A BETTER WORLD IS POSSIBLE: AGROECOLOGY AS A RESPONSE TO SOCIO-ECONOMIC AND POLITICAL CONDITIONS IN CUBA

by

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I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners. I understand that my thesis may be made electronically available to the public.

Abstract

Over the past century global agriculture has come to be characterized by high levels of industrial inputs, as well as increasing consolidation of land ownership and a focus on export-oriented monocrop production. In spite of its dominance, this conventional model of food production has faced growing criticism for being environmentally, socially, and economically unsustainable, and alternatives such as organic agriculture are becoming increasingly popular. The rapid growth of these alternative modes of production raises questions regarding how sustainable food systems should be defined, how they might best be implemented, and how they can contribute to the overall goals of sustainable development.

Cuba is a recognized leader in the adoption of sustainable agriculture. This research examines the Cuban experience in an effort to determine how Cubans who work in the agricultural sector perceive and define agricultural sustainability, who the major actors have been in the shift away from conventional techniques, and what the future challenges and opportunities for agroecology in the country might be. In order to address these questions interviews were conducted with Cubans involved in the agricultural sector at the level of research, education, and extension, as well as with Cuban farmers. In addition, participant observation was carried out during a number of farm visits and while attending agricultural extension workshops.

The results of this study demonstrate that agroecology in Cuba is based on a wide range of techniques, including polyculture, mixed farming, animal traction, organic input use, and a focus on local food networks. For many farmers, the use of agroecological techniques does not reflect a conscious choice on their part. Rather, their production

decisions tend to be driven by a combination of resource shortages and strong state influence at the farm level. Indeed, the shift towards agroecology in Cuba has largely been driven by national level actors, including the state, NGOs, and research institutes. As such, many farmers lack a sense of personal commitment to agroecology, and this may pose challenges for its present and future success. A further challenge is presented by a lack of resources for agroecological development and extension. The opportunity for price premiums in the niche organic market could provide positive economic incentives for Cuban agroecology; however, this would imply shifting back to an export driven agricultural economy, and the degree to which this is desirable or truly sustainable is questionable.

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For Glenna Nelson,
who is with me always.

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List of Acronyms

ACAO *Asociación Cubana de Agricultura Orgánica* (Cuban Association of Organic Agriculture)

ACTAF *Asociacón Cubana de Técnicos Agrícolas y Forestales* (Cuban Association of Agriculture and Forestry Technicians)

ANAP *Asociación Nacional de Agricultores Pequeños* (National Association of Small Farmers)

CCS *Cooperativa de Créditos y Servicios* (Credit and Service Cooperative)

CENSA *Centro Nacional de Sanidad Agropecuaria* (National Centre for Agricultural Health)

CIA Central Intelligence Agency

COMECON Council for Mutual Economic Assistance

CPA *Cooperativa de Producción Agropecuaria* (Agricultural Production Cooperative)

CREE *Centro de Reproducción de Entomófagos y Entomopatógenos* (Centre for the Production of Entomophages and Entomopathogens)

FAO Food and Agriculture Organization of the United Nations

GAO *Grupo de Agricultura Orgánica* (Organic Agriculture Group)

GMO Genetically Modified Organism

IFAD International Fund for Agricultural Development

IFOAM International Federation of Organic Agriculture Movements

IMF International Monetary Fund

INCA *Instituto Nacional de Ciencias Agrícolas* (National Institute of Agricultural Sciences)

INIFAT *Instituto Nacional de Investigaciones Fundamentales en Agricultura Tropical* (The Institute for Fundamental Research in Tropical Agriculture)

INRA *Instituto Nacional de Reforma Agraria* (National Institute of Agrarian Reform)

MINAGRI *Ministerio de Agricultura* (Ministry of Agriculture)

NGO Non-Governmental Organization

SV *Sanidad Vegetal* (Plant Protection)

TNC Transnational Corporation

UBPC *Unidad Básica de Producción Cooperativa* (Basic Unit of Cooperative Production)

UNAH *Universidad Agraria de la Habana* (Agricultural University of Havana)

Chapter 1

Introduction

1.1 The Research Problem

In a world dominated by a productionist paradigm rooted in the industrial revolution, global agricultural production has come to be characterized by massive amounts of industrial and capital inputs, highly specialized monocrop production, rapidly increasing farm sizes, and a vast reduction in the amount of labour required to operate farms (see for example Altieri, 1998; Pretty and Hine, 2001; Lang, 2003). This industrial model of agriculture is designed to maximize profit by increasing productive capacity and reducing costs for both producers and consumers (Ikerd, 2005). Although it is widely practiced around the world, and is supported by powerful industry lobbies and governments, this model is also being criticized by increasing numbers of people who question the degree to which it is socially, environmentally, and even economically sustainable (see for example Bird, 1988; Altieri, 1998; Pretty and Hine, 2001; Carson, 2002). One response to concerns about industrial agriculture has been the organic agriculture movement.[1] Over the past two decades, this movement has been characterized by rapid growth around

[1]The term 'organic agriculture' is a contested one, which is sometimes but not always considered synonymous to sustainable agriculture. In this chapter the terms 'organic', 'sustainable', and 'alternative' agriculture will be used. Later chapters will expand upon the nuanced differences between these terms and explore what terminology is most appropriate for the research being presented.

the world (see for example Goodman, 2000; Vos, 2000; Guthman, 2002). This growth has sparked a heated debate about what organic agriculture means to people, how it should be conceptualized and defined, what practices should be involved, and how the organic food chain should be structured (Buck et al., 1997). Underlying this debate is the question of whether organic agriculture is best viewed as a specific set of production practices based primarily on avoidance of synthetic chemicals, or as a more holistic set of ideological principles related to ideals of environmental and economic sustainability as well as social justice. In other words, is organic agriculture primarily an industry or a social movement? Is it, and should it be, motivated primarily by economic or ideological concerns?

A number of studies have been conducted with these questions in mind. They have addressed issues such as the history of the organic movement, the growth of the organic sector, organic certification bodies and regulatory standards, the structure of organic sectors, and organic producer and consumer motivations (see for example Buck et al., 1997; Fairweather, 1999; Vos, 2000; Hall and Mogyorody, 2001; Kaltoft, 2001; Guthman, 2002; Richardson, 2005). This body of literature is sometimes referred to as the conventionalisation debate, because one of the central issues that it addresses is the degree to which the organic agriculture sector resembles the conventional sector in terms of such variables as farm size and structure, distribution systems, and producer motivations. The conclusions that have been drawn from these studies regarding how organic agriculture is defined, the degree to which conventionalisation has taken place, and the variables that might facilitate or constrain changes in the organic sector have varied from study to study. The one conclusion that the participants in this debate have agreed upon is that the characteristics of an organic sector are highly dependent on the historical, political, economic, social, and ecological conditions of the region in which the agriculture is being practiced. This recognition has led to a call for future research, regarding how organic agriculture is defined and how the sector is structured, to be carried out in various contexts in the hopes that this will create a stronger basis for comparison and generalisabilty of results.

While an attempt has been made to address the need for multiple case studies in various regional contexts, to date these case studies have primarily been conducted in various American states (Buck et al., 1997; Fairweather, 1999; Duram, 2000; Guthman, 2000), Canadian provinces (Hall and Mogyorody, 2001; Loreto et al., 2005; Richardson, 2005), European Union member countries (Tovey, 1997; Kaltoft, 2001), and New Zealand (Coombes and Campbell, 1998; Campbell and Liepins, 2001). The research has thus been focused almost exclusively on Northern contexts, where demand for organic products is generally considered to be concentrated. The literature on the formation, and potential shifting, of definitions of organic agriculture has therefore excluded Southern voices and experiences. This exclusion exists despite the fact that organic imports from the South, particularly coffee, tea, cocoa, cotton, and fruit, are becoming increasingly important in terms of feeding the growing organic demand in the North (Gomez Tovar, 2005), as well as the fact that organic agriculture is increasingly being looked to as an option for sustainable rural development in communities across Latin America, Africa, and Asia (Pretty and Hine, 2001; Carpenter, 2003).

In recognition of the growing importance of organic agriculture in the South, a small number of studies have begun to consider the issue (see for example Raynolds, 2000; Pretty and Hine, 2001; Carpenter, 2003; IFAD, 2003). However, the relatively limited research that has been conducted on organic agriculture in the South has been fairly narrowly focused on how and why organic agriculture may contribute to sustainable development projects and increasing food security, and the ways in which this contribution might be either facilitated or constrained. Broader discussions of how people in the South define organic agriculture, the various levels of motivation that underlie its practice, and how the organic sector is structured have not been thoroughly explored.

1.2 Research Purpose and Scope

This study will address the need for further case study research on how organic agriculture is defined, what motivates its practice and facilitates or constrains its success,

how organic sectors are structured, and the role that contextual variables play in shaping these definitions, motivations, and structures. Specifically, this study will focus on addressing the absence of Southern case studies from current discussions on the above issues. As such, the purpose of the research will be to explore what organic agriculture means to producers in the South, and how this meaning is affected by local context.

In order to address the overall goal of this research, the Cuban agricultural experience was used as a case study. Prior to 1989 the Cuban agricultural sector was characterized by extensive monocropping, high levels of industrial inputs, widespread mechanization, and large scale irrigation (Funes, 2002). Indeed, the Cubans were recognized as having the most industrialized agricultural sector in all of Latin America (Rosset, 1997). However, industrialisation had been highly dependent on support from the Soviet Union and other Socialist Bloc countries. Thus, when the Soviet Bloc began to collapse in the late 1980s, support for Cuban industrial agriculture evaporated, and the country faced a deep economic and food security crisis (Rosset, 1997; Carranza, 2002; Nieto and Delgado, 2002). Part of the Cuban response to this crisis has been the transition toward a sustainable alternative model of agriculture, based on many of the principles of organic farming. As a result, today Cuba is widely recognized as one of the most important global leaders in terms of the adoption of sustainable agriculture, and it has been lauded for translating its shift to organic techniques into successful sustainable development (see for example Chaplowe, 1998; Enriques, 2000; Pretty and Hine, 2001; Levins, 2002). The unique progress that Cuba has made in terms of moving towards a sustainable agricultural sector makes its experience worthy of close attention. Because it is a Southern nation, the Cuban experience also offers the opportunity to address the lack of research on organic agriculture in the South.

Because of the recognition that Cuba has received for its advancement of sustainable agriculture, the case has received a fair amount of attention in the literature. However, research on sustainable agriculture in Cuba has generally avoided any in-depth discussion about the motivations and beliefs that affect how Cuban producers, consumers, and policy-makers engage in agricultural transition. In addition, the ways in which Cuba has

been able to overcome some common constraints on both the adoption of sustainable agriculture and on its incorporation into a sustainable development strategy (including rural poverty, lack of agricultural education, insecure land tenure rights, and inadequate institutional support) have not been sufficiently examined. Instead, much of the research on Cuban agriculture has fit the general pattern of research on sustainable agriculture, which has tended to focus on specific production methods and techniques from the perspective of agronomy and has only recently begun to do justice to questions of how social and political context affects the agricultural sector (Pretty and Hine, 2001).

It is hoped that this research will enrich the ongoing debate about what sustainable agriculture means to producers and consumers, as well as to society in general. As well, the Cuban case study will provide an additional point of reference for comparative discussions regarding organic agriculture in various contexts, in terms of both its meaning and its connection to sustainable development. Because the Cuban case will form the basis of the study, it is hoped that the results will offer some insight into the potential future of sustainable agriculture there, particularly in the event that the American embargo is lifted and industrial inputs become more readily available. This insight may be useful to policy makers in both government and non-governmental organisations who would like to try to maintain the advances in sustainability that have been achieved through the shift away from conventional agriculture. In a broader sense, an in-depth study of how the Cubans, who have been notably successful in their adoption of sustainable agriculture, perceive and define agricultural sustainability could provide information for agricultural policy makers and organic advocates in both the North and South.

1.3 Research Objectives

This research has five main objectives:

1. To assess the extent to which Cuban producers practice organic techniques and define their own production as organic;

2. To explore the motivations of Cuban producers for using non-conventional production methods;

3. To determine the degree of commitment that Cuban producers have to the practice of alternative agricultural methods;

4. To identify the role that government and non-governmental organisations have played in the transition away from conventional production in Cuba, as well as the motivations of these actors;

5. To determine factors that either facilitate or constrain the development of alternative food production systems.

1.4 Making a Contribution to Development Geography

In addition to the specific research objectives addressed in this thesis, the work seeks to make a contribution to the general field of development geography. Bebbington (2002: 298) has argued that an essential goal for research within this discipline should be the analysis of development "as an arena in which diverse actors (operating from different places and at different scales) struggle to rework the balance of control over and transformation of diverse types of resources ..." Central to this form of analysis are the four interrelated concepts of place, livelihood, scale, and network (Bebbington, 2002).

As noted above, contextual factors such as local history, culture, and climate are central to the shaping of sustainable agricultural systems (Guthman, 2000). This point is stressed by Vos (2000: 251), who argues that organic agriculture focuses on "the socio-ecological relations of production, which are rooted in the specificity of place" and is highly dependent on place based local knowledge and ecological particularity. Perhaps even more important for the work presented here are the notions of scale and network, as they are deeply related to the question of how sustainable agricultural systems should be

defined and how they might best be achieved. Specifically, many argue that small scale farms are inherently more consistent with organic production (see for example D'Souza and Ikerd, 1996; Guthman, 2000; Vos, 2000), and that local production and consumption networks should be the focus of sustainable food systems rather than transnational networks of food trade (see for example Rigby and Cáceres, 2001). In terms of the Cuban case specifically, the scale at which various actors (the state, NGOs, and producers) are able to shape agricultural systems is an important part of a discussion on how sustainable agriculture has been adopted. In addition, in contrast to Bebbington's (2002: 299) definition of development as the "progressive expansion of [institutional and economic] networks and relationships linking people and places across increasingly wide distances," the Cuban shift towards sustainable agriculture has been marked by a reverse trend of focusing on the development of endogenous networks, as international networks (particularly those related to trade) have been limited for political reasons.

1.5 Organization of the Thesis

This thesis is organized into eight chapters. Chapter 2 reviews the relevant literature in order to provide a theoretical framework within which research results can be interpreted. Drawing on the notion of political ecology, definitions of organic agriculture are explored as are motivations for its practice. Chapter 3 elaborates on the case study introduced above, presenting contextual information that serves as a background for the research results. The research design and methods are explained in Chapter 4. The results are then presented and analyzed in Chapters 5, 6 and 7. Chapter 5 examines how the notion of agricultural sustainability is perceived and defined in Cuba. Chapter 6 explores the manner in which agricultural development has occurred in Cuba, with a particular focus on the role of the state in institutionalizing agroecology. Finally, Chapter 7 presents some of the challenges and opportunities for the future of sustainable agriculture in Cuba. Chapter 8 provides some concluding thoughts as well as recommendations drawn from the research findings.

Chapter 2

Literature Review: Exploring the Concept of Sustainable Agriculture

2.1 Introduction

This chapter explores the literature relevant to the research question, in an effort to provide a framework within which the research results can be situated. In order to develop this framework, several themes will be examined. First of all, the theoretical perspective of political ecology will be introduced as a lens through which much of this chapter, and this thesis, can be viewed. The development of this paradigm will be discussed, with particular attention given to the relationship between political ecology and agricultural research, and to an examination of some alternatives to a global capitalist world economy. Following this fairly broad theoretical introduction, the literature regarding the contested nature of the term 'organic agriculture' will be explored. This discussion will include a review of debates in the literature concerning organic standards and philosophies, the growth of organics (i.e. organic production, distribution and consumption networks) and conventionalisation, and the motivations that underlie the development of the organic sector. Thirdly, organic agriculture will be considered in terms of its relation to development, particularly in a Southern context. The linkages between organics and the sustainable development paradigm will be outlined, with a focus on the notions of

conservation and participation.

2.2 Political Ecology and Agricultural Research

A useful starting point for developing a framework in which the research can be situated is with an introduction to the school of thought known as political ecology. Although the political ecology paradigm is broad and complex, encompassing a variety of viewpoints, at its core is the notion that deep connections exist between political and economic structures and the processes of environmental change (see for example Bryant and Bailey, 1997; Robbins, 2004). This concept began to emerge within the disciplines of anthropology, geography, development studies, and environmental studies in the 1980s, largely as a response to dominant theories regarding environmental destruction. In particular, political ecology seeks to critique the modernization paradigm, which tends to view environmental degradation as a result of underdevelopment and improper or insufficient adoption of modern technologies, and the ecoscarcity paradigm, which is based on the Malthusian belief that population growth, particularly amongst the poor, is the root cause of environmental damage (Robbins, 2004). Both the modernization and the ecoscarcity arguments place the blame for environmental problems primarily on the shoulders of the poor, and the resulting policies aimed at environmental protection have generally focused on economic growth and population control (Robbins, 2004).

In contrast to the traditionally accepted view that poor people destroy nature as a result of high population and underdevelopment, political ecology looks to the role that political economy plays in creating environmental change, and explores the ways in which structural inequalities, in terms of both income and power, shape human behaviour towards the environment (Gray and Moseley, 2005). Drawing on Marx's critique of political economy, political ecologists stress the need to analyze how people make resource use decisions at a local scale, and how these decisions are affected by the broader political economic climate in which they are made. Like Marxism, political ecology is also based on a set of normative assumptions and political positions, and political ecologists are

generally explicit about these positions in their work (Robbins, 2004). Rather than attempting to claim objectivity (as proponents of modernization and ecoscarcity theories usually do), political ecologists readily admit the political nature of their research, and are clear about the fact that it is based "on the conviction that our current way of life is unsustainable, and that if our grandchildren are to inherit a world worth living in then we are going to have to radically change the way we live and the way we relate to the rest of nature in general" (Atkinson, 1991: 13).

In an effort to explore both the root causes of the unsustainable way of life described by political ecologists, and some potentially more sustainable alternatives, research from the political ecological perspective has focused heavily on the study of agricultural issues, and as such is of particular relevance to this thesis. One important subject of analysis for political ecologists has been the Green Revolution, and the processes by which governments and agribusiness brought high yielding seed varieties, fertilizers and pesticides, and other modern industrial agricultural techniques to the traditionally low input producers of the South (Low and Gleeson, 1998). Systems of land tenure have also been carefully considered by political ecologists for their role in influencing farming practices, and particularly for the way inequitable land tenure arrangements can contribute to soil erosion (Blaikie, 1985; Grossman, 1997; Foster and Magdoff, 1998). At a more micro level, political ecological studies have examined how individuals make decisions about land management, farm technology, pesticide purchasing and application, and the hiring of labour (Awanyo, 2004; Robbins, 2004). However, even when research is focused on micro level case studies, political ecologists usually integrate their case study findings into a discussion about how decisions made by local producers are influenced by regional, national, and international policies (such as the implementation of Structural Adjustment Policies, or SAPs) and by global commodity markets (see for example Awanyo, 2004; Vasquez-Leon and Liverman, 2004; Moseley, 2005). As such, the political ecological perspective is extremely useful for geographical research which, as noted in the introduction, seeks to explore how actions and events at one scale can impact decisions and outcomes on either a more micro or more macro level (Bebbington, 2002).

The results of this kind of analysis have led many political ecologists to conclude that it is not the poor, but rather the world political and economic system created by international capitalism, that is the ultimate force behind large scale environmental degradation (Atkinson, 1991; Altieri, 1998; Moseley, 2005). As Pepper (1993, cited in Low and Gleeson, 1998: 169) puts it: "Social justice ... or the increasing global lack of it, is the most pressing of all environmental problems." Political ecologists have thus criticized mainstream environmental programs for their lack of attention to issues of power and political economy, and many argue that a radical change in the current global capitalist system will be necessary for true environmental sustainability to be achieved (see for example Bryant and Bailey, 1997; Low and Gleeson, 1998).

In terms of the agricultural sector more specifically, Levins (2002: 277) argues that capitalism inherently undermines sustainable production and is responsible for the economic, social, and environmental "plunder of the countryside." This occurs partly because the capitalist market system does not allow for consideration of factors other than price in decision making processes (Flora, 2001). Under capitalism, land, labour, and food are all viewed as commodities, which are traded on the basis of short-term profit maximization, rather than on the basis of ecological wisdom, social justice, or long term economic viability (Bird, 1988; Callicott and Lappé, 1988). As well, because the closed-systems approach, which is vital to long term farm sustainability, is based on recycling materials and minimizing input purchasing, it is discouraged by the consumption-driven capitalist spirit (Bird, 1988). This spirit, which has contributed to the explosion of the agrochemical industry, is also at the core of the current system of global agricultural trade, in which many Southern countries specialize in producing raw agricultural materials for export to the North (Foster and Magdoff, 1998). In a discussion of Mali's agricultural sector Moseley (2005: 53) notes that, rather than poverty causing environmental problems, "soil degradation seems to be more clearly linked to the technological package of export-oriented cotton production as well as the wealth spin-offs of this production." Thus, in addition to elevating price and profit beyond all other decision making considerations, and discouraging recycling of materials, capitalism has also created conditions in which

export-oriented production flourishes at the expense of environmental sustainability.

2.2.1 Alternatives to the Global Capitalist Paradigm

It has been argued, based on some of the concerns raised above, that a socialist world-view may be theoretically more compatible with sustainable agricultural systems than a capitalist perspective (see for example Foster and Magdoff, 1998). However, in practice Socialist agriculture has tended to follow the Soviet model of large scale, highly mechanized, input intensive operations that conform to the productivist tradition.[1] As such, the notion of a capitalist/socialist dichotomy in terms of agricultural sustainability (or lack thereof) may not be entirely appropriate. Instead, it may be more useful to look to alternatives outside of the traditional frameworks of a strictly capitalist or socialist world-view. For example, Barkin (1998, 2002, 2006) argues that increasing regional resource management, based on the notions of local autonomy, self-sufficiency, and productive diversification, offers an important avenue for pursuing sustainable rural development by decreasing dependence on dominant patterns of capitalist globalized trade. Drawing on examples from across Latin America, Barkin (1998: 31) notes a growing trend towards recognition that "globalization promises only poverty and despoilation" (Barkin, 1998: 31) and a corresponding movement of people "retreating into more insular patterns [of economic activity] to exercise control over the ecosystems that they are called on to husband, to produce more of their own basic needs, and to diversify productively so that they do not have to close themselves off to the world economy" (Barkin, 2002: 132) but can participate in it on their own terms. This model falls outside of current capitalist trends and provides a potentially more sustainable framework, not only for agricultural production, but for the overall organization of the global economy.

[1]It has been argued that the Soviet model of Socialism is not reflective of true socialist ideals, and as such is best conceptualized as a form of bureaucratic state capitalism (Djilas, 1957). This could help to explain why so-called Socialist agriculture, as practiced according to the Soviet model, exhibited the same environmentally destructive patterns as conventional capitalist agriculture.

2.3 Defining Organic Agriculture

2.3.1 A Rationale for Alternative Agricultural Production

As evident from the above discussion regarding political ecology, environmental degradation is viewed by increasing numbers of academics as a subject of deep concern that must be addressed not only by scholarly analysis, but also through substantial shifts in societal priorities and structures. Of particular concern to many political ecologists has been the way in which agricultural systems have become unsustainable as they have developed within the global capitalist political economy. This concern is shared by many people around the world, who are dissatisfied with conventional agriculture and have serious questions about its long term ecological, economic, and social sustainability (see for example Bird, 1988; Kaufman, 1988; Altieri, 1998; Duram, 2000).

Some of the environmental problems that have arisen as a result of industrial agriculture's heavy reliance on chemical fertilizers and pesticides include salinization and contamination of soil and groundwater, declining soil fertility, increasing pest resistance, and human health problems (Ikerd, 1993; Altieri, 1998). However, for many people the problems that have been directly caused by dependence on agrochemicals are only one example of the destructive nature of modern industrial agriculture. Other concerns include the fact that the highly specialized monocrop production that tends to characterize conventional agriculture decreases the genetic base and natural soil fertility, and in so doing increases vulnerability to pests, diseases, and nutrient deficiencies, thereby deepening dependencies on chemical application (Rigby and Bown, 2003). In addition, non-renewable energy use and export driven production add to the environmental costs of industrial farming. As Rigby and Bown (2003) point out, the emissions produced from the production, processing, packaging, and distribution of food are a major source of global greenhouse gases. Despite the agriculture industry's ability to externalize these environmental costs, many farmers are still dependent on subsidies and price supports for their survival, and the industrial model is blamed by many for an overall decline in rural quality of life, providing further evidence of the unsustainable nature of conven-

tional farming (Ikerd, 1993). Thus, the problems with the conventional model that have motivated a search for alternatives are not necessarily limited to the use of synthetic chemicals, but for many people relate to the entire structure of the conventional system.

Another widely critiqued element of this conventional system is its deep integration with food and agrochemical transnational corporations (TNCs) (see for example Bird, 1988; Allen and Kovach, 2000; Ikerd, 2005). It is argued that the dominance that TNCs have achieved in terms of controlling agricultural trade networks puts too much power in the hands of entities that tend to place a higher priority on profit maximization than on environmental or social sustainability, favouring cost effectiveness over the precautionary principle. This can have a very direct effect on global environmental management. For example, Clapp (2003) notes that the influence of agricultural TNCs has sometimes resulted in watered down environmental treaties, as companies like Monsanto, Dupont, and Syngenta have taken part in negotiations (either directly or through industry lobby groups). The effects of agricultural TNCs' power have been particularly evident with regards to genetically modified organisms (GMOs) as, for example, TNC pressure was cited as the primary reason for Brazil's 2003 policy shift that lifted a ban on GMO seeds (NACLA, 2003). Indeed, the developing world may be particularly vulnerable to the power of TNCs, as environmental regulations there tend to be relatively new, and enforcement can be difficult due to a lack of state capacity and pressure to attract foreign investment (Clapp, 2005).

One way in which the above concerns about conventional agriculture have been addressed has been the organic agriculture movement. The term 'organic agriculture' first came into use in the 1940s in North America, Europe, and Japan, to refer to production without the use of synthetic chemicals (Vos, 2000). Today there are many interpretations regarding the meaning of organic agriculture. As Vos (2000: 250) notes, "there exists a continuing dialogue encompassing multiple and heterogeneous organic food and farming constituencies" and this makes defining the term concisely or definitively problematic. The literature does, however, make an effort to address this problem, as an exploration of what organic agriculture means to different people and in different contexts is an essential

part of achieving a deeper understanding of how organic farming systems function.

2.3.2 Certification Standards

One way of defining organics is to use the regulatory frameworks provided by certifying bodies such as the Organic Crop Improvement Association International (OCIA-I) or the United States Department of Agriculture (USDA). These regulations tend to focus on allowable inputs and practices, for example by providing lists of restricted substances such as chemical fertilizers and pesticides, genetically modified organisms, and sewage sludge (Vos, 2000). Thus, organic agriculture can be defined as food and fibre production without the use of synthetic chemicals or other inputs and practices that are disallowed by certifying bodies. These prohibited inputs and practices vary somewhat depending on the regulatory body, but their general aim is to address specific environmental concerns associated with specific industrial agricultural methods, particularly the application of agrochemicals to soil and crops.

The coherent definition of organics provided by regulations has been lauded for creating a barrier against farms that would fraudulently attempt to enter the organic market, and for setting a standard that provides consumers with access to information about production processes (Allen and Kovach, 2000). However, the definition of organics that is drawn from regulatory standards has also been criticized for breaking down the organic paradigm into its component parts and, in the process, failing to capture the essence of the organic ideal (Allen and Kovach, 2000; Kaltoft, 2001). As Rigby and Bown (2003: 5) explain, "standards are far more able to refer to prohibited inputs than to deal with precise criteria for the assessment of whether producers are acting in a manner which is socially just or ecologically responsible." Thus, the regulatory definition of organic agriculture offers an input substitution model in which chemical inputs are replaced with biological ones, leaving the overall structure of agricultural systems (including the trend towards monoculture, increasing farm size, and widespread mechanization) in tact. While this certainly addresses some of the problems associated with the overuse of agrochemicals, the input substitution model of organics takes a "relatively benign view of capitalist

agriculture" and in so doing "negates the existence of economies of scale in agriculture and ignores the political power of agribusiness corporations and current trends set forth by globalization" (Altieri, 1998: 71).

2.3.3 An Organic Philosophy

Building on his critique of both conventional agriculture and the input substitution model of organics, Altieri (1998: 71) calls for a radical transformation of the agricultural sector, "guided by the notion that ecological change in agriculture cannot be promoted without comparable changes in the social, political, cultural, and economic arenas that also constrain agriculture." This notion of organic agriculture as part of transformative societal change, and the related idea of viewing organics as an ideal or philosophy that extends beyond the restriction of particular inputs, was somewhat implicit in the early works of proponents of organic agriculture, such as Rudolf Steiner, Albert Howard, and Lady Eve Balfour (Ikerd, 1993; Vos, 2000). In his call for a land ethic based not just on environmental concern or economic considerations, but on a much more holistic ideal of "love, respect, and admiration for the land" and for all those who rely on it for survival, Aldo Leopold expressed the concerns of the organic pioneers of the 1940s (Leopold, 1949 cited in Kaufman, 1988: 76). A little over a decade later, in her watershed work on the dangers of agricultural chemicals, Rachel Carson (2002: forward) added her voice to the call for a shift in society's philosophy of nature, citing E.B. White: "Our approach to nature is to beat it into submission. We would stand a better chance of survival if we accommodated ourselves to this planet and viewed it appreciatively instead of sceptically and dictatorially." Thus, beyond advocating agricultural production without synthetic chemicals, some of the early critics of industrial agriculture advocated organics as a holistic alternative perspective on society-nature relations that starkly opposed the productionist ethic that became increasingly dominant in post-war Western society (Vos, 2000; Carson, 2002).

Today, while many variations of organic philosophy exist, the majority of them still incorporate an alternative vision of society-nature relations that has come to be framed by

three interrelated guiding principles: ecological soundness, economic viability, and social justice (see for example Ikerd, 1993; Flora, 2001; IFOAM, 2006). Within this framework society is viewed as working with nature, as opposed to attempting to overcome or conquer it. As well, there is recognition that human well-being is dependent on the well-being of other species, as well as on the well-being of human society as a whole (Ikerd, 1993). Members of the organic movement who have internalized this philosophical perspective regarding the 'right' relationship between people and the land, people and other species, and amongst people themselves, can be said to be part of what Ikerd (2005) has dubbed the "deep organics" movement. This term makes allusions to the notion of deep ecology, which distinguishes itself from more 'shallow' manifestations of environmentalism, and advocates a radical shift in human consciousness based on an ecocentrist philosophy (Devall, 2001).

As is the case with deep ecology, the broad ethical principles associated with deep organics are not easily defined, and thus cannot be readily translated into specific production practices. Because a model of organic agriculture that seeks deeper and more radical change than the input substitution model is difficult to enshrine in a concise regulatory framework, it is argued that the most appropriate way to perceive organics is as a lifestyle, belief system, set of values and ethics, or philosophy (see for example Vos, 2000; Hall and Mogyorody, 2001; Ikerd, 2005). This philosophy is based on the desire "to create integrated, humane, environmentally and economically sustainable production systems, which maximize reliance on farm-derived renewable resources and the management of ecological and biological processes and interactions, so as to provide acceptable levels of crop, livestock, and human nutrition, protection from pests and disease, and an appropriate return to the human and other resources" (Lampkin, 1994, cited in Rigby and Bown, 2003: 3). This definition forms the core for an organic belief system that is much broader and more holistic than the relatively concise and specific guidelines set out by organic regulations.

However, while the notion of deep organics, or an organic philosophy, offers a radical critique of conventional agriculture that resonates with many people, it tends to fall

short in terms of providing the kind of prescriptive solutions that are part of the appeal of the input substitution model. As Pepper (1993, cited in Bryant and Bailey, 1997: 4) notes, this problem is common to many movements seeking radical change, which "can be criticized either for not suggesting a coherent and feasible action programme, or . . . for being naïve and/or anodyne about what could and should be done." He goes on to explain that this occurs in part "because liberal-capitalist assumptions about the purpose of life and how to live it have gained such hegemony that any attempt to move towards a society based on alternative assumptions does seem either undesirable or futile." Thus, advocates of deep organics face significant challenges in terms of implementing ideas about organic production that extend beyond regulatory based input substitution.

2.3.4 The 'Conventionalisation Debate'

Despite the difficult nature of translating an organic philosophy into a set of actions, some ideas do exist regarding how this could be approached. Notably, based on an idea of organics as a comprehensive philosophical ideal, organic agriculture tends to be associated with the promotion of small scale, family farms that show a preference for mixed farming, and locally based input and distribution systems (Hall and Mogyorody, 2001; Rigby and Bown, 2003). While these characteristics held true in the early days of organic agriculture, the rapid growth of the organic market since the 1980s has led to a shift in the make-up of the organic community and has sparked a heated debate about the meaning of organics (Buck et al., 1997). This debate has been dubbed the 'conventionalisation debate' because of the concern amongst some that organic agriculture is increasingly resembling conventional industrial agriculture in terms of its structure and outlook on society-nature relations (see for example Buck et al., 1997; Goodman, 2000; Guthman, 2002).

The central argument of those who criticize conventionalisation is that it brings the productionist ethic, which organic agriculture initially sought to reject, to organic food and fibre production, and threatens to dilute the more progressive aspects of the organic movement (Goodman, 2000). Thus, as organics scales up from a niche market to an

industry, it is increasingly common for production to be characterized by large scale agribusinesses that focus on intensive monocrop production, which is often processed and sold in remote locations (Rigby and Bown, 2003). Within this framework, organics can be defined according to the certification standards discussed above, but not in relation to the philosophical underpinnings of the organic movement, and there is a possibility that some of the important social and environmental benefits of organic production may be subsumed in the quest for profit maximization.

Those who are concerned about conventionalisation argue that the increasing involvement of agribusinesses in organic production, processing, and distribution sets conditions that "undermine the ability of even the most committed producers to practice a purely alternative form of organic farming" (Guthman, 2004: 302). Allen and Kovach (2000: 225) explain that "flat or falling profits that result from competition will tend to force farmers, input suppliers, processors, and retailers to speed up production, cut costs, and increase the rate of product sales." Thus, while a small group of deeply committed organic farmers may do their best to resist the market competition, many will be forced by economic imperatives to intensify production regardless of the environmental or social costs this incurs. For example, organic producers are often pressured to give up practices such as non-cash crop intercropping, which increases soil fertility but does not directly translate into profits, or to hire migrant labour in order to save wage expenses (Guthman, 2000). This reality reinforces the notion that local production decisions cannot be viewed in isolation of the broader political economic context in which they are made.

Aside from the direct way in which market incentives may alter organics, the growing market has also led to greater institutionalization of the organic sector, which has implications for the meanings of organic agriculture. As noted above, organic standards have been criticized for their inability to capture the essence of the organic ideal. However, a harsher criticism is that they may actively suppress the broader ideological aspects of the organic movement, which are seen as threatening to the dominant structures of industrial capitalist society (see for example Vos, 2000; Goodman, 2000; Kaltoft, 2001; Rigby and Cáceres, 2001). Thus, when governments seek to institutionalize organic agriculture

through the creation of standards they "wrench the production practices free from [the ideological content of the movement] and slot them into a different context in which they do not in fact fit at all easily" (Tovey, 1997:33). The result is that "the original radical view of nature, including a view of nature as subjective, leaving the farmer with a moral responsibility for the soil, is abandoned in favour of a modern view of organic farming as a technical means of solving environmental problems ... as a more efficient way of controlling nature" (Kaltoft, 2001: 152). The definition of organics that is created through these standards is therefore one that is suitable to industrial organics and is conducive to the development of a large scale and highly productive organic industry modeled along the lines of conventional farming. It is not a definition that explicitly protects more ideologically committed farmers, but rather one that may threaten their survival.

2.3.5 Motivations that Underlie the Organic Sector

For many people, involvement with organic agriculture is a value-based lifestyle choice that is motivated by a complex set of personal ideological convictions (Loreto et al., 2005; Richardson, 2005). In the case of these actors, farming organically or consuming organic products has less to do with specific organic production practices or techniques, and more to do with an overall perspective regarding nature-society and social relations. In addition to being some of the most committed advocates of organics, these are also the people who most strongly object to the possibility of the conventionalisation of organic agriculture (Ikerd, 2005). For them, organic agriculture is partly about avoidance of chemicals, but it is also often about other methods such as mixed cropping, intercropping, renewable energy and nutrient cycling that all help to increase biodiversity and soil fertility, improve soil structure, decrease pest vulnerability and reduce levels of salinization and nitrate leaching (Allen and Kovach, 2000; Rigby and Bown, 2003). Furthermore, many of these organic proponents believe that organic farming is about the revitalisation of rural communities and the survival of small scale family farms (Ikerd, 2005). Thus agriculture that avoids chemicals but adopts other aspects of the conventional system such as export orientation and monocropping is viewed in a negative light.

On the other end of the spectrum are those who become involved in organic agriculture primarily due to market incentives such as price premiums. For these people, the conventionalisation of the organic sector poses few ideological problems, and indeed may be considered a good thing as it increases possibilities for profits, at least in the short term (Rigby and Bown, 2003). Studies have suggested that many of the multinational corporations that have bought organic subsidiaries explicitly reject the ideological content of the organic movement, and focus their marketing strictly on health conscious consumers, rather than on environmentalists or social justice advocates (Rigby and Bown, 2003). These health conscious organic consumers also tend to be accepting of conventionalisation because their primary concern is to avoid consuming chemical residues. A brand of organics based on this set of motivations may reduce problems of chemical contamination, but will not necessarily address some of the other issues with which organic production is often associated. Instead, it could be viewed as part of the 'green consumerism' or 'green capitalism' movement, which has been criticized for not going far enough in its critique of the root causes of environmental problems (Atkinson, 1991).

Although in some ways there is a stark contrast between the more ideologically motivated members of the organic movement, and those who are driven more by economic or personal health concerns, in many cases the motivations for involvement in organic agriculture are multiple and layered, mirroring the complexity of the entire conventionalisation debate. Despite Fairweather's (1999) categorization of producers as being motivated by either commitment or pragmatism, most may be somewhere along this spectrum. Even the most ideologically committed farmers cite profit as one element in their desire to produce organically, and even the largest, most market-oriented organic agribusinesses tend to demonstrate at least some concern for the environmental and social effects of conventional agriculture (Hall and Mogyorody, 2001). The same holds true for consumers, whose motivations for purchasing organic products range from individual health concerns to broadly ideological and political positions, but are most often a combination of the two (Campbell and Liepins, 2001). Thus, those who participate in the conventionalisation debate, or in the more general discussion on the motivations that underlie the

practice of organic agriculture, should take care not to oversimplify the issues, or leave the impression that categories such as 'conventional organics' and 'alternative' or 'deep organics' are clearly defined and mutually exclusive.

2.3.6 The Importance of Context

Duram (2000: 36) argues that "organic farmers act in response to their individual context, rather than as a uniform theoretical type." This sentiment is echoed by Allen and Kovach (2000: 223) who suggest that organic practices are the "product of historically specific social formations, with particular ecological, economic, and political characteristics." Thus the way organic agriculture is defined, the degree to which it may be subject to conventionalisation, and the motivations that underlie its practice are highly context-specific and will vary depending on both time and place (see for example Coombes and Campbell, 1998; Vos, 2000; Kaltoft, 2001; Rigby and Cáceres, 2001). The above discussion on defining organics sought to synthesize some of the commonalities that can be found in the literature as well as to present some of the major debates; however, the literature makes clear that more research is needed on organic agriculture in different contexts to provide a stronger basis for comparison and analysis (Hall and Mogyorody, 2001). Particularly noticeable is that the literature discussed above regarding defining organics relies almost exclusively on research done in the Northern contexts of North America, Europe, and New Zealand. Organic agriculture is also an important issue in the South and its relation to development will be discussed below.

2.4 Organic Agriculture and Development

2.4.1 Problems with Conventional Agriculture in the Global South

Although the industrialized world has more thoroughly adopted the industrial model of agricultural production, it has also been widely adopted across the South, largely as a

result of large scale international development efforts (e.g. the Green Revolution), and the evolution of transnational agribusiness (Bryant and Bailey, 1997; Pugliese, 2001; Carpenter, 2003). While the critical problems associated with this production paradigm were discussed above, many of them have been found to be even more pronounced in the South, where the exploitation of both environmental and human resources caused by industrial agriculture has been particularly dramatic (Raynolds, 2000).

Pugliese (2001) and Carpenter (2003) note that the importation of Western-style agriculture has been carried out in a top-down manner, regardless of local socio-ecological contexts and has led to the disempowerment of local rural institutions, decreasing socio-economic stability, and widespread environmental degradation. These symptoms run parallel to the experiences of Northern farmers; however, rural producers in the South often suffer from additional threats (including food insecurity, poverty, debt, and a lack of strong environmental and social regulations and supports) that increase both their socio-economic vulnerability and the vulnerability of their environments (Pretty and Hine, 2001; Carpenter, 2003). As well, lack of effective training programs and economic pressures may lead some producers to inappropriately or ineffectively apply industrial agricultural inputs (Carpenter, 2003). The position of Southern producers is made even more difficult as they compete in a global market that is heavily influenced by protectionist agricultural policies of Northern countries (IFAD, 2003).

2.4.2 The Sustainable Development Paradigm

The development policies and programs that brought industrial agriculture to the South were part of a broader set of post-World War II development strategies influenced by what is now referred to as the modernization paradigm (Nederveen Pieterse, 2001). Within this framework, processes that had developed in the North, and were viewed as contributing to its prosperity, were imported to the South in a top-down manner under the assumption that a linear path to development was possible. This linear path required modernization of technology as well as social, political, and economic structures based on the model of Modern Western Civilization, and development success was measured primarily in

terms of macroeconomic growth (Nederveen Pieterse, 2001). In terms of agricultural development, the primary goal was the maximization of total yields in an attempt to improve food security.

Following decades of development efforts based on modernization theory, a new alternative paradigm began to emerge. This new paradigm was partly a response to the social and economic injustices that modernization projects were believed to be causing, and to the increasingly obvious fact that reducing food security had at least as much to do with local distribution and livelihoods as it did with overall productivity (Wilson and Rigg, 2003). However, one of the primary motivations for change was the environmental destruction that resulted from the push to industrialize Southern countries, and particularly their agricultural sectors (Nederveen Pieterse, 2001). Out of these concerns grew the concept of sustainable development, which was famously described in the Brundtland Report as "development that meets the needs of the present without compromising the ability of future generations to meet their needs" (WCED, 1987: 8). Bell (2000, cited in Dwivedi et al., 2001: 219) explains that this idea "presents a new paradigm for decision making in all sectors of society and at all levels from the global to the local. [The sustainable development paradigm] challenges existing decision making practices insofar as it demands both the integration of economic, environmental, and social considerations, and attention to the long run consequences for future generations of present-day decisions and policies."

2.4.3 Organic Agriculture and Sustainable Rural Development

It was within the framework of the sustainable development paradigm that organic agriculture began to emerge as a viable development option in the 1990s (Pugliese, 2001; Carpenter, 2003). Based on the above description of sustainable development, it is readily apparent that organic agriculture is a related concept, as both notably share a commitment to the three interrelated concepts of economic, environmental, and social sustainability. Due to issues regarding certification that will be discussed below, the International Fund for Agriculture and Development (IFAD) defines organic agriculture

as "a farming system employing management practices that seek to nurture ecosystems capable of achieving sustainable productivity ... We can speak of small farmers using organic agriculture ... whether or not it has yet been officially certified as such" (IFAD, 2003).

Using this definition, it has been noted that, although further research is needed on the subject, organic agriculture in the South tends to be dominated by small-scale peasant producers (Pretty and Hine, 2001; IFAD, 2003). This may be because they have a tradition of farming in a way that equates to, or at least approximates, organics and will therefore face few, if any, major changes when adopting organic methods (IFAD, 2003). In contrast, larger farms and agribusinesses that have a history of reliance on chemical and capital inputs and low labour requirements must contend with significant structural changes if they choose to make a transition to organic production (IFAD, 2003). The heavy involvement of small scale peasant producers in organic agriculture is one way that the organic sector has potential to contribute to sustainable rural development. Pugliese (2001) suggests four more specific ways in which the two concepts are related: innovation, conservation, participation, and integration. These four themes will now be used to structure a discussion of the literature on organic agriculture and rural development.

2.4.4 Innovation

In this context, innovation is used to refer not to technological advances, but to a mental attitude that is conducive to creative problem-solving and decision making at both the farm and institutional levels (Pugliese, 2001). This attitude, which must be rooted in a deep understanding of local conditions, is regarded as an essential element of both successful organic farming and sustainable development initiatives (Pugliese, 2001; Pretty and Hine, 2001). Like their counterparts in the North, Southern organic producers have proven to be creative innovators, as they have developed endogenous agricultural solutions such as the hybridization of locally suitable seed varieties (Carpenter, 2003). This sort of innovation was specifically rejected by Green Revolution development policies, but is encouraged in the sustainable development context. By promoting local innovation,

the development of organic agriculture can help shift the center of decision-making power from global actors such as transnational agribusinesses and development institutions, to a more micro scale based within individual communities. This provides an opportunity for local Southern producers to be viewed as experts, capable of playing an essential role in their own development, rather than as objects of exogenous development projects, incapable of creating their own solutions.

2.4.5 Conservation

Within the context of a discussion about organic agriculture and sustainable development, conservation refers not only to environmental protection, but also to the conservation of vibrant rural communities and cultural identities (Pugliese, 2001). For reasons outlined above, organic agriculture clearly contributes to the environmental conservation that is an essential part of sustainable development. In case studies around the world, adoption of organic agriculture has been proven to improve soil fertility, and to reduce negative health impacts on farmers who had suffered problems while working with chemical inputs (Pretty and Hine, 2001; Carpenter, 2003; IFAD, 2003). Environmental conservation associated with organic farming has also had important benefits for rural communities in general, as it has reduced soil erosion, increased biodiversity, and decreased the amount of toxic chemicals that leach untreated into the land, and can contaminate both soil and water (IFAD, 2003).

In addition to the environmental conservation possibilities associated with organic agriculture, organic production systems can also contribute to the conservation of rural jobs and to increases in rural incomes, thus improving the viability of rural communities and helping to ease urbanization pressures (Pugliese, 2001). These socio-cultural and economic benefits are possible partly because organic production has been shown to increase food security, and thus reduce the need for off-farm income, when it is practiced by farmers who produce at least partly for subsistence (Pretty and Hine, 2001; Carpenter, 2003). As well, because of its labour intensive nature, adoption of organic agriculture can help absorb some of the excess labour that often contributes to rural poverty and urban-

ization (IFAD, 2003). Another way in which rural community conservation is achieved is through the increased net incomes that tend to result from a transition to organic farming. While the specific changes in production costs, yields, and product prices depend on a variety of factors, an IFAD (2003) report based on Latin American case studies found that, in all instances where organic farming was adopted, net revenues for producers increased.

Not only has organic agriculture been shown to increase food security and farm income, but evidence also suggests that organic production can help bring stability to farmers' livelihoods. Although organic production does not offer the kind of bumper crops that industrial agriculture may occasionally provide, organic farms generally experience much more stable yields, and long term steady productivity rates that are resilient to stress (Carpenter, 2003). Thus, organic farmers are less susceptible to dramatic income fluctuations. In addition, organic production offers farmers more flexibility in their input strategies, which means that they have some control over production costs and can adjust them somewhat to suit their changing needs and help ensure income stability, while at the same time avoiding the debt trap often associated with conventional farming in the South (Carpenter, 2003). Finally, income may be stabilized as organic farmers tend to have closer and more long-term relationships with their buyers (IFAD, 2003); however, this point is debateable and will be discussed further below.

2.4.6 Participation

For the better part of the 20th century the state tended to be viewed as the primary player in environmental governance. However, today a host of other actors, including TNCs, supranational institutions such as the United Nations (UN) and World Trade Organization (WTO), and non-governmental organizations (NGOs), are becoming increasingly important in terms of shaping environmental governance decisions (see for example Bryant and Bailey, 1997; Sonnenfeld and Mol, 2002; Jonas and Bridge, 2003; Lane, 2003). Increased space for local citizen participation has also been created as part of this shift, and this has tended to be viewed as a positive trend in terms of sustainabil-

ity. Indeed, participation has been one of the cornerstones of alternative development paradigms such as sustainable development. Originating with the works of Paulo Freire in the 1970s and Robert Chambers in the 1980s, the primary objective of participation as it pertains to sustainable rural development is to transform rural people from 'objects' of development projects into 'subjects' (Freire, 1982). A subject, according to Freire, is someone who is capable of critically analyzing his or her own situation, and taking action based on their analysis in order to improve their lives and their communities. Building on Freire's ideas, Chambers (1987) calls for a series of 'reversals' that he argues are essential for true participation to be achieved. Among the most important reversals is a genuine recognition of what he refers to as 'rural people's knowledge.' This idea is echoed in Freire's discussion of 'indigenous knowledge' and in Scott's (1998) arguments in favour of respecting 'practical' or 'metis' knowledge. All three suggest that the legacy of the Enlightenment has been a rejection of all knowledge that is not considered objectively scientific, and that this has hampered efforts to include participation in development and thus to achieve sustainability. They also argue that true participation is necessary for successful development projects, as programs that are perceived as exogenous will often be rejected in the long run.

The notion of participation is of particular relevance to a discussion of organic agriculture because the two concepts have tended to be viewed as complementary (Pretty and Hine, 2001; Pugliese, 2001). This is partly because, as discussed above, the nature of organics is to view local rural producers as experts, and therefore as subjects, capable of their own decision-making and stewardship of the land (Pugliese, 2001; IFAD, 2003). With respect to rural people's knowledge, Carpenter (2003) notes that organic agriculture specifically allows rural producers flexibility to use their knowledge of local ecology, as well as their personal and cultural preferences, when making decisions in a way that conventional agriculture does not. Pretty and Hine (2001) also argue that organic agriculture in the development context tends to be inherently participatory because its successful adoption relies so heavily on high levels of local human and social (as well as natural) capital. Understanding of this necessity has meant that the majority

of development projects related to organic agriculture have been deeply participatory in nature (Pretty and Hine, 2001; IFAD, 2003).

While the notion of participation may be an integral aspect of sustainable agricultural development, the participatory paradigm has not gone without criticism. Perhaps the starkest critique of participatory development is that it can be used as a guise for decreasing government expenditures through the offloading of development responsibilities onto local communities that may not be equipped to deal with them (Herbert-Cheshire, 2000). Participation as a development tool has also been criticized for its inability to be translated effectively from the level of theory and policy to the level of practice (Nederveen Pieterse, 2001). Indeed, participatory terminology may often be incorporated into development policies because it has become mainstreamed into development discourse, and not because institutions actually seek to use participation in a meaningful way (see for example Michener, 1998; Nederveen Pieterse, 2001; Lane, 2003). Finally, at the local level a host of issues can plague participatory development efforts, including a lack of sufficient natural, capital, and human resources, insufficient power to make systemic changes to structures that may constrain development, and the potential for local elites to co-opt the development process thus increasing local inequality or conflict (Nel et al., 1997; Herbert-Cheshire, 2000; Lane, 2003).

While the critique of the participatory paradigm highlights the importance of continued state and institutional involvement in development, a return to the largely discredited top-down model is certainly not called for. Instead, there may be room outside of the traditional top-down/bottom-up dichotomy for development models that incorporate the notion of participation without abandoning the potentially useful function of the state. In his discussion of state-society synergy Evans (1996) elaborates on this idea, arguing that active governments and mobilized communities can work together to enhance each other's development efforts. Pointing to examples particularly in Brazil and India, he explains how the resources, powers, and capabilities available to state and civic actors differ, and he concludes that, if they are combined, a synergistic relationship can be formed that can produce highly effective and sustainable development results. Some of

the conditions that may contribute to successful synergistic development include a strong and well organized state bureaucracy, an egalitarian social structure, high levels of social capital including not only horizontal but also vertical linkages, and an open democratic system (Evans, 1996).

2.4.7 Integration

With respect to integration, Pugliese (2001) argues that sustainable rural development must be holistic, multi-disciplinary, and multi-sectoral and that organic agriculture helps to achieve this because of its holistic nature, and because it offers opportunities for integrating local production, marketing, distribution, and processing. Carpenter (2003) points out that organic agriculture tends to increase linkages between producers, input suppliers, and buyers because the organic commodity chain is often more locally rooted than that of the conventional industry. This vertical integration becomes even more formalized and pronounced when organic producers enter fair trade networks, which many of them do (Raynolds, 2000; IFAD, 2003). Thus, the integration of fair trade and organics is considered one of the most important possibilities for linking organic agriculture and sustainable rural development.

2.4.8 Constraints on the Adoption of Organic Agriculture in the South

Local context can sometimes be conducive to organic agriculture; however, some local factors can also act as potential constraints. For example, organic production is most easily adopted when the producer's land tenure status is clear and stable (IFAD, 2003). In many parts of the South, rural producers may farm land that is owned by third parties and is either leased through short term contracts, or is for some other reason not guaranteed for the future (IFAD, 2003). In these cases, the incentives to adopt production strategies that show long-term sustainable benefits are not very high (Grossman, 1997; Gray and Moseley, 2005). Adoption of organics is also difficult when local soil is

not naturally very fertile, or when it has been degraded by conventional agriculture or other environmental problems. Both of these scenarios occur relatively frequently in the South and make it difficult for producers to start organic farming because the cessation of chemical application may lead to temporary decreases in yield as the soil quality is gradually improved (IFAD, 2003). Another constraint to the adoption of organics in the South has been the lack of available education and information for farmers regarding organic production techniques. This is especially problematic in cases where local ecological knowledge has been weakened following decades of conventional farming, and levels of local social and human capital in rural communities are low (Pretty and Hine, 2001; IFAD, 2003). Government policy is also not generally supportive of organic agriculture, and this makes funding for extension programs, infrastructure, and other support mechanisms for organics difficult without NGO assistance (Pretty and Hine, 2001; IFAD, 2003).

2.4.9 Constraints on the Contribution of Organic Agriculture to Sustainable Development

Another set of constraints on organic agriculture in the South has less to do with adopting the actual organic techniques, and more to do with the ability to translate those techniques into livelihood improvements - the primary aim of sustainable development. One element of this issue is the certification standards required for producers to take advantage of the price premiums that organics offers. In order to be certified to sell products that are labelled organic, producers must go through a lengthy and expensive certification procedure (IFAD, 2003). The process of becoming certified may last as long as three years, during which time producers do not receive price premiums but must pay the costs of certification (Raynolds, 2000). The lack of harmonized standards, which means producers must be certified by multiple agencies if they want to export to multiple countries, increases the costs of certification (Raynolds, 2000). These costs are particularly difficult to bear for small scale Southern producers who sometimes try to offset

them by forming cooperatives to share the financial burden (Gomez Tovar, 2005). In cases where the certification costs cannot be met, there is a risk that producers may farm organically without official recognition, potentially reaping socio-ecological benefits, but few direct economic ones (IFAD, 2003).

In her discussion of fair trade and organic agriculture, Raynolds (2000) argues that the contribution of organics to sustainable development is also severely limited because organic production does not necessarily challenge traditional North-South patterns of economic exploitation in the way that fair trade does. While organics makes a lot of progress in terms of exposing the natural processes of production, only a few certification bodies include any measures aimed at safeguarding producers' human rights, and even these are very limited (Raynolds, 2000). Thus, while organic farming tends to be considered an indicator of sustainable development, it is often driven by the same market forces that govern conventional agriculture, and may not improve the socio-economic status of peasants in the way that many assume (Wilson and Rigg, 2003). As well, there is nothing inherent in the regulations officially governing organic agriculture that prohibits the entry of large agribusiness into the market, and this leaves big openings for companies like Dole, (which already controls a large portion of the organic banana trade), to eventually dominate organic production in the way that they have dominated conventional production (Raynolds, 2000).

The concerns regarding the degree to which organic agriculture can contribute to sustainable rural development raise questions about the validity of the sustainable development paradigm itself. Indeed, some would argue that "while states and international institutions have been adept at appropriating the language of sustainable development, their actions generally have aligned them with the interests of capital and international corporations" (Gray and Moseley, 2005: 17). Sustainable development has thus, in effect, become an issue of semantics rather than a reflection of a desire for radical structural change (Bryant and Bailey, 1997). Until sustainable development begins to be envisioned in a more transformative way, it will be difficult for organic agriculture to assist in the creation of truly sustainable rural livelihoods, in spite of the implicit support for social

and economic justice that is generally assumed to be part of the organic movement.

2.5 Summary

A review of the literature on political ecology, defining organic agriculture, and organics and sustainable development, reveals some gaps that this research seeks to address. The debate about the meaning of organic agriculture that has been evolving in the North appears to be getting only more heated as the practice of organics becomes more widespread. However, despite a recognition of how essential context is in determining definitions, motivations, and the character of organics in general, this debate has focused exclusively on organics in the North. Input from some Southern contexts, particularly those where traditional peasant farming may be comparable to concepts of organics developed in the North, could greatly enrich the discussion of what organic means. Inclusion of Southern voices in the debate about how to define organics, and particularly how to set certification standards, would also help to address concerns about imposing Northern based standards on Southern producers without concern for their reality or ideas.

If information about organic agriculture from Southern perspectives could help to inform the debate about defining organics in the North, the reverse is also true. Ideas about what organics means to people and why they are motivated to engage in it has been largely absent from literature on the use of organic agriculture in a developing context. This absence is in spite of IFAD's (2003) recognition that motivations, particularly beyond the motivation provided by price premiums, are an essential factor in determining the success of organics as part of a sustainable development strategy. Thus, the kind of in-depth studies done by Fairweather (1999), Duram (2000), Hall and Mogyorody (2001), Kaltoft (2001), and Richardson (2005) on the motivations and beliefs that underlie decisions about organic agriculture in Northern contexts could add depth to the discussion about organics and development in the South. This kind of research may be especially relevant as the trend toward conventionalisation, that has already been noted in many Northern contexts, becomes more apparent in the South, raising questions about the

participatory, small-scale nature of organics that has been so important to its role in sustainable development.

In addressing these issues, the theoretical perspective offered by political ecology provides a useful background, and a lens through which much of this research can be viewed. The attention that political ecology pays to the processes of agricultural change, and to the political economic factors that shape production decisions make it an appropriate framework for an exploration of how Cuba has shifted from a Green Revolution model of agricultural production, to one that is based on organic techniques. The political ecological critique of capitalism could also help to inform a discussion about how Cuba's status as a Socialist nation, and its relative isolation from the global capitalist political economy, have affected its ability to pursue a unique path to agricultural development.

Chapter 3

The Cuban Context

3.1 Introduction

This chapter outlines some background information about Cuba, providing context for the research results that will be presented. It begins with a general discussion of the country, presenting some details regarding its geography, demographics, economy, history, and socio-political climate. This is followed by a more focused examination of Cuban agrarian history, including the period prior to the Revolution, the Revolutionary era, and the collapse of the Soviet Union. In the final section of this chapter, the Cuban agricultural sector is discussed, with a specific focus on organic agriculture in the country. The structure of the organic agriculture sector in Cuba is explored, as is the way in which organic agriculture appears to be defined and viewed within the Cuban context, and the roles that various actors at various scales (including the Cuban state, Cubans at the grassroots levels, Cuban NGOs, and international organizations) have played in the transition to organic production in Cuba. Finally, some of the challenges related to organic agriculture in Cuba are considered, with a view to the potential future of Cuban organic production.

3.2 General Information

3.2.1 People, Land and Climate

The largest island in the Caribbean, as of 2003 Cuba's population stood at 11 million (FAO, 2005). Although the country is considered a developing one, and its per capita Gross Domestic Product (GDP) adjusted for purchasing power parity is just 3000 USD, its people have an average life expectancy of 77 years, the infant mortality rate hovers around 6 deaths per 1000 live births, and 97 percent of the population is considered to be at least functionally literate. These statistics placed Cuba 52nd out of 177 countries on the United Nations's 2003 Human Development Index, considerably higher than most other developing nations (UNDP, 2005). As has been the case around the world, urbanization has affected the country over the past several decades, and today only 26

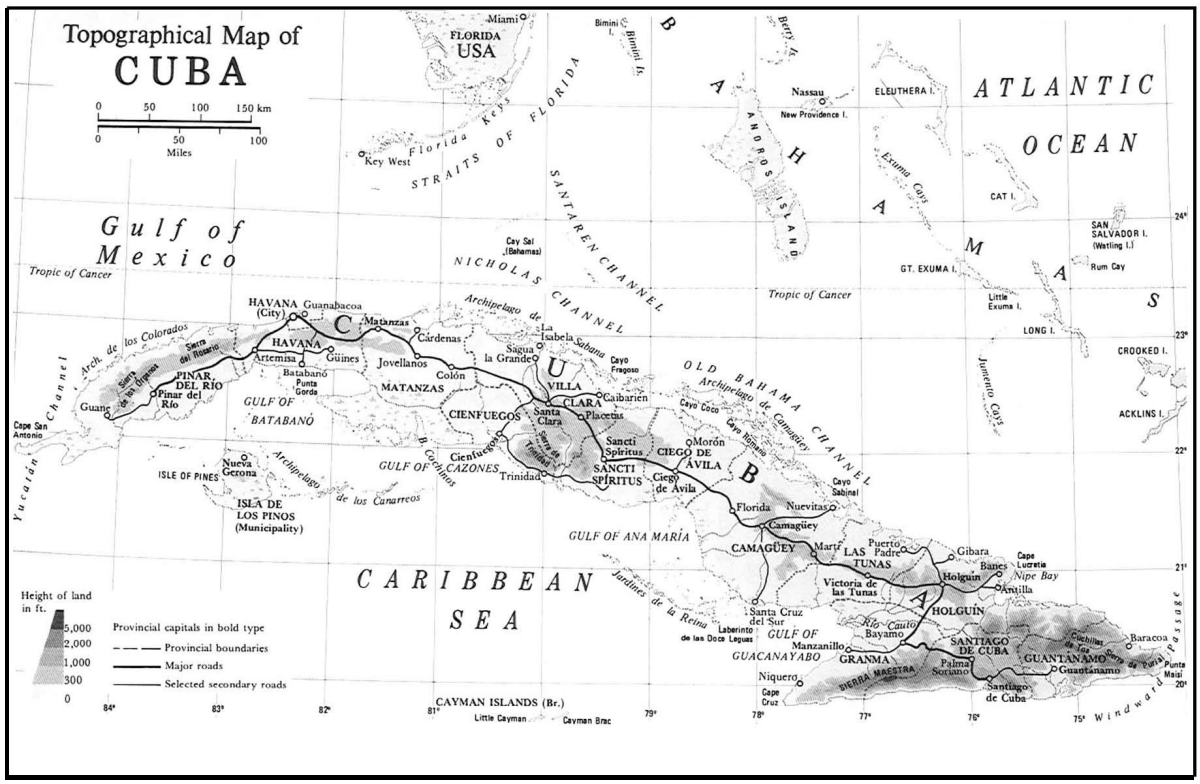

Figure 3.1: *Topographical map of Cuba (Source: Pérez Jr., 2006)*

percent of the Cuban population is officially classified as rural (Reynolds Wolfe, 2004). The decline of the rural population has been accompanied by a decline in the role that agriculture plays in the economy. Despite the important foreign exchange that agricultural exports such as sugar, tobacco, and coffee bring to the country (these products represent almost half of all Cuban export earnings), agriculture as a whole accounts for a mere 6.6 percent of the GDP, and the sector employs approximately 24 percent of the labour force (FAO, 2005).

The Cuban land mass is generally characterized by flat land and rolling hills, conducive to crop production; however, there are also three major mountain ranges spread out across the country (Pérez Jr., 2006). The climate is classified as tropical, and the country experiences a dry season between November and April, and a rainy season running from May to October (Funes, 2002). In the rainy season, Cuba receives an annual average of approximately 1450 mm of rainfall, while in the dry season this figure drops to about 450 mm (Pérez Jr., 2006). Approximately 40 percent of Cuban land is classified as arable (FAO, 2005), and while conditions are generally suitable for agricultural production, droughts, hurricanes, and soil problems present some significant challenges. In particular, low organic matter levels affect more than three quarters of Cuban agricultural land, and almost half of the country's arable land suffers from low soil fertility and significant amounts of erosion (Hernandez-Ortega, 2005).

3.2.2 U.S. Relations and the Cuban Socio-political Climate

Located less than 150 km south of the Florida Keys, Cuba has been greatly affected throughout its history by its close proximity to the United States. After independence from Spain in 1898, the American military took control of the island, primarily to protect its interests in the Cuban sugar industry (Pérez Jr., 2006). In 1902, Cuba officially became an independent republic; however, the Platt Amendment of 1901 ensured that the United States would maintain the right to intervene in Cuban affairs and veto Cuban economic, and foreign relations policy decisions (Pérez Jr., 2006). Although this amendment was abrogated in 1934, the United States continued to assert a strong political

presence in Cuba, helping to support a series of dictatorial leaders that ended with Fulgencio Batista, who was ousted by the 1959 Revolution led by Fidel Castro (Weinmann, 2004).

Following the Revolutionary government's announcement of its Communist ideology, and the nationalization of many American owned interests in Cuba (including a large amount of land used to produce and process sugar), the United States broke off diplomatic relations and imposed a trade embargo against Cuba that has proven to be the strictest in American history (Weinmann, 2004). In 1992, the American government enacted the Toricelli Act, which banned all subsidiaries of American companies from trading with Cuba, in the hopes that this would accelerate the food crisis brought on by the fall of the Soviet Union and lead to a regime change (Weinmann, 2004). Sanctions against Cuba were tightened again in 1996, with the passage of the Helms-Burton Act allowing Americans to prosecute foreign companies doing business with Cuba. In 2000 there was a mild shift in policy, as the American government legalized the export of limited amounts of food to Cuba; however, the United States continues to view Cuba as a serious threat, and remains adamant that relations will not be normalized until there is a shift in the country's political landscape (Powell, 2004; Weinmann, 2004).

The primary problem that the American government has with the current political landscape in Cuba is its Communist leader, Fidel Castro, whom the U.S administration accuses of imposing "upon the Cuban people a communist system of government that systematically violates their most fundamental human rights" (Powell, 2004: 1). Indeed, there has been widespread global condemnation of the fact that the Cuban Communist Party is the only legally recognized political party in the country and that Fidel Castro has been the head of state since coming to power in 1959 (Corrales, 2001). There has also been condemnation for Cuba's treatment of political prisoners, use of excessive police force to quell resistance, and as Aguirre (2002: 76) notes, for the fact that "Cuba's Ministry of the Interior continues to work closely with the Committees for the Defence of the Revolution throughout the island to repress all opposition to the regime."

However, in spite of the serious issues surrounding the ethics of Cuba's one party

state system, there has also been recognition that "in contrast to most previous state-socialist societies, Cubans have enjoyed a relatively high level of participation ... with the right to recall most politicians except those at the highest levels" and that this "has afforded the Cuban population considerable experience in serving on collective decision-making bodies, committee work, and so forth" (Otero and O'Bryan, 2002: 35). While the country may have always been relatively liberal compared to most of the Eastern Bloc (Utting, 1992), the fall of the Soviet Union and the ensuing economic crisis have led to further liberalization. For example, self-employment has been legalized, albeit in a highly regulated manner, foreign investment has been accepted, Cubans are now allowed to hold currency other than the Cuban peso, and restrictions against the church have been relaxed (Díaz Vázquez, 2002; Otero and O'Bryan, 2002). Thus, although the country remains a one party state, there are signs of an increasing acceptance of a role for non-state actors in the shaping of the country, and civil society may be an important force in the country's future development (Aguirre, 2002; Otero and O'Bryan, 2002).

3.3 Cuba's Agrarian History

3.3.1 Pre-Revolutionary Agriculture

Prior to colonization by Spain, agriculture was not widely practiced in Cuba, where people instead relied primarily on hunting and fishing for survival (Funes, 2002). Following colonial conquest in the 16th century agriculture began to be introduced, and by the 18th century hundreds of thousands of African slaves were being brought to the island to build a sugarcane industry (Funes, 2002). Despite a growing focus on cash-crop production, rural landholdings remained relatively equitable, and Funes (2002: 3) describes farming practices of the era as "a sort of sustainable agriculture, characterized in many cases by the careful selection and appropriate use of soils, the programming of sowing dates matched to local climates, the planting of polycultures and the use of crop rotations, the application of natural soil amendments and organic fertilization, etc.."

By the 19th century however, expansion of the sugar industry was beginning to cause widespread deforestation across the country (Deere et al., 1998). Then, with the onset of American intervention in the early years of the 20th century, the amount of capital being invested in Cuban agriculture began to increase rapidly (Deere et al., 1998; Funes, 2002). These investments were used to buy massive plots of land, which were primarily turned into sugarcane plantations. The majority owned by Americans, these plantations were farmed according to the high-tech, industrial model of agriculture that was gaining prevalence in Europe and North America at the time (Deere et al., 1998; Funes, 2002).

The influence of American led investment in Cuba's agricultural sector was felt quickly, and by the 1950s Cuban farming was characterized by extremely high levels of foreign land ownership and concentration of land holdings, an overwhelming emphasis on cash-crop production for export, and widespread use of 'modern' techniques such as blanket chemical fertilizer and pesticide application (Utting, 1992; Funes, 2002). The majority of rural Cubans had become landless peasants, renting small plots of land for subsistence farming and/or selling their labour to plantation owners (Deere et al., 1998; Nova, 2002). This structure made Cuba highly dependent on the United States for the survival of its agricultural sector (Utting, 1992). As well, it created a rural landscape in which extreme poverty, food insecurity, illiteracy, lack of access to health care and other amenities, and environmental degradation were prevalent (Ghai et al., 1988; Utting, 1992; Funes, 2002; Nova, 2002).

3.3.2 The Revolutionary Era

The dire situation faced by many rural Cubans in the first half of the 20th Century helps to explain why so many of them supported Fidel Castro's Revolutionary movement to depose Fulgencio Batista, whose corrupt dictatorship had done nothing to improve rural conditions, but had instead focused on protecting the interests of wealthy Cubans and foreigners with business interests in the country (Pérez Jr., 2006). In contrast, Castro and his revolutionaries considered the extension of education and social services into rural areas, and the general improvement of life in the countryside, to be a top priority

(Pérez Jr., 2006). Indeed, one of the first projects of the Revolutionary government was a massive rural literacy campaign in which urban youth were sent to rural areas to teach basic reading and writing skills (Pérez Jr., 2006). As a result of this, and other similar extension programs aimed at addressing inadequacies in rural communities, many of the deep socio-economic problems that had affected Cuba's rural areas were addressed. Rural illiteracy, abject poverty, and starvation were eradicated, and education, health care, housing, and other social programs were made widely available (Utting, 1992; Rosset and Medea, 1994; Funes, 2002).

In addition to the extension of social programs, another initiative aimed at revolutionizing rural areas was the introduction of the First Agrarian Reform law of 1959, which nationalized all farms larger than 402 hectares, turning some land over to rural labourers and putting the rest under state control (Wadekin, 1990; Nova, 2002). In 1963 a second law lowered the maximum private farm size to 67 hectares (Wadekin, 1990). While in some cases pre-Revolution landowners were left with the allowable 67 hectares after redistribution, in other cases their land was confiscated completely. Decisions regarding how much land owners could keep were made by the *Instituto Nacional de Reforma Agraria* (National Institute of Agrarian Reform, or INRA), an organization founded by the Revolutionary government and charged with implementing land tenure reforms (Deere et al., 1998; Nova, 2002). In the wake of the two agrarian reform laws the state found itself in control of 71 percent of Cuba's arable land, and it embarked on a plan to develop large state farms, with the goals of quickly adopting new technologies, increasing productivity, and providing well-paying jobs to rural labourers (Nova, 2002).

Despite the dominance of the state agricultural sector following agrarian reforms, many individuals also received land grants, and Deere et al. (1998) assert that one of the most important creations of the Revolution was the concept of a land-owning *campesino* who controls his or her own land. The newly strengthened class of independent farmers was organized socially, economically, technically, and politically by the *Asociación Nacional de Agricultores Pequeños* (National Association of Small Farmers, or ANAP), which was founded in 1961 (Deere et al., 1998). In 1977 ANAP, in agreement with Com-

munist Party suggestions, made the formation of farming cooperatives one of its primary objectives (Deere et al., 1998; Nova, 2002). Many of Cuba's present day *Cooperativas de Créditos y Servicios* (Credit and Service Cooperatives, or CCSs) and *Cooperativas de Producción Agropecuaria* (Agricultural Production Cooperatives, or CPAs) were thus founded in the remaining years of the 1970s and in the early 1980s (Deere et al., 1998).

The move towards cooperativization was never explicitly ordered by the government, and Deere et al. (1998) explain that the creation of cooperatives was actually a very voluntary process, (particularly in contrast to other, more coercive, rural initiatives such as those designed to encourage the sale or rental of legally held private land to the state, or the incorporation of farmers into state production plans). In order to encourage the formation of cooperatives, ANAP sent representatives to talk to farmers about the benefits of cooperative production, and the government offered farm cooperative members the promise of a pension after retirement, as well as other social benefits such as good quality housing, schools, and medical clinics (Wadekin, 1990; Deere et al., 1998). In theory, these social services were also supposed to be available to the rest of the rural population; however, in practice it was much easier to guarantee access to housing projects, schools, and clinics to people living in relatively centralized cooperative communities, easily accessible by local transportation, as opposed to those remaining on more geographically isolated independent farms.

In terms of actual farm production, the early days of the Revolution were characterized by attempts to diversify the agricultural sector away from export-oriented sugar and toward food self-sufficiency and sustainability (Rosset, 1997; Enriques, 2000). These attempts, however, proved to be short lived. Although, ideologically, the Revolutionary government would have liked to have moved toward agricultural diversification and increased food self-sufficiency, in the face of stiff trade sanctions imposed by the United States a Soviet offer of both a secure market and preferential pricing for Cuban sugar proved impossible to resist (Nova, 2002). In addition, Cuba's ideal sugar growing conditions, the wealth of knowledge and experience built over years of sugar production, and the massive amounts of industrial capacity based on past investment made continual

dependence on the sugar industry a practical decision (Nova, 2002). Thus, just as it was before the 1959 Revolution, the focus of the farming sector remained on cash-crops, although due to agrarian reform rural dwellers did have increased access to land that could be used, at least in part, to meet subsistence needs (Ghai et al., 1988; Wadekin, 1990).

In addition to the promise to buy Cuban sugar at inflated prices, the Soviets, eager to have an ally in the Western hemisphere, offered other benefits to Cuba. Through membership in the Council for Mutual Economic Assistance (COMECON), Cuba was able to import large amounts of oil, machinery, pesticides, and fertilizers from the Soviet Union and other Eastern Bloc countries at highly subsidized prices (Chaplowe, 1998). Taking advantage of artificially high prices for sugar exports and low prices for industrial imports, by the early 1960s Cuba was able to embark on an industrialisation project that would create one of the most highly modern agricultural sectors in the developing world (Rosset, 1997). Indeed, by 1989 Cuban agriculture was characterized by intensive monocropping, high levels of industrial inputs, and large scale irrigation - all typical aspects of conventional modern production (Funes, 2002). In stark contrast to the reality in most of the other developing nations of Latin America, in the 1980s Cuba had more tractors per hectare than California (McKibben, 2005). This situation prompted Ghai et al. (1988: 129) to predict that "it seems fair to anticipate ... that continuing mechanization and investment will enable [Cuban] agriculture in general to increase and diversify its output as it has already been doing for some years."

3.3.3 The Collapse of the Soviet Union and the Beginning of the 'Special Period'

Just one year after Ghai et al.'s comments regarding the future prospects of Cuban agriculture, the Berlin Wall had fallen and in Cuba everything changed. The Soviet Bloc began to crumble, and it could no longer afford to support its allies, including Cuba (Pérez Jr., 2006). Within a year, the country experienced an 80 percent drop in the

amount of pesticides and fertilizers it could import, a 50 percent decrease in the amount of available oil, and steep declines in imports of animal feed and spare parts for agricultural machinery such as tractors and irrigation equipment (Rosset, 1997; Deere et al., 1998). While the sudden lack of agricultural inputs severely undercut domestic food production, food imports, which had previously accounted for approximately 50 percent of the Cuban diet, also declined sharply (Rosset, 1997). Still unable to trade with the United States for political reasons, and now without support from other Socialist countries, Cuba found itself facing a serious economic and food security crisis (Rosset, 1997; Funes, 2002).

In response to the crisis, in August of 1990, the Cuban government declared *El Período Especial en Tiempo de Paz* (the Special Period in Peacetime, commonly referred to as simply 'the Special Period') (Deere et al., 1998). This declaration signalled the beginning of a large scale austerity program involving strict rationing and limits on consumption, as well as the initiation of multiple programs designed to help the country rebuild itself, and particularly to rebuild its agricultural sector and thus restore food security (Pérez Jr., 2006). For example, urban dwellers were sent to the countryside for two week periods to provide extra farm labour, and farmers were encouraged to increase the amount of food they produced for self-consumption (Deere et al., 1998). To create extra incentive for farmers to increase production, the state re-opened private farmers markets (which had been created in 1980, but declared illegal in 1986) and allowed farmers to sell any surplus production (beyond the obligations of their state quotas) for profit, and at prices based on supply and demand (Martín, 2002).

One of the most sweeping agricultural reforms to be inspired by the needs of the Special Period came when, in September 1993, the state made the decision to restructure many state farms by turning them into *Unidades Básicas de Producción Cooperativa* (Basic Units of Cooperative Production, or UBPCs) (Funes, 2002). The creation of UBPCs involved breaking large state farms into smaller units, and granting the land to groups of farm workers without charge for an indefinite period of time (Martín, 2002). The former state farm workers thus became cooperative farmers, and the state provided the newly formed cooperatives with low interest loans to buy subsidized farm equipment

such as machines, tools, and animals (Martín, 2002). These UBPCs were far smaller than the former state farms had been. At the time the UBPCs were created, the average state farm was 28 000 hectares, while the average UBPC was just over 1500 hectares (Deere et al., 1998). Still, the UBPCs remained significantly larger than the average CPA, which was just over 600 hectares (Deere et al., 1998).

The dismantling of the majority of state farms was an abrupt ideological shift for a government that had always maintained that the state sector was the most efficient and effective way to produce food. However, state farms were, on average, suffering far more acutely from the lack of industrial inputs than cooperatives, which were generally able to adapt more easily to a lack of inputs largely because they were not as dependent on these inputs in the first place (Deere et al., 1998). In addition, a shift of focus away from state production and toward cooperatives was useful because the state sector had primarily focused on sugar production, which was of little use in terms of addressing national food security, whereas cooperatives had a long history of focusing production on the tubers and vegetables essential to feeding the population (Deere et al., 1998). However, Deere et al. (1998) argue that the newly created UBPCs were still too big, and as a result they often suffered from insufficient supplies of labour to manage the large amounts of land. In addition, although they were meant to be officially independent, they tended to have less real autonomy from the state than other cooperatives, and in some cases they encountered problems due to a lack of farming tradition amongst members who had spent most of their careers as farm labourers, and thus had little or no farm management experience. These issues may help to explain why UBPCs, although in many ways better than the old state farms, have tended to be less successful than traditional cooperatives in terms of production levels and profitability (Deere et al., 1998; Martín, 2002; Pérez and Echevarría, 2002).

In addition to the creation of the UBPCs, another important transformation that began to occur in Cuba's agricultural sector during the early years of the Special Period was a shift away from the industrial style of agriculture that had begun with American investment in Cuban sugar plantations, and been wholeheartedly adopted during decades

of Soviet development assistance. The onset of the Special Period meant that, for the first time in centuries, Cuba found itself in a position where dependency on the outside world was not an option. Thus, an agricultural sector that had always been highly dependent, first on American and later on Soviet support, suddenly had to become independently viable. The only other option would have been for Castro and his government to resign, opening the door for American aid. In order to avoid this fate, Cuba had to find a way to make its agricultural system work without the imported inputs that Cubans had come to rely on so heavily. In conjunction with the reforms discussed above, one of the ways that Cuba addressed this problem was to begin shifting away from industrial agriculture and toward a more sustainable, or organic, low input model, and this shift has been the focus of much of the recent literature on the subject of Cuban agriculture (see for example Rosset and Medea, 1994; Rosset, 1997; Warwick, 2001; Funes, 2002). Indeed, the Cuban case is cited widely in the literature on sustainable agriculture, and the country is often hailed as a trailblazer in the quest for a more sustainable global food system (Pretty and Hine, 2001; Rosset and Bourque, 2002).

3.4 Defining Organic Agriculture in Cuba

Cuba is consistently referred to as a leader in the field of organic agriculture, and its experience has been dubbed the largest shift from conventional to organic agriculture in modern history (Rosset and Medea, 1994), "a grand experiment in the conversion from modern conventional agriculture to semi-organic farming on a large scale" (Rosset, 1997: 291), an overnight switch to organic farming practices (D'arcy, 2005), and an "Organic Revolution" (Warwick, 2001: 54). However, while the literature is full of references to suggest that Cuba is an important global leader in the development of organic and sustainable agricultural systems, precise definitions of what is meant by the terms 'organic' and 'sustainable' within the context of Cuba's agricultural sector are not readily available. Indeed, sometimes Cuban agriculture as a whole is described as organic, sometimes semi-organic, sometimes sustainable, and sometimes agroecological, while the

boundaries between these various terms remain blurred. The following discussion is an attempt to extrapolate from the available data in order to comment on what organic agriculture means in the Cuban context, with particular reference to issues that have figured prominently in the literature on the general debate regarding defining organics.

3.4.1 Historical Precedent

Although Cuban agriculture in general became a model for a modern, Green Revolution style of production during the years of Soviet support, the adoption of these techniques was far more extensive in the state sector than it was on private independent and cooperative farms. A substantial number of private and cooperative farmers (who as a whole controlled 20 percent of Cuban land prior to the Special Period) had always maintained traditional low-input, and relatively sustainable practices on their farms (Funes, 2002), and were thus able to provide a basis for a shift away from high-input techniques at a national level. In addition, as in many parts of the world, Cuba saw a rise in environmental consciousness during the 1960s and 1970s, in part as a result of the publication of books such as Rachel Carson's classic *Silent Spring*, which documented the negative impacts associated with agricultural chemicals such as DDT (Funes, 2002). This increased consciousness was translated into a research agenda during the 1970s and 1980s when many Cuban academics, both within the Ministry of Agriculture (MINAGRI) and the university system, became heavily critical of conventional farming and began to focus research on developing alternative techniques (Rosset, 1997; Warwick, 2001; McKibben, 2005). Thus, at both the farm and research level, some resources were ready to be put into use relatively quickly following the onset of the economic crisis.

3.4.2 Input Substitution

Input substitution is perhaps the most common way of defining organic agriculture, in large part because the substitution of conventional inputs such as chemical fertilizers and pesticides with biological inputs such as organic compost is at the core of most regulatory

standards for organic certification. In the case of Cuba, Funes (2002) has suggested that input substitution has also been at the heart of Cuba's new agriculture, and he notes that the success of input substitution in Cuban agriculture can be viewed as an indicator that organic production is being adopted. This input substitution can be described as a move from high input to low input agriculture (Rosset, 1997), from input intensive techniques to knowledge and management intensive techniques (Funes, 2002), and from industrial inputs such as oil, chemicals, and machinery, to locally produced, more sustainable inputs such as alternative energy, biocontrol organisms, and oxen (see for example Rosset, 1997). One example of how quickly input substitution was introduced is that by 1991 56 percent of Cuban crops were already being treated with biocontrol organisms, signifying a step towards organic production and creating savings of approximately 15.6 million U.S. dollars (Rosset and Medea, 1994). In addition, while the national ox herd stood at approximately 50 000 in 1990, by 2000 400 000 oxen were being used to replace tractors and till Cuban farmland (McKibben, 2005).

3.4.3 Traditional vs. Modern Techniques

Although it has been proven that traditional agriculture cannot necessarily be equated with sustainable agriculture, and indeed some traditional farming practices have been highly environmentally destructive, there is often an assumption that organic production involves a return to pre-industrial low input traditions, and that it is a low-tech, anti-modern way of producing food and fibres. In Cuba, the return to traditional farming practices has indeed been part of the shift to organics, and the reintegration of traditional agricultural techniques into the national production model has been actively encouraged (Rosset, 1997; Nieto and Delgado, 2002). These techniques are particularly important because they are usually less expensive than more modern methods (McKibben, 2005). However, as McKibben (2005: 64) points out, "the rise of Cuba's semi-organic agriculture is as much an invention of science and technology as the high-input tractor farming it replaced." In Cuba, modern and organic agriculture are not necessarily viewed as dichotomous. Instead, a kind of "technological pluralism" is promoted, in which technology is

not applied in a blanket way, but rather in a way that is suited to local conditions. Both modern and traditional methods are accorded respect, and there is a belief that "even the most rudimentary traditional methods should not be seen as limitations imposed by economic exigencies, but rather as elements in a technological diversity that corresponds to the socio-structural heterogeneity of Cuban agriculture" (Martín, 2002: 69).

3.4.4 Farm Size

The issue of farm size has been an extremely contentious part of the debate on defining organic agriculture, with some arguing that there is an inherent contradiction in the idea of organics being practiced on large farms, where micromanagement and a closed-systems approach are extremely difficult to implement. Citing Drucker, D'Souza and Ikerd (1996: 81) note that "greater performance in a mechanical system is obtained by scaling up. Greater power means greater output: bigger is better. But this does not hold for biological systems. There, size follows function." As such, knowledge based processes such as organic farming work more effectively at smaller scales, while mechanical based processes may be more efficient when they are scaled up (D'Souza and Ikerd, 1996).

Indeed, although in Cuba the transition to organics on large sugar, cacao, and coffee plantations is beginning to happen, it is occurring at a much slower rate than the transition on smaller farms and cooperatives (Funes, 2002). In a discussion of sugar and tobacco farms, Pérez and Echevarría (2002: 273) admit "the truth is that there is still a long way to go for the development of organic production at the large farm level." While the majority of large farms continue to practice a form of conventional agriculture, it has been small scale Cuban producers and their organizations who are in many ways leading the move to organics (Warwick, 2001; Ricardo, 2003). One reason for this is that small farms have an inherent advantage when it comes to implementing organic techniques, which require farmers to have intimate and very location specific knowledge of their land. Thus, the agrarian reforms that decreased farm size by breaking up large state farms during the early years of the Special Period have helped to ease the transition to organic production.

3.4.5 Export-Oriented Production vs. Local Food Networks

Another important issue related to defining organics is the question of local production and consumption networks versus export-oriented agriculture. Many advocates of organic agriculture argue that a focus on local food networks should be part of organics, both because they view this as an important part of creating healthy and self-sufficient communities, and also because of the environmental damage caused by the long distance shipping of food. Despite this, in much of Latin America organic agriculture has not been geared towards local consumption, but rather towards the lucrative Northern market for organic foods (Raynolds, 2000; Gomez Tovar, 2005); however, it appears that this has not been the case in Cuba. Instead, the shift toward organic production in Cuba has been accompanied by a new focus on achieving local food security (Rosset and Bourque, 2002; Funes, 2002), or as Perera (2002: 7) refers to it, "food sovereignty."[1]

Rosset (1997) notes that this shift was necessary in order to stave off a potential famine during the early years of the Special Period. Indeed, when the Special Period began, Cuba was classified as a food deficit country that imported more than 50 percent of its food (Nieto and Delgado, 2002), and the abrupt absence of these imports made local food security an important issue. Although statistics regarding exactly how much organic produce is consumed directly in the communities where it is produced are unavailable, unofficial estimates suggest that local consumption is quite high (Álvarez, 2002; Funes, 2002). While some food may be consumed directly by those who produce it, another local distribution option is provided by private farmers markets, which were re-opened in 1994 and provide a space for local producers to sell their products to Cubans with some disposable income who wish to supplement the food available to them through the government rationing system (Sinclair and Thompson, 2001; McKibben, 2005).

An important example of the apparent synergy between increasing organic production

[1]It should be noted that, despite an increasing focus on developing local food networks, Cuba still spends almost 900 million US dollars per year on agricultural imports (down slightly from over one billion per year during the 1980s), and remains dependent on imports of rice, wheat, and flour as well as protein sources such as meat, milk, and soybeans, to meet the food needs of its population (FAO, 2005).

and focusing on local food networks in Cuba has been the rise of urban agriculture, which Altieri et al. (1999: 132) define as "all agricultural and animal production that occurs within cities or peripheries that receive direct influence from cities, so that the productive process is intimately linked to the urban population." Prior to 1989 home gardens, some of them in urban areas, had been a source of some food items for some Cubans (Wezel and Bender, 2003); however, these gardens tended to be viewed negatively as a symbol of underdevelopment (Altieri et al., 1999). Perceptions about urban gardening changed quickly when, in response to the food crisis brought on by the collapse of the Soviet Union, home and community gardens became an essential means of addressing food security problems (Altieri et al., 1999; Chaplowe, 1998; Warwick, 2001). City dwellers can now obtain land free of charge from the local government, provided that they use it for food production, and many people - even those with little agricultural experience - have taken the government up on this offer (Altieri et al., 1999). Indeed, today there are thousands of urban gardens in Cuba, and in the city of Havana tens of thousands of people are employed in the urban agriculture sector, which produced 300 000 tons of food (including nearly all of the city's fruits and vegetables, and a significant amount of rice and meat) in 2004 (McKibben, 2005). Urban agriculture has become such an attractive field that Wezel and Bender (2003) note a trend amongst state workers to quit their jobs and seek employment in the urban agriculture sector where wages can be significantly higher.

While Cuba's urban gardens fulfil an important role in terms of improving local food security through the creation of local food production and distribution networks, they are also recognized as a prime example of model organic production. The use of chemical fertilizers and pesticides is prohibited within city limits, thus ensuring that urban gardens use organic methods to achieve soil fertility and combat pests and plagues (Altieri et al., 1999). Equally important are the local production and consumption networks that urban agriculture creates, which mean it meets the organic ideal of building social cohesion within communities, as well as avoiding the pollution caused by food transportation (Altieri et al., 1999). In addition, urban gardens rely heavily on recycling inputs and using

locally available materials (such as soil produced through vermiculture) (Altieri et al., 1999), thus creating the kind of closed production systems that some organic advocates view as a deeper form of organics than the traditional input substitution model.

While it is apparent that, to date, the rise of organic agriculture in Cuba has been associated with a focus on local food networks, there have been signs that the country plans to develop organic production for export as well. In order to take advantage of the price premiums available on the international market for certified organic food, Cuba is working to try to certify some of its traditional cash crops such as sugar, cacao, coffee, honey, and fruit (Funes, 2002). While shifting towards export-oriented production may create changes in what organic agriculture means in Cuba, "the current economic conditions of scarce foreign exchange . . . favour implementation and marketing of organic agriculture [for export]" (Funes, 2002: 23). It is unclear how far Cuba will move in the direction of export-oriented production, and whether or not the potential of certified organic production focused on an export market will move Cuba back towards its position as a major cash crop exporter and food importer.

3.4.6 Organic Philosophy

One more issue that has been an important part of the discussion regarding what organic agriculture means is the extent to which organic agriculture may be viewed as a holistic set of values or ideals that is far more difficult to define concisely than the input-substitution based model that forms the basis of most regulatory definitions. This question also relates to the motivations that underlie the practice of organic agriculture, which can range from purely economic concerns to deeply held philosophical convictions about society-nature relations. While some literature suggests a relatively pragmatic definition of organics, based primarily on economic motivations and import substitution, is prevalent in Cuba, the prominent role that small farms and local food networks have played, at least until now, in the transition to organic agriculture could be indications that the Cuban model of organics is deeper and more holistic than the input substitution model. Indeed, there is some evidence that a holistic approach to organics exists in Cuba, as

Funes (2002:23) argues that input substitution is not enough, and that Cuba must work to "develop more complex agroecological systems that will integrally and coherently combine crops, livestock production, forest management, and other subsystems, based on organic and sustainable methods geared toward taking full advantage of synergistic mechanisms." García (2002) builds on this sentiment, suggesting that the differences between conventional and organic agriculture go far beyond the obvious contrasts in terms of inputs and specific production techniques, to include basic philosophical differences. Thus, the shift towards agroecology cannot be accomplished merely by changing the content of rural education and extension programs, but requires a shift in mentality, away from the idea that agriculture can be viewed in terms of specific and isolated units, and towards the notion that an interdisciplinary, holistic approach to farming is essential in order to successfully establish a sustainable system.

In spite of some evidence that suggests the potential for a deep philosophical basis for organic production in Cuba, other trends, including the aforementioned possibility of a shift towards export-oriented production, could be considered contradictory. For example, although Cuba has been lauded for its rapid and extensive shift to organic production, the country has also maintained some conventional agriculture, and it will likely continue to do so (Funes, 2002). Indeed, specifics regarding how extensively organic agriculture is actually being practiced are unavailable. The issues of mixing organic with conventional methods and biotechnology are also relevant to the question of whether a philosophical or moral commitment to organics or a more pragmatic approach is at the core of Cuba's new agricultural vision. McKibben (2005) presents the case of one Cuban farmer who, in general, practices organic agriculture, but who also uses chemical pesticides to combat potato bug infestations, thus suggesting that Cuban farmers may be willing to use whatever options are available and practical for them, rather than limiting themselves to organic production because of a strong belief that it is the right way to produce food. In addition, Cuba has been conducting a substantial amount of research on agricultural biotechnology (McKibben, 2005). However, Warwick (2001) notes that they have continued to follow the precautionary principle, and have not made field testing

a priority as of yet.

3.4.7 Summary

The existing literature on organic agriculture in Cuba does not provide sufficient information to make any precise statements about how the majority of Cubans define and view organic agriculture. This is particularly true because much of the relevant literature seems to be based on anecdotal evidence or general impressions rather than on carefully conducted scientific study of these issues. Analysis of the available literature does suggest that the Cuban model of organic agriculture is based largely on input substitution and on a combination of both traditional and modern techniques. In terms of farm size and structure, organic farming methods are being practiced across a variety of land tenure structures, including on small private farms, CCSs, CPAs, UBPCs, and particularly in urban areas (Rosset, 1997; Chaplowe, 1998; Altieri et al., 1999; Funes, 2002). While relatively smaller farms have generally been quicker to shift to organics than larger state farms, there is little evidence to suggest that small farm size is an integral element of Cuban organic agriculture. Similarly, it is unclear whether a focus on local food networks is truly important to the Cuban idea of organics, or whether it is a temporary and practical reaction to a very real food security crisis. There is also not enough evidence in the literature to make any definitive conclusions regarding the degree to which Cubans view organics as a holistic philosophy of society-nature relations, or conversely as an economically motivated set of input substitutions. In the end though, what is clear is that Cuban agriculture does currently incorporate many principles and practices of organic production (including vermiculture, waste recycling, alternative energy use, conservation tillage, intercropping, mixed farming, animal husbandry, and locally produced biological inputs such as biocontrol organisms, biocides, and biomass), and it does so in a far more systematic way than the vast majority of other countries (see for example Rosset and Medea, 1994; Rosset, 1997; Warwick, 2001; Funes, 2002; CIC, 2003).

3.5 The Major Actors in the Shift Away from Conventional Production in Cuba

3.5.1 Government Policy

Pretty and Hine (2001: 73) argue that "without appropriate policy support at a range of levels ... improvements [resulting from organic agriculture] will remain at best localised in extent, or at worst, wither away." This sentiment has been echoed by advocates of organic agriculture, who sometimes find that their efforts are limited by government policies that, beyond failing to encourage organic agriculture, in many cases actively inhibit it by favouring conventional production with subsidies and incentives (Pretty and Hine, 2001; Funes, 2002; Gomez Tovar, 2005). Cuba is therefore noted as an extremely original case because of the active role that the state has taken in supporting the shift to organic production (Funes, 2002). The Cuban government is aided in this regard by the general absence of agrochemical TNCs, whose vested interests both influence agricultural policies in many other nations, and combine with state policies to create conditions that tend to be favourable to conventional production (Funes, 2002; McKibben, 2005).

Although prior to the Special Period Cuba was not considered a global leader on environmental issues, at the 1992 Earth Summit in Rio de Janeiro Fidel Castro appeared on the international stage as a strong advocate for sustainable development. In a speech to conference delegates he made a plea to "stop transferring to the Third World lifestyles and consumer habits that ruin the environment. Make human life more rational. Adopt a just international economic order. Use science to achieve sustainable development without pollution. Pay the ecological debt not the foreign debt. Eradicate hunger and not humanity" (Castro, 1992). This statement set the tone for the adoption of a policy to promote organic agriculture at the national level. While some would argue this shift was made purely out of necessity, it is also argued that a philosophy of sustainable, self-sufficient agricultural production was always important to the Cuban Revolution, and that the adoption of the Soviet industrial model was regretted as an exogenously

imposed development strategy that reflected a "colonized mentality" (Rosset and Medea, 1994: 8). Whether or not one questions his motives, today Castro and his government explicitly support organic production, referring to it as the "real socialist agriculture" (Chaplowe, 1998: 49) because its principles "run counter to the vicious globalization promoted by neoliberalism, and are more in favour of socially just and solidarious, more *human* globalization, without dependency on transnational corporations and in favour of self-sufficiency" (Funes, 2002: 22).

The ideological position of the Cuban state has been translated into direct policy measures to promote organic agriculture. Although policy did not change comprehensively until the early 1990s, throughout the 1970s and 1980s increasing numbers of Cuban officials were becoming disillusioned with Soviet-style agriculture, and researchers at MINAGRI began to focus the majority of their projects on biological production techniques (Rosset, 1997). The informal focus on alternative agriculture at the research level that had existed for decades became official government policy in the early 1990s when MINAGRI formally adopted an "Alternative Model" of agriculture to guide its policies (Rosset and Medea, 1994). This model is built around eight specific goals: substitution of local knowledge for external inputs; agricultural diversification; replacement of tractors and other machinery with oxen; adoption of integrated pest management to reduce reliance on pesticides; provision of support for research and development of new sustainable techniques; implementation of a large scale organic methods training program; encouragement of increased cooperation amongst farmers; and an effort to slow or reverse the trend toward urbanisation to ensure adequate rural labour supplies for the labour intensive sustainable methods (Pretty and Hine, 2001).

Various programs have been implemented by the Cuban government in order to help move the country away from conventional agriculture and towards MINAGRI's new model. One example of this type of initiative was the 1993 restructuring of rural land tenure, discussed above, which created smaller land units that allow for the micro management essential to successful organic farming (Rosset, 1997). Another important state project was the creation of *Centros de Reproducción de Entomófagos y Entomopatógenos*

(Centres for the Production of Entomophages and Entomopathogens, or CREEs) as part of the Cuban National Program for Biological Pest Control (Pérez and Vázquez, 2002). Today, a network of 280 CREEs exists across Cuba, and each one produces biocontrol organisms, such as *Bacillus thuringensis* and *Trichoderma spp.*, that address specific local pest and disease problems (Pérez and Vázquez, 2002). In addition to land tenure changes and the development of CREEs, the state has also put agroecology extension programs in place across Cuba, invested heavily into research and development that focuses on organic production (Funes, 2002), built high quality housing and community facilities in rural areas (Rosset and Medea, 1994), created an Urban Agriculture Department within MINAGRI (Warwick, 2001), and outlawed the use of agricultural chemicals in urban areas (Chaplowe, 1998; Altieri et al., 1999). Each of these initiatives has been designed to encourage the shift to organic agriculture as outlined by the MINAGRI model.

Although not originally intended to provide support for organic agriculture, the Cuban government's consistent investment in basic and university level education has also helped to ease the transition to organics. With more scientists per capita than any other Latin American nation, and high levels of agricultural education and technical training, Cuba's well educated population has been cited as an important factor in the country's ability to adopt a knowledge based system such as organic agriculture (Rosset, 1997). In recognition of the connection between Cuba's educated populace and the country's success with organic agriculture, María del Carmen Pérez, a representative of the Cuban *Grupo de Agricultura Orgánica* (Organic Agriculture Group, or GAO) has stated that "the cultural, political, and technical preparation of the Cuban people, accumulated throughout the years of the Revolution, proved to be the decisive factor during the brusque change that took place at the beginning of the 1990s and that could not have successfully been faced by an uncultured people" (Pérez, 1999).

While state initiatives have played an important role in Cuba's shift to organics, participation of local people is widely considered to be essential to the success of both organic agriculture and sustainable development initiatives (see for example Pretty and Hine, 2001; Pugliese, 2001) and, despite its top-down approach to many issues, literature

suggests that the Cuban government has demonstrated support for participation within the realm of agriculture, allowing some decentralization in that sector (Wadekin, 1990). One key way the state has done this is through its promotion of participatory education, especially as it concerns sustainability and organic agriculture. This idea was officially laid out in the 1997 National Strategy for Cuban Environmental Education, which states that education related to the environment must be "active, flexible, and participatory, stimulating creativity and intelligence where the subject-object relationship is a two way interaction that fully realizes the subject's potential" (García, 2002: 104). MINAGRI has also adopted an official policy "explicitly emphasising an increase in the degree of local participation in decision-making and in developing agricultural systems adapted to local agroecological conditions" (Rosset and Medea 1994: 21). As part of this effort, the Cuban government actively encourages the transmission of rural people's traditional knowledge through farmer-farmer training programs, as well as the inclusion of this knowledge at the levels of both research and policy (Rosset and Medea, 1994; García, 2002).

3.5.2 Cuban NGOs and Grassroots Support for Organics

In spite of the strong role played by the state in the transition to organic agriculture, the Cuban experience has also been pointed to by some as an extremely successful example of participatory, or 'bottom-up' development, in which individual farmers have responded to their conditions by adopting low-input, organic techniques (see for example Rosset, 1997; Altieri et al., 1999; Funes, 2002; García, 2002). For example, Rosset (1997: 301) notes how the increasing use of intercropping, a technique common to organic production systems, "appears to be a case of growth from below. As peasants have increasingly gained greater control over their own production as a result of new agricultural sector policies, they are putting this apparently effective method into practice." The same has been said about the widespread adoption of urban agriculture, which has become one of the pillars of the organic agriculture movement in Cuba (Altieri et al., 1999). Although it eventually became a state supported program, in its initial stages the growth of urban agriculture was generally described as "a massive popular response" (Altieri et al., 1998:

132; Warwick, 2001: 55). As Chaplowe (1998: 56) explains: "Efforts to ensure the future of [urban] gardens have invested in the community, encouraging local participation and decision-making ... [and stressing] grassroots principles ..."

In rural areas, the non-governmental organization ANAP has been recognized as a strong force in terms of grassroots support for organics. In much the same way as the organization encouraged cooperativization in the 1970s and 1980s, it began to encourage organic production in the 1990s, and indeed today ANAP views the promotion of agroecology as its primary objective (Álvarez, 2002; Perera, 2002). Some of ANAP's programs designed to facilitate the transition to organics include: national training programs to build capacity amongst small farmers and co-op members; the transmission of information about agroecology through local television, radio, and magazines; the development of networks that include farmers, scientists, and extension workers who support agroecology; and the creation of a national program known as *campesino-a-campesino* (or farmer-to-farmer) (Álvarez, 2002). The farmer-to-farmer program is designed to rescue and spread the best practices of Cuban *campesinos*, and to facilitate the transmission and exchange of knowledge amongst *campesinos* in an effort to promote sustainable production systems in a horizontal, grassroots manner (Perera, 2002). Indeed, at the heart of all of ANAP's initiatives is the ideal of "combining traditional knowledge and practice with new techniques in a participatory effort that enables farmers to educate each other" (Álvarez, 2002: 82).

Like ANAP, the *Asociacón Cubano de Agricultura Orgánica* (Cuban Association of Organic Agriculture, or ACAO), which was founded in 1993 by a group of Cuban academics, placed a high priority on helping farmers educate each other about both newly developed organic techniques and traditional methods that are compatible with organic principles (Funes, 2002). In 1999 this Cuban NGO was incorporated into the *Asociacón Cubana de Técnicos Agrícolas y Forestales* (Cuban Association of Agriculture and Forestry Technicians, or ACTAF), became the GAO, and was awarded the Right Livelihood Award, or Alternative Nobel Prize, for its promotion of organic agriculture (Funes, 2002). Other Cuban NGOs such as the *Consejo de Iglesias de Cuba* (Cuban

Council of Churches, or CIC), and the *Federación de Mujeres Cubanas* (Federation of Cuban Women, or FMC) play an active role in encouraging transition to organic agriculture (Nieto and Delgado, 2002). For example, in 2003 the CIC published a series of instructional and educational pamphlets entitled *Caminos Alternativos* (Alternative Paths) designed to provide practical information, about everything from composting to biocontrol to alternative energy, to people who want to practice alternative agriculture.

3.5.3 International Support for Cuban Organic Agriculture

Many international organizations have also become involved in the movement towards organic agriculture in Cuba. These groups work in partnership with Cuban NGOs to assist with training programs, capacity building, infrastructure improvements, networking, and extension efforts (Álvarez, 2002). For example, the Sustainable Agriculture Networking and Extension (SANE) program of the United Nations Development Program (UNDP) has developed an initiative in Cuba, in which model agroecological farms are used to support the participatory extension of ecological techniques (García, 2002; Funes, 2002) . Oxfam, Bread for the World, the International Federation of Organic Movements (IFOAM), the Food and Agriculture Organization of the United Nations (FAO), and various other international organizations have provided important assistance for the SANE initiative, and for other programs designed to promote organic production in Cuba (Sinclair and Thompson, 2001; Funes, 2002; Nieto and Delgado, 2002; Perera, 2002). For example, international groups have been instrumental in providing funding and support for organic certification programs, education and extension, the recovery of traditional ecological knowledge, and capacity building (Nieto and Delgado, 2002). International NGOs have also played a role in helping Cuba help other Southern nations. One example of this kind of North-South-South initiative was developed by a group of NGOs from Belgium that have funded a project to facilitate cooperation on organic agricultural development between Cuba and Uruguay (Álvarez, 2002). The collaboration of so many actors, both nationally and internationally, has been cited as an important factor in Cuba's success with organic agriculture (Nieto and Delgado, 2002; Álvarez, 2002).

3.6 Challenges for Cuban Organic Agriculture

While the transition to organic agriculture in Cuba has in many ways been highly successful, it has by no means been easy, and Cuba's new agricultural paradigm faces some significant challenges. One of the most basic problems is that organic techniques do not provide the kind of quick fixes characteristic of many conventional methods, but instead require significant investments of time and energy in order to be effective. Thus, the period of transition is very difficult, as Cuban farmers switching to organic agriculture must wait for improvements in soil structure and fertility to take effect, and for their land to attain the productive equilibrium that is at the core of successful organic production (Rosset and Medea, 1994). In the early years of transition, production levels may decline, and the decline in production as a result of the loss of industrial inputs has been particularly pronounced for the UBPCs, or the former state sector, primarily because of the larger average sizes of these units and a lack of farming expertise amongst former state farm workers (Rosset, 1997; Deere et al., 1998). In contrast, although independent and cooperative farmers have also had some difficulties with transition, their farms have generally remained profitable (Deere et al., 1998), and anecdotal evidence has suggested that in some cases production levels may have even exceeded those prior to the Special Period (Rosset, 1997).

Another challenge that may impact the future of organic agriculture in Cuba is the possibility that many Cuban farmers use organic methods primarily "out of necessity rather than conviction (Funes, 2002: 24)." The extent to which this is the case goes to the heart of how Cubans, particularly Cuban producers, define and view organic agriculture - an issue that, as discussed above, has received insufficient attention. Some would argue however, that there is little value in exploring the degree of commitment that Cuban producers, as well as consumers and policy makers, have with regards to organic agriculture because of the belief that, in the future, "if Cuba opens up to the world economy ... it's very hard to see how the sustainable farming would survive for long" (McKibben, 2005:66). Indeed, much of the literature on the transition to organic

agriculture in Cuba suggests that as the economy improves, and the country moves out of the Special Period, there will be a general return to the conventional industrial agriculture that characterized Cuban farming for the better part of the 20th century (see for example Chaplowe, 1998; Altieri et al., 1999; McKibben, 2005). However, if Cubans are truly committed to organic production, and if they feel they have reaped benefits from the shift away from conventional farming, there is a chance that they may prefer to continue practicing organic agriculture on a large scale.

One final issue however, is that even if Cubans should decide that they would like to maintain an agricultural system based on organic methods, if in the future the country becomes more integrated into the international market economy, this could prove to be problematic. McKibben (2005) explains how, in Mexico, the introduction of the North American Free Trade Agreement (NAFTA) allowed the United States to flood the Mexican market with relatively cheap American maize, produced on immense, heavily subsidized, industrial farms. As a result, small scale Mexican maize growers were gradually forced to sell their land to large agribusinesses, which have a chance of competing against American imports, but which also farm in a manner that has created widespread environmental destruction in Mexico. Cuba already imports a small amount of food from the United States, and "in a free-trading, post-Castro Cuba [the current trickle of imports] would likely become, as in Mexico and virtually every other country on earth, a torrent, and one that would wash away much of the country's agricultural experiment (McKibben, 2005: 67)." Fidel Castro himself has suggested that his country has been able to pursue unique policy initiatives largely "thanks to its privileged position as a non-member of the IMF" (Castro, 2000). Although he was not referring specifically to agricultural policy, it is certainly fair to suggest that if Cuba were more fully integrated into the current global economy, for example through membership in organizations such as the IMF, it would face the kind of pressures that McKibben (2005) discusses, and that have played a role in inhibiting the spread of alternative agriculture around the world.

Figure 3.2: *Map of Havana Province showing the municipality of San José de las Lajas*

3.7 The Case Study Site: San José de las Lajas, Havana Province

While this study addresses the Cuban agricultural sector in general and data was gathered around the country, the primary case study focused on the community of San José de las Lajas. This community is one of 26 municipalities that make up the province of Havana, and the main urban settlement of San José lies just under 30 km southwest of the Cuban capital city. At just under 600 square kilometres, San José de las Lajas is the second largest municipality in the province and accounts for 10 percent of its landmass. The total population is 69 000, with the vast majority officially classified as urban dwellers and a small minority living on what is officially considered rural land. The overall population density is approximately 116 people per square kilometre, which is typical for the province. The three communities that formed the basis for the study were San José, Zaragoza, and Tapaste and the surrounding rural areas.

Home to a number of industries as well as to several national research institutes, San José de las Lajas is more economically developed than many of the surrounding municipalities and, as part of Havana province, it is certainly more developed than many more isolated regions of the country, particularly those in eastern Cuba, or the *Oriente*. How-

ever, despite the presence of some industry, more than three quarters of the municipality's 60 000 hectares of land is devoted to agricultural production, particularly cattle raising and the dairy industry. The dominant soil type in the region is red ferralitic, which is generally characterized as highly productive, but is considerably shallower, rockier, and less productive in the far south and northeast of the municipality.

Chapter 4

Methods

4.1 Research Framework

The research presented in this thesis was guided in part by an approach that has been referred to as interpretive (Neuman, 2000) or constructive (Creswell, 2003). Within this framework, the primary goal of social research is to develop an understanding of how people construct meaning within their own context. Because the meanings that people construct are subjective, it is necessary for the researcher to gain an understanding of peoples' realities and perspectives in order to understand how the meanings they attach to phenomena are formed (Neuman, 2000). The interpretive/constructive framework recognizes that meaning will vary according to contextual factors, and therefore that no concrete laws can be developed from research results. Instead, the goal is a deepening of understanding and insight into a particular issue or situation. As a result, research often relies on case studies that are presented using detailed thick description (Neuman, 2000). As discussed in Chapter 2, this research has also been informed by the framework of political ecology, and as such is guided by a set of ethical or moral assumptions. Specifically, my critical view of conventional agriculture, and corresponding belief that the development of sustainable alternatives is a worthy goal, played a part in determining how my research was both conducted and presented. Neuman (2000) asserts that this incorporation of ideological beliefs into the research strategy is a valid aspect of critical

research. Finally, this research draws on Freire's (1982) notion of the research participant as an active subject in the research process, and on England's (1994) call for researchers to maintain critical awareness of their own positionality.

4.2 Research Design

As is consistent with the overall research framework, this thesis is based on a qualitative case study approach. The qualitative case study seeks to achieve in-depth understanding of the reality of a specific location or group of people, as well as to uncover the layers of meaning that may underlie a particular phenomenon in a particular context (Neuman, 2000). It is also a flexible way to design research, as it allows for the gradual focusing of the research goals and objectives throughout the research process (Neuman, 2000). As such, there is greater opportunity for researcher reflexivity and for the inclusion of research participants in the development of the research strategy.

The qualitative case study was also an appropriate research strategy because achievement of the research objectives could not have been accomplished through the quantification of specific variables, but rather required the kind of subtle understanding of "the relativity of actor's accounts of their social worlds, and the relation between sociological descriptions and actors' conceptions of their actions" (Halfpenny, 1979, cited in Neuman, 2000: 145) that the qualitative case study approach encourages. As well, as noted in the literature on sustainable agriculture, context is an important variable in determining the characteristics of an organic sector (see for example Duram, 2000; Vos, 2000; Kaltoft, 2001; Rigby and Cáceres, 2001). Thus, the qualitative case study approach, which specifically emphasizes the necessity of understanding context in order to understand the meaning of any phenomenon, was a useful way to design the research.

4.3 Data Collection

The primary data for this thesis was collected during two field visits to Cuba. The initial visit took place between May and July of 2005. The first three weeks of this three month field period were spent traveling across Cuba as part of a course sponsored by the University of British Colombia (UBC). This provided me with the opportunity to meet a number of key contacts, speak informally with many producers, and visit a variety of farms, research institutes and schools, urban gardens, and biocontrol production facilities. My intention was to follow this up with a prolonged stay in one farming community in order to collect the majority of my data; however, due to my lack of official status as a researcher in Cuba this proved to be impossible. As such, upon returning to Canada in July 2005 I immediately began planning a second field visit, contacting several organizations in an effort to obtain official permission to conduct my research. Following several months of email communication with a number of Cuban organizations and contacts, with whom I had developed unofficial relationships during my initial visit, I was able to formalize an official connection with the *Instituto Nacional de Ciencias Agricolas* (National Institute for Agricultural Sciences, or INCA). In January 2006, following months of negotiations, I received the formal offer of institutional support that made conducting my research in Cuba possible. I was thus able to complete my study during a six week visit to INCA in January and February of 2006.

4.3.1 Semi-structured Interviews

This study was based largely on data collected from a series of in-depth, semi-structured interviews. This form of data collection is common for qualitative case studies. It allows the participant and researcher to engage in a dialogue, thus the participant may play a more active role in the research process than is possible in other, more rigid, forms of primary data collection such as surveys (Neuman, 2000). Creswell (2003) also notes that semi-structured interviews are a useful means of exploring the views or opinions of participants. They are effective at uncovering meaning, and gaining deep understanding

Table 4.1: *Key Informant Interviews*

Occupational Category	**Number of People Interviewed**
University Researcher	3
National Research Institute Researcher or Technician	9
Plant Protection or CREE Researcher or Worker	3
Cuban NGO Director, Staff, or Retired Worker	3
Canadian NGO worker	1
Farmers	Organopónico: 2 UBPC: 1 CPA: 3 CCS: 7
City Planner	1
Agricultural High School Teacher	1
Agricultural Tour Guide	1
Total Key Informant Interviews	**35**

of context, because they allow the researcher to ask open-ended questions and probe for further information following initial responses. As well, semi-structured interviews allow participants to respond to questions in the way that they normally speak, rather than forcing them to organize information into more formal written responses (Neuman, 2000). Finally, the use of semi-structured interviews can be an ongoing process with an indistinct beginning and end (Neuman, 2000). This means that the researcher can conduct further interviews should the initial responses suggest the need for additional detail, or a change of research focus. Each of the above factors contribute to the gradual building of trust between researcher and participant, which potentially allows participants to respond more openly than they might under other circumstances (Neuman, 2000). The process of trust-building was of particular importance in Cuba, where people are sometimes wary of sharing personal opinions, especially those of a critical nature, with foreigners.

The first set of interviews was conducted with key informants, including several producers and a variety of people involved in the Cuban agricultural sector (see Table 4.1). Contact with most of these informants was made during the aforementioned three week field course. Additional participants were found using a snowball strategy, which Neuman

(2000) notes is common during field research. These interviews were primarily conducted during the first field season, although several key informants were also interviewed during the second research trip. The primary themes that characterized discussions with most key informants included: the nature of their involvement in the Cuban agricultural sector, and specifically with agroecology in Cuba; how they define sustainable agriculture; what motivates them to support sustainable agricultural development (or not); the constraints on agroecology in Cuba; the involvement of various parties in the move towards agroecology in Cuba; and thoughts on the future of Cuban agriculture. Producer key informants were additionally asked about their farms and farming techniques. Because most of the key informant interviews took place during the first field trip, in addition to providing data for the thesis they were also an important means of refining the research objectives and discussion themes. For example, initial interviews with producer key informants revealed that often there is no clear dichotomy between organic and conventional producers in Cuba. Obtaining this kind of contextual information helped me to prepare for the more in-depth interviewing process with producers in my case study community that took place during the second field period.

The second set of semi-structured interviews for this thesis was conducted with twelve Cuban producers and their families from the municipality of San José de Las Lajas in the province of Havana. (Data from these interviews is cited in the text using roman numerals.) Between two and six visits were made to each family over a period of six weeks, and the interviews took place in various locations, including people's homes, fields, and points of sale. The length of the visits varied from one hour to an entire day. The interviews were informal, and often several family members would be present, thus comments from producers were often augmented by friends or relatives who were present during the visits. I was introduced to the majority of the research participants by the person who acted as my advisor during my stay at INCA. As "someone with formal or informal authority to control access to a site" (Neuman, 2000: 352), he was able to act as my 'gatekeeper,' allowing me to visit sites and people that would normally be off limits to foreigners in Cuba. The choice of participants was designed in collaboration with

INCA, and was intended to reflect a variety of production types as well as geographic and economic diversity. Producers recognized for their relatively high input methods, or conversely for their model organic production, were included in the sample, as were a number of producers who were considered to be more representative of the norms for the community. Once initial participants were identified, others were found using a snowball strategy. Rough notes were taken during each interview, and these were expanded upon when the interview was completed.

Although I began my work in San José de Las Lajas with an initial set of interview themes and questions based on my literature research and the information gleaned from interviews and observations during my first field period, changes were made throughout the data collection process. These changes were based upon suggestions from INCA staff, as well as on the advice and comments of the participants themselves. For example, although I did not initially intend to ask producers about their personal patterns of food consumption, this theme was added because it was frequently raised by participants and was also considered important by INCA staff. The major themes that were covered during the interviews included (but were not limited to): general information such as age, education level, length of time farming, etc; land tenure; farm size; crop variety and rotation; machinery; energy sources; animals; soil fertility, including methods for fertilization and satisfaction with these methods; irrigation; pests and disease, including methods for management and satisfaction with these methods; human resources; processing, distribution, and sales; income; major challenges/problems and potential solutions; relationships with state and non governmental agricultural institutions; desired changes both on and off farm; and environmental sustainability and agroecology. (For a more detailed list of themes and sample questions, see Appendix B.)

4.3.2 Participant Observation

Neuman (2000) notes that participant observation is an extremely useful form of data collection, particularly during field research conducted for case studies. One of the primary benefits of participant observation is that it allows the researcher to gradually

develop an understanding of the subtleties of a particular situation, thus moving beyond superficial understandings and uncovering the core meanings that underlie particular processes or actions Neuman (2000). This deep understanding is possible because participant observation can take place over a long period of time, it provides large amounts of detailed information, and it allows for a gradual building of trust with participants. Creswell (2003) points out that participant observation can also provide the researcher with information that may not be shared in more direct forms of data collection, such as interviews, because of some discomfort on the part of participants. Some potential drawbacks associated with participant observation include the fact that the researcher may be viewed by participants as being intrusive, the researcher may observe private information that cannot be used in the study, and the researcher may have difficulty keeping track of the vast amounts of detailed data that are available through participant observation (Creswell, 2003).

In spite of the potential limitations of participant observation, this form of data collection is very valuable and was used throughout both field work periods. During my first field visit, I had the opportunity to attend many meetings and demonstrations at CPAs and CCSs, CREEs, research institutes, and universities. During these encounters I was able to observe interactions between cooperative management, producers, and representatives of ANAP, as well as amongst researchers and technicians. During the second field visit to Cuba I lived on site at INCA in the rural municipality of San José de las Lajas. As such, I had daily interactions and exchanges with Cuban graduate students, researchers, technicians, producers, and others who are directly involved in the study and practice of Cuban agriculture. I also had the opportunity to participate in cooperative meetings and extension workshops, where I observed how producers, researchers, and technicians communicate in the attempt to build a better agricultural sector. Finally, because I lived in Cuba for a total of 5 months, I was able to observe many aspects of daily life that, although not always directly related to my research questions, added depth to my understanding of how Cubans make decisions and helped me situate my results within the general socio-political context of Cuban culture.

4.3.3 Participatory Research Methods

According to Chambers (1995: 30), participatory research is "an empowering process, which enables local people to do their own analysis, to take command, to gain confidence, and to make their own decisions." It was initially designed with the specific aims of addressing issues that face the rural poor, and providing opportunities for sustainable, bottom-up development strategies. The use of some participatory techniques was appropriate for this study, in part because the research addressed some of the very issues for which participatory research was first developed (i.e. rural poverty and revitalization, and the sustainability of rural livelihoods). Because techniques have been developed with the goal of working with rural people, many of them are geared toward providing insight into farm structures, and other farm-related information, making them ideal for research on sustainable agriculture. As well, participatory techniques have been designed with the specific intention of allowing participants to actively engage in the research process, and be viewed as experts who can critically evaluate their own situation. Thus, the techniques are consistent with the framework that helped to guide this study. Participatory techniques are also particularly relevant for research in rural Cuba, where a concerted effort has already been made to create extension programs that are participatory in nature, and view rural people as subjects in their own development as well as experts in their field (Rosset and Medea, 1994).

For this study, the participatory techniques that were used included mapping, seasonal calendars, and transect walks. The transect walks were generally enjoyed, and in many cases even suggested, by participants. They were also useful in terms of providing information that producers may not have thought to include during more direct questioning. For instance, in many cases transect walks revealed the presence of crops that had not been identified during interviews. In addition, some producers tended to be noticeably more comfortable engaging in conversation during a transect walk than in a more direct interview. As such, many open comments were made during the walks on a variety of themes. In contrast, the creation of maps and seasonal calendars made many

participants uncomfortable. Producers often became embarrassed when asked to map their farms, many noting that they were incapable of the task and asking me to make the map for them. Because I had no desire to coerce people into research activities that are meant to be participatory, mapping and seasonal calendars were frequently abandoned. This problem reflects critiques that Chambers (1995) himself makes regarding participatory research methods. For example, he notes that they may place undue burdens and expectations on some participants. In addition, the techniques can be used in a manner that is too rigid, rather than being flexible and responsive to the needs of a particular context, allowing researchers to use the terminology of participation without actually ensuring that participants' input is meaningful.

4.3.4 Secondary Sources

Creswell (2003) notes that the use of secondary sources provides the researcher with access to information that may be more thoroughly thought-out and carefully prepared than data that is obtained from primary sources. Secondary sources are also a relatively unobtrusive way of collecting data, because examination of these sources does not make the same kind of demands on participants' time that is a part of primary data collection techniques such as interviews (Creswell, 2003). However, researchers should be aware that, although secondary sources are often in the form of written data, they may contain the same potential biases and omissions that can be associated with primary sources (Neuman, 2000). While in Cuba, I was able to access many secondary sources that were not available in Canada. Books, conference proceedings, research reports, journals, and pamphlets all helped me to addresss the research questions. These sources, almost all in the Spanish language, were generally written by Cubans involved in the agricultural sector, with ties to either research institutes, universities, associations, or NGOs.

4.4 Data Analysis

Neuman (2000) explains that, generally, the specific forms of data analysis that will be

used in qualitative research are not determined until data collection has begun, or sometimes until it is complete, and as such my analysis of the data was an ongoing process that began during field work and continued throughout the writing of the thesis. The primary form of data analysis was the coding of my interview notes and field journal. Although I had developed several potential coding themes based on my literature research, these themes shifted during my initial trip to Cuba, and evolved further during my second field period. Following Neumans's (2000) suggestion, while I was in the field I used 'open coding', in which information is divided into broad categories on a regular basis in order to determine the major themes that are emerging from the data. As major themes began to emerge from the data, axial coding was used. Neuman (2000) explains that axial coding involves making connections between themes, combining some narrow themes into broader ones, and narrowing some broad themes into sub-themes. When the data collection process was complete, I began to adjust my initial data analysis results through a process of selective coding. In this final form of coding that took place during the writing of the thesis, I identified the most important themes and attempted to reorganize data around those themes.

4.5 Strategies for Validating Findings

Research validity refers to the honesty or truthfulness of a research study, and in qualitative studies this tends to be measured by the authenticity of the data that is presented (Neuman, 2000). Triangulation has been identified as one of the most important ways of ensuring the validity of qualitative research (Neuman, 2000; Creswell, 2003). In an effort to triangulate my results, I compared my findings from semi-structured interviews, participatory methods, participant observation, and secondary sources. This cross-checking of results helped to ensure that my interpretations of the data were valid, and did not stem from one form of data collection alone, but rather proved to be consistent across a variety of data collection techniques. In addition, during the data collection process I regularly asked participants for their opinions of initial coding themes and key research

ideas to enable them to communicate any errors in interpretation and analysis that I may have made. This process of 'member-checking' is a recognized method for improving the validity of qualitative research (Creswell, 2003), and it also had the benefit of allowing participants to play a more active role in the research process. The final method that I used in an effort to achieve the highest possible degree of authenticity in my research was the use of thick description, which involves the presentation of as much relevant contextual detail as possible in the case study (Neuman, 2000). Identifying my own role as a researcher is also related the validity of the study, and this issue will be addressed thoroughly below.

4.6 Reflexivity and the Role of the Researcher

While current thinking generally suggests that the researcher plays an important role in determining the outcome of any research study, there is some suggestion that this is particularly true for qualitative studies (Neuman, 2000). Thus, it is highly important for qualitative researchers to be aware of their own positionality and potential biases, and the role that they will play in determining research outcomes. England (1994: 82) refers to the process of identifying one's position and potential biases as reflexivity, and defines it as "self-critical sympathetic introspection and the self-conscious analytical scrutiny of the self as a researcher." Being reflexive involves recognizing the positionality, biases, and power dynamics that are created by factors such as a researcher's gender, age, race or ethnicity, and nationality. This process is an essential element of qualitative field work, and it helps to address the potential problem of appropriating or "colonizing" the voices and experiences of participants (England, 1994).

In terms of my own reflexivity for this research, it was important for me to recognize my position as a young, white, middle-class, English-speaking, Canadian woman, who has been raised in an urban environment, and has a university education. As such, there were some inherent challenges in terms of my ability to understand the realities of Cuban producers. For example, many Cubans feel a strong desire to present a positive

image to foreigners visiting their country, and this may have coloured some people's comments. In addition, some research participants are aware of Cuba's image as a global leader in sustainable agriculture, and thus it is possible that they framed their comments to maintain this image for a visiting foreigner. Despite these issues, the potential gap between me and the research participants was in many ways mitigated by the warm and open nature of the people with whom I worked, which allowed me to develop deep personal relationships, and thus gain a better understanding of their personal realities. This process was facilitated by the length of time I spent in the field and my lengthy and multiple visits with participants (which were sometimes primarily social and thus trust-building). In addition, my affiliation with INCA provided me with a degree of credibility in the eyes of many participants because of their knowledge of, and respect for, the institution's work.

As part of the process of reflexivity, it was also important for me to recognize my personal bias in favour of supporting a shift from conventional agriculture to more sustainable alternatives as a means of contributing to positive and sustainable rural development. These views were formed throughout my undergraduate degree in International Development (during which I specialized in rural and agricultural development), as well as during employment and volunteer experiences with several international aid and environmental NGOs. They were also affected by employment as an intern on an organic farm in Germany. Indeed, it was this belief that inspired me to conduct research on Cuban agriculture in the first place. Despite my personal feelings on the subject, I made a distinct effort to maintain an open mind, not ask leading questions, and specifically ask people to identify problems related to the implementation of agroecological techniques. However, while I made sure to remain aware of how my personal ethics might have affected the way I designed and conducted my research, I did not try to completely eliminate these effects, as they were integral to the nature of my research framework. Indeed, it is my hope that this research will be able to contribute in some way to a better understanding of the shift to agroecology in Cuba in order to help support sustainable agricultural development in Cuba and around the world.

4.7 Research Limitations

The growing body of literature that exists on conducting academic field work makes clear that the endeavour, while full of potential in terms of research findings and personal growth, is generally fraught with challenges (see for example Katz, 1994; Myers, 2001; Scott et al., 2006). These challenges can be particularly pronounced when field work is conducted in a context that is foreign to the researcher. In the case of my experience in Cuba, I was confronted with a variety of issues that limited my ability to conduct my research. These issues included my initial unfamiliarity with Cuban culture, the degree of my fluency in Spanish, and the reality of life in a developing nation like Cuba, where power outages are common, access to technology including telephones, computers, and the Internet is limited, and many things do not run as efficiently as might be expected in, for example, the Canadian context.

Each of these issues posed challenges to my ability to conduct research, and I was often required to adjust my approach, my plans, and my expectations accordingly. For example, the approach that I took when interacting with informants, the majority of whom were male, was sometimes affected by the machismo that colours many male-female relationships in Cuba, and I often faced dilemmas regarding how to deal with a sexualised atmosphere created by some research participants. I also had to be very flexible in terms of planning meetings and scheduling interviews, as people were often difficult to contact and would not always be available, even at pre-arranged times. An added challenge that required me to adjust my expectations was my inability to use a translator (the reasons for which will be discussed below). Although my Spanish skills were acceptable when I arrived in Cuba, and certainly improved dramatically throughout my time there, as a non-native speaker my communication with people was certainly limited by language. These issues, while challenging, were not insurmountable, and while they affected my research, they did not impede it dramatically.

4.7.1 Official Institutional Support

By far the most striking limitation that I experienced during the course of my research was the lack of official institutional support that characterized my first visit to the field.[1] Although I had some contacts prior to arriving in Cuba, and was able to make many more during my three week participation in a UBC sponsored field course, knowing local people proved to be far less important than having officially sanctioned institutional support, which I did not. While I did have some degree of affiliation with a Cuban NGO as a result of my participation in the UBC course, my specific research project did not have the formal backing of any Cuban organization. Neuman (2000) notes that lack of permissions can be a problem for research conducted in countries with more authoritarian governments, as there may be extensive regulations that directly limit research possibilities. Based on research experiences in Vietnam, Scott et al. (2006: 3) add that official institutional relationships and passing "through the proper channels, from the top down" are essential for foreigners hoping to carry out research, particularly in areas that have traditionally been restricted to outsiders. In Cuba, any areas that are not officially designated for tourists are off limits to foreign visitors without special visas or other forms of official permissions. The Cuban authorities are particularly sensitive regarding rural areas and farms. As a number of people explained to me, this concern stems from a history of American-based attempts to introduce harmful species or diseases designed to destroy Cuban crops and livestock. Another potential concern for the Cubans could be to limit the possibilities for critical evaluations of their agricultural sector, as agricultural reforms have been one of the cornerstones of the Revolution, and thus the

[1] It is worth noting, for the purposes of comparison, that research conducted for a third party on the subject of handicrafts during this same visit to Cuba was relatively easy, and interviews with artisans were carried out without problems despite my official status as a tourist. This is likely a result of artisans' position as people who are expected to interact with tourists, and their accessability in locations, such as craft markets, where the presence of a foreigner would not arouse suspicion. The stark contrast between the two projects highlights the lack of clarity regarding what kinds of research may be possible to conduct in Cuba without official permission, and what is not possible. This ambiguity helps to explain why I was unprepared for the degree of difficulty that I faced during the first field period.

sector's image both internally and abroad is very important to the Cuban state.

As a result of this situation my access to rural people, who I had hoped would be at the heart of my research, was severely limited during my first field period. Interviews with key informants were often challenging to organize; however, due the connections I had forged with a Cuban NGO during my initial few weeks in the country, and as a result of quite a bit of luck, I was able to conduct lengthy, and in some cases multiple, interviews with many key informants. In contrast, I was able to carry out very few interviews with Cuban farmers, and was unable to employ any participatory research techniques, or to engage in any extensive participant observation. Despite having individual contacts within institutions (such as ANAP) who made their best efforts to help me achieve my goals, we were consistently frustrated by the extensive bureaucracy that characterizes most Cuban organizations and by the aforementioned difficulties regarding foreigners visiting agricultural sites. For example, agreements developed with municipal branches of associations could not be honoured because national level approval was not forthcoming. Thus, I was left with a choice between attempting to informally or clandestinely conduct interviews with farmers - not an easy or ethically comfortable task - or leaving the country and attempting to organize a second visit.

In the end, I left the country with an unsatisfying amount of data, and thus decided to begin the process of planning a second visit. Based on the information I obtained during my first field period I knew that, to be successful, I would have to find an organization that would be willing to officially support my specific research project and invite me to Cuba. After several months of communication with a variety of NGOs, university professors, ANAP, and INCA, I was able to develop a formal arrangement with INCA in which they accepted my research proposal and offered me their official support. Five months after returning to Canada from my first visit I received a D2 visa from the Cuban consulate in Toronto, and three days later I left for a second trip to Cuba.

I cannot emphasize enough the difference that official institutional support made to my field work experience. During my six week stay at INCA I had a wide variety of resources at my disposal, including transportation, a library full of documents related

to Cuban agriculture, and the expertise of a number of professionals and academics. Most importantly, I was able to visit local farms, speak to local people, attend meetings and workshops, all without restrictions. In addition, people from both INCA and the general community of San José were extremely open, supportive, and eager to assist me in achieving my research goals.

While my second field visit was in many ways restriction-free when compared to my first field experience, it should also be noted that research can be limited indirectly in countries with strong central governments, as people may be unwilling to be critical of state policies and programs (Neuman, 2000). It is impossible to be sure of the extent to which this issue may have affected the research presented in this thesis; however, participants (both key informants and producers) proved on many occasions to be willing to make very critical comments, thus suggesting that they either felt that this would not be a problem, or were comfortable with my commitment of confidentiality.

Chapter 5

Defining Alternative Agriculture in Cuba

Introduction

Perhaps one of the more difficult issues to broach in a discussion of sustainable agriculture in Cuba is the personal beliefs that people have regarding the agricultural transition that is occurring, including how they define sustainability, how they feel about the implementation of agroecology, and their mentality regarding the future. The following discussion attempts to draw on the data to illuminate some of these ideas. The chapter begins with a description of the twelve farms in San José de las Lajas that formed the basis for the case study, examining issues such as land size and tenure, crops and livestock, and input use. The following section explores the way that Cuban agriculture is defined, both by producers, and by those who work on the periphery of the agricultural sector conducting research and development or working on agricultural extension in some capacity. This discussion is accompanied by an exploration of the motivations that underlie definitions of terms such as 'sustainability,' 'organic agriculture,' and 'agroecology.'

5.1 An Introduction to 12 Cuban Farms

5.1.1 Background Information

The participating producers ranged in age from being in their early 30s to early 90s, with the average age being in the mid 50s. Each farm (in officially rural areas) or parcel (in officially urban or peri-urban areas) supported an average of 5 people, generally family members. All producers had at least a grade six education, while only four had achieved the level of *'tecnico medio'* (similar to a college degree), two in agronomy, and two in unrelated subjects. None of the producers had attended university. In addition, besides the two technical agronomists, none of the producers had any formal agricultural education. Four of the 12 producers either owned land themselves prior to the 1959 Revolution, or had parents or grandparents who did. Of the eight producers who did not own land prior to the Revolution, all became involved in agricultural production in the years following the onset of the Special Period. For these people, the decision to enter the agricultural sector was related to the collapse of other industries as well as state incentives to take on land for food production. While their previous employment experience included work in the construction, hotel and restaurant, machinery, smelting, and textile industries, and few claimed to have had farming expertise prior to beginning their agricultural endeavours, many of these people were born and at least partially raised in the *campo*, and thus had at least a basic affinity for, and understanding of, farm life.

5.1.2 Land Size and Tenure

Four participating producers had holdings of at least 30 hectares before the triumph of the Revolution, and these farms were primarily dedicated to cattle raising and dairy production. Following the introduction of Revolutionary land reforms these producers were allowed to maintain only two hectares, mainly for subsistence use. This amount was considerably less than the maximum officially allowed under the agrarian reform laws because the municipality of San José de las Lajas was subject to what producers referred

to as a 'special plan' (Interviews VIIa, IX, 2006). Under this plan, the state took control of the majority of the municipality's land in order to develop highly mechanized coffee and bean production. This program proved to be unsuccessful for a variety of reasons, including the use of imported varieties not adapted to local conditions, lack of water, and insufficient technical knowledge and expertise, and the land was eventually transformed into large scale citrus and cattle farms (Interview 24a, 2006). However, with the onset of the Special Period the state embarked on a program to gradually return land to *campesinos* deemed capable of working it in a productive manner (Interview 24a, 2006). As such, in accordance with general trends of dismantling state farms across the country (Deere et al., 1998), at the time the research was conducted many large state holdings in San José de las Lajas were being transformed into much smaller independent or CCS farms. Of the farms included in the case study, only two were larger than five hectares - one being 27 hectares and the other 60. This was generally reflective of independent and CCS farming in the municipality, and one farmer explained that "large farms like the ones in Canada are not a concept in Cuba" (Interview I, 2006).

In general, the producers expressed satisfaction with the size of their farms. Only those who already had sizeable farms showed any real interest in expansion. However, the primary reason cited by those with small holdings for not desiring more land was an inability to take on any additional work, rather than a belief that the size of their farms was ideal. For example, many producers noted that they already worked too many hours and could not find enough labour to assist with farm tasks, and thus had no interest in taking on added responsibilities that would take more time away from family and leisure activities, even if there might be opportunities for income improvement. In addition, several producers noted that, even if they had interest in expansion, it would not be possible because of limits such as the boundaries of other farms, highways, or hills. One producer did explain that expansion could be very useful for those with small holdings because it would make it easier to develop more extensive crop rotations, introduce more fallow periods, and keep more animals; however, even he did not seriously consider the possibility of more land because of the increased labour that would be required (Interview

IX, 2006).

While the majority of the producers had thus not made any attempts at expansion, and showed no desire to do so in the future, this was not the case for the two farmers with more significant holdings. One of these producers had a history of expanding his farm by taking over state pasture over the past seven years and, at the time of research, the other had a proposal under revision to expand his farm by adding an additional 14 hectares owned by the state. The process of farm expansion required application to the government, and both farmers explained that the prerequisite for a successful application was to be able to prove to state officials that you are a productive farmer who would take advantage of added land, using it in an efficient and effective manner. As one producer's sister noted: "If you give to the state, the state will give to you" (Interview VIa, 2006). Thus, if you reliably provide large quantities of high quality food to the state, there is a greater chance of being permitted access to more land.

Eight of the twelve participating case study farms were incorporated into CCSs, while two farms were classified as independent, and two others as urban gardens.[1] In terms of land tenure, the only case study producers who officially owned their land were those who had holdings prior to the Revolution. The rest worked land officially considered to be in usufruct (i.e. owned by the state, but offered to farmers for rent free use). However, as one producer emphatically pointed out: "Fidel says that whoever works the land owns the land, and we work it so we own it, because Fidel's word is the law here - it is sacred" (Interview VIII, 2006). Only one of the producers interviewed voiced negative feelings

[1]Nationwide, CCSs are the most common form of private farm organization, covering approximately one million hectares as of 1998 while CPAs covered 700 000 hectares (Álvarez, 2002). Taking into account independent farms as well as the cooperatives, approximately one quarter of Cuban farmland is owned privately (i.e. not by the state) (Álvarez, 2002). As of 1997, UBPCs were the predominant form of land management structure, occupying approximately 40 percent of Cuban farmland (Martín, 2002). The remaining 35 percent of land still remained managed by the state. It should also be noted that, as of 1997, over 400 hectares were devoted to urban agricultural production (Altieri et al., 1999). The numbers for CCSs, CPAs, UBPCs, independent farms, and urban gardens are all currently experiencing growth, while the state sector is in gradual decline.

about his land tenure status, expressing frustration that he had to renew his access to pasture land for his cow every two years (Interview IV, 2006). He explained that this process involved a lot of paper work and bureaucracy and, although he had never had a problem renewing his access, he resented the insecurity of having to continuously reapply. While none of the other producers themselves expressed dissatisfaction with their personal land tenure status, several did comment that, in general, people take better care of things that they own, and that a lack of land ownership in Cuba has contributed to general agricultural underproduction.

5.1.3 Crops and Livestock

San José de las Lajas has never been a prime sugar or tobacco growing region due to its soil and climate. Partly for this reason its farms did not display the same trend toward monoculture that is still prevalent on the country's sugar plantations. In addition, relatively unsuccessful state attempts to develop extensive monocrop coffee, bean, and citrus production in the early years of the Revolution were eventually abandoned in favour of the encouragement of subsistence based production. As such, the farms that were part of this study demonstrated without exception the use of complex polycultures, growing between 15 and 35 different crop varieties throughout the year. This number of crops was generally reflective of agriculture in the municipality.

The farmers were responsible for meeting yearly production quotas that were determined in collaboration with cooperative management (in the case of co-op members) and representatives of *empresas* (state-owned companies). Quotas were determined by a combination of factors, including a farmer's amount of land, soil quality and number of available workers. The *empresas* paid the farmers a fixed price for all production up to the amount required by the quota. Some surplus production was used for household consumption, while the rest was sold either to the same *empresas* at a premium price or in the newly legal local private farmers markets. In the case that a farmer could not meet the quota, mandatory state crop insurance would cover the financial losses. For urban producers the situation was slightly different, as they were required to sell far less quota

production to the state for distribution in local schools, hospitals, and other institutions. They were thus able to sell the majority of their produce directly to individual local customers. These kinds of private sales take place outside of the ration system and allow Cuban consumers to supplement the diet provided in government stores.

The crops that have been most important in San José de las Lajas in the past include yucca (and other root vegetables such as *malanga*, potato, and *buneato*), beans, and fruits such as bananas, mangos, guavas, avocados, and oranges. At the time this research was conducted, these products remained staples of farm production; however, almost all producers were making an increasing effort to integrate vegetables such as lettuce, tomatoes, and cabbage into production plans because of the high value of these goods on the private market. Other crops grown by the producers included corn, squash, cucumbers, beets, spinach, peppers, onions, ginger, garlic, lemons, grapefruit, *mamey*, cherimoya, sugar cane, coconut, herbs (such as oregano, basil, cumin, anise, marjoram, and coriander), cacao, coffee, rice, soy, medicinal plants (such as *noni*), and ornamental flowers. In addition, farmers with grazing animals usually maintained a small area of pasture with a variety of grasses and in some instances legumes.

All but two of the farms studied in San José de las Lajas could be classified as mixed farms, combining plant crop production with the raising of at least one animal species. Of the producers that kept animals, all but one had chickens, while pigs and rabbits were also common. Other animals raised for food included goats, ducks, guinea pigs, turkeys, and fish. In addition, two farms kept bees, both to make honey and to assist with pollination. Half of the farms also kept oxen, which were used to work the land. Three of the six farmers that did not use ox teams had plots that were too small to warrant the use of the animals. The other three producers that did not work with oxen had all been farming since before the Revolution. Two had tractors from that period, while the third did have an ox team, however it was stolen and had not been replaced.

Life History: Pedro[a]: The Philosopher campesino

Although he grew up in the *campo*, Pedro went to college, got a technical certificate in law, and eventually settled into a career as a state worker for *la vivienda* (the Department of Housing). Then, in the early 1990s, he was convinced to return to his *campesino* roots and reinvent himself as a producer within the urban agriculture movement, which has been promoted by the Cuban government as a means to increase urban food security. While there is nothing uncommon about this part of the story, what makes Pedro unique has been his unswerving dedication to sustainable agriculture, not just as an economic necessity, but as a philosophical ideal, which he believes is essential for the long term survival of the planet and the human species.

Like all urban producers, Pedro is prohibited from using chemical fertilizers or pesticides; however, he goes a step further, attempting to reduce to a bare minimum his use of any external inputs, as he believes reliance on these inputs is contradictory to true agricultural sustainability. Although in the beginning Pedro's practices may have diminished his economic returns, his beliefs were more important to him than profits, and in the long term this attitude has paid high dividends. Indeed, today Pedro is one of the more successful urban producers, making a good living for himself and his family as a result of his reputation for quality produce produced in an ecological manner.

An outspoken advocate of his opinions, at a local gathering to discuss biological pest management, Pedro criticized the mentality that pests need to be completely removed from productive land, noting that even pests deserve to maintain their place in an ecosystem. As an example of his creativity, he challenged those who had problems with a common pest known as *vivijagua* to plant roses on their land, assuring them that the roses would attract the pests who would eat the leaves. Using this technique on his own land, Pedro found he could avoid damage

[a]Names have been changed to ensure confidentiality

to his crops, and develop an extra revenue source (through the sale of the roses), all without eliminating a life form from his agroecosystem. While Pedro knows that it is not easy to change people's mentalities, especially those that have been created over centuries of conventional agricultural experience, he is an eternal optimist, noting that every day more and more people are trying to learn about alternatives.

Always an innovator, Pedro has become somewhat famous for developing and patenting a unique irrigation system that does not require any external power source. While he already shares this invention with other community members (and has travelled outside of Cuba to conduct demonstrations as well), he dreams of being able to work more on agroecological extension. For example, he hopes to build a classroom on his land where he can teach agroecology and run workshops. In addition, he is eager to find access to a computer so that he can create a database to keep track of the experiments he runs with his crops, and work on publishing educational materials.

5.2 The Use of Agricultural Inputs

5.2.1 Machinery

Only four of the twelve participating producers owned tractors, while one additional producer had access to the tractor of a neighbour. Although it was common for a cooperative to own at least one tractor, members explained that access to these shared vehicles was almost impossible due to the high demand. In spite of the fact that nearly half of the farmers had access to tractors, much of the farm work was still done manually or with the use of oxen, and in all cases the tractors were used sparingly. This was primarily due to the lack of availability of both spare parts and gasoline, as well as the high prices of these inputs. Of the farmers that did not have tractors, three did not have

enough land to make the use of machinery worthwhile, two had very hilly land making the use of a tractor a difficult proposition, and two would have liked to use tractors, but had not been able to acquire them. In spite of the generally good opinion that all producers expressed regarding tractors as a means of saving labour, the majority also noted that they enjoyed using oxen as well, and valued the fact that oxen do not compact the soil in the way that excessive tractor use does.

While tractors were certainly an important fixture for many farmers, the most important farm machinery by far, as expressed by all producers, was a system of irrigation. As one farmer, who installed an irrigation system two years ago after decades of farming without it, noted: "Although it cost 40 000 Cuban pesos that took me years and years to save for, it has been worth it because without irrigation you have very little control over the success of your production" (Interview IX, 2006). In addition, irrigation was important to producers because it allowed for production of increasingly lucrative crops such as lettuce, cabbage, and tomatoes. The importance of irrigation was echoed by one of the producers who did not irrigate: "We plant our yucca and if it rains then we harvest and if it doesn't rain then we don't harvest" (Interview VIII, 2006). This, despite the fact that yucca was one of the most drought resistant crops grown in the region.

Six of the twelve case study producers had their own irrigation systems. Of these, four were sprinkler systems that ran on gas powered motors, one was an electric sprinkler system, and one producer had developed, and even patented, his own unique system of self-powered drip irrigation. For those whose irrigation pumps ran on gas, the ability to purchase fuel was a constant problem. As such, one had installed a hand crank to allow for manual pumping (see Fig. 5.1), and most expressed a desire to switch to an electric system. However, an electric irrigation system was only available in the difficult to come by Cuban convertible pesos, and was thus economically out of reach for all but the most successful producers. Because of the dramatic way in which irrigation can improve production, of the six farmers who did not have their own irrigation systems, three had already prepared wells and were merely waiting for the opportunity and available capital to install a power source (see Fig. 5.1).

Figure 5.1: *A water pump that has been modified to run on manual power when gasoline is unavailable (left); a well waits for the installation of a power source - the farmer hopes for a windmill - in order to become functional (right).*

5.2.2 Soil Fertility and Plant Health

Although there was a general consensus that the soil conditions in San José de las Lajas were fairly good, with only three producers describing their natural soil fertility as poor, all producers cited the need to fertilize the soil in some manner in order to obtain satisfactory production results. Prior to the Special Period, the most common methods of improving soil fertility in the region were the application of nitrogen, potassium, and phosphorous through chemical fertilizers, and the application of manure, and manure based compost. The chemical fertilizers were always readily available to be bought either directly from *La Agricultura* (a branch of MINAGRI that exists in all municipalities and provides resources for producers), or obtained from the cooperative. As a supplement to the chemical applications, sufficient quantities of organic material were also always available from the local state cattle farms.

At the time of research however, farmers explained that the situation had changed significantly. As one producer put it when describing the current availability of his traditional fertilizers: "Now there is nothing. Everything is lost. All our resources are lost"

(Interview XI, 2006). Indeed, in spite of the important role that soil fertilization played for all producers in terms of helping them achieve desirable production levels, only four farmers expressed satisfaction with their ability to fertilize their soil. Of these, two were urban producers and as such had prioritized access to available organic material and one had a state contract for goat milk production and, because this was a highly prioritized product, also received preferential access to organic material (in addition to that which he produced himself from his animals). The fourth producer who was satisfied with his access to fertilizer was well known as one of the most successful farmers in the municipality, whose high production levels also guaranteed him access to whatever was available from *La Agricultura*. In contrast, the majority of the farmers and their families expressed very serious concerns and frustrations regarding the lack of soil fertilization possibilities available to them, and the corresponding limiting effect on their harvests. This situation demonstrates just how dependent Cuban agriculture was on Soviet support, and how deeply affected local farmers have been by the 80 percent decrease in imported chemical fertilizers brought on by the fall of the Soviet Bloc (see for example Rosset, 1997; Deere et al., 1998).

In spite of the shortages, one of the methods still used to increase soil fertility was chemical fertilizer application. Chemical fertilizers were applied at least occasionally by almost all of the producers (the most notable exceptions being the two whose land was classified as urban, rendering chemical application illegal); however, the applications were very rare, primarily because the products were extremely difficult to come by. Most producers were hesitant to discuss the sources of the chemical fertilizers they used, suggesting that they were often obtained either as 'gifts' from friends who had access, or on the black market. As one producer explained, this could be potentially dangerous as being caught with illegally obtained fertilizer had the potential to result in punishment, including heavy fines or even jail time (Interview VIII, 2006). It should be noted that, although many producers did admit to using chemical fertilizers when they had the opportunity, this occurred so rarely as to render the rate of chemical application insignificant by the standards of modern industrial agricultural production.

In fact, although almost all of the producers made clear that they would have appreciated an increased availability of chemical fertilizers, seven of the twelve also made note of the negative effects of chemicals on human health and the health of the land, and pointed out that non-chemical fertilizers offer many benefits. For example, they tend to remain longer in the soil, and help the land maintain its moisture - an extremely important feature given the water shortages that affect the region. The non-chemical methods of soil fertilization used by participating producers included the application of manure, compost, *cachaza* (a by-product of sugar processing), crop residues, minerals, biofertilizers, and worm compost. Although it was a relatively recent innovation, worm compost was very popular amongst the producers, with many of them either using it already or citing an intent to begin to use it as availability increased. For example, at the time of research, one local cooperative was in the process of planning a worm compost centre to provide organic material to its members (Interview IX, 2006). Biofertilizer use had also been particularly successful, and *Ecomic* (a biofertilizer produced by INCA) for example was found to raise yields by 15-60 percent. However, the promise offered by alternative fertilizers was often limited by resource availability, as will be discussed further in Chapter 7.

In terms of plant health, the pattern of input use generally mirrored that of soil fertility, as chemical pesticides were very difficult for most producers to come by. However, the producers of San José de las Lajas were not nearly as concerned about pests and disease as they were about soil fertility, citing very few major problems with plant health. While chemical solutions to problems that did arise could occasionally be achieved in much the same manner as chemical fertilizers were obtained, in general non-chemical methods, although they do not eliminate all pests and disease, were perceived as satisfactory by most producers.

The primary methods cited by all producers for addressing pest and disease issues were crop mixture and rotation. Having a wide variety of crops planted in close proximity was a recognized means of confusing pests, and as such crops were generally grown in relatively small concentrations, for example one or two rows of a particular variety in a

Figure 5.2: *Corn intercropped with beans (left) as well as marigolds (right) help to keep pests at bay in San José de las Lajas.*

field, or a small grouping of trees. In some cases intercropping was used as well. The primary example of this was the mixture of corn and beans, which was employed on half of the farms, with several other producers indicating interest in implementing this mixture in the future (see Fig. 5.2). In addition, many farms used beneficial plants such as Neem trees and marigolds to ward off pests (see Fig. 5.2). Biocontrol organisms such as *Trichogramma* and *B. thuringensis* that, as discussed in Chapter 3, are produced in Cuba's network of CREEs, were only used by the two urban producers and on one rural farm. Although the literature cites the CREEs as a very important element in agroecological development in Cuba (see for example Pérez and Vázquez, 2002), and they are indeed a useful resource in many parts of the country, for the majority of the participating producers in San José de las Lajas CREE products were not available - a problem that will be discussed in more depth in Chapter 7.

5.3 Seeking Definitions for Alternative Agriculture in Cuba

Prior to beginning a discussion on how alternative agriculture in Cuba can best be defined, it is important to note that Cuba's entire agricultural sector is not yet moving away from conventional production. Specifically, the sugar industry is still generally character-

ized by large scale export-oriented monocrop production that is highly mechanized and dependent on agrochemicals, particularly fertilizers (see Fig. 5.3). A concerted effort is being made to decrease economic dependence on the sugar industry, and sugar production decreased significantly from approximately 80 million tonnes in 1990 to 23 million tonnes in 2003. During the same period, Cuban agricultural export earnings (dominated by sugar, with tobacco and distilled beverages a distant second and third in terms of importance) decreased from approximately 4 billion to 750 million US dollars per year (FAO, 2005). At the same time production of items for national consumption such as vegetables and plantains increased by a dramatic 2000 percent and 700 percent respectively (FAO, 2005). However, in spite of these changes almost one million hectares (or approximately one fifth of Cuban agricultural land) is still devoted to sugar cane and the crop remains one of the most important sources of foreign exchange for the Cuban economy. Because of its economic importance, there has been little push to advance the ideals of agroecology in the sugar sector, as maintaining productivity and profit is the primary goal. As such, although several projects to develop certified organic sugar for export do exist, the sugar industry will be generally left out of this discussion of alternative agriculture in Cuba. In addition, crops that are notoriously difficult to produce in an agroecological manner have largely been excluded from the transition away from conventional production. Most notably, potatoes in Cuba are still usually produced using high levels of agrochemical application.

The maintenance of conventional techniques in the sugar industry as well as in the vast majority of the country's potato crops suggests that, in spite of strong general support for agroecology, Cuban agricultural policy still remains rooted in a productivist framework. The state prioritization of productivity is also evident in the way that surplus production is encouraged. Each producer must meet a contractual obligation to the state, selling a previously agreed upon amount of production at very low prices to *la Agricultura*, before they can declare a surplus. If a surplus is achieved, it can be sold either at a premium price to the state (which is significantly higher than the initial contractual price), or on the private market at a price determined by supply and demand. Because premiums are

Figure 5.3: *Highly mechanized monocrop sugar plantations still dominate much of the Cuban agricultural landscape.*

only paid for surplus production the Cuban state encourages a productivist mentality, which many have argued is antagonistic to agroecological ideals (see for example Allen and Kovach, 2000; Guthman, 2002; Ikerd, 2005). Indeed, one of the most economically successful producers in San José de las Lajas noted that his "dream is to have a 100 percent organic farm, but it is not achievable because [he] cannot afford the decreases in yield that would result" (Interview VI, 2006). In addition, he noted that a decrease in production would also limit the availability of supplies, as *la Agricultura* reserves access to certain inputs for those producers who are deemed to be the most productive (Interview VI, 2006).

The focus on productivity in the agricultural sector suggests that the state may view agroecology largely as a pragmatic response to resource shortages and food security problems. Indeed, many key informants rejected the notion that the Cuban government is in favour of agroecology for philosophical reasons, instead suggesting that all but a few committed individuals within MINAGRI view productivity as the primary concern. This is perhaps not surprising given Bryant and Bailey's (1997) assertion that it is often very difficult for states, particularly in the Global South, to mediate between economic development needs and environmental conservation, and that the tendency is generally to favour economic imperatives over environmental concerns.

5.3.1 The View From the Farm

As demonstrated by the above data, the Cuban case study farms can generally be characterized by their small size, use of polyculture, crop rotation, fallow periods, mixed farming and animal traction, and the application of more biological inputs than chemical ones. In short, there is a very clear trend towards the conservation and recycling of on-farm materials and the minimization of off-farm inputs. The farms also tended to rely heavily on the labour of family or neighbours, and products that were not sold to the state were marketed locally. This holistic model of low input agriculture was also evident on the farms of key informants across the country, and is fairly consistent with what was described in Chapter 2, drawing on the work of Ikerd (1993); Altieri (1998); Vos (2000); Hall and Mogyorody (2001); Rigby and Bown (2003) among others, as an 'organic ideal'. However, there is a fair amount of doubt amongst Cubans involved in the agroecology movement at the level of organization, research, and extension regarding the extent to which this model has been adopted with conscious intent at the level of the average Cuban *campesino* (Interviews 20, 22, 24, 2005).

Indeed, the majority of case study and key informant producers expressed a strong desire for more access to resources such as agrochemicals, gasoline, electricity, and machinery. In addition, when describing their ideal farm, many referred to the conventional agricultural model that predominates in developed countries such as Canada, and tended to equate their current low input model with underdevelopment. One farmer expressed this yearning for modernity as defined by high input production, explaining in an almost embarrassed tone that "we are very backward now with agriculture in Cuba. We used to have everything. Everything was mechanized and all of the inputs were the best, but now we are incredibly backward" (Interview IX, 2006). He went on to note that he would love to have a farm like those in Canada, where airplanes dust crops, all the labour is mechanized, you can buy any inputs you need, and production levels are booming.

In addition to expressing frustrations with the lack of availability of conventional resources, most producers found it difficult to define what sustainability meant to them

and were generally unsure how to respond to questions regarding organic agriculture, sustainable agriculture, or agroecology. Thus, although a great deal of literature on the subject of Cuba's post Special Period agricultural transition refers to the adoption of 'organic' or 'sustainable' agriculture (see for example Rosset and Medea, 1994; Rosset, 1997; Warwick, 2001; Funes, 2002), and the data on farm practices largely supports this claim, very few producers were comfortable using this terminology. The combination of a sense of longing for the conventional methods that were much more easily practiced prior to the Special Period, and a general lack of consciousness regarding concepts of agricultural sustainability suggests that many sustainable farming practices had been adopted primarily for pragmatic rather than ideological reasons on the part of producers. Thus, while a small number of participating producers did consciously define themselves in terms of their ecological production, most instead viewed agroecological methods primarily as practical adaptations to the economic and political realities that govern their lives.

However, the fact that many farmers would like to have more access to inputs and could not readily define sustainability does not mean that there is a complete absence of ideological attachment to the principles of agroecology. On the contrary, several producers spoke passionately and eloquently about their philosophical belief in the need to preserve balance in the agroecosystem (Interviews 7, 8, 11, 12, 13, 2005; Interview I, 2006) and their mentality fit closely with that of the most ideologically driven of organic producers, as described by organic advocates such as Ikerd (2005). This high level of ideological commitment was particularly prevalent on urban farms, with one urban producer passionately explaining "how beautiful it is when you start loving the land" and going on to note that "chemicals are to soil what drugs are to human beings. They stimulate you, but they bring bad problems in the long run" (Interview 7, 2005). A CPA manager echoed this idea, stating that "agroecology is very very beautiful work, and productive and healthy" (Interview 11, 2005). Indeed, deep commitment to agroecology was more commonly expressed on participating CPAs than on CCS or independent farms. This could be related to the organizational structure of CPAs, in which a Com-

munist Party member sits on the management board and is responsible for on-farm 'ideology'(Interviews 8, 9, 2005).

Although most CCS and independent producers tended to be less enthusiastic about agroecology than their urban or CPA counterparts, several did express fairly clearly defined ideas regarding sustainable agriculture, and demonstrated an interest in achieving full organic production by eliminating chemical use completely and introducing alternative energy sources. In addition, while most noted a desire for more conventional inputs, and did not readily respond to specific questions about sustainability or organic production, they did generally demonstrate respect for the ideas of limiting chemical use (often referring to agrochemicals as *venenos*, or poisons), maintaining biodiversity, and minimizing tractor use as a means of protecting the soil.

5.3.2 Agroecology: Falling Short of the Organic Standard?

While most producers did not tend to identify themselves consciously in terms of their ecological production methods, those who worked in agricultural research, development, policy, and extension did generally seek to define the agricultural transition in Cuba and to place it within the context of global agricultural development. As such, within the realm of Cuban research institutes, universities, NGOs and other organizations, there was a high level of knowledge regarding the theoretical underpinnings of sustainable agriculture, and most key informants made reference to the need to include ecological, social, and economic concerns in the building of a truly sustainable agricultural sector (Interviews 5, 17, 20, 21, 24, 2005). This position echoes the literature on sustainable agriculture, much of which has called for the need to integrate the related concepts of environmental, social, and economic sustainability rather than view each in isolation (see for example Ikerd, 1993; Altieri, 1998; Rigby and Bown, 2003; IFOAM, 2006). There was also a general appreciation for the way in which the Cuban movement away from conventional production is reflective of broader global concerns about societal sustainability. However, like their farming counterparts,these research participants almost entirely avoided the term organic agriculture. Instead, they preferred to use the term agroecology

to describe alternative production in Cuba.

One reason for the preference of the term agroecology was that, although IFAD (2003) argues that the organic label may be appropriate regardless of certification status (particularly in the South where many barriers to certification exist), for many Cubans the term 'organic agriculture' still carried with it strong connotations of official regulatory certification. Although the levels of agrochemical use on many Cuban farms may be negligible, particularly when compared to the levels used in most conventional agriculture, very few rural producers had the 0 percent chemical application rates generally required by organic certification bodies. As a result, most research participants reserved reference to organic agriculture for the small amount of Cuban production that has, to date, been certified by international organic regulatory agencies. One researcher even went as far as to refer to Cuba's reputation as a global leader in organic agriculture as "somewhat false," noting that organics in Cuba is practiced in a very limited way, and generally only within the context of urban gardens or projects supported by international NGOs (Interview 23, 2005).

Indeed, with the possible exception of the urban producers, none of the research participants would have qualified for organic certification according to most regulatory standards, primarily because they have not completely eliminated chemical use. However, while chemical use was present on most farms, in all cases the rates of application were extremely low, and use was always targeted to address specific problems rather than being viewed as a preventative measure. One researcher commented on the minimal use of chemicals across Cuba, noting that while most Cuban tomatoes receive some chemical application, the levels are so much lower than those used in most countries as to render them virtually insignificant (Interview 19, 2005). Using coffee production as another example, he went on to explain that Cuban coffee could be described as "95 percent organic," meaning that only 5 percent of the problems that occur are dealt with through the use of agrochemical application. In the vast majority of instances, biological, cultural, or mechanical methods are used instead (Interview 19, 2005). Even in the most conventionally produced of Cuban crops, notably sugar and potatoes, the rates

of agrochemical application are far lower than is often the case in other countries. For example, although some chemicals, particularly fertilizers, are still used in the majority of Cuban sugar production, the levels do not come close to approaching those of other sugar producing regions such as the United States, where nitrogen is regularly applied indiscriminately at an excessive rate of 300 kg/ha (Interview 23, 2005).

In spite of very low application rates, the incomplete elimination of agrochemical use was an important reason why many research participants considered 'agroecology' to be a more appropriate, if less concise and cohesive, label for Cuban alternative production. Indeed, in contrast to the complete elimination of agrochemicals generally associated with organic agriculture in Cuba, agroecology was viewed more in terms of minimizing the environmental impacts of agricultural production, using the concepts of moderation and knowledge as a foundation (Interviews 19, 21, 23, 24, 2005). Within the framework of agroecological production, integrated pest and farm management is encouraged, allowing for some limited chemical use, although in a minimal way and only as a complement to a variety of other practices (Interviews 19, 21, 23, 2005). One producer used the analogy of antibiotics to describe the limited use of chemicals practiced within the Cuban model of agroecology, explaining that chemical use for a crop is much like antibiotic use for a human - it is a means of addressing a specific problem, but should be viewed as a necessary evil (Interview VIIc, 2006). This moderate approach was considered by many of even the most committed proponents of sustainable agriculture to be appropriate. As one researcher and highly regarded organic agriculture advocate noted, "Cuba may be the country with the best chance to achieve complete organic production, but it would not be logical. Some chemicals do not harm the environment, therefore you have to be smart, educated, and use moderation. You also have to remember that you can contaminate without chemicals, so it is very oversimplified to talk about the elimination of chemicals being equal to sustainability" (Interview 24, 2005).

5.3.3 Agroecology: Moving Beyond the Organic Standard?

The use of the term 'organic' to officially describe the majority of Cuban alternative agriculture may be precluded because most farms would fall short of meeting organic regulatory standards; however, as the above comment on the need to avoid oversimplification alludes to, in another sense the organic label itself falls short in terms of describing the multi-faceted changes that have been part of agricultural transition in Cuba. As discussed in Chapter 2, the organic label used in regulatory standards has been criticized for its focus on input substitution, and its relative silence on other issues such as monocrop production, non-renewable energy use, input and distribution networks, farm size, and labour conditions (see for example Allen and Kovach, 2000; Kaltoft, 2001; Rigby and Bown, 2003). When these factors are taken into consideration, agroecology as practiced in Cuba actually resembles in many ways a more holistic model of alternative agriculture, similar to that envisioned by those who have critiqued the conventionalisation of the organic sector that has been enabled by narrowly defined regulatory definitions of organic agriculture (Buck et al., 1997; Guthman, 2002).

Indeed, while the substitution of chemical inputs with biological ones has been an important aspect of agricultural transition in Cuba, many other elements have also been part of the shift away from conventional production. For example, oil use is being minimized by the increasing use of oxen to replace tractors, and in some cases by the introduction of alternative energy to fuel irrigation systems. In addition, increasing biodiversity (Leyva Galán and Pohlan, 2005) and decreasing farm size (Deere et al., 1998; Funes, 2002) are essential elements of alternative agriculture as practiced in Cuba. This trend is evident across the country, and was clearly demonstrated in San José de las Lajas, where even the most high input farms were relatively small by conventional standards, and included high levels of both plant and animal biodiversity. Finally, current agricultural production in Cuba relies heavily on local production and distribution of farm inputs, as well as on encouraging subsistence production and locally based consumption networks. Thus, although the occasional use of chemical inputs poses a potential problem for cer-

tification efforts (to be discussed in Chapter 7), and leads many in the country to define Cuban agriculture as 'agroecological' rather than 'organic', in a very important sense Cuban alternative production comes closer to what some view as the organic ideal, or 'deep organics' (Ikerd, 2005), than does much of the certified production that occurs in other parts of the world.

5.3.4 Genetically Modified Organisms (GMOs) in Cuba

As is the case in most of the world, the subject of GMOs is hotly debated in Cuba, and there is little consensus regarding whether or not they should play a role in the development of a sustainable agricultural sector. Some research participants were vehemently opposed to the inclusion of GMOs in an agroecological vision, while others believed that, although care should be taken, GMOs could potentially be compatible with agroecology because they could limit the need for chemical application without diminishing yields (Interviews 15, 19, 21, 24, 2005). In order to prepare for future possibilities, a substantial amount of research is being conducted on GMOs in Cuba; however, as of yet the use of GMOs in uncontrolled situations such as farmers' fields is prohibited without exception.

Part of the potential appeal of GMOs in Cuba is related to the Cuban desire to not simply practice an 'organic by neglect' form of production, which Rigby and Cáceres (2001) note can be just as unsustainable as industrial agriculture. Instead, the Cubans wish to develop a highly modern agricultural sector that employs the latest advances in technology to achieve both high production levels and long term sustainability (Interview 34, 2006). However, it is recognized that GMOs must still be carefully managed, and also that distinctions must be made between potentially positive uses of genetic modification (such as those that reduce chemical dependence, or increase the nutritional value of food) and those that are simply designed to consolidate the power of agrochemical TNCs (Interviews 19, 24, 2005).

5.4 Summary

Evidence gathered on twelve farms in San José de las Lajas as well as through farm visits and key informant interviews across the country suggests that Cuban agriculture today in many respects reflects the ideals of philosophically driven organic agriculture advocates. Characterized by small farm size, mixed farming, polyculture and crop rotation, animal traction, family labour, local distribution networks, and the minimization of off-farm resources (particularly oil and agrochemicals), agriculture on participating farms presented a model distinctly different from that of conventional production. The notion of a conventionalized organic sector dominated by large scale, highly mechanized farming, agribusiness control, and monocrop production was certainly not relevant, nor was the concept of profiting from price premiums available on the international market for ecological products. Although the use of agrochemicals still occurs, application rates were so low that no comparison could be made to conventional production methods. Thus, while most Cuban agriculture would not meet organic certification standards, in many ways it goes beyond these standards in terms of approaching the holistic ideal of a sustainable agricultural system.

However, while this holistic agroecological model of production has a fair amount of conscious support at the level of agricultural research, development, extension, and policy, the degree to which Cuban *campesinos* have internalized ideas about sustainable agriculture is still considerably low. Rather, many still demonstrate a desire to return to more conventional methods, and there is a sense that high production levels is a much higher priority for most than any commitments to agroecological ideals. As such, most Cuban *campesinos* would likely fall into the category of pragmatic organic producers and, should the political and economic conditions in which they live change significantly this would likely bring about a transition away from agroecology and towards more conventional farming methods. While one ideologically committed producer specifically noted he was willing to forgo gains in yield in order to maintain the integrity of his ecological production, the majority of Cuban farmers base their production decisions on

how they can best maximize yield. In addition, even amongst non-producer research participants, the desire to achieve national food security in the wake of the crisis brought on by the fall of the Soviet Bloc tended to be prioritized over the development of an idealistic sustainable agriculture sector. As such, the suggestion made in Chapters 2 and 3 that there may be a connection between a Socialist system and sustainable agriculture (Foster and Magdoff, 1998) and that alternative production in Cuba is reflective of true Socialist agriculture (Funes, 2002; Levins, 2002) was not borne out by the data in this study.

Chapter 6

Institutionalizing Agroecology

6.1 Introduction

Although Chapter 2 noted a trend towards a decreasing role for the state in environmental governance (see for example Sonnenfeld and Mol, 2002; Jonas and Bridge, 2003; Lane, 2003) and also highlighted the strong correlation between sustainable agriculture and participatory development (see for example Pretty and Hine, 2001; Pugliese, 2001), in Cuba there is no doubt that much of the impetus for the development of agroecology has come from 'above'. That is, the shift away from conventional production has been both led and facilitated by institutional structures, including the government, research institutions, NGOs, and other associations. The primary actors in this movement have included: the *Asociación Cubana de Agricultura Orgánica* (Cuban Association of Organic Agriculture, or ACAO), which was eventually incorporated into ACTAF as the *Grupo de Agricultura Orgánica* (Organic Agriculture Group, or GAO); ANAP; NGOs such as *La Fondación por la Naturaleza y el Hombre* (The Foundation for Nature and Man), and the *Consejo de Iglesias de Cuba* (the Cuban Council of Churches); the network of national agricultural research institutes including INCA, the *Centro Nacional de Sanidad Agropecuaria* (National Centre for Agricultural Health, or CENSA), and the *Instituto Nacional de Investigaciones Fundamentales en Agricultura Tropical* (The Institute for Fundamental Research in Tropical Agriculture, or INIFAT); agricultural universities and

schools, including the *Universidad Agraria de la Habana* (Agricultural University of Havana, or UNAH); and some elements of the Cuban government.

In this chapter, the data collected regarding how some of these institutions have been involved in promoting agroecology, as well as the underlying motivations for this involvement will be examined. In the first section, non-state institutions will be discussed. This will be followed by an examination of how some state organizations work to ensure that producers shift away from conventional farming techniques. Both the advantages and disadvantages of the strong state role in Cuban agricultural transition will be explored. Finally, some possibilities for more participatory agroecological development in Cuba, including the potential for state-society synergy, will be assessed.

6.2 Key Non-State Actors in the Cuban Agroecological Movement

As discussed in Chapter 3, one of the prominent leaders in agroecological extension in Cuba has been ANAP, particularly through its *campesino-a-campesino* program (Álvarez, 2002; Perera, 2002). While this program has certainly had a great deal of success in some parts of the country in terms of helping farmers adopt agroecological production techniques (Perera, 2002; Interviews 9, 13, 26, 2005), none of the producers in San José de las Lajas were familiar with it, as its influence has thus far not reached all provinces or municipalities. Indeed, the producers of San José de las Lajas did not generally have a great deal of contact with ANAP, viewing it primarily as a political organization, rather than an association designed to offer them direct assistance (Interview IX, 2006).

Like ANAP, ACTAF is a non-governmental organization that conducts work on agricultural extension and has played a central role in the transition to agroecology in Cuba. Indeed, the group that received the alternative Nobel prize in 1998 for its work promoting sustainable agriculture was eventually incorporated into ACTAF. Based out of its headquarters in Havana's Ministry of Agriculture Building, ACTAF focuses on build-

ing capacity and communication networks in order to facilitate producers' adoption of agroecological techniques (Interview 21, 2005). Part of its work includes the administration of agroecological lighthouses (or model farms used for teaching), the publication of resources that teach alternative production methods, and the organization of events across the country that are designed to promote the ideals of sustainable agriculture by educating both producers and consumers (Interview 21, 2005). A particularly important new program has recently been implemented by ACTAF in which producers can qualify to receive a *sello agroecológico* (agroecological stamp) that goes some way towards certifying their production. Although this agroecological stamp does not meet the standards of international organic certifying bodies, and is not recognized outside of Cuba, it may be an important step in the direction of achieving international certification for Cuban organic production (Interview 21, 2005).

Other NGOs such as the Cuban Council of Churches and the Foundation for Nature and Man may be less prominent than ANAP and ACTAF, but they nevertheless act as strong supporters of agroecology in Cuba. Both organizations receive considerable support from international donors, and with this support they have published extensive materials on agroecological education that address both theoretical issues and also offer practical advice and training for producers (Interview 20, 2005). In addition, the Foundation for Nature and Man has played an integral role in the development of an ecological village in eastern Cuba that is based around the principles of agroecological food production.

The considerable work done by Cuban NGOs to promote agroecology is complemented by a vast network of research institutions, universities, and technical schools, where research programs and curricula are becoming increasingly focused on the promotion of agroecology (Interviews 4-6, 15-18, 24, 2005). The municipality of San José de las Lajas is home to several of these institutions, including INCA, CENSA, and UNAH. Because of its national prominence, its importance in the case study municipality, and the support that it provided for this research, the role that INCA plays will be closely examined to provide an example of the work done in similar institutions around the country.

Although INCA does not devote its research agenda entirely to the promotion of agroecology, many of its projects and programs are aimed at addressing the need for an agricultural paradigm to replace that of the Green Revolution (Interview 34, 2006) (see Fig. 6.1). INCA envisions this paradigm as one that enables development of a "true modern agriculture" that is sustainable, but also intensive, diverse, and incorporates the notion of adding value to products (Interview 34, 2006). With these goals in mind, several INCA projects have been highly important to the agroecological movement, particularly the development of *Ecomic* - a biofertilizer composed of mycorrhizal fungi that increases a plant's ability to retrieve nutrients from the soil - that is now used extensively in Cuba and also exported across South and Central America (Interview 22, 2005). In addition to the important work INCA conducts with mycorrhizae and biofertilizers, it also has projects that focus on topics such as the use of *cachaza* and other green manures, conservation tillage, reintroducing native seed varieties and increasing agricultural biodiversity (Interviews 22-25, 2005; Interview IX, 2006).

In accordance with the general principles of scientific research in Cuba, INCA places a high priority on putting its academic results into practice through workshops, dissemination of literature, and the distribution of its products. Indeed most of the participating farmers in the municipality of San José de las Lajas cited assistance from INCA as an important contribution to the success of their farms. In some cases this assistance is formal. For example, in the community of Zaragoza a number of producers were working with INCA to, among other things, improve biodiversity by increasing the number of bean varieties used and introducing the use of non-traditional crops such as soy, hibiscus, and vegetables like carrots and Chinese cabbage. The goals of this project include the re-introduction of local varieties that have been lost as a result of years of focusing on high yielding varieties, as well as the introduction of new species that could offer both environmental and economic benefits to producers (see Fig. 6.1). Extension and education programs such as those provided by INCA are extremely important, particularly given the fact that, as noted in Chapter 2, a lack of available agroecological education and information tends to be a serious constraint to the adoption of sustainable agriculture in

Figure 6.1: *A field experiment tests a number of bean varieties to determine which is best suited to local conditions (top left); producers attend an INCA sponsored meeting to receive new seed varieties (top right); a farmer demonstrates his integrated pest management strategy at a workshop on biological pest control (bottom left); an INCA technician works to develop sustainable methods that can be transmitted to local producers (bottom right).*

many communities in the South (Pretty and Hine, 2001; IFAD, 2003).

INCA also collaborates with other research and educational institutions in support of agroecological extension. For example, on February 18, 2006 a workshop on biological pest management was held at *Las Papas* - INCA's experimental farm (see Fig. 6.1). Approximately 50 people attended, including workers from INCA, *Las Papas*, CENSA, and *Sanidad Vegatal*(the branch of MINAGRI responsible for plant protecion, or SV), UNAH students, and a number of both urban and rural producers. Almost one quarter of the participants were women, including a nationally prominent CENSA biocontrol specialist. The workshop began with one of the organizers employing the famous slogan used by Fi-

del, "*Sí, se puede*" (Yes we can), explaining that the goal of the day was to demonstrate that alternatives to chemical management of pests are possible. Indeed, over the course of the day, researchers, technicians, farmers, and students shared information regarding a wide variety of biological pest management methods, from beneficial plants such as Neem and sassafras, to beneficial organisms such as *Trichogramma*, *B. thuringensis*, and certain nematodes, to cultural methods such as crop rotation. Towards the end of the day, an exchange student from Belize commented on how inspiring he found workshops such as these, noting that in his country "everything is chemicals, chemicals, chemicals. There are no workshops like this for farmers to learn about other possibilities and because there is a lack of information the mentality is not the same."

6.3 The Role of the State in the Transition towards Agroecology

6.3.1 The Importance of State Involvement in Agricultural Transition

While the actions of non-governmental associations such as ANAP and ACTAF and research institutes such as INCA have played an integral role in the transition to agroecology in Cuba, the role of the state must not be overlooked. Indeed, the Cuban state, particularly through MINAGRI and SV, has become one of the central figures in the Cuban agroecological movement. The notion of strong state support for sustainable agriculture has been recognized as an important, albeit in most contexts missing, element in terms of enabling the adoption of sustainable production practices, developing markets for sustainably produced products, and helping to ensure that alternative production can be translated into more general sustainable development goals such as improvements in rural quality of life (see for example Pretty and Hine, 2001; Gomez Tovar, 2005). In addition, as one Cuban researcher noted, "the biggest contaminators in the world are governments, who contaminate for economic or power interests or allow others to con-

taminate for those reasons" (Interview 24, 2005). As such, in spite of the increasing focus on participatory development discussed in Chapter 2 (see for example Chambers, 1987; Nederveen Pieterse, 2001), a state role in addressing environmental issues, both in general and in the agricultural sector specifically, remains important. This necessity is emphasized by Bryant and Bailey (1997), who argue that the state can be a particularly important player in environmental governance because of their ability to mediate between the local, national, and global scale.

The necessity of state support is particularly striking within the Cuban context. In a free market economy goods and services are supplied and, although there is some government regulation in terms of controlling consumption, the primary factor that constrains the ability to consume products is a person's wealth, or lack thereof. However, in a Socialist economy such as Cuba's, the majority of goods and services are supplied by the state, with a relatively small number of products available for sale and consumption on the free market. Although Otero and O'Bryan (2002) note that this is beginning to change, particularly following the onset of the Special Period and ensuing legislation to legalize the holding of foreign currency and some private businesses, the state is still able to exert a great influence on Cubans' socio-economic behaviour. In terms of the agricultural sector specifically, in addition to controlling ownership of a great deal of Cuba's arable land, the state is also the primary supplier of many agricultural inputs for producers and, through its network of *empresas*, is the primary buyer and distributor of agricultural production. Thus, state organized incentives for alternative production are of particular importance in Cuba, because the national political economy renders the price premiums that usually motivate organic production irrelevant to producers (Interview 20, 2005).

6.3.2 State Support for Agroecology at the National Level

In spite of its focus on maximizing agricultural productivity as discussed in Chapter 5, as outlined in Chapter 3 the Cuban state has generally been an integral part of the Cuban agroecology movement, implementing a variety of policies including land tenure changes, the development of CREEs, and investment in agroecological research and extension,

designed to facilitate a shift away from conventional production (see for example Rosset and Medea, 1994; Deere et al., 1998; Pérez and Vázquez, 2002; Funes, 2002). As one former MINAGRI worker noted, the government also recently implemented a policy of subsidizing biocontrol products in order to shift the economy in favour of their use (Interview 19, 2005). In addition, SV has been a particularly important part of the push for agroecology in the country. As early as 1973 this organization had begun a research program on Integrated Pest Management (IPM), and this research focus was accelerated following the onset of the Special Period (Interviews 19, 21, 2005).

6.3.3 State Influence at the Farm Level

While the state's creation of a policy and research and development framework that is supportive of agroecology has been an essential element of moving away from conventional production in Cuba, in the end it is on the farm, where production takes place, that agroecology must be put into practice if transition is to be successful. Indeed, the data presented here demonstrates how, through both *la Agricultura* and local branches of SV, the Cuban state is able to effectively limit individual producer agency and thus induce the practice of agroecological techniques. This is particularly true with regards to the minimization of agrochemical use; however, the state also has a great deal of authority in terms of managing farm size, as well as labour and machinery use. The state's ability to influence production decisions tends to be strongest on the newly independent UBPCs (Interview 20, 2005). However, Communist Party representatives also sit on cooperative boards, representing the deep integration of politics and farm management (see Fig. 6.2).

As the primary legal supplier of agrochemical inputs in San José, *la Agricultura* is in a position to directly control the access that producers have to these products. Effectively, it is left to *la Agricultura* to determine which producers, if any, will be allowed to purchase the limited quantities of chemical fertilizers and pesticides that are available in the country. Thus, although many farmers would not be able to afford chemical inputs because of their high price, even if a producer were to have sufficient economic means to pay for chemical fertilizers or pesticides, they would not necessarily be in a position to

buy them from *la Agricultura*. In fact, only one of the farmers interviewed in San José de las Lajas was able to buy chemicals from the state, and this was based on his proven high levels of productivity, as well as the fact that he agreed to sell his entire harvest back to *la Agricultura*, foregoing the possibility to sell surplus in the private market. The rest of the producers must either go without chemical inputs, or negotiate through networks of friends and acquaintances in order to obtain these inputs as gifts, or paid for on the black market. In either of these cases very limited quantities are ever available, and there is also risk inherent in using illegally obtained products. Thus, in terms of applying chemical fertilizers or pesticides (an essential feature of conventional agricultural production), the ability of Cuban producers to make their own decisions at the farm level is largely negated by strict state regulation of the sale and distribution of these products.

While *la Agricultura* has a very direct impact on producers because of its role as the primary supplier of agricultural inputs and buyer of agricultural production, SV representatives have an on-farm presence that is perhaps even more direct. The structure of SV is such that it extends directly from MINAGRI to the level of individual *empresas*, and beyond that to both cooperatives and independent farms. In San José de las Lajas, producers explained that they receive visits on an almost monthly basis from SV representatives during which inspections are made, and suggestions for addressing plant health (that can range from useful intercropping possibilities to appropriate biocontrol methods) are offered (Interview 19, 2005; Interviews I, II, IIa, 2006) (see Fig. 6.2). It should be noted that these inspections provide SV representatives the opportunity not only to provide valuable extension services, but also to monitor producer behaviour and detect practices that it deems inappropriate, for example the use of illegally obtained agrochemicals. Although the lack of important export crops such as sugar and tobacco in San José de las Lajas allows for a relatively relaxed degree of SV control, in other municipalities (such as the tobacco growing Viñales) producers must directly seek permission from their local SV representative prior to purchasing and applying any agrochemical product (Interviews 27-33, 2005). As such, like *la Agricultura*, local SV representatives constrain the decision making ability of individual Cuban producers regarding chemical application,

Figure 6.2: *A photo of Fidel signing the Agrarian Reform Act hangs in a cooperative office as a symbol of the deep connection between politics and agriculture (left); a physical trap allows farmers to keep track of pest populations - useful information for consultations with SV representatives (right).*

allowing them to apply only the products that are deemed acceptable by the state.

In addition to the strict regulation of farm inputs, another way in which Cuban state regulation affects producer decision making is through state control of the majority of Cuban farmland. For example, while most participating producers did not express desire to expand their farm size, citing labour shortages and natural or man-made barriers to expansion as the primary reasons for this position, in fact any expansion would also require state authorization, as the buying and selling of land on the free market is prohibited in Cuba. Thus, it is the state that has the ultimate authority in terms of deciding the extent to which producers can expand their farms, and, as is the case with the purchase of chemical inputs, farmers seeking additional land must prove to the state that their use of added land will be productive for Cuban society. The same is true for producers seeking to employ additional labour or purchase a tractor, as they must apply to the state for permission to do so. As such, in much the same way as it does with agrochemical use, state regulation largely negates producers' ability to make decisions

regarding expansion of their farms in terms of land, labour, and machinery, and can therefore ensure that most farms remain relatively small scale operations. This is not to say that producers can never acquire land, hire labour, or purchase machinery; however, because state permission is required, it is the state who has the ultimate authority on these issues.

6.4 A Critique of the Top-Down Approach to Agroecological Extension

The above discussion demonstrates some of the ways in which state intervention works to limit the agency of individual producers in Cuba, thereby ensuring that their agrochemical use remains strictly limited and their farm operations remain relatively small scale. While some producers might make these choices on their own for other reasons, including personal conviction, lack of financial resources, or tradition, there is no doubt that their decision making ability is highly influenced by state action. While the strong state role in ensuring that producers move away from conventional production was lauded by supporters of agroecology for the contribution it has made to Cuba's significant advances in the field of sustainable agriculture, its actions have not gone without criticism and it could be argued that, in order to truly be sustainable, agroecological practices must be adopted in a far more participatory manner. Indeed, two of the most prominent supporters of the agroecological movement in Cuba - the state and ANAP - have been criticized for being far too centralized in terms of decision making, and too hierarchical in their approach to rural development (Interviews 20, 23, 24, 2005). One researcher even suggested that the highly vertical nature of agroecological development in Cuba poses by far the greatest threat to the movement's long term success (Interview 20, 2005). This situation is a stark contrast to the notion, discussed in Chapter 2, that sustainable agricultural development projects tend to be deeply participatory endeavours (Pretty and Hine, 2001; Pugliese, 2001).

Some producers were clearly very appreciative of the state support they receive in terms of subsidized inputs from *la Agricultura* (Interview VI, 2006) and extension services from SV (Interviews I, II, IIa, IIb, VI, 2006). There was also a high level of general support for the state amongst participating producers, with many expressing positive opinions about the Cuban government and its work to provide services (such as housing, medical care, education, and more recently electric pressure cookers and hot plates) to rural areas. Indeed, particularly those producers who remembered life prior to the Revolution were highly supportive of the state, with one exclaiming proudly that "Fidel is the best thing that any mother in the history of the universe has given birth to" (Interview II, 2006), and another noting that he is always ready to "respond to a call from our *Comandante*, Fidel" (Interview 11, 2005). However, the potential for alienation as a result of the state's top-down approach was also evident as some producers expressed frustration at what they viewed as a disconnect between themselves and SV representatives or other state workers.

There was a sense amongst some farmers that SV workers visited their farms too infrequently and thus provided insufficient support in dealing with plant health problems. In addition, several producers complained that, when SV officials did make farm visits they were often overly critical and unwilling to provide any positive feedback or reinforcement for good work on the part of the farmers. There was a general sense amongst the complaining producers that the root cause of the problems in their relationship with SV was that many SV workers were perceived as being unappreciative of the realities that make farm life difficult (Interviews III, IV, 2006). One producer explained the issue, stating that "sometimes the people who work for SV, or other big organizations, have a lot of theoretical knowledge, but they do not understand what it is like to be a *campesino*" (Interview X, 2006). Although very few producers expressed the same kind of explicit concerns about *la Agricultura*, many did note high levels of dissatisfaction with their ability to purchase inputs and also with the low prices that they receive for state contracted production. Referring to the overall system of strong state involvement in farm management, one producer went so far as to say that his biggest problem in life

is dealing with state control and regulation of his farm, noting that constant inspections to ensure compliance with a myriad of rules are the primary source of stress in his life (Interview 28, 2005).

The feelings of alienation that some producers expressed with regards to SV is one example of how some of the theoretical problems associated with top-down development strategies, which led Freire (1982), Chambers (1987), and others to call for a more participatory approach, can affect life at the farm level. Indeed, because some producers felt resentment towards SV workers, the advice and assistance offered by these workers, however useful it may have been, was not always welcomed (Interview X, 2006). This attitude of mistrusting extension workers was evident at a workshop on seed sharing organized by INCA, where a very small percentage of cooperative members attended despite the fact that many had stated their intention to participate. Although it was not explicitly stated by any producers, workshop organizers believed that many producers chose not to attend at least in part because of historical relationships of mistrust and resentment with extension workers that have evolved over decades of top-down agricultural development. Unfortunately, because of the relatively strained relationships between some producers and some extension organizations or workers, the valuable agroecological expertise that can be shared with farmers is not always easily imparted, thus limiting the ability of the state (or any institution) to effectively implement an agroecological vision.

6.4.1 Participatory Efforts: Reality or Rhetoric?

In recognition of the limitations of top-down development strategies, and in accordance with growing trends in international research and development circles, Cubans are increasingly attempting to promote agroecology and sustainable development through a participatory approach (Interviews 2, 19, 25, 26, 2005). The increasing importance being assigned to participatory planning and development across Cuba was described by a number of people as "a Revolution within the Revolution" that is being adopted at various levels of government and within academia and NGOs (Interviews 2, 5, 2005). Indeed, as discussed in Chapter 3, the Cuban government has made a concerted effort to support

this notion by "explicitly emphasising an increase in the degree of local participation in decision making and in developing agricultural systems adapted to local agroecological conditions" (Rosset and Medea, 1994: 21). As well, ANAP's *campesino-a-campesino* agroecological extension program is specifically touted as a truly participatory effort that allows farmers to both learn from and teach other farmers (Perera, 2002).

However, even a program such as ANAP's, which is somewhat famous for its participatory approach, has received some criticism for adopting the language of participation while maintaining an essentially top-down approach to development, based on the use of reference farms created by specialists, and vertical rather than horizontal communication patterns (Interview 25, 2005). Likewise, although the Cuban state has begun to incorporate participatory ideas into its official policy statements, there is some concern that this is not truly reflective of a paradigm shift within either MINAGRI or the Cuban government. Instead, participation may occur at the level of information sharing and consultation, while actual decision making remains a highly centralized process (Interview 20, 2005). One small example of the centralization of decision making authority was a government decision to close and relocate a CREE in San José de las Lajas in spite of some locally based opposition to this plan.

The possibility that the Cuban government and some other actors in the agroecology movement may be adopting the notion of participation more in terms of rhetoric than in actual practice is not necessarily surprising. Indeed, Nederveen Pieterse (2001) argues that participatory theory can be exceedingly difficult to implement in practice. In addition, as noted in Chapter 2, the widespread popularization of the participatory paradigm has created a context in which principles of true participation are often co-opted by actors seeking to legitimize their own development strategies and goals (see for example Michener, 1998). In the Cuban case, the state and other organizations have focused development efforts on the goal of creating a transition away from conventional farming practices towards a more agroecological model. Because this goal, which was determined largely at a national level based on a combination of political and economic factors, is not necessarily shared by the majority of Cuban producers, there is a chance

that truly participatory development efforts would not lead to its achievement. Indeed, as one researcher noted, there is some concern that rural development projects that have been highly participatory in nature have not tended to focus on the adoption of agroecological farming techniques (Interview 23, 2005). As a result there is a degree of scepticism regarding the ability of fully participatory projects to achieve the goal of implementing agroecology at the farm level. In addition, there is a sense that purely participatory projects may not be able to take advantage of the wealth of expertise that Cuba's excellent higher education system has helped to develop. As such, there is some ambivalence regarding the notion of participation, with most participants perceiving it as a worthwhile concept, however doubting whether it is possible to achieve successful agroecological development within its framework.

6.5 Potential for More Participatory Development Efforts

While there was a sense amongst many research participants that agroecological extension in Cuba has thus far largely been conducted in a top down manner, regardless of the inclusion of participatory language in official policies and programs, there may still be a great deal of potential for more participatory approaches to rural development in the country. One prominent program that has been touted as an example of truly participatory rural development in Cuba has been the creation of participatory plant breeding projects in three municipalities across the country. These projects, designed to help producers rediscover local seed varieties and thereby increase the genetic base, biodiversity, and the use of locally adapted species, have been deeply participatory in nature. Producer participants have been treated at all times as fully equal partners (or 'subjects') in the development of the projects, and have led the way in terms of determining a vision and making decisions about how best to achieve it (Interview 35, 2006). This program has gained a fair amount of international attention for its success at including local peo-

ple in the development process, and as such as received extensive funding from agencies such as Canada's International Development Research Centre (IDRC).

The potential for participatory rural development projects in Cuba may be particularly great, as rural communities in the country have generally high levels of education, as well as access to health care facilities, good housing, and a variety of other services. In addition, communities tend to be relatively egalitarian in terms of the socio-economic status of the population. As such, some common barriers to participatory development discussed in Chapter 2 - including the co-opting of the agenda by a powerful local elite, or inadequate availability of the basic necessities of life (Nel et al., 1997; Herbert-Cheshire, 2000) - may be less prevalent in Cuba than in many other contexts.

6.5.1 A Middle Way: State-Society Synergy

Although it cannot be classified strictly as participatory development in the purest sense of the term, Evans' (1996) notion of state-society synergy could be a relevant framework for considering how agroecological development in Cuba, although guided largely by the state, could also include a more participatory element. As discussed in Chapter 2, synergistic development efforts that take advantage of both state and civil society engagement are most likely to occur in contexts where social capital levels are high and are able to be scaled up, there is a high degree of socio-economic equity, strong and competent bureaucratic structures are in place, and a degree of political competitiveness is present. Although this research was not specifically designed to assess the degree of synergy that exists between the state and civil society in terms of agroecological development in Cuba, the findings do demonstrate that there is a great deal of potential for synergistic development to occur, as many elements that are conducive to the emergence of state-society synergy are present.

First of all, as noted in Chapter 3, civil society is becoming an increasingly powerful force in Cuba, as the Special Period has led to a degree of state liberalization (Aguirre, 2002; Otero and O'Bryan, 2002). In addition, high levels of social capital are evident in Cuba's rural communities as the majority of producers are organized into some form of

cooperative production and the country's Socialist system actively encourages collective action at the local, regional, and national level. Indeed, all of the producers of San José de las Lajas were members of either cooperatives or urban farming organizations, and the majority also participated actively in non-farming collective organizations such as Committees for the Defense of the Revolution (CDRs), the Communist Party, or other more informal neighbourhood associations. At a workshop on seed sharing held in Zaragoza, cooperative members made a direct comparison between their communities and rural communities in other countries, noting that, in Cuba farmers share information, resources, and expertise, and help each other because, "together we are stronger than any one of us would be alone." In terms of the ability to scale up local social capital resources, the evidence is somewhat contradictory. Channels for scaling up do exist, for example in the form of SV contact with both local producers and the highest levels of MINAGRI, and also in the form of farm visits made by state extension workers. However, as one producer noted, "State social workers are going to visit me in the next few days and ask what I need to make my life better and I will tell them, but I have doubts about whether or not they can actually do anything about my problems" (Interview XI, 2006).

In spite of the limited ability of Cuban state officials to address all of the concerns that face producers, Cuba does generally possess the strong bureaucratic structures that can contribute to synergistic development. Within the agricultural sector *la Agricultura* and SV function as the primary bureaucratic forces, while state *trabajadores sociales* (youth social workers) and local councils also perform bureaucratic functions. Although the above critique of top-down development presented some evidence to suggest that these institutions might demand the kind of "uniform, simplistic application of inflexible rules which leave no room for initiative or imagination on the part of either local officials or their counterparts in civil society" that has been recognized as a barrier to synergy (Evans, 1996: 1126), the positive light in which most producers viewed state policy and bureaucratic action suggests that there is still room for synergy to be fostered.

In contrast to the ambiguity regarding whether or not Cuba's bureaucratic institutions are strong and competent enough to contribute in a positive way to synergistic

development or are instead too rigid, thus acting as an inhibitor to synergy, there is little question regarding the egalitarian nature of the Cuban context. Indeed, the Cuban countryside has more in common with Evans' (1996) description of the egalitarian contexts of Kerala (India) and Taiwan than it does with the more common situation evident in Mexico where "large landowners dominate an excluded peasantry" (Evans, 1996: 1128). Similar to the Taiwanese example, San José de las Lajas is home to several "local notables" whose income and standard of living is noticeably higher than the majority of producers; however, these differences "do not derive from controlling the land and labour of their neighbours" (Evans, 1996: 1128), they are relatively small when viewed in global terms, and they did not appear to cause any significant local conflict. As such, they should not be viewed as a significant barrier to synergistic development potential.

The final contextual factor that Evans (1996) argues is potentially conducive to synergy is political competitiveness. Although on the surface Cuba's one party system of government does not meet this criteria, there is some evidence to suggest that Cuba may not be entirely devoid of political competitiveness. Indeed, many research participants were adamant that there is a great deal of political choice in Cuba in spite of the absence of multiple political parties. This competitiveness takes the form of official elections for all levels of government, but is perhaps particularly evident at the local level, as many people expressed interest in the voting process for local government officials, who they explained are chosen based on their reputations as good community members. As such, the Cuban context may be similar to the Taiwanese one described by Evans (1996: 1127), where, "despite one-party rule at the national level, political competitiveness (among factions) is quite pervasive at the local level" and thus helps to generate possibilities for synergy.

6.6 Summary

Evidence suggests that the transition to agroecology in Cuba has largely been conducted within the framework of a top-down development strategy led by organizations such

as ANAP, but also directed to a great extent by the Cuban state. Although these institutions in many cases use the language of participation, this may reflect a theoretical paradigm shift that has, in general, not yet been translated into practice in a meaningful manner. Instead the state, primarily through *la Agricultura* and SV, works in a very direct way to limit producers' decision making capacity and lead them on a path away from conventional production. This strategy of institutionalizing agroecology has been highly successful in terms of the extent to which agroecological practices have been adopted, and some producers are highly supportive of the government's actions. However, the top-down approach does pose a potential problem for agroecological development in Cuba, as it may be perceived by some producers as too heavy-handed. As such, there is a danger that the adoption of agroecological techniques will be superficial in nature, as producers conform to the extent that economic or regulatory necessities force them to, but with little internalization of true agroecological values. If this is the case, agroecological techniques may not be practiced in an optimal manner, and indeed they may be abandoned in the future should economic or regulatory changes occur.

In recognition of this potential problem, there has been some movement towards more participatory rural development efforts. Although in the cases of ANAP and the Cuban state these efforts may still be primarily a matter of rhetoric, projects such as the participatory plant breeding program suggest the potential for deeper participation on the part of producers. This added degree of participation raises another problem however, as truly participatory rural development efforts may lack a focus on environmental sustainability. With its joint emphasis on the roles of both the state and civil society, the state-society synergy paradigm offers a potential means to address the dilemmas associated with the top-down versus bottom-up dichotomy. While top-down strategies may be too rigid and dogmatic, thus alienating producers, participatory strategies may not incorporate an ecological vision and thus not contribute to the transition away from conventional agricultural production. Synergistic development may allow for a movement towards agroecology that incorporates both strong institutional support and an active role for producers. Some evidence suggests that conditions in Cuba may be conducive

to this form of development, however further research is still required to determine the extent to which synergy exists or may be developed in the future.

Chapter 7

Looking Forward: Challenges and Opportunities for Sustainable Agriculture in Cuba

7.1 Introduction

While Cuba has certainly taken some important steps towards a more sustainable agricultural sector in recent years, even the most committed proponents of agroecology stress that "*No es fácil*" (It is not easy). The flip side of the optimistic *Sí, se puede* mantra, *No es fácil* is a frequently used expression in Cuba, denoting frustrations with everything from a lack of variety in ice cream flavours, to the difficulties of trying to transform the agricultural sector. Both expressions were used liberally by research participants when describing agricultural development in Cuba, and this chapter seeks to examine some of the challenges that have made the transition to sustainable agriculture difficult and that could threaten the future success of the movement, as well as some of the opportunities that created conditions conducive to the adoption of agroecology and could allow it to thrive in the future.

This discussion will begin with an examination of some of the primary challenges

identified by producers, as well as other key informants, including a lack of resources, limitations on producer knowledge and expertise, and theft. Secondly, the issue of Cuba's tense relations with the United States will be explored in terms of how it creates both challenges and opportunities for the development of Cuban agroecology. Finally, the market potential for Cuban ecological production will be considered, along with some of the factors that constrain this potential.

7.2 Challenges to Sustainability

7.2.1 Limitations on Alternative Resources

As discussed in Chapter 5, the limitations on conventional resources have been an important factor in the rapid shift toward agroecology in Cuba. However alternative resources, such as organic material, biocontrol organisms, and alternative energy sources like solar panels and windmills, are also not always readily available. Indeed, one key informant noted that, although Cuba has only recently begun to offer agroecological extension assistance to Venezuela, that country has been able to move farther and faster than Cuba in terms of adopting agroecology because of their greater access to capital (Interview 17, 2005). Thus, in some ways the economic problems of the Special Period act simultaneously as both a motivator and a constraint to the adoption of alternative agricultural techniques. As one key informant explained, "what we are missing is capital and resources. We have the political will and the scientific expertise, which are very important ingredients, but we do not have the resources to do everything we want to do" (Interview 19, 2005). The frustration was evident in his voice as he spoke.

One of the most immediate problems in terms of resource limitations is a sheer lack of the organic material that is essential to successful agroecological farming (Interviews 22, 23, 2005; Interviews I-XII, 2006). The collapse of the Cuban cattle and dairy industry, and the steady decline of sugar processing following the onset of the Special Period have decreased the availability of both manure for compost and *cachaza*. Worm composting,

while a promising way to address a lack of organic material, requires a lot of work when done on-farm, and is still too expensive for many producers to buy sufficient quantities off-farm. Biofertilizers, also out of reach for many producers because of the expense, can be useful; however, as one producer pointed out, if the nutrients are not in the soil, even the best biofertilizer will not be able to change that (Interview VII, 2006). Cover crops and green manures may be the most readily available means to increase soil fertility, but many producers were sceptical that this alone would be able to solve their nutrient deficiencies. Thus, as long as producers face serious shortfalls in terms of soil fertility, the majority are willing to use whatever means are available to them to address their problems, be it chemical or biological, because their first priority is to produce enough food to feed themselves and their families, to meet their state contracts, and ideally to earn some additional income.

In terms of plant health the situation is similar. As is the case with the development of biofertilizers and worm composting techniques, much research and development has been devoted to the *lucha biológica* (biological struggle) in Cuba. In particular the work of SV and the creation of a network of CREEs, where biocontrol products are produced and distributed, have been important in the search for alternatives to chemical pesticides. However, in the municipality of San José de las Lajas, only three of the participating producers had access to CREE products at the time research was conducted. While a CREE in Zaragoza used to serve the municipality, it was recently shut down due to a lack of resources and the need to use the building as a school. As a result the nearest CREE was located in the neighbouring municipality of Güines. Although the cost of the biocontrol products themselves was not viewed by most producers as a limiting factor, and indeed many used the CREE when it was located in Zaragoza, the transportation crisis in Cuba meant that the trip to Güines was out of the question for the majority of local farmers.

This gap between what is theoretically available to support agroecological production and what is available in reality to the average producer was made evident at a workshop on biological pest control when, following a presentation on the application of *Trichogramma*

to yucca fields, a producer asked where he could obtain the product and was told that there was currently no local supply. Just as farmers' hopes were high that new worm composting stations would soon be built to serve the San José area, there was great enthusiasm for the possibility that CENSA would begin producing *Trichogramma* by the end of 2006, and that the new CREE for the municipality would be up and running as soon as possible. One local farmer in particular was very hopeful that this would be the case, as he learned about CREEs in a class offered through his cooperative, but could do nothing with this knowledge because his co-op did not stock any CREE products and he was unable make the trip to Güines himself.

7.2.2 Agroecological Knowledge and Expertise

Although the above discussion makes clear that in some cases producers have sufficient knowledge but lack resources, in other cases a lack of agroecological knowledge and expertise in the *campo* has been cited as a factor that challenges the development of sustainable agriculture in Cuba (Interviews 19, 21-23, 2005). As one researcher explained, agroecological techniques are not nearly as formulaic as conventional ones and therefore producers have to be highly trained in order to be successful. Otherwise, there is a risk that complicated processes such as the preparation and application of organic material will not be carried out effectively, and thus producers will not reap the potential benefits that these methods offer. Unfortunately however, "there is still a lot of ignorance in the *campo* and even *campesinos* who have completed secondary school do not usually know their soil well enough to successfully use organic methods. Many people do it [agroecological production] badly because they lack information regarding what substances they are applying and nothing is analyzed properly" (Interview 23, 2005). Although some programs are in place to educate producers, it is an extremely slow process to reach everyone, and resources for extension programs and projects are limited. Thus, while the extremely high levels of knowledge and expertise that exist in Cuba's universities and research centres has been a great benefit in the development of more sustainable agriculture (Rosset, 1997), the ability to transmit this knowledge to producers can be

limited by the realities of funding availability - a common problem for agroecological development in the South (Pretty and Hine, 2001; IFAD, 2003).

Indeed, differences were evident between those producers in San José de las Lajas who had some relationship with INCA or UNAH and those who did not. For example, the producers most closely affiliated with an INCA project in Zaragoza expressed a great appreciation for the knowledge and assistance they were able to gain through their participation (Interviews III, IIIa, IV, 2006). Although not directly affiliated with a specific project, another producer stressed that the assistance provided through his personal relationships with INCA staff members was invaluable (Interview IX, 2006). Farmers working with UNAH students as part of a project to develop integrated farm management were equally enthusiastic about receiving extension assistance (Interview XII, 2006). In the community of Tapaste, there was a stark difference between a farm that was part of a UNAH project and a neighbouring one that was not. While the participating farm had just completed building a worm compost system to help address soil fertility problems, the other producer was intensely frustrated by his inability to make any improvements to his production possibilities, and noted that he was rarely visited by any extension personnel (Interview XI, 2006).

It should be noted that, in some cases, farmers have the opportunity to participate in extension projects and build their knowledge base but choose not to. The reasons for this, touched on in Chapter 6, can include scepticism regarding the possibilities for improvement, suspicion of the actors involved in extension, a desire to be as independent as possible and corresponding unwillingness to seek help, personal conflicts with other community members, a lack of time to devote to workshops and meetings, and a host of other issues (Interviews 23-25, 2005; Interviews III, V, X, 2006). Unwillingness on the part of producers can sometimes be frustrating for those trying to conduct extension work, however extension workers noted that they understood why there might be farmer resistance and were committed to trying to overcome the problem.

7.2.3 Theft

While a lack of resources such as organic material and irrigation systems, and a lack of specific knowledge and expertise can present very direct challenges for the development of agroecology in Cuba, a more indirect, but nevertheless pressing issue that could also pose a threat to the successful shift to sustainability in Cuban agriculture is theft. Aside from resource limitations, theft was one of the most prominent concerns raised by the producers of San José de las Lajas. An issue that all participants agreed was non-existent only a few years ago, producers explained that "the misery of the Special Period has brought a new desperation to the country and this leads to theft" (Interview XI, 2006). Although not all of the producers had had personal experience with theft, many had lost at least some parts of their harvests, and some had even lost cows and oxen, to *bandidos* (bandits). At a workshop on biological pest control, one producer jokingly asked "Is there a biological control for the bandits?" and was greeted with laughter and nods of understanding from all of his colleagues, demonstrating the widespread nature of this issue.

In an effort to reduce the problem, many producers have been forced to perform night watch duties on their farms. These are of particular importance for producers who have cattle, as the theft of a cow can result in substantial fines from the Cuban state, which is seeking to limit the loss of important sources of milk production. Those who perform the night watch duties generally do not sleep the entire night, only to begin a full day of work the following morning, and while some producers expressed an interest in finding specific workers to act as guards, regulations prohibit them from hiring any labour without official permission. This situation places an extremely heavy burden on a group of people who already work very long hours at a demanding job. As one producer explained, "It is very very hard. We work all day long, every day, and it is very important to get rest at night. If we cannot rest at night it is impossible to do our best work" (Interview X, 2006). Another producer made the direct link between theft and the long term sustainability of his farm, noting that he felt no incentive to make improvements to his land because of

fear that improving his farm would only attract more thieves (Interview XI, 2006). While the instability created by a lack of land ownership has often been cited as an inhibitor to the development of agroecology (see for example Pretty and Hine, 2001; IFAD, 2003; Gray and Moseley, 2005), in Cuba the instability created by increasing levels of theft is potentially far more damaging, as producers lose motivation to make improvements to their farms.

7.3 Poor Relations with the US: A Double Edged Sword

As discussed in Chapter 3, Cuba's relationship with the United States has been ridden with conflict since the 1959 triumph of the Revolution, as the US government has actively attempted to bring down Castro's regime through both intelligence operations and a strict economic blockade (Weinmann, 2004). The vast majority of research participants were acutely aware of the US government's disdain for Cuban Socialism and, while it might seem unlikely to those unfamiliar with Cuban-American relations, a significant number of key informants expressed serious concern about US government attempts to sabotage Cuban agricultural production. Specifically, several commented that the American Central Intelligence Agency (CIA) has a history of bringing pests and diseases to Cuba in an effort to cause a crisis in agricultural production that would bring down Castro's government (Interviews 19, 21, 24, 26, 2005). One Plant Protection specialist went so far as to suggest that, along with nature, the CIA is the biggest barrier to protecting plant health in an agroecological manner (Interview 19, 2005).

While the threat posed by American intelligence activities may be perceived by many Cubans to be direct, a problem that is more immediate in terms of affecting agricultural development in the country is posed by the US economic blockade. One NGO worker explained that the blockade is evident in all aspects of Cuban life, noting that it creates severe limits in terms of everything from telephone and internet communications, general

consumption, travel possibilities, and energy use (Interview 3, 2005). These limits occur because Cuba is unable to import products from what would be, based on geographical proximity, its most logical trading partner. As such, imports must come from significant distances and, because of high travel costs, are considerably more expensive than they would be if they could be bought from the United States. In addition, Cuba must often import from relatively small scale companies that sell their products at a higher price than American produced goods because they cannot take advantage of the same economies of scale that help many American firms produce relatively inexpensively (Interview 3, 2005). This situation acts to stifle the Cuban economy as a whole, thus limiting access to the capital and resources that, as discussed above, are important to the successful long term development of an alternative agricultural sector.

However, while the economic problems created by the American blockade may make it difficult for Cuba to advance as quickly as it would like in terms of agroecological development, as discussed in Chapters 3 and 5, it was this very economic necessity that played a significant role in prompting the transition away from conventional production in the first place (see for example Rosset, 1997; Chaplowe, 1998; Altieri et al., 1999). As such, the economic blockade was viewed by some research participants as, at least to a degree, a blessing in disguise. As one NGO worker explained, "the need created by the blockade has forced us to be more creative and to look for original solutions to our problems within our own country" (Interview 3, 2005). She went on to note that this ingenuity has led to a great deal of innovative research and development, such as the development of nationally produced vaccines, that has benefited Cuban society as a whole.

In terms of the agricultural sector specifically, the relative absence of American products has motivated the development of internally produced farming inputs, including biofertilizers such as *Ecomic* (discussed in Chapter 6), a trademarked brand of *B. thuringensis*, and a number of hybridized seeds that are particularly suited to Cuba's unique soil and climactic conditions (Interviews 10, 20, 22, 2005). This kind of endogenous innovation is precisely what, as noted in Chapter 2, Pretty and Hine (2001) and Pugliese

(2001) argue is necessary for the success of sustainable agricultural development programs. Well aware of this reality, researchers and NGO workers noted that Cuba's high level of national production - uncommon in most developing countries - has the great benefit of decreasing dependence on volatile international markets for seeds and agrochemicals (Interviews 14, 19, 21, 2005). Indeed, while most countries remain dependent on imported Green Revolution technologies and inputs, Cuba has been able to escape this fate essentially because the American government forced them into that position. Thus, although maintaining such a high level of economic independence and sovereignty has high costs as possibilities for trade are limited, the absence of American agricultural TNCs has been integral in terms of allowing Cuba to pursue an independent agricultural policy that has included the promotion of agroecology (Interviews 20, 21, 24, 2005).

Perhaps just as important as the relative absence of aggressively marketed conventional agrochemicals and seeds is the relative absence of inexpensive conventionally produced food products on the Cuban market. As noted in Chapter 5, the shift towards agroecology in Cuba has been more rooted in economic necessity than ideological conviction. As one researcher put it "organic agriculture here is not a way of life. Cubans eat ecological food because of economic necessity. We are not like the Swiss who eat organic food because it is part of a philosophy of life. If cheaper food were available, Cubans would buy whatever is the cheapest" (Interview 20, 2005). Thus if American products, produced in a conventional manner and taking advantage of economies of scale, were available for sale on the Cuban market, there is little doubt that much of the nationally produced ecological production would have a difficult time competing. Indeed, this is precisely what McKibben (2005) argues has occurred in Mexico, and many other countries of the world, where more sustainable small scale agricultural production was gradually taken over by agricultural TNCs.

7.4 The Opportunity of Niche Market Sales

Although Cuba's poor official relations with the United States render the lucrative US market off limits for Cuban exports, the notion of selling ecological products on the international market was pointed out by many key informants as a potential means of strengthening the agroecological movement (Interviews 1, 6, 19-21, 24, 25, 2005). This possibility is particularly relevant given that the global organic sector is currently valued at 28 billion USD and is one of the fastest growing segments of the food market (IFOAM, 2006). As a result, increasing numbers of consumers are willing to pay substantial price premiums for the kind of ecological production that is currently widespread in Cuba. Taking advantage of these premiums could provide valuable foreign exchange for the Cuban state, and thus provide economic incentives to ensure the future success of agroecological farming in the country. Already some honey, citrus, sugar, coffee, and tobacco has been certified by international bodies and is exported under the organic label. However, as is the case in much of the Global South, and indeed for many small scale farmers in the North as well, the high costs of certification and the need to be certified by multiple regulatory bodies in order to sell in multiple markets create barriers to entry for Cuban production (Interview 4, 2005). It is possible that the cooperative structure of Cuban agriculture could help to offset this challenge, as cooperativization has long been considered an important way of helping decrease individual cost by allowing for collective certification (Gomez Tovar, 2005).

In addition to the cost-related and organizational challenges to entering the potentially lucrative market for certified organic products, international certification has remained out of reach for all but a few Cuban producers because, as discussed in Chapter 5, much of Cuba's agroecological production would not comply with the strict regulatory standards set out by many certifying bodies. For instance, seeds are not generally certified organic, and most farms have not entirely eliminated agrochemical application. Thus, although Cuba is currently working with international firms and organic certification bodies to develop its own internationally recognized certification system (Interview

6, 2005), certification will still remain impossible for many producers, as their production may be 'agroecological' but not 'organic'. A potential avenue for Cuba to take in the face of this problem would be to create various levels of certification status such as 60 or 95 percent organic, or to label production as agroecological rather than organic (Interview 19, 2005). There is some precedent for this model, as some products today are marketed to consumers as 'natural' or 'ecologically friendly'; however, in general these types of products have not achieved the same level of brand recognition as organic goods (Buller and Morris, 2004).

Despite the challenges to obtaining the required certification in order to profit on the international market for organic goods, many key informants still viewed the development of this niche market as an important means of ensuring the future strength of alternative agricultural production in Cuba. However, it is worth noting that the vast majority of producers expressed little interest in the prospects of certification, and indeed many found it difficult to comprehend the concept of receiving a higher price for certified organic products. Part of the reason for this may be the low degree of direct connection that most Cuban producers have to the marketplace. As one researcher noted, Cuban farmers are very disconnected from consumers because they sell the vast majority of their production to the state for distribution (Interview 20, 2005). Although recently reopened private farmers markets are beginning to change this situation, only surplus production can be traded privately and producers still remain largely removed from the notion of selling their goods at market value. As such, it is not entirely surprising that few would show interest in the possibility of certifying their production as organic.

While rural farmers may remain largely disconnected from direct market contact, urban producers are in a significantly different situation, as they can sell the majority of their goods privately. In addition, because of strict state regulations prohibiting agrochemical use, urban production in Cuba could generally be classified as organic according to regulatory standards (although there is some debate on this point because of urban pollution issues such as contaminated soil, air, and water). Perhaps in part because of these factors, the only participating producer who showed interest in the notion of tak-

ing advantage of price premiums for ecological production was an urban farmer. Indeed, although his production was not certified as organic at the time of the study, he had already begun to profit from an unofficial price premium for his ecological production through the sale of mint to a hotel chain (Interview I, 2006). The hotel purchased the mint to make *mojitos*, a popular drink with foreign tourists who, unlike most Cubans, are willing and able to pay for high quality ecological products (Interview I, 2006). Thus, as a direct result of the integrity of his ecological production, and also certainly because of his entrepreneurial abilities, this producer was able to reap the kind of economic benefits that organic premiums are designed to ensure. Recognizing the potential of this model, one researcher commented that if farmers could sell directly to ecologically conscious and economically secure foreign tourists this could be an important incentive that would help ensure the future success of Cuban agroecology (Interview 20, 2005). However, to date this potential remains untapped in all but a few isolated instances.

7.5 Summary

The above discussion presented some of the challenges that threaten to undermine agroecological development in Cuba, as well as some of the opportunities that have helped facilitate success thus far, and could help to ensure that the gains that have been made are not lost in the future. Problems such as a lack of alternative resources and agroecological expertise amongst producers, as well as the uncertainty created by a recent rise in theft and fear of American sabotage, create significant challenges for those seeking to propel agroecological development forward. However, Cuba's strong position on maintaining political sovereignty and a Socialist system, and the resulting absence of agrochemical giants such as Monsanto, whose influence encourages Green Revolution style production in many parts of the world, helps to create fertile ground for the development of agricultural alternatives. In addition, although premiums for certified organic food do not currently play a significant role in Cuba, there is a great deal of potential for future entry of Cuban ecological production into the lucrative niche organic market.

Chapter 8

Conclusions and Recommendations

8.1 Introduction

The primary intention of this thesis was to address the need for further case study research regarding what organic agriculture means to people and how it is practiced in a particular context. Cuba was used as the location for this case study, in part in order to address the notable absence of Southern voices from current debates on this issue, and also because of its unique position as a recognized global leader in sustainable agriculture. Consistent with the political ecological perspective, this research was premised on the normative judgement that the conventional agricultural paradigm, which characterizes the majority of global food and fibre production, is not environmentally, socially, or economically sustainable in the long term, and that the promotion of alternative production systems is a cause worthy of support. As such, these concluding remarks will not only summarize the research findings, but will also offer some recommendations regarding how the considerable progress Cuba has made in sustainable agricultural development may be supported, maintained, and indeed furthered, and how other countries might be able to learn from the Cuban experience.

8.2 Revisiting the Research Objectives

8.2.1 Objectives 1-3: Exploring the Behaviour and Beliefs of Cuban Producers

The first set of research objectives set out to explore Cuban producers' feelings and opinions regarding agricultural transition and sustainability. The specific objectives were:

- To assess the extent to which Cuban producers practice organic techniques and define their own production as organic or sustainable;
- To explore Cuban producer motivations for using non-conventional production methods;
- To determine the degree of commitment that Cuban producers have to the practice of alternative agricultural methods.

The findings presented a somewhat ambivalent image of Cuban producers in terms of their position as non-conventional farmers. The majority of research participants practiced a wide variety of techniques often associated with organic agriculture that went beyond simple input substitution to include practices such as polycultures and crop rotation, mixed farming, the use of family labour, incorporation of some subsistence production, a focus on local input sourcing and sale, and an emphasis on minimizing off-farm input needs by maximizing on-farm recycling. Conventional techniques, most notably agrochemical applications, were in most cases minimal enough to be considered negligible. Farm sizes were relatively small and most farms were family-run (in the case of CCSs) or community based (in the case of CPAs) operations. As such, the Cuban producers who participated in the study could be perceived in some ways as pursuing a holistic model of organic production that approaches what some might refer to as an organic ideal.

However, most producers themselves were reluctant to define themselves in terms of their sustainable farming methods, and very few felt comfortable referring to themselves

specifically as organic farmers. Indeed, many producers perceived low input methods, such as the use of compost rather than chemical fertilizers, crop rotation and intercropping rather than chemical pesticides, and oxen rather than tractors, as a symbol of underdevelopment. Comparisons were frequently drawn between Cuban farming prior to the Special Period, which some producers were proud to note was in many ways comparable to Canadian production, and post-Special Period agriculture, which tended to be viewed as a symbol of Cuba's economic crisis and stagnation. Although some producers recognized some benefits of their current production practices, including decreased soil compaction and environmental contamination, the majority would follow a comment on these benefits with an expression of desire for increased availability of conventional inputs such as agrochemicals, machinery, and oil. As such, many farmers found it difficult to understand why a foreign researcher would be interested in bringing lessons from the Cuban agricultural experience to a developed nation such as Canada. The notion that Cuban agricultural transition could offer an example of sustainable production for other countries, particularly ones that producers identified as developed, was hard for many to believe.

Given that the majority of participating producers did not define themselves based on their sustainable farming techniques, it is not surprising that most were motivated to avoid conventional methods less because of ideological commitment to organic ideals and more as a result of the economic and political realties that govern their lives. Specifically, most producers did not present themselves as having made a conscious choice to adopt organic practices, but instead found their agency significantly limited by economic restrictions and by state control in the agricultural sector. These limitations were particularly relevant in terms of motivating the avoidance of agrochemical use, as the availability of these inputs was strictly regulated by the state. Thus, even if producers had the economic means to purchase and apply agrochemicals they would not necessarily be able to do so in a legal manner. While some conventional inputs, particularly agrochemicals, were available on the black market, quantities were limited, prices were high, and there was a certain risk inherent in using this system. As a result, most producers did not rely

to any significant extent on illegally obtained conventional inputs.

In summary, although most producers who participated in the study practiced a wide variety of production techniques that are usually associated with organic agriculture, most did not express direct personal commitment to these techniques, nor to the notion of organic agriculture as an environmentally, socially, and economically sustainable food production paradigm. Instead, most producers based many of their production decisions on a combination of their economic possibilities and the constraints of state regulation. As a result, should the economic well-being of the participating farmers improve, or should there be any significant changes to current state regulations that govern the markets for both agricultural inputs (such as agrochemicals, land, machinery, and labour) and agricultural outputs, there is little reason to believe that producers will maintain all aspects of their current agroecological systems in the long term.

Having said this, it should be noted that a minority of producers were highly committed to agroecological production, and were adamant that they will continue to move towards truly organic production because of a deep belief that it is the right way to produce food. This mentality was particularly evident amongst urban producers, and also tended to be more pronounced on CPAs than on the more independent CCS farms. In addition, although many producers were not explicitly committed to avoiding conventional methods such as agrochemical application and non-renewable energy use, very few exhibited any direct ambition to develop the kinds of large scale, high input, monocrop farms that dominate conventional production systems. This may be partly because such ambitions would be impossible to achieve given the current system; however, should there be a systemic change in the future it would likely take a significant amount of time for producer mentality to shift.

8.2.2 Objective 4: Exploring the Behaviour and Beliefs of Other Actors in the Agricultural Sector

The fourth research objective sought to address how non-producers who are involved in the agricultural sector in Cuba have engaged in the transition away from conventional production practices. Specifically, the objective was:

- To identify the role that government and non-governmental organisations have played in the transition away from conventional production in Cuba, as well as the motivations of these actors.

The findings demonstrated that the shift away from conventional production in Cuba has been led by these actors. The Cuban government, research institutes, universities, agricultural schools, and non-governmental organizations such as ANAP and ACTAF have all been very actively engaged in promoting agroecology in the country through policy measures, research and development related to agroecological techniques, and agroecological extension to assist farmers in the move away from conventional production. These organizations have received a substantial amount of assistance from international bodies such as IFOAM, the FAO, and NGOs from a variety of countries. In turn, Cuban organizations have sought to assist other Southern nations with the adoption of agroecological farming methods, through the provision of alternative inputs such as biofertilizers, and also through the transmission of agroecological knowledge and expertise.

While the motivations of the state are ostensibly ideological and based on a true belief in the need to build sustainable food and fibre production systems, the timing of their support for agroecology, a continued reliance on the highly conventional sugar industry for foreign exchange, and strong incentives for the maximization of farm production suggest that policies may be based more on averting food security and economic crises than on a deep commitment to sustainable agriculture. However, there is no doubt that some people within the government are passionately committed to sustainable agricultural alternatives, and the success that the transition has had thus far may convince increasing numbers of policy makers that Cuba is moving in the right direction. In addition, the

shift to agroecological production helps to decrease Cuban dependence on TNCs and international agricultural markets, thus helping the Cuban state maintain its national sovereignty and globally unique Socialist system. As such, the Cuban state may have at least some continuing incentive to support agroecological production even in the event of significant economic improvement.

In terms of the motivations for non-state actors in the agroecological movement, this research revealed a mixture of pragmatism and idealism with regards to the support for moving away from conventional farming. While many non-producer key informants expressed a degree of personal conviction in terms of the environmental, social, and economic benefits of agroecological production, most also adopted a realistic approach, recognizing that in an economically struggling nation such as Cuba, that is significantly distanced from the global economy, maintaining sufficient production levels is the primary concern of the agricultural sector. As such, the majority spoke glowingly of organic agriculture, but viewed organic techniques as only one element of a successful food production system. Most felt the food system could also incorporate notions such as carefully targeted use of conventional inputs, export orientation, and potentially GMOs. The overwhelming emphasis was thus not focused on strict adherence to a purely organic paradigm, but rather on the quest for balance, moderation, and equilibrium.

8.2.3 Objective 5: Opportunities and Challenges

The final primary research objective was:

- To determine factors that either facilitate or constrain the development of alternative food production systems.

In Cuba clearly one of the central factors that has contributed to the development of agroecology at a national level has been economic necessity. However, in many other developing nations economic resources are scarce, raising the question of why Cuba has been willing and able to pursue such a unique agricultural vision in the face of resource shortages. One important factor was clearly the wealth of human resources created by

Cuba's excellent education system, as internal research and development efforts, combined with generally high levels of education amongst producers have combined to facilitate agroecological extension efforts. Relatively good infrastructure in the countryside and well organized producer networks have also contributed to a smooth transition, as NGOs such as ANAP and ACTAF have been able to mobilize large numbers of farmers, and make sure that the agroecological message is spread. Finally, Cuba's Socialist socio-economic and political system has contributed to the adoption of agroecology. This system has largely freed Cuba from the influences of powerful agrochemical companies with an interest in promoting conventional methods, helped to create a 'culture of saving' more consistent with agroecological methods than consumption driven high input systems, and ensured that national level prioritization of sustainable agriculture can be fairly easily incorporated into the country's education system and other bureaucratic structures.

While Cuba's centralized Socialist system has thus acted to facilitate a transition away from conventional agriculture, the top-down nature of the state's involvement could also act as a constraint on the agroecological movement, as producers may resist developments that are perceived as exogenously imposed. Although MINAGRI and organizations like ANAP have made efforts to incorporate participatory principles into their mandates, the most important decisions in terms of agricultural direction remain largely out of the hands of the average producer, thus threatening the degree to which producers will enthusiastically take ownership of new methods and the degree of their commitment to those methods. The other primary constraint on the extension of agroecology in Cuba has been a lack of resources. It is somewhat ironic that the very factor that spurred the growth of agroecology also acts as a constraint on its success; however, it is clear that funding shortages for research, development and extension as well as for the production of alternative inputs such as biocontrol organisms and organic fertilizers have limited the possibilities for advancing sustainable agricultural development. An additional irony is the way in which the US embargo has simultaneously facilitated agroecological development in Cuba by forcing economic need, and limiting the presence of inexpensive

conventionally produced imports as well as agrochemical and agro-food TNCs, but has also acted as a constraint by limiting access to capital resources.

8.3 Revisiting the Notion of Political Ecology

In addition to the specific objectives that guided this research, the work was also meant to be situated within the theoretical framework of political ecology. As such, attention was paid to how macro level political and economic forces affect micro level decisions made on Cuban farms. Using this perspective as a lens, it is clear that Cuba's political and economic isolation from the global economy has been an extremely important factor in the shift to agroecology. Indeed, in most countries of the world the powerful influence of TNCs and neoliberal trade regulations imposed by the WTO or structural adjustment programs have an important impact on the agricultural sector, encouraging high levels of industrial input use, land consolidation, and export-oriented production. Because Cuba has chosen to remain largely isolated from the global capitalist political economy, the impact of these pressures is muted, if not eliminated. As such, the Cuban state has been relatively free to pursue independent agricultural policies that have included official support for agroecology and a corresponding focus on local food networks and national food sovereignty. In addition, the dramatic nature of the economic crisis that followed the fall of the Soviet Bloc served to strengthen Cuban resolve to pursue national food self sufficiency and move away from dependence on global agricultural markets.

While Cuba's substantial distance from the global political economy both necessitated and facilitated the promotion of agroecology at the state level, Cuban farmers themselves have been less directly affected by global level forces. Instead, whereas farmers in many parts of the world are impacted in a very direct way by the influence of agricultural TNCs, global agricultural commodity markets, and neoliberal trade policies, in Cuba the state acts as an intermediary between global political economic forces and on-farm decision making. As such, it is the state that has the most direct affect in terms of determining how farmers will make decisions about production methods. Thus, while

the state's role in environmental governance tends to be decreasing in many parts of the world, the Cuban case clearly demonstrates what a powerful force it can be, particularly when it is freed from some of the constraints of the global capitalist political economy.

8.4 Recommendations for the Future

In the final analysis of both the literature and data presented here, three concepts stand out as being particularly essential to the development and maintenance of an agroecological food system. The first of these is *economic incentive*, which can take the form of either economic barriers against conventional production (for example inability to purchase conventional inputs), or economic incentives for agroecological production, the most prominent of which may be price premiums for certified organic goods. Governments can act to create further economic incentives, for example by subsidizing biological inputs and/or taxing conventional ones. This brings us to the second important ingredient for a successful sustainable agricultural sector, which is *policy*. In addition to providing economic incentives for organic production or disincentives for conventional production, policy can also help to create infrastructure to support agroecological or organic systems (such as certification bodies and centres for the production of organic inputs), and can develop regulatory structures that favour agroecological production. In addition, state policy can help to support the third necessity for a strong sustainable agricultural sector - *research and education*. Research and education are extremely important in terms of developing new successful methods of agroecological production, and ensuring that producers are informed about these methods, understand the benefits of using them, and have the expertise to implement them effectively on their farms. General environmental education is also important as it can provide both producers and consumers with information regarding the dangers of conventional agricultural production and the importance of supporting alternatives.

8.4.1 Economic Incentive

To date, agroecological production in Cuba has largely been driven in a negative way by economic crisis and necessity. Although Cuba has not turned to an 'organic by neglect' form of agriculture, as is sometimes the case when economic necessity prevents conventional production, resource shortages do present a significant barrier to the continued success of the agroecological movement in the country. As such, it is extremely important that Cuba begin to *develop positive economic incentives for its agroecological production, particularly by taking advantage of price premiums on the international market for organic products.* These incentives could provide both a source of profits to be reinvested into Cuban farms and long term motivation for continued agroecological production. In order for this to occur in a significant way, Cuba must develop its own internationally recognized certification system so that it is not dependent on expensive foreign agencies. This system could certify organic products, and also potentially ecological products that are not strictly organic but are produced with minimal use of conventional inputs.

In order for price premiums to have the maximum effect in terms of encouraging agroecological production, it is important that individual producers be directly connected to these premiums. In Cuba this could potentially be achieved by further liberalization of farmers markets to include freedom for farmers to sell, either individually or through cooperatives, to tourists in the country or even on the international market. Profits from price premiums could also potentially be passed down by state *empresas* who would pay a higher price for certified production destined for either the international or tourist market. There may also be considerable potential for Cuba to enter into fair trade networks, which frequently complement organic systems; however, fair trade networks tend to rely on maximizing the directness of the relationship between producer and consumer by eliminating intermediaries (Raynolds, 2000). Within the current Cuban system, the state acts as a strong intermediary blocking direct producer access to the market (with the notable exception of recently legalized private surplus sale), and this could inhibit entry into fair trade organizations.

A final comment on the importance of price premiums is that, while they could provide an important means of supporting agroecological development in Cuba and ensuring that the movement continues should the economy improve and necessity cease to act as an incentive for alternative production, they also represent some potential dangers. First of all, as discussed in Chapter 2, there is some evidence to suggest that heavy reliance on price premiums as a motivating force may open the door for a relatively superficial or 'conventionalized' form of organic production, which conforms to regulatory standards without addressing many of the problems of the conventional sector, including monocrop production, farm scale, labour issues, and export-oriented production (see for example Buck et al., 1997; Guthman, 2002). In particular, as long as there is no significant national market for certified organic foods in Cuba, suggesting that the country rely heavily on price premiums for the maintenance of agroecological production implies reliance on an export driven agricultural economy. Thus, while this thesis suggests that certification and price premiums could be part of a sustainable food sector in Cuba, it is hoped that this avenue could be explored without abandoning the increased attention to subsistence production and local food networks that Pretty and Hine (2001), Rigby and Cáceres (2001), and others stress is essential for truly sustainable food systems. Finally, while Cuba currently has a strong chance to enter the niche organic market as a leader, as the market continues to grow it is possible that premiums will eventually diminish. Thus, an organic sector that relies too heavily on price premiums, or indeed on any economic incentive, for its survival will always be vulnerable to economic fluctuations. In the end then, as stressed by so many Cubans in a discussion of the agricultural sector, the notion of striving to achieve balance - taking advantage of price premiums without becoming entirely dependent on them - is perhaps of primary importance.

8.4.2 Policy

Cuba has already clearly demonstrated its commitment to supporting agroecological production at the policy level. However, while policy measures have been integral to the widespread adoption of agroecological techniques, they have also tended to be imple-

mented in a relatively top-down manner, raising questions about their long term effectiveness. As such, a second recommendation aimed at ensuring the future success of Cuban agroecology is a *decentralization of decision making power within the agricultural sector.* This could be accomplished in part by delegating increased authority to local branches of state organizations; however, the increased incorporation of local experts, particularly producers themselves, into agricultural policy decision making could be potentially very beneficial to the agroecological movement. In order to be as effective as possible, participation of local people (especially producers) should not be limited to discussion of how to implement mandates that are directed from a more centralized authority, but should be focused on providing a voice for local actors in the creation of the mandates themselves.

Perhaps the most significant concern regarding decentralizing responsibility for the direction of agricultural policy is that this could potentially lead to a decreased focus on agroecological development, as it may not be viewed as an immediate priority by many producers at the local level. However, if agroecological techniques continue to be adopted without a high degree of consciousness or direct decision making on the part of producers, there is little reason to believe that these techniques will be practiced in an optimal manner, and even less reason to believe that they will be maintained should policy measures that currently encourage alternative production be altered.

8.4.3 Research and Education

Perhaps the most important means of ensuring that agroecological techniques be adopted in an effective manner, and will be sustainable in the long term regardless of economic or policy shifts, is through research and education. Although initially research and education may be dependent on both economic ability (i.e. resource availability) and policy support, in the long term, because of their focus on changing people's mentality, they offer perhaps the most powerful means of creating lasting change. Given its tenuous economic situation, Cuba is already doing an exceptional job in terms of supporting research and education designed to promote agroecological production. However, efforts at product development

and particularly widespread extension of available agroecological expertise are hampered by resource shortages. As such, perhaps the most effective way to maximize the benefits of Cuba's current agroecological research and education system would be to focus on *developing increased linkages with institutions outside of Cuba that share a desire to promote the development of sustainable agricultural systems.*

Many Cubans are already aware of the need to seek outside support for the transition away from conventional production, and a number of projects are already underway with international assistance. However, there is still a considerable amount of untapped potential, particularly with regards to official inter-institutional cooperation. High levels of regulation and bureaucracy can act as inhibitors to the development of research and education networks between Cuba and other nations, but there is a lot to be gained from the kind of knowledge sharing that these networks could facilitate. While increased networks with foreign based institutions may help to provide Cuba with necessary resources, people outside of Cuba also stand to benefit greatly from that country's innovative work on agroecological research and education. Thus, increasing research and educational linkages should be viewed as a process that would be mutually beneficial to both North and South and would also help to facilitate important South-South development cooperation.

8.4.4 Recommendations for Future Research

As discussed in the introduction to this thesis, research on sustainable agriculture in Cuba has tended to devote insufficient attention to the study of how sustainability, both in a general way and in terms of the agricultural sector, is conceptualized by Cuban producers and by others involved in food systems. How Cubans define terms such as 'organic agriculture' or 'agroecology,' as well as what motivates them to either support or reject alternative production systems have thus not been thoroughly enough explored. Examination of the Cuban case is particularly useful because of the relatively unique nature of the Cuban agricultural experience. As such, careful study of what is happening in Cuba and why adds to current discussions and debates regarding how sustainable systems of food and fibre production and distribution can be promoted around the world.

While this thesis sought to address the above issues, it was extremely limited in its scope. As noted in Chapter 4, significant research limitations (particularly during the first field visit) meant that this work was primarily based on a six week case study carried out in one municipality with twelve participating farms. Although this, in addition to a significant number of key informant interviews and visits to agricultural sites, yielded some interesting results, the small sample size and relatively short period in the field, combined with other issues such as linguistic and cultural barriers, suggest that further research into similar questions could be useful. In particular, exploring how different production structures (CCS, CPA, and UBPC), may affect producer opinions and behaviour, as well as examining regional variation (especially between the relatively developed central parts of the country and the less developed eastern and western provinces) would help to paint a fuller picture of Cuban agricultural transition. In addition, as highlighted in Chapter 6, further research into the potential of state-society synergy to contribute to agroecological development could be a useful endeavour.

From a more practical perspective, research that would address how to best implement the above recommendations could be potentially very important. Future studies could include market research designed to facilitate Cuba's entry into the global market for ecological products, and policy reviews to help determine how a more decentralized agricultural policy structure might be created. Ideally these studies could be conducted in collaboration with Cuban research institutes in furtherance of the objective of increasing research and education linkages. Finally, Bebbington (2002) has argued that there is a need for development geography to focus increased attention on comparative analysis as opposed to free-standing case studies. As such, although it was beyond the scope of this thesis, future research could take this case study as a starting point for comparison with data on sustainable agricultural development in other contexts in an effort to extend the theoretical contributions of the information presented here.

8.5 Final Comments

The title of this thesis was drawn from a popular Cuban slogan found on billboards and posters across the country. While there may be an element of propaganda in advertising the notion that "*Un mundo mejor es posible*" (A better world is possible), and the phrase is certainly viewed with scepticism by some Cubans, it is also not uncommon to encounter people who truly believe the message and are eager to convince foreigners of its importance. This belief, that better alternatives to the current global capitalist paradigm exist, is a powerful one. It refutes Pepper's (1993, cited in Bryant and Bailey, 1997) argument, discussed in Chapter 2, that the hegemony of the liberal capitalist worldview has essentially eclipsed any realistic belief in societal alternatives. At the same time, it supports Barkin's (1998, 2002, 2006) position that it is possible to develop systems that are not entirely dependent on dominant patterns of globalized trade.

Indeed, the development of sustainable food systems in Cuba has in many ways been reflective of Barkin's ideas regarding the importance of local autonomy, self-sufficiency, and productive diversification, as the country has moved to replace export-oriented crops with subsistence production and decrease dependence on the global agroindustrial market. As such, although there is no doubt that there is room for both critique and improvement, the Cuban case does provide an inspiring example of how much can be achieved with considerable amounts of determination and creativity, even in the face of limited capital resources. It demonstrates that viable alternatives to the current conventional agricultural paradigm exist, and that these alternatives can be implemented in a way that helps to ensure environmental sustainability and both food security and sovereignty. Thus, within the admittedly limited framework of this study there was more than sufficient evidence to support the notion that better food systems, and indeed a better world, are possible.

Appendix A

List of Interviews

Key Informant Interviews

Interview 1 May 2, 2005. Canadian NGO Worker

Interview 2 May 2, 2005. Planning Specialist

Interview 3 May 3, 2005. Cuban NGO Worker

Interview 4 May 3, 2005. National Research Institute Researcher

Interview 5 May 4, 2005. University Researcher

Interview 6 May 5, 2005. National Research Institute Researcher

Interview 7 May 5, 2005. Organopónico Farmer

Interview 8 May 7, 2005. UBPC Farmer

Interview 9 May 10, 2005. CPA Farmer

Interview 10 May 11, 2005. CREE Worker

Interview 11 May 12, 2005. CPA Farmer

Interview 12 May 13, 2005. Organopónico Farmer

Interview 13 May 14, 2005. CPA Farmer

Interview 14 May 14, 2005. CCS Farmer

Interview 15 May 16, 2005. University Researcher

Interview 16 May 18, 2005. *Sanidad Vegetal* Researcher

Interview 17 May 18, 2005. National Research Institute Researcher

Interview 18 May 18, 2005. Agricultural High School Teacher

Interview 19 June 5, 2005. *Sanidad Vegetal* Worker

Interview 20 June 6, 2005. University Researcher

Interview 21 June 14, 2005. Cuban NGO Worker

Interview 22 June 26, 2005. National Research Institute Technician

Interview 23 June 27, 2005. National Research Institute Researcher

Interview 24 June 27, 2005. National Research Institute Researcher

Interview 24a January and February, 2006. Follow-up conversations

Interview 25 June 27, 2005. National Research Institute Researcher

Interview 26 June 28, 2005. Cuban NGO Worker

Interview 27 July 14, 2005. CCS Farmer

Interview 28 July 15, 2005. CCS Farmer

Interview 29 July 16, 2005. CCS Farmer

Interview 30 July 16, 2005. CCS Farmer

Interview 31 July 17, 2005. CCS Farmer

Interview 32 July 18, 2005. CCS Farmer

Interview 33 July 18, 2005. Agricultural Tour Guide

Interview 34 January 16, 2006. National Research Institute Researcher

Interview 35 February 10, 2006. National Research Institute Researcher

Case Study Producer Interviews

Interview I January and February, 2006. Urban Producer

Interview II January and February, 2006. Urban Producer

Interview IIa January and February, 2006. Urban Producer

Interview IIb January and February, 2006. Urban Producer

Interview III January and February, 2006. CCS Producer

Interview IIIa January and February, 2006. CCS Producer

Interview IV January and February, 2006. CCS Producer

Interview V January and February, 2006. Independent Producer

Interview VI January and February, 2006. CCS Producer

Interview VIa January and February, 2006. CCS Producer's sister

Interview VII January and February, 2006. CCS Producer

Interview VIIa January and February, 2006. CCS Producer

Interview VIIb January and February, 2006. CCS Producer

Interview VIIc January and February, 2006. CCS Producer's son

Interview VIII January and February, 2006. CCS Producer

Interview IX January and February, 2006. CCS Producer

Interview IXa January and February, 2006. CCS Producer's daughter

Interview IXb January and February, 2006. CCS Producer

Interview X January and February, 2006. Independent Producer

Interview Xa January and February, 2006. Independent Producer

Interview Xb January and February, 2006. Independent Producer

Interview XI January and February, 2006. CCS Producer

Interview XII January and February, 2006. CCS Producer

Appendix B

Interview Themes and Sample Questions

Producer Interviews

Theme 1: Personal Information

- What level of education do you have?
- Do you have any formal agricultural training or education? If so, what kind?
- Does your family have a history of farming?
- When did you begin farming?
- What other jobs or occupations, if any, have you held?
- Do your children plan to continue farming?

Theme 2: Farm Description

- What is your land tenure status?
- Are you a member of a cooperative?

- What is the size of your farm? Has it always been this size? Are you satisfied with the current size?
- What crops do you produce? What kind of rotation do you use? What animals, if any, do you have?
- How many people work on the farm?

Theme 3: Input Use

- What machinery do you own or have access to for irrigation, tilling, harvesting, etc.?
- What methods do you use to improve soil fertility? Have these methods changed significantly during your time farming? Are you satisfied with your current ability to fertilize? What changes might you like to see?
- Do you have any concerns about pests and/or disease? How do you address these problems? Do you use any chemical pesticides, and if so where do you obtain them and how much do they cost?

Theme 4: Post-Harvest

- Where do you sell your products? To whom? Are you satisfied with the prices you receive? Are you satisfied with your ability to sell your produce?
- Do you process any of your own production in any way?
- What products do you use for your own consumption? What are the main food products that you need to buy off-farm?

Theme 5: Sustainable Agriculture

- What does sustainable agriculture mean to you?
- What does organic agriculture mean to you? Is your farm organic?

Theme 6: Agricultural Extension

- What kind of interaction, if any, do you have with government extension workers (e.g. *Sanidad Vegetal*, ANAP, research institutes, foreign NGOs)?
- Is there any extension help that you could use that you currently do not get?

Theme 7: Challenges

- What major challenges do you currently face on your farm? In your life? How have these changed over time?
- How have you tried to address these challenges?
- What would you need to be able to better address these challenges?

Non-Producer Interviews

Theme 1: Nature of Involvement with Organic Agriculture

- What is the nature of your involvement with organic agriculture in Cuba?
- How long have you been a part of the organic movement?

Theme 2: Definition of Organic and Sustainable Agriculture

- What do the terms organic and sustainable agriculture mean to you?
- What are the major goals of organic agriculture?
- What would you consider an ideal size for an organic farm?
- What would you consider an ideal distribution outlet for organic products?

Theme 3: Motivations

- What motivated you initially to become involved in the organic movement?
- Are your motivations today the same as they were originally?

Theme 4: Constraints

- Have you identified any specific problems that constrain organic production in Cuba?
- How do you think these problems could be solved?

Theme 5: Other Parties

- How do you view the involvement of other actors in the organic movement?
- What do you think about organic agriculture policy?
- How do you view Cuba's role in the international organic agriculture movement?

Theme 6: The Future

- What changes, if any, would you like to see in the Cuban organic sector in the future?
- What changes, if any, do you think might be likely to happen?

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