Food sovereignty in Cuba:

A case study of the social support for agroecological farming with a focus on gender through participatory photography

by

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BSc, University of Calgary, 2004

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Supervisory Committee

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Abstract

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In the industrialized world, sustainable agriculture has remained a fringe agricultural experiment, unable to provide a large-scale alternative model. Cuba provides a case study of a massive agricultural shift to sustainable farming brought about by economic crisis. In 2009, 31 farmers and 6 key informants from 4 provinces in Cuba were interviewed and 12 women participated in a participant driven photography project about their involvement in small-scale agroecological farming. The research found that the inability to purchase imported chemicals and fertilizers has encouraged farmers to innovate their own solutions to maintaining soil, plant, animal and ecosystem health. Institutional support through academic institutions and non-government organizations is facilitating the spread of agroecological education through farmer-to-farmer exchanges. Economically, farming as a profession provides a fair income; although, farmers' wealth was tied to other industries in their respective regions, and influenced by tourism. The need for housing and land tenure are large barriers, but the government's opening up of land for farming in usufruct has been a successful strategy for encouraging new farmers. Allowing for subsistence growing, has been historically and is currently an important incentive. Cooperatives allow for the distribution of scarce inputs, provide educational and social opportunities for farmers and can provide retirement benefits, administrative and legal help. However, women tend to participate less in cooperatives, and traditional household roles and machismo are still an undercurrent in the Cuban countryside. Cuba's agricultural story is rich in lessons that can be applied globally, learned from its requirement to respond quickly to change during economic crisis. These lessons are simple; productivity and happiness increase with worker autonomy, support from government and institutions works better when it is participatory, and social groups whether cooperatives, family or neighbourhoods, provide an essential human support system.

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CHAPTER 1.0 Introduction to the research

My research began with my passion to better understand what could be a sustainable food system and what would be the humanity involved in the practice and management of small-scale agriculture within a specific community.

There are social, economic and environmental variables to what can be called a sustainable food system. The industrialized food system is dependent on market forces and dollar values that demand cheap (usually overseas, low waged) labour and cheap (subsidized) fuel for transportation (for e. g. McMichael, 2009); an industry with a growing rate of pollution contributing to global climate change (Chapman, 2007). This system is not sustainable in the long-term. In the face of global economic crisis and fluctuating world markets, many are seeking an alternative path. My research is therefore focused on food systems that are alternative to the industrial agricultural model. Agroecology provides an example (Altieri, 1990).

1.1 Research Scope

In a simple way, the food system can be divided into production, distribution and consumption. My approach to examining the food system focuses on the producers of fresh foods and the factors supporting their lives and livelihoods. This aligns with the use of a food sovereignty lens that requires sustainable livelihoods for producers, amongst other principles (Patel, 2009). My research interest is focused on the social world of humans: this includes how farmers are supported in their efforts towards sustainable farming, and how women are involved in farming.

In the industrialized world, sustainable agriculture has remained a fringe agricultural experiment, unable to provide a large-scale alternative model. Cuba provides a case study of a massive agricultural shift to sustainable farming brought about by economic crisis. With the collapse of the Soviet Union in the 1980s, and trade sanctions imposed by the United States, Cuba shifted from large state farms into co-operatives and from high input industrial farming to agroecological farming. Cuba's success with alternative farming has not only been a result of innovative low-tech farming techniques but also stems from the social organization of farmers (Levins, 2002). After the economic crisis, large tracts of land were subdivided into small farms and agricultural co-operatives first began to characterize the organization of the agricultural community. Cuba's transition to agroecology was initiated by top-down policies and has

largely been facilitated through institutions (Nelson et al, 2009). However, the implementation of this type of farming has only been realized by farmers themselves at a very local level. The local knowledge required by these farmers is a key component in sustainable agricultural systems (Kloppenburg, 1991). With leadership and economic change in Cuba there may be increased access to fuel, fertilizers, and imported food that has been lacking since the 1980s. Because of this, many observers have questioned whether Cuba will return to conventional methods and an industrial model of agriculture. The answer to this question is both unknown and complex. My research objective, though grounded in curiosity over the sustainability of Cuba's alternative model of agriculture, has a much smaller scope.

1.2 Research Questions

In light of the global fragility of the industrialized food system, my objective was to research the social environment of small-scale producers participating in a working model of sustainable farming. Small holder farmers, or peasants make up approximately half the world's people, and using plots averaging only 2 ha, grow at least 70% of the world's food (ETC Group 2009 in Altieri, Funes-Monzote, Petersen, 2011). Though I did not specify farm size parameters in my research, I understood small-scale producers as those that grow crops and raise livestock for subsistence but also as a means of livelihood by selling cash crops or through sales in their communities. Focusing on farms modeling agroecology (which will be defined further in Section 2.2), it will further outline an appropriate scale and how this encompasses the notions of social, ecological and economic sustainability. The food sovereignty concept (discussed further in Section 2.1) is a valuable lens for my research as it explores a broader understanding of food that includes the politics in food production and consumption. Cuba provides an excellent case study as an example of a nation working toward food sovereignty (Altieri & Toledo, 2011).

The overarching question that framed my research is: **How are Cuban farmers working towards food sovereignty?**

The following secondary questions illustrate my objectives for information gathering in order to begin to answer the broader question:

- **What local knowledge is being generated? What methods are small farmers using?**
- **What support do small farmers have in using agroecological methods in farming?**
- **How are women on farms participating in farming, and in agroecology?**

1.3 Justification for the research

Rice and Vandermeer (1990) refer to agroecology as the 'geography' of agriculture where geography constitutes not only "the location of crops in space and time, but the human agency that produces these crops within physical and social landscapes" (p.21). Geographic literature constitutes a blend of the physical sciences with those of the social sciences. This nexus is the source for much departmental friction, but also fertile ground for concepts, such as agroecology, that overlap the boundaries. Agricultural studies generally fall into the physical science literature where new methods, technologies and understandings of the natural world unfold. The human side of agriculture is less exposed, particularly with the engagement of a gendered lens.

A developing bank of scholarly work in food geographies has opened up the discussion in past years, but there is still a paucity of research particularly related to food production within geography. Food security has been a hot topic in the academy but still remains within a neoliberal mindset. By focusing on food sovereignty, through agroecology, the momentum behind peasant movements from the global South can ease the disconnection with the food security discourse in the global North. Cuba does not easily fit into either of those categories and opens the discussion further.

Perhaps because of the increased difficulties in conducting research in a socialist country, much of the internationally available research on contemporary Cuban agriculture falls into grey literature. Proponents of sustainable agriculture have latched onto Cuba as an idyllic example of agriculture for the rest of the world. Because of this body of knowledge, I became aware and interested in the Cuban situation, hoping that with a critical eye I could pick out components that would be helpful to understanding a path towards food sovereignty in any context.

As the literature review will outline, a food sovereignty lens can be applied to food production to expose the social world of agriculture. Agroecology provides tangible guidelines in assessing farming practices, and Cuba demonstrates an example of how the concepts and practices are working for small-scale farmers.

CHAPTER 2.0 Thematic Contextualization and Literature Review

2.0 Agroecology in Cuba through a food sovereignty lens

Food is what keeps us alive. It can bring us around a table to celebrate with family and friends, and help us form community. Food is a central part of what differentiates cultures and has historically been part of our everyday actions from the first hunting and gathering peoples to the onset of modern agriculture, as it began upwards of 10,000 years ago. It has also been a source of much grief, as when access to food is denied, whether because of scarcity or otherwise, resultant famines can be disastrously tragic.

2.1 The Right to Food, Food Security and Food Sovereignty

In 1948, food was first recognized as a human right. With the Declaration of Human Rights, the right to food was thus, protected by national and international law. The term food security was developed within the United Nations framework on adequate nutrition and hunger alleviation and initially did not recognize individual and household rights to food, which was rectified in later definitions. Access to food was very shallowly based on population to food availability ratios and was then strategically used for increasing food production (Windfuhr and Jonsén, 2005). Rideout et al (2006) bring our attention to the fact that "the Canadian constitution makes no explicit reference to the 'right to food'" (p.568) and they argue that action domestically towards food security is not showing any signs of progress. They point to absence of policy interlinking food and nutrition (that would require collaboration across the health, agriculture and trade sectors) and the shift towards emergency food being provided by charities; which, thereby takes away the urgency for provincial or national governments to uphold rights to food (also see Riches, 2011).

The Food and Agriculture Organization of the United Nations (FAO) defines food security as "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2001 in Patel, 2009, p.664). A definition of food security can be broadened to include the "adequacy of the food supply in terms of culture, nutrition and sustainability" (Rideout et al, 2006, p. 566) however, does not directly address the rights involved in the *production* of food. This is consistent with the way food security has been presented in general discourse. Without drawing attention to the food production system, there is an implicit assumption that the food supply, hinged on the global economic system, will be able to adequately provide in the future. This assumption ignores the politics involved in producing food and the rights and livelihoods of the producers of food.

So if food is considered a basic human right, who protects this right and how? Although states must guarantee our basic rights, there are not strong sets of policies that require implementation (Windfuhr and Jonsén, 2005). Food security definitions (like the one above) neglect a discussion of power and social control in the food system. Food sovereignty activists feel this is unacceptable (Patel, 2009). La Via Campesina, a Latin American peasant group, popularized the idea of food sovereignty in the early 1990s, incorporating attention to local smallholders, collectively owned farms and enterprises (Patel, Balakrishnan & Narayan, 2007) and access to land through agrarian reform (Rosset, 2006). Policies using the language of food security did not provide hope for changing economic structures that peasant movements of the South believed were the cause of environmental and social problems in rural areas (Wittman, Desmarais and Wiebe, 2010). Food sovereignty focuses on local autonomy, local markets, local production-consumption cycles, and farmer-to-farmer networks that promote ingenuity and innovation (Altieri and Toledo, 2011).

La Via Campesina has argued that "farmers need land to produce food for their own communities …and for this reason has advocated for genuine agrarian reforms in the areas of access to and control over land, water and agrobiodiversity" (in Altieri and Toledo, 2011, p.607). Some elements in an acceptable definition for food sovereignty would include: "the priority of local agricultural production to feed people locally, the rights of consumers to decide what they consume and how and by whom it is produced, the right of countries to protect themselves from under-priced agricultural and food imports, the population's participation in agricultural policy decision-making, and the need for agricultural prices to be linked to production costs" (Windfuhr and Jonsén, 2005, p.13). The Nye´le´ni Declaration suggests that there are certain necessities to obtain food sovereignty such as a living wage, tenure security and security of housing and cultural rights (Patel, 2009). Further, there needs to be an end to the dumping of goods below the cost of production, capitalism hinged on crisis, colonialism, and imperialism (Patel, 2009, p.669). All of these conditions to food sovereignty are extremely prodigious objectives many of which clash with hegemonic politics, and as a result, perhaps it is not surprising that the global North has not yet widely adopted the concept or terminology of food sovereignty. Often food sovereignty is discussed as part of Latin American movement and does not draw parallels into a global context. Fairbairn (2011) cautions that by reducing the concept to only local examples of how food sovereignty can be exercised it dilutes the call to citizens for global action to change the neoliberalization and commodification of agriculture.

2.1.1 Women in farming

Food sovereignty has broadened the discussion to include food production as a human right, and in order to talk about rights, we must talk about how these rights will be met, "across a range of geographies, in meaningful and substantive ways" (Patel, 2009, p.671). The concept of food sovereignty not only has

transformative potential to both farmers and consumers, but also presents a deeper discussion of food and discrimination. Using a feminist analysis of food sovereignty, Patel (2009) posits that in true food sovereignty, every person should be able to meaningfully engage in changing food policy and that in order to do this sexism, patriarchy, racism, and classism must first be eradicated. Similarly, Wittman, et al. specify that: "the social and political transformation embedded in the food sovereignty concept specifically entails changed gender relations" (2010, p.5).

Women are often the preparers of food, the providers of nourishment for themselves and their families. Increasingly, their importance to food security is being recognized in the developing world (Quisumbing, 1995). However sometimes their roles as caregivers and homemakers does not allow equal time for involvement in food production and decision-making, and they are not seen as experts in agriculture as compared to their male counterparts. Food sovereignty goes beyond the utilitarian acknowledgement of women's importance in these discussions, and questions the social, political and cultural structures that impede their autonomy. Many women have struggled with integrating gendered issues into agricultural policies at their local and regional levels, and at the international level, La Via Campesina has brought women together through a Women's Commission and through organizational awareness (Desmarais, 2003).

The food sovereignty concept provides language for a growing peasant movement that is dissatisfied with an imposed corporate model of agriculture. The concept contradicts the dominant model of commodity agriculture on nearly every premise (for example see Table 1, p 169, Martínes-Torrez & Rosset, 2010). A rejection of export price dumping and low price protection that allows farmers fair wages directly confronts the neoliberal economic system in which farmers are working. By working in rural communities and dealing directly with issues facing individual farmers, food sovereignty activists expose and confront power struggles and violence based on gender and race amongst other factors. These issues, that food sovereignty seeks to change, are embedded in the institutional structures that govern our communities, and in within our communities that govern our daily human interactions. La Via Campesina, organizes and makes decisions with a consensus based process, taking the time for the inclusion of international voices; which is not a fast process (Martínez-Torres & Rosset, 2010).

The food sovereignty concept draws connections across physical and social boundaries, scientific and psychological boundaries, political and economic boundaries. It is inherently interdisciplinary, provides few quantifiable determinants, and its recognition in policy relevant decision making seems difficult if not impossible. Using a food sovereignty lens in my research is messy, but I argue, that it will be of greater integrity when exploring the social landscapes of food production. It provides an excellent basis for inquiry, but lacks tangible tools for implementation or measurement.

2.2 Agroecology

How can food sovereignty be achieved? Altieri and Toledo (2011, p.607) posit that "agroecology provides the principles for rural communities to reach food sovereignty."

Carroll, Vandermeer and Rossett (1990) explain that the popularity of studying the intersection of agriculture and ecology has arisen from three motivations: that current agricultural practices (in both developed and developing countries) are leading to environmental degradation; current agricultural practices are not in the best long-term interests of farmers or consumers; and that studying agroecosystems may yield more general insight into ecological processes. An assumption in agroecology is that agricultural systems cannot easily be separated from those who manage them (Altieri, 1990). The literature generally agrees that agroecological methods include the incorporation of several of the following physical components: small-scale farms; diversification of agroecosystems: intercropping, agroforestry, crop/animal integration; resource conservation: low fuel, oil and machinery needs, low water inputs and emphasis on hand and mechanical tools; biological inputs: manures or organic matter amendments over chemical fertilizers; soil conservation: crop rotation, reduced tilling, green manures, animal traction; and biopesticides and bio-fertilizers.

Though agroecology is most generally considered a science (Wezel et al, 2009) it is one that "carries an ecological and social ethics with a research agenda of creating nature friendly and socially just production systems" (Ruiz-Rosado, 2006 in Altieri and Toledo 2011, p. 598). The novelty of the concept of agroecology in the sciences is not the technical methods, as these have been around for some time, but that the inclusion of environmental sustainability coupled with the acknowledgement of human managers (and all of their previous knowledge and experiences) will be just as important to study as the climate, soil, plants and animals (Leyva Galán, 2005). Agroecological principles include the promotion of participatory methods of research and extension and a reliance on local knowledge and farmer input (Altieri, 2002). Hassanein (1997) reminds us to recognize that social location is also a part of local knowledge in the sharing of alternative agricultural practices, and that gender, amongst other variables, will be an important factor.

Agroecology could be a tool for change on a global food scale. The United Nations Special Rapporteur on the Right to Food recently drafted a call to the General Assembly outlining how agroecology could be used as a tool for realizing the right to food through increased farm productivity, farmer engagement and increased income for the rural poor (de Schutter, 2010). In a recent review by Tomich et al (2011), agroecology has been conceptualized in a framework of global change, addressing food security at the farm level while acknowledging farmers and peasants' relationships in regional, national or international

markets. The authors discuss emerging research around the importance of social networks and the successful diffusion of agroecological innovation (Tomich et al, 2011).

At its core, agroecology provides tools for implementation at a local level. Agroecology's focus on renewing local connections between consumers and producers of food, can begin to restore a historic and fundamental role of food as a bonding mechanism in communities (Gliessman, 2007). "Agroecology emphasizes the capability of local communities to experiment, evaluate and scale up innovations through farmer-to-farmer research and grassroots extension approaches" (Altieri and Toledo 2011, p.587).

Agroecology, with an established set of principles and practices, can be used to describe a system of sustainable agriculture. This system, as it has been applied at both local and global scales, can offer a structured pathway towards achieving food sovereignty.

2.3 The Cuban context

Many food sovereignty activists are motivated to action by an impending food systems crisis hinged on global capitalism. Cuba provides a case study of economic crisis leading to massive agricultural change. Though Cuba vehemently rejects capitalism it still remains part of the international trade market with a large quantity of imported foodstuffs and a need for foreign currency through exports and a growing tourism industry. This dichotomy adds complexity to Cuba's food system, and its unique history of agrarian change helps us understand how it has mediated food crisis and simultaneously enriched its domestic agriculture.

Urban agricultural systems in various cities in Cuba have been recognized as exemplary, spreading to other parts of the world. However, emphasis on urban agriculture as a means for poverty reduction tends to neglect the rural-urban interactions that contribute to food access for the urban as well as rural poor (Ellis and Sumberg, 1998). Cuba's rural farmers, though somewhat overshadowed by urban agriculture's success, should not be overlooked, as they are still the highest overall contributors to the food system. This literature review will mainly focus on agriculture in a rural context.

2.3.1 Pre-crisis: The centralized model of agriculture

Cuban colonial agriculture began its development with the introduction of African slaves that provided labour to the growing sugarcane industry in the late 18th century. Very few landowners controlled the majority of land and the Cuban government welcomed foreign investment of any kind. Large-scale estates, *latifundios*, of sugarcane and cattle ranching dominated the landscape (Nova, 2002). Rural areas then lacked sanitation, the rural population was highly illiterate (Funes, 2002) and worked only seasonally as agricultural wage labourers (Kay, 1988).

The revolution of 1959 inspired dramatic agrarian and social reform. The first agrarian reform of 1959 saw that any private land holdings of greater than 403 hectares were repossessed by the State or distributed to the tenants who were cultivating the land. However, large-scale private landowners still owned between 20 and 25% of the country's land (Kay, 1988, p.1241). The second agrarian reform law of 1963 reduced large tracts of private land down to 67 hectares, redistributing these land to tenants and expropriating lands to the state to develop a centralized state agricultural sector (Kay, 1988).

Up until 1970, the large-scale Soviet model of agricultural production, with increasing usage of chemical inputs, was favoured as the most efficient method of farming and was seen as a means to replace the lack of rural labour that was quickly migrating to urban areas, partially as a result of an increasingly educated population. In 1970, a large push to achieve a harvest of 10 million tons of sugar included mobilizations of voluntary labour (Kay, 1988). When this target failed, Cubans began losing faith in the revolutionary leadership, which resulted in increased absenteeism for state work and discontent among the rural population.

Discontent of urban dwellers was also rising because of the lack of fresh food. Though the nationalized farm sector was able to provide approximately 2500 calories/day per capita in food staples (Mesa-Lago, 1981), fruits and vegetables were generally available only on the black market at high costs (Deere & Meurs, 1992). The state-run parallel market was opened up in the early 1970s to discourage black market selling and increase access to food. These markets allowed for selling of certain things in addition to the ration card at state determined prices (Deere & Meurs, 1992).

In 1975, the Economic Planning and Management System (SDPE) was an agrarian reform that began a path towards ecentralization (Kay, 1988). Along this path was a shift towards more food production, more realistic production targets, and a strategy aimed to bring farming more in line with opportunity costs, with price reforms (Kay, 1988). Though theoretically, this system encouraged a higher degree of popular participation, this participation was only in terms of implementation of directives developed by the state (Meurs, 1992). Within the SDPE, the organization of material incentives for farmers left ample room for individual and enterprise corruption and the state's social goals were not well understood by agricultural workers (Meurs, 1992).

However, one very successful result of the SDPE reforms was the approval of voluntary membership in producer cooperatives as an alternative and complementary path to state farming (Kay, 1988). 'Agricultural Societies' (sociedades agropecuarias) had formed after the revolution but only few had remained because of the state emphasis on large-scale farming. These societies became a model for the organization of Agricultural Production Cooperatives, CPAs (Kay, 1988). Within a decade CPAs became the dominant type of peasant organization over land that was not in the state farming sector. In a CPA,

farmers pooled their land, livestock and machinery, farmed the land collectively and shared the profits. The CPA provided access to various social benefits, loans and subsidized inputs. Under the Cooperative Law No. 36, enacted in 1982, each CPA had autonomy over their own management (Kay, 1988; Álvarez 2002) though the degree that this was true in practice has been challenged (for e. g. Meurs, 1992). A strong incentive for rural people to join CPAs was direct access to food through collective plots for self sustenance (Kay, 1988). The cooperative law also encouraged to a lesser degree another type of cooperative, the credit and service cooperative (CCS) that would become very important in the future.

Though the numbers of CPAs steadily increased, they were not able to immediately provide the level of increased production expected (Deere and Meurs, 1992). In 1980, free peasants markets were opened to allow private sellers the right to determine prices for their products and to create more incentives to raise production yields. Immediately these financial incentives had positive effects on increasing yields. For example, due to these policies the outputs of roots and tubers increased by about 50% and vegetables by 81% (Figueroa Arbelo and de la Torre, 1984, p.38). However, the nature of farming required that farmers tend their fields during the day therefore intermediaries were required to sell in the free markets (Deere & Meurs, 1992). The shortages of food products meant that buyers were forced to pay exorbitant prices and which allowed certain intermediaries to amass profits. Furthermore, the advantage of living close to Havana, and its subsequent buying power, also created large income inequalities (Deere and Meurs, 1992). The resultant inequalities were unacceptable to the socialist government and free markets were made illegal in 1986. Following closure of the free markets, increased support for the parallel state-run market allowed for some gaps in the provisioning of supplemental foods, however there were still overall food shortages.

In an effort to increase yields and provide food that was lacking for the Cuban population, the National Food Program was launched in 1989. The program's goal was to increase domestic food production so as to provide an adequate amount of calories to each person. However the program did not modify structures in the functioning of agrarian management, which ultimately, was its demise (Burchardt, 2001). The National Food Program was nearly halted with the collapse of the Soviet Union in 1989.

2.3.2 Economic Crisis – The Special Period 1989-1993

In order to understand the position that Cuba was in, following the collapse of the Soviet Union, it is important to look at its particular economic situation. The socialist tendency of thorough statistics gathering illuminates a quantitative understanding of the situation.

Table 1: Effects of the Cuban Economic Crisis

	Pre Crisis (1989 except where noted)	Special Period
Value of Cuban Peso (1994)[1]	8 CUP = 1 US$ (1990) [1]	120 CUP = 1 US$
Imports of Petroleum	13.5 MT[2]	6 MT (1992)[2]
Imports of Fertilizer	1.3 MT[1]	300,000 T (1992)[1]
Caloric Intake of Cubans	2845 calories [3]	1670 calories (1994)[3]
Unemployment rate	8%	34% [6]
Proportion of land in State sector	82% (1993) [4]	33% (1996)[5]

MT=Million Metric Tonnes
[1] Mesa-Lago, 1998, p.861, 864 [2]Deere, 1993, p.40
[3]Castro as cited in Pollitt, 1997, p.184 [4]Noguera, 2004, p. 631 [5]Martín, 2002, p.59 [6]Comision Economica Para America Latina 2000 as cited in Enriquez 2003).

2.3.2.1 Foods

After the 1959 Revolution, the Cuban agricultural economy, propped up by the export of sugar, continued increasing its dependence on the import of foodstuffs. The value of imported foodstuffs increased nearly six-fold between 1958-1986 (García Ravelo, 1988, p.45). However, the government was aware of this dependency and beginning in 1975 there was a trend towards decreasing dependence on food imports. By the late 1980s Cuba had shifted from 20% of total imports in foodstuffs to approximately 9% (Deere, 1993, p. 36) by increasing domestic dairy production, certain vegetables, and meat.

Prior to the crisis, approximately 50% of per capita caloric intake; 55% of proteins and 90% of all fats, (Figueras, 1994 as cited in Burchardt, 2001) were estimated to be derived from imported food, mostly from the Soviet Union (Deere, 1993). Major food imports were wheat, lard and oils, and animal feeds (Deere, 1993). Importantly, both rice and beans were also heavily imported, and have long been essential components of a Cuban diet.

2.3.2.2 Exports

Citrus was Cuba's second largest export crop, but in 1994 output decreased to 50% of 1990 levels (Mesa-Lago, 1998, p. 864). Tobacco, the third largest export in 1994 was 58% below 1989 levels (Mesa-Lago, 1998, p.864). The drop in these export commodities meant less hard currency available to import food to feed Cuba's population.

2.3.2.3 Fuel

Fuel was one of the most important imports that drastically reduced with the fall of the Soviet Bloc. Cuba had also exported Soviet crude oil and refined petroleum, injecting hard currency into the economy (Deere, 1993). Being severely cut from fuel trade with the Soviet Union doubly affected Cuba for its own fuel needs, but also in gaining currency needed for purchasing other imports. Between 1989 and 1992

imports of petroleum derived products from the USSR fell from 13.5 to about 6 million tons (Deere, 1993, p.40). This had drastic consequences on the ability to carry out large-scale industrial agriculture, but was also felt by the masses with 90% of transportation shut down in Havana and frequent power blackouts (Mesa-Lago, 1998, p.869).

2.3.2.4 Fertilizers and pesticides

Though fuel shortages had serious impacts on agriculture of the era, the lack of fertilizers was even more important to a system that relied on these inputs to maintain yields. Imports of fertilizers fell from 1.3 million tons in 1989 to 300,000 tonnes in 1992 (Castro as cited in Pollitt, 1997, p.184). The sugarcane industry was especially vulnerable, based on the intensive chemical dependency of a large-scale system. Between 1989-1992, farmer's sugar yields dropped by as much as 45%, exacerbated because of emergency harvesting of premature cane when government managers were attempting to make up for shortages in order to come closer to established production goals (Pollitt, 1997, p.186). Because of the small amount of total fertilizers available, the sugar industry had to face even greater challenges as proportionally their 'share' of fertilizers was being diverted to the National Food Program where priority was on growing foodstuffs that would feed the population suffering from serious food shortages.

Though Cuba established biological pest management as a national priority in the 1980s, it still relied heavily on the import of pesticides and herbicides and in the late 1980s imports accounted for 82% of those used (Deere, 1993, p.37). Between 1989 and 1992, pesticide imports fell by 63% (Lage 1992 as cited in Vandermeer et al, 1993). Hand weeding was an alternative practice, however in 1990 root crop and vegetable production was especially affected by the takeover of weeds and insufficient labour to pull them (Deere, 1993).

2.3.2.5 Machinery

Though the use of animals in agriculture was common before the revolution of 1959, modernization demanded mechanization and the number of tractors in 1960 grew from 9000 to 85000 in 1990, while the use of oxen dwindled (Ríos and Ponce, 2002, p.155). Components for agricultural machinery had previously been imported by the Soviet Union including tractors, replacement tires and batteries. Extending harvests into the rainy season in attempts to increase production increased the wear and tear on machinery that was already suffering from less repairs and improvised replacement parts (Pollitt, 1997). Tractors sat idle while specialized plows for oxen were domestically fabricated (Ríos and Ponce, 2002). Animal traction again became (and remains) a very important component of Cuban agriculture albeit, a very labour intensive component requiring 8-12 pairs of oxen to replace one tractor (Pollitt, 1997, p.195).

2.3.2.6 Labour

In the 1950s, approximately 40% of the population was employed in agriculture, livestock, forestry and fishing but by 1989 agriculture generated only about 20% of employment (Pollitt, 1997, p.193). Under the agricultural modernization model, rural to urban migration was the dominant trend in Cuba's population patterns. However with drastically diminished inputs and mechanization, increased human labour was needed to replace this. The alternative model Cuba was developing required much greater availability of farm animals and a much larger percentage of the population in the agricultural labour force (Vandermeer et al, 1993). Though the primary constraint on production levels initially was labour (Deere, 1993) after 1990, the lack of fertilizers and pesticides played an ever increasing role in decreasing yields.

The absence of chemical agricultural products, and lack of fuel was replaced with volunteer human labour. Beginning in 1990, through the National Food Program, hundreds of camps, with collective dining facilities and medical services, were created for volunteers that stayed between 2 weeks and 2 years (Perfecto, 1994; Vandermeer et al, 1993; Deere et al, 1998). Bonuses were based on the quality of work and productivity and could offer substantial financial incentives for many Cubans to earn an above average salary. Long-term incentives to reduce labour shortages included infrastructural projects of housing, clinics, childcare and community centres, in attempts to reverse the trend of rural to urban migration (Perfecto, 1994). Furthermore in place of military duties, young people were able to perform their mandatory service as agricultural labour, with the hope of attracting new families to rural resettlement (Vandermeer et al, 1993).

2.3.3 Post Crisis: Cooperatization and the democratization of agrarian structures

During the special period, all Cubans felt the effects of lower imports and lower agricultural yields. Between 1989 and 1994 the caloric intake of the average Cuban decreased from 2845 calories/day to approximately 1670 calories/day (Mesa-Lago, 1998, p.864).

The persistence of low worker productivity and low yields on State farms during the Special Period pushed the Cuban government to instigate the most dramatic agrarian reform to date. In September 1993, the majority of the state farm sector was transformed into Basic Units of Cooperative Production (UBPCs), and some individual parcels were handed over to private farmers. Land was granted in free usufruct and the basic means of production were guaranteed by the State. The State remained the owner of the lands but the UBPC became responsible for the management and running of the unit. The majority of the harvest was contracted to the State, though if UBPCs exceeded the contract they were allowed to sell surplus in free markets (Mesa-Lago, 1998). By creating UBPCs, the government hoped that production would increase because of lowering costs, attracting new workers, stabilizing the labour force and providing social services to rural areas more efficiently (Burchardt, 2001).

Several obstacles prevented the UBPCs from success. Burchardt (2001) describes them as being transitional, sociocultural and structural in nature. State farm workers were required to switch from a highly mechanized strategy of production to a smaller-scale, self-managed model that demanded increased labour. Unsurprisingly, many workers lacked the managerial know-how to enable a smooth transition. Creating a cooperative structure from a top down directive created sociocultural challenges, where state farm managers continued to play a managerial role, and UBPC members did not perceive themselves as owners of their production (Burchardt, 2001).

Though there was much hope in the UBPCs distributing decision-making (Deere, Meurs & Pérez, 1992) the main structural challenge that UBPCs faced was the lack of true autonomy. One of the reasons farmers were attracted to the UBPCs was because of the promise of greater participation in management (Pérez Rojas and Léon, 2001). However, true participation in management was impossible and made clear in December of 1993 by the ministry of Agriculture by stating that though elected boards were created to manage the UBPC, the state would continue to supervise activities and had veto power over many decisions (Pérez Rojas & Léon, 2001). Furthermore the State retained direct and indirect control over production, marketing, and allocation of inputs (Burchardt, 2001). The actual decision-making powers the UBPC could exercise became limited to how to use materials provided by the state (Suero and Romero 1998 as cited in Pérez Rojas and Léon, 1998). These conditions paved the way to failure for UBPCs and in 1995 only 9% of the UBPCs were profitable, at least partially due to the high prices paid to the State for inputs, and low prices they received in return for the harvest (Alfonso 1995 as cited in Mesa-Lago 1998). Furthermore, even though UBPCs were an average of 10% of the size of a state farm, this size may still have been too large for efficient management (Álvarez, 2004).

Incentives for worker productivity were low in the UBPCs. One incentive to join a UBPC was the provision of land for subsistence agriculture. This provision was a measure aimed at solving food problems faced by the workers and their families (Pérez Rojas and Léon, 2001). Similarly, in 1992, state farms began allowing workers to cultivate land for self-provisioning (Deere, Pérez and Gonzalez, 1994). This allowance was the most important component to a UBPC member's work rewards, yet was not tied to the performance of the enterprise (Pollitt, 1997). Despite all of the challenges UBPCs faced, they provided an alternative model of social organization that involved the participation of a much larger number of the nation's population seeking solutions to food scarcity.

Another incentive to increase agricultural production was created in 1994 with Mercados Libres Agropecuarios (MLAs) to allow farmers to sell excess produce on the free market (Enriquez, 2003). These were similar to the free peasant markets between 1980 and 1986, however, oligopolies developed which allowed sellers to profit from exorbitant prices (Álvarez, 2004). This inspired the creation of 'Agricultural Markets with Fixed Maximum Prices', so as to compete with the MLAs and offer products at

lower rates (Álvarez, 2004). The opening up of markets outside of the government markets, not only allowed more access to food for the public but had an immense impact on the value of the Cuban peso. During the crisis the American dollar was worth 120-140 Cuban pesos, and by 1996 it rose to 25 pesos/dollar (Deere et al, 1998, p.373.)

Before the creation of UBPCs the state owned 82% of farm land, CPAs collectively owned 8%, and 10% of the land was privately owned where the majority of farmers belonged to a Credit and Service Cooperative (CCS) (Noguera, 2004, p.51). The CCS co-ops were first created after the first agrarian reform. They are utilized by private farmers, who farm their own lands but participate in the cooperative in order to access government loans and services (Álvarez, 2004). CCS farmers have an above average income and the number of farmers associated with CCSs is currently growing (Martín, 2002).

Though urban agriculture contributes a relatively small quantity to total agricultural production, the local distribution of highly perishable items has made a positive impact on Cuban diets and has dramatically increased the number of people involved in agriculture. Urban agriculture played an important role in providing fresh produce to city dwellers after the crisis, and continues today. It is organized into huertos populares (crops sown directly into the soil) and organopónicos (Álvarez, 2004). Organopónicos are raised bed systems mixing soil and organic matter and are the most common form of urban agriculture in Cuba. The first organopónico was developed in 1987, however it was not until after the crisis that organopónicos became widespread throughout the city (Koont, 2008). Vegetable production from urban agriculture had increased from a negligible yearly amount in 1994 to over 4.2 million metric tons in 2006 (Koont, 2008, p.287).

The review of Cuban agrarian history and reform serves to show how food production in Cuba has changed and adapted over time. While Cuba's economy relied heavily on cash crops, it was the magnitude of the economic crisis that pushed the country to understand its maximum potential for food growing. In addition to the need to develop new physical agricultural techniques (as described in the agroecology section that follows), a key factor in the successes and failures of food production is the social human/realm; for example, regulations on how food producers could sell their products, the organization of agricultural management, and the distribution of arable lands.

2.4 Cuba's model of agroecology

2.4.1 Appropriate technology and farming methods

Since the 1960s Cuba has demonstrated support for ecological initiatives in agriculture. The Voisin system of rotational grazing was introduced in the 1960s (Levins, 2005) as one of the initial steps toward agrosystems integration. This system divided grazing land into small pastures with shifting grazing. The

animal manure then provides fertilization for the pasture that will be planted in legumes and cane that will go towards feeding the cattle. After the crisis, with the decreased availability of imported animal feed, animal and crop integration was necessary for domestic animal feed production (Monzote, Munoz and Funes-Monzote, 2002). The implementation of such systems was and remains slow. In 1994, milk and cattle production had not been able to come near the levels reached with concentrated animal feed (Deere et al, 1994). However these systems are playing an increasingly important role in the dairy industry (Funes-Monzote et al, 2008).

The Ministry of Agriculture had already begun testing certain biological pest management strategies as early as the late 1960s (Perfecto, 1994). Cuba developed a plant protection system based on biological controls in 1975 (Pérez and Vazquez, 2002). In 1993, Cuba had over 200 Centres for the Reproduction of Entomopathogens and Entophagous Agents (CREE) (Dlott et al, 1993). Integrated pest management strategies became widely used in the 1990s (Pérez and Vasquez, 2002). Research on weed and disease control, and pest monitoring was well under way before the crisis and the urgency of finding solutions encouraged the implementation of methods and the expansion of facilities.

Cuban soils are not generally very productive (Perfecto, 1994; Gersper, Rodríguez-Barbosa and Orlando, 1993) and soil fertility methods have been an ongoing research area for decades. Through crop rotation, 'green manures' fix nitrogen in soils. By planting legumes as cover crops (such as velvet beans, cow peas, soybeans, and sesbania) coupled with reduced tillage programs, the loss of nutrients through erosion has been greatly reduced in Cuban soils (Gersper et al, 1993).

Based in traditional farming, intercropping has been shown to increase productivity. Different crops demand different nutrients from the soil and can be planted side by side to take advantage of their differences. In Cuba, intercropping has been successful with cassava, maize, beans, and many vegetable crops (Casanova, Hernandez and Quintero, 2002). Particularly important was the intercropping of soybeans with cane. Soybeans fixed nitrogen for cane, and the soybeans remain an important component of animal feed (Gersper et al, 1993).

Soil fertility has been widely improved through the application of cattle, pig and poultry manures. To complement this, the potential for worm castings to contribute to soil fertility problems was explored in the 1980s with vermiculture. Deere estimates that one kilo of worms are necessary to convert one square meter of cane or plantain residues into humus (1993, p.47). In 1989 there were 123 vermiculture units that produced 24 000 metric tons of humus, however with the crisis, vermiculture was intensified and the number of vermiculture units increased to 172 across the country delivering 93 000 metric tons of humus (Gersper et al, 1993, p.20). In 2005 vermiculture had expanded to produce >2.7 million tons of worm humus (Koont, 2008, p.289). Waste recycling has become an important component of Cuban agriculture,

especially within the sugarcane industry. Leaves and tops of green cane are used as cattle fodder (Deere, 1993), waste water from sugarcane processing is used to irrigate fields, and by-products of sugarcane are used in animal feed, energy production and biofertilizers (Gersper et al, 1993).

These appropriate technologies have allowed farmers to adapt to decreased inputs. For example, when interviewing farmers in the provinces of Havana and Santiago in 1998, Enriquez found that although the availability of inputs was commonly stated as restrictive to their farming only 41% of those interviewed thought this restriction was affecting their production levels (2003, p. 207). Depending on the region, Altieri, Funes-Monzote and Peterson estimate that agroecological practices are used in 46–72% of peasant farms which produce over 70% of the domestic food production (2012, p.7).

2.4.2 Agroecological education

Following the crisis, highly trained Cuban agronomists found themselves without skills for low input systems. This inspired a rapid change in the education curriculum to include agroecological courses at the undergraduate, masters and post-graduate levels (García, 2002). Not only was course content modified, but because of the systems nature of agroecology, a new education methodology was needed to incorporate a more participatory experience-oriented approach (Garcia, 2002) that would bridge the field level problems farmers were facing. For example, formerly administrative technical staff were transferred to field units so that they could benefit from hands-on farmer experience as well as integrate farmers' concerns into broader agricultural recommendations (Perfecto, 1994). In Cuba, the spread of agroecology can also be attributed partially to ACTAF (Asociación Cubana de Técnicos Agrícolas y Forestales) with the training, extension, and research activities geared towards agroecology (Altieri et al, 2012, p.6)

Cuba's centralized agricultural extension provided structural capability for the dispersal of the ‘campesino a campesino’ (farmer-to-farmer) movement that rapidly spread agroecological principles and methods across the island (Holt-Giménez, 2006). This agricultural learning model incorporates an understanding that farmers are continually inventing and adapting technologies in their fields and that this should be incorporated into the scientific enterprise (Perfecto, 1994). As its name suggests, the principle of this methodology is that knowledge is created by the connections and skill-sharing by those that are doing the work on the ground. It is a different model than one where the ‘scientific expert bestows knowledge on a farmer’ which is a traditional underlying principle of agricultural extension. Campesino a campesino workshops are often sponsored by government agencies but conducted by community members. Information dispersal becomes a much more casual and interactive skill sharing and is organized through research centres or co-operative boards (Holt-Giménez, 2006). Facilitating connections between producers increases social capital for the farmers and increases the knowledge bank for the overall community. Comparing experiences and both giving and seeking advice from people that undertake the

same kind of work, takes the isolation and some of the guesswork out of farming. Such participatory research is contributing to the decentralization of Cuban agriculture and as Ashby and Pretty (2006) suggest, is developing completely new relationships between researchers and farmers. Occasionally, Cuban farmers have new opportunities to travel throughout Latin America to spread agroecological methods developed through this program to other farmers (Holt-Giménez, 2006).

In Cuba, perhaps the most published (and therefore well known) participatory research to date has been carried out in plant breeding. An example of participatory plant breeding in Cuba was initiated by the CGIAR (Consultative Group on International Agricultural Research) with the Participatory Research and Gender Analysis (PRGA) program. This program funded a project that aimed to improve biodiversity of farming crops and raise awareness toward gendered differences in preferences for maize and bean varieties (Vernooy, 2003; Verde et al, 2003). This is not an anomalous case, though there is not much else published in the literature in English, there are countless examples of participatory research ongoing in Cuba. In a recent study La Via Campesina (LVC) gave a role to the 'International Working Group on Sustainable Peasant Agriculture' to identify the best practices for the success and implementation of agroecology. Cuba was chosen as a leader in this project and it resulted in a study spanning 13 of 14 provinces in Cuba, interviewing farmers, extension agents, and in-depth research into the organizations that had contributed to the dispersal of agroecological principles (Rosset et al, 2011). An essential tool employed by the National Association of Small Farmers (ANAP) was the farmer-to-farmer movement, a methodological framework used by LVC. Although Holt-Gímenez argued that agroecology has been said to be practiced via "community-based organizations and non- governmental organizations (NGOs) rather than national peasant organizations and social movements" Rosset et al believe that this is now changing with LVC's use of the farmer-farmer methodology (2011, p. 162).

2.5 The politico-philosophical argument

Though Cuba has applied and been accepted for membership to the World Trade Organization (WTO) (because of important exports for Cuba's economy), Cuba is not a member of the World Bank or International Monetary Fund (IMF). The WTO's main goal is to reduce barriers to trade which results in the commodification of agricultural products for the world market in contrast to Cuba's agricultural priority of growing products domestically for its own citizens. Because of this, Cuba has a special role to play as a member of the WTO, in speaking against neoliberal trade policies (Cohen, 2004).

Levins (1993) argues that the path towards sustainable agriculture is rooted in the absence of private interests in agriculture. And although Cuba's history has shown that a certain degree of privatization has encouraged farmers and increased productivity, fundamentally, food is treated more as a common good

and less as a commodity. He argues that debates about scientific technologies that do not coincide with conflicts of interest, become simply differences of opinion that allow greater integrity in understanding (Levins, 1993). This may oversimplify Cuba's political position in larger issues (for example in terms of the research and development in genetically engineered foods) but imbues decision-making on a daily basis. Clausen (2007) uses Marxist notions of metabolism to describe the alienation of nature that is fostered by capitalism. She argues that Cuba's transition to agroecology was not simply a transition of methods but one of social transformation, this is due to reversing the rifts between nature and society (Clausen, 2007). Levins (1993) feels this was enabled because of Cuba's socialist commitment to science. He argues there was national receptivity to Marxist thought, which allowed for interconnected, complex and process-oriented ideas of nature and agriculture (Levins, 1993).

2.6 Cuba as Case Study

The centralized nature of the agricultural sector in Cuba has allowed for the rapid training and education of agroecological methods that were disseminated during a time of economic crisis. However the path towards greater domestic productivity had been forged before the crisis, by the decentralization of agricultural management through the organization of cooperatives and urban agriculture. The decentralization of decision-making encouraged greater and more democratic participation in agriculture, aligning with the principles of agroecology. This national political strategy was integral to Cuba's transition to an alternative agricultural model however political factors at the regional, local, farm and individual levels of decision-making go a long way to dictate success on the ground.

The dispersal or acceptance of agricultural techniques or organization was not homogenous, and varied considerably across regions. During the Special Period, Deere et al (1994), reported that there was significant variation in the agricultural development of cooperatives in three Cuban municipalities. Major obstacles to successful agriculture have occurred at the local and community level, for example: the lack of incentives to implement agricultural policies and sociocultural barriers, such as racism and sexism, that prevent true participation and autonomy in cooperatives.

Nelson et al (2009) argue that the Cuban agroecology movement is highly institutionalized, led by the government, research institutes and organizations. In their research they found that individual Cuban farmers had not intentionally accepted organic methods nor internalized an ideological reasoning behind the methods they use (Nelson et al, 2009). The increasing individual freedom in farming may in fact jeopardize the continued use of agroecological methods in the absence of clear incentives or ideological conviction for their use.

Cuba's example of agroecology was spurred by crisis, is highly institutionalized, and varies across geographical boundaries. Across the country the dispersal of agroecological education, use of various

techniques, and increasing farmer-to-farmer knowledge sharing is educating and empowering small farmers. Cuba's position as compared to others in the Latin American context of food sovereignty is very different. Cuban citizens are not fighting against agro-industrial corporations but often for more individual or community level freedom and autonomy. Despite the urgency that Cuba had to develop food security, agroecology has remained a steadfast tool in developing domestic food systems and working towards food sovereignty.

Cuba makes for an excellent case study to examine agriculture after crisis. The lessons provided by this unique agrarian history continuously inform subsequent agricultural policy and development. Cuba's path has included and continues to support agroecological principles. By examining Cuba's example, the global community can better define and understand what food sovereignty can look like.

CHAPTER 3.0 Methods and Methodology

3.1 Research Framework

Conducting research

I consider the human landscape a gendered space, and grounded my research in feminist methodology. In my research I aimed to use methods that were something different than the traditional interview protocol based in the positivist social science discipline (Oakley, 2005). I wanted to use community based and participatory research tools appropriate to feminist research, but in the field, I found it was difficult to fully incorporate this approach, given the short time period for the field work of my masters project. My research focused on interview data gathering with the added element of a participatory photo project in one study area.

Because of the misuse and abuse of the term 'participatory' in research and projects, I will briefly describe what I understand as participatory research. In participatory research (PR) those being researched are viewed as agents, not objects (Cornwall and Jewkes, 1995). In true PR the emphasis is on the objectives (Ashby and Pretty, 2006) and the process (Cornwall and Jewkes, 1995) and less on the tools or outcomes. Lilja and Bellon (2008) explain that in PR, there is a feedback loop between the research and the outputs. Using Freire's notions of power, PR attempts to confront power relations, shifting the researcher's role to one of facilitating, rather than controlling or directing the research. Gatenby and Humphries state that "Participatory Action Research (PAR) has traditionally been conducted as if the social world were a place of gender-neutrality" (2000, p. 90) and go on to explain how feminist PAR seeks to empower women involved in research but also to make research accessible to more women.

Feminist methodology places importance on the 'how' of doing research. This includes using appropriate tools but also acknowledges the role of the embodied researcher. As Chambers describes: "What we are able to learn...depends not just on what methods we use, but on what sort of people we are, how creative and inventive we are, how we relate to others, and how open we are to learning" (2007, p. 34).

Through my work, I do not claim to be uncovering some type of universal truth but acknowledge my role in the design and interpretation at all stages of the research. My approach to epistemology is constructivist. Like Freire, I believe that knowledge is not something one has or lacks, but what is created when people exchange ideas and construct meanings that make sense to them. It is an active and creative process of inquiry into understanding the relationships between the self and the world (Freire, 1973). I deny the existence of an objective reality; however, in conducting research I hope to observe and conceptually

share with others some kind of meaningful truth that transcends my subjective experience.

3.2 Research Design

I used a qualitative case study approach to research based on constructivist grounded theory. When beginning my research I did not have specific objectives for what dataset I would come home with. I was interested in the general state of agro-ecological agriculture in Cuba with a particular interest in hearing about women's experiences in rural areas.

However, unlike approaching research as a blank slate as Glaser suggests, (Glaser 1978 in Mills, Bonner and Francis, 2006) prior to leaving for the field, I articulated research questions. This was partially because of requirements from my advisor and department and also for the Research Ethics Board at McGill University in order to follow protocol and be approved (Approval#393-0409) for conducting research with humans. Once I was in the field, I quickly found out that many of the questions did not 'work.' That is to say that, respondents were either confused by their meaning or wording, or the responses were not offering meaningful insight to me. By 'feeling out' problematic questions I found the research process in the field to be creative and dynamic. I came up with new questions and re-worded several questions or themes to probe during interviews. As respondents brought up new themes, I explored these themes with subsequent respondents. I have used casual terminology to describe this process because it was mostly intuitive, and the way I proceeded was based on my own feelings of the situation and the participants' responses and reactions. The research questions I have chosen to frame my research (as outlined in Chapter 1) were articulated after the research, upon reflection of what the research experience served to uncover.

Grounded Theory

What's going on? This is the question that grounded theory researchers are trying to answer (Glaser and Strauss, 1967). Using this approach I had no pre-articulated hypotheses coming into the research. In constantly comparing data with other data, and developing codes for my own notes I was able to identify concepts that I felt were important to the research. Grounded theory research is an iterative process of sorting and re-sorting what is coming up with research participants, which enables questions to be asked that further clarify key concepts and issues arising. By grouping and sorting themes and comparing and contrasting responses and stories shared from respondents, I have grouped the findings into my interpretations and insights of 'what's going on' with rural agriculture in Cuba. Like Charmaz (in Mills et al, 2006), I do not believe that certain truths emerged from the data, but have organized the stories shared by research participants in a way that constructs meaning for myself and, hopefully, for others.

3.3 Data Collection and Research Methods

3.3.1 Study Area

My research took place on 34 agricultural sites in four provinces in north central and northwestern parts of Cuba. I visited farms and gardens in the city of Havana, the surrounding area of San José de las Lajas formerly in the province of Havana (which has been rezoned and renamed to fall within the province of Mayabeque), the area of Quemado de Güines in the province of Villa Clara, and the area near Viñales in the province of Pinar del Rio.

Figure 1: Map of Cuban study area -- Source: Google maps 2011

3.3.2 Research Participants

I interviewed farm owners, farm managers, farm workers and often their family members as well as key informants from the University and relevant non-government organizations. Table 2 shows the number and types of visits and interviews I conducted in each area.

Table 2: Data acquisition and research participants by area

	San José	Quemado	Viñales	Havana
Semi-structured farm interviews	10	10	8	3
Semi-structured academic interviews	2	0	0	2
Semi-structured NGO interview	0	0	0	1
Participant Driven Photography (PDP) participants	9	3	0	0
Additional informal discussions	3	2	5	2
Farm visits	11	10	9	4
Home stays	1	1	3	2

Before arriving in Cuba I had arranged guest graduate student stays with both the National Institute of Agrarian Sciences (INCA) and the Department of Geography at the University of Havana. As a temporary resident student, at each institution I arranged to work with a host advisor. In San José de las Lajas, I worked closely with Dr. Ángel Leyva Galàn from INCA. At the University of Havana, I worked with Silvia Díaz. With the help of these local advisors, I used purposive sampling to identify farmers that would be good candidates for interviewing. The selection of candidates varied from light to heavy users of agroecological techniques. Other key informants were selected based on having expertise in the area of research, and their availability to talk with me.

In Cuba, the regulations governing monetary interactions amongst tourists and foreigners are strict. Therefore any type of social interaction between these groups, can raise the eyebrows of neighbours, especially those in *la vigiláncia*, the neighbourhood watch, who will then report any abnormal or suspicious behaviour to authorities. In order to minimize any risks to respondents (i.e. social alienation, or prosecution) and to myself (i.e. interrogation) I chose not to independently seek other respondents. My research participants were carefully chosen by placing trust in my host affiliates and their proven academic integrity.

3.3.3 Interactive research methods

The following section will discuss the methods used for data collection: semi-structured interviews, participant observation, and participant driven photography (PDP) that can include focus groups in the process (and did in my research). Each discussion includes some theory behind the use of the method and how it was used 'in the field' during the research. A thorough discussion of PDP is included because of its relative novelty in geographic research.

3.3.3.1 Semi-structured interviews

Theoretical Underpinnings

Interviews, though time consuming, allow for a much greater depth of information than many other forms of data collection such as surveys, or mass data gathering tools. Further, Dunn (2000) describes the semi-structured interview as a method that allows the interviewee to reflect on their own experiences whilst their opinion and view of the world is respected and valued by the interviewer. I chose to use semi-structured interviews as my main method of gathering data because of the ability to probe for explanations of what is a very complex agricultural (and economic) system. I felt it more useful to gain a rich data set from a small group of people than a census of shallower date from a larger pool. Some

structure to interviews and some consistent questioning allowed for comparisons between regions that illuminated particularly regional phenomena.

In the field

I conducted the interviews, myself, in Spanish, and the results were therefore limited by my proficiency in Spanish. Respondents were tolerant and generous in slowing down their speech and repeating or providing points of clarification.

Prior to leaving for Cuba, I had put together a semi-structured interview schedule to guide my interviews. This allowed some immediate focus to the discussion with farmers, and also helped me gather similar information from each respondent. As Dunn (2000) has noted, a researcher does not need to strictly follow the schedule and he encourages flexibility with the questions and treating the interview process as dynamic, allowing the interviewer to adapt with each research informant. At certain points in the process, I felt that omitting sensitive questions allowed me to gain more trust and develop rapport with the respondents.

When interviewing a married couple that shared a household and farming operation, the initial conversation was often with the male head of the house. However, the final part of the semi-structured interview was designed to be a conversation with the woman of the house. If she had not already been participating in the other sections of the interview, I asked if she wanted to participate in a conversation about her everyday life, and the support and challenges she experienced on the farm. After this section of the interview, I introduced the participatory photo project, which I will further discuss in Section 3.3.3.3.

3.3.3.1a Farmer Interviews

San José de las Lajas:

In June-July 2009, I visited and conducted semi-structured interviews on 11 agricultural sites over a six-week period based out of INCA, about 35km outside of the city of Havana, near San José de las Lajas.

Quemado de Güines:

In July 2009, in the area of Quemado de Güines, I visited and conducted semi-structured interviews on 10 farms in a five day period.

Viñales:

In August of 2009, in the area of Viñales I visited and conducted semi-structured interviews on 8 farms in a 2 week period.

City of Havana:

During my field season based in the city of Havana throughout May – August 2009, I visited 3 urban agricultural sites and conducted informal semi-structured interviews with farmers onsite.

3.3.3.1b Non-farmer Interviews

San José: By being based out of a research institute, I had the opportunity to engage in conversations and discussions with Cuban students and researchers on a daily basis. My host advisor, an expert in agroecology, was very generous with his time and thoughts related to the subject area. Another key informant was a researcher working specifically with gender and agriculture in the community. With her invitation, I was able to attend workshops hosted for farmers that were designed and based on the current needs of that particular community.

Ciudad Havana: Through my affiliation with the University of Havana, Silvia Díaz helped me to arrange interviews with scholars in geography and sociology as well as a non-profit organization that worked in agriculture based in agroecology.

3.3.3.2 Participant Observation

Theoretical Underpinnings

In using participant observation, the embodied human experience of research is embraced. We are, as researchers, not neutral academics or scientists, but people with emotions, instincts and feelings (Walsh, 2009). These human characteristics constantly shape how we perform the research and what we interpret as results and findings. As participants in the performance, we are constantly observing others and ourselves and recreating our own positions within the research space.

In the Field

Because I had arranged a student visa, I was considered a temporary resident of Cuba. Though I was initially granted only a 30 day student visa when I entered Cuba, after jumping through numerous bureaucratic hoops I was later able to obtain an extension to the visa and get a 'carnet' identity card. This identity card gave me legitimacy to conduct academic research, and permissions to access things usually only accessed by locals i.e. libraries in Havana, transportation for Cuban residents etc. With this student status, I was able to participate in an agroecology course for graduate students at INCA, working alongside others who were exploring agricultural issues in Cuba and hear stories about their lives, past food shortages and how agriculture was dynamically changing in Cuba. It allowed a much more relaxed

space that opened up rich detail in story sharing as opposed to more limited interview responses to questions I invented.

Because of my background in small-scale farming in the U.S. and Canada I immediately shared some commonalities with farmers because of an understanding of basic systems. Before leaving for the field, I had thought to offer work exchange for farmers for their time interviewing. In Cuba, I did not follow through with this offer as farmers seemed happy to sit down and share their stories and I felt more comfortable simply accepting their time as a gift.

When my field season wrapped up in late August, I was oblivious to the temporary resident status not allowing me to travel as I wished. At this time, any resident of Cuba required a special permission to leave the country, and the process of acquiring the permission slip (glued into a passport) could be lengthy. I had never been informed of this requirement and on the day of my departure, when immigration officials denied me from boarding the plane, I felt the other edge of the temporary resident's sword. With much help from my local contacts I was able to speed the usually 2 week process into 2 days and travel home without much of a delay. However the experience of (very temporarily) losing my ability to move freely allowed me to participate in another facet of Cuban life.

3.3.3.3 Participant Driven Photography

Theoretical Underpinnings

To the general public, the discipline of geography is often associated with cartography, physical exploration and scientific observation. These traditional foundations of the discipline are inherently visual. This ocularcentrism continues to influence the perceptions of what constitutes geography.

With both feminist and postmodern critiques of 'the gaze' in geography – methods shifted away from the visual in the practice of geographic research (Rose, 2003) and qualitative methods increased. Verbal interviews, coupled with participant observation, became the norm for human geographers, and their textual analysis; the pathway to epistemology. However, Crang (2003) argues that qualitative methods are too heavily concentrated on the verbal and the many limitations on the interview-respondent scenario have many geographers again calling for more engaging and creative methods in geography.

Photovoice, photo novella, photo elicitation, photo diaries, reflexive photography, auto-photography and photo ethnography are terms that describe a research method that includes participant driven photography (PDP). PDP recognizes that locals will have insight into their own communities that outsiders do not have and that this insight cannot be easily extracted with words. Photovoice was first developed in human

health research by Wang and Burris (1997). Their model has developed the most comprehensive framework for using PDP as a research tool. Aligning with feminist geography, PDP confronts traditional social science research methods and seeks to shift power dynamics that occur in field research. Participants are identified as knowers (Guillemin and Drew, 2010), not merely research objects from which knowledge is extracted. Though grounded and developed in other disciplines, human and feminist geographers have increasingly turned to PDP as an engaging way of doing research for participants and researchers and as a tool for reflexivity in the research process. By involving participants in the creation of research, the production of images concretizes participant experience related to research questions.

The performative turn away from textual and discourse analysis in human geography opened a pathway where research emphasized embodied lived experience. Thrift became known for his 'nonrepresentational theory' that focuses on the prediscursive and the noncognitive perceptions of 'the body subject' (Thrift, 1999). With this theory, it is understood that there is more to our human experience and interaction with the environment than can be easily explained with the verbal and textual. Rose (2004) situated her research with photographs in the performative turn in geography. She concentrated on how "spectators, as embodied subjects, experienced the viewing [of family photographs] through a range of sensory and affective registers" (p.551). However, Nash (2000) (and many others) suggested that this theory reinforced the mind-body binary; rather than question it. She worried that the return to the phenomenological sense of 'being in the world' disrupted the work feminist scholars have undertaken in highlighting the politics of embodied living (Nash, 2000). She went on to further critique nonrepresentational theory by questioning whether the focus on the prediscursive does not allow room for the shifting acceptance in academic literature towards video, poetry, and artwork (Nash, p.662). However, Latham (2003) argued that this turn in geographic thinking created a new open-mindedness towards methods and encouraged examining the research process itself as a performance. This performance need not be restricted by traditional social science methods but invigorated by creating new ways of knowing. In Latham's work with photographic diaries he believed that "the movement towards a framing of the social world based around …performance" could offer a "range of creative dialogues between already established forms of human geographic writing and ….novel approaches to doing human geography" (2002, p.2010). This led to considering participant driven photography as performance in itself. For example, Holm (2008) offered a photo ethnography project where doctoral students used photography to construct and reflexively perform their lives and identities.

Traditional uses of photography and mapping in geography have presented images as visual evidence of truths, and have not always considered the gaze of the author and their role in the presentation of research. Feminists scholars have problematized these assumptions and terms such as masculinist, colonialist or

ageist have described 'the gaze'. However, PDP often is initiated from within participatory action research, and specifically feminist participatory action research. PDP is rooted in feminist theory with the awareness of masculinist power dynamics. Often the objectives of research include empowering research participants, and the valuing of local knowledge as expert knowledge. Kindon (2003) felt that these connotations of gaze have somewhat prevented geographers from taking up visual methods. She posited that the explicitness of the gaze (in participatory videography) "demands attention to the exercise of power" between the researcher and researched (2003, p. 146) and called for a feminist 'practice of looking' in geography. Embodied photographers (or videographers) can reflect on their situatedness in the research (Haraway, 1991). Rose (2007) posited that using photographic methods in research can lead to examining and challenging social power relations, engaging the researcher in a reflexive process, and therefore can be an important tool in critical visual methodologies.

PDP is strongly influenced by Freire's concept of conscientização or 'critical consciousness' (Freire, 1973). In Freirian thought, once the oppressed become conscious of their oppressors, a critical analysis of their individual social and political situation can empower individuals to participate in changing their situations. As an educator, Freire rejected the idea of a teacher as the owner of knowledge that would be imparted to students, and instead advocated a learning environment where both teachers and students learn together. Participant driven photography reflects this learning environment, as the researcher and participant learn together through the participant's photos.

In sum, the performativity of lived experience, feminist theory and Freire's theory of education and research, lay the footing for the PDP research process. PDP considers participants the creators of research, through which they can use their own images to expose issues or everyday experiences that have the potential to provoke community or policy change that could improve their lives. Simultaneously, PDP produces a bank of concrete images; these lasting images can provide a rich text to work from. The research process of PDP (the performance) and the images generated in the process provide a much needed corporeal and creative engagement for all participants in geographic research.

In the field

The best practices for photovoice have been developed and articulated by Wang and Burris (1997). However PDP does not have a consistent framework and requires modifications based on local particularities. I attempted to follow the best practices, however realized quickly that I would need to modify the way of carrying out this method due to the constraint of my own time, participants' time and transportation difficulties in gathering participants together.

In San José de las Lajas, the woman (or women) of the household would decide whether or not to continue in the PDP project after completing the semi-structured interview component. If she agreed, I gave her some very basic training on the digital camera and then I asked her to take (about) 3 photos of things on the farm or in her life that 'supported her', and another 3 photos of things on the farm or in her life that 'were challenges'. As she was taking the photos, we discussed the reasons for each photo. When we returned to where we had been having our discussion earlier we again talked about the photos she took, the next stages of the process in the photography project, and more informally about the farm and her life. Several days or weeks later, after printing the photos in Havana, I returned to each of the farms and gave the women hard copies of the photos (and some extra photos that I had taken of their families, pets, etc.) and invited each woman to participate in the gathering of all the PDP participants.

After leaving San José de las Lajas, I attempted to continue the PDP part of my research but logistically, it proved too difficult. In Quemado de Güines, I visited 10 farms but had only three women participate in taking photos. In this area, I stayed with the family of my local guide and research assistant, Julio, who had grown up in the community. Though Julio did not know all of the farmers we spoke with personally, once the family name was exchanged, we were welcomed warmly. I stayed here only four days and we did multiple visits per day. Because of time constraints and so few participants, I did not organize a meeting of participants. As a result, the photo-project became more of an extension of the individual interviews. Because there were no printing facilities nearby, I was not able to deliver printed photos personally but sent them (once they were printed in Havana) with my research assistant when he returned home for a visit.

I chose not to continue with PDP in the other study areas of my research. Looking back on the experience, I feel that having established rapport and spending more time in San José allowed me to develop relationships with participants where the PDP project was meaningful. I usually only met once with the other participants in the city of Havana, Quemado de Güines, and Viñales. This one-time meeting did not create the same type of comfortable space where we could engage in a longer and more creative process.

At the end of my stay in San Jose de las Lajas, we held a closing workshop at INCA where all the women who had taken photos were invited to share in a discussion of their photos and a more general discussion on issues relevant to women farmers in the area. Through their photos the participants talked about their lives on the farms. Though the photos themselves mostly depicted the things that they liked about farming the discussion also shifted to challenges and certain obstacles to farming in their homes and

greater communities. Appendix 1 contains the photos I refer to in the text that are associated with my research, taken by myself and research participants in the in the PDP project.

3.3.4 Secondary Sources

It is difficult to access Cuban literature from outside of Cuba. As a temporary resident, with my student status I was able to access libraries at INCA, and in Havana, that otherwise would not have been accessible. Also in Havana there are many bookstores with mass printed government publications at incredibly low prices. I used a digital camera to take photographs of sources from libraries (photocopying and printing was difficult), was able to purchase electronic files from the Ministry of Agriculture.

3.4 Data Analysis

While in the field, I organized data chronologically and geographically in my general field journal. I also kept two separate field journals to reflect on 1) content and 2) process. The content journal allowed me to pull out salient themes and further explore interest areas in the processes Neuman identifies as open and axial coding (2000). The process journal was used more in reflexive process of the research as described further in section 3.6. Upon returning from an interview, at the end of the day, I would input the data into my computer and add any impressions or thoughts that were not captured on the interview sheet along with photos to visually remind me of the particular site. I found it best to record this information as soon as possible, to avoid forgetting any details. Upon my return to Canada, the compilation of all the data was entered into a spreadsheet after picking salient themes, called selective coding (Neuman, 2000). Writing the results and analysis was based on this data set and any additional notes from my field journal. Though I was not able to audio record the majority of interviews, I listened to selected passages repeatedly and for certain important discussions I hired a native Cuban speaker to transcribe; where I could look more closely at the discussion, verbatim.

3.5 Research Dissemination

One of the intentions of participatory research is not to 'extract' research from a community but to give back to the community in some way. Below, I have outlined how I have and propose to disseminate the research:

- I intend to continue to present my research at conferences that I have the opportunity to attend and have done so at UVic's Latin American Research Group Symposium in 2011, the Canadian Association of Geographers meeting in 2011 in Calgary, and the WDCAG in Kelowna in 2012.

- Since returning, I have worked with Dr. Leyva Galán with some of his continued research in agroecology and fully intend to continue this relationship.
- Though the opportunity has not yet presented itself for me to return to Cuba, provided I can secure adequate support for travel and translation, I would like to return to San José de las Lajas and Havana and present my thesis to my host advisors and welcome any feedback or revisions. If possible I would also like to gather the participants in the PDP project to ask for their feedback and potential opportunities for further collaboration. Although, my timeframe didn't allow me to return prior to publishing this version of the thesis, with their endorsement, I would like to submit versions of this paper for publishing in academic journals.
- With a fellow researcher (MA in UVic's Environmental Studies) who has done farmer interviews and videography in the Saanich area of BC, we have been discussing a collaborative community visual presentation of our projects to occur in the late fall/early winter of 2013.

3.6 Reflexivity

Conducting cross-cultural research requires increased mindfulness in terms of ethical and political considerations. As a white, North American, middle class, educated woman in a foreign environment I faced many questions as to how to situate myself and balance along the insider/outsider fence. Partially I chose to interview farmers, and women specifically because of commonalities that would allow for a deeper level of understanding from the 'sameness' we shared (for example see Skelton, 2009). But the differences were always present in the research. The privilege I have with the freedom to travel, my financial resources (from boarding the plane to buying relatively expensive produce at the market), and my level of education, all affected my interactions with people and with the research.

Cuba as a political anomaly, has a particularly stigmatized portrayal in the dominantly capitalist media. In conducting research, and subsequently publishing or sharing research to a broader audience, I felt I needed to uphold a responsibility to the communities I visited. These communities exist within a political landscape, and navigating this occurs through interactions at a very personal level.

For most of the interviews conducted, after a brief introduction of my research interests, we began with a brief tour around the farm. We continued the visit with a semi-structured interview with questions about their farm, the agricultural methods they used, and organizations to which they belonged. Though my method of interviewing was based on the idea that the qualitative interview is based on a structured and purposeful conversation because I suggested and initiated the interview, I do not claim that the interview was *just* a conversation, as this does not accurately reflect my own information gathering agenda and the

power that I had as a researcher to guide, start and end the dialogue (Packer, 2011). Packer (2011) explains that although qualitative research is "motivated by respect for the unique and creative ways that individuals understand the world" (p. 55) qualitative researchers must constantly consider their involvement and consider interviews as "joint productions."

Affiliations and introductions

In San José de las Lajas, I was introduced to all of the farmers that I interviewed by Dr. Ángel Leyva Galán from INCA. Together we traveled to the farm and after the initial introduction, I arranged a time to return on my own (sometimes several times), at the farmer's convenience. This initial introduction provided research participants with an immediate level of trust for me, by way of my host advisor, which was invaluable to the research process. In the city of Havana, Silvia Díaz accompanied me to all three urban agricultural sites and to many key informant interviews. In Quemado de Güines, I was accompanied on all of my interviews by Julio, an alumnus of the University of Havana's Geography department, and a local to the area. In Viñales, various national park staff (former students of my University of Havana host advisor) accompanied me to each of the agricultural sites for initial introductions, and often stayed for the interview that followed.

These affiliates could be described as 'gatekeepers' to my research (Broadhead and Rist, 1976). In Cuba, without written permissions it can be very difficult to find willing research participants, as the risks are too high for participants. In conversations with others that have done research in Cuba, some researchers met with many barriers and obstacles when completely independent (Nelson E. pers. comms., Oct 2008). I want to be explicit about the role that my affiliates had in shaping my research as it was crucial to its formation. My advisors were involved in choosing who I interviewed, changing specific research questions in order to make them more understandable, advising me with hurdles in the research, and overall were a large part of my research process in the field. I am confident that participants spoke with me more openly than if I had been conducting research independently, because by having a local contact it encouraged participants' trust and provided accountability via the affiliation.

Because of the need for legitimacy through Cuban affiliations, my research was very much framed by those that I worked with. Though initially I framed and designed the research myself, the performance of the research (and its related negotiations of power) was shared with those that accompanied me throughout the process. The dynamic process of doing research therefore consistently called on me to change and re-work my research methods along the way. Respecting the importance of these affiliations throughout the process enabled me to visit areas and talk with people that likely would not have talked with me as an independent individual.

However, “the nature of the gatekeeper's influence in controlling the research process is in part contingent on how the researcher's institutional base politically and morally aligns itself to strengthen that influence” (Broadhead and Rist, 1976, p. 332). My host advisors were affiliated with Universities and like most everything in Cuba, heavily associated with the government. Because of Cuba’s non-conformity with the dominant economic system, any research in Cuba can be considered political research. With much adversity to the Cuban regime in capitalist global media, Cuba and Cubans are often portrayed negatively. My host advisors, by virtue of being Cuban, were under some pressure from their institutional base to portray Cuba in a more positive light. This light may have reflected in my research more than if I was able to conduct research completely independently but because independent research is nearly impossible in Cuba, overall I feel that the integrity of my research was made stronger by my affiliations with Cuban institutions.

CHAPTER 4.0 Agroecology in Action: Results, Analysis and Discussion

Before answering the broader question of how Cuban farmers are approaching food sovereignty (Chapter 5) I will first describe the results of my three secondary questions by categorizing the results into physical and social variables in Section 4.1 and 4.2 respectively. Section 4.3 will discuss the challenges on the path to food sovereignty in the Cuban context and Section 4.4 will summarize the overall findings of my research.

In total, I visited 34 agricultural sites in 4 provinces. As explained in the methods chapter, I visited farms in the surrounding area of a centre I was based out of, and have referred to place names of the central area, though each individual farm was often outside the town. Table 3 shows the variation of types of agricultural sites I visited during my field research. Though I was primarily focused on the methods used by small-scale family farmers, the variation in plot types and sizes added complexity but also understanding through comparative analysis.

Table 3: Farm count by type and nearest regional town

Type	San José de las Lajas	Quemado de Güines	Viñales	Havana	Average size (ha)
Family farms	6	6	3	-	11
Urban patios	1	-	1	-	0.4
Small parcel	1	-	-	-	0.5
School farm/garden	1	-	1	-	0.75
State farm	1	-	1	-	61
Institutional/research farm	1	-	-	-	8
CPA farm (Cooperative of Agricultural Production)	-	2	1*	-	465
Farm connected with business	-	1	1	-	2
Organopónico (urban garden)	-	1	2	-	1.5
UBPC farm (Unit of Basic Cooperative Production)	-	-	-	3	5

(*size data not available)

Urban vs. rural

The organization of agricultural sites in Cuba is complicated. I chose to focus on small-scale rural farms rather than on small urban gardens firstly, because there is a tendency in the literature to focus on urban agriculture in Cuba. I wanted to broaden the scale of [foreign] research and further explore peri-urban and

rural agriculture. Secondly, because urban farming is feeding only a small minority of the total Cuban population I wanted to look at rural farming which provides a scale of production that more feasibly coincides with the tenets and goals of food sovereignty leading to food security. However, I was presented with (and accepted) opportunities to visit some dense urban small plots, classified as patios, small parcels or organopónicos (a raised bed garden) in Cuba. There are not often clear distinctions between urban and rural areas; for example, a farmer on one side of the street in an area just outside of the town of San José de las Lajas, was considered rural while the other side of the street was considered urban. This distinction became a fuzzy one, though important, as it had consequences in terms of farmers' associations to cooperatives and organizations.

The plots I visited varied in size from urban backyards of less than one acre to farms of greater than 2000 acres. Table 3 shows the average size of farm; however, the median farm size was approximately 7 ha (or ~17acres). Larger farms were put under contract of the State agricultural authority, (Acópio), that procures and distributes fresh food. The very largest farm of over 900 ha was part of a CPA, an agricultural production cooperative.

In the Cuban literature, there is sometimes a description of agricultural workers that makes a distinction between a cooperative member, *cooperativista,* and a campesino, usually a private holder of land (for example Deere et al, 1998). In my writing I have translated campesino to farmer, and have not made such distinctions, also referring to those in cooperatives as farmers.

I conducted 31 interviews with farmers. In both San José de las Lajas and Quemado de Güines there was more or less equal gender representation. Interviews were often done in groups, as more family members would become involved through the process. In Viñales, the farmers I interviewed were mostly men, with only occasional involvement from women in the family, and in Havana I interviewed mostly women. The average age of the main family members interviewed would fall between late 40s-early 50s, with only a few respondents with school aged children, most had grandchildren. Again, as interviews with family farmers often involved several members of the household, age diversity was sometimes represented in one interview.

There are many gaps in my data. At the beginning of the research I thought there were certain sociodemographic questions I needed answered in order to follow rigorous social science methods, as I alluded to in SS 3.3.3.1. My information gathering agenda changed as I perceived discomfort from respondents with questions related to money and education. I instead chose to conduct interviews in a style that was often more like a conversation (for example Packer, 2011). An excerpt from my field book

dated June 12, 2009 explains the reluctance I felt when speaking with a respondent "I kept pressing her to give a monthly income but she wouldn't…didn't know, didn't feel comfortable??" As I continued to interview, I did not press respondents for answers when I felt like there was any kind of resistance or avoidance of the question. I often did not ask a particular question if I felt we had not built up enough rapport, or if I began to question the relevancy of the information. An excerpt from my 'Content' field journal, June 29, 2009 provides an example: "How does discerning relative wealth explain anything interesting? All farmers [in this area] make good money. Agroecology is not determined by this." Similar to relative income, the level of highest education of participants did not seem important enough to ask, considering the power dynamics already inherent in conducting my research. Education varied from grade school to post-graduate university amongst the farmers I interviewed.

4.1. THE PHYSICAL SIDE OF AGROECOLOGY

The following sections responds to the first of the secondary questions: **What agroecological methods are farmers using** (SS 4.1.1)? These results have been grouped into biodiversity, fertility and pest management, and a discussion of local knowledge follows (SS 4.1.2).

4.1.1 Agroecological methods

a) Biodiversity

Biodiversity was considered a very important part of farming for many respondents. In general, small plots were much more diverse per area, as usually the production of crops for use in the home increased the total number of crops, therefore increasing the diversity. Common crops included: corn (for human and animal consumption), beans (green and dry), taro, sweet potato, yucca, tomatoes, squash, onions, garlic, cucumber, chard, banana, mango, avocado, papaya and marigolds. Less common crops included peanuts, lettuce, okra, cabbage, radishes, beets, basil, oregano, guava, coffee, sugarcane, peppers, potatoes, sunflowers (for oil), other flowers (to sell), sorghum, sesame, millet and tobacco. Several farmers said that 'biodiversity is key' and when asked about how he controlled pests one farmer said 'biodiversity is what controls the insects here'.

Two particularly biodiverse examples stand out. One farmer whose patio was only 0.34 hectares, said he had 231 species grown in rotation. He was an adjunct professor at the University, well known in the community for being an advocate for agroecology and had traveled internationally to agricultural conferences and workshops. Another example was an urban plot in Havana, where >370 species were said to be grown on the 10 ha plot. This particular urban farm was exemplary, wages for workers were

much higher than anywhere else, and foreigners often visited this particular site as a showcase of urban agriculture's potential.

b) Fertility

Nearly all farmers reported using animal manures from their own livestock or from delivered manures, by either directly applying or by composting with other vegetable wastes. Nearly half reported receiving occasional truckloads of manure (cow/chicken) by way of the cooperative; however, the lack of fuel for transportation reduced deliveries. The most common animals kept on farms were chickens, pigs, and rabbits that were generally for household consumption. Some producers also had goats, cows for milk, and bees. One producer had an aquaponic setup with tilapia.

Four respondents out of 33 reported using chemical fertilizers. The calculated average fertilizers used by farmers in my research was ~41kg/ha annually which is higher than the World Resources Institute's reported statistic of fertilizer use in Cuba of ~30kg/ha (World Resources Institute, 2000-2013, accessed online). This amount is still less than half of the average fertilizer use in the U.S (2000) but much higher than expected. This seems likely due to the small number of respondents (only 4) and that the amounts were roughly estimated.

Vermiculture, the production of worm humus, was fairly well known amongst farmers in Havana, San José de las Lajas, and Viñales but relatively unheard of in Quemado de Güines. Two notable producers existed in San José de las Lajas and Havana, producing enough for their own needs and giving away or selling offsite. Of all those that were familiar with the use of worm compost, they spoke highly of the benefits, though the price was a deterrent for buying. In Viñales, two farmers had previously produced worm humus but their infrastructure had been destroyed in hurricanes. One farmer in Quemado de Güines had produced it in the past, but it was currently not in operation due to the drought that had killed the worms.

Another common practice for contributing to soil health, was leaving vegetable wastes in place to act as a mulch and to return organic matter back to the soil. Only 3 farmers (all in San José de las Lajas) used cover crops; two of whom were given seeds of Canavalia (a legume) by INCA staff for cover crop experimentation.

San José de las Lajas farmers were the only ones to report using biofertilizers and the most common was called 'Ecomic' a soil amendment made with microrrhyzal fungi, that was provided by the research

institutes nearby. Several farmers mentioned using lime to help with soil pH and one farmer made a homemade biofertilizer with a solution of worm humus and water.

All farmers interviewed practiced plant rotation to some degree. On less diverse farms it was strictly a rotation based on seasonal plant cycles; for example, tobacco followed by corn and beans every year, whereas on more diverse farms crop rotations alternated amongst 3 or 4 plant families i.e. corn, beans, sweet potato, tomatoes, and back to corn. Most farmers considered plant rotation a very important practice.

The intercropping of plants (within a bed) was very popular in urban and small plots though less common at larger scale farms. However, even on large farms, there were some cases where corn was coupled with squash, sweet potato or beans and on a few farms there was a concerted effort at intercropping young fruit trees with beans or peanuts. The most common reason to intercrop was 'to make the best use of space' but also to 'improve the soil' and to guard against pest outbreaks.

c) Pest Management

Many farmers alternated the varieties of plants in rows or intercropped and often this was said to be a way to mitigate pests (Appendix 1, Photo 1).

Nine farmers reported the occasional use of chemical pesticides. Of those that used them, availability was limited, though occasionally they would be supplied by way of the cooperative. Usually they were supplied when there was a particularly bad pest outbreak. Highly susceptible crops mentioned were: green beans, garlic and peppers. Most said they used very little and only when necessary for an outbreak. When pesticides were available, commercial crops were given priority such as potatoes and tobacco. In Cuba, the use of chemical pesticides and herbicides is prohibited in urban areas (Altieri et al, 1999), and the organopónico model follows suit with this direction. However, two farmers spoke of using some chemical products on their properties just outside the boundaries of their respective organopónicos where there were said to be 'problem areas'. Farmers that did not use chemical pesticides said that 'they were harmful,' 'damaged the soil' 'contributed to soil erosion' or that they 'preferred not to plant anything that would require chemicals.' One spoke proudly of being 'chemical free for 6 years' and another that their farm was designated agroecological and there was 'nothing chemical on this farm.'

Many San José de las Lajas farmers regularly used Fitomac (a cuban developed biostimulant) that was used for plant growth and/or against pests. This was available through cooperatives in the area. One

farmer in Quemado de Güines also reported using this on one occasion. Other biopesticides reported included a soap solution, and a solution of fermented tobacco waste with lime.

Corn, sorghum, millet, and fruit trees were cited as barriers to pests and pollen drift. Marigolds (*Tagetes spp*.) were a very common sight spread throughout farms; and were often cited as an insect repellant. Herbs such as basil, oregano, and cilantro were used for pest management as well as neem (*Azadirachta indica*), and noni, (*Morinda citrofolia*) a fruit in the coffee family that gives off a strong odour. Coloured sticky traps were an additional method used by some respondents to catch insects.

4.1.2 Local Knowledge

Kloppenburg explains knowledge as local "in the sense that it is derived from the direct experience of a labor process which is itself shaped and delimited by the distinctive characteristics of a particular place with a unique social and physical environment" (1991, p. 528).

The local knowledge that developed in Cuba was very much shaped by the lack of available resources after the Special Period. The 'distinctive characteristics' of this particular time in Cuban history, forced Cuban farmers to innovate in many ways: from mechanical repairs to designing specialized agricultural equipment. There were several respondents who quoted the importance of innovation, for example: 'to go forward is to invent.' Others showed me examples of inventions made with readily available resources. See Photos 2, 3 of handcrafted inventions

Instead of pitting local knowledge and scientific knowledge in opposition, respondents demonstrated how the two can work together. Farmers made use of what was available locally when outside inputs were not available or unwanted. In Quemado de Güines, many farmers spoke of using 'cachaza': a waste product of the sugarcane factory that was central in the community. Similarly in Viñales, farmers used 'tabacina' a waste product from tobacco that was heavily farmed and processed in the area. Farmers would mix this with lime and/or water and apply as a biopesticide. Another very locally adapted solution was by one farmer who planted grasses to aid in erosion control in one area of his farm. When the grass grew tall, he would cut it and feed it to the oxen he kept as work animals.

Altieri et al posit "that agroecological systems are deeply rooted in the ecological rationale of traditional small-scale agriculture" (2012, p. 2). Traditional farming often conjures up images of oxen and wooden ploughs, and this type of farming was still common in Cuba even into the 1960s. The use of farm work animals in Cuba was widespread in the 1960s with 500,000 oxen and 800,000 draft work horses (Ríos and Ponce, 2002, p.155). With the mechanization of the Green Revolution, this fell by approximately 70% by

1990, when they were replaced with tractors (Ríos and Ponce, 2002, p.155). Faced with the lack of tractor parts and fuel in the Special Period, work animals were re-introduced. Nearly all the farmers I interviewed in 2009 used oxen and/or work horses for cultivating, weeding and even harvesting, with the exception of very small plots, or plots with raised beds. Several farmers owned a pair themselves and many shared work animals with family members or neighbours. Often farmers dedicated a section of the farm for growing grains and legumes for the animals. Additionally, they were fed plant wastes and their manure was incorporated into a cycle of fertility on the farm. So although Pollitt (1997) laments how labour intensive oxen are as compared to tractors, on a small farm scale they seemed a good fit. They enabled more farmer autonomy; with the ability to grow the fuel (food) the animals required and less dependence on parts and fuel from outside sources. A few farmers owned or co-owned tractors, or they were available through cooperatives, however shortages of fuel (or money to buy fuel) and replacement parts (e.g. tires) made them available only sporadically.

In addition to popular agroecological methods, I asked farmers what other methods they used in growing. A traditional method used by a large majority of farmers was planting/working with reference to the phases of the moon. Only three respondents said they did not pay attention to moon phases. Farmers noted that of particular importance were root crops such as sweet potato, yucca, and malanga (also known as taro). I was surprised that this particularly popular method was not more widely discussed in the literature, and one respondent described its taboo nature. Although he admitted to using lunar cycles, he first referred to this as a 'problem' brought forward from traditional farming myths. One farmer believed moon phases were very important to follow, and told me a story of how a fellow worker had medicated young piglets without reference to the moon. He believed that was why the pigs died shortly thereafter. Another farmer, (referred to as biodynamic by a fellow research participant) talked about the importance of following moon phases from plant seeding, cultivating, harvesting to castrating animals and cutting wood.

4.1.3 Physical Agroecology Summary

From my observations, small-scale farmers were implementing methods that increase their biodiversity; while providing foods for self-sustenance and income generation. Animal manures from on-farm animals, including worms, were contributing to soil fertility. Increasing farmer education and basic infrastructure on small-scale farms for vermiculture would further allow farmers to produce their own fertility in situ that would allow a greater degree of autonomy over the fertility needed on small plots; this seemed an underutilized tool. Additionally, spreading knowledge and distributing cover crop seeds would provide farmers with more options for on-farm soil health strategies. The use of work animals, the production of composts and plant rotation were all very common practices. Some farmers practiced

intercropping for better soil fertility and for pest management. Plants were used as pest and pollen barriers and lunar cycles were important considerations in many agricultural applications. Some used chemical fertilizers and pesticides though they were in short supply and earmarked for certain commercial crops and pest outbreaks. Many farmers innovated their own solutions based on locally available products. Biofertilizers and pesticides were occasionally available through cooperatives and academic institution trials however the scarcity of fuel affected the delivery of these and all other off-farm inputs.

The local knowledge developed by Cuban farmers manifests in physical agroecological techniques used but also in the social world. Feldman and Welsh (1995) feel that 'place' within Kloppenburg's definition of local knowledge does not account for the heterogeneity of differentially empowered members who are taking part in agricultural production. They encourage readers to deconstruct places of local knowledge for social inequities that may exist. The following section, SS 4.2 will discuss the social and human side of agroecology (though these are often inextricably tied to the physical) and serve to further describe local knowledge generated in Cuban small-scale agriculture. By including a focus on women, it begins to deconstruct local knowledge generation at the farm level.

4.2 THE SOCIAL SIDE OF AGROECOLOGY

This section discusses the social side of agroecology encompassing the last two of the secondary questions: **What support do small farmers have in using agroecological methods in farming** (SS 4.2.1)? The next subsection will answer: **How are women on farms participating in farming, and in agroecology (**SS 4.2.2)?

4.2.1 What support do small farmers have in using agroecological methods in farming?

This question was complex. In order to explain I have grouped the results into economic, government, academic, and community.

4.2.1a Economic

Cuba functions with two currencies, the Cuban convertible peso, CUC, and the national currency, the Cuban peso. One CUC is worth ~25 Cuban pesos. Though nationals use both currencies, visitors are likely to use only the CUC. Basic needs can be met with only the Cuban peso, but certain items (i.e. clothing, toiletries, specialty foods, building supplies) can be difficult to acquire with only Cuban pesos and are available at what are commonly referred to as 'Dollar' stores that use CUCs. To understand what items Cubans needed to buy or access to maintain a basic quality of life, I used income as a marker of material wealth. I also attempted to gauge relative wealth within regions.

The income data I garnered from my interviews was difficult to interpret with the diversity of farmers and their situations. When I asked how much money they made in farming, many farmers did not choose to answer directly. Some were able/willing to estimate a number, and others described their income relative to their relatives and friends or their past salaries in other lines of work. A family owned farm might report annual farm sales (some reported net, and others profits); however, the number of people living on the farm and related off-farm sources of income, were often unclear. Several of the farmers I interviewed were retired from their careers, and as seniors, were making more money in farming than they ever had before. Employees were more able and willing to consistently report their salaries and, in general, it seemed that they earned less than farmers who were able to sell privately, however they also sometimes earned a portion of their income in CUCs. Their observable level of wealth did not seem greatly disparate. Where farmers felt more ownership over processes, they tended to work more and earn more. Given only the small amount of income data I received, I would estimate the average income of farmers I interviewed to fall between 600-800 Cuban pesos/ month or the equivalent of US$24-32. This value is higher than the national average, which in 2009 was 429 Cuban pesos (Officina nacional de estadisticas, 2013, Table 7.5) and coincides with Enriquez's findings (2003) that also reported a higher income for farmers as compared to the national average.

Those involved in farming had a slightly higher income relative to the rest of the population. Basic housing, education, healthcare, and food (through the ration system) are provided by State social support in Cuba, and salaries amongst the middle class are fairly equal. For example there is not a large discrepancy between a doctor's salary and a teacher or farmworker's salary. According to national statistics, in 2009, monthly salaries varied only slightly across sectors; from 418 for community/social workers to 537 pesos for those involved in mining (an equivalent range of US$15-20) (Officina Nacional Estadisticas, 2013, Table 7.4). With this level of resources, life is enriched not with many material items (that usually require CUCs) but with more diversity of foodstuffs (purchased with Cuban pesos), and as a result, Cubans spend a lot of their income on food. A luxurious item for certain Cubans could be an addition of fresh vegetables or herbs, or some meat accompanying a basic meal of beans and rice. Those involved in farming have more food access on a daily basis, this greatly increases their relative wealth to those without, and frees up any available income for extraneous or non-food items.

Discerning relative wealth within a region was difficult as all farm households were very much influenced by off-farm income (for example children or partners working full-time jobs elsewhere); however, I attempted to gauge relative income by observing farmers' homes and assets. All of the farmers' homes I visited were equipped with hotplates or gas ranges, rice cookers, and some decorative items (lace

tablecloths, candle sticks). Farmers that were slightly better off owned bicycles, or very rarely owned (or co-owned) a vehicle. Farmers that were or had been affiliated with institutions also owned such things as digital cameras, computers, tractors or specialized agricultural equipment. Initially, I felt it important to gauge relative wealth as I thought financial means may be a factor in whether farmers were more or less likely to use agroecological methods, but as I gathered data I did not find this to be important, as discussed in Section 3.0, and was sometimes an uncomfortable component of the interviews.

In San José de las Lajas, those who sold directly to consumers from farmgate sales earned the highest prices per item – however this proximity to consumers only worked in urban or peri-urban locations. One farmer reported making 8-9 pesos for a certain item sold directly to the public compared to 4.5 pesos that he received from the State authority.

In more rural areas, most of the crops were contracted to the State and were regulated through a CCS cooperative that would take a portion of the profits. The State authority offered prices that were much lower than what a farmer could get when selling at the market. Theoretically farmers would then get more if they had a smaller State contract and larger ability to sell at the market or through farmgate sales, however I cannot say that my data can discern this difference. Further, the determination of what percentage of crops was contracted to the State authority or available for alternate selling was not always clear. In general, farmers would estimate and report their expected total yield, and the majority of this amount was contracted to the State authority. Any surplus grown was then eligible to be sold in markets. One exception was that farmers who were raising meat or dairy contracted all of the sales (aside from home consumption) to the State. This provided a higher return than vegetables, but no ability to (legally) sell to the public who were willing to pay much higher prices. The consumption of certain meats for example beef, were (and remain today) highly regulated and many cattle farmers were not permitted to eat the beef they produced.

More than any anything else economic, the most observable phenomenon was how access to wealth was tied to geographic location and the predominant industry in the area. This variation was widely recognized in Cuban literature (Enriquez, 2003) and when talking with key informants (for example A. Leyva Personal Communications, July 10, 2009). Other industries existing within a region provided economic spin off to those in the agricultural sector. For example, in San José de las Lajas, the proximity to Havana provided farmer's families and relatives with more employment opportunities, especially related to tourism and earning CUCs. These economic returns were made apparent by their possessions, the foods and drinks they consumed, and by hearing stories of past travels and experiences. To a lesser degree in Quemado de Güines, near Villa Clara, associations with the sugarcane factory provided

employment to farmer families. This industry obviously contributed wealth to the community as displayed through the construction of apartment blocks, paved roads with sidewalks and garbage cans (which were a rare sight to see outside of tourist areas). But it did so less directly, as compared with direct increases in income from tourism. Farmers in this area had simpler homes and possessions, and when questioned about their dreams for the future of their farms; their responses were much humbler, simply hoping for irrigation for their crops, for example. In the Pinar del Rio area, there was a protected area and a national park that employed over 150 people. The national park and surrounding scenery drew in a large tourism industry. The town of Viñales where I was based, was full of bed and breakfasts, with next to no vacancies when I arrived. Similarly, this influence of tourism seemed to provide the surrounding community and farmers with more employment and higher incomes. In addition to earning income from selling produce, around Viñales, some farmers were involved in eco-tourism activities. Tourists could take either walking or horseback riding excursions that would occasionally provide accommodation and food. However, although tourists paid for the excursions through a tour company, there was no *formally* established system of compensating farmers for their efforts in eco-tourism activities. Unofficially, there was a system of informal compensation for farmers, through tips given by tourists but this was not reliable or steady income.

i) Geographic limitations

My research is limited by what I was able to observe within the geographical extent of the study area. All of the sites I visited in north central and northwestern parts of Cuba had various industries providing other means of wealth to their respective communities. The eastern and southern portions of Cuba, particularly in remote rural areas, are said to have much less access to wealth and the situation for farmers may be a lot different. For this reason, it is not my intent to paint a picture of all Cuban farmers, as though they are a homogenous group.

4.2.1b Government

There is a refreshing absence of corporate advertising in Cuba; however, along the sides of roads and highways there are a plethora of billboards with hand-painted images of Fidel Castro or Che Guevara accompanied with a quote from the government. These are sometimes numerically labeled in the bottom corner: 'Propaganda #xxxx.' Photo 4 depicts a placard I saw in the countryside of Pinar del Rio, I saw a similar placard in Havana. The rough translation is: 'to have more, we have to start with producing more' a quote from Raúl Castro. When I first saw this message I wondered why such a basic simple message would be worthy of placing on a billboard, and I had a hard time imagining such a message in a North American context. To me, this demonstrates the State's interest in making connections between the general public and producers of food. The message implies that involvement in agricultural production is

a community responsibility. Further, I noted in my field journal on August 8, 2009 how on the television, a government message depicted farmers laboring in fields spoke of the need to connect with each other "with both feet on the earth." Additionally, on the nightly news there were at least one or two stories, usually positive, on something happening in the agricultural sector. Many have directly felt the connections between food and community in their lifetimes, for example when food was in short supply in the 90s and caloric intake dropped by ~40% (see Table 1). The State display of reminding the public about these connections appears to be supported by the philosophical arguments by Levins (1993) and Clausen (2007) where the absence of capitalism can allow for more interconnected understandings of agriculture and society.

i) Land Availability

In the 1990s post-crisis era, in an attempt to encourage more farming, the Cuban government made land available in usufruct to farmers. As long as the land was farmed, it was available via a 'free lease' from the government, with the caveat that it may need to be taken back by the State if necessary. Several of the farmers I interviewed used their farmland under this provision. As Raúl Castro took over leadership of Cuba he began further opening up unproductive State lands with the Decree Law 259. Since 2008, the State distributed 1.3 million hectares of land to private individuals and farming cooperatives (Grogg, 2012, pages unnumbered). Historically, the construction of housing associated with the emergence of CPAs was one of the strongest incentives for farmers (Díaz, 2005). Access to farmland is essential for encouraging new farmers; but housing and land tenure must also be considerations.

In Cuba, many facets of life are directly or indirectly entangled with the concept of government. In the following sections I separate out the types of support into academic, and community but this is not meant to downplay the government's role or involvement in institutions or cooperatives.

4.2.1c Academic

As discussed in Chapter 1, following the crisis, agroecological training and education for adults included experiential learning at Universities and technical institutes. In addition, agroecological education also was introduced to children and built into the school curriculum. During my interviews, I

BOX 1: Palacio de pioneros

The farmers I interviewed were a retired couple that had begun farming only years earlier. They worked at a small garden/farm plot connected to a provincial palacio de pioneros, a vocational school for young children. They sold produce on their road stand at the side of the road (a fairly busy connecting road between the city of San José de las Lajas and the highway to Havana). Their plot was very biodiverse and the love for their work was apparent. Part of this work was to guide students in learning about plants and farming. Ernesto*, explained a recent school group's project with which he facilitated 1-2 times a week. As part of their school curriculum, each child (8-9 years old) was assigned 2 plants to learn everything about: from their botanical classification, and culinary uses to the hands-on experience cultivating and harvesting in the outside schoolyard garden. The students would then share their experiences and produce with each other, and in the process learn about several dozens of plants' lifecycles. *Name changed

visited two agricultural sites that were connected with schools. Young students are encouraged to learn about and be part of food production, by being challenged both intellectually and physically while tending crops. See Box 1.

The Agrarian University of Havana is located just outside of San José de las Lajas with institutes on both sides of the town. These institutions: INCA (National Institute of Agrarian Sciences) and ISCA (Higher Institute of Agricultural Sciences) were very much a part of the farming community in this area. Farmers mentioned trials where they were given certain biopesticides or biofertilizers at no cost, or where friends who worked in the fabrication of the inputs would provide them as a gift. Researchers would work with farmers directly, asking them about their needs and providing resources and support. Farmer-to-farmer events were organized, where a new (or old) technique could be shared with other growers in the area. Often transportation and snacks were facilitated through the institutions. Many respondents commented on how their farm had changed since 'the project' for example new infrastructure was created, biodiversity had increased, or a new method had become mainstream. Further questioning would reveal that 'the project' was always affiliated with an NGO, research institute or University, where dedicated staff or researchers would work with farmers to improve their farm in some small or large way.

The most striking example was a family farm of about six hectares. With help from a neighbouring University, a PhD student chose this farm to investigate how agroecosystems could implement and deepen agroecological methods used in working towards sustainable farming. Working closely with the couple that ran the farm, the student facilitated the integration of systems that expanded the autonomy of the farmers while increasing food production. By way of participation in farmer-farmer workshops, and by working with the student and the institute's staff, the farmers increased their knowledge and started implementing more agroecological methods; greatly reducing the use of chemical pesticides and eliminating the use of chemical fertilizers, intercropping plant families, increasing their biodiversity, changing their diets to include new crops grown and growing crops such as rice and sunflower (for oil) so as to depend less on purchased food (Lores, Leyva, & Tejeda, 2008). In addition, the farmers began a seed saving bank that provided more than enough seeds for the family (Photo 5); and the creation of a large-scale worm composting system (Photo 6); providing fertility for their farm and excess that was given away.

Other farms that seemed to stand out in terms of the degree to which they used agroecological methods were all linked with institutions; such as the Santa Clara University, the University of San Cristobal and programs run through the National Park in Viñales. The integration of academic institutions within

farming communities, and the participatory pedagogy of the institutions supported farmers in using agroecology and working towards food sovereignty.

4.2.1d Community

Associations for private farmers were divided by the urban/rural designation. If the farm was designated as urban, the farmer was part of the 'Urban Agricultural' (AU) municipal organization. If the farmers were rural, they were members of their municipality's cooperative. These organizations were the contact points for farmers and held similar roles to each other. Those that worked for State farms, institutions, and private businesses, were not members of a particular agricultural authority but salaried employees. For employees, these associations, and any related benefits were filtered through their employer.

i) Cooperatives

Co-operatives are the dominant type of agricultural organization in Cuba. Though they have changed and adapted through time, agricultural cooperatives have been in Cuba since pre-1975 when instituted with the SDPE reforms (refer to SS 2.3.1). Cooperatives were modeled after existing agricultural production societies of tobacco farmers that were created after the 1959 revolution, alongside the State sector. Although there has been much debate over the actual level of autonomy that a member of a co-operative holds (for example Díaz, 2005; Meurs, 1992); they were initially established in an attempt to decentralize agriculture and were part of an effort to democratize and increase incentives for farmers. I was particularly curious how small-scale farmers were involved with co-operatives and asked specific questions to understand how cooperatives were providing support to farmers (or not). I wanted to know whether cooperatives were places of member engagement and decision-making or whether they functioned more as de facto arms of the State. The answer to this was not black and white. From the responses to my questions, cooperatives were recognized in a variety of ways; as facilitators of produce and livestock sales to the State, where they could acquire inputs (if available), as providers of social benefits and as treasurers for their payments from State contracts. Members described monthly meetings that included a voting process to make decisions; however I perceived a lack of engagement and excitement related to participation. When asked about the disadvantages of the cooperative most respondents could not come up with any for example 'without being a part of [the cooperative] you must do everything on your own.' Other advantages included: learning, sharing ideas with fellow farmers, helping with registration of things (machinery, animals), helping with legal problems or paperwork, and retirement benefits (one respondent specified this was not available through AU). Some of those interviewed were affiliated with the cooperative by current or past participation on the board of directors and had participatory knowledge of decision-making.

Cooperative type and variation

Cuba's agrarian history has encouraged the re-organization of farmers in many ways and I interviewed farmers in multiple types of organization. Though the scale of my research and subsequently limited dataset did not allow me to do a thorough comparison, I did perceive that the level of involvement, and benefits available, varied amongst the different types of cooperatives. Boillat et al, explain that each type of cooperative "has a specific degree of autonomy in their decision-making structure and in access to markets…[and that]…they show different performances in productivity, efficiency, use of inputs and adoption of agroecological practices" (2012). The CCS (Credit and Services Cooperatives) farmers have a good deal of autonomy in decision-making on a daily basis, though the bulk of their yields go to pre-determined government contracts facilitated through cooperatives. The private farmers on small plots that I interviewed could also access resources through their urban agricultural authority. Both types of organizations allow for the distribution of scarce inputs, occasionally provide educational opportunities & social opportunities for farmers to gather and can provide retirement benefits, administrative and legal help. However, the gendered division of labour in the nuclear family is still strong, and married women are not as involved as their farming husbands in decision-making or participation in cooperatives (S. Díaz, Personal Communications Aug 22, 2009).

The CPAs (agricultural production co-operatives) provide a very different example of how farming could integrate into the larger community. Often functioning at a much larger scale, agriculture in CPAs tends to use less agroecological techniques and employs farm workers that tend to have less incentive and work ethic than farm owners. Additionally there is a loss of CPA workers as they are increasingly attracted to the higher incomes garnered by their CCS counterparts (Boillat et al, 2012). However, the structure integrates different levels of agriculture; growing both export crops as well as crops that will go directly towards feeding the workers and community. Integrating these two scales could lend innovation and efficiencies across both sectors. Further, agricultural decision-making becomes a community process, as living spaces are built right into the farming area and ample social support is available through a thick tapestry of tightly-knit neighbourhood networks.

Amongst farmers that were 'cooperativistas', the level of activities or workshops varied amongst cooperatives. One farmer spoke of the enjoyment brought about by the only social event held each year by the cooperative, where food, beer and rum was served, allowing an opportunity to connect with other growers.

What seemed more common was that other organizations, such as academic institutions, ANAP (National Association of Small Farmers), or the FMC (Federation of Cuban Women) would hold workshops open

to farmers in the region. Respondents spoke of several gatherings organized by associated institutions, sometimes occurring more than once a month, where farmers gathered over a certain project or idea. A key component of these gatherings was that inevitably there was down time where the casual exchange of information was shared. For example, I joined a voluntary workday near Viñales, where about 45 local residents got together and planted fruit trees in honour of Fidel Castro's 83rd birthday. The gathering was jointly organized by the National Park, AU, ANAP and the local chapter of the Communist Party. When we took a snack break, one farmer pulled out a corn cob and started talking about saving the seed, then the discussion moved onto pest control for bean plants. With my limited Spanish I could not grasp exactly what was being discussed amongst the producers (speaking at full speed with each other), but I could tell that the animated discussion was a fertile exchange of ideas and opinions of trials and lessons experienced by experts with these particular crops.

In a Canadian context, a common understanding of a cooperative includes a perception of a grassroots, member-driven, democratic structure. Before leaving to do the fieldwork, I had a strong sense that the support for agroecology came from how agriculture was predominantly organized by agricultural cooperatives. However, I did not realize just how much my own interpretation of a cooperative differed from a cooperative in a Cuban context. I was therefore surprised that respondents did not seem very involved or excited by being participants in cooperatives. In Cuba, it was a form of social organization, but one that stemmed from the State's mandate. Other institutions, NGOs, or farmer advocacy groups were just as, if not more, important in participants' lives in terms of hosting events, but also in the general empowerment of farm owners or employees in cultivating a dedication to their work.

In the past, employees did not have much involvement in agricultural decision-making and instead took direction from their managers and were less invested in the farm. With the initial re-organization post crisis, this phenomenon was very problematic, as worker productivity was not at all tied to compensation. However this has changed in many cases, where there have been major efforts to link workers with productivity, and create more democratic decision making structures. One farmworker, caring for a vegetable farm growing for workers in a tobacco factory, said: 'I am my own boss, and I make the decisions [with a co-worker].' The day I interviewed him, he said he was actually on vacation, but had come to the farm to work on the irrigation. Most of the employees I interviewed had a set salary but then a possibility to make additional bonuses based on productivity. Many respondents commented that the most successful farmers were 'connected with their work' through incentives but also through love of the work.

ii) Family and neighbours

"Neighbours are like family" said one respondent and this sentiment was echoed by many. She was a member of a CPA, which was the most community-oriented land arrangement I visited. CPA members live and work with pooled land and resources. Those I interviewed at the CPA explained how they had individual homes but also social space for people to gather, a community snack bar and they shared other resources such as a computer. While visiting the CPA, there was a strong sense of camaraderie and care for other members; including childcare that was shared amongst members.

Though the CPA was an extreme example, neighbourly support seemed an underlying part of Cuban life throughout my research. With the constant flux of the availability of goods being regulated through certain channels in order to acquire basic things, Cubans *have to* talk with their neighbours, and often consider them as close as family. There is a culture of exchange on a daily basis, whether it is where you can find building cement or who might have (black market) meat for sale; interaction with people is a constant. From my experience of staying in people's homes, there is also a strong notion of sharing the wealth. If one person on a street block has a telephone, it does not only benefit them, but the neighbours will also likely be stopping in frequently to receive and place calls. This notion is expressed in agrarian life with the sharing of equipment; tractors, and oxen for example; but also seeds, and fertilizers. It seems the lived experiences of scarcity and crisis of the past, has knit a strong social fabric. This network of neighbours ultimately provides more social capital and enriches life.

The notion of sharing the wealth is also propagated through the national philosophy of equality. Although a thorough discussion of the actualization of a more egalitarian society in Cuba is beyond the scope of this paper, there are many quotidian measures taken with this intent. For example, many of the farmers interviewed reported providing a certain percentage (from 10-30%) of their crops to social programs, where the cooperative or urban agricultural authority administered the donation. The food was then used in schools, hospitals, for seniors, or in childcare centres.

4.2.2 How are women on farms participating in farming, and in agroecology?

In this section I will discuss the results of the interviews I had with women on farms and other key informants, and the results of a participatory photo project performed in one area of my research.

4.2.2 a) Why photos?

As discussed in the methods section, my initial engagement with farm women, was through the final section of the semi-structured interview. And though at times, the interview structure felt confining, it also made room for a 'women only' space and allowed some 'sameness' between me and the participant

that seemed to lead to some ease in the next stage of the research; the photo project. At first many of the women seemed somewhat intimidated by taking photos perhaps because some had never handled a digital camera. However, the physical movement of getting out of our seats and walking around the farm together seemed to relax the atmosphere and allow us to abandon the more formal roles of interviewer and respondent. Taking photos during the interview process served to change up the regular 'extractive' interview style of questioning, shift some of the power dynamics to the participant as creator, and added an element of fun and interaction to the research.

why photos?

a glimpse of how we see something
through a lens
the small visible part invites a peek
if just for a moment
into how we fit into a web
too grand for comprehension

a second of knowing
a pause in a dynamic process
if just for a moment
stoodstill

the photographer
takes control
if just for a moment
to understand how things are
or how she sees them to be

The passage above was taken from my reflexive field journal while I was in Cuba during the summer of 2009. When questioned about my research I was often asked why I included photography and not exclusively use traditional methods of interviewing and/or focus groups. I tried to articulate my motivation through this poem and partly, in response to Thrift and Dewsbery's call for performative writing in human geographical research (2000), I chose to use this as an expression of what I feel PDP has offered as a component of my research.

Once the photos were taken, initially, I asked the women to write the reasons for the photographs they took on paper. I noted however some women did not feel very comfortable writing. In one instance, a participant immediately called her husband over to write, and once he took the pen in hand he wrote his own interpretations and descriptions of the photos his wife had taken. These descriptions were quite a lot different than what she had told me while we were walking around and taking the photographs. For the remaining interviews (where possible) I took audio recordings and used the transcription (and my own translation) of our discussions. However as the photos were taken while we were walking around the farm, there was too much environmental noise to be able to use the audio recorder. Most of the photo

descriptions came from a translation of my own notes based on the discussion I had with the women while we were walking around doing the exercise, or immediately afterwards.

For one of the first interviews, where the participant farmed an area of land where she did not live, I left the digital camera with her so that she could choose whether to take photos at her home and/or the farm. I did this partially to build trust (see Morgan et al, 2010) however, I had not provided enough direction and the next day when I returned she told me she had not been comfortable using the camera. Further having the responsibility of the digital camera, a very valuable item to replace if lost/damaged, seemed to be somewhat stressful for her. For the rest of the interviews, immediately after explaining the project idea, we walked around together while the participants took photos.

PDP was not the focus of my research but was a method I used among many. Although I feel it was a highlight of the research process, the way I was able to carry it out, had limitations. Because of the way I recruited participants (snowball sampling: through the help of my host advisor/research assistant), the difficulty in arranging transportation for participants, and the time demands on farmers, I was able to organize only one closing workshop in San José de las Lajas, where a discussion of the project and a more general discussion on issues relevant to women farmers in the area could take place. Bringing together the group to introduce the project is said to build relationships immediately amongst participants and has been the traditional way PDP is organized, however, I did not hold an initial meeting to gather participants but instead engaged with women on their farms, one on one, in order to make best use of their time and to alleviate transportation logistics. Resultingly, my version of this project may not have reached its full potential. However, using PDP one-on-one allowed for a more embodied experience that complimented the rest of my research process. As we walked around their farms, we became more engaged in our environments; touching plants, listening to birdsong, smelling compost piles, tasting ripe guavas, taking grandchildren by the hand, spitting out cherry pits, and creatively framing snapshots of things on their farms, in their everyday lives.

The meeting with photo participants of the San José de las Lajas community created group cohesiveness amongst the women involved. I passively facilitated the meeting so that the group could do most of the talking and bring up the issues they desired. Whereas the photos taken generally focused on individual situations and concrete materiality, during the meeting the discussion was able to broaden to more generalizable gender issues. This meeting created a space of togetherness that brought the participants to a new level of comfort with each other and myself and it brought a new level of collaboration in the research.

4.2.2 b) The participants

Most of the producer women I interviewed and/or who participated in the PDP were married women and worked on family farms. However, I also spoke with a manager of one larger scale government farm, one widowed farm owner/manager, a farm worker at a research farm, and a few women who were involved in aspects of farming (i.e. the mother/grandmother and bed and breakfast host of an extended family involved in farming). I had the opportunity to talk with three academics at the University of Havana whose research overlapped with gender and farming, and one program manager of a non-profit group that worked in organic agriculture. The diversity of experience amongst the women I interviewed was rich, although they were all lighter skinned Cubans. Racism is an important issue in Cuba, with a spectrum of backgrounds from Afro-Cubans to those of Spanish heritage. I do not feel I can offer a thorough discussion of the topic in this thesis. Of all the participants in my research, most were lighter-skinned Cubans. Some participants noted that racism was still strong, and others that it did not exist because of an acceptance of all shades. In my discussion I have picked out some similarities (and differences) but do not want to paint a picture of the Universal Cuban Farmer or the Universal Cuban Farmer Woman as I do not condone the existence of such images.

4.2.2 c) What they said and photographed

Many of the notions of support that women experience on the farm, overlapped with information from the rest of the research. The photos and their descriptions in Appendix 1, coincide with the economic, academic and community support discussed in Sub Section 4.2.

i) Economics: Though few women spoke directly about money or financial issues, several women took photos of the crops/animals that they said were good for the farm because they gave a good financial return. See photos 7, 8, and 9 of lucrative crops.

ii) Community: Of those that were employees, many took photos of co-workers; and those on family farms, of their family members. Some spoke about their concerns about the lack of youth involved in farming and one woman took a photo of her young daughter who seemed to really enjoy farming, as her older children had already moved to take higher paid tourism jobs in the city. The community support and notion of sharing the wealth was also brought up when talking with the group of women, where they saw farming as a service to the greater public. One farmer said it was 'their duty, given to them by the party, that they serve the country folk' and another that they sold their products to "those who passed by with or without money… as you know how it is."

Our discussion included how during hard times neighbors become closer. Because of increased vulnerability there is more need for shared support both with physical goods and emotional support. For farmers especially during hurricane season, women spoke of how they shared plants, seeds and helped on each other's farms.

iii) Academic/Institutional: Several farmers took photos of the machinery or infrastructure that was acquired as part of a project. See photos 6 and 10 for examples.

These photos depict equipment that was acquired as a result of a connection with a particular institution/organization. At INCA I spoke with the coordinator of a program aimed at increasing agricultural diversity with a special focus on gender. She spoke about workshops that were held jointly by INCA and other groups such as ANAP and chapters of the FMC in San José de las Lajas and Havana including a recent workshop that focused on food preservation/conservation in hurricane crisis times (B. Benitez, Personal Communications, July 1, 2009). During interviews, because I was aware that the national women's federation (FMC) had done a lot of work in creating more gender equality in Cuba, I asked women specifically about their involvement with the FMC. Aside from the woman working on programming with them (as mentioned above) most of the women said the FMC was geared towards women's programs in urban areas and did not much serve rural women.

iv) The farmer's helping role…and working in the home

I asked women to describe a day in their life on the farm. Of married women, many responded that they did not farm, that they only helped with a few things. But as their descriptions revealed nearly all the women (married or not) described a full day of farm activities including: waking up earlier than others in the household to prepare breakfast, feeding animals, preparing lunch, cleaning and tidying the house, planting seeds, potting and watering seedlings, sometimes helping with harvest, collecting eggs or vegetables to cook with, and processing farm products i.e. shelling garlic, making tomato sauce, preparing seeds for planting etc. After a full day of work for the farm they were expected to cook dinner for the household, take care of children/grandchildren, wash clothes and do other household chores. In the final PDP women's meeting, women spoke of feeling taken for granted for their work in the home and that this type of work should be rewarded equally. Some women took photos of their cooking facilities. One said that her stove was primitive and dangerous, and found it hard to cook big meals. Another was grateful for her appliances; rice cooker, blender, double hot plate, and newly tiled cleaning and washing area. See photos 11 and 12 for examples.

Women that did not live on their farms, talked about how it was sometimes difficult balancing the responsibilities associated with the home and getting to and from the farm. It made for a very long day, especially when dependent on public transportation (which was often unreliable and slow). Several women talked about how having independent transportation facilitated this, and both, one farm worker and one farm owner, spoke of appreciation for their bicycles, see Photo 13.

During the final meeting with women, the space of discussion that was created allowed for the sharing of sensitive information. One woman voiced that she knew of husbands who did not want their wives to be cooperative members and several heads nodded around the room. Machismo culture is very much alive in Cuba and is not exempt from agriculture. It was mentioned at the gathering that ANAP was trying to create programs to reduce the machismo in agriculture. Similarly, I heard that the Cuban Association of Agriculture and Forestry Technicians (ACTAF) was active with increasing the engagement of rural farm women (N. Peréz, Personal Communications, July 23, 2009).

CCSs were described as the most male dominated spaces as compared to other types of agricultural organizations. If a married couple owned and managed the farm, in general, the man in a partnership took on the cooperative member position and the woman took care of the home and children. As explained to me in one interview, there are many more women who work in the home rather than on the farm or off the farm (B. Benitez, Personal Communications, July 1, 2009). However, when reviewing what activities women on farms did, many such duties could be included as farm work. Redefining farming to include women's activities; might acknowledge their roles as major contributers (see for example Reimer, 1986). Where there is an effort to engage women specifically by encouraging their community involvement, their status is raised at the community level, and serves to empower women to make changes in their families and homes.

From discussions with members, it seemed there were more opportunities for women to be involved in group decision making in CPAs, and this was corroborated by other interviews (S. Díaz, Personal Communications Aug 22, 2009). CPA members live and work on the same land and often each have assigned jobs. Perhaps as a result, each member of the household becomes a participating member of the cooperative. Women are no longer a minority in such groups and can support each other. On State farms, the government is also making attempts to encourage women into leadership roles and management positions (S. Dìaz, Personal Communications, Aug 22, 2009).

v) Autonomy and happiness

Many women described their love for taking care of animals and seedlings, and beautifying the spaces around homes with shrubs and flowers. Many photovoice pictures show farm animals: particularly chickens, goats and rabbits as these were usually women's responsibilities. Seeding plants and the watering and care of seedlings, potted plants and flowers were also captured in their photos. This was particularly true for married women, whose husbands were 'the farmers' and whom they were 'helping.' It seemed they took pride and felt joy in the small part of the farm over which they took ownership. See Photo 14.

"El campo es la medicina" – 'being in the countryside is my medicine.' Many women described a love for rural living and the farm lifestyle. For those that did not live on their farms, going to work was sometimes described as a vacation from household responsibilities. Farm work provided both mental and physical health. Though the lifestyle was not for everyone (one farmer's new wife had abruptly left, because rural life was not for her), many of those that I spoke with described a feeling of belonging and happiness on their farm.

vi) 'Good' photography and PDP reflexivity

Many of the women took photos of their family members, their pets, and what was directly nearby where we were sitting. These pictures may have been taken partially because of the convenient tangible location of things, and sometimes because of conforming to social conventions of photography. Many of the photos taken were not particularly striking images, and if exhibited would probably not be deemed 'good' photography. However concentrating on the image as outcome was not the focus of the exercise, changing a traditional research process was. On one farm, where both mother and daughter were taking photos for the project, they insisted that I be part of the picture where we posed with a freshly harvested stack of bananas. At first I hesitated, thinking the desire to take this photo was just the social convention of including everyone in group shots, and backed away from the suggestion. However, they insisted, saying that having visitors from INCA (the research institute I was affiliated with) was an important part of the farm. Though I won't include the photo to protect the identity of the farmers, I look sheepish in the picture and felt out of place, latching onto some idea that I was 'outside' the project and therefore had no place in the concrete products of the process. Kindon (2003) notes that even with the use of participatory photography or visual methods, researchers fall into this trap. She posits that her visual research was made stronger by including the researchers in the participatory video as it reminds future viewers of their presence and influence throughout that should not be hidden or forgotten (Kindon 2003).

Fiedrich and Jellema (2003) caution that what prevents us from understanding how our resources and influence affect and alter the lives of those in the communities in which we work, is an arrogant notion

that through participation in our projects, we are *allowing* the poor to voice what they have been wanting to say. As Trinh min Hah has noted there may be a place for feminist researchers to 'speak nearby' instead of 'speaking for' research participants (Kindon, 2003). In many PDP projects, exhibits are held to showcase the images captured and to trigger discussion in the community and with policy makers. When considering cross-cultural research, exhibits can be held thousands of miles away from where the research initially took place and with an audience that may know nothing of the local situation. McIntyre reflects that the photos and texts may not change violent situations but what they can do is "provide politically disempowered people with opportunities to author individual and collective stories that best represent how they experience their lives" (2003, page 64). In exhibiting cross-cultural feminist research, the goal then, is firstly, to share and develop more enriching research tools and, in some cases, this can amplify a voice for participants, from a local to an international scene.

All of the participants gave me positive feedback on my project and recommendations for what I could do further or do better the next time. Though my PDP project was small in scale, and did not include an action component or attempt to change policy, this method allowed me to conduct research with respect and thoughtfulness beyond what I could achieve with the other methods I used. The embodied performance of the PDP project and the images along with the texts and the discussions they generated, greatly enriched my relationship with participants and the research process.

4.2.3 Social Agroecology Summary

Farmers are supported in using agroecology in a variety of ways. Economically, farming as a profession provides a fair income, although this varies with geographical location. If available, the extra costs of pesticides and fertilizers (whether chemical or biological) are disincentives, though their immediately higher yield justifies their use to certain farmers. Agroecological methods require farmer knowledge, time and organization and can provide longer-term health to agroecosystems such as higher resilience to hurricanes. Farmers are spreading knowledge to other farmers via participatory workshops, with key roles played by academic institutions and other NGO or government bodies. Food distribution remains somewhat centralized and although the cooperative structure has the potential to decentralize administration and decision-making, they are more functionally, state administrators. Women tend to have less participation in cooperatives; and traditional household roles and machismo are still an undercurrent in the Cuban countryside. However, women's increased participation as farm managers on State and urban farms, and as participants in gender based agricultural research are shifting traditional power dynamics. Social networks play a strong role in accessing equipment, inputs and information and these ties are especially tight within families and neighbourhoods.

4.3 Challenges to farming

To fully answer the questions of how farmers and (specifically) women farmers are working towards food sovereignty, it is important to identify what impedes their success, and where they are not supported. However, considering my short time in the field and limited capacity as a solo researcher, I did not feel as though I had the ability to provide support or resources for negative situations. Through research, participants can have a space to voice concerns where negative emotions may arise, but if the researcher does not have the capacity to provide follow-up or support, some observers question the ethics of such research and have cautioned that it can do more harm than good (for example Fiedrich and Jellema, 2003; Wang and Burris, 1997; Heron, 2007). This influenced my decision to reframe my questions in a more positive light and not concentrate on the negative aspects of farming. However, in order to paint a more balanced picture of farming, I was very curious to understand what was *not* working in Cuban agriculture. By adapting to a more conversational nature during interviews, the challenges and obstacles to success in farming surfaced more naturally in discussions throughout the entire research process and are mentioned below.

With industrial farming, the mechanization of agriculture has been the demise of the peasant farmer, and this is no exception in Cuba. The monocrops grown for exports are more likely to be grown conventionally and with higher mechanization, such as sugarcane and tobacco. One farmer commented that in the past, the mechanization of sugarcane nearly killed him. He had a small plantation that lost incredible value but he was able to keep farming by diversifying into other products. Though Cuba as a country, still relies heavily on the revenues from such export crops, the widespread agroecological cultivation of crops that is primarily focused on local consumption ensures the need for labour in the fields.

Challenges mentioned by farmers often had to do with the level of autonomy they experienced. The more dependent on provisions by something outside their farm, the more challenges they experienced. Many spoke of the problems with lack of fuel for irrigation pumps and the interruptions in electricity. Particularly affected were young seedlings needing regular watering. One farmer had solved this issue, by his invention of a gravity based micro pump [see photo 2]; and by having a windmill onsite for power generation (that was acquired with the help of project funds affiliated with a University) [see photo 10]. Though the consistency of electricity is said to be much better than it has been in the past, especially with the summer storms, it was not uncommon for the power to fail for a few minutes to a few hours everyday. During the closing PDP meeting, improving irrigation systems was identified as important. Some women spoke of the challenge of using old equipment in general, and this was also reflected in their photos. They also spoke of innovation as a tool for overcoming the challenge.

Though many of the small farms I visited had high diversity over a small area, larger farms often still focused on only a handful of crops. Though the need for increasing agro-biodiversity is a theme that is spreading, it is only by individual advocates in institutions and by NGOs; but does not have broader level national support (A. Leyva, Personal Communications, June 27, 2009). I was told by a researcher who had extensive experience visiting farms, that, in the past, biodiversity of vegetable crops (not including root crops) was higher, with about 15 types per farm in 1976-1980, but since 1990 this has dropped to only about 3 types per farm (A. Herera, Personal Communications, June 26, 2009). As a key component of agroecology, many other variables rely on a diverse agroecosystem. Identifying the barriers to increasing biodiversity on small farms may alleviate this perceived challenge.

Many farmers purchased seed from their cooperative or the AU authority. Because they relied on procuring seeds off-site, they were vulnerable to fluctuating prices and availability. Most farmers saved seeds from the previous year's crops to be guaranteed the quantity and quality of seeds they needed for the next year's harvest. Some outstanding seed savers created community seed banks where seeds were shared amongst neighbours and family. The importance of growing his own seeds was expressed succinctly by one farmer: 'without seeds, we are nothing.'

Some of the more socio-cultural challenges were brought up as 'having love for one's work' and having motivated people that despite knowing the work is hard and the hours long, continue to have the will and conviction to farm. Of particular concern to some respondents, was the lack of youth in farming. One respondent described the phenomenon of youth migration to urban centres: as education is widely accessible, succeeding in academics can provide opportunities for travel both within Cuba and abroad (B. Benitez, Personal Communications, July 1, 2009); however, post graduate study of rural livelihoods is uncommon and not seen as popular as other subjects such as fashion, urban living, or tattoo art (N. Peréz, Personal Communications, July 23, 2009). Many young Cubans migrate to Havana for the University, which leaves rural areas without youth to continue in farming. Despite the economic feasibility of farming, there is a still a strong social sentiment that hard agricultural labour is less desirable than urban living. One respondent talked about how Cuba has a culture of beauty, that encourages high fashion and personal aesthetics[1] and discourages manual labour (A. Leyva, Personal Communications, June 27, 2009). Young people are attracted to life in urban centres that holds possibilities of earning CUCs and upward mobility in society.

[1] This was even somewhat present amongst farm women, as after conducting interviews with farm families I left them with small gifts and (using local advice) I found that ornate hair accessories were the most appreciated.

Another socio-cultural obstacle is what the average Cuban is accustomed to eating. A common diet is not very high in fresh vegetables, but relies on meats and a fair amount of culinary oils to fry root crops. Many farmers listed vegetable oils as the primary ingredient they had to buy in addition to what they could grow. Those that had less reliance on purchasing vegetable oil were growing sunflowers or soybeans for oil, and some animal farmers used pig fats for their oil needs. Leafy greens were very rarely eaten as part of a meal. Aside from starchy roots, vegetables that were commonly served included cucumbers, green beans, tomatoes and occasionally beets. Salads were a very uncommon occurrence, thought there seemed a small but growing movement towards eating green and raw vegetables. Farmers that were increasing their biodiversity were themselves eating a larger diversity of vegetables and encouraging their community to do the same. This idea of changing the diet was brought up by key informant interviews (A. Leyva, Personal Communications, June 27, 2009) and in several farmer interviews; to quote one farmer: 'the public needs to learn to eat more vegetables!' During the final PDP meeting, women spoke about the need to educate the public about food conservation and to introduce and promote less common vegetables as well as increase education around chemicals in foods. Concomitantly, workshops held by academic institutions were suggesting and encouraging producers to eat a wider diversity of fresh vegetables as possibilities for future crops; however often still included a high starch meat based meal or snack accompanied with soft drinks. While living at INCA, I went to a workshop for farmers on food conservation where dried mango was 'introduced' as a relatively novel idea. Aside from making tomato sauce, only a few farmers made mention of preserving other parts of the harvest; one farmer had pickled cucumber, two farmers made mango jam, another conserved papaya, and another made garlic vinegar. Because the production of fresh foods is mostly geared towards local consumption, if the public increased its demand for preserved or dried foods it would surely allow farmers a chance to fill that niche.

Several informants spoke to me about the historical problem of housing, such as old buildings in Havana that required basic maintenance despite a lack of resources for repairs. One participant in the PDP project was embarrassed by the state of her house and for that reason she did not want to take any photos in her home, but instead took a photo depicting the year the house was built to imply how badly it needed maintenance see Photo 15.

Until recently the average Cuban was not allowed to buy or sell a home. There was a system of exchange, (called *la permuta*) that allowed for housing swaps, but was a lengthy process to officiate. Housing was constructed and distributed through the State and even building materials were legally restricted, and mainly sold through the black market. In recent years, Raúl Castro has made changes to housing rules and

Cubans are more easily able to purchase building materials, improve and even sell their homes (Burnett, 2012), although, for many Cubans, the costs are still prohibitive.

When Cuba desperately needed workers in agriculture during the Special Period the incentive of housing encouraged many to migrate to rural areas, but without housing a long commute to farmland is a huge disincentive for farmers. With the difficulty of housing, family relationships often allow an opportunity for those who want to move. Especially with the popularity of living in Havana, the strength of family ties can provide housing options for those who want to live in the city, that would not otherwise be able to.

Closely linked with the housing issue is that of land tenure. Although farmland has been opened up in usufruct for those committed to farming, in addition to the unlikelihood of finding housing near the farm, there are concerns about the slow distribution of lands and the uncertainty of land tenure (most usufruct leases were only for 10 years) (Nova-Gonzalez, 2012). A lack of tenure discourages farmers or potential farmers from investing in any kind of infrastructure or long-term farm improvement strategies i.e. planting of trees, or multi-year soil improvements.

4.4 Summary of findings for both the physical and social variables of agroecology

For the purposes of organizing this paper, I separated the social and physical notions of support for agroecology; however, in practice these are very much interlinked with each other and everyday challenges to farming.

Farmers are employing a wide array of agroecological techniques. Some of these techniques are based on traditional farming, and some are developed with the help of current scientific research, and a participatory relationship with extension support workers. The inability to purchase imported chemicals and fertilizers (whether from prohibitive cost or lack of availability) has encouraged farmers to innovate their own solutions to maintaining soil, plant, animal and ecosystem health. Increasingly, institutional support through academic institutions and NGOs is spreading agroecological education (often simply by supporting farmer-to-farmer exchanges) resulting in a growing conviction amongst producers to continue using low impact farming methods. Farmers that have ties through an institution have shown increased usage of agroecological methods and commitment to the continued incorporation of agroecology in their farming.

What stood out starkly in contrast to my experience with farming in North America, is that economically, the farmers I interviewed were all fairly well off compared to their peers. As a profession, farming in

Cuba seems to be providing a good living; although, farmers' wealth was also often tied to other industries in their respective regions, and especially influenced by tourism. Income amongst farmers did not appear to vary considerably, despite the fact that farmers that sold directly to the public received more per item. Some farmers were compensated for direct selling at twice the rate of a government contract, and though initially this seemed very disparate, it compares to my own experience with farming in Canada, where bulk selling allows farmers to offload large quantities of a certain crop and direct selling earns more per item, with fewer items sold.

Though the need for housing and land tenure are still large barriers for new farmers, the government's opening up of land for farming in usufruct has likely been the most successful strategy in encouraging citizens to relocate rurally and pick up their shovels. Additionally, offering employment in agriculture that allows for subsistence growing, has been historically and is currently an important incentive for new growers. By way of public media, there is subtle daily encouragement for agriculture, through linkages between food and farming throughout Cuban society.

Though cooperatives continue to characterize Cuba's agrarian organizational structure, there is variation amongst cooperative in terms of member involvement, autonomy in decision-making and benefits available. Additionally, the growing farmer-to-farmer exchanges happening have increased agroecological support especially with private farmers associated with CCSs and urban farmers. However, rural CCS farmers tend to hold onto traditional power dynamics of the nuclear family that keep farmwives from being as active in decision-making as their husbands. CPAs, on the other hand, generally have larger scale agriculture and employ less agroecological techniques as a result. However, women as members of various committees in the CPA, seem to have more opportunities for independent involvement and decision-making in the community.

Cuba's difference from a capitalist economic system presents complexity in its agricultural model when comparing to other global examples. The distribution of farmland is not based on a system of private property (although this is changing in recent years), there is a dual currency where certain inputs are only available with one or the other, there is a centralized model of distribution for basic rationed foodstuffs, and there are shortages of electricity, fuel, and resources on a regular basis. Despite all of these differences, Cuba's agricultural story is rich in lessons that can be applied globally, learned from its requirement to respond quickly to change during economic crisis. Many of these lessons are simple; productivity and happiness increase with worker autonomy, support from government and institutions works better when it is participatory, and that social groups whether cooperatives, family or neighbourhoods provide an essential human support system. The final chapter will take the above results

and conclude by applying them to my overarching research question of how farmers are working towards food sovereignty in Cuba.

CHAPTER 5.0 Conclusion

A Path to Food Sovereignty in Cuba

My objective was to research the social environment of small-scale producers participating in a working model of sustainable farming. My research focused on the producers involved in the food system. By spending time in farmer's homes, engaging in interviews and conversations with farmers, agroecology students and agricultural support workers, I gained a lot of insights into the Cuban farming situation. Aside from the production of food, distribution and consumption are also important components in the food system. Though given the scope of my project, I could not explore these areas in depth, there were certain findings that fit into these categories that seemed intertwined with production and will be discussed below, preceeding a review of my overarching research question and conclusion.

5.1 The Food system: Production, consumption and distribution

Consumption

The consumption of food by the growers themselves and their families was very important. Farm employees (of the state, private business, or institutions), if not provided with a portion of the harvest, were allowed land for subsistence growing. This had been a lesson learned under post-crisis circumstances, as a necessary incentive to increase work ethic and productivity, and is currently still a huge incentive for growers and workers. However, the common Cuban diet currently is not based on a lot of fresh vegetables but focuses on meat, rice and vegetables fried in cooking oils. As discussed in Section 3.2.1d, the relationships between growers and the general public are already knit closely by a culturally thick social fabric, so if consumers increased the demand for fresh vegetables, through dietary changes, this could strengthen the relationships between the community and the growers while providing additional farmgate sales (that often result in the most financial return for growers). Conversely, the growers themselves have the ability to influence and introduce new vegetables to clients, so as to encourage the public's demand for more diverse fresh vegetables; additionally resulting in greater agrobiodiversity on their farms.

Distribution

Aside from the food farmers are growing for themselves and families, farmers produce food that needs to be sold. The bulk of the food sold (especially with slightly larger-scale growers) was contracted to the agricultural authority and distributed through a centralized system. This distribution system runs fairly smoothly with sundry items and vegetables that have a longer shelf life, but does not work as well for easily perishable foods. The direct sale of these items, through urban kiosks and outdoor markets, has been an excellent tool to increase the availability of fresh vegetables in Cuba. Having more opportunities to distribute fresh vegetables would further encourage growers to diversify, instead of basing the majority of their harvest on roots and tubers contracted to the agricultural authority.

5.2 The principles of food sovereignty in practice in Cuba

The overarching question that framed my research was: **How are Cuban farmers working towards food sovereignty?**

In Chapter 4, I have outlined, as demonstrated through my research, how agroecological farming methods and local knowledge; support for agroecology from: the government, economic system, and the community; and the involvement of women in agriculture are laying the foundation for food sovereignty in Cuba. By reviewing the principles of food sovereignty we can better assess the lessons Cuba has offered. Using six major principles described by the International Planning Committee for Food Sovereignty (IPC, 2009), I have summarized the research results and show how they both support and contradict food sovereignty in the Cuban context.

a) Focus on Food for People

With the exception of Cuba's main export crops of sugar and tobacco, and certain types of crops earmarked for tourism, the priority of food growing is to feed the local population. This is vastly different from many situations in the global South where export food is being grown for Northern countries, or where farmland is being used to grow for energy crops. On small-scale rural farms in Cuba, farm workers are able to grow food for themselves and for family consumption. Of all the farmers I interviewed, only the State farm was growing monocrops of potatoes that prioritizes their use for the tourist market. Amongst the farmers I interviewed, all other crops were being grown for consumption by locals, though sometimes diverted through the agricultural authority. However currently Cuba is only using 50% of agricultural lands (Funes, 2009) and much of that land base goes towards the production of cash crops. If Cuba can reduce its reliance on foreign currency through the sale of export crops like sugarcane and tobacco, more land, energy and resources could be dedicated to growing food domestically.

b) Valuing Food Providers

The farmers I interviewed seemed to be rewarded with fair compensation for their work. Their economic situation compared to others in Cuban society, was on par, or better than average, and they had the additional bonus of fresh foods available for consumption. This may not be the case everywhere in Cuba, but was an obvious valuation of the food producers in the areas where I conducted my research.

However, poor housing supply and lack of building materials in Cuba affects both current and potential food providers, as their basic needs are not fulfilled. It does not encourage new young farmers or those changing careers later in life to take up farming.

Women in farming are still undervalued as providers of farm services. Women often work a double role as primary caretakers of the home and children. Machismo still exists in the culture that prevents gender equality. However, there are efforts to engage and empower women through workshops hosted by non-profits, academic institutes and government-affiliated institutions that are changing these traditional dynamics. Further, the diversification of crops and duties in agroecological farming offers women more managerial roles, which is reducing the weight of patriarchy in the peasant family (Rosset et al, 2011).

c) Localizing Food Systems

One of the principles of food sovereignty includes the need for food prices to be linked to local production costs. In the alternative food movement in Canada and the U.S., locally grown foods are often more expensive than their widely available imported counterparts. The labour involved in growing food locally means the payment of North American wages, which adds considerable cost. In Cuba, aside from the food rations allotted to each individual, additional processed and imported foods are only available with convertible pesos at a cost much higher than goods produced locally. Fresh vegetables are sold both through government and private markets. The government sets prices and provides a certain level of foodstuffs to residents based on local availability, and the free markets base their prices on scarcity and the highest price consumers are willing to spend. Because of the predominantly local production of agricultural products this means that production costs are inherently incorporated into agricultural prices.

Another principle of food sovereignty includes the rights of consumers to decide what they consume and how and by whom it is produced. In Cuba, there are very limited product choices. What is available in the market (either legal or black market) may only be available in convertible pesos, restricting choice for those that only have the national currency. There are certain higher priced open air markets that use national currency, and supermarkets that offer similar products in CUCs at much higher prices than those at government markets, but in general, paying more for a product is not voluntary but dependant on the

scarcity/availability of products. When comparing to a US or Canadian context, the food movement focuses on how consumers *choose* to spend their money. Consumers that shop at farmer's markets willingly choose to pay higher prices for food that they perceive to be of higher quality, that is grown locally, or where they can engage directly with their farmer. However, the caveat is that the consumer must have the financial means to make this choice, so the option of choosing higher quality, locally grown food is not always a plausible choice for those on low incomes. In Cuba, most fresh food available for resident consumption is grown locally, but there is often no choice involved; the average consumer is forced to eat locally, as often that is all that is available. State propaganda promotes eating locally and supporting farmers (refer to section 4.2.1b) but it is with a very different intention. At least partially, the motivation behind these messages is perhaps to increase citizens' acceptance/satisfaction of paying a large portion of disposable income on supplementary food.

d) Putting Control Locally

The background to asking the question about food sovereignty was the fragility of the global food system trapped in a capitalist web supported by the false economics of foreign labour and subsidized fuel and transportation. Cuba functions within this global web but also completely differently than most of its neighbours. The difference in systems does not discount what Cuba can offer as an example but gives hope for sustainable alternatives. In a recent article, Boillat et al. examine Cuba's work in agroecology as a promising and unique example of 'de-growth' (2012). Sustainable de-growth can be defined as 'an equitable and democratic transition to a smaller economy with less production and consumption'' (Boillat et al, 2012, p. 600). What they find is that with the conditions in Cuba; where individual farmers are not able to accumulate much capital because of state control, the absence of a land market, and the limited availability of inputs, what becomes most important in transitioning to de-growth is autonomy and local decision-making power (Boillat et al, 2012).

The historical legacy of co-operatives and land reform has shifted more control and decision-making powers down to a larger number of producers at the community level. This has been a huge step in increasing the democratic nature of agriculture and in increasing productivity, by linking agricultural workers with their land and work performance. Reviewing the history of that agrarian change, allows for a richer understanding of the gradual steps involved and how that has translated to the agrarian structures currently in place. From my own research, the organization of agriculture through co-operatives continues to allow participation in agricultural decision-making though their roles have become more administrative rather than actively democratic although this varies dependant on the type of cooperative. This democratic variation amongst cooperatives is supported by other published works (for example Boillat et al, 2012). Co-operatives provide a community association that allows for the facilitation of selling produce, sharing

equipment, socializing, and occasionally providing retirement benefits. Interview respondents in my research were members of co-operatives but participation was limited at monthly meetings and they struggled with equal gender representation and participation. If the CCS model of cooperative continues to increase in popularity, in order to follow the principles of food sovereignty, there will have to be more of a focus on confronting traditional politics in the nuclear family.

There is still much resistance to transitioning from a centrally planned system of production. Agriculture in Cuba is heavily regulated, where goods move through a centralized system of distribution. The rules and regulations often deter local exchanges, and as a result, there is still a very active black market to allow for the continued flow of scarce goods (i.e. dairy products, meat, eggs). These regulations do not stop the flow of goods, but instead hamper access to food and increase an authoritative oppressiveness amongst sellers, for fear of being caught.

Many producers lack control of their land. The opening up of land to farm in usufruct with no financial requirement has encouraged many to transition to farming from other careers; however the lack of land tenure deters many and does not support investing in infrastructure or longer-term agricultural strategies.

e) Building Knowledge and Skills

Cuba has only 2% of the Latin American population but 11% of scientists (Altieri and Funes-Monzote, 2012) and extremely well developed and supported educational programs for those wanting to pursue agroecology from school aged children to post-graduate study. Aside from formal post-secondary or vocational education, less formal but hands on education exists through participation in urban agriculture. This can provide accessible introductions to those interested in pursuing agriculture as a career path, without a family farming background or prior knowledge.

Though agroecology is nationally supported through educational programs, the driving force behind the agroecological movement seems primarily rooted through individuals or public interest groups that have the passion to continuously promote the principles that are in opposition to conventional agriculture. Farmers that have worked on agroecology projects through academic institutions seemed committed to ensuring the integrity of their farming practices and this conviction spreads to other farmers via farmer-farmer exchanges.

The building of knowledge and skills is being done by the self-organization of farmers. ANAP, the organization most involved in spreading the farmer-to-farmer movement, is funded by a voluntary tax by each municipal cooperative (Rosset et al, 2011). The farmer-to-farmer movement in Cuba grew to

100,000 participants in 8 years, compared to 20 years in other countries (Holt-Gimenéz, 2009). Additionally, other academic and government institutions are providing support for spreading agroecology. Many Cuban farmers have embraced agroecology. And as a result, farmers are becoming better stewards of the land. Agroecological techniques are allowing farmers more autonomy in producing their own systems of soil fertility, soil health and pest management.

Increasingly, Cuban researchers are asking how agroecology and food sovereignty can be measured so as to share lessons from case studies as tangible tool kits for other farmers and communities. The development of indicators for food sovereignty (Reardon and Peréz, 2010) and agroecology (Lores, Leyva, & Tejeda, 2008) shows the commitment by Cuban researchers to further explain both qualitatively and quantitatively how food sovereignty is being defined concretely. These indicators include both human and social components in a particular community, such as the level of control over land needed for self-sufficiency or the level of protection of wildlife corridors (Reardon and Peréz, 2010).

f) Working with Nature

The use of agroecological methods is widespread in Cuba; they are estimated at being used in 46-72% of small-scale farms that produce over 70% of domestic food production (Altieri et al, 2012). However industrial farming still exists, and is heralded at certain levels of government (Altieri and Funes-Monzote, 2012) where export crops are grown in monocultures with high amounts of imported fertilizers and pesticides. Further, unlike the staunch rejection of genetically engineered (GE) foods by food sovereignty advocates and ANAP, Cuba has invested in research around genetically modified foods and is growing out GE varieties of maize and soy (Altieri and Funes-Monzote, 2012). The biotechnology industry is largely devoted to medical applications, but six institutions, under the National leadership of the Centre of Genetic Engineering and Biotechnology (CGIB) were created in 1998 to focus on agricultural biotechnology (Lehmann, 2000). The agricultural research institute, I was based out of, had strong advocates and researchers in agroecology on the same compound as an office based around research for genetically engineered crops. Lehmann (2000) notes that public concern about GMOs is generally absent, and similarly GE controversy did not come up in interviews with farmers, although two other key informants (NGO worker and an academic) did not condone the energy and research invested in GE foods and highlighted their concerns about this in their interviews. After a 2010 meeting of officials from Cuba's biotech institutions, experts requested a moratorium until further information was available and there was time for a public consultation process but this had not yet officially been sanctioned (Altieri and Funes-Monzote, 2012).

Since 1988, Cuba has reduced the use of agrochemicals significantly; from 72% on vegetables in general and up to 85% on roots and tubers (Altieri and Funes-Monzote, 2012, p. 2) and thereby greatly reducing the negative environmental effects of chemical fertilizers and pesticides. In addition, because most fresh vegetables are grown for local consumption, average food miles are very low, reducing associated pollution from transportation.

By reviewing these six principles it helps summarize and show the complexities of Cuba's path towards food sovereignty.

5.3 Connecting discourses of the North and the South

The concept of food sovereignty has the power to bridge connections between the food movement in the North and the peasant movement in the South. By concentrating on the principles outlined above, I do not mean to imply that the concept is static but acknowledge how it is dynamically changing, over time and as it gets used more frequently in a Northern context. Fairbairn (2011) questions whether the food sovereignty concept used in industrialized countries will get 'reframed beyond recognition' like terms such as 'sustainable development.' In her research, she finds that the US use of the term is re-framed and used differently than La Via Campesina's framing of the concept. It concentrates more on the consumer side of food, but remains political - calling for an end to the neoliberalization of agriculture, and attention to women's and indigenous peoples rights (Fairbairn, 2011). The use of the concept as a lens for my research was meaningful and, in writing this thesis, I acknowledge my own involvement in its constant re-framing. Shifting the discourse about food to re-centre food producers in the food system, much like the Southern discourse of food sovereignty has from its origin, greatly enriches the food movement in the North; and hopefully will not dilute or co-opt the terminology in a way that disregards the strength of its political roots.

Bridges between the North and the South have been created internationally, by a growing support for agroecology and many of the principles of food sovereignty. A call has been issued by the UN Special Rapporteur on the right to food (2010) to *all* nations to condone and implement: women's participation in agricultural research, farmer-to-farmer exchanges, sustainable agricultural techniques that will mitigate climate change, and fair livelihoods for food producers (de Schutter, 2010).

5.4 Bringing it home: Canada and food sovereignty

Conducting research in a foreign country incited a constant comparative analysis to my own farming experience in Canada and the U.S. In North American media, food stories generally exist as special

interest items. There has been a growing 'foodie' community; composed of those with the disposable time and income to explore gourmet cooking and dining. This affluent community often overlaps and intertwines with local growers who provide the freshest and most flavourful foods, yet often exist close to and even below the poverty line. The price premiums small-scale farmers and ranchers require in order to ensure a very basic living (without even addressing their needs to pay mortgages and purchase farm equipment) are orders of magnitude higher than the prices at neighbourhood chain grocery stores. In Canada, we are not accustomed to spending a lot of money on food. According to Statistics Canada, in 2005, Canadians spent an average of only 15% of their income on food consumption, even lower than the U.S. and much lower than France at 24% or China at 40% (Table 1.3, StatsCan 2012). The choice to spend twice, or even three times more on locally grown and organic foods is one very few people can justify. Amongst the 25 farmers Tunnicliffe interviewed recently on the Saanich peninsula in British Columbia (the area where I am farming currently), the most successful ones had to "decouple their prices from the world market and provide their customers with a sense of value that is beyond what the world market can offer" (2011, p.97). The benefits from global trade (lower valued currencies and foreign labour) and cheap transportation; provide food at such low cost that it erases the need to eat seasonally and the general public becomes further disconnected from their food supply. This gives rise to misunderstandings and conflict when it comes to farmers and the general public. Tunnicliffe noted that farmers in Saanich had an extraordinary number of conflicts with neighbours (2011). This was in stark contrast to my research in Cuba, where neighbours were often mentioned as pillars of support for farmers. However, she also noted that "embedded community ties and loyal clientele were the strongest indicator of long-term success" for growers in the area (Tunnicliffe, 2011, p.100). Schanbacher explains how "food sovereignty's emphasis on local production for local consumption is underscored by notion of interdependence. A focus on local community development [and] the interests of families, friends and neighbors is extremely different than a neoliberal vision of a globally integrated world composed of rational, autonomous, self interested individuals" (Schanbacher, 2010, p.55). This notion of interdependence as described by Schanbacher, also describes a feeling that underscores Cuba's system of agriculture. My research showed that neighbours, family and friends comprised a strong interwoven fabric of support for community members in food production and consumption. This does not mean that there are not self-interested Cubans, but that there was a perceptible current of community support running through mainstream society. In Canada, as Tunnicliffe suggests, this support remains within groups outside of the status quo (2011). Community integration and education around the importance of agriculture with and for the general public would seem to lend itself well to increasing the community of support amongst the general Canadian populace.

5.5 Final Conclusion

Cuba has not achieved food security. Of the food that Cuba distributed *through the ration system*, 60-70% is imported (Reuters, 2012, unnumbered), however according to data from the Food and Agriculture organization of the UN, only 16% of *total* food is imported and weighted heavily towards vegetable oils, legumes, cereals and meats (Altieri & Funes-Monzote 2012, unnumbered). With the recent opening up of markets and business opportunities, a rise in imports and exports is likely to result, as Cuba becomes a larger player in international markets.

If food sovereignty is a precursor to food security as La Via Campesina and Patel (2009) suggest, achieving food sovereignty would logically, be the first objective. In attempting to achieve a goal, a community must have a clear understanding of what the goal looks like and steps that can be taken for it to be obtained. This is not a straightforward undertaking considering the complexity of defining food sovereignty, and achieving 'a state' of food sovereignty is perhaps not the goal after all. In order for Cuba to be food sovereign, some *thing* has to guarantee rights to its sovereignty. As Patel explains: "to demand a space for food sovereignty is to demand specific arrangements to govern territory and space … imply[ing] a particular burden on the state" (p. 668). If the State is what guarantees rights, then the State holds that power over those seeking rights, which contradicts the autonomy of the individual or community in food sovereignty. In order to reconcile this paradox and find use and meaning with the concept of food sovereignty, Patel suggests that it is useful to refocus on the premise of food sovereignty that "challenges deep inequalities of power" that exist within food systems. By seeking to shift traditional patriarchal relationships in farm households or between farmworkers and managers, we begin to understand the counter-hegemonic potential that Fairbairn (2011) describes. To counteract the dilution effects of the term's emerging definition in Northern settings (that deals less with this confrontation of power), it is paramount to keep "the movement's insistence on challenging existing social structures" (p.10) at the forefront of how food sovereignty is defined.

There are still many obstacles on the path to Cuban food sovereignty. Since 2004, agricultural production has stagnated and even declined in Cuba (Brundenius, 2009 in Boillat et al, 2012). However, I argue that, perhaps more than any other nation, they are working towards this path. The predominance of small-scale farms and the use of agroecological methods in Cuba is widespread. From what I observed, the intention behind using such methods, and not simply being forced to out of lack of other resources, was growing, especially when linked with an institutional base and an associated community that supported their use.

Cuba has provided an example by surviving crisis that shows the rest of the world what has and has not worked in the Cuban context. These lessons include the importance of: fair compensation tied to work

performance; participatory research and development, especially farmer-to-farmer education; the equal involvement of women; and that social support networks through neighbours, family, cooperatives and institutions allow farmers more success and happiness. Additionally, adequate housing, land tenure, and autonomy in decision-making allow for increased dedication and love for one's work.

In the global North, as Rideout et al suggest, in order to create "more equitable food policy options" we need to call for the "integration across health, agriculture, environment and social policy" (2011, p.5). Agroecology bridges such disconnects across sectors and provides tangible tools and techniques for growers. In addition, a re-valuation of food and food producers is required to carve a path towards sustainable food systems. Using a food sovereignty lens opens up the food security discourse to include food producers and their livelihoods. This has the power to be transformative. As Handy describes: "food sovereignty demands that we recognize the social connections inherent in producing food, consuming food, and sharing food. In the process it will change everything" (Handy in Wittman et al, 2010, p. 4). One of the mantras of the Cuban people faced with many challenges throughout daily life during the Special Period was 'sí, se puede.' I was given this response many times when I encountered an obstacle while traveling in Cuba. One particular time, on my way to the agricultural research station, I was flagged down by a middle aged Cuban professional woman hoping for a lift to work (hitchhiking is a very common activity). However, I was on a bicycle and wasn't confident in my ability to double her on my bike, but she repeatedly assured me along the way: 'sí, se puede' and we got there, unscathed, several wobbly minutes later. In the face of an increasingly disconnected and unsustainable economy and food system, it is my hope that Cuba's example of a shift towards smaller-scale, agroecological farm systems working towards food sovereignty, provides us globally with the assurance that although it might be a wobbly journey: 'sí, se puede.'

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APPENDIX 1 - Photographs

Appendix 1: Photographs

Photo 1: Corn intercropped with squash

Photo 2: A homemade gravity-timed watering system that provides protection from electricity interruptions

Photo 3: A peanut sheller made from waste materials

Appendix 1: Photographs

Photo 4: 'To have more we must start with producing more' billboard along the roadside in Pinar del Rio, Cuba

Photo 5: Farmers' seed bank created with help from a neighbouring academic institution

Photo 6: Worm composting system under shade of banana trees

Appendix 1: Photographs

Photo 7: PDP photo taken by Participant 4 of things that support her in farming: Okra- a crop that is continuously harvested and provides good financial return

Photo 8: PDP photo taken by Participant 6 of things that support her in farming: Piglets- breeding pigs sustains a cycle of economic wealth with the sale of pork

Photo 9: PDP photo taken by Participant 7 of things that support her in farming: Flowers -provide beauty and good sales in the community

Appendix 1: Photographs

Photo 10: PDP photo taken by Participant 4 of things that support her in farming: Windmill- generates power for their electrical needs and decreases dependence on the electrical grid

Photo 11: PDP photo taken by Participant 4 of obstacles to success in farming: Inadequate cooking facilities

Photo 12: PDP photo by Participant 5 of things that support her in farming: Good kitchen appliances makes preparing farm meals easier

Appendix 1: Photographs

Photo 13: PDP photo taken by Participant 12 of things that support her in farming: Her bicycle provides reliable transportation to and from the farm

Photo 15: PDP photo taken by Participant 1 of obstacles to success in farming: Housing – this photo was set into the foundation when her home was built, the house is now old and needs repairs

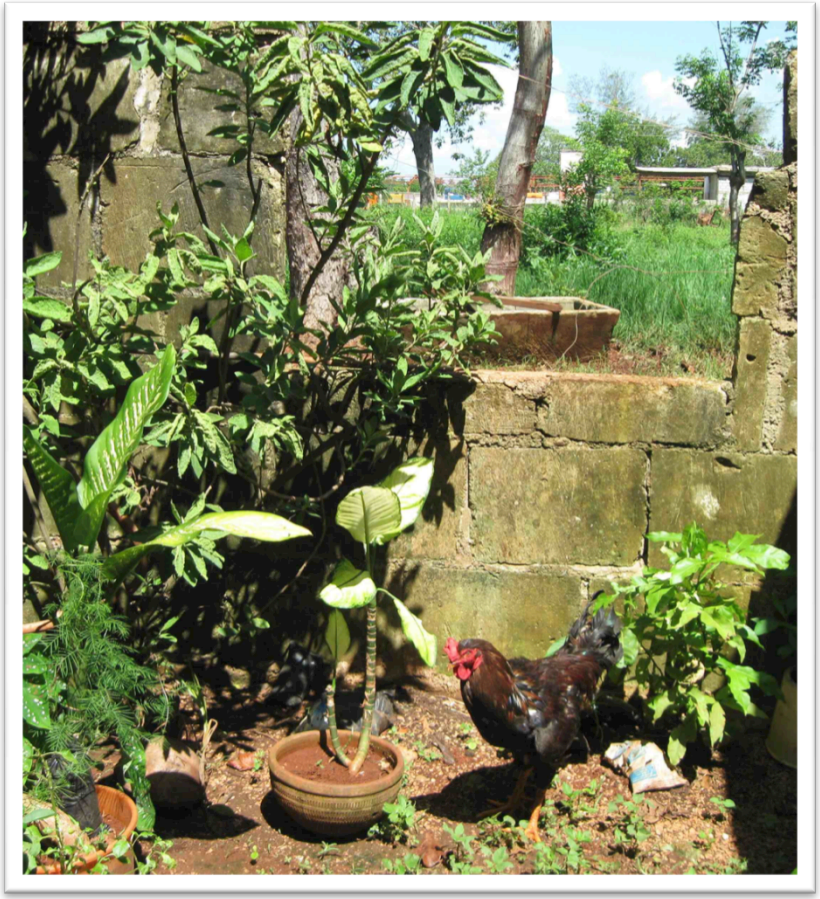

Photo 14: PDP photo taken by Participant 1 of things that support her in farming: Chickens and potted plants –two areas of the farm that she cares for and that bring her joy