relationship between objectives and methods

| Objectives | Methods |
|---|---|
| 1) To explore strategies by which Meechim Inc. can boost the local food economy | <ul style="list-style-type: none"> • Semi structured interviews • Focus group • Household surveys |
| 2) To develop best practices to establishing a viable commercial garden with community members | <ul style="list-style-type: none"> • Field trial • Farm workshops |
| 3) To understand the role of traditional and sustenance activities and commercial activities in sustainable food production | <ul style="list-style-type: none"> • Semi structured interviews • Data review • Household surveys • Focus group |

3.2 Research Ethics Approval and Introducing Researcher to the Community

I submitted an ethics protocol for human subject research to the University of Manitoba's Ethics Board in April, 2015. Approval was granted (Protocol #J2015:44) in May, 2015. The protocol describes the household survey instrument used to gather information regarding food production in the community. Also described were semi-structure interviews and focus group discussion questions centered on strategies to boosting the local food economy, as well as ways to harness the potential of traditional and ancestral sustenance activities and commercial activities in sustainable food production. Interviewees and survey participants were guaranteed anonymity and confidentiality, and so consent forms (also described in the protocol) were signed by participants and survey participants as evidence of voluntary participation.

Equally important is the approval by GHFN community of the research. With this in mind, I participated in monthly meetings (with project partners, including: Aki Energy, Four Arrows Regional Health Authority, GHFN, and the University of Manitoba Natural Resources Institute) to gain a better understanding of the project and the community. I attended this monthly meeting from the fall of 2014 to May, 2015. Upon arrival in GHFN, a meeting was conducted with chief and council to get final approval. A letter introducing my research and its benefits was presented to council members to further address any concerns and questions. Thereafter, I dedicated the first few weeks helping to set up Meechim farm and gaining the trust of community members.



Figure 3. 1: Researcher on farm site helping to set and fill up farm water tank

3.3 Data collection methods

As mentioned earlier, I collected both quantitative and qualitative data. Both were centered on how Meechim Inc. can help build community capacity and boost food security; Figure 3.2 below shows the location of Meechim farm in the community. This mixed method approach to data collection is useful in explaining and generating complex social issues (Creswell, 2003).

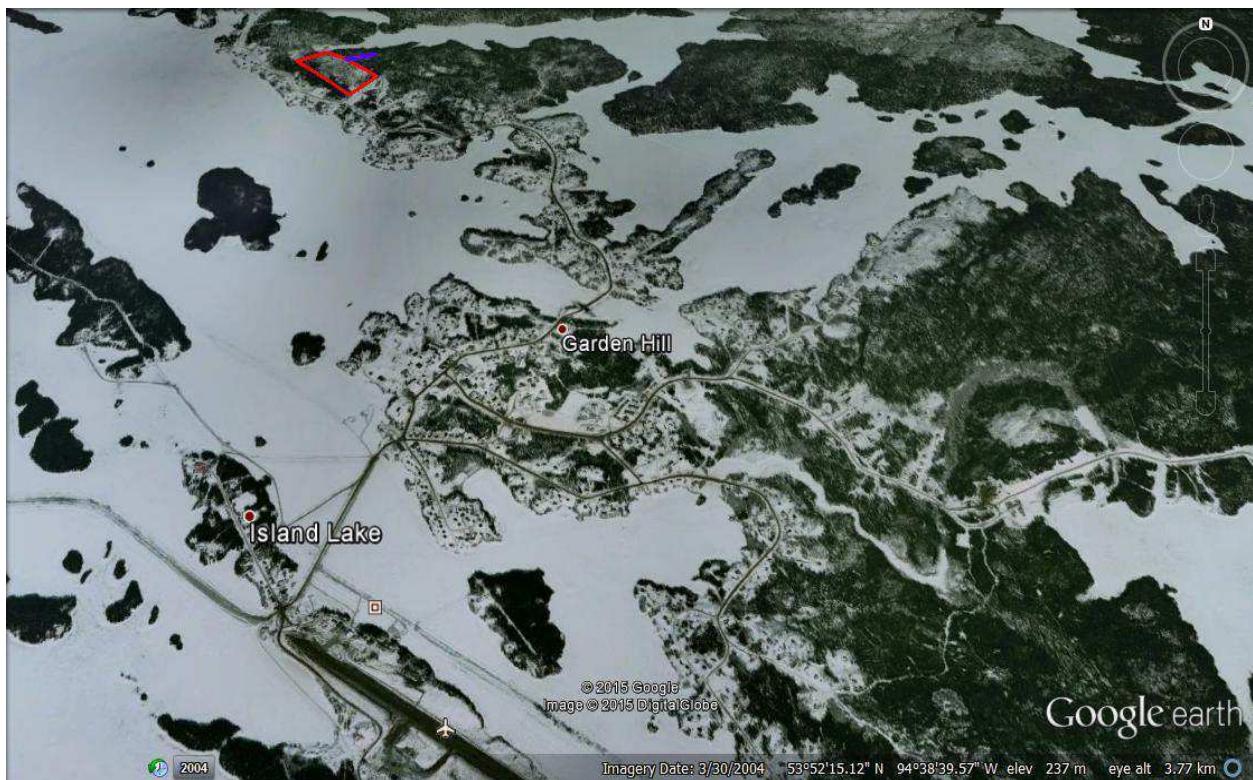


Figure 3. 2: Location of Meechim farm (red square) in GHFN

3.3.1 Quantitative Methods

The quantitative methods I employed were field trials and household surveys. These two methods are discussed below.

3.3.1.1 Field trials

Field trials were conducted to determine the community's capacity to grow food. Field studies were conducted to determine the effect of soil amendments on crop yields¹. Soils on this land are predominantly clay and hard in nature, which makes it difficult to grow crops in the community, hence the need to amend the soil. The experimental was set up using completely randomized design. This is illustrated in figure 3.3 below.

¹ Refers to the measurement of the yield of a crop (see https://en.wikipedia.org/wiki/Crop_yield)

Treatments:

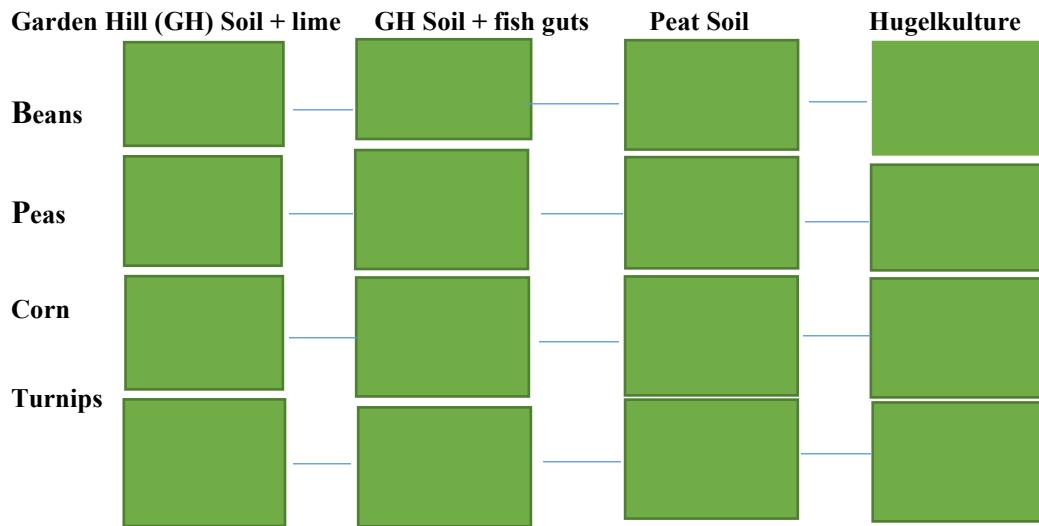


Figure 3.3: Field layout of experimental design

Each plot measured 4 feet by 16 feet. I then went further to divide each plot (or treatments) into 4 separate subplots – each measuring 4 feet by 4 feet. I planted beans, peas, corn, and turnips in rows 1, 2, 3, and 4 respectively across treatments. This was done in order to determine consistency in results among different types of crops in terms of yields.

For this experiment, soil amendments were locally sourced. The notion behind this is simple: To produce food within the community without having to rely on costly external inputs. Crop yields were obtained on the 14th of August, 2015. Number of pods per hole (or replication) were recorded for beans, weight for peas, while height measurements were taken for corn. Data gathered were subjected to analysis of variance - using an excel sheet - (anova²) to determine if there were significant differences in yields as a result of soil treatments.

² Anova is a statistical technique used to compare the means of more than two samples



Figure 3. 4: Preparation of experimental plots by researcher

Table 3. 2: Planting chart

| Plant | Variety | Row | Planting date | Seed depth | Seed spacing | Weather Conditions |
|--------------|-------------------|------------|----------------------------|-------------------|---------------------|---------------------------|
| Beans | Top Notch | 1 | 3 rd June, 2015 | 2 -3 inches | 4 – 5 inches | 18 degrees C |
| Peas | Little Marvel | 2 | 3 rd June, 2015 | 2 -3 inches | 4 – 5 inches | 18 degrees C |
| Corn | Corn Honey &Cream | 3 | 3 rd June, 2015 | 2 -3 inches | 4 – 5 inches | 18 degrees C |
| Turnips | Swede Turnip laur | 4 | 3 rd June, 2015 | 1-2 inches | 4 – 5 inches | 18 degrees C |

3.3.1.2 Household Survey

Over the last 60 year household surveys have become important in exploring social phenomena (United Nations, 2005). This is because household surveys are versatile in its approach to data collection (United Nations, 2005). The household survey was conducted in the

summer of 2015. The aim of the household survey was to get respondents perceptions on gardening and what type of crops they prefer, and wish to be part of their diet. These aims were realized in several questions and administered during the planting season. A total of 22 households, selected randomly, were surveyed. Data gathered were subjected to various descriptive statistics with excel 2013.

3.3.2 Qualitative methods

Qualitative methods employed were semi-structured interviews, focus group discussions, farm workshops, and data review. The aim of this approach was to get community perceptions and opinions on wide range of issues, particularly on strategies that can help boost the local food economy.

3.3.1.1 Semi-structured Interview

Semi-structured interviews are excellent tools for gaining access to information about experiences and opinions (Hay, 2005), that are useful for better insight and understanding into the research problem (Gillham, 2000; Ritchie & Lewis, 2003). This is done when complex questions need more elaboration and explanation (Rubin & Rubin, 2005). The interviews were done to supplement data from focus group discussions, and to assess the potential of the community to produce food. So, interviewees with practical farming experience were purposively selected.

Also, individuals with definite knowledge on traditional activities were selected. This was done in order to understand the role of traditional and sustenance activities and commercial activities in sustainable food production. I thought this method was effective at deep

investigation into issues the respondent is knowledgeable in. Ten face-to-face interviews were conducted. Interviews were recorded, and participants were assured of confidentiality and anonymity. Participants interviewed included: the former chief of GHFN, the director of Youth & Employment Training Department, band council members (2), community members (3), Meechim farm manager, and farm workers (2). The average time spent conducting interviews was 50 minutes.

3.1.1.2 Data Review

In addition to interviews conducted, I reviewed documents and maps that linked sources of wildlife in the area to quantity of food and sustainability. Also reviewed were literatures that would be useful for planners or decision makers in developing agricultural land resources in GHFN. My aim was to further make clear the role of traditional and sustenance activities and commercial activities in sustainable food production.

3.1.1.3 Focus group

Focus group discussions can help in changing the existing system, and serve as an avenue through which the marginalized can be heard (Dukpa, 2012). This group interaction between the researcher(s) and members of the community allows issues or topics to be discussed (Hay, 2005). The kind of talking circle highlights not only group perspective on topic being discussed, but also makes explicit current socio-cultural and political relationships within the group (Kitzinger, 1995).

For this study, I conducted one focus group discussion. The group consisted of all eight farm workers. The aim of this focus group was to share Indigenous knowledge, and generate possible strategies to be incorporated into Meechim Inc. Also discussed were issues around

revamping gardening in Garden Hill. This discussion was recorded and transcribed manually afterwards.

3.1.1.4 On Farm workshops

I conducted several on farm workshops regarding the importance of soil nutrients, as well as the ways to enrich the soil. These farm-based workshops aimed to improve community food production, health, and self-independence through learning how to grow healthy crops.



Figure 3. 5: Farm workshop where I am working with community members on soil

Chapter Four

Exploring Opportunities and Strategies through which Meechim Inc. can boost the Local Food Economy

4.1 Introduction

Meechim is an Ojibway Cree word, which means food. This chapter details results and analysis related to the first objective: exploring strategies through which Meechim Inc. (Meechim hereafter) can boost the local food economy in GHFN (GHFN). As established in chapter 1, Meechim is a local food social enterprise founded in 2014 to help curb growing food insecurity in First Nations communities in Manitoba, Canada. This food insecurity is most evident in GHFN, where 88% of households are food insecure (Thompson et al., 2012). Moreover, healthy foods are costly and in limited supply.

The development of Meechim to counteract food insecurity led me to explore the strategies Meechim Inc. could use to boost the food economy in GHFN. Like any social enterprise business, Meechim utilizes business practices to achieve environmental and social goals (Aki Energy, 2015). Meechim Inc. – a community food social enterprise - is a joint partnership project. The project partners include: Aki Energy, Four Arrows Regional Health Authority (FARHA), GHFN Chief and Council, Garden Hill Department of Economic Development, and the University of Manitoba’s Natural Resources Institute. The core objective of Meechim Inc. is to “increase access to healthy food and local employment through the production and sale of local foods” (Aki Energy, 2015, p.2).

The project began with a vegetable and poultry farm on a 15 acre site in GHFN community in May of 2015 (see figure 4.1). Prior to the establishment of the farm, Meechim launched a “Monthly Healthy Food Market” in the fall of 2014 that gives community members the opportunity to purchase healthy food items at affordable prices (see figure 4.2).

4.2 Method

Community-based participatory research was employed throughout this research. Both household surveys and interviews were conducted. Household surveys of 22 households were conducted in the summer of 2015, to elicit respondents’ perceptions on gardening and what type of crops they prefer to garden and be part of their diet. The survey was administered during the planting season.

Ten face-to-face interviews were conducted. Interviews were recorded, and participants were assured of confidentiality and anonymity. Participants interviewed included: Ex-chief of GHFN, Director of Youth & Employment Training, band council members (2), community members (3), Meechim farm manager, and farm workers (2). The average time spent conducting interviews was 50 minutes. As well, I conducted a focus group discussion.

In addition to the interviews conducted, my summer long stay in the community gave me the opportunity to bond with community members and to share in their hopes and aspirations. Data gathered were transcribed manually, and a thematic content analysis was done to identify themes that came out of the interviews.

4.3 Findings

The data are presented below in relation to the following themes:

- I. History of Agriculture in GHFN
- II. Local food economy and the sustainability livelihood framework
- III. Meechim Inc.: Challenges and opportunities

All interviewees were aware of Meechim and its objectives, and so were able to give useful insights on how the project can move forward. Further, this process allowed me to gain a better understanding of the community and its history. To understand the current food situation in GHFN, I begin this chapter with a brief history of agriculture in GHFN.



Figure 4. 1:Meechim Inc. 15-acre farm during the planning phase in May, 2015

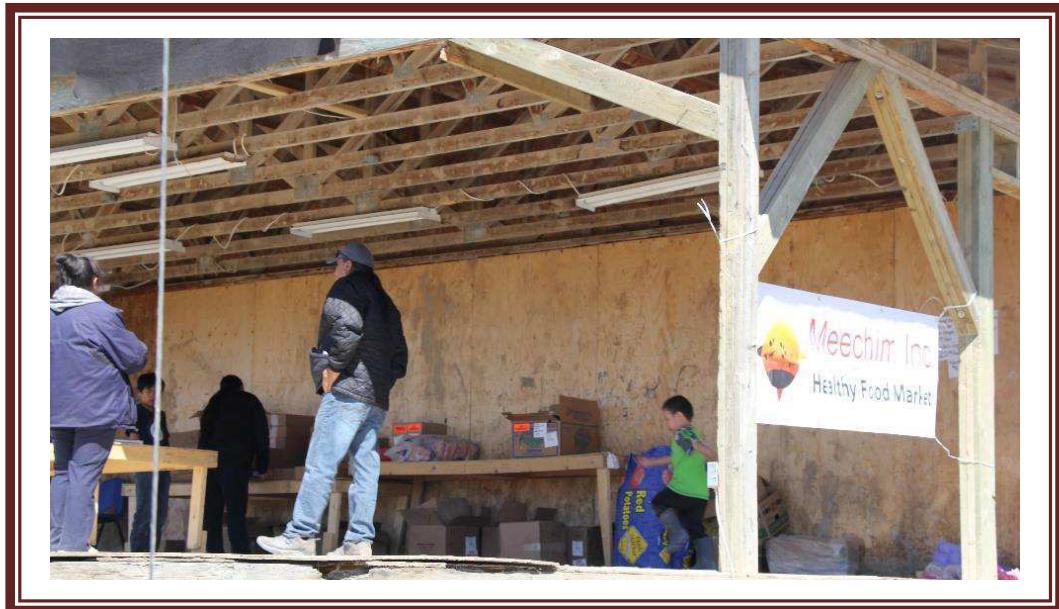


Figure 4. 2: Meechim healthy food market in 2014

4.4 History of Food Production in Garden Hill

To understand the present and realize future possibilities for food production in GHFN, the past has to be understood. The inclusion of an historical perspective can help to improve research directed at First Nations communities in Manitoba (Hackett, 2005). I listened to many interviewees detail the food history of GHFN. Two generations ago, the inhabitants of GHFN were food gatherers, and also food secure (Socha et al., 2012). One of the elders commented on this fact:

We were hunters and gatherers, also gathering medicine before money started coming in. We did not stay here as a community, for we were inland. Inland is out there on the trap lands, you probably hear people say that trap lands are fishing land, they go out spring or fall and stay there. That's basically getting their food, getting their trapping in, you could live off it. We were food secure. Also with the fur trade – that kind of thing. Then commercial fishing came on and provided fish too.

As far as GHFN community members are concerned, the name “Garden Hill” was given because people gardened along the shores. Gardens consisted of family plots. In Oji-Cree their community is called Kistiganwacheeng, which means gardening hill. Community members talked about big gardens in the community: Beardy’s garden, Macpherson’s garden, and so on. Each individual family lived off their family plot with country foods and made a living from country food production by hunting, trapping and fishing. Today, there are very few gardens in GHFN and families mostly depend on store-bought foods, fishing and hunting. The council member I interviewed, further said:

I believe every backyard should have a garden to go back into, everything we eat today is processed, and that is what is killing a lot of our people, a ramp in diabetes. So going back to eating healthy is one of the key things. So, there is a generational gap between my grandfather that is used to be a gardener, my parents that went to residential school, and the present generation trying to bring it back.

The transition from being food secure and self-dependent to being dependent began in the 1960’s. A prominent community member captured this transition in food production in GHFN saying,

I remember hearing a story when money was introduced – the welfare, child tax, allowances. Then the transition between food, self-sustenance to money dependency, where you can go buy your food at the end of the month, began (interview, 2015).

Under these circumstances, that physical transformation, from being healthy to unhealthy began only at the mid to late twentieth century. Within a few decades, Island Lake community members had started gaining weight because of unhealthy food consumption. Prior to that, just before the Island Lake band was split, all four First Nations (i.e., Wasagamack, St. Theresa

Point, and Red Sucker Lake) were one community. So, as a community, the history of GHFN is fairly new, even though community members have been living off the land in the Hayes River watershed for millennia. According to a former band council member, the genesis of the food crisis began when the Island lake treaties³ came along, which were signed in 1909. In describing the effect of the treaties, he said:

The biggest factor that has led to this is that “hand me mentality”, the silver spoon mentality where the treaties says that “as long as the grass grows, tree grows, sun shines, rivers flow, that’s how long they will take care of us”. So I think in there the people got dependent on that. That is what I see on a personal level.

The interpretation of the treaties by the colonial Canadian government and the creation of the Indian Act deprived Indigenous peoples of natural and financial resources. For example, the Indian Act⁴ clearly states that community members cannot own a home within the reserve boundaries. This had a detrimental effect on community members.

In the 1950s and 1960s there was no cash economy in Island Lake communities. People traded furs for food and goods at the trading post through a barter system. At that time everyone depended mainly on local resources – fishing, hunting and gathering to eat. But for the recent one or two generations, food economy has been dependent on food imported by the Northern Store. And back then, sharing was the norm. At the present time, money is definitely an issue with few jobs and high costs for food and goods on the reserve.

³ “A Treaty is a formal agreement between two parties. The numbered Treaties, which cover all of Manitoba, are formal agreements that created a relationship between the Crown and First Nations. As a result, each party has certain expectations and obligations, both explicit and implicit. The numbered Treaties promised to provide First Nations with such things as annuities, education, reserves and protection of their traditional economies, while the Crown acquired the means to open up territories, including modern-day Manitoba, for settlement and agricultural and resource development” (see www.gov.mb.ca/asset_library/en/newslinks/.../TreatyDayBG.PR.AN.do)

⁴ The Indian Act, which was first enacted in 1876, is the principal statute through which the federal government of Canada governs First Nations people, their bands, and the system of First Nation reserves (see <http://lawslois.justice.gc.ca/eng/acts/i-5/>)

Inflation is a large factor affecting cost of living over time. The treaties do not follow inflation. For instance, \$5 was a lot of money in the past. Not anymore. A line from the treaty states: “Every man, woman, and child will receive annually \$5 as part of their treaty annuity payment” (Satzewich, & Wotherspoon, 2000, p.25). In 1902, that was a lot of money. But today, this does not amount to even one meal. So, inflation has an effect. Today, most foods GHFN people eat are highly processed products bought from the store. Everything now about eating is all about dollars and cents, as food costs money either at the store or to have gas and equipment to go hunting and fishing.

After considering “What was done, what is being done, and what could be done?” gardening is seen as important. The Meechim intervention is one way to bring back the culture of gardening, self-dependency, and self-reliance (see figure 4.3). A scenario that a community member described GHFN people as gaining: “a sense of food security. [They] grow their garden, preserve it, preserve the seeds, and eat as they ate back in the day”. In order to get to this point of food security, the sustainability of the local food economy is key. An elder in the community put it succinctly:

To me, sustainability is money. Sustainability is life. How do we live without depending on the mighty dollar? So, there are two pieces: the sustainability of living (life) vs. the sustainability of this entity (Meechim). This entity is going to be the dollars, whereas to live, you need food around you. So these two teachings are important.

To put it differently, the food economy in GHFN has for the last few decades been dependent on external funds (dollars), largely welfare dollars for feeding people without jobs. And little has been done to address food insecurity and the economic poverty issues people face in Garden Hill.

Meechim, on the other hand, approaches the problem in a different way. By its definition, social enterprises aim to be self-sustaining. Thus, by putting profits back into building social systems and economic systems, Meechim addresses the concerns raised in the above quote by providing sustainable livelihoods.

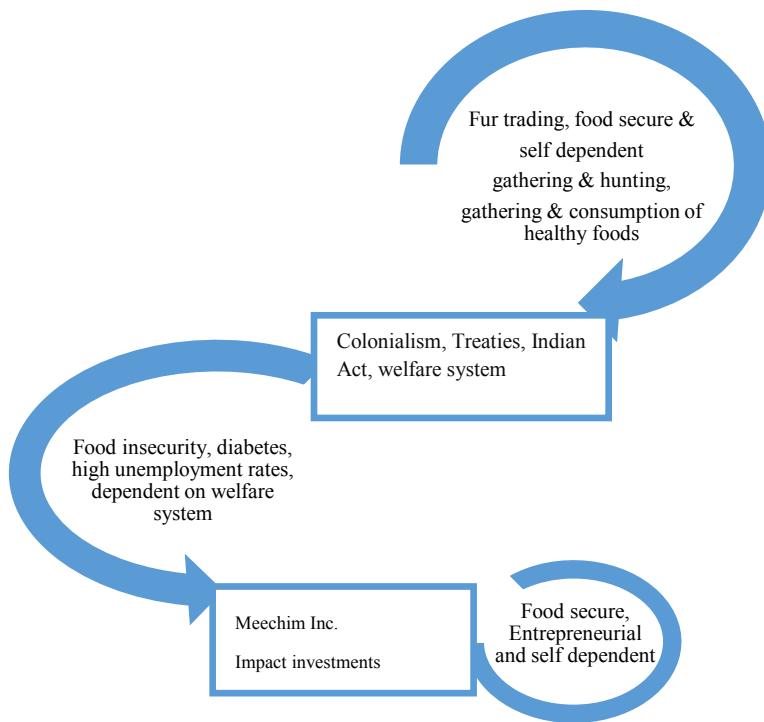


Figure 4. 3: Potential Food Security Pathway in GHFN

4.5 Exploring the Local Food Economy through the Sustainable Livelihoods Framework

In order to fully explore options or strategies to developing a robust food economy, I further applied the sustainable livelihood framework (SLF) to my findings. For my study area, the SLF was used as it provides an opportunity to identify influences of structural factors on rural communities (Barnidge, 2011). Most importantly, SLF provides a clear understanding of the strategies needed by intervention programs, such as Meechim, to create livelihood opportunities for rural communities such as GHFN (Carney, 2003). According to the UK Department of International Development (1999):

A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living.... A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future (p. 1).

These livelihood assets are the building blocks of livelihoods, and they control the capacity to mobilise strategies towards achieving certain livelihood outcomes (Newton & Franklin, 2011). Livelihood assets (capital) include: natural resources stocks (e.g., land, water, wildlife, biodiversity, environmental resources), social assets (e.g., relationships, networks, membership of groups, access to institutions), physical assets of basic infrastructure (e.g., water, energy, energy, shelter, transport and communications), human assets (e.g., skills, knowledge, health, ability to work, physical capabilities) and financial assets (e.g., credit, savings, pensions, remittances) (Newton & Franklin, 2011). With this in mind, I examined the five livelihood assets – using the sustainable livelihoods framework (see figure 4.4 below), in GHFN, so as to better understand the livelihood strategies/options to be adopted.

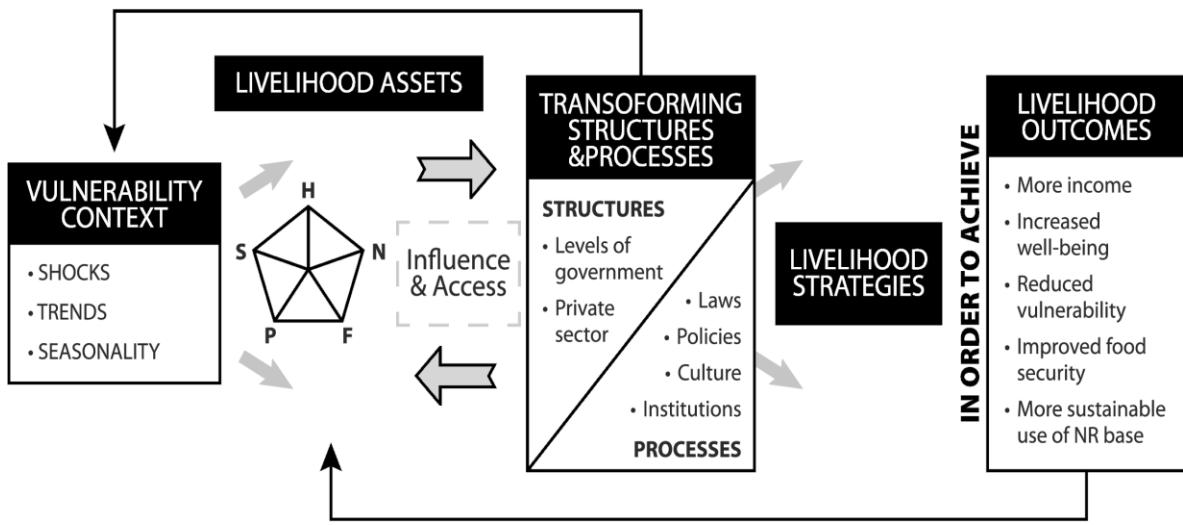


Figure 4. 4: Sustainable Livelihood Framework

Source: “Sustainable Guidance Sheets”, Department for International Development, 1999.

4.5.1 Vulnerability Context

Like many First Nations in Manitoba, GHFN still suffers from the effects of colonialism and dispossession. From my discussions with community members – old and young -- there is a general consensus that the government of Canada is responsible for the decline in livelihoods in the community. Many authors have illustrated the fact that there is a direct relationship between colonialism and the current economic situation in many First Nations communities (Alfred, 2009). For instance, unresolved psychophysical trauma stemming from historical harms and cultural dislocation have been identified as the main source of crisis in First Nations communities (Alfred, 2009). As well, the restrictive government policies for accessing natural

resources and financial capital have resulted in underdevelopment. One of the community members stated that:

Before colonialism, we were dependent on ourselves..., but the different stages of colonialism had an effect. We started depending on government handouts, to provide us foods, housing. No more entrepreneurs here in Garden Hill.

This colonialism is reflected in attitudes and behaviours, according to another community member:

Everyone buys from Northern Store, no one wants to grow anything, if there were other stores, we would buy from there. Everyone is lazy or they don't know how to grow their stuff. But if they are taught or have the resources then most would grow- especially the old people. The young ones are lazy, it's all about money. They are not motivated.

Although, some older people see the young people as lazy, others are of the opinion that lack of opportunities to work or engage in traditional activities results in lack of knowledge and interest in how to garden and make a living. By the same token, the isolation of many FN communities makes FN people increasingly vulnerable to economic deprivation. For instance, GHFN is a fly in community, without all-weather road network (see figure 4.5). As a result, food items are expensive at the Northern Store (accessible only by a \$10 boat ride) located on a separate Island close to GHFN. In addition, these food items – for the most part – are not brought in fresh, as they are left at the airport for several days before being shipped to the store:

Social services, they do business with Harris Foods. They have a grocery list to buy for clients – welfare recipients. There is a food meal discount for certain items, things that are in the food groups. Whatever amount they order gets deducted from their welfare cheque. That's how people order. But the downside is that it gets stuck at the airport. It's supposed to be fresh. But after being stuck at the airport for few days, it is not fresh anymore. So if ordered from here, it is fresh. It takes three days to get to Garden Hill (delivered at the cargo at perimeter). Meechim Inc. can help change all that, once it gets going.

So, likewise, the confinement to rural reserves also leads to the same effect in negative life experiences, and on livelihood assets (Alfred, 2009). All of these facts point to the need to seek changes at the individual level, community level as well as in government policies.



Figure 4. 5: Driving up North to GHFN on ice road. (Source: Robert Guilford)

4.5.2 State of livelihood assets in GHFN

In GHFN, livelihood assets required to make a decent living are underdeveloped. As previously mentioned, these assets are important, as they can influence people's ability to organise different strategies to achieve certain livelihood outcomes. Furthermore, the current state of assets helps

develop a clear understanding of what is needed to boost economic prosperity in the community. When asked about the state of assets in relation to food security, a community member had this to say:

Directly related to food security, I don't think they have the physical infrastructure. I don't think they have the financial either. Not all of our people here in the community have the ability to get a loan to start a farm. The only one I would think we have is the social. The natural resource here [are vast. GHFN] is still one of the most pristine communities, the water is not polluted, we have the natural trees, and everything is still pristine, other than what we are doing to it. Not the human assets at the moment, we need more training. We can't raise them [the chickens] on a large scale. We need to know the risks involved. We need people to come show us, but it can be done..... So, Meechim is the new buzz word now.

To fully understand the direction or approach to take in community capacity building, I conducted an assessment of GHFN livelihood assets at the outset of farming season in 2015. From the above quote, it is evident that only two livelihood assets are in place in GHFN: social and natural assets. Generally, there is a higher level of bonding, friendship, and cooperation in poor communities compared to people living in high income neighbourhoods somewhere in the city. This was clearly evident from my observation, and also interactions with community members. There was a general sense of belonging – to the community and themselves. Equally, GHFN is abundant in natural resources – from natural forests, clear lake water, to minerals – but do not have full control of these (more on this in chapter 6). Figure 4.7 below describes each of these assets.

Also, local food production is highly dependent on changes in weather conditions. According to Lizumi & Ramankutty (2015), local food security and global food production are

affected by variations in climate. So, in order to get a sense of weather conditions in GHFN and how this affects decision-making, I extracted weather data for the production period in 2015. (Figure 4.6).

Figure 4.6: Weather report for production period in 2015

Station Name: Island Lake A

Province: Manitoba

Latitude: 53.86

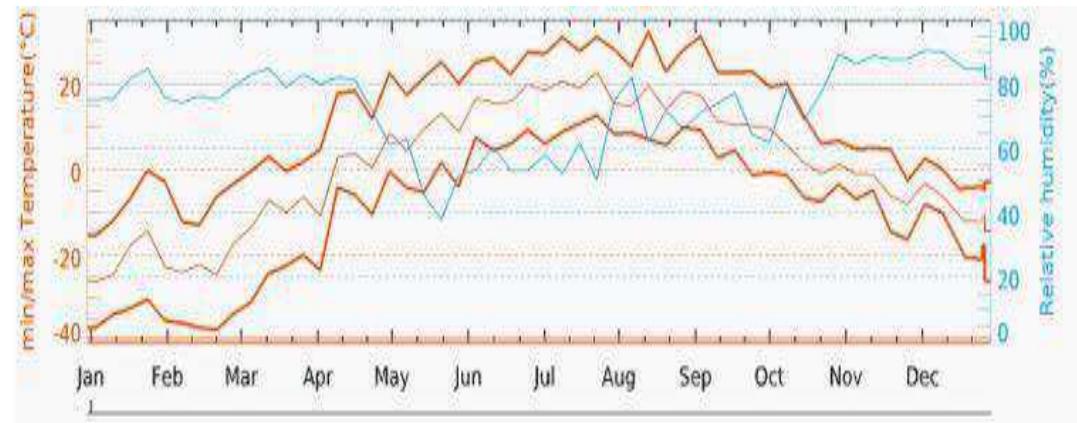
Longitude: -94.65

Elevation: 235.3

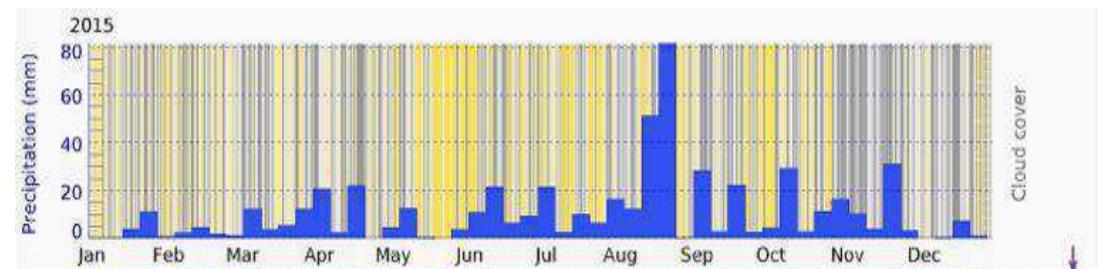
Climate Identifier: 5061375

WMO Identifier: 71145

TC Identifier: YIV



The min/max temperature graph shows temperature including relative humidity in hourly intervals. The blue line shows the average relative humidity (high or low) for each date. The red lines show the highest and lowest recorded temperatures for each day of the year



The precipitation graph indicates the average daily amount of precipitation. The grey background indicates grey cloud cover and the darker grey background indicates more dense cloud cover. While yellow background indicates a clear sky

Source: Meteoblue, 2017

Figure 4. 7: Livelihood assets in GHFN

| Assets (or Capital) | State | "Quote" |
|---------------------|---|--|
| Physical | Access to transportation is limited, some houses have no clean running water. Some buildings are in poor condition. | "its \$10 for a ride to anywhere, if you dont have a vehicle" |
| Social | People come together; however, there is limited communication between the band council and community members. | "yes, a lot of social bonding. When people live at the poverty line they tend to bond together, they more caring ...than the rich people, they live alone" |
| Financial | Poor community, high unemployment rates, and limited access to funds | "We need money to buy healthy foods". |
| Natural | Rich in natural resources; however, these resources untapped, and under the control of government policies. | "GH has lot of natural resources. We can build our own homes. Again southern policy control all. We had lot of timber to build our homes". "We are filthy rich" |
| Human | Basic skills needed to succeed are underdeveloped and underutilized. High rates of diabetes | <p>"There is a desire , but no skills. If we can get the young people keen on it, make their elders relearn". "A lot of people don't know how to work, they have no job experience.</p> <p>"we have kids with diabetes (7 years upwards) , and that's because they don't have money to provide healthy foods".</p> |

4.5.3 Transforming Processes & Structure: Building Community through Food production

The Project is positive in a lot of ways, it creates employments, and knowledge in farming – didn't even know the land was farmable – Director, Youth & Employment Training, GH

Local food production has been hailed as the best opportunity for rural development, and as a conduit for sustainable development (Government of Alberta, 2010). Since its inception in 2014, Meechim has generated a lot excitement in the community. Like any developmental project, Meechim provides the opportunity for employment, learning, and for capacity building:

This [Meechim Market] is a great idea, the low prices we are selling [Food] for, we are having an effect on them. People can afford it. I think everyone should be doing this. Keeping the money in circulation. At least give people work, because that's what people need here – work, a lot of people don't know how to work, they have no job experience. So they really need this type of initiative - Director, Youth & Employment Training, GH

4.5.3.1 Physical Infrastructure

Increased local food production assists in building local food procurement infrastructures, according to work done in Vancouver (Vancouver Island Community Research Alliance, 2011). On May 19th, 2015, farm set up began. The farm workers built a greenhouse, homestead, irrigation line, and site mapping to determine location of each farm enterprise. Also, forty feet freight containers – containing materials for a farm set up – were hauled in earlier in the year. On farm workers included five community members, hired as part of the youth employment and training program, a farm manager, and two intern/researchers (myself included) from the University of Manitoba. The first few days were dedicated to construction and setting up (see figure 4.8).



Figure 4. 8: Cistern system being filled by water truck

4.5.3.2 Crop production

Garden Hill First Nation (GHFN) has a very short growing season due to extreme weather conditions in the north, and so a greenhouse was constructed to allow for all year round crop production (see figure 4.10). The greenhouse also serves as a nursery to sow crops that cannot be planted directly in the ground. Planting started on 25th of May, 2015. Close to half of the 15 acres farm was used in 2015. Varieties of crops grown included: *Brassica napobrassica* (Swede turnip, 1kg), *Cucumis sativus* (cucumber national, 1kg), *Daucus carota* (carrot touchon, 1kg), *Daucus carota* (carrot scarlet, 1kg), *Phaseolus vulgaris* (bean tendergreen improved, 5kg), *Pisum sativum* (peas little marvel, 5kg),

Pisum sativum (peas Lincoln & cream, 5kg), *Zea mays* (corn golden bantam, 5kg), *Beta vulgaris* (beet Detroit dark, 5kg), and *Solanum tuberosum* (potatoes – russet Burbank). (See figure 4.10).



Figure 4.9: Farm workers planting seeds in the ground



Figure 4.10: Greenhouse construction and crops growing in the greenhouse



Figure 4.11: First sprout of potatoes

4.5.3.3 Employment, training, & capacity building

A booming local food system can help create jobs, keep money in circulation within the community, and improve access to healthy foods (United States Department of Agriculture Service, 2010). This is already being realised in GH. Meechim's partnership with the youth and employment training program creates employment, and provides training opportunities. One Elder in the community believed that Meechim serves the purpose of youth empowerment:

To make this a success, from my program point of view. We need to create more employment and training. That's what I see, when they are part of something – once you give a youth a chance, there is a huge self-esteem and pride. When I pick them up from the farm, they are always excited and have a sense of pride.

For most of the youths working on the farm, it was their first job. As such, they carried out their daily tasks with dedication – the first feeling that comes with knowing that you can make something positive out of a situation. One of the farm workers also commented:

I'm not doing bad stuff anymore, not waiting around on welfare cheque- not for me. I'm focused on work, it keeps me busy..... At first, I didn't think anything will grow, but things are starting to grow, and so, I'm proud of the hard work I have put into it. I probably will do this next year.

In addition, community members, as well as farm worker were able to learn the basic rudiments of crop production. For instance, several ways to amend the major nutrients deficiencies in soils were explained during the planting phase. Also, the feed requirements of chicks, growers, layers, and meat birds were taught.

Meechim increased the livelihood assets in GHFN. For example, the skill and education (in animal husbandry, vegetable production, carpentry, and maximizing natural resources) of farm workers were greatly increased by the training program. More connections were forged on the

farm as a result of regular visits by community members. Also, infrastructure and equipment necessary for agricultural production are gradually being put in place including a storage container attached to a functioning green house, a three season camper, a small living quarters atop the greenhouse, and so on.

Generally, the enthusiasm among community members is high, and they believe this could open up opportunities for other business ventures. A former chief elaborated on this while being interviewed:

Starting a construction company for our First Nation will require only 30 million. The only way we can start a company is to build a limited partnership agreement with a big private company. We would have 51% ownership of the company and they 49%. It would probably be eight years deal. It will take four years to put back the money they put in. Like Garden Hill borrow the money. They will be doing all accounting, and GH will have people training in accounting in that company.

The above quote reflects the current mood in the community: That agriculture is not only possible in GHFN, but other industries can take root also. Much of the Garden Hill infrastructure needs to be rebuilt: from houses, house retrofitting, to roads. Having a construction firm in the community not only accelerates the rate of infrastructure development, but economic development as well.

Although in its early stages, Meechim provides a viable pathway towards achieving a food secure and sustainable community. Furthermore, studies have shown that local farms contribute to overall economic health of the community (Swenson, 2009). This implies that Meechim's business model is affordable, encourages community participation, and promotes entrepreneurship - unlike the typical agribusiness that requires huge start up and operating costs. Still, challenges relating to infrastructure development and training awareness programs would need to be addressed.

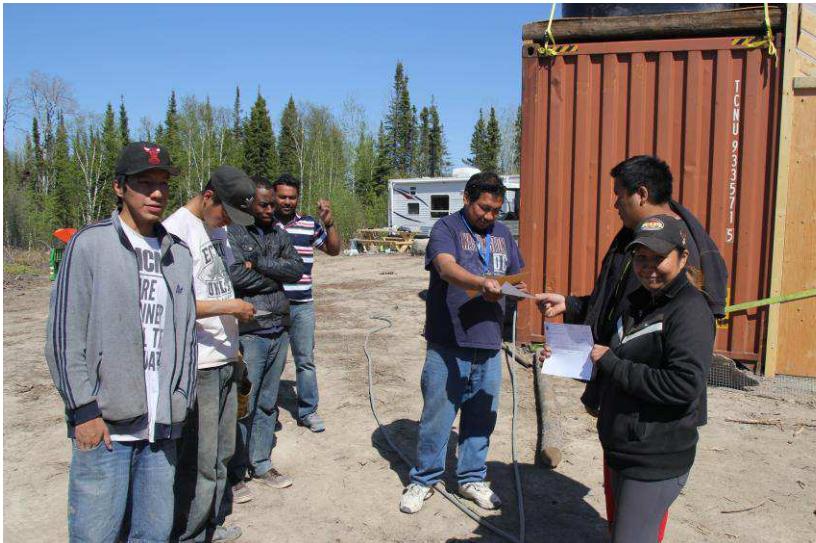


Figure 4.12: Farm workers in GHFN receiving their first paycheck

4.6 Meechim Inc.: Challenges and Opportunities

I don't see anything stopping this, this is beginning of something nice. Everyone likes this, cheap food. Vegetables are growing, chickens are growing. Although, this is just a tester, to see how everything grows. This won't feed everyone, not everyone will get a piece of this. This is just to encourage people around to try this kind of stuff at home, when they see what we are doing. This is experimental, I've never seen this done here or any other first nation community, this is pretty good. More people need try this

– Community member

The above statement from a community member echoes the general feeling within the community about Meechim. Furthermore, there is a general sense that GHFN can take control of its own food future, and maybe can return to being food sovereign; however, this requires strategic planning and foresight. Like any new project, the start of Meechim Inc. was fraught with challenges. For instance, the initial plan to have electricity generated off-grid (from power back up

and solar panels) could not be worked out. So, instead, electricity was generated using a gasoline powered generator. The system was costly (\$100 per day), generated a lot of air and noise pollution, and could not power all the farm equipment. At the same time, there were security concerns at night, and during the day over theft and vandalism – mostly driven by outsider fears.

For irrigation purposes, water was drawn from the nearby stream and passed through a water pump. Irrigation set up started few days after planting started – the reverse should have been the case. The entire set up – which consisted of a single water pump, hose, and tank – was not adequate to irrigate the whole field. Furthermore, there was no proper irrigation schedule in place. Similarly, fertilisers to be used were not delivered, and so peat and lime were used to amend the soil. This, however, did not result in any bountiful yields. No harvests were recorded in 2015 for all crops planted except potatoes.

Another key point, the current production will not meet current demand. With about two to four thousand people in GHFN, commercial farming is needed. But that raises a red flag. A community opines on this:

If we have ten thousand chickens in one facility, that brings in red flags to the government. But if we have one thousand people that have backyard gardens at one hundred birds apiece, that's ten thousands chickens right there. That relieves some of the food insecurity issues. If we have one thousand families with a hundred bird each, we'd have thousands of chickens versus Meechim having thousands of birds, Meechim will become a corporate entity, where standards will be followed. The government will swoop in.

First Nations reserves are federal lands but subject to provincial laws for export. Moreover, intensive livestock production are governed by provincial laws (Health Canada, 2015). From several discussions with community members, including a household survey conducted, producing

food locally is the most practical way to improve the food situation in GHFN. Furthermore, as Hardin & Kwauk (2015) concluded in their study, local food production drives down cost of food items (see figure 4.13)

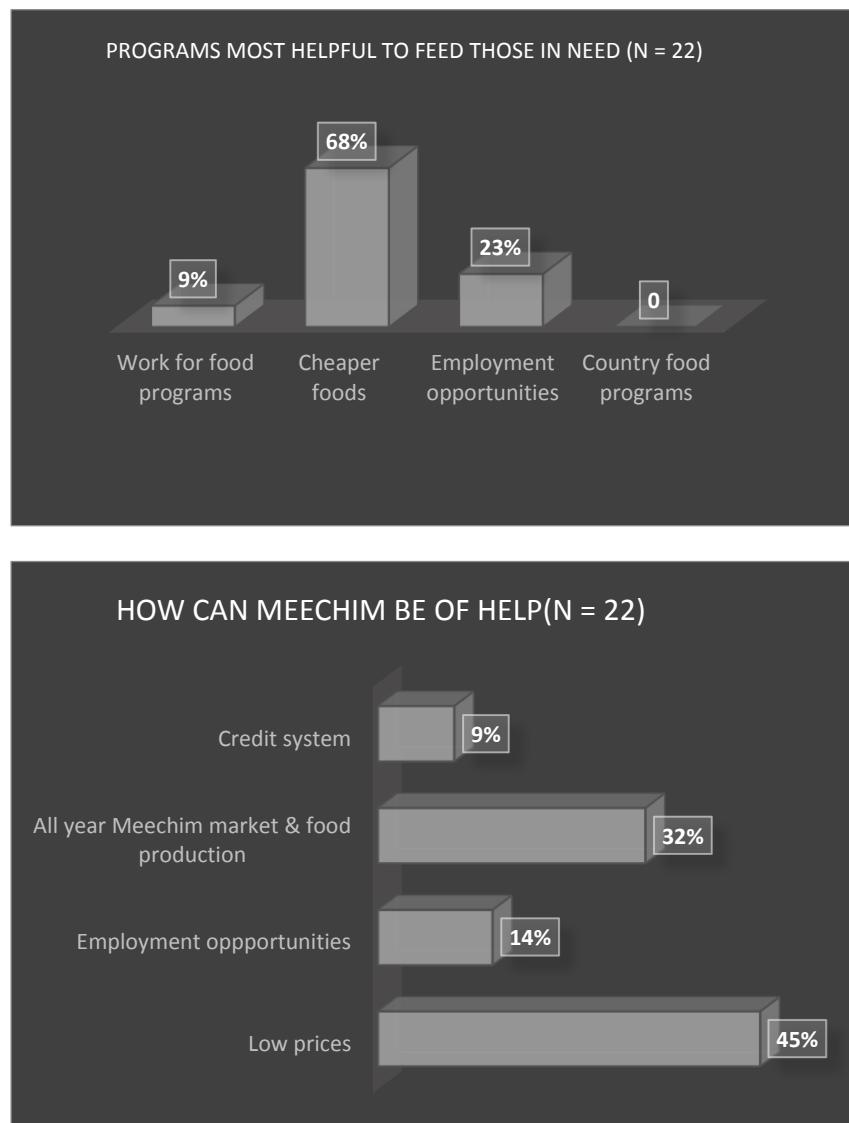


Figure 4.13: Food price ranks highest in resolving food situation in GHFN

This approach to food production becomes more important as a 2015 household survey also shows that only 4% of household members were food secure, while 96% were food insecure (Das, 2015).

Generally, the notion is that healthy foods are expensive (Hardin & Kwaak, 2015). However, healthy foods do not have to be expensive. Healthy foods could range from beans, lettuce and other vegetables as well as local berries and other fruit, as pointed out by many GHFN community members. Moreover, the World Health Organisation and Food & Agricultural Organisation emphasize the need for local vegetable production and consumption in rural areas as a way to combat health issues (WHO, 2016). Several community members mentioned that vegetable farming represent healthy foods, and that food items bought from Meechim Store are healthy and nutritious.

Equally important to note is that the response to the market survey had fairly equal representation from men and women, with 55% (n=22) of females representing their households. This suggests that women govern food related issues in the house. This was pointed out in a report by World Food Programme (2015), stating that: “Women play a key role in guaranteeing food security for the entire household” (para 3). In considering their choice of where to buy food, factors such as price, proximity, and quality of food, were ranked as very important. Furthermore, cheaper foods, all year availability of food, employment opportunities were indicated as ways to help those in need.

Developing a local market system is also crucial in achieving food security in GHFN. As Hardin & Kwaak (2015) states, producing healthier community members is only feasible by

producing healthier food markets. At present, Meechim Farm and Market are trying to achieve this. However, to achieve greater market reach will require significant contributions from community members in terms of local food production, or more regular local markets having local food, such as vegetables and chickens, as well as food shipments with subsidized freight through Nutrition North through Meechim Market pop –up markets. In the first year, the markets were not regular, and so there were several instances when community members could not buy processed chickens from Meechim, as there was no organised time and place for transaction to take place. This market could and should be analyzed within the context of food security (Bonnard & Sheahan, 2009) as markets serve as a vehicle – especially for the poor- to engage in economic activities whether as producers or consumers (Ferrand et al., 2004). Markets help connect the local economy, and are crucial in livelihood developments (Asian Development bank, 2003).

The lack of markets in GH is made worse by its remote geographic location and absence of any access roads. But, Meechim market has begun the process of building a local market economy. As per the statement of a buyer at the Meechim market:

Meechim market can be turned into a marketing chain. What you have to remember is to locate [the market] where lots of activities are, it has to be concentrated.

So, in spite of these initial challenges, there are several opportunities Meechim can take advantage of in order to realise its core objectives. According to Visser, Trienekens, & Beek (2013), the major component to managing a local food economy revolves around governance, education, and capacity building.

Table 4. 1: Opportunities for the local food economy through formal and informal channels

| Formal | Informal |
|--------------------------------------|--|
| Educational programs/community talks | Sharing circles with community members |
| Home garden support | Elder-youth community gardening |
| Farm plan | |
| Additional farm animals | |

4.6.1 Educational outreach programs

Introduce more programs, have more training, increase funding. Don't just give money to the band - to motivate people to go out. More educational programs in high school – Farm supervisor

As established in chapter 1, inadequate access to healthy and nutritious foods has caused severe physical and psychological issues – including diabetes. This could also be attributed to lack of awareness (Hoque, 2014). Educational outreach programs centered on the benefits of healthy living, as well as on how to grow healthy foods should be organized periodically. In parts of Ontario, this strategy (called the local food act) has been adopted, and is being pursued vigorously. One of its food literacy goal is to increase consumer awareness and education (Ministry of Agriculture, Ontario, 2016, para 4). Ensuring long term sustainability of GH's food system requires public education and awareness. For instance, school workshops centered on how to grow healthy foods, and the benefits of eating can be organized periodically. One of the community members recommended a means to achieve this goal:

Work with the school, offer a training course, say how to start a potato gardening. We will teach you how to do it at your own pace, open up the land for you. It is possible, it can be done.

Children were generally excited about outdoor activities, and keen on learning new things (see figure 4.14). Likewise, community talks or events should be organised to engage the youth and elders in food related activities.



Figure 4.14: Children helping out on the Meechim farm in Garden Hill FN

4.6.2 Home garden support

Several community members showed interest in starting their own backyard farm, but require assistance in doing this. A prominent community member expanded on this:

I thought about it more from the business sense angle. What if a person comes and says in two years the farm is blossoming? I want do this in my farm, but I don't have knowledge or equipment. Who can help me build these things for me? Who can train me to raise chicken? How can one family get this second source of income? For the school, there is the knowledge part, opening the kids' mind to broaden their horizon in agriculture. It builds attendance rate (countering low attendance rate), because there is something to look forward to.

For instance, one of the farm workers requested use of the tractor to till her land. From my discussions with community members, farm support service to homes from Meechim will help community members in getting started with home gardens.

4.6.3 Additional Farm animals

The first phase will be the chickens. The initial shock /surprise once they know that these baby chickens are going to be used for consumption. Then it will be easier for other farm animals to come in – Community member

Community members have expressed interest in seeing other types of farm animals (e.g. pigs, goats) on site. However, the introduction of more farm animals requires that infrastructures are put in place. Also brought up was the introduction of cattle or bison. Then again, it takes up to 24 weeks or 6 months to raise a veal calf to slaughter, but 18 months for beef cattle. Four to six months maybe possible for a veal calf, but not for beef cattle. All year round manpower for farm animal management is not yet in place. Regardless, an improvement in farm management practices will result in an increase in various farm animals.

4.6.4 Farm plan

Make a farm plan. I don't see any reason why this can't keep going. It is dependent on funding, but it requires a minimal amount of money. It will require a lot more money to not keep it going – Meechim farm manager, 2015.

There was no farm plan prior to production, and so, this affected key decisions on how activities were carried out. Decision making on the farm was erratic, as there was no set guidelines or timelines (as noted previous sections) for production activities. A well-developed farm plan can increase profitability, and also be beneficial to the environment (BC Agricultural Research & Development, 2013). The farm plan covers four major areas, they include: planning, management,

production, as well as marketing (Agriculture Victoria, 2016). These allow for easy decision-making on a wide range of issues (Agriculture Victoria, 2016). Furthermore, the environment (environmental farm plan) aspect of the plan looks at the control of diseases, pest, farm wastes, and the impacts of farm activities on water and soil resources etc. (Government of Manitoba, 2010).

4. 7 Role of Government

There are several steps the government can take to support this kind of initiative in First Nations and other communities. In the first place, funding is important for successful implementation. A community member explained about the lack of long-term funding for Meechim:

More money, but sometimes the government cuts hopes after funding for one year and cuts it the next year. For Meechim, I am positive it will go through. Community members will take the initiative- grow their foods.

So, this requires provincial and federal governments to create budgets that caters for food programs (food research, educational programs, infrastructure development, and so on) in remote northern communities, as well as in urban areas (Food Secure Canada, n. d). Similarly, policies geared towards the support of small start-ups should be implemented. For instance, federal policies through the lens of Indigenous food sovereignty should be developed in the areas of community development, health, and environment (Food Secure Canada, n. d). In addition, there should be reforms in provincial agricultural policies that are mainly focused on food safety. Such reforms should be centered on pricing and providing healthy foods. The establishment of the Northern

Food Price Survey program by the government of Manitoba has not had any significant impact – so far (Socha et al., 2012). Also, partnerships are important in implementing local food projects.

Partnerships is a big thing we are trying to do also. Partnering with other businesses, for instance; meeting with credit unions, to create employment for contract work. Also, off reserve businesses to create work for community members that live in Winnipeg – (Interview, 2015)

Finally, there should be co-ordination between the different levels of governments and agencies in charge of food production (Government of Alberta, 2010).

4.8 Summary

This chapter explored food production activities in GHFN – the past, present and future. At present, Meechim Inc. provides a great opportunity for GHFN to achieve food security and build community capacity. However, the lack of many assets for a sustainable livelihood, such as physical infrastructure and financial capital, reduced the ability to achieve this goal. The chapter also explored strategies and opportunities through which Meechim Inc. and community members can build a vibrant local food economy.

These strategies revolve – for the most part - around asset building. For example, basic skills needed to succeed are underdeveloped. This requires periodic educational programs that focuses not just on learning gardening skills alone, but also on self-development. Further, GHFN is a poor community, and so strategic partnership is important in order to pull funds and resources together, and to attract economic actors into the community. Notably, Meechim's partnership with the Department of Youth and Employment Training, GH was able to provide employment and training

for some youths in the community. This, in turn, can lead to infrastructural development across the community. Additionally, developing a functioning market that can adequately serve the people of GHFN is crucial, as markets connect the farm to the local economy and can enhance community food security, as well as improve the sustainability of livelihood. To achieve this connection of the farm to the market, a farm to market business plan is required. As noted earlier, some of the challenges encountered were a result of this element being missed. Clearly, this research on Meechim shows that social enterprise can help build livelihoods and food security in First Nations Communities.

Chapter Five

Developing Local Solutions to Local Food Production: A Case of GHFN Community, Manitoba.

5.1 Introduction

First Nation communities in Northern Manitoba are economically poor and food insecure (Thompson et al., 2012). Resolving these issues requires community based food action as well as business activities (Power & Tarasuk, 2006). Correspondingly, Meechim Inc. (a local food social enterprise meaning Food in Ojibway Cree) was established in the fall of 2014 at Garden Hill First Nation (GHFN). Working with Meechim Inc. (referred to hereafter as Meechim), my research focused on finding solutions to boosting local food production.

All communities in Canada are different, as they all have distinct characteristics that make each one unique (Government of Alberta, 2010). Identifying these characteristics to ensure successful project implementation is imperative. For instance, in its report, “Best Practices in Local Food: A guide for Municipalities”, the Ontario Municipal Knowledge Network (2013), stated that the success of local food initiatives requires the identification of the community’s unique situation.

Meechim’s core objective is to increase access to “healthy food and local employment through the production and sale of local foods” (Aki Energy, 2015, p.3). To achieve this, factors like food preferences, suitability of soils for growing crops, and so on would have to be considered. Having explored some of GHFN’s characteristics, my goal in this chapter is to describe and document some things learned about the community that can be used by Meechim and GHFN.

5.2 Soil and Food production

Like many First Nation communities, GHFN community members depend mostly on food items purchased from the one store in the community – the Northern Store - than on locally produced food. According to Swinburn and Egger (2002), reliance on a single area of the food system, in this case, food items purchased from the Northern Store are not enough to reduce food insecurity and decrease chronic health conditions related to diet. For the most part, food items purchased from the Northern Store in GHFN are expensive and unhealthy. So, a holistic approach that looks at the food system, one that is capable of changing the social, health and economic factors in a positive direction, is needed (Signal et al., 2013).

In the context of First Nation communities, one important component that has the potential of boosting the local food system is the soil. At the core of food production is the soil (Food & Agricultural Organisation, 2011). It not only increases access to healthy food items, but also influences social choices for certain food items (Oliver & Gregory, 2015). According to Zanella et al. (2015), the four pillars of food (food access, availability, stability, and utilization) are intrinsically connected with how soils are managed, secured, and accessed – especially by food insecure communities. Yet, soil has been largely absent in discourse around solving food insecurity problems in First Nations communities in Canada.

In describing the importance of soil in food production, a quote from Vedas Sanskrit scriptures (1500 BC) captures it succinctly: “Upon this handful of soil our survival depends. Husband it and it will grow our food, our fuel, and our shelter and surround us with beauty. Abuse it and the soil will collapse and die, taking humanity with it” (United Nations, 2012, para 1).

Thus, extricating soil from food security and health related issues is difficult (Oliver & Gregory, 2015). In simplest terms, soil is defined as the “natural medium for plant growth” (FAO, 2016, para 1). More importantly, the fertility of this medium determines the quality and quantity of food that can be grown on a certain area of land (Gregory, 2012). In the Meechim Farm study area at GHFN, the fertility of soil is poor, due to its clayey nature, but also due to the topsoil being bulldozed away when they cleared the trees. While clay soils are often said to be more fertile than other soil types, holds on tightly to soil nutrients and moisture making it unavailable for plant use.

At least 15 elements are important as plant nutrients, and a deficiency in any one or more of these nutrients can have an adverse effect on plant growth (Government of Manitoba, 2007). Out of the 15 plant nutrients, three (including oxygen, hydrogen, and carbon) of these nutrients are obtained from the atmosphere through photosynthesis. In contrast, 12 of these nutrients are derived from the soil. Table 5.1 below shows the various functions of these nutrients and in what forms they are absorbed.

Table 5. 1: Essential plants nutrients and functions

| Element | Abbrev -iation | Form Absorbed | Function |
|----------------|-----------------------|---|---|
| Nitrogen | N | NH_4^+ (ammonium) and NO_3^- (nitrate) | An important element in amino acids which are the building blocks of protein, helps form the DNA, component of chlorophyll that gives plants its green color, Supports plant growth |
| Phosphorus | P | H_2PO_4^- and HPO_4^{2-} (orthophosphate) | Development of reproductive structures and energy fruiting. Root growth, crop maturity, and supports fruiting |
| Potassium | K | K^+ | Helps in enzymatic reactions, building of energy compounds, regulates gas and water exchange during transpiration |
| Sulfur | S | SO_4^{2-} (sulphate) | Formation of amino acids, chlorophyll formation, and enzyme activation |
| Calcium | Ca | Ca^{+2} | cell growth, cell wall component, translocation of carbohydrates |
| Magnesium | Mg | Mg^{+2} | protein synthesis, energy transfer |
| Iron | Fe | Fe^{+2} (ferrous) and Fe^{+3} (ferric) | photosynthesis, respiration, chlorophyll formation, and many enzymatic reaction |
| Zinc | Zn | Zn^{+2} | protein synthesis |
| Molybdenum | Mo | MoO_4^{2-} (molybdate) | nitrogen fixation |
| Copper | Cu | Cu^{+2} | lignin formation in cell walls, photosynthesis, and respiration |
| Boron | Bo | H_3BO_3 (boric acid) and H_2BO_3^- (borate) | metabolism of sugars in the plant and synthesis of plant hormones |

| | | | |
|-----------|----|-----------|--------------------------------|
| Manganese | Mn | Mn^{+2} | photosynthesis and root growth |
|-----------|----|-----------|--------------------------------|

Source: Adapted from University of Hawaii: Soil Management for Maui County (2007 -2010).

The macronutrients needed for plant growth are: Nitrogen (N), Phosphorus (P), and Potassium (K). In particular, the soil in GHFN is unusually hard, and so, largely deficient in these macronutrients as shown in table 5.2 below (see appendix A for full results)

Table 5. 2: Amount of soil nutrients present at Meechim Farm in Garden Hill First Nation

| Soil Nutrients | Amount present (ppm) |
|-----------------------|-----------------------------|
| Nitrogen | < 1 |
| Phosphorus | 8.0 |
| Potassium | 190 |
| Magnesium | 290 |
| Calcium | 1600 |

In a fly-in community like GHFN, the challenges of managing poor and nutrient deficient soils are complex. As FAO (2013) highlighted in its research on soil management in sub-Saharan Africa, solutions that rely on vast amounts of fertilizers are very expensive and pose huge environmental risks. Certainly, in a community that is isolated and relies chiefly on commodities being shipped from outside, depending on this approach to soil improvement is not practical and feasible over the long term. In trying to resolve this challenge, part of my research focused on local solutions using local resources to enhance soil fertility.

Different local materials were considered to amend the soil. Fish was available to be used for fertilizer. Despite problems facing the community, GHFN has maintained its customs and traditions including fishing and hunting (Thompson et al., 2012). Although facing challenges, commercial fishing has been in existence for decades in GHFN (Thompson, Rony, & Temmer, 2015). According to Wolford (2014), twenty percent of fishing catch caught are thrown away – also referred to as by-catch. Thus, it is useful to see what this waste can translate into in terms of food production. As well, GHFN contains large deposits of peat⁵, which was located close-by the farm. This peat is rich in organic matter, and so has the potential to improve crop yields. In addition, large tree piles were available as the land had been cleared from an alder forest and so these could be used to construct a hugelkulture bed.

5.3 Soil Experiment

I conducted an experiment to investigate the effect of different soil amendments on crop production. The major question tested was which amendment would increase yields and soil fertility. Local resources used for this experiment included fish emulsion, peat, large tree piles, and GHFN soil. On each plot, I planted beans, peas, corn, and turnips (see Figure 5.1).

Each plot measured 4 feet by 16 feet. I then went further to divide each plot (or treatments) into 4 separate subplots – each measuring 4 feet by feet. I planted beans, peas, corn, and turnips in rows 1, 2, 3, and 4 respectively across treatments. This was done in order to determine consistency in results among different types of crops in terms of yields. For this experiment, soil amendments were locally sourced. The notion behind this is simple: To produce food within the community without having to rely on costly external inputs. Crop yields were obtained on the 14th of August,

⁵ “Peat is a heterogeneous mixture of more or less decomposed plant (humus) material that has accumulated in a water saturated environment and in the absence of oxygen” (The International Peatland Society, n.d, para 1).

2015. Number of pods per hole (or replication) were recorded for beans, weight for peas, while height measurements were taken for corn. Data gathered were subjected to analysis of variance (anova⁶) to determine if there were significant differences in yields as a result of soil treatments.



Figure 5. 1: Varieties of seeds planted

I measured the yields based on different parameters, based on academic findings, namely the height of corn, pod number, seeds per pod and seed size. Yin et al (2011) concluded that corn yields can be estimated from plant heights. Similarly, “pod number, seeds per pod, and seed size” are strong indicators of bean yield (Casteel, 2012, p. 4), thus, my decision to use these parameters in measuring yields for peas, beans, and maize. I was not able to measure yields of turnips, as there was no germination in any one of the treatment plots.

⁶ Anova is a statistical technique used to compare the means of more than two samples

5.3.1 Findings

The results showed that there were significant differences in yields across the treatments. From Table 5.3 below, results showed differences in bean yields. More fruit/vegetables resulted from fish soil (8.6 pods/stand) than hugelkulture (4.2 pods/stand). Fish soil also provided roughly four times the yields as lime (1.8 pods/stand) and peat (2.2 pods/stand). As previously mentioned, Hugelkulture is simply making raised garden beds filled with rotten wood. However, the wood that was used was not rotten yet, but rather recently cut wooden branches that were not even chipped up to make nutrients available. To further show if differences in yields were as a result of soil treatments, the variances between the groups were analysed. There is a statistical difference ($\alpha = 0.05$) between the soil groups as the F value is greater than the F critical value; this is evidence that the null hypothesis ($H_0: U_1=U_2=U_3$) can be rejected. Therefore, a true difference exists as a result of the soil amendments.

Table 5. 3: Soil amendments impact on bean pods harvested in area of 64ft²

| <i>AMENDMENT</i> | <i>Count</i> | <i>Sum</i> | <i>Average</i> | <i>Variance</i> |
|------------------|--------------|------------|----------------|-----------------|
| Lime + GH soil | 5 | 9 | 1.8 | 0.7 |
| Fish | 5 | 43 | 8.6 | 1.3 |
| Hugelkulture | 5 | 21 | 4.2 | 0.7 |
| Peat | 5 | 11 | 2.2 | 0.7 |

ANOVA

| <i>Source of Variation</i> | <i>SS</i> | <i>Df</i> | <i>MS</i> | <i>F</i> | <i>Pvalue</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|---------------|---------------|
| Between Groups | 145.6 | 3 | 48.53 | 57.10 | 0.001 | 3.24 |
| Within Groups | 13.6 | 16 | 0.85 | | | |
| Total | 159.2 | 19 | | | | |

Likewise, there were significant differences in pea yields across soil treatments as shown in Table 5.4. Table 5.4 shows the difference in yields among the different soil types, with, fish soil producing 2.9kgs of peas, compared to hugelkulture and peat producing 0.3 and 0.1kgs respectively. Table 5.4 below further highlights the differences in yields. The F value (obtained from the SS and MS values) in the table is greater than F critical or F alpha (obtained from the degree of freedoms) indicating there is a statistical difference in yields as a result of differences in soil types.

Table 5. 4: Soil amendments impact on the weight of peas harvested (kg) in area of 64ft²

| <i>AMENDMENT</i> | <i>Count</i> | <i>Sum</i> | <i>Average</i> | <i>Variance</i> |
|------------------|--------------|------------|----------------|-----------------|
| Lime + GH soil | 6 | 0.8 | 0.1 | 0.0 |
| Fish | 6 | 2.9 | 0.5 | 0.0 |
| Hugelkulture | 6 | 0.3 | 0.1 | 0.0 |
| Peat | 6 | 0.1 | 0.0 | 0.0 |

| ANOVA | | | | | | |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
| Between Groups | 0.81 | 3 | 0.27 | 487.29 | 0.001 | 3.10 |
| Within Groups | 0.01 | 20 | 0.00 | | | |
| Total | 0.82 | 23 | | | | |

For the maize plants, Table 5.5 shows the differences in height between the soil groups. The maize plants on the fish soil had an average height of 43.2 inches, which is three times taller than the others. This suggests that there is difference in yields between the soil types. Table 5.5 analysis shows that there are real differences in plant growth due to soil amendments. The F value is greater than the F critical indicating a statistical difference between the soil groups.

Table 5. 5: Soil amendments impact on maize height (inches) in area of 64ft²

| <i>AMENDMENTS</i> | <i>Count</i> | <i>Sum</i> | <i>Average</i> | <i>Variance</i> |
|-------------------|--------------|------------|----------------|-----------------|
| Lime +GH soil | 5 | 55.5 | 11.1 | 2.05 |
| Fish | 5 | 216 | 43.2 | 32.7 |
| Hugelkulture | 5 | 59 | 11.8 | 6.7 |
| Peat | 5 | 37 | 7.4 | 3.8 |

ANOVA

| <i>Source of Variation</i> | <i>SS</i> | <i>df</i> | <i>MS</i> | <i>F</i> | <i>P-value</i> | <i>F crit</i> |
|----------------------------|-----------|-----------|-----------|----------|----------------|---------------|
| Between Groups | 4164.44 | 3 | 1388.15 | 122.71 | 0.0 | 3.238871517 |
| Within Groups | 181 | 16 | 11.31 | | | |
| Total | 4345.44 | 19 | | | | |

However, the ANOVA analysis does not indicate which soil types are different, merely that the soil types are significantly different. But from comparative observations (see Figures 5.2, 5.3, 5.4 and 5.5). The fish soil is clearly more productive than the others with peat as well as lime being the least productive, and lime and GHFN soil being the next worst in terms of maize height. The figures clearly illustrate the differences in yields ten weeks after planting.



Fish soil

PH – Alkaline
Phosphorus – Sufficient
Potassium – Sufficient
Nitrogen – Adequate

Figure 5. 2: Beans plants growing in fish soil at week 10



GH Soil + Lime
PH – Alkaline
Phosphorus – Deficient
Potassium – Sufficient
Nitrogen – Deficient

Figure 5. 3: Bean plants growing in Garden hill soil with added lime (week 10)



Peat soil
PH – Slightly acidic
Phosphorus - Adequate
Potassium – Sufficient
Nitrogen – Deficient

Figure 5. 4: Bean plants growing in peat soil at week 10



Figure 5. 5: Difference in growth and harvest visible between abundant fish plot and GH soil without amendments at week 10



Figure 5. 6: Experimental plots of plants growing in soils with different soil amendments at four weeks



Figure 5. 7: Experimental plots of plants growing in different soil amendments at ten weeks

5.3.2 Discussion

Clearly, soil amendments can make a difference in yields and productivity according to statistical analysis by excel (2013) ($p<0.005$). More fruit/vegetables resulted from fish amendments in soil (8.6 pods/stand) than from hugelkulture (4.2 pods/stand), lime (1.8 pods/stand) or peat (2.2 pods/stand). Similarly, pea production rates with fish was high, and the differences in yields between treatments were significant. Although, corn yields were not measured and were minimal due to the need for a longer growing season than that available in the northern Manitoba community of GHFN, the production of higher corn stalks for soil with fish amendments indicates corn and other vegetables would do better with fish fertilizer, which includes nitrogen.

Comparisons were limited to three plants – maize, bean, and pea – as no germination occurred for turnip in any of the treatments. Differences in yields and growth of plants were very visibly different across the four soil treatments. In particular, the fish plot had more yields of each crop compared to other plots. The leaves were broader and greener, and the stands had larger sizes of pods. Hugelkulture, according to the Permaculture Research Institute (2010), does better in later years as a result of wood decomposition, thus, could be the reason why fertility was low in its first year. All results indicate the availability of important nutrients in the fish soil as compared to other soil types. The soil tests carried out five weeks after (using luster leaf soil test kits) planting indicated that soil amended with fish guts was the only one that was not nutrient deficient.

The use of fish guts is not new, dating back to ancient Egypt where farmers used fish guts to enhance soil fertility (Great Pacific Bioproducts, 2016). A study conducted by Haque et al (2016), showed that the use of fish pond sediments in crop production produced a higher rate of return than other treatments. The breakdown of fish guts produces large deposits of nitrogen and

phosphorus (Haque et al., 2016) – two major plant nutrients. Figure 5.8 shows the fish soil two weeks after mixing with fish guts. The worms, maggots, and other bugs that resulted from the fish guts not only provided organic matter, released nutrients from clay but also improved the pore spaces needed for proper soil aeration.

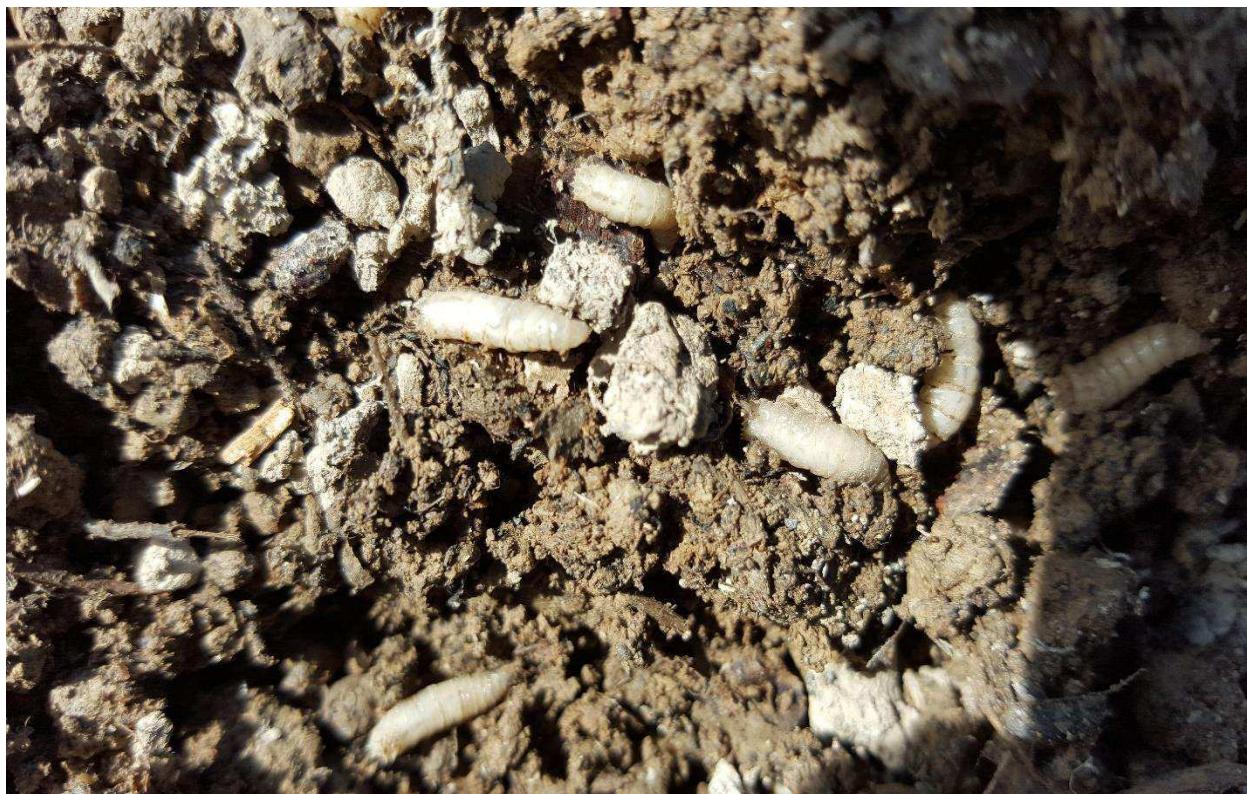


Figure 5. 8: Meechim Farm's soil at Garden Hill First Nation soil two weeks after amendment with fish guts in 2015

Overall, the results show that the soil capacity for sustainable food production in GHFN can be built but requires the soil be amended with nutrients. This will improve the yields considerably. For instance, an estimated 155,727 pounds of peas can be harvested from a five-acre farm amended with fish guts. Therefore, given these results, in 2016 and 2017 growing seasons,

fish guts (5000lbs) were used as fertilizers (see figure 5.9). As can be seen, fish fertilizers enrich the soil, thereby improving yields in crop production.



Figure 5. 9: Healthy crops growing on fish soil

Without the soil amendments to the farm (only to the test plot), the yield was very poor (reported to be six bags of potatoes in 2015 growing season for five acres of planted fields). These improvements in soil fertility can make significant contributions to food security in First Nations Communities. Food production is needed both at the community farm and the household level for food security. For example, GHFN members have expressed interest in growing their own food, which can ultimately lead to more self-reliant families and a more healthy community. Livelihood strategies and resources are needed for this community and food security. In particular, seeds should be provided for free to households wanting to grow crops in their backyards. Also, as fertilizer is not available from a store in the community, and not everyone fishes- fish guts should be available to make the otherwise unfertile soil fertile. Important to realize, GHFN is a fishing community, and fish fertilizer is a local and easily accessible resource.

5.4 Summary

To reduce rates of food insecurity and increase livelihoods, Meechim Farm has to improve its soil to build a viable farm and illustrate an agriculture system. Healthy fertile soil is clearly the building block for food as shown by the results of this study. Without fertile soil, nothing grows, and a good agricultural yield to feed the community will not be obtained.

Working together with Meechim, my research findings suggest that amending the soil with fish guts is vital to local food production. Locally grown vegetables and fruits are cheaper, healthier and fresher, as this local food increases the financial capital of both producers and consumers alike. On the whole, these findings have implications not only for Meechim Farm and GHFN, but also for First Nations communities in Manitoba who share similar characteristics.

Chapter 6

Traditional and Ancestral Sustenance Activities in Sustainable Food Production

6.1 Introduction

Food consumption is an important factor that underpins the cultural foundation of Indigenous people in Canada (Cidro et al., 2014). In particular, food provisions in Indigenous communities (which comprises First Nations (FN), Metis, and Inuit) are characterized by two systems: the purchase and consumption of food items from the store and the harvesting, sharing, and consumption of traditional (or country) foods (Power, 2007). To explain, FN people refer to wild harvested foods as traditional foods, while the Inuit call it country foods (Skinner, 2013).

In trying to understand Indigenous perspective on food security, Power (2008) argues for the inclusion of cultural food security. Equally important, Power states that access to traditional or country foods – as well as market foods – is key to food security. Thus, achieving food security in FN communities requires an understanding of Indigenous perspectives and current state of cultural food security. In this chapter, I explore the importance of traditional foods and land use planning in reducing food insecurity in Garden Hill FN (GHFN).

6.2 Method

For my research, household surveys were conducted. A total of 22 households, selected randomly, were surveyed. The surveys were conducted with the help of a community member, so as to facilitate rapport and build trust. Data gathered were subjected to descriptive statistical analysis. Ten face-to-face interviews were conducted.

In addition to interviews conducted, I reviewed documents and maps that linked sources of wildlife in the area to quantity of food and sustainability. Also reviewed were literatures that would be useful for planners or decision makers in developing agricultural land resources in GHFN. My aim was to further make clear the role of traditional and sustenance activities and commercial activities in sustainable food production.

I conducted one focus group discussion. The group consisted of all eight farm workers. The aim of this focus group was to share Indigenous knowledge, and generate possible strategies to be incorporated into Meechim Inc. Also discussed were issues around revamping gardening in Garden Hill. This discussion was recorded and transcribed manually afterwards.

6.3 Traditional Foods in Garden Hill First Nation (GHFN)

Throughout history, inhabitants of GHFN have relied on fishing, hunting, trapping, and gathering as a means of survival. The land serves not only as a livelihood resource, but also their cultural identity. According to the script written on a sign in GHFN, community members in GHFN believe in the sanctity of the land:

All of our rights originate from our connection to the land. Our lives, our beliefs and our presence as First Nation are validated to the land, inhabited by our ancestors since time. Our land is sacred. It is the living body of our sanctity. The teachings and our customs are implicit and practiced through the integrity that protects and warrants our survival (Oyegunle, 2015, p.81).

GHFN possesses vast amounts of natural resources including: wildlife (moose, beaver, fish etc.), minerals (gold, bedrock), and a pristine natural environment. In fact, before the advent of colonialism (in the 1960's) brought about by the Indian Act and treaties, people in GHFN were food secure. In addition to being hunters and gatherers, they also gardened along the shore lines. In

several discussions with community members, they often will reminisce about how they used to go hunting, gathering berries and medicinal plants. But now, everyone buys food from the stores and no longer feed solely off the land. As noted by Lamden et al. (2007), traditional foods are healthier, less expensive, and are culturally more relevant compared to store bought foods. Also, consumption of traditional foods undergirds key cultural values such as bonding with nature, encouraging the spirit of sharing, and caring for one another.

Furthermore, as Wilson (2003) notes, traditional foods and medicines have medicinal value. For instance, certain fruits, berries, plants, and animals are used in the production of medicines. Today, many FN communities experience high rates of food insecurity. The dependency on the welfare system, amongst other factors, have led to a shift in store bought foods. By the same token, the reduction in traditional food consumption is a major cause of food insecurity, as well as health issues in FN communities including GHFN (Lozeznik, Thompson and Klatt, 2011). This way of life (that includes its traditional economy, social and spiritual practices) of FN peoples was severely disrupted by the Indian Act, mining activities, the residential school system and racist government policies (Thompson et al., 2010):

Island Lakes were an untouched community until 40 or 50 years ago. They were very independent and ate traditional foods off the land. Then they switched their diet in less than a generation. Bodies cannot adapt that quickly (p.22).

Also, a community member in GH contributed to the decline in traditional foods:

I know the hydro dam has affected us, but it's the nelson house in that area, its destroyed wild games, livelihoods, trappings, and fish. But there is no dam here, that's why people are hesitant about the mining project

The practice of harvesting traditional foods was not only for the adults only, but had the involvement of the entire family. A community member opined:

Everyone can do it, they have land, and it's not hard to get seeds. My grandma used to take us berry picking when we were younger. But all that has been destroyed by the Arnason [Industry Ltd], berries don't grow there anymore. But they give us jobs, so no one protests.

Harvested food would include: "muskdeer, geese, duck, moose, beaver, medicines, ginger, and bulrushes, berries (blueberries, raspberries, and strawberries), and fish" (Thompson et al, 2010, p.22). Table 6.1 below gives an insight into what constitutes traditional foods

Table 6. 1: Traditional foods throughout Manitoba (and not specific to Northern Manitoba)

| CATEGORY | FOODS |
|---------------|---|
| Large animals | Bear, beaver, bison, coyote, (white-tailed) deer (venison), elk, moose, lynx, caribou |
| Small animals | Duck, goose, grouse (rock/willow), partridge, prairie chickens, ptarmigan, muskrat, rabbit, wildfowl (chicken), wild turkey, muskrat |
| Fish | Bass, bullfish, catfish, jackfish, lake sturgeon, lake trout, pickerel, perch, speckled trout, suckers, walleye, whitefish, white sucker fish |
| Berries | Blackberries, blueberries, chokecherries, crab apples, cranberries, gooseberries, pin cherries, raspberries, saskatoons, strawberries, currants, smooth sumac, buffalo berry & soapberry, red cherries, Canadian plum & American plum |
| Other | Edible wild plants, e.g.: dandelion greens, hazelnuts, pink roses, Labrador tea, licorice, mint leaves, squash, weekay, wild grapes, wild onion, wild plums, wild potatoes, wild rhubarb, wild rice, wild turnip, 100% pure maple syrup |
| Garden | Beans, carrots, corn, cabbage, green beans, onions, potatoes |

Source: Food Matters Manitoba, 2016

In other words, GHFN were food sovereign as they had control over their food systems. Thus, to achieve food security, GHFN must first be food sovereign. The term food sovereignty indicates the control of food production and consumption (Cidro et al., 2015). First devised by La Via Campesina (a group of land based farmers, peasants, and Indigenous people in 1996), food sovereignty emphasizes the relocalisation and control of food systems (Cidro et al., 2015).

On the whole, Indigenous food sovereignty (IFS) is guided by four essential principles: 1) realisation that food is sacred; 2) regulations and polices that are locally relevant and supportive; 3) self-determination; and 4) participation in the food system (Morrison, 2011). For many people in GHFN, the land is still their source of livelihood. So, despite the decline in traditional food consumption, community members still express great interest in traditional activities:

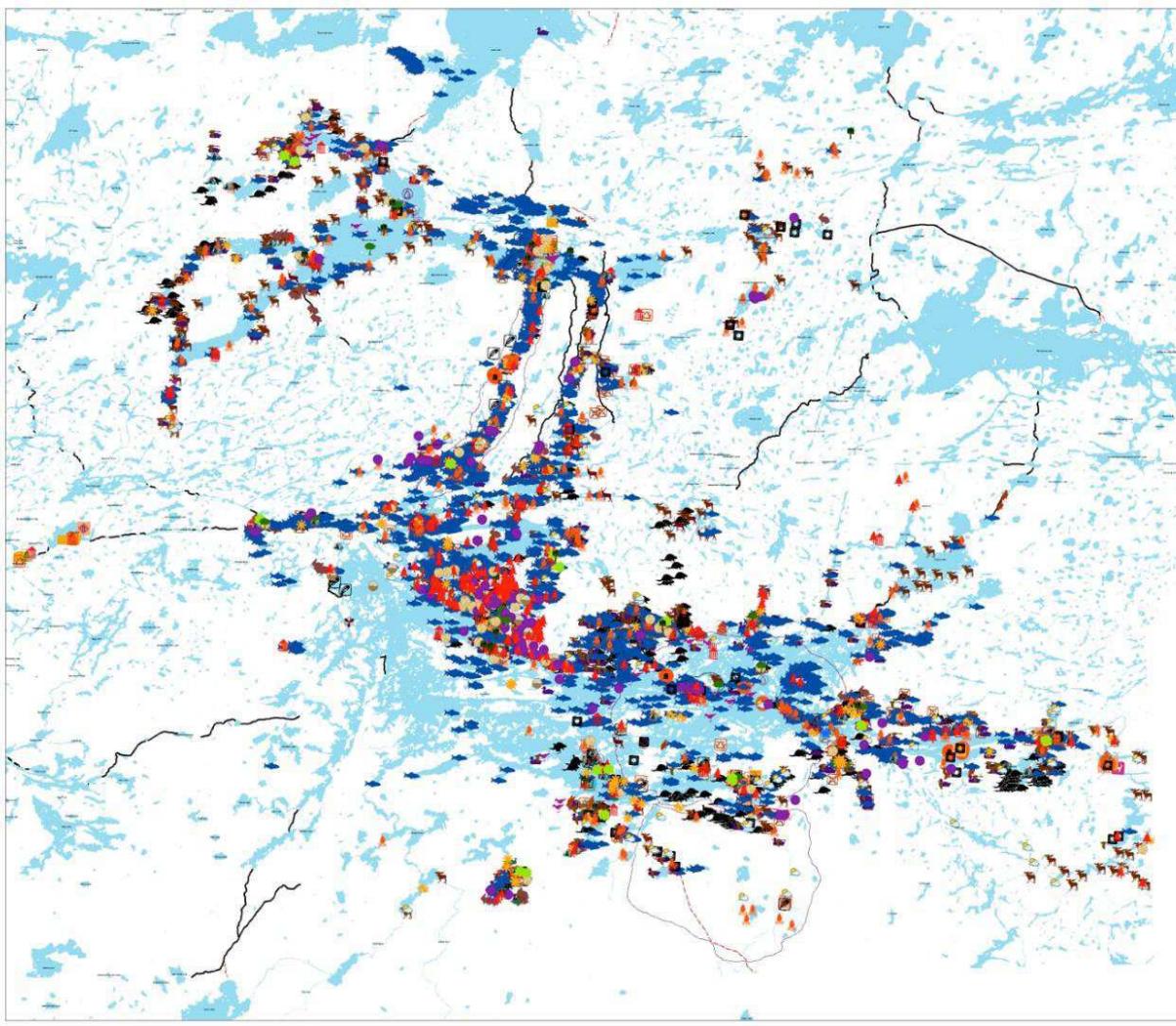
I also try to eat off the land – go for fishing, hunting for wild meat once a week. Also buy food from stores – from northern stores or stores in the community. I hunt moose (if we see them), beaver, rabbits, geese, ducks. So, 70 percent of food grocery stores and 30 percent from out in the bush (interview, 2015).



Figure 6. 1: Community members in GHFN skinning moose

To understand the significance of traditional foods to community members, land use maps were created by Thompson (2014) to help identify sites of great importance. With these maps, it was easy to see cultural sites, hunting sites, camping sites, and so on. Figure 6.2 shows a summary map of Garden Hill showing some of these sites.

Summary Map on Garden Hill First Nation's Ancestral Land Use and Occupancy



Garden Hill's Ancestral Territory, Manitoba



Figure 6. 2: A draft summary map of Garden Hill First Nation showing some cultural and hunting sites (Source: Thompson, 2014).

6.4 Indigenous Land Use Planning

"Indigenous-led land use plans can establish certainty for industry and communities by identifying where they can operate, providing local conditions are met, and where the ecosystem will remain undisturbed. I believe this form of planning is our best opportunity to realize a wise balance of conservation and sustainable developments". - Ron Thiessen, Executive Director of CPAWS Manitoba

To ensure land rights and environmental health are protected, land use planning are important to ensure activities are carried in the right place. Even more, land use planning ensures Indigenous and treaty rights are kept, while bringing stability to a region often filled with conflict between "rights holders and stakeholders" (Thiessen, 2015, para 5). With regards to access to traditional foods, the ever increasing demand for access to their territories by industries has had an impact on their cultural food security (Booth & Muir, 2011). For these reasons, land use and environmental planning is a sine qua non for sustainable development in Indigenous communities in Canada.

According to Booth & Muir (2011), Indigenous planning and environmental planning are two different concepts. A recent subunit of planning, Indigenous planning takes into account the unique legal, historical, political, social and cultural conditions of Indigenous peoples. Further, they stated that this field recognizes the challenges of maintaining access to their resources, while trying to keep up with traditional lifestyles including gathering, hunting, fishing and trapping. So, Indigenous planning is inextricably linked to self-determination, food security, and food sovereignty. At a community planning project in 2011, a prominent GHFN member had this to say: "You have to plan the future, if you don't have a vision you are going to be lost somewhere" (Garden Hill Comprehensive Planning Project Report, 2011).

Indeed, GHFN community members are keen on how their natural resources are to be used, especially in partnerships with external organisations. In times past, outside organisations have been uncivil with respect to community needs (Garden Hill Comprehensive Planning Project Report, 2011). For instance, mining activities have had negative impacts on fish population in the area (GCPP, 2011). Generally, extracting resources without due consideration of its impact on Indigenous peoples is unethical (Booth & Muir, 2011). Considering this, Lertzman & Vrendenburg (2005) conclude that there is an expectation, in most countries, of ethical treatment of people, but the exception frequently is unethical treatment of Indigenous people. In Manitoba, the basic legal duty to consult is not being respected which breaks an ethical treatment. According to Palmatas & Dumas (2013):

Manitoba is one of the only provinces that does not have a First Nation consultation policy, despite the Supreme Court of Canada saying since the 1990's that the provinces have a legal duty to consult, accommodate and obtain the consent of First Nations for activities on their reserve, treaty and traditional land (p.1).

For instance, figure 6.3 shows a recent map by the province for mineral exploration. Although some FN communities have control over their lands as a result of the *First Nations Land Management Agreements* (Oyegunle 2015, as cited in Zagozewski et al., 2011), GHFN does not have any autonomy over its lands. Any form of community and traditional land use planning should require the infusion of traditional or Indigenous knowledge, and involve community input and consultation to those impacted by development. According to Turner, Ignace & Ignace (2000), traditional ecological knowledge is vital in the management of local resources and to sustainable living.

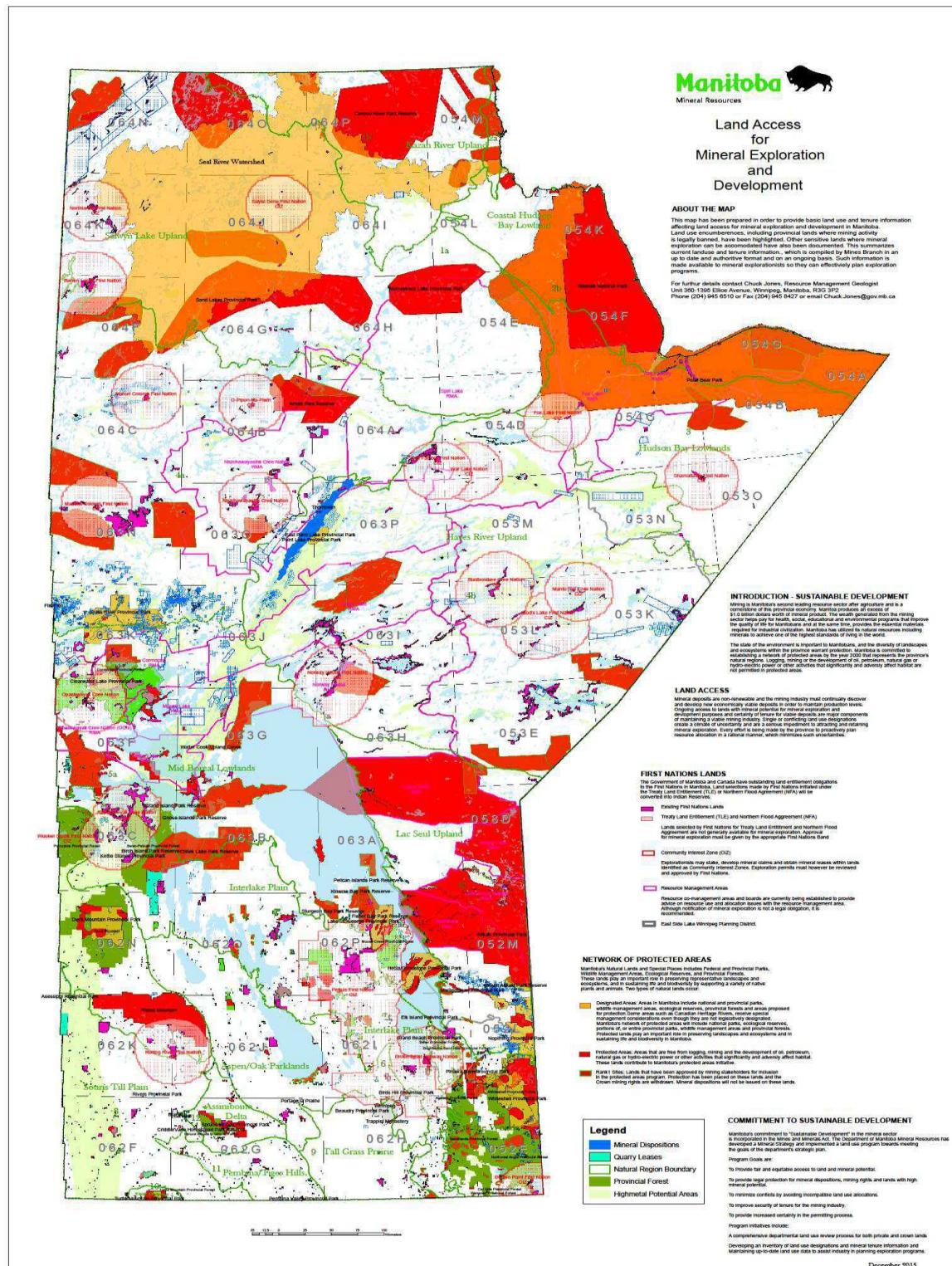


Figure 6. 3: Land access for mineral exploration & development in Manitoba

Source: Government of Manitoba, 2015.

Social and environmental considerations are generally lacking in community planning and development in GHFN. Since the start of international discourse about sustainable development propelled by the Brundtland report of 1987, several definitions, models, frameworks, and initiatives have been propounded (Baumgartner, 2011). In all of these definitions what stands out is the connecting of social, economic, and environmental values into one single idea. True sustainability will only be achieved when each of these are given equal priorities in the process of sustainable development.

Additionally, this type of knowledge-based study is useful in proffering developmental policies that are more socially and environmentally friendly. At present, traditional Indigenous lands are under attack by forestry, mining, and development activities that have destroyed traditional and hunting sites, and have created disputes in many FN communities (Rudolph & McLachlan, 2013).

6.4.1 Social ecological knowledge

According to Richards (1985), a knowledge system refers to a set of beliefs, perceptions, and practices held by members of a particular community. Simply put, social ecological knowledge refers to knowledge about plants, animals, people, and natural resources in a community (Moquin, 2014). In GHFN, community members not only display knowledge of natural resources around them, but also about its people and their history. Since ecosystems are diverse and adaptive, Berkes et al (2000) suggest that the use of knowledge in management decisions should also be complex and adaptive.

6.4.1.1 Food knowledge

Community members identified types of food they would love to have as part of their diet.

They also expressed their concern for the quality of food available in Garden Hill as it relates to health issues (see figure 6.4). Wild meat was identified as a major delicacy in diets of most community members and the healthiest of foods. Speaking to a youth who had just gone duck hunting, he said:

I go duck hunting almost every evening, its part of my routine.....I have my spot where I do my hunting. I use my bow and arrow every time. My grandma uses this to prepare soup for us. (interview, 2015)

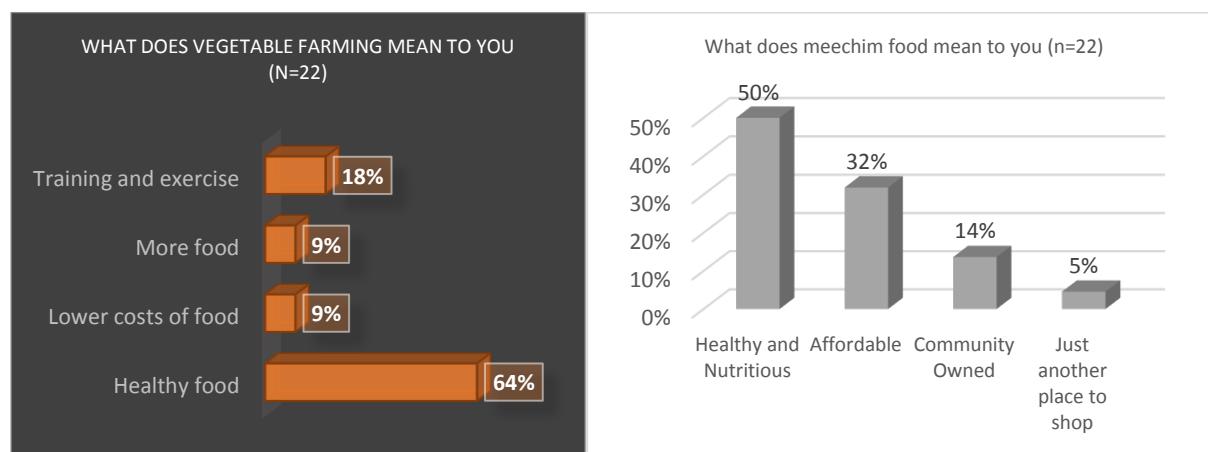


Figure 6. 4: GHFN views on vegetable farming and Meechim Food

6.4.1.2 Knowledge of people

In a tight knit community such as GHFN, people's welfare is related to the well-being of others in the community. There are many informal or family social networks. People were often during interviews mentioning others in the community as a more knowledgeable person to speak to. Statements like, “*you can talk to John, he will be able to help with.....or that family over there used to have their own garden but now....*” are not rare during interviews or discussion with community members. Also, community events or gathering provides further opportunities for community members to come together to share issues and ideas.

6.4.1.3 Local Environmental Knowledge

The respect and care for Mother Nature is of utmost importance to community members in GHFN. While problems persist with regards to waste management in the community, the sanctity and importance of their local environment is not lost on them. They understand the value of clean water, that deforestation (from mining and development activities) affects biodiversity – which impacts their cultural food security. When asked about the state of natural resources, a community member said:

“We are filthy rich” (interview, 2015).

However, due to restrictive government policies, the natural resources in the traditional territory of Island Lake are owned by the provincial government, who restrict access to the GHFN and other First Nations. To be filthy rich in reality for GHFN community members requires a shift in government policies and sustained efforts by organisations such as Meechim.

6.5 Summary

This chapter explored existing natural resources in relation to sustainable food production in GHFN. Through interviews and document reviews, natural resources identified include wildlife (moose, beaver, fish etc.), minerals (gold, bedrock), and a pristine natural environment. However, activities like forestry, mining, and development activities continue to negatively impact its cultural food security and way of life.

Notably, provincial policies have shaped the relationships between government, First Nations' communities, and industry representatives, but this relationship has devolved into a

contentious one. According to Gaile (2015, p. 2), “implementation and application of provincial policies and procedures” has been flawed. Furthermore, Gaile notes that the lack of communication, inadequate consultation, and lack of understanding of cultural backgrounds have contributed to a decline in relationships. To counter this trend, the history, knowledge, and perceptions of community members are needed in community development activities and programs.

Chapter 7

Conclusion and Recommendations

Years of systemic racism along with the geographic isolation and underdevelopment due to economic poverty of First Nations will take years to revert. Besides, access to healthy foods does not immediately solve these problems. Nevertheless, “healthy food is a precursor to wider social change and improved health” (Socha et al., 2012, p.1), which Maslow’s hierarchy of needs clearly points this out. A basis for a healthy community and economy has to be healthy food and shelter. In trying to bring about this change to healthy food, several measures – including National and Provincial programs like National Nutrition North Canada and Northern Healthy Food Initiative have been taken in times past, all of which have been mostly influenced and controlled by external forces. But none of these have brought any meaningful change.

The purpose of this research was to explore opportunities to building livelihoods and food security through social enterprise. To achieve this, specific objectives included: to explore strategies by which Meechim Inc. can boost the local food economy; to develop best practices to establishing a viable commercial garden with community members; and to understand the role of traditional and sustenance activities and commercial activities in sustainable food production

My thesis focused on a new path towards achieving a more self-reliant, food secure, and economically vibrant community: social enterprise. As a rule, social enterprises reinvest its proceeds towards community economic development and capacity building. Meechim’s quest to spur local economic growth in GHFN has been met with enthusiasm and support from community members and various stakeholders. Historically, community members relied on traditional foods.

They were hunters and gatherers, and food secure. Today, community members depend largely on store bought foods, and are food insecure. Undoubtedly, this can be traced to the colonization of First Nations Communities – from cultural disruptions to land dispossession. And these have had a cascading effect, including financial and psychological dependency on the state. In describing these effects, Tanner (2009) identified four core effects. They include: disorientation, disempowerment, discord, and disease (p.254). To reverse this trend, Alfred (2009) recommends the need for community regeneration through land based cultural practices. Likewise, as Zahariuk (2013) concluded, “solutions for improving food security must be embedded within the realm of sovereignty and be led by community members” (p.3). Through my collaborative research with Meechim, this research with the community identified opportunities and challenges to be considered in future planning. This research offers solutions to GHFN as well as other FNs with similar situations.

Through data generated, I identified the state of major livelihood assets required to make a living. In GHFN, livelihood assets required to make a decent living are underdeveloped. These assets are important, as they can influence people’s ability to organise different strategies to achieve certain livelihood outcomes. At the present time, only two livelihood assets dominate in GHFN: social and natural assets. The data, however, indicates various opportunities that community members, as well as Meechim can take advantage of to realize its objectives – from home garden support, comprehensive farm plan, educational programs, to strategic partnerships.

Another important factor is the soil. At the core of food production is the soil. It not only increases access to healthy food items, but also influences social choices for certain food item.

Yet, soil has been largely absent in discourse around solving food insecurity problems in First Nations communities in Canada. Working together with Meechim, my research findings suggest that amending the soil with fish guts is vital to local food production. Equally important, as the data reveals, is the significance of traditional foods and land use planning in reducing food insecurity in GHFN. This is an indication that the history, knowledge, and perceptions of community members are needed in community development activities and programs.

To further move the conversation forward, two key elements are important, namely 1) linking food to health; 2) need for capacity building. These two aspects are further discussed below.

7.1 Healthy foods should be at the top of health care agenda

Healthy foods need should be the focus for social change and improved health. So, in addressing health care, issues in FNs, healthy foods should be at the top of the agenda. An estimated two hundred fifty thousand dollars is spent in treating each diabetic patient in GHFN (Loney, 2012). This amount of treating one diabetic patient is the same capital Meechim started with, which has helped a dozen youth gain employment, training, and in providing better food to prevent diabetes.

Clearly, little attention is being paid to the root cause of the problem: food insecurity. Programs like the Northern Healthy Food Initiative, food buying clubs, and country food programs have done little to increase food security. Thompson et al. (2012) states that country foods with no road or public transit still amounts to 60% food insecurity, which while being an improvement from 88% is still high. Furthermore, these programs require external funding to be successful to

pay for equipment and gas for hunting/fishing trips. Country foods programs work on the sharing model but are not self-sufficient as external funding is required. Also, under the goal of reducing the price of healthy foods, Nutrition North Canada puts a million dollars into freight subsidy program. Still, registered retailers in this program – like North West Company (Northern Store) – sell foods that are expensive and unhealthy. From discussion with community members, other gardening and Nutrition North subsidy programs have yet to make any difference in their lives. They want to be in control of their food system. Projects, like Meechim, therefore look at the larger picture. A future where FN communities are self-reliant and self-sufficient.

7.2 Capacity building

However, achieving self-sufficiency requires a substantial amount of capacity building to build people's skills and sense of self-determination. This requires changing mindsets and attitudes to seek opportunities in social enterprise and build support networks to assist with financial assets and physical infrastructure as well as training. Steve Maraboli captions this point:

“Once your mindset changes, everything on the outside will change along with it” Of course, this will not happen overnight. Seminars in different areas should be held periodically across FN communities: career choices, parenting, family budgeting, eating healthy, skill acquisition, business management, and so on. This creates an atmosphere where community members feel they are in control of their lives and their future.

In conclusion, building livelihoods in isolated communities like GHFN requires communication, co-operation and co-ordination among the different stakeholders. Additionally, policies that affect FN communities – going forward – should be one of inclusiveness and equality.

I have heard people argue: “community members should move to Winnipeg (or other cities) and be part of the larger community”. This way of thinking does more harm than good. Instead, FN communities should be developed the same way our major cities are – with clean water, healthy foods, decent housing, and so on. For instance, construction of an all season road will go a long way in resolving various logistical difficulties. More than just paying lip service to policies of equality is needed, but sincerely acting on them.

As I mentioned in chapter 4, the effects of past ills are reverberating today and made worse by apartheid like funding and policies. Clearly, the institutional discrimination for First Nations community in Canada needs to be corrected (Mohammed, 2016). So, a holistic approach that includes education, policy, institutional change and funding, becomes necessary but needs to extend to food and other basic needs. So, changing perceptions requires awareness programs across the country that can lead to an influx of potential investors in FN communities, and increase connection between lenders and borrowers (Mohammed, 2016). Furthermore, lessons can be drawn from BUILD, an aboriginal non-profit that utilizes green economy initiatives to address employment issues and sustainable rural and northern economic development (Loney, 2012). Thus, appropriate funding should be targeted towards solutions that are more local.

References

- Abate, G. (2008). Local food economies: Driving forces, challenges, and future prospects. *Journal of Hunger and Environmental Nutrition*, 3, 384-399. doi: 10.1080/19320240802528914
- Aboriginal Affairs and Northern Development Canada. AANDC (2013). Common Terminology. Retrieved on August 9th, 2017 from <https://www.aadnc-aandc.gc.ca/eng/1358879361384/1358879407462>
- Agriculture Victoria. (2016). Whole farm planning. Retrieved on April 4th, 2016 from <http://agriculture.vic.gov.au/agriculture/farm-management/business-management/whole-farm-planning>
- Aki Energy. (2015). Gardening again in Garden Hill: Growing good jobs and healthy foods through social enterprise. A report by Aki Energy.
- Alaimo, K., Packnett, E., Miles, R., & Kruger, D. (2007). Fruit and vegetable intake among urban community gardeners. *Journal of Nutrition Education and Behavior*, 40, 94–101. doi: [10.1016/j.jneb.2006.12.003](https://doi.org/10.1016/j.jneb.2006.12.003)
- Alaimo, K., Reischl, T. M., & Allen, J. O. (2010). Community gardening, neighbourhood meetings, and social capital. *Journal of Community psychology*, 38, 498-514. doi: 10.1002/jcop.20378
- Alfred, T. (2009). Colonialism and state dependency. *Journal of Aboriginal Health*, 5, 42-60. Available at: http://www.naho.ca/jah/english/jah05_02/V5_I2_Colonialism_02.pdf
- Anderson, A. R., & Jack, S. L. (2002). The articulation of social capital in entrepreneurial networks: glue or a lubricant? *Entrepreneurship and Regional Development*, 14, 193-210. doi: 10.1080/08985620110112079
- Asian Development Bank (ADB). (2003). Making Markets Work Better for the Poor: Proceedings from the Inception Workshop. Hanoi: ADB
- Avnimelech, Y. A., Cohen, A., & Shkedi, D. (1990). The effect of municipal solid waste compost on the fertility of clay soil. *Soil Technology*, 3, 275–284.
- B.C. Agricultural Research & Development Corporation. (2013). Growing forward 2. Retrieved on April 04th, 2016 from https://www.bcac.bc.ca/sites/bcac.localhost/files/Ardcorp_Program_Documents/EFP%20Program%20Detail%204%20Pg%20Handout%2030%20April%202013%20version%20final.pdf
- Barbeau, C. D., Oelbermann, M., Karagatzides, J. D., & Tsuji, L. J. S. (2015). Sustainable agriculture and climate change: Producing potatoes (*Solanum tuberosum L.*) and bush beans (*Phaseolus vulgaris L.*) for improved food security and resilience in a Canadian subarctic first nations community. *Sustainability (Switzerland)*, 7(5), 5664–5681. <http://doi.org/10.3390/su7055664>

Barnidge PhD, MPH, E. K., Baker PhD, MPH, E. A., Motton, F., Fitzgerald, T., & Rose, F. (2011). Exploring Community Health through the Sustainable Livelihoods Framework. *Health Education and Behavior*, 38(1), 80. <http://doi.org/10.1177/1090198110376349>

Baumgartner, R. J. (2011). Critical perspectives on sustainable research and practice. *Journal of Cleaner Production*, 19, 783 -786. Doi:10.1016/j.jclepro.2011.01.005

Berkes, F., Colding, J., & Folke, C. (2000). Rediscovery of traditional ecological knowledge as adaptive management. *Ecological Applications* 10:1251–1262.

Bessant, K. C. (2005). Community development corporations as vehicle of community economic development: The case of rural Manitoba, community development. *Journal of the Community Development Society*, 36, 52-72. doi: 10.1080/15575330509490175

Blaikie, B. (2000). Revitalizing democracy in the era of corporate globalization. *Canadian Parliamentary Review*, 23(1)10 Retrieved from <http://search.proquest.com/docview/220822270?accountid=14569>

Blair, D., Giesecke, C.C., & Sherman, S. (1991). A dietary, social, and economic evaluation of the Philadelphia Urban Gardening Project. *Journal of Nutrition Education*, 23, 161–167.doi: [10.1016/S0022-3182\(12\)81191-5](https://doi.org/10.1016/S0022-3182(12)81191-5)

Blumenthal, D. S. (2011). Is Community-Based Participatory Research possible? *American Journal of Preventive Medicine*, 40, 386-389. doi: [10.1016/j.amepre.2010.11.011](https://doi.org/10.1016/j.amepre.2010.11.011)

Bond, J. K., Thilmany, D., & Bond, C. (2009) ‘What Influences Consumer Choice of Fresh Produce Purchase Location?’*Journal of Agricultural and Applied Economics*, 41(1), 61–74. doi: [10.1017/S1074070800002558](https://doi.org/10.1017/S1074070800002558)

Bonnard, P. & Sheahan, M. (2009). “Markets, Food Security and Early Warning Reporting.” FEWS NET Markets Guidance, No 6.

Booth, A. L., & Muir, B. R. (2011). Environmental and Land-Use Planning Approaches of Indigenous Groups in Canada: An Overview. *Journal of Environmental Policy & Planning*, 13(4), 421–442. <http://doi.org/10.1080/1523908X.2011.635881>

Braun, P., Harman, J., & Paton, F. (2014). Economic gardening: Capacity building for stronger regions. *Journal of Economic and Social Policy*, 16(1), 1-28. Retrieved from <http://epubs.scu.edu.au/jesp/vol16/iss1/8>

Brimblecombe, J., van den Boogaard, C., Wood, B., Liberato, S. C., Brown, J., Barnes, A., ... Bailie, R. (2015). Development of the good food planning tool: A food system approach to food security in indigenous Australian remote communities. *Health and Place*, 34, 54–62. <http://doi.org/10.1016/j.healthplace.2015.03.006>

Busch, L. (2011). Food standards: The cacophony of governance. *Journal of Experimental Botany*, 62, 3247-3250. doi: 10.1093/jxb/erq439

Buzby, J. D., Wells, H. F., & Vocke, G. (2006). Possible implications for U.S. agriculture from adoption of select dietary guidelines. Economic Research Service, USDA. Economic Research Report No. 31. Retrieved on April 04, 2015 from <http://www.ers.usda.gov/publications>

Campbell, M. S. (2004). Building a common table: The role for planning in community food systems. *Journal of Planning Education and Research*, 23, 341-355. doi: 10.1177/0739456X04264916

Canada Parks and Wilderness Society. (2015). New Provincial Commitment for Indigenous Land Use Planning Good News for Communities, Conservation. Retrieved on October 3rd, 2016 from <http://cpawsmb.org/news/new-provincial-commitment-for-indigenous-land-use-planning-is-good-news-for>

Canadian CED Network (n.d). Neechi CED principles, courtesy of Neechi foods worker co-op. Retrieved on February 15, 2015 from http://ccednet-rcdec.ca/sites/ccednet-rcdec.ca/files/ced_principles.pdf

Carney, P. A., Hamada, J. L., Rdesinski, R., Sprager, L., Nichols, K. R., Liu, B. Y., Pelayo, J., Sanchez, M. A., & Shannon, J. (2011). Impact of a community garden project on vegetable intake, food insecurity, and family relationships. A community based participatory research study. *Journal of Community Health*, 37, 874-881. doi: 10.1007/s10900-011-9522-z

Casteel, S.N. (2012). Estimating soybean yields- simplified. Retrieved on October, 2016 from https://www.agry.purdue.edu/ext/soybean/News/2012/2012_0814SOYSimplifiedYieldEstimates.pdf

Cidro, J., Adekunle, B., Peters, E., & Martens, T. (2015). Beyond Food Security: Understanding Access to Cultural Food for Urban Indigenous People in Winnipeg as Indigenous Food Sovereignty. *Canadian Journal of Urban Research*, 24(1), 24-43. Retrieved from <http://login.ezproxy.lib.umn.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&AuthType=ip,uid&db=keh&AN=110270016&site=ehost-live>

Clapp, J., & Cohen, M. J. (2009). *The global food crisis: Governance challenges and opportunities*. Waterloo, Ontario: Wilfred Laurier University Press

Collinson, J., Hilderbrand, J., & Rempel, L. (2011). Garden Hill Comprehensive Community Planning Project (Process report, December 2016). Retrieved October 16th, 2016 from https://umanitoba.ca/faculties/architecture/media/Garden_Hill_Report_2011.pdf

Cornwall, A., & Jewkes, H. (1995). What is participatory research? *Social Science & Medicine*, 70, 794-794. doi: [10.1016/j.socscimed.2009.11.005](https://doi.org/10.1016/j.socscimed.2009.11.005)

Creswell, J. W (2014). The selection of research design: Qualitative, quantitative, and mixed methods approaches (4th Ed.). Thousand Oaks, CA: Sage Publications

Creswell, J. W. (2003). Research design Qualitative quantitative and mixed methods approaches. *Research Design Qualitative Quantitative and Mixed Methods Approaches*, 3-26. <http://doi.org/10.3109/08941939.2012.723954>

- Cummings, H., & Associates Inc. (2005). Region of Waterloo food flow analysis study. Region of Waterloo Public Health. Retrieved on March 26th, 2017 from http://chd.region.waterloo.on.ca/en/researchResourcesPublications/resources/FoodFlow_Analysis.pdf
- Das, M. (2015). Understanding local food system in Garden Hill Community: A feasibility study on community based poultry production. A Report presented to Aki Energy.
- Deloitte. (2013a). Best practices in local food: A guide for municipalities (A report for Ontario Municipal Knowledge Network) Retrieved from <http://www.roma.on.ca/ROMADocs/Reports/2013BestPracticesinLocalFoodAGuideforMunicipalities.aspx>
- Deloitte. (2013b). Best practices in local food: A guide for municipalities. Retrieved from <http://www.roma.on.ca/ROMADocs/Reports/2013BestPracticesinLocalFoodAGuideforMunicipalities.aspx>
- Department for International Development. (1999). Sustainable livelihoods guidance sheets. Retrieved on December 2nd, 2016 from <http://www.eldis.org/vfile/upload/1/document/0901/section2.pdf>
- Department of International Development. (1999). The Sustainable Livelihoods Framework. Retrieved on August 2nd, 2016 from www.eldis.org
- Department of International Development. (2008). DFID's Sustainable Livelihoods Approach and its Framework. *Development*, 1–5. Retrieved from www.eldis.org
- Department of Trade and Industry. (2002). Social enterprise: A strategy for success. Retrieved February 15, 2015 from <http://www.faf-gmbh.de/www/media/socialenterprisestrategyforsuccess.pdf>
- Desjardins, E., Lubczynski, J., & Xuereb, M. (2011). Incorporating policies for a healthy food system into land use planning: The case of Waterloo Region, Canada. *Journal of Agriculture, Food Systems, and Community Development*. Advance online publication. <http://dx.doi.org/10.5304/jafscd.2011.021.003>
- Desjardins, E., Macrae, R., & Schumilas, T. (2010). Linking future population food requirements for health with local production in Waterloo Regions, Canada. *Agricultural and Human Values*, 27, 129 - 140. DOI 10.1007/s10460-009-9204-y
- Douglas, D. J. A. (1994). Community economic development in Canada. Ontario: McGraw-Hill Ryerson
- Draper, C., & Freedman, D. (2010). Review and analysis of the benefits, purposes, and motivations associated with community gardening in the United States. *Journal of Community Practice*, 18, 458-492. Doi: 10.1080/10705422.2010.519682
- Dukpa, R. D. (2012). Examining small millet-based food and livelihood security: A case study of semi-arid mountain communities in Nepal (Master's Dissertation). Available from Mspace at University of Manitoba.
- FAO, IFAD and WFP. (2013). The State of Food Insecurity in The World 2013; The Multiple Dimensions of Food Security. Rome, FAO. Retrieved from Food and Agriculture Organisation of the United Nations website: <http://anserj.ca/index.php/cjnser/article/view/12>

- Feagan, R. (2007). The place of food: Mapping out the local in local food systems. *Progress in Human Geography*, 31, 23-42. doi: 10.1177/0309132507073527
- Ferrand, D., Gibson, A., & Scott, H. (2004). Making Markets Work for the Poor: An Objective and an Approach for Governments and Development Agencies, South Africa: The ComMark Trust
- Festing, H. (1998). *Farmers' Markets: An American Success Story*. Bristol: Eco-logic Books.
- Fieldhouse, P & Thompson, S. (2012). Tackling food security issues in indigenous communities in Canada. The Manitoba experience. *Nutrition & Dietetics*, 69, 217-221. doi: 10.1111/j.1747-0080.2012.01619.x
- Firth, C., Maye, D., & Pearson, D. (2011). Developing "Community" in Community Gardens. *Local Environment*, 16, 555-568. doi: 10.1080/13549839.2011.586025.
- Food & Agricultural Organisation (2008). Socio-Economic & Livelihood Analysis in Investment Planning. Retrieved on October 5th, 2016 from http://www.fao.org/docs/up/easypol/581/3-7-social%20analysis%20session_167en.pdf
- Food & Agricultural Organisation. (2016). Soil Fertility. Retrieved on October 2nd 2016, from <http://www.fao.org/ag/agp/agpc/doc/publicat/FAOBUL4/FAOBUL4/B401.htm>
- Food & Agricultural Organisation. (2011). *The State of the World's Land and Water Resources for Food and Agriculture*. Routledge, Abingdon.
- Food and Agricultural Organisation (2009). The state of food insecurity in the world: Economic crisis-impacts and lessons learned. Retrieved on February 7, 2015 from <ftp://ftp.fao.org/docrep/fao/012/i0876e/i0876e.pdf>
- Food and Agricultural Organization (1996). World Food Summit: Rome Declaration on World Food Security and World Food Summit Plan of Action. Retrieved November, 2014, from <http://www.fao.org/search/en/?cx=018170620143701104933%3Aqq82jsfba7w&q=food+security&cof=FORID%3A9&siteurl=www.fao.org%2Fhome%2Fen%2F&ref=&ss=1794j294358j13>.
- Food Banks Canada (2014) Hunger count 2014: A Comprehensive report on hunger and food bank use in Canada, and recommendations for change. Retrieved December, 2014 from http://www.foodbankscanada.ca/getmedia/7739cdff-72d5-4cee-85e9-54d456669564/HungerCount_2014_EN.pdf.aspx?ext=.pdf
- Food Matters (2016). Winnipeg traditional food guide. Retrieved on October 16th, 2016 from <https://www.foodmattersmanitoba.ca/2015/12/updated-winnipeg-traditional-food-guide/>
- Food Secure Canada. (2015). Discussion Paper: Indigenous Food Sovereignty. Retrieved on March 22nd, 2017 from https://foodsecurecanada.org/sites/foodsecurecanada.org/files/DP1_Indigenous_Food_Sovereignty.pdf
- Four Arrows Regional Health Authority Inc. (FARHA). (2015). Island Lake. Retrieved on March 15th, 2015 from <http://www.fourarrowsrha.ca/island-lake>

Fuchs, D., & Kalfagianni, A. (2010). The causes and consequences of private food governance. *Business and Politics*, 12, 1-36. doi: 10.2202/1469-3569.1319

Gail, F. (2016). An Evaluation of Aboriginal, Government, and Mining Industry Relationships and Policies in Manitoba: Accessing Land for Mineral Exploration and Mine Development. (Masters Dissertation). Available from Mspace at University of Manitoba

Garcilazo, J. E. (2009). *How Regions Grow: Trends and Analysis*. Paris: Organisation of Economic Cooperation and Development (OECD).

Gilham, B. (2000). *The research interview*. London: Continuum

Glover, T. D., Parry, D. c and Shinew, K. J. (2005). Building Relationships, Accessing Resources: Mobilizing Social Capital in Community Garden Contexts. *Journal of Leisure Research*, 37 (4), 450-474.

Godfray, H.C.J., Beddington, J.R., Crute, I.R., Haddad, L., Lawrence, D., Muir, J.F., Pretty, J., Robinson, S., Thomas, S.M., & Toulmin, C. (2010). Food Security: The Challenge of Feeding 9 Billion People. *Science*, 327, 812.

Government of Canada (2016). Historical data. Retrieved on February 28th, 2017 from climate. Weather.gc.ca

Government of Manitoba (2015). Land Access for Mineral Exploration and Development. Retrieved on September 9th, 2016 from <http://www.manitoba.ca/iem/mines/sustain/images/landuse.pdf>

Government of Manitoba. (2003). Healthy Child Committee of Cabinet. Northern Food Prices Steering Committee. Northern Food Prices Project Report. Retrieved November, 2014, from http://www.gov.mb.ca/ana/food_prices/2003_northern_food_prices_report.pdf

Government of Manitoba. (2005). GHFN. Retrieved on February 7, 2015 from https://www.gov.mb.ca/conservation/wno/status-report/fa-8.15_gardenhill.pdf

Government of Manitoba. (2013). Treat Day at Manitoba Legislature. Retrieved March 20, 2016 from www.gov.mb.ca/asset_library/en/newslinks/.../TreatyDayBG.PR.AN.do

Government of Manitoba. (2014). Land access for mineral exploration and development. Retrieved on October 16th, 2016 from <http://www.manitoba.ca/iem/mines/sustain/images/landuse.pdf>

Government of Samoa. (2010). National Non communicable Disease Policy 2010–2015. Retrieved on September 12th, 2016 from <http://medicaid.as.gov/wp-content/uploads/2015/10/Samoa-Final-NCD-Policy-2010-2015.pdf>

Grace Communication Foundation (n.d). Local and regional food systems. Retrieved on April 12, 2015 from <http://www.sustainabletable.org/254/local-regional-food-systems>

Great Bio-pacific Products. (2016). Why use fish fertilizer. Retrieved on October 4th, 2016 from <http://www.greatpacificbioproducts.com/section.asp?pageid=12756>

Gregory, P.J. (2012). *Soils and food security: challenges and opportunities*. In: *Soils and Food Security* (eds R.E. Hester & R.M. Harrison), pp. 1–30. RSC Publishing, London
Groh, T., & McFadden, S. (1997). *Farms of tomorrow revisited*. , Kimberton, PA: Biodynamic Farming and Gardening Association.

Guenther, W. C. (1964). *Analysis of Variance*, 868–869. Prentice- Hall, Englewood Cliffs, New Jersey

Guptill, A., & Wilkins, J. L. (2002). Buying into the Food System: Trends in food retailing in the U.S. and Implications for Local Foods,” *Agriculture and Human Values*, 19, 39-51

Hackett, P. (2016). From Past to Present: Health Patterns in a Historical Context Understanding First Nations, 96(February 2005), 16–21.

Hamilton, N. (2001). Success in changing Iowa’s food culture. Des Moines Register, September 5, p. 9A.

Haque, M. M., Belton, B., Alam, M. M., Ahmed, A. G., & Alam, M. R. (2016). Reuse of fish pond sediments as fertilizer for fodder grass production in Bangladesh: Potential for sustainable intensification and improved nutrition. *Agriculture, Ecosystems and Environment*, 216, 226–236. <http://doi.org/10.1016/j.agee.2015.10.004>

Haque, M. M., Belton, B., Alam, M., Ahmed, G. A., & Alam, A. (2016). Reuse of fish pond sediments as fertilizer for fodder grass production in Bangladesh: Potential for sustainable intensification and improved nutrition. *Agriculture, Ecosystems, & Environment*, 216, 226-236. Doi: <http://dx.doi.org/10.1016/j.agee.2015.10.004>

Hardin, J., & Kwaik, C. T. (2015). Producing markets, producing people: Local food, financial prosperity and health in Samoa. *Food, Culture and Society*, 18(3), 519–539. <http://doi.org/10.1080/15528014.2015.1043113>

Hawkes, C. (2007). Promoting healthy diets and tackling obesity and diet-related chronic diseases: What are the agricultural policy levers? *Food and Nutrition Bulletin*, 28(2), S312–S322

Hay, I. (2005). *Qualitative research methods in Geography (2nd edition)*. South Melbourne: Oxford University Press

Health Canada (2015).Health Canada 2015 -16 report on plans and priorities. Retrieved January 6th, 2017 from <http://www.hc-sc.gc.ca/ahc-asc/performance/estim-previs/plans-prior/2015-2016/report-rapport-eng.php>

Health Canada. (2007). Canadian Community Health Survey, Cycle 2.2, Nutrition (2004): Income-Related Household Food Security in Canada. Retrieved November, 2014 from http://www.hc-sc.gc.ca/fn-an/alt_formats/hpb-dgpsa/pdf/surveill/income_food_sec-sec_alim-eng.pdf.

Henderson, A. (2014). Planning for economic development: A social justice approach. (Master’s Dissertation). Available from Mspace at University of Manitoba.

- Henderson, B. R., & Hartsfield, K. (2009). Is getting into the community garden business a good way to engage citizens in local government? *National Civic Review*, 98, 12–17. doi: 10.1002/ncr.271
- Hernandez, G. (2013). Indigenous perspective on community economic development: A North-South Conversation. *Canadian Journal of Nonprofit and Social Economy Research*, 4(1), 6-24. Retrieved from <http://search.proquest.com.proxy2.lib.umanitoba.ca/docview/1465350838>
- Hiebeler, V. R., Kelly, T. B., & Ketteman, C. (2000). *Best Practices*. São Paulo, Atlas, 2000.
- Hinrichs, C. C. (2000). Embeddedness and local food systems: Notes on two types of direct agricultural market. *Journal of Rural Studies*, 16, 295-303. doi:10.1016/S0743-0167(99)00063-7
- Hinrichs, C. C. (2003). The practice and politics of food system localization. *Journal of Rural Studies*, 19, 33-45. doi:10.1016/S0743-0167(02)00040-2
- Hinrichs, C., Kloppenburg, J., Stevenson, S., Lezburg, S., Hendrickson, J., & DeMaster, K. (1998). Moving beyond ‘Global’ and ‘Local’. USDA Multi-state Project NE-185, Working Paper. Available at: <http://www.ces.ncsu.edu/depts/sociology/ne185/global.html>>.
- Holkup, P. A., Tripp-Reimer, T., Salois, E. M., & Weinert, C. (2004). Community-Based Participatory Research: An approach to intervention research with a Native American community. *Advances in Nursing Science*, 27(3), 162-175. Retrieved from <http://web.b.ebscohost.com.proxy2.lib.umanitoba.ca/ehost/pdfviewer/pdfviewer?sid=4f0a0fed-d925-4f00-98c0-2bee469b44c1%40sessionmgr111&vid=2&hid=102>
- Hoque, M. (2014). Knowledge Among Mothers on Under Five Children Malnutrition : Materials and Methods. *The American Journal of Innovative Research and Applied Sciences.*, 94–98.
- Indian and Northern Affairs Canada (INAC). (2007). The revised northern food basket. Retrieved 2014 from <http://publications.gc.ca/pub?id=317334&sl=0>
- International Peatland Society. (n.d.). What is peat. Retrieved from October 4th, 2016 from <http://www.peatsociety.org/peatlands-and-peat/what-peat>
- Iowa State University. (2015). 2016 Iowa State University Combined Research and Extension Plan of work. Retrieved on September 15th, 2016 from <https://www.iahees.iastate.edu/files/page/files/2016-2020%20PLAN%20OF%20WORK.pdf>
- Irshad, H., & Government of Alberta. (2010). Local Food – A Rural Opportunity, (July), 1–31. Retrieved from [http://www1.agric.gov.ab.ca/\\$Department/deptdocs.nsf/all/csi13484/\\$FILE/Local-Food-A-Rural-Opp.pdf](http://www1.agric.gov.ab.ca/$Department/deptdocs.nsf/all/csi13484/$FILE/Local-Food-A-Rural-Opp.pdf)
- Israel, B. A., Schultz, A. J., Parker, E. A., & Becker, A. B. (1998). Review of Community-Based Participatory Research: Assessing partnership approaches to improve public health. *Annual Review of Public Health*, 19, 173-202. doi: 10.1146/annurev.publhealth.19.1.173
- Israel, B. A., Schultz, A. J., Parker, E. A., Becker, A. B., Allen, A. J., & Guzman, R. (2008). Critical issues in developing and following CBPR principles. In M. Minkler, & N. Wallerstein (Eds),

Community based participatory research for health: From process to outcomes (2nd ed.) (pp.47-66). San Francisco, CA: Jossey Bass.

Jojola, T.S. (1998). "Indigenous Planning: Clans, Intertribal Confederations and the History of the All Indian Pueblo Council." In *Making the Invisible Visible. A Multicultural History of Planning*, edited by Sandercock Leonie . Berkeley: University of California Press

Kirkpatrick, S. I., & Tarasuk, V. (2008). Food insecurity in Canada: Considerations for monitoring. *Canadian Journal of Public Health*, 99(4), 324-327. Retrieved from http://www.jstor.org.proxy2.lib.umanitoba.ca/stable/41995113?seq=1#page_scan_tab_contents

Kirkpatrick, S. I., & Tarasuk, V. (2009). Food insecurity and participation in community food programs among low-income Toronto families. *Canadian Journal of Public Health*, 100(2), 135-139. Retrieved from http://www.jstor.org.proxy2.lib.umanitoba.ca/stable/41995224?seq=1#page_scan_tab_contents

Kitzinger, J. (1995). Introducing focus group. Medical Journal. *British Medical Journal*, 311, 299:302.doi: <http://dx.doi.org.proxy2.lib.umanitoba.ca/10.1136/bmj.311.7000.299>

Kloppenburg Jr., J., Lezberg, S., DeMaster, K., Stevenson, G.W., Hendrickson, J. (2000). Tasting food, tasting sustainability: defining the attributes of an alternative food system with competent, ordinary people. *Human Organization*, 59 (2), 177-186.

Krasny, M. E., & Tidball, K. G. (2009). Applying a resilience systems framework to urban environmental education. *Environmental Education Research*, 15, 465-482. doi: 10.1080/13504620903003290

Kristoffersen, A. O., Greenwood, D. J., Sogn, T. A., & Riley, H. (2006). Assessment of the dynamic phosphate model PHOSMOD using data from field trials with starter fertilizer to cereals. *Nutrient Cycling in Agro ecosystems*, 74, 75-89. doi: 10.1007/s10705-006-6256-x

Lambden, J., Receveur.O., & Kuhlein, H. V. (2007). Traditional food attributes must be included in studies of food security in the Canadian artic. *International Journal of Circumpolar Health*, 66(4). Retrieved on November 16th, 2016 from

Lang, T. (1999). The complexities of globalization: the UK as a case study of tensions within the food system and the challenge to food policy. *Agriculture and Human Values*, 16(2), 169-185. Retrieved from <http://link.springer.com.proxy2.lib.umanitoba.ca/article/10.1023/A%3A1007542605470#>

LaTrobe, H.L., Acott, T.G., 2000. Localising the global food system. *International Journal of Sustainable Development and World Ecology*, 7, 309-320

Leach, K. (2013). Community economic development: Localisation, the key to a resilient and inclusive local economy. *Local Economy*, 28, 927-931.doi: 10.1177/0269094213500912

Lertzman, D.A. & Vredenburg, H. (2005). Indigenous peoples, resource extraction, and sustainable development: An ethical approach. *Journal of Business Ethics*.56, 239/ :10.1007/s10551-004-3528-8

- Lightfoot, N., Strasser, R., Maar, M., & Jacklin, K. (2008). Challenges and rewards of health research in northern, rural and remote communities. *Annals of Epidemiology*, 18, 507-514. doi:[10.1016/j.annepidem.2007.11.016](https://doi.org/10.1016/j.annepidem.2007.11.016)
- Lisle, J. De. (2011). The Benefits and Challenges of Mixing Methods and Methodologies: Lessons Learnt From Implementing Qualitatively Led Mixed Methods Research Designs in Trinidad and Tobago. *Caribbean Curriculum*, 18, 87 - 120
- Little, J., Libery, B., Watts, D., Glig, A., & Simpson, S. (2012). Regionalization and rescaling of agro-food governance: Case study evidence from two English regions. *Political Geography*, 31, 88-93. doi:[10.1016/j.polgeo.2011.10.007](https://doi.org/10.1016/j.polgeo.2011.10.007)
- Lizumi, T & Ramankutty, N. (2015). How do Weather and Climate influence Cropping area and Intensity. *Global Food Security*. 4, 46 -50. <http://dx.doi.org/10.1016/j.gfs.2014.11.003>
- Loney, S. (2012). *Build Prosperity: Energizing Manitoba's Local Economy*. Manitoba: Dersksen
- Lyson, T. A., & Green, J. (1999). The agricultural marketscape: A framework for sustaining agriculture and communities in the Northeast. *Journal of Sustainable Agriculture*, 15(2-3), 133-150. Retrieved from http://www.tandfonline.com/doi/abs/10.1300/J064v15n02_12#.VSglgvnF_0U
- Maisonneuve, N. (2014). Assessment of Additional and Alternative Livelihood Options in five Marine Protected Areas. Retrieved on April 16, 2016 from file:///C:/Users/2014/Downloads/2014_Report-Add-Altern-Livelihood-Assess-Recomm.pdf
- Manitoba Department of Transportation and Government Services (2003).Winter Roads in Manitoba. Retrieved from http://cripe.civil.ualberta.ca/Downloads/12th_Workshop/Kuryk-2003.pdf
- Mardsen, T., Lee, R., Flynn, A., & Thankappan, S. (2009). *The new regulations and governance of food*. New York: Routledge
- Martinez, S., Hand, M., Pra, M. D., Pollack, S., Ralston, K., Smith, T., Vogel, S., Clark, S., Lohr, L., Low, S., & Newman, C. (2010). Local food systems: Concepts, impacts, and issues. United State Department of Agriculture, Economic Research Report, No 97.
- Mas, S (2015). Trudeau lays out plan for new relationship with indigenous people. Canadian Broadcasting Corporation. Retrieved on December 19th, 2016 from <http://www.cbc.ca/news/politics/justin-trudeau-afn-indigenous-aboriginal-people-1.3354747>
- McElnea, W. (2005). The Role of Social Enterprise in Economic Development: Urban and Regional Planning, Economic Development Handbook. Retrieved November, 2014 from, <http://www.umich.edu/~econdev/socialenterprise/>
- Meteoblue (2017). Weather archive Island Lake Airport. Retrieved on August 2nd, 2017 from https://www.meteoblue.com/en/weather/forecast/archive/island-lake-airport_canada_6296211
- Mohammed, R. (2016). Impact Investing & Aboriginal community economic development: from fish net to financial net. (Master's Dissertation). Available from Mspace at University of Manitoba.

- Moquin, R. L. J. (2014). Growing together: Cultivating community through gardening in Kenora, Ontario (Master's Dissertation). Available from Mspace at University of Manitoba.
- Moron, C. (2006). Food-based nutrition interventions at community level. *British Journal of Nutrition*, 96(1), 20–22. Retrieved from <http://journals.cambridge.org/action/displayIssue?decade=2000&jid=BJN&volumeId=96&issueId=01&iid=927784>
- Morrison, D. (2011). *Indigenous food sovereignty: A model for social learning*. In *Food sovereignty in Canada: Creating just and sustainable food systems*, ed. H. Wittman, A. Desmarais and N. Wiebe 2011, 97–113. Halifax, NS: Fernwood Publishing
- Mundel, E., & Chapman, G. E. (2010). A decolonizing approach to health promotion in Canada: The case of the Urban Aboriginal Community Kitchen Garden Project. *Health Promotion International*, 25, 166-173. doi: 10.1093/heapro/daq016
- Natural Resources Institute (NRI), University of Manitoba. (2011). Harvesting hope: In northern Manitoba communities. [Videofile]. Retrieved from http://home.cc.umanitoba.ca/~thompsonso4/harvestinghope_doc.html
- Newton, J., & Franklin, A. (2011). Delivering sustainable communities in China: using a sustainable livelihoods framework for reviewing the promotion of “ecotourism” in Anji. *Local Environment*, 16(8), 789–806. <http://doi.org/10.1080/13549839.2011.56953>
- Northern Food Prices Project Steering Committee (2003). Northern Food Prices Report. Retrieved November 8, 2014, from http://www.gov.mb.ca/ana/food_prices/2003report.html
- O'Shaughnessy, M., Casey, E., & Enright, P. (2011). Rural transport in peripheral rural areas. The role of social enterprise in meeting the needs of rural citizens. *Social Enterprise Journal*, 7, 183-190. doi: 10.1108/17508611111156637
- Okvat, H., & Zautra, A. J. (2011). Community gardening: A Parsimonious path to individual, community, and environmental resilience. *American Journal of Community Psychology*, 47, 374-387. doi: 10.1007/s10464-010-9404-
- Oliver, M. A., & Gregory, P. J. (2015). Soil, food security and human health: A review. *European Journal of Soil Science*, 66(2), 257–276. <http://doi.org/10.1111/ejss.12216>
- Ontario Ministry of Agriculture, Food, & Rural Affairs. (2016). Ontario's local food strategy. Retrieved on April 05th, 2016 from <http://www.omafra.gov.on.ca/english/about/localfood.htm>
- Onyango, C. M., Harbinson, J., Imungi, J. K., Shibairo, S. S., & Kooten, O. (2012). Influence of mineral and organic fertilization on germination, leaf, nitrogen, nitrate accumulation, and yield of vegetable amaranth. *Journal of Plant Nutrition*, 35, 342-362. doi: 10.1080/01904167.2012.639917

Oyegunle, A. O. (2016). Solid Waste Management Practices in Two Northern Manitoba First Nations Communities: Community Perspectives on the Issues and Solutions. (Master's Dissertation). Available from Mspace at University of Manitoba

Palmater, P., & Dumas, A. (2013). Manitoba's Epic Failure: Manitoba and Mining Companies Work Together to Deny First Nations Rights. Retrieved on October 2nd, 2016 from <http://indigenousnationhood.blogspot.ca/2013/08/manitobas-epic-failure-manitoba-and.html>
Power, E. (2007). Food security for First Nations and Inuit in Canada background paper. Health Canada: Prepared for the First Nations and Inuit Health Branch

Palmater, P., & Dumas, A. (2013). Manitoba's epic failure: Manitoba and mining companies work together to deny First Nations rights. Retrieved on October 7th, 2016 from <http://indigenousnationhood.blogspot.ca/2013/08/manitobas-epic-failure-manitoba-and.html>

Patel, I.C. (1991). Gardening's socioeconomic impacts: Community gardening in an urban setting. *Journal of Extension*, 29(4), 7–8. Retrieved from <http://www.joe.org/>

Patel, N., Jonash, R., Anderson, K., & Bautista, J. (2014). Social enterprise challenge: Food security in urban slums by 2018. Retrieved November 4, 2014 from <http://www.hultprize.org/en/media/featured-media/>

Permaculture Research Institute. (2010). What is permaculture. Retrieved on October, 4th, 2016 from <http://permaculturenews.org/what-is-permaculture/>

Pirog, R. 2009. Local Foods: Farm Fresh and Environmentally Friendly. Retrieved April 5, 2015 from http://www.leopold.iastate.edu/research/marketing_files/WorldBook.pdf

Popierlaski, J. A., & Cotugna, N. (2010). Fighting hunger through Innovation: Evaluation of a food bank's social enterprise venture. *Journal of Hunger & Environmental Nutrition*, 5(1), 56-69

Power, E. M. (2008). Conceptualizing food security for aboriginal people in Canada. *Canadian Journal of Public Health*, 99(2), 95-97. Retrieved from http://www.jstor.org.proxy2.lib.umanitoba.ca/stable/41995048?seq=1#page_scan_tab_contents

Power, E. M. 2008. Conceptualizing food security for Aboriginal people in Canada. *Canadian Journal of Public Health*, 99 (2), 95-97

Power, E.M., & Tarasuk, V. (2006). The impact of income on healthy eating in Canada. Health Canada Policy Forum #60, March 23, 2006

Reading, L. R., & Wien, F. (2009). *Health Inequalities and Social Determinants of Aboriginal Peoples' Health*. Prince George, BC: National Collaborating Centre for Aboriginal Health

Region of Waterloo Planning Department. (2005). Population growth projection, Scenario 66. Waterloo, Ontario, Canada: Region of Waterloo Planning Department

Region of Waterloo Public Health (2013). The health of Waterloo Region's food system: An update. Retrieved March 14th, 2016 from http://chd.region.waterloo.on.ca/en/researchResourcesPublications/resources/WRFoodSystemHealth_Update.pdf

Renting, H., Marsden, T. K., & Banks, J. (2003). Understanding alternative food networks: Exploring the role of short food supply chains in rural development. *Environment and Planning A*, 35(3), 393-411. doi:10.1068/a35

Richards, P. (1985). *Indigenous Agricultural Revolution: Ecology and Food Crops in West Africa*. Methuen, MA, USA.

Ritchie, J., & Lewis, J. (2003). *Qualitative research practice: A guide for social science students and researchers*. London: Sage

Ritchie, S. D., Wabano, M. J., Beardy, J., Curran, J., Orkin, A., Vanderburgh, D., & Young, N. L. (2013). Community based participatory research with indigenous communities: The proximity paradox. *Health & Place*, 24, 183-189. doi: [10.1016/j.healthplace.2013.09.008](https://doi.org/10.1016/j.healthplace.2013.09.008)

Rubin, H. J., & Rubin, I. S. (2005). *Qualitative Interviewing: the Art of Hearing Data (2nd Edition)*. Thousand Oaks CA: Sage Publications.

Rudolph, K. R., & McLachlan, S. M. (2013). Seeking indigenous food sovereignty: origins of and responses to the food crisis in northern Manitoba, Canada. *Local Environment*, 18(9), 1079–1098. <http://doi.org/http://dx.doi.org/10.1080/13549839.2012.754741>

Rudolph, K.R. & McLachlan, S.M. (2013). Seeking Indigenous food sovereignty: origins of and responses to the food crisis in northern Manitoba, Canada. *Local Environment*, 18, 1079- 1098

Sarris, A., & Morrison, J. (2009). The evolving structure of world trade agricultural trade: Implications for trade policy and trade agreements. Food and Agricultural Organization of the United Nations, Trades and Market Division. Retrieved February, 12, 2015 from <http://www.fao.org/docrep/018/i1041c/i1041c.pdf>

Satzewich, v., & Wotherspoon, T. (2000). *First Nations: Race, Class, and Gender Relations*. Saskatoon. Canadian Plains Research center

Shaun N., C. (n.d.). Estimating Soybean Yield - Simplified. *World Wide Web Internet and Web Information Systems*, 7–8. Retrieved from https://www.agry.purdue.edu/ext/soybean/News/2012/2012_0814SOYSimplifiedYieldEstimates.pdf
df\nhttp://www.ca.uky.eduBooth, A. L., & Muir, B. R. (2011). Environmental and Land-Use Planning Approaches of Indigenous Groups in Canada: An Overview. *Journal of Environmental Policy & Planning*, 13(4), 421–442. <http://doi.org/10.1080/1523908X.2011.635881>

Signal, L.N., Walton, M.D., Ni Mhurchu, C., Maddison, R., Bowers, S.G., Carter, K.N., et al., 2013. Tackling ‘wicked’ health promotion problems: A New Zealand Case Study. *Health Promot. Int.* 28 (1), 84–94

Skinner, K., Hanning, R. M., Desjardins, E., & Tsuji, L. J. S. (2013). Giving voice to food insecurity in a remote indigenous community in subarctic Ontario, Canada: traditional ways, ways to cope, ways forward. *BMC Public Health*, 13, 427. <http://doi.org/10.1186/1471-2458-13-427>

Socha, T., Zaha, M., Chambers, M., Abraham, R., & Fiddler, T (2012). Food Security in a Northern First Nations Community: An Exploratory Study on Food Availability and Accessibility. *Journal of Aboriginal Health*. (March 2012), 5–15.

Social Enterprise Council of Canada (n.d.). Retrieved November 4, 2014, from <http://www.socialenterprisecanada.ca/en/learn/nav/whatisasocialenterprise.html>

Statistics Canada (2004). Canadian Community Health Survey, Cycle 1.1, 2000/01. Retrieved from <http://www.statcan.gc.ca/concepts/healthsante/index-eng.htm>

Statistics Canada. (2007). GHFN, Manitoba (Code 4622048). Community Profiles. 2006 Census, Ottawa. Retrieved December, 2014 from <http://www12.statcan.gc.ca/census-recensement/2006/dp-pd/prof/92-591/details/page.cfm?Lang=E&Geo1=CSD&Code1=4622048&Geo2=PR&Code2=46&Data=Count&SearchText=Garden%20Hill%20First%20Nation&SearchType=Begins&SearchPR=01&B1>All&GeoLevel=PR&GeoCode=4622048>

Statistics Canada. (2012). GHFN, IRI, Manitoba (Code 4622048). National Household Survey (NHS) Aboriginal Population Profile. 2011 Census. Retrieved December, 2014 from <http://www12.statcan.gc.ca/nhs-enm/2011/dp-dprof/details/Page.cfm?Lang=E&Geo1=CSD&Code1=4622048&Data=Count&SearchText=garden%20hill&SearchType=Begins&SearchPR=46&A1>All&Custom>

Storper, M. (1997). *The Regional World*. London: Guilford Press.

Swinburn, B., Egger, G. (2002). Preventive strategies against weight gain and obesity. *An official Journal of the International Association for the Study of Obesity*. *Obes. Rev.* 3 (4), 289–30

Tarasuk, V. (2005). Household food insecurity in Canada. *Topics in Clinical Nutrition*, 20 (4), 299-312.

The Canadian CED Network. (N.D.). Assiniboine Credit Union. Retrieved on February 15, 2015 from <http://ccednet-rcdec.ca/sites/ccednet-rcdec.ca/files/ccednet/Profile - Assiniboine Credit Unionx 0.pdf>

Thompson, S. (2013). Farming, fishing and food programs as sustainability and well-being education in Canada's Boreal forest. *Journal of Chemical Information and Modeling*, 53(9), 1689–1699. <http://doi.org/10.1017/CBO9781107415324.004>

Thompson, S. (2015). Report for the ancestral land use and traditional activities at GHFN. University of Manitoba.

Thompson, S. (2016). Growing a farm in a fly-in First Nation community using shipping containers for building infrastructure and capacity. Retrieved December 2nd, 2016 from https://umanitoba.ca/faculties/engineering/departments/ce2p2e/alternative_village/media/16th_NO_CMAT_2015_submission_112.pdf

Thompson, S., Gulrukh, A., and Wong, K. (2010). Is healthy food on the table in northern Manitoba? Evaluating northern healthy foods initiative for sustainability and food access. Winnipeg, MB: Natural Resources Institute, University of Manitoba.

Thompson, S., Lozeznik, V., & Klatt, R. (Eds.). (2011). Harvesting hope in northern Manitoba communities [Video]. Retrieved from http://home.cc.umanitoba.ca/~thomps04/harvestinghope_doc.html

Thompson, S., Kamal A.G., Alam M.A., and Wiebe, J. (2012). Community Development to Feed the Family in Northern Manitoba Communities: Evaluating Food Activities Based on Their Food Sovereignty, Food Security, and Sustainable Livelihood Outcomes. *Canadian Journal of Nonprofit and Social Economy Research*, 3(2), 43 -66. Retrieved from <http://anserj.ca/index.php/cjnsr/article/view/121>

Thu, K.M., & Durrenberger, E.P. (Eds.), (1998). Pigs, profits and rural communities. Albany, New York: State University of New York Press

Tonn, A.N. (2011). Food Insecurity and Self-reported pscho-social Health Status in Manitoba First Nations Communities: Results from the Manitoba First Nations Regional Longitudinal Health Survey 2002-2003. Retrieved November, 2014, from <http://www.iportal.usask.ca>

Turner, N. J., Ignace, M. B., & Ignace, R. (2000). Traditional Ecological Knowledge and Wisdom of Aboriginal Peoples in British Columbia. *Ecological Applications*, 10(5), 1275–1287. Retrieved from https://www.fws.gov/nativeamerican/pdf/tek_turner-2000.pdf

United Nations (2011.). *The State of the World's Land and Water Resources for Food and Agriculture Managing Systems at Risk*. Retrieved on September 04th, 2016 from <http://www.fao.org/docrep/017/i1688e/i1688e.pdf>

United Nations Convention to combat Desertification. (2012). Proverbs on soil (Vedas Sanskrit). Retrieved on September 22nd, 2017 from <http://www.unccd.int/en/programmes/Event-and-campaigns/WDCD/Pages/Proverbs-on-land-and-soil-.aspx>

University of Hawaii. (2016). Soil Nutrient Management for Maui County. Retrieved on October 2nd, 2016 from http://www.ctahr.hawaii.edu/mauisoil/c_nutrients03.aspx

Usher, P., Duhaime, G., & Searles, E. (2003). The household as an economic unit in Arctic Aboriginal communities, and its measurement by means of a comprehensive survey. *Social Indicator Research*, 61, 175–202. doi: 10.1023/A:1021344707027

Vancouver Island Community Research Alliance (2011). Strategies for Increasing Food Security on Vancouver Island Community Research Alliance | Office of Community Based Research The Local Food Project : Strategies for Increasing Food Security on Vancouver Island Vancouver Island Local Food Project, (August), 44. Vázquez-Barquero, A. (2002) *Endogenous Development*, London: Routledge.

- Visser, J., Trienekens, J., & Beek, P. Van. (2013). Opportunities for Local Food Production A Case in the Dutch Fruit and Vegetables. *International Journal on Food Dynamics* 4(1), 73–87. Retrieved from <http://library.wur.nl/WebQuery/wurpubs/447471>
- Waltz, C. (2011). *Local food systems: Background and issues*. New York: Nova Science Publication Inc.
- Warren, A. (2004). International forum on indigenous mapping for indigenous advocacy and empowerment. The indigenous communities mapping initiative. Retrieved February 15, 2015, from www.ifad.org/pub/map/pm_web.pdf
- Willow, D. N. (2005). Determinants of healthy living in aboriginal peoples in Canada: The current state of knowledge and research gap. *Canadian Journal of Public Health Revenue*, 96(3), 32-36 Retrieved from http://www.jstor.org.proxy2.lib.umanitoba.ca/stable/41994470?seq=1#page_scan_tab_contents
- Wilson, K. (2003). Therapeutic landscapes and First Nations peoples: An exploration of culture, health and place. *Health & Place*, 9, 83-93.
- Winter, M. (2006). Rescaling rurality: Multilevel governance of the agro-food sector. *Political Geography*, 25, 735 -751.doi:10.1016/j.polgeo.2006.07.001
- Wittman, H., Beckie, M., & Hergesheimer, C. (2012). Linking local food systems and the social economy? Future roles for farmers' markets in Alberta and British Columbia. *Rural Sociology*, 77, 36-61. doi: 10.1111/j.1549-0831.2011.00068.x
- Wolford, B. (2014). *Sea food Waste: Throw Away 20% of Animals Caught in Nets*. Retrieved on September, 12th 2016 from <http://www.isciencetimes.com/articles/6978/20140321/seafood-waste-fisheries-throw-away-20-animals.htm>
- Yin, X., McClure, M. A., Jaja, N., Tyler, D. D., & Hayes, R. M. (2011). In-season prediction of corn yield using plant height under major production systems. *Agronomy Journal*, 103(3), 923–929. <http://doi.org/10.2134/agronj2010.0450>
- Zagozewski, R., Judd-Henrey, I., Nilson, S., & Bharadwaj, L. (2011). Perspectives on past and present waste disposal practices: A community-based participatory research project in three Saskatchewan First Nations communities. *Environmental Health Insights*, 5, 9–20. doi:10.4137/EHLS6974
- Zahariuk, S. (2013). Food Insecurity within the Island Lake First Nations Communities in Northern Manitoba, Canada (Master's Dissertation). Available from Mspace at University of Manitoba.
- Zanella, A.M., Rahmani, M., Perch, N. L., Callinius, C., Rubio, J. L., Vuningoma, L., Rist,S., & Mapfumo, P. (2015). Discussion: Food security and sustainable food systems: The role of soil *International Soil & Water Conservation Research*, 3, 154-159. Doi: <http://dx.doi.org/10.1016/j.iswcr.2015.06.001>
- Zepeda, L., and J. Li. 2006. "Who Buys Local Food?" *Journal of Food Distribution Research*, 37(3), 1-1.

Zick, C. D., Smith, K. R., Kowaleski-Jones, L., Uno, C., & Merril, B. J. (2013). Harvesting more than vegetables: The potential weight control benefits of community gardening. *American Journal of Public Health*, 103(3), 1110-1115. Retrieved from <http://web.a.ebscohost.com.proxy2.lib.umanitoba.ca/ehost/pdfviewer/pdfviewer?sid=7f3596f5-7dbe-4bba-8f86-275d625103b0%40sessionmgr4005&vid=1&hid=4212>



UNIVERSITY
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APPROVAL CERTIFICATE

May 16, 2015

SSHRC insight

TO: **Tosan Okorosobo** (Advisor S. Thompson)
Principal Investigator [REDACTED]

FROM: **Susan Frohlick, Chair**
Joint-Faculty Research Ethics Board (JFREB)

Re: **Protocol #J2015:044**
"Building livelihood and food security through social enterprise: A case of study of Garden Hill First Nation Community, Canada"

Please be advised that your above-referenced protocol has received human ethics approval by the **Joint-Faculty Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement (2). **This approval is valid for one year only.**

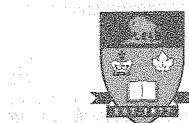
Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

Please note:

- If you have funds pending human ethics approval, please mail/e-mail/fax (261-0325) a copy of this Approval (identifying the related UM Project Number) to the Research Grants Officer in ORS in order to initiate fund setup. (How to find your UM Project Number: <http://umanitoba.ca/research/ors/mrt-faq.html#pr0>)
- if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.

The Research Quality Management Office may request to review research documentation from this project to demonstrate compliance with this approved protocol and the University of Manitoba *Ethics of Research Involving Humans*.

The Research Ethics Board requests a final report for your study (available at: http://umanitoba.ca/research/orec/ethics/human_ethics_REB_forms_guidelines.html) in order to be in compliance with Tri-Council Guidelines.



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RENEWAL APPROVAL

May 4, 2016

TO: **Tosan Okorosobo** (Supervisor: Shirley Thompson)
Principal Investigator [REDACTED]

FROM: **Lorna Guse, Chair**
Joint-Faculty Research Ethics Board (JFREB) [REDACTED]

Re: **Protocol #J2015:044 (HS18298)**
“Building livelihood and food security through social enterprise: A case of study of Garden Hill First Nation Community, Canada”

Please be advised that your above-referenced protocol has received approval for renewal by the Joint-Faculty Research Ethics Board. **This approval is valid for only one year and will expire May 14, 2017.**

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Coordinator in advance of implementation of such changes.



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Appendix A (1): Consent for interviewing community members on strategies by which Meechim can boost the local food economy and to understand the role of sustenance and commercial activities in sustainable food production.

INFORMED CONSENT FORM

Project title: Building Livelihood and Food security through Social Enterprise: A Case Study of Garden Hill First Community in Manitoba, Canada.

Principal Investigator: Tosan Okorosobo, Master of Natural Resources Management Candidate, Natural Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba, okorosot@myumanitoba.ca

Research Advisor: Dr. Shirley Thompson, Associate Professor, Natural Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba, 204-474-7174, s.thompson@umanitoba.ca

This consent form is only part of the process of informed consent. A copy of which will be left with you for your records and references. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

1. Project Description: As a partial fulfillment of my Masters of Natural Resources Management degree at Natural Resources Institute of University of Manitoba, I am conducting this research. This research aims to boost local food production by assisting in the establishment and operations of a commercial garden, as well as a local food hub.
2. Procedure: If you give your kind consent to take part in this study, you will be asked to answer some questions on local food system of the community and about the scope, challenges, demand and impacts of commercial gardening.
3. Funding: Funds provided by research supervisor Dr. Shirley Thompson through Meechim Inc.
4. Location and Time Requirements: The total time to complete the interview might range from

- 40-60 minutes. The interview will be recorded with an audio recorder (for harvesters) and also video-taped (for farmers) with your consent so that I will not miss any part of this interview. I will also take notes, but your name will not be identified unless you request otherwise.
5. Voluntary Participation /Withdrawal: Participation in this study is strictly voluntary. You may choose not to participate or may end the interview session at any time without dire consequences. You may also decline to answer question(s) during the interview.
 6. Confidentiality: The collected information of the interview will remain confidential. All collected data will be kept safe at the university office. Only the Investigator and research supervisor will have access to the data. Your personal information will be withheld in any report published from the study. After 2 years of the completion of the study approximately April, 2017 information containing personal data will be destroyed. Interview notes and audio recordings will be also destroyed.
 7. Compensation: Participants of the study will not receive any sorts of compensation for participating in this study.
 8. Result Dissemination: Information provided by you may be published in my thesis report at the University of Manitoba and academic Journal. Please note, this report will not in any way identify participants. Any publication resulting from this research will be shared with the community under investigations, regional government agencies, as well as other participants requesting these materials.
 9. Risks and Benefits: There are no known risks associated with participation. Community members will benefit through the establishment of these food ventures.
 10. Feedback: If you wish to have any notes or recording of the interview, I will be willing to provide it to you.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject, in no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at the research record to see that the research is being done in a safe and proper way.

This research has been approved by the Joint-Faculty Research Ethics Board. If you have any concerns or complaints about this project, you may contact any of the above named persons or the Human Ethics Coordinator (HEC) at 474-7122 or email

Margeret_bowman@umanitoba

.....
Signature of the Participant

Date

.....
Signature of the Principal Investigator

Date

Please provide your contact address and contact information below if you would like to receive an audio-file of this interview.



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Appendix A (2): Consent for School workshops on strategies by which Meechim can boost the local food economy.

INFORMED CONSENT FORM

Project title: Building Livelihood and Food security through Social Enterprise: A Case Study of Garden Hill First Community in Manitoba, Canada.

Principal Investigator: Tosan Okorosobo, Master of Natural Resources Management Candidate, Natural Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba, okorosot@myumanitoba.ca

Research Advisor: Dr. Shirley Thompson, Associate Professor, Natural Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba, 204-474-7174, s.thompson@umanitoba.ca

This consent form is only part of the process of informed consent. A copy of which will be left with you for your records and references. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

1. Project Description: As a partial fulfillment of my Masters of Natural Resources Management degree at Natural Resources Institute of University of Manitoba, I am conducting this research. This research aims to boost local food production by assisting in the establishment and operation of commercial garden, as well as a local food hub.
2. Procedure: This will be done in collaboration with school authorities who will provide student time, and other school resources. These community based workshops aim to improve children's health through learning, influence their food choice, and induce increased physical activity.
3. Funding: Funds provided by research supervisor Dr. Shirley Thompson through Meechim Inc.
4. Location and Time Requirements: The total time to complete the workshops might range from 40-60 minutes. The workshop design will have two elements to it: In class and

- field sessions (out-of -school).
5. Voluntary Participation /Withdrawal: School's Participation in this study is strictly voluntary. You may choose not to participate or may end the session at any time without dire consequences.
 6. Confidentiality: The collected information from workshops will remain confidential. All collected data will be coded and kept in a safe lock at the university office. Only the principal investigator and research supervisor will have access to the data. Your personal information will be withheld in any report published form the study. After 2 years of the completion of the study approximately April, 2017 information containing personal data will be destroyed.
 7. Compensation: Participants of the study will not receive any sorts of compensation for participating in this study.
 8. Result Dissemination: Information provided by you may be published in my thesis report at the University of Manitoba and academic Journal. . Please note, this report will not in any way identify participants. Any publication resulting from this research will be shared with the community under investigations, regional government agencies, as well as other participants requesting these materials.
 9. Risks and Benefits: There are known risks associated with participation. Community members will benefit through the establishment of these ventures.
 10. Feedback: If you wish to have any notes on workshops activities, I will be willing to provide it to you.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject, in no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at the research record to see that the research is being done in a safe and proper way.

This research has been approved by the Joint-Faculty Research Ethics Board. If you have any concerns or complaints about this project, you may contact any of the above named persons or the Human Ethics Coordinator (HEC) at 474-7122 or email Margeret_bowman@umanitoba.ca.

.....
Signature of the Participant

Date

.....
Signature of the Principal Investigator

Date



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Appendix A (3): Consent for focus group discussion members on strategies by which Meechim can boost the local food economy.

INFORMED CONSENT FORM

Project title: Building Livelihood and Food security through Social Enterprise: A Case Study of Garden Hill First Community in Manitoba, Canada.

Principal Investigator: Tosan Okorosobo, Master of Natural Resources Management Candidate, Natural Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba, okorosot@myumanitoba.ca

Research Advisor: Dr. Shirley Thompson, Associate Professor, Natural Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba, 204-474-7174, s.thompson@umanitoba.ca

This consent form is only part of the process of informed consent. A copy of which will be left with you for your records and references. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

1. Project Description: As a partial fulfillment of my Masters of Natural Resources Management degree at Natural Resources Institute of University of Manitoba, I am conducting this research. This research aims to boost local food production through the establishment and operation of a commercial garden, as well as a local food hub.
2. Procedure: If you give your kind consent to take part in this study, you will be asked to participate in discussions revolving around local food system of the community. Also questions on the scope, challenges, and demand and potential impacts of commercial gardening will be brought forth for discussions.
3. Funding: Funds provided by research supervisor Dr. Shirley Thompson through Meechim Inc
4. Location and Time Requirements: The total time to complete the interview might range from

- 40-60 minutes. The discussions will be recorded with an audio recorder with your consent so that I will not miss any point of this interview. I will also take notes, but your names will not be identified unless you wish it to.
5. Voluntary Participation /Withdrawal: Participation in this study is strictly voluntary. You may choose not to participate or pull out of discussions at any time without dire consequences. You may also decline to answer question(s) during the interview.
 6. Confidentiality: The collected information from discussions will remain confidential. All data will be kept safe at the university offices. Only the Investigator and research supervisor will have access to the data. Your personal information will be withheld in any report published form the study. After 2 years of the completion of the study approximately April, 2017 information containing personal data will be destroyed. Interview notes and audio recordings will be also destroyed. But please note, the PI does not have control over what information group members disclose, and as such complete confidentiality cannot be guaranteed.
 7. Compensation: Participants of the study will not receive any sorts of compensation for participating in this study.
 8. Result Dissemination: Information provided by you may be published in my thesis report at the University of Manitoba and academic Journal. . Please note, this report will not in any way identify participants. Any publication resulting from this research will be shared with the community under investigation, regional government agencies, as well as other participants requesting these materials.
 9. Risks and Benefits: There are no known risks associated with participation. Community members will benefit from the establishment of these food ventures.
 10. Feedback: If you wish to have any notes or recording of the discussions, I will be willing to provide it to you.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject, in no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at the research record to see that the research is being done in a safe and proper way.

This research has been approved by the Joint-Faculty Research Ethics Board. If you have any concerns or complaints about this project, you may contact any of the above named persons or the Human Ethics Coordinator (HEC) at 474-7122 or email Margeret_bowman@umanitoba.ca.

.....
Signature of the Participant

Date

.....
Signature of the Principal Investigator

Date

Please provide your contact address and contact information below if you would like to receive an audio-file of this interview.



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Appendix A (3): Consent for household survey on developing best practices in vegetable production.

INFORMED CONSENT FORM

Project title: Building Livelihood and Food security through Social Enterprise: A Case Study of Garden Hill First Community in Manitoba, Canada.

Principal Investigator: Tosan Okorosobo, Master of Natural Resources Management Candidate, Natural Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba, okorosot@myumanitoba.ca

Research Advisor: Dr. Shirley Thompson, Associate Professor, Natural Resources Institute, Clayton H. Riddell Faculty of Environment, Earth and Resources, University of Manitoba, 204-474-7174, s.thompson@umanitoba.ca

This consent form is only part of the process of informed consent. A copy of which will be left with you for your records and references. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

1. Project Description: As a partial fulfillment of my Masters of Natural Resources Management degree at Natural Resources Institute of University of Manitoba, I am conducting this research. This research aims to boost local food production through the establishment and operation of a commercial garden, as well as a local food hub.
2. Procedure: If you give your kind consent to take part in this study, you will be asked to participate in a survey revolving around local food system of the community. Also questions on the scope, challenges, demand and impacts of commercial gardening will be asked.
3. Funding: Funds provided by research supervisor Dr. Shirley Thompson through Meechim Inc
4. Location and Time Requirements: The total time to complete the survey might range from 40-60 minutes. Your names will not be identified unless you request otherwise.

5. Voluntary Participation /Withdrawal: Participation in this survey is strictly voluntary. You may choose not to participate or not complete the survey without dire consequences. You may also decline to answer question(s) during the survey.
6. Confidentiality: The collected information from discussions will remain confidential. All data will be kept safe at the university offices. Only the Investigator and research supervisor will have access to the data. Your personal information will be withheld in any report published form the study. After 2 years of the completion of the study approximately April, 2017 information containing personal data will be destroyed.
7. Compensation: Participants of the study will not receive any sorts of compensation for participating in this study.
8. Result Dissemination: Information provided by you may be published in my thesis report at the University of Manitoba and academic Journals. Please note, this report will not in any way identify participants. Any publication resulting from this research will be shared with the community under investigation, regional government agencies, as well as other participants requesting these materials.
9. Risks and Benefits: There are no known risks associated with participation. Community members will benefit from the establishment of these food ventures.
10. Feedback: If you wish to have any notes or recording of the discussions, I will be willing to provide it to you.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject, in no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

The University of Manitoba may look at the research record to see that the research is being done in a safe and proper way.

This research has been approved by the Joint-Faculty Research Ethics Board. If you have any concerns or complaints about this project, you may contact any of the above named persons or the Human Ethics Coordinator (HEC) at 474-7122 or email Margeret_bowman@umanitoba.ca.

.....
Signature of the Participant

Date

.....
Signature of the Principal Investigator

Date



Certificate of Completion

This document certifies that

Tosan Okorosobo

*has completed the Tri-Council Policy Statement:
Ethical Conduct for Research Involving Humans
Course on Research Ethics (TCPS 2: CORE)*

Date of Issue: **26 December, 2014**



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University Of Manitoba

Certifies that

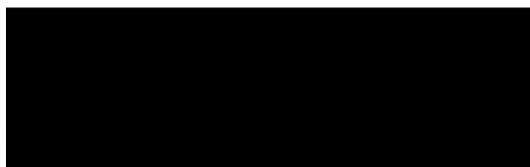
Okorosobo Tosan Jolomi

completed the

Animal User Training Course: Animal Science

December 1, 2014

E S T . 1 8 7 7



University Veterinarian



Lab Animal Training Coordinator

Report To: Cash Account

Grower: GARDEN HILL FN

Lot Number: 141010_002

Grower Field Name:

Date Sampled: 2014/09/24

Reference Field Name:

Received Date: 2014/10/10

Legal Location:

Date Reported: 2014/10/17

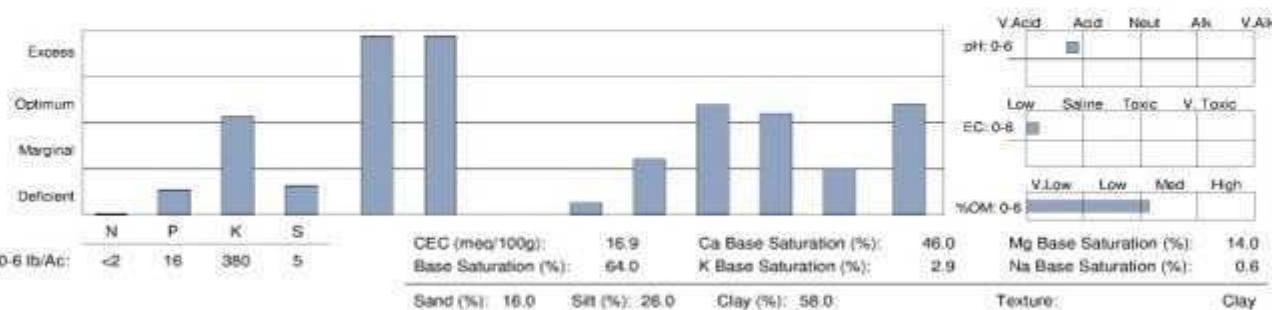
Attention: University Of MB - Shirley Thompson

Total Acres:

Client ID: 11-0006

Sampler:

| Sample ID | Depth | N ppm | P* ppm | K ppm | S ppm | Ca ppm | Mg ppm | Na ppm | B ppm | Cu ppm | Fe ppm | Mn ppm | Zn ppm | Cl ppm | pH dS/m | EC % | OM |
|---------------|-------|----------|-----------|----------|----------|-----------|-----------|-----------|----------|-----------|-----------|-----------|-----------|-----------|------------|---------|-----|
| 141010_002-01 | 0-6 | <1 | 8.0 | 190 | 2 | 1600 | 290 | 25 | <0.1 | 0.4 | 120.0 | 11.0 | 1.0 | 21.0 | 5.6 | 0.11 | 4.6 |



| | |
|---|-------------------------------|
| Recommendation: | Comments: OTHER ANALYSIS: PSA |
| * Bicarbonate-Extractable (Olsen) Phosphate | |



Interpretive Guidelines and Class Limits are based on accepted guidelines. The client is advised to consult with an agronomic professional for detailed interpretation.
 Farmer's Edge Laboratories limits liability to the cost of the analysis.

