

Institutionalizing agroecology: successes and challenges in Cuba

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Abstract Over the past two decades, Cuba has become a recognized global leader in sustainable agriculture. This paper explores how this process of agricultural transition has taken place, and argues that it has largely been led by research institutes, non-state organizations and the Cuban government, which have all contributed to the institutionalization of agroecology in both policy and practice. This process has been highly effective in terms of the numbers of people using agroecological techniques. However, although these techniques have been widely adopted by farmers across the country, this paper suggests that many still perceive maximizing production to be a higher priority than maintaining a commitment to agroecological ideals. For these farmers, agroecological farming is viewed primarily as a pragmatic decision rather than an ideological or moral one, and they may thus be susceptible to shifting back to conventional production if this option became politically and economically feasible

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Abbreviations

ACTAF	Asociación Cubano de Técnicos Agropecuarios y Forestales (Cuban Association of Agricultural and Forestry Technicians)
ANAP	Asociación Nacional de Agricultores Pequeños (National Association of Small Farmers)
CENSA	Centro Nacional de Sanidad Agropecuario (National Centre for Agricultural Health)
CREE	Centro de Reproducción de Entomofages y Entomopatogenos (Centre for Reproduction of Entomophages and Entomopathogens)
INCA	Instituto Nacional de Ciencias Agrícolas (National Institute of Agricultural Sciences)
MINAGRI	Ministerio de Agricultura (Ministry of Agriculture)
NGO	Nongovernmental organization
UBPC	Unidad Basico de Producción Cooperativa (Basic Unit of Cooperative Production)

Introduction

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, industrialization was highly dependent on support from the Soviet Union and other Soviet 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). In 1990, in response to this crisis, the Cuban government declared the Special Period in Time of Peace—a large scale austerity program involving strict rationing of everything from food to electricity—as well as the initiation of multiple programs designed to help the country rebuild (Deere et al. 1998).

One of the programs introduced during the Special Period was 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 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). This paper explores how the agricultural transition took place, and argues that it has largely been led by research institutes, non-state organizations and the Cuban government, as these actors have effectively institutionalized agroecology in terms of both policy and practice. It is further argued that this strategy has been highly effective to the extent to which agroecology has been adopted across the country; however, it may be somewhat less effective in terms of convincing farmers to adopt a deep-seated agroecological mentality.

The paper is organized as follows: The first section briefly discusses the sustainable agriculture paradigm and its relation to conventional agriculture, and introduces issues such as the potential conventionalization of the organic sector and the relationship between sustainable agriculture and the state. Following this introduction, the transition to agroecology in Cuba is examined, with a look at the roles played by national level non-state actors as well as by the Cuban state. The next section explores in greater detail how the Cuban state has effectively institutionalized agroecology at the farm level, with specific attention paid to how the state regulates input supplies and monitors farm practices. This discussion is followed by an examination of how the actions of the Cuban state are viewed by farmers. Finally, we conclude by discussing the potential for increasing participation, particularly at the grassroots level, in the transition to sustainable agriculture in Cuba.

The sustainable agriculture paradigm

Today, conventional global agricultural production is characterized by massive amounts of industrial and capital inputs (e.g. chemical pesticides and fertilizers, heavy machinery), highly specialized monocrop production, rapidly increasing farm sizes, and a vast reduction in the amount of labor required to operate farms (Altieri 1998;

Pretty and Hine 2001). This industrial model of agriculture is designed to maximize profit by increasing productive capacity and reducing costs (Ikerd 2005). Although it is widely practiced around the world, and is supported by powerful industry lobbies and governments, this model is criticized by increasing numbers of people who question the degree to which it is socially, environmentally, and even economically sustainable (Altieri 1998; Pretty and Hine 2001).

In response to concerns about conventional agriculture, there has been growing global interest in alternative options such as organic, agroecological or sustainable production. For the purposes of this paper, the term “organic agriculture” will generally be avoided because of its association with organic certification procedures and requirements—which, for the most part, have not been pursued in Cuba, nor are they viewed as a priority. “Agroecological” and “sustainable agriculture” will be used interchangeably to refer to systems designed 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, p. 3)

It is important to note however, that the definitions of terms such as organic and sustainable agriculture are highly contested, and have been the subject of much debate in society, as well as within scholarly circles. One manifestation of this lack of clarity has been dubbed the “conventionalization” debate, and focuses on concerns that the organic sector, as it grows in proportion, increasingly resembles conventional agriculture in structure and outlook on society-nature relations (see for example Buck et al. 1997; Goodman 2000; Guthman 2002). Although it is focused on the certified organic sector, this debate is relevant to the Cuban case because at its heart are questions regarding what motivates people to practice sustainable agriculture, and how alternative food and agriculture networks are structured and regulated. For example, Fairweather (1999) suggests that organic farmers can generally be categorized as either “pragmatic” or “committed” in terms of their motivations, and both Tovey (1997) and Kaltoft (2001) argue that when governments seek to institutionalize organic agriculture through the creation of standards they run the risk of suppressing the ideological content of the sustainable agriculture movement and leaving the sector open to conventionalization. Both of these themes will be explored in the paper.

The state and sustainable agriculture

Michelsen (2001) notes that organic farming historically is considered to be a voluntary social movement driven by civil society rather than relying on institutional support. Indeed, around the world the sustainable agriculture movement has tended to be strongly associated with the concepts of participatory, grassroots, and bottom-up development (see Pretty and Hine 2001; Pugliese 2001; IFAD 2003). In part, this may be because governments have not traditionally supported alternative agriculture. However, the sustainable agriculture and participatory development paradigms are also considered naturally complementary because they share common values of recognizing rural people as being capable of managing their own development, respecting traditional systems of knowledge, and promoting creative and flexible solutions that can be tailored to the needs of a particular community or ecosystem (Pugliese 2001).

Perhaps paradoxically, although participation may be an integral part of sustainable agricultural development, and in spite of concerns about institutionalization raised by the likes of Tovey and Kaltoft, the notion of strong institutional support—particularly on the part of government—has also been recognized as an crucial element in 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 Pretty and Hine 2001; Gomez Tovar 2005). Indeed, Pretty and Hine (2001, p. 73) argue that “without appropriate policy support at a range of levels ... improvements [resulting from sustainable agriculture] will remain at best localized in extent, or at worst, wither away.”

While a supportive policy environment is considered a key element for successful sustainable agricultural development, governments around the world have generally shown little support for organic agriculture. Instead, heavily influenced by the agro-industrial lobby, the global trend has been for states to favor conventional production with subsidies and incentives (Pretty and Hine 2001; IFAD 2003; Gomez Tovar 2005). As a result, in most contexts funding for extension programs, infrastructure, and other support mechanisms for organic production is scant without NGO assistance (Pretty and Hine 2001; IFAD 2003).

This situation is gradually changing, particularly in the European Union, where governments are beginning to more actively engage with the sustainable agriculture movement (Michelsen 2001). In Cuba, the state—along with other national institutions—has taken a particularly active role in supporting the shift away from conventional agriculture (Funes 2002). Indeed, the Cuban government

has stated that the adoption of the Soviet industrial model of agriculture was reflective of a “colonized mentality” (Rosset and Benjamin 1994, p. 8) and that sustainable agriculture is “real socialist agriculture” because its principles “run counter to the vicious globalization promoted by neoliberalism, and are more in favor of socially just and solidarious, more *human* globalization, without dependency on transnational corporations and in favor of self-sufficiency” (Funes 2002, p. 22).

Although the extent to which this position has truly been internalized by government officials may be debatable, the intense resource shortages brought on by the Special Period led the Ministry of Agriculture (MINAGRI) to officially adopt an “Alternative Model” of agriculture in the early 1990s. This model is based on eight goals: 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 agroecological methods training program; encouragement of increased cooperation amongst farmers; and an effort to curb urbanization to ensure adequate rural labor supplies (Pretty and Hine 2001). Specific policies aimed at achieving these goals have included land tenure changes designed to break up large state farms into smaller production units, the development of Centers for Reproduction of Entomophages and Entomopathogens (CREEs) to produce biocontrol products, and heavy investment into agroecological research and extension programs (see Rosset and Benjamin 1994; Deere et al. 1998; Pérez and Vázquez 2002; Funes 2002).

Methods

The research presented here is based primarily on a case study conducted in the municipality of San José de las Lajas in Havana province (see Fig. 1). This case study sought to assess the extent to which Cuban producers practiced agroecological methods, as well as to determine their motivations for, and degree of commitment to, using those methods. In addition, the case study explored the role of government and other national institutions in the shift away from conventional agriculture, particularly with regards to how national policies were implemented and their effect life at the farm level.

In order to address these questions, field research was conducted during two periods. The first was a 3 months period in 2005. During this time, semi-structured interviews were conducted with 13 farmers from various municipalities across the country, as well as with 22 Cuban key informants involved in agricultural research and extension. These key informants included university

Fig. 1 Map of Cuba showing San José de las Lajas



professors, agricultural technicians, plant protection workers, CREE staff, planners, teachers, and an agrotourism guide. The initial research participants were identified during a three-week officially sponsored farm tour of the country organized jointly by the University of British Columbia in Vancouver, Canada; and the Cuban organization *El Movimiento Cubano por la Paz*. Further sampling during this visit was done using the snowball method, as initial contacts identified others they thought could participate in the study.

The second field period, in 2006, involved a 2 months stay in San José de las Lajas, where the case study research was undertaken. Research methods included a series of in-depth, semi-structured interviews conducted with farmers and their families on 12 farms in the municipality. The work was officially supported by the National Institute of Agricultural Sciences (INCA), which collaborated in the identification of initial case study participants. Later participants were selected through snowball sampling. The choice of participants was intended to reflect a variety of production types as well as geographic and economic diversity. Producers recognized for their relatively high external input methods or, conversely, for their model agroecological 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. Eight of the participating farms were part of Credit and Service Cooperatives (CCS), two were independent, and two were classified as urban. Of the farmers interviewed during the previous field period, seven belonged to CCS, three to Agricultural Production Cooperatives (CPA), one to a Basic Unit of Cooperative Production (UBPC), and two to urban gardens or *organopónicos*.¹

¹ CCSs are cooperatives in which each member remains largely responsible for the management of his or her own parcel. The most common form of non-state land tenure, in 1998 CCSs covered approximately one million hectares. CPAs function in a more communal manner, with major production decisions being made by a management board and land managed collectively by the cooperative community. In 1998 there were approximately 700,000 ha of CPA land. Together, cooperative land, along with a relatively small number of independent farms, accounted for about one quarter of

Between two and six visits were made to each of the participating families in San José de las Lajas. The interviews were informal, and comments from producers were often augmented by friends or relatives who were present during the visits. In addition to these interviews, participant observation was carried out during a variety of extension workshops, farmer gatherings, demonstrations, and farm tours. The case study was admittedly small; however, the in-depth interviews yielded considerable insights that could help form the basis for more extensive future research.

The role of non-state actors in institutionalizing agroecology in Cuba

Before examining in more detail the role that the Cuban state has played in agriculture transition, the work of non-state actors will be mentioned. Some of the most prominent non-state players in the Cuban agroecology movement have been the National Association of Small Farmers (ANAP) and the Cuban Association of Agriculture and Forestry Workers (ACTAF). Both of these organizations represent producers and focus on education and extension of sustainable agriculture techniques. However, in the case study community of San José de las Lajas, the farmers interviewed did not cite either ANAP or ACTAF as prominent in terms of their own experience. Instead, INCA along with other local research and educational institutions such as the Agricultural University of Havana were the primary players. As such, although its prominence as an actor is atypical, INCA will be used to illustrate how

Footnote 1 continued

Cuban farmland Álvarez (2002). UBPCs consist of land previously belonging to state farms and are also run as cooperatives with management boards. In 1997 they occupied approximately 40% of Cuba's agricultural land (Martín 2002). In 1997 over 400 ha were devoted to urban agriculture (Altieri et al. 1999). Private cooperatives as well as UBPCs and urban farms are currently growing in number, while the state-owned sector is in gradual decline.

agroecology is promoted in an institutional manner by non-state actors.

Founded in 1970, INCA receives the majority of its funding from the Cuban Ministry of Higher Education. Thus, although it is not directly considered part of the government, its work reflects state policy, at least in a general way. Although it 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 (i.e., the industrial model). According to its director, 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. 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) which is now used extensively in Cuba and exported across South and Central America. In addition to the important work INCA conducts with mycorrhizae and biofertilizers, it also has projects on topics such as the use of *cachaza* (a residue from sugar cane processing), green manures, conservation tillage, reintroducing native seed varieties, and increasing agricultural biodiversity.

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 farmers interviewed 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 was informal. For example, on three farms that participated in the study and were in particularly close proximity to INCA, informal communication with research and extension workers (who were also neighbors and, in two cases, past or present co-workers) often provided useful information regarding agroecological methods and inputs.

In other cases, INCA’s assistance was formal. For example, in the community of Zaragoza, producers from one cooperative (three of whom took part in the study) were working with INCA to, among other activities, 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 included the re-introduction of local varieties lost as a result of years of focus on high-yielding varieties, as well as the introduction of new species that could offer both environmental and economic benefits to producers. Extension and education programs such as those provided by INCA are extremely important, particularly considering that a lack of available agroecological

education and information is a serious constraint to the adoption of sustainable agriculture in 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 18 February 2006 a workshop on biological pest management was held at *Las Papas*—INCA’s experimental farm. Approximately 50 people attended, including workers from INCA, *Las Papas*, the National Centre for Agricultural Health (CENSA), and *Sanidad Vegetal* (the branch of MINAGRI responsible for plant protection), students from the Agricultural University of Havana, and a number of both urban and rural producers (two of whom were participants in the study). 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 Fidel Castro, *Si, se puede* (Yes we can!), explaining that the goal of the day was to demonstrate that alternatives to chemical pest management 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 use of beneficial plants such as Neem and sassafras, to beneficial organisms such as *Trichogramma* sp. parasitic wasps, *Bacillus thuringiensis* 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.”

The role of the Cuban state

As discussed above, the Cuban state’s creation of a policy framework that is supportive of agroecology has been essential in the move away from conventional production in Cuba. However, 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. As such, the data presented here demonstrate how, through both *la Agricultura* (a local branch of MINAGRI) and local branches of *Sanidad Vegetal*, the Cuban state is able to effectively limit the range of production decisions available to individual producers 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 labor and machinery use. The state’s ability

to influence production decisions tends to be strongest on the newly independent Basic Units of Cooperative Production (UBPCs). However, Communist Party representatives also sit on cooperative boards, reflecting the deep integration of politics and farm management.

Controlling input supplies

As the primary supplier of agrochemical inputs in San José de las Lajas, *la Agricultura* is able to regulate the access that farmers have to these products. Effectively, it is left to *la Agricultura* to determine which producers 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 have an opportunity to buy them from *la Agricultura*. In fact, only one of the farmers interviewed in San José de las Lajas was permitted 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 were left with the options of going without chemical inputs, or negotiating through networks of friends and acquaintances in order to obtain these inputs as gifts, or buy them on the black market. In either of these cases, very limited quantities are ever available, and there is also risk 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 state regulation of the sale and distribution of these products. As a result, agroecological methods replace agrochemical application on most farms.

In addition to the administration of chemical input supplies, another way in which Cuban state regulation affects producer decision making is through state control of the majority of Cuban farmland. Indeed, the buying and selling of land on the free market is prohibited in Cuba. Thus, any expansion of farm size requires state authorization. Although only one of the producers interviewed expressed any specific desire for expansion, in the end it is the state that has authority in this regard. Similar to the case of the governance of purchase of chemical inputs, farmers seeking additional land must prove to the state that their use of additional land will be productive for Cuban society (e.g., will maximize food production to feed the population). The same is true for producers seeking to employ additional labor 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 for agrochemical use, state regulation limits producers' ability to make decisions regarding expansion of their farms in terms of land, labour, and machinery; therefore, state policies ensure that most farms remain relatively small in scale. This is not to say that producers can never acquire land, hire labor, or purchase machinery; however, because state permission is required, it is the state that has the ultimate authority on these issues.

Monitoring farm practices

While the state has a direct impact on producers because of its role as the primary supplier of agricultural inputs and buyer of agricultural products, *Sanidad Vegetal* representatives have an on-farm presence that is perhaps even more direct. The structure of *Sanidad Vegetal* is such that it extends directly from MINAGRI to the level of individual *empresas* (state companies), 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 *Sanidad Vegetal* representatives during which inspections are made, and suggestions for addressing plant health are offered. These can range from useful intercropping possibilities to appropriate biocontrol methods. These inspections provide *Sanidad Vegetal* representatives the opportunity to provide valuable extension services, and also to monitor producer behavior and detect practices deemed inappropriate. Although the lack of important export crops such as sugar and tobacco in San José de las Lajas allowed for a relatively relaxed degree of *Sanidad Vegetal* control, in other municipalities (such as the tobacco growing Viñales) producers must seek permission from their local *Sanidad Vegetal* representative prior to applying any agrochemical product. As such, like *la Agricultura*, local *Sanidad Vegetal* representatives constrain the decision making ability of individual Cuban producers regarding chemical application, thereby enhancing the degree to which sustainable agricultural practices are used.

The breadth of agroecological production

The results of the case study confirmed much of what has been written in both academic and popular literature regarding Cuba's leadership in the adoption of sustainable agriculture. The findings demonstrated that Cuban 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 than chemical inputs. In short, there is a clear trend towards the conservation and recycling of on-farm materials and the minimization of off-farm inputs, in accordance with the study's definition of sustainable agriculture. Farms also

tended to rely heavily on the labor of family members or neighbors, and products not sold to the state were marketed locally. This holistic model of low external-input agriculture is fairly consistent with what many consider to be an organic ideal (see Ikerd 1993; Altieri 1998; Vos 2000; Hall and Mogorodoy 2001; Rigby and Bown 2003). The notion that institutionalization of sustainable agriculture may lead to an input substitution model of alternative production that in many respects mirrors the conventional sector was not evident. Rather, the practice of institutionalizing agroecology in Cuba can be considered extremely successful in terms of the breadth of adoption of a holistic array of sustainable farming techniques. This difference may partly be accounted for by the fact that in other contexts institutionalization has primarily taken the form of implementation of organic certification standards, while in Cuba this has not been the case. In addition, the market pressures that affect the organic sector in other contexts are muted or absent in Cuba's centrally planned economy.

The view from the farm

The depth of commitment to agroecological production

Although agroecological farming methods had been adopted by all of the farmers who participated in the study, the majority of those interviewed had not chosen this path with conscious intent. Instead, all but a few expressed varying degrees of desire for more access to resources such as agrochemicals, gasoline, electricity, and machinery. In addition, when describing their ideal farm, many referred to the industrial agricultural model that predominates in developed countries, and tended to equate their current low external input model with underdevelopment. One farmer expressed a 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.” He went on to note that he would love to have a farm like those he believed exist in North America, where airplanes dust crops, all the labor is mechanized, one can buy any inputs needed, and production levels are booming.

In addition to expressing frustrations with the lack of availability of conventional resources, aside from several notable exceptions, the producers interviewed found it difficult to define what sustainability meant to them and were unsure how to respond to questions that specifically referred to 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 Rosset and Benjamin 1994; Rosset 1997; Warwick 2001; Funes 2002), and the data on farm practices largely support 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 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. Following Fairweather's (1999) analysis, pragmatic organic producers (as opposed to ideologically committed ones) are likely to revert to conventional production methods if the reason for their pragmatic decision (in Fairweather's example, price premiums; while in Cuba, resource limitations combined with state regulation) is removed. This issue should be further explored by future research, as it could potentially threaten the long-term success of the agroecology movement in both Cuba and similar contexts.

The fact that most of the farmers interviewed would like to have greater 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 at the farm level. On the contrary, one of the producers interviewed in San José de las Lajas, and three others from across the country, spoke passionately and eloquently about their philosophical belief in the need to preserve balance in the agroecosystem. 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”; 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.” One cooperative manager echoed this idea, stating that “agroecology is very, very beautiful work, and productive and healthy”.

Even amongst those producers who did not express direct enthusiasm for, or commitment to, agroecological production, most still demonstrated appreciation for some agroecological concepts. Indeed, the majority of the farmers interviewed expressed respect for the ideas of reducing chemical use (often referring to agrochemicals as *venenos*, or poisons), maintaining biodiversity, and minimizing tractor use as a means of protecting the soil. Even the farmer who commented on the “backwardness” of Cuban agriculture in the Special Period noted that, although he would like more access to chemical inputs, he also appreciated the way that organic fertilizers have helped improve his soil quality.

This ambivalence brings to mind Fairweather's (1999) finding that many conventional producers had not made a conscious choice to reject organic agriculture, but rather had never considered the possibility of organic production. Based on this information, he suggests that policies designed to increase education and expose farmers to the organic option could help increase the number of organic farmers. In Cuba, although many farmers may not have made an initially conscious choice to adopt agroecological production, it is possible that, having now been exposed to the option, and to a great deal of agroecological education, some may gradually make the transition from being primarily pragmatic users of organic techniques to being more committed believers in agroecology, thus becoming less likely to convert back to conventional agriculture should conditions change. Having said this, as noted above, the majority of the producers who participated in this study still appear to be closer to the pragmatic end of the spectrum, and some researchers within INCA felt this attitude was typical for the country. Again, as noted above, this issue of motivation is potentially of great importance, and should be the subject of further study.

Farmer-state relations

The majority of the producers interviewed were appreciative of the state support they received in terms of subsidized inputs from *la Agricultura* and extension services from *Sanidad Vegetal*. Almost all those interviewed also expressed general support for the state, with most 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," and another noted that he is always ready to "respond to a call from our *Comandante*, Fidel".

However, the potential for alienation as a result of the state's top-down approach was also evident, as one third of the producers interviewed in San José de las Lajas expressed some frustration at what they viewed as a disconnect between themselves and *Sanidad Vegetal* representatives or other state workers. For example, three producers noted that, when *Sanidad Vegetal* officials made farm visits they were often highly critical of their farms and provided little or no positive feedback or reinforcement for efforts on the part of the farmers. These producers felt that the root cause of the problems in their relationship with *Sanidad Vegetal* was that many *Sanidad Vegetal* workers were unappreciative of the realities that make farm life

difficult. One producer explained the issue, stating that "sometimes the people who work for *Sanidad Vegetal*, or other big organizations, have a lot of theoretical knowledge, but they do not understand what it is like to be a *campesino*". Although very few producers expressed the same kind of explicit concerns about *la Agricultura*, most did note high levels of dissatisfaction with their inability to purchase inputs and also with the low prices that they received for state contracted production. Referring to the overall system of strong state involvement in farm management, a farmer from Viñales 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.

The frustration that some producers expressed with *Sanidad Vegetal* is not an issue unique to Cuba, but rather highlights part of the reason why scholars such as Freire (1982) and Chambers (1987) began to call for a more participatory approach to rural development. Indeed, in the Cuban case, because some producers felt resentment towards *Sanidad Vegetal* workers, the advice and assistance offered by these workers, however useful it may have been, was not always welcomed. As noted by one of the researchers and extension workers interviewed, farmers often did not feel committed to making the effort required to participate in agroecological extension activities because they did not necessarily see the potential for immediate rewards. This is a somewhat intractable problem, because extension and education are required in order to convince farmers of the benefits offered by correctly practiced agroecological farming, but a belief in the potential benefits of agroecology is a necessary motivation for active farmer participation. Unfortunately, these issues mean that 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.

Increasing participation—a revolution within a revolution

In recognition of the limitations of top-down development strategies, and in accordance with growing trends in international research and development circles, Cubans working to promote agroecology and sustainable development are increasingly turning to participatory approaches. The growing importance being assigned to participatory planning and development across Cuba was described by a number of research participants as "a Revolution within the Revolution" that is being adopted at various levels of government and within academia, NGOs, and other

organizations. Indeed, the Cuban government has made a concerted effort to support this notion by “explicitly emphasizing an increase in the degree of local participation in decision making and in developing agricultural systems adapted to local agroecological conditions” (Rosset and Benjamin 1994, p. 21). As well, ANAP’s *campesino-a-campesino* (farmer to farmer) agroecological extension program is specifically promoted as a truly participatory effort that allows farmers to both learn from and teach other farmers (Álvarez 2002; Perera 2002).

Another prominent program that has been touted as an example of authentic participatory rural development in Cuba has been the creation of participatory plant breeding projects in three municipalities across the country (Ríos 2006). These projects, which have been deeply participatory in nature, are designed to help producers rediscover local seed varieties and in doing so, increase biodiversity and the use of locally adapted species. Producer participants have been treated at all times as fully equal partners in the development of the projects, and have led the way in determining a vision and making decisions about how best to achieve it. This program, sponsored by INCA, has gained a fair amount of international attention for its success at including local people in the development process and, as such, has received extensive funding from agencies such as Canada’s International Development Research Centre. Indeed, researchers at INCA noted that participatory projects are much more likely to receive international funding and this provides an added incentive for Cubans to focus increasingly on them in the future.

Conclusions

Evidence gathered on 12 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 labor, 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. Although the use of agrochemicals still occurred, application rates were so low that no comparison could be made to conventional production methods. Thus, while most of the products of Cuban agriculture would not meet organic certification standards, in many ways the production practices go beyond such standards in terms of approaching the holistic ideal of a sustainable agricultural system. As such, the Cuban model of institutionalizing agroecology can be considered highly successful in terms

of achieving a large-scale transition away from conventional production.

While this holistic agroecological model of production has received conscious support at the level of agricultural research, development, extension, and policy, the degree to which the Cuban *campesinos* who participated in the study have internalized ideas about sustainable agriculture is still considerably low. Many demonstrate a desire to return to more conventional methods, and there is a sense that maximizing production is a higher priority for most than honoring commitments to agroecological ideals. While a small number of ideologically committed producers specifically noted a willingness to forgo gains in yield in order to maintain the integrity of ecological production, the majority of the Cuban farmers interviewed based their production decisions on how they could best maximize yields within the framework of economic and political restrictions. As such, they would likely fall into the category of pragmatic organic producers and, should the political and economic conditions in which they live change significantly, there is reason to believe that many would gradually revert from agroecology to conventional farming methods.² This information suggests that, while policy support can be a useful means of facilitating sustainable agriculture (as many advocates argue), it has limitations and therefore would function best in conjunction with other efforts.

The lack of producer commitment to an agroecological philosophy may represent a significant challenge to the present and future success of the Cuban agroecological movement. Other challenges exist as well. One of the greatest is probably a lack of capital resources, which impedes the progress of agroecological development by limiting the resources available for investment into infrastructure, research, education and extension. However, in spite of these challenges, the Cuban model is still an extremely useful demonstration 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, as well as food security and sovereignty. Cuba’s experience also demonstrates that the state can be a very useful agent in the development of a low-input, locally based, sustainable model of agriculture. As issues such as global climate change and diminishing oil reserves increasingly limit the viability of conventional food production and distribution systems, national governments around the world may need to consider the notion of institutionalizing alternatives. Should this be the case, a great

² With the recent election of Raul Castro as Cuba’s new president, some changes are already occurring, and a close eye should be kept on the agricultural sector to assess how liberalization may affect farming practices.

deal could be learned from both the successes and the challenges of the Cuban experience.

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