When attempting to assess the economics of commodity production systems in different countries, the typical approach is to use data and information on prices, costs of production, etc. to determine profitability and relative production efficiencies. However, Cuba’s strong system of collectivized production and central planning (since 1959) has created significant distortions in their agricultural production systems and food markets. Food price controls and subsidies mean that prices are not an accurate reflection of value, while cost of production is a concept that is largely ignored. Fundamentally, the structure and function of Cuba’s agricultural sector are such that the use of economic principles does not provide useful insights into the economics of Cuba’s agricultural or horticultural sectors. Nevertheless, there is a wide range of issues which help us better understand the current situation in and prospects for Cuba’s horticultural industry, including geography, agronomic realities, climate, government policies and even culture and society.

That said there is one economic principle that helps us begin the challenge of analyzing Cuban agriculture and its horticultural industry. Economists consider three fundamental factors of production in assessing economies: land (which includes all natural resource endowments), labor, and capital. More recently, some schools of thought have come to recognize a fourth factor of production—entrepreneurial consciousness or entrepreneurship. In Cuba’s case, this turns out to be a particularly important factor so this paper will attempt to assess Cuba’s horticultural industry using these four factors of production, before examining some specific data on harvested area, production volumes and yields.

Land

Many people don’t realize that Cuba is a relatively large land mass in the Caribbean Basin. With an area of nearly 43,000 square miles, Cuba is about three quarters of the size of Florida. Or, for comparison, it is very nearly as large as the land area of all the rest of the Caribbean islands in total. Although Cuba does have three mountain ranges, including peaks exceeding 6000 feet, about 70% of its land area is arable. Cuba also has generally good soils. In some areas soil fertility has been degraded from lack of proper care, but assessments by U.S. and foreign soil scientists have indicated that the soil quality can be restored with proper treatment.

Cuba has a tropical/subtropical climate, and normally has favorable rainfall patterns, with a rainy season (from May to October) and a dry season (from November to April). Cuba’s average annual rainfall is 52 inches, about three-quarters of which falls in the rainy season. However, drought is periodically a problem and Cuba’s ability to respond to drought in agriculture is somewhat constrained. Irrigation systems and pumping capabilities are limited and often in disrepair. Furthermore, as a long, narrow island, Cuba doesn’t have a great deal of surface water. Finally, its sub-surface geology is such that Cubans in farming areas near the coast face problems similar to those in Florida, where salt water intrusion can occur if too much groundwater is withdrawn.

While Cuba’s geographic location provides for a good climate and no freeze risk, it is in a region prone to hurricanes. Hurricanes and tropical storms often cross the island from south to north causing damage to agriculture and infrastructure across a fairly narrow swath of the island. Sometimes however, as with hurricane “Ike” in 2008, storms move along the length of the island causing significant damage to the entire country.

Labor

One of the accomplishments of the Cuban Revolutionary government has been the establishment of an impressive, universal education system. In fact, the U.S. Central Intelligence Agency reports that Cuba actually has a slightly higher literacy rate (99.8%) than we have here in the United States (99%) (CIA World Factbook, 2014). Granted, this is not a statistically significant difference, but Cuba’s well-educated workforce could potentially be a very productive workforce. Beyond its high literacy levels, Cuba has a cadre of very well trained scientists in agriculture and other fields that also bodes well for Cuba’s future productive capabilities.

Cuba has knowledgeable farmers but, in many cases, their ability to utilize their expertise is constrained by the government’s rigid policies of central planning and/or the inability to obtain necessary inputs. In recent years the Cuban government
has been attempting to implement new policies to relax some of their central control of the agricultural sector. As these policies have been implemented, agriculture and farming has gradually become more lucrative; this has resulted in movement of labor that had left rural areas for urban areas (in anticipation of better job opportunities), back to rural areas and farming.

Finally, Cuba has a long tradition as an agricultural country, so agriculture is very much a part of Cuban society and culture.

An Agricultural Powerhouse?

With these positive factors endowments for land (and other natural resources) and labor, coupled with its historical agricultural culture, one might expect Cuba to be an agricultural powerhouse. However, in 2007, a Cuban government official reported that they were importing over 80% of their total food supply (Granma, 2007). This was a surprising admission given Cuba’s agricultural production potential.

To fully appreciate the situation in Cuba’s agricultural sector, it is important to bring some historical context into our examination. In the late 1980s, Cuba was producing over 8.4 million metric tons of sugar per year. This made Cuba the third largest sugar producer in the world behind Brazil and India. Brazil and India however, both consume most of the sugar they produce domestically, so Cuba was the largest sugar exporter in the world at that time. Nearly all of this sugar was exported to the former Soviet Union and the countries of Eastern Europe who were part of the COMECON. The Soviets were paying extremely high prices for these sugar imports—at times more than 10 times the world sugar price (Bain, 2005). These sugar exports were a critically important component of the Cuban economy as they were generating approximately 85% of Cuba’s total export earnings.

In addition, the Soviets sold oil, fuel and related petrochemical products to Cuba at prices far below world market prices. Together, these trade preferences were estimated to have provided Cuba with over $6 billion worth of subsidization per year in the late 1980s (Sweig, 2016). The foreign exchange earnings that these Soviet subsidies generated allowed Cuba to import food, fertilizer, pesticides, equipment and spare parts for its sugar industry along with other items and equipment.

The fall of the Berlin Wall in 1989 began to erode Cuba’s subsidy programs and when the Soviet Union was dissolved less than two years later, Cuba suddenly lost all of its subsidies. As a result of the generous prices received for its sugar exports, the Cuban sugar industry had become very inefficient and it could not make money selling sugar at world market prices. Furthermore, Cuba could no longer purchase the necessary inputs for sugar production, and the industry became a steady decline that didn’t stop until the 2010–11 season, by which time Cuba’s sugar production had fallen to less than 15% of its previous peak volume. These developments created a crisis for Cuba, with all productive sectors of the economy suffering. The economy all but collapsed.

Food Shortages and the Role of Capital

One of the key achievements of the Cuban revolution had been to assure its citizens of an adequate food supply. This was accomplished by an elaborate system of centrally-planned agricultural production and food collection by the government, heavily supplemented by food imports. These food supplies were distributed through a system of stores where Cuban citizens would obtain their allocated ration of food each month at extremely low, subsidized prices. When Soviet subsidies suddenly ended, Cuba’s ability to import food was constrained, resulting in food shortages.

In other countries, the response to such a development would have been to allocate capital to expand production of food for domestic consumption on lands that had been producing sugarcane, which were abandoned as the Cuban sugar industry collapsed. However, the Cuban economy was not (and still is not) capable of generating internal capital for investment. So it is the lack of capital—the third fundamental factor of production—that has kept Cuba from adjusting its agricultural production capabilities away from sugar to other crops for domestic consumption.

Recognizing their lack of capital, the Cuban government began trying to attract foreign investment into agriculture as well as other sectors of the economy. Their foreign investment laws, however, are not up to international standards, so foreign direct investment (FDI) has been limited. Nevertheless, some foreign investment did flow into Cuba, most notably for construction and refurbishing of tourist hotels, as well as into Cuba’s nickel industry (Cuba has the largest nickel deposits of any country in the world). Some FDI was made in agriculture, but it was largely limited to crops and products for export. Since salaries average about $25 per month, Cubans have a very limited ability to pay for products of any sort. This results in a limited “effective demand,” which is measured by the ability to pay for goods, despite the high local actual demand for food and agricultural products.

The Fourth Factor of Production: Entrepreneurship

As food shortages worsened in Cuba starting in the early 1990s, a significant black market for food products developed. But purchases in the black markets had to be made in hard currencies like U.S. dollars, rather than Cuban pesos. This created a problem for the Cuban government. Cuban citizens who received remittances from family in the United States or from tips in the developing tourist sector were able to purchase black market food products, while those without access to hard currencies were not. This, in turn, created social divisions in Cuban society that were inconsistent with the egalitarian underpinnings of the Cuban revolutionary philosophy. By summer 1994, food shortages for those unable to purchase black market food products became so dire that people began to protest in the streets (a very unusual occurrence in post-revolutionary Cuba).

To remedy this problem, in 1994 the Cuban government allowed farmers who had met their production quotas for the state to sell their surplus products in new, state-run agricultural markets where transactions were only in Cuban pesos. This brought considerable volumes of food out of the black markets and made them more readily available to all. Prices were not controlled by the Cuban government and were high relative to Cuban salaries because food supplies were still short, although less expensive than black market prices. On the plus side, food was accessible to all.

These markets brought challenges as farmers had to figure out how to get their surplus agricultural products from farms to markets in cities and towns, and arrange to sell them. A wide variety of informal systems quickly developed that included brokers and middlemen to handle transportation and sales. The
Cuba’s Horticultural Industry

Cuba’s non-sugar agricultural production has been largely stagnant in the years since the collapse of the Soviet Union. It is worth examining statistics for individual horticultural commodities to get a sense of how they compare with Florida. Vegetables. Table 1 provides a comparison between Cuba and Florida for tomatoes, peppers and potatoes in 2014. Note that reported Cuban tomato production was slightly greater than Florida’s, although it required more than three times Florida’s acreage to achieve. Thus, Cuban yields are less than one-third of Florida yields. Florida produces nearly two and a half times more peppers than Cuba on a slightly greater acreage. Cuban pepper yields are only about 40% of Florida yields. Florida’s potato acreage is more than 4.5 times greater than Cuba’s; Florida produces nearly 6 times the volume of potatoes as compared to Cuba. But for potatoes, Cuba’s yields are much closer to Florida’s at about 75% of Florida yields.

Table 1. Cuban versus Florida vegetable production, 2014

<table>
<thead>
<tr>
<th></th>
<th>Tomatoes</th>
<th>Peppers</th>
<th>Potatoes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuban harvested area (acres)</td>
<td>110.913</td>
<td>13,035</td>
<td>6,346</td>
</tr>
<tr>
<td>Florida harvested area (acres)</td>
<td>33,000</td>
<td>11,900</td>
<td>29,300</td>
</tr>
<tr>
<td>Cuban production (thousand CWT)</td>
<td>10,011</td>
<td>1,331</td>
<td>1,175</td>
</tr>
<tr>
<td>Florida production (thousand CWT)</td>
<td>9,240*</td>
<td>3,094</td>
<td>7,032</td>
</tr>
<tr>
<td>Cuban yield (CWT/acre)</td>
<td>90</td>
<td>102</td>
<td>185</td>
</tr>
<tr>
<td>Florida yield (CWT/acre)</td>
<td>280</td>
<td>260</td>
<td>240</td>
</tr>
</tbody>
</table>

* Fresh market production only.

Source: Anuario Estadistico de Cuba, and Florida Agriculture by the Numbers, 2014 issues.

Creative ways that evolved to satisfy the demand within this market-oriented policy reflect a change on the part of the Cuban government and indicate the considerable entrepreneurial talent of the Cuban people. Although Cuba suffers from a severe lack of capital, the presence of the other three factors of production (land, labor, and entrepreneurship), suggests that if the capital constraint can be resolved, and if market-oriented policies are implemented, the ability of Cuban agriculture, and perhaps the entire Cuban economy, to respond to such changes could be very significant.

The Importance of Foreign Investment

As discussed previously, Cuba’s sugar industry collapsed after the loss of preferential export markets in the Soviet Union. Table 5 documents sugar production losses from 8.4 million metric tons in the 1989–90 season to 1.1 million metric tons in the 2010–11 season. The 1.1 million ton figure is the lowest sugar production volume for Cuba in a century. In 2011, Brazil began to invest in Cuba’s sugar industry, and the results of this investment are apparent—more than a 60% increase in Cuban sugar production in only four seasons. While this increase doesn’t bring Cuban output anywhere close to volumes from the late 1980s, it does demonstrate how foreign investment can rapidly and significantly help improve Cuba’s agricultural output.

With the proper foreign investors and authorizations from the Cuban government, similar results presumably could be replicated for Cuba’s fruit and vegetable production. However, questions remain as to whether any foreign investors would be interested in investing in Cuba’s horticultural industry until such time as they know they would be allowed to export to the United States.

Even the Cuban government recognizes the key importance of foreign investment and in 2014, two Cuban officials, in separate speeches, publicly stated that Cuba’s target was to attract between $2 and $2.5 billion a year in foreign investment to allow the economy to meet its growth goals (Associated Press, 2014;
Trotta, 2014). However, foreign investment flows are nowhere close to meeting this target and Cuba’s economy remains stagnant.

Changing U.S.–Cuban Relations and Florida’s Unique Concerns

In Dec. 2014, U.S. President Barack Obama and Cuban President Raul Castro announced that they were launching discussions to resume diplomatic relations. These discussions were concluded in mid-2015 when the two nations formally resumed diplomatic relations after more than 50 years of relative isolation. While this represented a very significant departure from U.S. policy toward Cuba, the U.S. embargo remains in force. Inasmuch as the embargo was changed from an Executive Order to a formal law in 1996 (via the Cuban Liberty and Democratic Solidarity Act, also known as the Libertad Act or the Helms-Burton Legislation), a lifting of the embargo will require approval by the U.S. House of Representatives, the U.S. Senate, and the U.S. President—a development that appears unlikely in the near term.

On the other hand, a piece of U.S. legislation passed in 2000 that notably changed the nature of U.S.–Cuban relations while garnering relatively little attention. This legislation—the Trade Sanctions Reform and Export Enhancement Act (TSRA)—allowed U.S. firms to sell food and agricultural products and medicine to Cuba for the first time in more than 40 years. Under TSRA, U.S. agriculture has shipped over $5 billion worth of food products to Cuba. From 2003 until 2010, the United States was Cuba’s most important supplier of imported food products. Not surprisingly, U.S. farmers and ranchers were very happy to have access to this new market—a mere 90 miles from our country.

Access to the Cuban market afforded by the passage of the TSRA legislation, coupled with the renewal of diplomatic relations, have prompted some agricultural organizations and firms to lobby for a lifting of the embargo. In fact, Farm Bureaus in 49 of the 50 U.S. states support a lifting of the embargo, the lone exception being Florida. This is because Florida has unique concerns.

First and foremost, as Florida’s citrus industry continues to reel from the impact of the imported HLB infection, Florida agriculture is understandably sensitive about the possibility of importing additional pests. Florida’s climate is conducive to supporting all manner of invasive species—from the smallest insect pests to pythons. Other recent examples of invasive pests affecting Florida’s agriculture include laurel wilt disease, Oriental fruit fly, and the recent screwworm outbreak among Key deer in the Florida Keys and a dog in Miami-Dade County.

A secondary concern is related to the fact that Cuba’s historical agricultural production patterns and those of Florida are strikingly similar, being made up of sugar, vegetables, citrus, and tropical fruit, as well as livestock and ranching and marine and seafood products. Cuba’s production seasons for these crops and commodities are generally the same as Florida’s, so there is concern about the potential for the eventual export of these products to the United States with some sort of subsidy from the Cuban government. The immediate reaction to this concern might be how can an economically strapped economy like Cuba’s afford to subsidize its agriculture, and that is a reasonable question.

But as part of this discussion, it is important to keep in mind that subsidies can take many forms. For example, over the past few years the Cuban government has given permission to thousands of small farmers to utilize tens of thousands of hectares of fallow land, often at little or no cost. This clearly constitutes a subsidy to land costs.

All of this suggests that open trade and commercial relations with Cuba, whenever they may be resumed, has the potential to fundamentally alter the competitive structure of the winter fresh vegetable market in the United States, as was the case with NAFTA.

Broader Issues and Concluding Observations

Regarding the threat of importing invasive pests, it is worth noting that the United States has imported an average of nearly $6 billion worth of agricultural products from Central America and the Caribbean over the past six years (USDA GATS). Table 6 lists the major exporting countries in the region and the value of their agricultural exports to the United States for 2015.

This raises fundamental questions regarding the issue of the potential for importing invasive pests into Florida and the broader United States. In the author’s mind, there would appear to be three possible scenarios:

1. The current USDA regulations and inspection procedures to protect U.S. agriculture from invasive pests are adequate and effective. Although Florida’s recent experiences with invasive pests would suggest that this is not the case. If this is believed to be true, one could argue that the U.S. protocols for agricultural imports from Central America and the Caribbean should be effective for Cuba whenever the U.S. embargo is lifted and Cuba is allowed to export agricultural products to the United States.

2. However, if the current USDA regulations and inspection protocols aren’t effective and adequate to protect from the importation of new invasive pests, than an entire rethinking of USDA protective systems may be in order.

3. The third scenario is that, perhaps the U.S. regulations are adequate to protect U.S. agriculture, but perhaps the problem is that the U.S. inspection and control systems are overwhelmed by present import volumes, and unable to adequately implement the current regulations.

Table 6. U.S. food and agricultural imports from Central America and the Caribbean, 2015.

<table>
<thead>
<tr>
<th>Country</th>
<th>Million U.S. $</th>
</tr>
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<tbody>
<tr>
<td>Central America</td>
<td>$5,497</td>
</tr>
<tr>
<td>Guatemala</td>
<td>1,994</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1,562</td>
</tr>
<tr>
<td>Honduras</td>
<td>837</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>649</td>
</tr>
<tr>
<td>El Salvador</td>
<td>256</td>
</tr>
<tr>
<td>Other</td>
<td>199</td>
</tr>
<tr>
<td>Caribbean</td>
<td>$693</td>
</tr>
<tr>
<td>Dominican Republic</td>
<td>420</td>
</tr>
<tr>
<td>Jamaica</td>
<td>108</td>
</tr>
<tr>
<td>Trinidad &amp; Tobago</td>
<td>65</td>
</tr>
<tr>
<td>Haiti</td>
<td>27</td>
</tr>
<tr>
<td>other</td>
<td>73</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$6,190</td>
</tr>
</tbody>
</table>

Source: USDA, Global Agricultural Trade System (GATS) database.

2. Cuba’s livestock industry is heavily depleted due to poor genetic management, and the inability to import feed or the inputs necessary to improve its pastures.

3. Though not intrinsically an agricultural product category, the marine fisheries sector is an important natural resource-based sector for both Cuba and Florida.
As an agricultural economist, it would not be the author’s place to suggest which of these three scenarios accurately describes the current situation. However, regardless of whether or not the United States might allow Cuba to ship agricultural products to the our markets, it would seem that there would be incentive to determine the true status of U.S. regulations and implementation measures to protect against invasive pests, not just for the safety and protection of Florida agriculture, but for all of U.S. agriculture.

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