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International Perspectives on Sustainable Agriculture in Cuba

by

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Abstract

Since the economic crisis following the collapse of the Soviet Union, Cuba has restructured their agriculture with a greater focus on domestic production of domestically consumed produce, and a dramatic reduction of petroleum products in all aspects of food production. This overhaul has included the broad application of what is termed agroecology – agricultural practices which focus on principles of biodiversity and sustainability – and inter-farm cooperation facilitated by the National Association of Small Farmers (ANAP) and *Campesino a Campesino*. Academics and journalists from within and abroad have critically examined aspects of the novel reforms developed in the country in starkly contrasting terms, as either an impressive example of sustainability in farming meeting human needs, or as an inefficient, bureaucratically bloated attempt to cope with an enduring food crisis in the country. This author speculates that both perspectives have political agendas unrelated to the observable successes or failures of food production in Cuba.

The challenge is in finding the common ground between these poles of argument to clarify how Cuba's agricultural system has shown remarkable success in recovery from crisis, and in modeling sustainable agriculture; and how it is impeded from further success by circumstances such as governmental bureaucracy, social prejudice, and insufficient profit for farmers with which to motivate ingenuity. While both perspectives can provide insight into food production in Cuba, the context of the broader political

debate is present in the data and arguments of both critics and proponents of sustainable agriculture in Cuba.

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Introduction

In the 1990's, the collapse of the Soviet Union caused a major economic crisis in Cuba, which lost over half of its imported food calories, which at the time made up approximately 57% of the country's food consumption (Rosset, 1997). In the following years, the country made a highly focused and government directed effort to fulfill food needs during a period which Fidel Castro termed "The Special Period in time of peace". The period began in the early 1990's when Cubans experienced severe poverty and food shortages, and continues to the present day, as there has been no official statement to indicate the end of the Special Period. To this day, the government and the population are working to build on the improvements in the country's per capita calorie consumption.

Cuba has implemented a system of sustainable agriculture, initially as a direct response to the overwhelming shortage of petrochemical inputs – from petroleum-based

fertilizers and pesticides to gasoline for mechanical farm equipment (Altieri & Funes-Monzote, 2012) – which has since evolved into a highly successful program of delivering the social development so often sought after by the Socialist government. It has also served as a badge of environmentalism, drawing praise and academic interest globally from state and non-state actors and scholars. Since the early 2000s, Cuba has shown statistical improvement in nutrition and health that exceed 1980's levels, and has maintained these improvements through three devastating hurricanes (Rosset, 2011). On top of exceeding the country's pre-crisis health standards, the organic, local, and ecological food production methods undertaken have drawn agricultural study from abroad. Food production system studies that have indicated that organic agriculture, as practiced in Cuba, produce greater food volume per-hectare, and are less capital intensive than Green Revolution technology.

In contrasting theoretical discourses, other authors have pointed out the shortcomings of Cuban Agriculture, in terms of market inefficiencies and the bureaucratic weaknesses of a highly centralized governance system (Avery, 2013), as well as the benefits of urban and sustainable agriculture programs on health, employment, and the environment (Altieri & Funes-Monzote, 2010; Koont, 2009; Simón Reardon & Pérez, 2010; Stricker, 2010) in the country. Additionally, authors in sociology and ethnic studies have considered the inequities of a country that claims to have eliminated racial and class biases (Swartz, 2009; Moret, 2008, 2012). Because of the political polarization between Cuba and the US, experts on either extreme have expressed at length, while they have been infrequently considered together in one study to determine the merits of each perspective. A critical examination, rather than a

politically fueled debate among scholars and journalists, could potentially reveal what successes have been achieved, and what reforms are needed in order to better serve the needs of Cuba's population and expand their economy. Experts have studied various aspects of Cuban agriculture, primarily seeking to validate one of two perspectives. The first group has documented the success and sustainability of the agriculture program since the mid 1990's, and the second group criticizes the bureaucracy and social economic system and their negative impact on food production in the country. Due to the controversial and emotional nature of US-Cuba relations, the discourses often present exaggerated and sometimes directly contradictory evidence in support of their own position. Scholars tend to ignore or reject the concerns raised by opponents, without considering their validity or pertinence. This author asserts that the field would benefit from a critical examination of Cuba's progress in sustainability and agricultural independence, as well as the potential to benefit from trade liberalization and land policy reform. In this essay I hope to address that middle ground of both recognizing the positive gains which Cuba's government has achieved, and what aspects of the agriculture program deserve critical attention.

Defining Agriculture

When discussing Cuban agriculture, academics make a distinction between three forms of agricultural production: conventional or Green Revolution; organic; and agroecological (Altieri, 2000; Alvarez, 1994; Koont 2009). While the three categories are commonly considered mutually exclusive, they have also been described as an assortment of inputs and methods used within those three agricultural models. This understanding of agricultural systems suggests that they can be used in a manner

adherent to any one of the three distinct agricultural forms, or activities used in each method can be combined with those of others to create a mixed or transitional agricultural system.

Conventional agriculture is also referred to as Green Revolution technology, and is widely considered the greatest advance in agricultural technology yet. The methods employed in Green revolution agriculture date to the mid-twentieth century, when an excess of synthetically produced nitrogen needed to find a new home after the end of World War II. It found one in the agriculture industry, where nitrogen is a finite element in soil fertilization. With the introduction of synthetic fertilizer, a field could bear crops through consecutive seasons and years without having to fallow, or to be alternated with nutrient-fixing crops. The boom rose to new heights in the mid-twentieth century when chemical companies such as Monsanto developed herbicides and pesticides such as Agent Orange and DDT to support the agricultural industry (and the defense department), and took yet another leap with their 1983 breakthrough in genetic modification of plants (Tokar, 2002). This industry has become highly technological as well, with specialized, complex machinery to allow many crops, when planted in large monoculture fields, to be harvested quickly and with little labor. There have also been advances in the process of plant breeding, raising it to the level of development of Genetically Modified Organisms (GMOs) whose DNA has been altered and combined with that of other plants and animals in order to create crops with desired attributes in fewer generations than by conventional breeding practices.

The organic agriculture movement was a response to the practices of conventional agriculture. Amidst concerns of potential health problems related to food

containing pesticides and GMOs, policy groups at the state and national level in many places in the world have banned or heavily regulated certain practices and substances. In the US, the foremost organic standard is the USDA Organic label, which is summarized by the USDA as follows:

“Organic is a labeling term that indicates that the food or other agricultural product has been produced through approved methods that integrate cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity. Synthetic fertilizers, sewage sludge, irradiation, and genetic engineering may not be used.”¹

This standard still largely fits the format of conventional, green revolution agriculture, with a variety of naturally occurring chemicals used to substitute the synthetic, petroleum-based chemicals present in conventional agriculture.

Rather than being a new phenomenon, agroecological practices draw from the heritage of human agricultural practices, utilizing traditional knowledge of crops and local ecology, and incorporating a modern scientific process to design a system of optimum cooperation between human agriculture and the surrounding ecology. Agroecology, as practiced in Cuba, is founded on a philosophy of a closed-circuit, sustainable system: the food is produced on farms that feed the community nearest to them, and those community members are employed there. Using practices such as planting mutually beneficial plants alongside one another, a practice known as intercropping, and planting crops that have odors or colors which repel pests reduce the

¹ This summary is quoted from the USDA website, <http://www.ams.usda.gov/AMSv1.0/nop>
The full list of regulations can be found at: http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&sid=3f34f4c22f9aa8e6d9864cc2683cea02&tpl=/ecfrbrowse/Title07/7cfr205_main_02.tpl

dependency on inputs external to the farm. Other practices which may take place on the farm or at specialized facilities include worm mulching and composting for fertilizer, and producing biopesticide or BP sprays, a pesticide which is essentially a bacteria that is harmful to some pest species, but benign to humans. Additionally in Cuba, the human contributions can be considered integrated and self-sustaining, with scientists and university students working on farms; farm workers and scientists educating students; and farm workers and students contributing to the research and development of new agroecological practices.

History of Sustainable Agriculture in Cuba

When the Soviet Union collapsed in 1989, it sent Cuba into an immediate economic and human crisis. The subsequent tightening of the US embargo left Cuba with extremely limited access to foreign resources. During the 1990's, Cuba experienced severe food shortages, malnutrition, and an epidemic of optic neuropathy related to nutritional deficiencies (NEJM, 1995). The economic and social conditions were exacerbated by the increase in intensity of the US embargo against Cuba during this period, with the introduction of the 1990 Mack Amendment proposing sanctions against other countries engaged in trade with Cuba; the 1992 Torricelli Law barring US subsidiaries in other countries from trading with Cuba, including in food and medicine; and the 1996 Helms-Burton Act imposing penalties on foreign countries trading with Cuba, and allowing US citizens to sue foreign parties who conduct business in Cuba on land appropriated by the Cuban government during the 1959 Revolution (Moret, 2008).

When petroleum and other inputs from the international market became scarce and expensive, Cubans both in the central planning apparatus, and at the individual and

community levels, began relying on gas- and petrochemical-free food production methods that had been largely abandoned, save for poor rural farmers, and some practitioners of Afro-Cuban religions who cultivated medicinal and ritual herbs at home (Moret, 2012). These agricultural experts were suddenly a source of coveted knowledge about how to provide desperately needed food autonomously in Cuba.

The project of agroecological domestic food production reached a new height of success when, in 1998, the National Association of Small-scale Farmers (ANAP) in Cuba adopted a new model of farm information and technology sharing called *Campesino a Campesino* (CAC) - farmer to farmer. This agricultural information network was adopted most directly from Nicaragua, though the CAC movement existed in many Latin American countries before it reached Cuba (Rosset et al, 2011).



1. Photograph by Bess Miller

Today, Cuba's agriculture model is a unique blend of modern and traditional agriculture. With more scientists per capita than any other Latin American country (Altieri & Funes-Monzote, 2012), Cuba has access to human resources and a world

class network of scientific inquiry and research dissemination in the agricultural field. In most other aspects of Cuba's agriculture system, though, traditional farming methods dominate. Modern Cuban farms are labor intensive, with nearly all farm activities done by hand, or by draft animals. The program has largely been viewed as a success, though many critics outside Cuba argue that the success could be greater under more economically liberal circumstances.

The Proponents, the Critics, and the Arguments

Possibly the most prolific author on Cuba's sustainable agriculture system is Miguel A. Altieri, a doctor of entomology and specialist in agroecology at the University of California at Berkeley. He has studied and published on the subject of urban agriculture and agroecology in Cuba since its first appearance in the late 1990's, and has examined the practical advantages of urban agriculture in sociological and environmental terms. Altieri, along with Cuban agriculture researcher Fernando Funes-Monzote and land researcher Peter M. Rosset are the scholars most visible in the field of agroecology, and publish on the agricultural and social circumstances surrounding Cuba's agriculture from their respective fields. Their work offers analyses of the agricultural reforms since the collapse of the Soviet Union.

Rosset highlights the importance of the Direct Democracy framework, and communication and trade between rural areas without reliance on the periphery-center dynamic of classic colonial and neo-colonial economic structure. He also describes the history, development, and modern structure of peasant farm cooperatives and inter-farm organizations. Funes-Monzote writes together with Altieri, and independently on the history and aspects of sustainability in Cuba's agriculture system.

The Economist, a popular magazine with a focus on global economy and current events, has a longstanding history of criticizing Cuban socialism, the Castro regime, and social programs created there. In various articles the magazine's authors criticize the enduring programs, celebrate the failures, and predict the downfall of the government every time it meets a new challenge, such as the death of socialist Venezuela president Hugo Chavez, and the passage of the 1998 Helms-Burton Act which brought trade restrictions against Cuba to their all-time peak. Author Dennis Avery is also among the popular sources discussed here, director and blog writer for the Center for Global Food Issues at the Hudson Institute.

The academic literature examined for this essay includes many authors during the 1990's who wrote on Cuba's food crisis and the failure of a highly centralized state to deliver basic human necessities. Among these are Jose Alvarez, professor of farm management and production economics at the University of Florida Belle Glade, and Massachusetts economics professor Nicolas Sanchez. I found that as the 2000's progressed, the volume of criticism directed at Cuba's agriculture system decreased, while authors in the US began to document Cuban agriculture as an unlikely feat of sustainability-oriented reform. This is likely related to the apparent success in adapting their agricultural system to the shortage of external inputs through programs like urban agriculture, agroecology, and *Campesino a Campesino*.

In the 2000's a new kind of criticism emerged, examining the failure of Cuban society to deliver the social equity promised by the Revolution along racial lines. Afro-Cubans, as argued by Oxford Sociologist Erica Moret and Ellen Swartz, professor of education at Nazareth College in Rochester, NY, continue to experience a lower quality

of life on average than their lighter-skinned countrymen. With regards to agriculture, this is evident in the agricultural labor force, in credit for Afro-Cuban contributions to traditional agricultural knowledge, as well as in the varying quality of markets in neighborhoods that are largely racially segregated. These themes of unequal access to food and unequal professional opportunities are the most prevalent remaining criticisms from the academic sphere of Cuba's food distribution system.

Among the various positions expressed by academics and journalists regarding Cuba's agriculture system, there are three major threads of discussion to which the majority of authors on the subject contribute. Authors within Cuba, as well as many agricultural and public health researchers from outside the country, have written extensively on the successful aspects of Cuba's agriculture system, including the rapid recovery from the severe crisis conditions of the early 1990's, the environmental sustainability including restoration of natural habitats on the island, and the high food security and nutritional variety of Cuba in comparison to other developing countries in the region.

Critics of Cuban agriculture cite the food crisis of the 1990's, and the enduring conditions of food scarcity that requires the government to distribute staple food items by ration card. This reflects a broader criticism of the inefficiencies of a highly centralized government in providing its citizens with the supply to meet a fluctuating demand, and to plan agriculture without generating extensive waste due to bureaucracy. Additionally among the failures in distribution, one sees racial biases enduring in the country in which the government has declared that racism has been overcome.

Political bias and incomplete information

In 1983, Rodriguez developed the term Cubanologists to describe academics who make ideological attacks on Cuba through academic mediums (Bell, 2011). While this is a tactic that is highly reminiscent of the Cold War era, and was, indeed, first reported on during the cold war, the use of academic publication venues to publish criticisms of Cuba's reputation under the guise of scientific studies continues to the present day. The bias of Cuban scholars, by contrast, uses data to support their claims which is generated by a government that has a history of being intolerant of criticism. Additionally, data which may shed a negative light on Cuba's agriculture program may go un-reported, as agricultural data has not been collected as rigorously as data in other fields in the country, such as public health.

Jose Alvarez (1994) seeks to discredit government managed agriculture as being less efficient than private enterprises, with the ultimate conclusion that Cuba's government should lessen its involvement in the sector. This advice was certainly heeded by Raul Castro, who since taking over the presidency in 2006² has introduced trade liberalization measures in a variety of industries, including agriculture. Other contemporary critics go further in their condemnation of the current political circumstances and their negative impact on the wellbeing of Cubans. Nicolas Sanchez argues for the restoration of expropriated property of Cubans, at the expense of those currently occupying that property, and suggests a format for a democratic government in Cuba (1994). His proposal, however, does not reflect the reality of Cuba's choice to govern itself, but rather looks very much like the US model of government. The effect of the reforms listed, such as the return of appropriated property, a cap on taxes, and

² He began as acting president in 2006 when Fidel fell ill, but officially took office in 2011.

privatization of all work done by the government excluding “National Defense, Foreign Affairs, Information (or Statistics), Tax Collection, Banking and Regulation (Sanchez)” would effectively reverse all positive progress made in the country in the half century since the Revolution. The advances in nutritional health, gender and racial equality, and the research and developments in the emerging field of agroecology would likely grind to a halt, if not backslide, if the exiled community sought to return Cuba to pre-Revolution conditions. The extent of the latter criticism goes beyond observation of existing problems and proposing a plausible solution, but rather demonstrates the fantasy of what might happen if Cuban exiles returned to take over the country, without regard to those who live there currently.

The central concept to Alvarez’s 1998 article “State Intervention in Cuban Agriculture: Impact on Organization and Performance” was that government intervention has been detrimental to agricultural production in Cuba. He uses the success of Soviet era experiments in trade liberalization, and of independent small farmers who lack mechanization and government support to assert that less government interference leads to greater production per-hectare. Altieri employs similar evidence of greater performance by farmers using non-mechanized, agroecological farming methods to support his hypothesis that mechanized, Green Revolution agriculture has been the limiting factor in food yields per unit of land. Additionally in 2009, Sinaan Koont highlighted the work done by universities and public institutes across Cuba, many of which have been studying sustainable agriculture practices since the 1970’s. He observed that public institutions have provided critical support to the industry through the crisis and to the present day. The strength of the central planning mechanisms of

Cuba's government allowed them to research and develop solutions to anticipated problems. In 1987, under the supposition that Cuba may soon lose support and resources from the Soviet Union (though not necessarily anticipating its complete collapse), Raul Castro initiated a research program to study low-input agriculture in order to improve food sovereignty in the country (Rosset, 2011). Governments of countries heavily immersed in capitalist economies are prone to react to problems rather than pre-empt them, a practice in line with free market ideals of non-interference by governments except in emergencies. Though Cuba's authoritarian government has many characteristics worthy of criticism, the country's preparation prior to the crisis is a positive aspect that allowed the rapid planning and execution of food production alternatives which would not have been possible in a more economically liberal government. This is merely one example of the schism between the two ideologies which creates a barrier in the discourse on otherwise non-political subjects. It is often clear in the discussions of US authors that Cuba's government system is dismissed as a whole, without considering positive outcomes while it is also apparent that Cuban perspectives depict the US as an obstacle to Cuban prosperity due to the embargo, failing to recognize positive advances in relations such as the relaxation of sanctions in 2000 which allowed the sale of agricultural produce.

A challenge of reading information on Cuba is that sometimes information from either side will directly contradict one another, even in the most straightforward-seeming data points. In the 2012 article "The Paradox of Cuban Agriculture" (Altieri & Funes-Monzote), the authors refute the data of an article written by Dennis Avery, in which Avery quotes a Cuban official as saying that 84% of Cuba's agriculture is imported.

Altieri cites the FAO commodity balance to determine that the total food import dependence is in fact exactly the inverse, 16%.

When Altieri refutes the misinformation presented by Dennis Avery, he indicates that the deception is in the omission of the phrase “in the basic food basket” which is used to refer to food distributed by ration card. But even this correction is deceptive, redirecting the reader’s attention away from the challenge the country faces in feeding its population.



Either or both of the authors may be concealing information to support their argument, the clearest possible avenues being, on Altieri’s part, he does not indicate the units of measurement of his import dependency chart beyond “percent”, which could be the percent of the cost, percent by weight, or percent by calories, all of which are completely different ways of understanding the domestic and imported food consumption. Avery also uses a vague quote, and does not cite the speaker in his

article, making neither datum entirely credible.

An attentive reader can draw a more whole story from the two incomplete accounts. Altieri presents an FAO table showing Cuban food imports by food groups. At a bodega in Havana, I photographed the ration board which showed which foods are distributed through the government system. We see that the foods on that list are dietary staples such as rice, beans and eggs, and are likely the primary source of calories, so while imports may be a small portion of the total food consumed in Cuba, it is a portion of the food without which the population could not survive. Altieri and Funes-Monzote later state that “Cuba’s average daily per capita dietary energy supply in 2007 (the last year available) was over 3,200 kcal, the highest of all Latin American and Caribbean nations.” This is an impressive achievement that exceeds the FAO mean recommended daily calorie intake of 2,800 for an adult male, though the source, the FAO who retrieves their data directly from national governments, should also be considered when assessing the validity of that data. Calorie estimates could reflect the actual food consumed in Cuba per their commodity balance data, or it may be taken from the value of rationed calories. Cubans reported during my visit that while the ration cards may reflect an adequate calorie intake, bodegas often run out of ration supplies before all of the people they serve have fulfilled their weekly allotment.

Rarely when anti-Cuban authors talk about Cuban agriculture do they talk directly about Cuban farming, which by and large has been a success, and a model for agriculture in developing countries who wish to avoid the high debts and dependencies that are common to Green Revolution agriculture practices. The weaknesses raised within the system they attribute to the central planning and government involvement,

which inhibit farmers from being sufficiently incentivized by the potential for profit to be moved to innovate. There have been trade-liberalizing policies introduced gradually since Raul Castro took office, the critics are unsatisfied with the progress. In line with US foreign policy towards Cuba, most express the opinion, directly or indirectly, that Cuba will not be forgiven until there are no Castros in the government. The success of implemented trade policies suggest that, indeed, continued increases in profitability would allow Cuba to speed up its trend of increasing efficiency in food production. It is important to also consider what support would be sacrificed with the reduction of government revenue, due to the agriculture-supporting programs noted by Koont.

From various articles in *The Economist* on the topic of agriculture in Cuba, one of the first things which confront a reader is disdain for the Cuban government as the framework for the discussion on food production and distribution in the country. The 1998 article "Just One Lump" starts with the opening line "As if Cubans did not have enough trouble already, thanks to Papa Fidel [...]" before going on to discuss the impact of a hurricane on Cuba's domestic food production. This misdirection is visible in coverage of 2008, 2010, and multiple pieces written in 2013. "A Private Affair"(2013) begins with the claim that "From the Bay of Pigs to Che Guevara's mausoleum, there is plenty for revolutionary tourists to see in Cuba." Some articles, such as the one just quoted, reveal data of genuine concerns that should be addressed. However the contempt shown to Cuba as a whole elicits defensiveness and anger from a reader sympathetic to Cuba, while a US-allied reader would enter the story with contempt, and would likely leave it having gained little else but justification for their contempt when reading predictions of failure of a budding wholesale market. This contribution of

popular media does little to inform, and instead bolsters longstanding stereotypes and disinterest in understanding the perspective of those with whom the readers disagree.

Sinaan Koont (2009) describes urban agriculture on patios and plots as a centrally planned initiative within Cuba's crisis management as of 1994. The back yard cultivation of food, however, seems implausible as a centrally directed activity that reached into the home of so many Cuban families. As Erica Moret points out, it is more likely to be a product of two factors independent of government action: tradition among Afro-Cuban users of religious medicinal herbs, and necessity of individuals, encouraged by the central government, during the massive health crisis of the early 1990's. Their support for the various survival techniques has been spread across many facets of Cuban society, however the image of Cuban agriculture is an exclusive one, representing one facet of the country's rich cultural heritage and the diverse population that has contributed to their knowledge of cultivation practices.

Koont makes the assertion that peasants are now an esteemed member of Cuban society, free from their harsh stereotypes. This view of Cuban progressivism, however, may not extend far beyond the utilitarian and egalitarian interests of the government and the scientific community on the island. As reported by Erica Moret, the stratification and stigma of rural-dwelling, dominantly Afro-Cuban peasants remains, and their contributions to the agricultural revival is undervalued, and highly under-credited in Cuba.

“Secular Cuban interviewees (officials and non-officials alike, regardless of ethnic background) argued that Cubans with the most expertise on *medicina verde* (herbal medicine) were almost exclusively *guajiros*. These

white peasant farmers, typically linked to the tobacco industries, derived their ethnobotanical knowledge from European migrant ancestors, according to official rhetoric. The land in which they lived was portrayed by the same interviewees as an ethnobotanical haven, or 'storehouse' for the country's medicinal plant knowledge." (Moret, 2012)

This perspective, she reveals, contrasts with the reality of ethnobotanical practice in Cuba, with strong evidence for the mixed heritage of Cuba's medicinal plants. "A study on Cuban homegardens, for example, found that 13% of medicinal, aromatic, and venomous cultivated plants were of European origin and 12% of African origin (Esquivel and Hammer 1992)"(Moret, 2012).

This imbalance in esteem between European and African roots in Cuba reverberates through many aspects of daily life in Cuba. In my visit to UBPC Organopónico Vivero Alamar, and in conversations with agricultural specialists, academics, and students, they expressed views in line with Moret's report of racial inequality within the agricultural labor market, and perspectives about those who perform agricultural labor. Students and academics in Havana noted that, although it has become a middle to high income field, agriculture is still an undesirable trade because it requires hard manual labor. Agricultural workers at Vivero Alamar also noted that their workforce is one of the most racially diverse among professions, and also supposed that Afro-Cubans were more willing to work on farms despite the daily labor demands. While racial demographic data is not reported in Cuba - for example, their census does not ask about racial or ethnic identity - Moret as well as nearly every academic or community leader we met reported that racism continues to be a problem

in Cuban society, though it has been de-institutionalized. The willingness of Afro-Cubans to undertake hard labor while most consider it undesirable work, therefore, may be related to their experiences of discrimination in other labor markets.

During the social revolution of 1959, the political elites worked to undo relics of the crony capitalists that came before them. They introduced substantial education, health and business reform, but as Erica Moret points out, the government has thus far been unable to, and underwhelmingly invested in overturning some artifacts of pre-Castro Cuban society, especially with respect to race. Racism is still a visible social dynamic in the country, though Cuba has gone further to reach equality in all demographic strata, with great strides towards equality reached in gender representation in government, gender disparity in unemployment, equal pay for equal work with the government regulating the income level of all jobs, and universal education free of charge. The fact remains that, in Cuba, there are enduring attitudes and practices that express racial bias.

Critical Analysis of Cuban Agriculture System

Cuba has made some remarkable achievements in the agricultural industry. They implemented a complete overhaul of the existing agricultural system to end the conditions of country-wide hunger, and bring agricultural production above 1980's levels by 2004 (Altieri, 2009). The country created a food system with a level of independence that's unprecedented in a developing country in response to extensive international trade sanctions. Less than 20% of Cuba's food is imported, although those are mostly dietary staples. Nearly 100% of domestically consumed fruits and vegetables are produced within Cuba (Altieri, 2009). Additionally, the vast reduction of synthetic

pesticides and fertilizers has contributed to the health of the natural environment on the island; and their design of a distribution system that reduces fuel consumption and allows locally produced food to be consumed locally has inadvertently served to reduce carbon emissions and improve air quality.

The country has the highest concentration of scientists in Latin America, which has facilitated rapid progress in agricultural research that has benefited farmers throughout the country. ANAP has facilitated a complex network of farm-to-farm agricultural education and training, allowing farmers who seek to improve the diversity and productivity of their land to connect with other agricultural workers who have achieved the advancements they seek. The *Campesino-a-Campesino* system is not native to Cuba, it arrived there from other Latin American countries that have invested in the peasant agriculture sector to achieve greater food security. But the support from ANAP and the Cuban government have allowed the movement to flourish in the country (Rosset, 2011), and has helped Cuba's agriculture become more ecologically, socially and economically successful.

Agricultural wages are some of the highest in the country, making it a lucrative employment in spite of the physical labor required. In a comparison offered by a lawyer and tour guide leading our study group in Cuba, lawyers in Cuba make 500 pesos monthly³, while general physicians make 700 pesos, regulated nationally. An agricultural laborer begins working at a wage of 400 pesos monthly plus a portion of profits, but receives increases of 100 pesos at intervals of 1-3 years until the 10th year, and less frequently beyond that. The average farm worker's salary at UBPC Vivero

³ The rate of exchange of the Cuban peso to the US dollar (CUP:USD) is approximately 24:1, making a lawyer's monthly salary roughly \$20.83. Many, like our tour guide, supplement their income working in the tourism industry or via remittances from family abroad.

Alamar is 900 pesos⁴. Additional wages are garnered from free trade in produce markets, where the price of goods is determined by the collective, and the additional income is distributed among the farm workers within a cooperative equally. By contrast, because of an array of market factors in US agriculture that make agricultural work low-paying for individual farmers and laborers, making agriculture an extremely challenging field in which to be successful. Farmers are often highly indebted to inputs providers, such as equipment manufacturers, genetically engineered crop producers, chemical manufacturers; and laborers are allowed to be paid below the national minimum wage in many states.

Although the transformation of agriculture in Cuba has resulted in many successes, the critics bring to light important concerns that need to be addressed within Cuban agriculture. The centralized government and extensive bureaucracy results in most land acquisition requests taking months or years to be processed. The evidence provided by the increase in yields since profitable farmer's markets became legal indicates that allowing the farmers greater freedom and more incentives would increase food production, as various critics claim. Additionally, in the study by Alvarez he reveals that the substantial black market can be diverted into the legitimate trade sector upon implementation of trade liberalizing reforms, which could benefit Cuba's GDP and tax revenue.

Reforms have not affected all of Cuba's population equally. As demonstrated by Moret, and supported by firsthand experience by the author of this paper, racial bias has not been eliminated in the country. Contributions of Afro-Cubans to the traditional

⁴ This data was reported by the UBPC Vivero Alamar manager, and reflects data for that particular farm cooperative. Variations in farm incomes will depend on the profits derived from that farm's private business.

agricultural knowledge are under-appreciated, even denied or ignored entirely. The quality and volume of produce available in urban communities varies greatly depending on the demographic differences of the communities, including income and race. These factors reflect a tendency to over-report their own success in achieving equality. While income is centrally regulated, and education is free, there are still families who have unequal access, often due to remittances from families abroad. This has also produced an unequal access to capital and goods to use in the new free market trade in tourist centers. With more liberalization will come more prosperity, and more inequality.

Finally, the costs of the food crisis should not be understated. The extreme hardship of the early 1990's drove many to desperation, and countless Cubans died at sea in their attempt to reach the Florida coast in makeshift rafts. The recovery plan was being rapidly implemented, with markets being opened for free trade and a low-input sustainable agriculture system being developed countrywide, but not before taking its toll on countless Cubans. Additionally, the degree of hunger was such that malnutrition-related diseases, including an epidemic of optic neuropathy, or blindness (de la Fuente, 1999), shows us how deep the crisis was, and the cost borne by the Cuban people of the continued unwillingness to reconcile the relationship between Cuba and the US.

Politics in the Perspectives

In examining the texts presented by both sides, it is clear that there is political and emotional sentiments that drive authors to report inaccurate data, present incomplete data, or to present personal political arguments as if they were a product of scientific inquiry. These are irresponsible research and reporting practices. While all research will inherently contain the biases of the author, members of the academic

community constantly distinguish between opinion and research, and should be able to reflect that in their writing. By contrast, writers of *The Economist* have no such responsibility, and clearly express political biases in favor of free market capitalism. In such cases, it is the responsibility of the reader to consider the interests of the source of information.

Moret and Swartz explore in depth the racial prejudices and social imbalances that remain throughout Cuba, despite the country's efforts and claims that the revolution has overcome class and race differences among Cuban citizens. The reality is far more complicated than rhetoric, or even the laws that are carried out to generate greater equality. Among all of the authors examined in this study, these two present the most fully developed and constructive criticism of an issue within Cuban society with respect to agriculture that must be addressed. They may also be affected by politics, as being outside of Cuba leaves them free to make such criticisms freely, though freedom of speech in Cuba is a subject that I will leave for another study.

Conclusion

Cuba is a country that has endured through great challenges of domestic and international origins. Among their greatest achievement to improve the conditions of Cuban people, as well as to gain them international renown, are their advances in sustainable agriculture technology. These advances have made rapid recovery possible following an enormous crisis that deeply damaged the country's living conditions and economy - the collapse of the Soviet Union. The country rapidly changed their agriculture production and distribution plans in order to meet the needs of a population

suffering from severe food shortages, while at the same time lacking fuel to obtain food from abroad, or even distribute it within the country. The result was a world-renowned sustainable agriculture system that brought Cuba from extreme food crisis conditions to a quality of life greater than their soviet era peak in the 1980's in the 12 years after the crisis began, while pioneering a new agricultural methodology.

This transformation, and the resulting successes, have been recorded in length by academics and journalists within Cuba and around the world, both praising and condemning the system, but few have made thorough critical analyses of the strengths and weaknesses of the system, given the political polarity of Cuba's government. The rhetoric is such that supporters of Cuba tend to document the successes of the program, while those who oppose Cuba's government address only the failures and inefficiencies of the government to provide for their citizens. In this essay I have sought to find the gaps where bias has led to incomplete reporting of information, to highlight the validity in arguments from both perspectives, and to consider how broader political agendas are impacting the analysis of Cuba's novel agricultural policies.

As noted by Rosset, food security improvements in Cuba, coming from domestic food production, low inputs from outside the farm, community, or country, and diversity of produced goods has been a major motivating factor for the proponents of agroecology. By contrast, supporters of industrial, Green Revolution methods are more often producers of those off-farm inputs. Their primary interest are economic, their political platform is one of growth in trade, which is inherently off-farm, and of increased outputs with less labor. These interests are fundamentally opposed, the former is concerned with reducing dependence on trade to create more security for individuals

dependent on the agricultural system, while the latter is focused on trade growth and increased interdependence regionally, nationally, and globally.

Readers and researchers, therefore, must acknowledge and address these fundamental assumptions of authors writing on Cuban agriculture before they can approach the actual subject of Cuban agriculture. Supporters of Cuban agriculture cite environmental sustainability, the economic and environmental resilience of agroecology, and the increases in farmers' income and employment as benefits of agroecological practices, while downplaying the cost to consumers, the role of central planning and associated restrictions on personal freedom central to Cuba's success, and the exceptional circumstances that have made agroecology so successful in Cuba. Many critics demand changes from the Cuban government that will not come to pass. This is a solution to a problem that is not related to agriculture in Cuba, but to the plight of the Cuban exile community - a challenge worthy of devoted attention in its own right, rather than being tangentially related to all activity within Cuba.

The authors reveal some important challenges, from the prominence of the black market and the need for incentives to innovate, to the lack of available resources for Cuban farms. When framed in an antagonistic argument against Cuba as a whole, though, they will likely be dismissed or never seen by the people that they are intended to help. They treat Cubans who remain there as if they have no authority over or understanding of their own circumstances. Cubans are a largely educated and politically aware population with a greater intelligence than outside critics give them credit for. One Cuban academic lecturer I met stated his perspective on why some might not love Castro, but prefer him to the possible alternatives gleaned from Cuba's history of

domination by outside forces: “he may be a son of a bitch, but at least he’s our son of a bitch.”

It would benefit Cuban agriculture, and the field of agriculture more broadly, to develop a more thorough examination of the agroecology practiced there to see what has made it successful, what aspects of it are successful due to Cuban exceptionalism, and what factors of Cuban governance or economy are hindering it from greater success. An additional area of study that may be derived from this paper - one that I hoped to follow, but was inhibited by the information barriers between the US and Cuba - is the study of distribution equality in Cuba’s food system. While Cuba has made strides ahead of many other countries in terms of racial and gender equality, a study of the distribution in urban and rural settings, and in nutritional data comparisons across regions and municipalities may help actors in the agricultural program understand where energy must be focused in order to meet the needs of the Cuban population.

Emotional investment in the political fate of Cuba, from the Cuban diaspora as well as from those within Cuba, has shaped the arguments into a political tool, used to show allegiance to one side or the other. But at its root, Cuban agriculture is a sector responsible for feeding the population of Cuba. As academic authors and not public officials, rather than asking ourselves whose agreement we’re seeking, the more responsible questions to ask are: how is their agricultural program performing its function of feeding the population? What barriers are hindering its performance that could be removed or amended to bring greater success? What could we learn from their success to improve our own agricultural practices? When we ask these questions, we move beyond publishing a perspective driven by ideology, and into the realm of

scientific inquiry to assess and improve the ability for people to obtain a fundamental human need: food.

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