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# The Evolution of Agricultural Production and Yields in Post-Reform Cuba

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## Abstract

The agricultural reforms introduced in Cuba since 2007 have directly impacted agricultural output and yields. This paper documents the evolution of agricultural output and yields in Cuba since the introduction of agricultural reforms in 2007. Agricultural output and yields experienced notable declines during the first years after the reforms for the majority of the non-sugar crops included in our study, but have recovered since. However, after more than a decade of reforms, agricultural output and yields remain below pre-reform levels, and Cuba depends on imported food and agricultural products to satisfy domestic demand.

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## 1. Introduction

The agricultural reforms implemented in Cuba since 2007 are one of the central pillars of the country's efforts to "update" its socialist economy. The most important agricultural reform measures (so far) include: increases in the prices paid by the state for selected agricultural products, reductions or the elimination of state subsidies, decentralized commercialization of selected agricultural products, micro-credits for non-state agricultural producers, and the expansion of usufruct farming (Mesa-Lago, 2018; Nova González & Figueroa Alfonso, 2018).

Cuba's agricultural reforms have contributed to the emergence of a new agricultural model in which the non-state sector accounts for a growing share of output and plays a larger role (Mesa-Lago, et al., 2018; Nova González, 2018). The reforms have also contributed to the redistribution of land from the state to the non-state sector, reductions in idle land, and the reorientation of agriculture towards greater efficiency and productivity (González-Corzo, 2019; Mesa-Lago, et al., 2018; Nova González & Figueroa Alfonso, 2018; Spadoni, 2014).

Agricultural output and yields have fluctuated considerably since the start of the reforms in 2007. Even though both of these indicators have recovered slightly in recent years, production remains below 1989 levels and crop yields are relatively-low, compared to regional averages. As a result, Cuba depends on imported food and agricultural products to satisfy a large share of its domestic demand for food and agricultural products (González-Corzo, 2019; Mesa-Lago, et al., 2018; Nova González, 2018).

This paper documents the evolution of agricultural production and crop yields in Cuba since the introduction of agricultural reforms in 2007. The paper is organized as follows. Section one contains this Introduction. To provide a basis for comparison, section two summarizes the principal trends of agricultural output, crop yields, and labor productivity in a selected group of transition economies in Central Asia (CA), Central and Eastern Europe (CEE) and in the Former Soviet Union (FSU) during the 1989-1999 period. Section three analyzes the evolution of agricultural production and crop yields in Cuba during the 2007-2017 period. Finally, section four presents the conclusions.

## 2. Agricultural Output and Productivity in Transition Economies

The agricultural transition process implemented in the former socialist economies of Central Asia (CA), Central and Eastern Europe (CEE) and in the Former Soviet Union (FSU) in early 1990s had a direct impact on agricultural production and productivity (Swinnen, Van Herck, & Vranken, 2009). This process was mainly characterized by the liberalization of prices, markets, and foreign trade, reductions or the elimination of state subsidies, land reform, the elimination of state-owned agricultural monopolies, the creation of a privately-owned financial system to support the emerging private sector, and the development of the institutional framework and administrative systems required to operate under a capitalist (or market) economy (Csáki, 1999; Swinnen, Van Herck, & Vranken, 2009).

## 2.1 Agricultural Output

Agricultural growth (in terms of higher output levels) plays an important role in economic growth and development (Pingali, 2007; Valdes & Foster, 2005). The agricultural sector is one of the principal sources of direct and indirect employment; generates export earnings to purchase imported capital goods; supplies capital and labor to the non-agricultural sector; and contributes to price stability and food security and sovereignty (Hwa, 1988; Pingali, 2007). Agriculture also provides raw materials for the food processing industry, contributes to the expansion of markets for finished industrial goods, and (Delgado et al., 1998; Johnston & Mellor, 1961; Pingali, 2007; Timmer, 2002).

Even though agriculture remained important in most of the former socialist countries of Central Asia (CA), Central and Eastern Europe (CEE) and in the Former Soviet Union (FSU), its share of gross domestic product (GDP) declined significantly during the first decade of reforms (Lerman & Feder, 2004; Liefert & Swinnen, 2002). Swinnen, Van Herck, and Vranken (2009) show that agricultural output declined by at least 20 percent in the former socialist economies of Central Europe (i.e., Hungary, Poland, Czech Republic and Slovakia), the Baltic States (i.e., Estonia, Lithuania, and Latvia), the Balkans (i.e., Albania, Bulgaria, Romania, and Slovenia), the European Commonwealth of Independent States (CIS) (i.e., Russia, Ukraine, and Belarus), Transcaucasia (i.e., Georgia, Armenia, Azerbaijan), and Central Asia (Uzbekistan, Turkmenistan, Kazakhstan, Kyrgyz Republic, and Tajikistan) during the early stages of the transition process. Agricultural output recovered in all these transition economies, during the subsequent five year period, exhibiting the "U effect" described by Swinnen, Van Herck, and Vranken (2009).

The initial decreases in physical output experienced in these countries (or regions), however, was far from uniform. In the Baltic States and the European CIS, for example, gross agricultural output (GOA) declined to somewhere between 50 percent and 60 percent pre-reform levels, compared to between 25 percent and 30 percent in the case of the transition economies of Central Asia and Central Europe (Swinnen, Van Herck, & Vranken , 2009). These trends were primarily attributed to relative increases in the service sector's share of the economy, changes in the population's consumption patterns (largely due to rapid price increases during the early stages of transition), and the reorientation and restructuring of agricultural production and distribution systems during the first years of the transition period (Liefert & Swinnen, 2002).

Price liberalization, the reduction and elimination of state subsidies, and opening the agricultural sector to international trade also contributed to the declines in agricultural output in these transition economies (Macours & Swinnen, 2000). Agricultural output was also affected by higher input prices, uncertainty with respect to property rights and land tenure, and the radical transformation of existing linkages between producers, intermediaries, and consumers (Trzeciak-Duval, 1999).

## 2.2 Agricultural Labor Productivity

Agricultural labor productivity (ALP) is a common measure of agricultural efficiency (Dharmasiri, 2012). ALP is measured the ratio of total product (TP) to the labor input (L), as shown in Equation (1):

$$ALP(L) = \frac{TP(L)}{L}$$

(1)

*APL (L)* represents agricultural labor productivity; *TP* is total product (or total output), and *L* represents the labor input used in agricultural production.

Agricultural labor productivity (ALP) is affected by several factors such as the educational attainment, accumulated experience, and social capital of the labor force (Polyzos &Arabatis, 2006). Employee training, specialization, and the relative availability of capital inputs can also impact agricultural labor productivity (Polyzos & Arabatis, 2006; Zioganas and Nikolatis, 1995). Other important factors that influence agricultural labor productivity include public sector investments in infrastructure (Mamatzakis, 2003), the adoption of new technologies and innovation (Beeson, 1987; Porceddu & Rabinge, 1997), and proximity to major urban centers (Polyzos & Arabatis, 2006).

Agricultural labor productivity (ALP), which measures total output per unit of labor as shown in Equation (3), declined during the initial years of the transition process, but recovered since the mid-1990s in the majority of the transition economies of Central Asia (CA), Central and Eastern Europe (CEE), and in the Former Soviet Union (FSU) (Blanchard, 1997; Gorton & Davidona, 2004; Swinnen & Rozelle, 2006; Swinnen, Van Herk, & Vranken, 2009). In some of these countries (e.g., Estonia, the Czech Republic, and Hungary), for example, the use of the labor input declined at a faster rate than the cultivated area; as a result, after its initial decline, agricultural labor productivity recovered at a faster rate (Swinnen & Rozelle, 2006).

Other explanatory variables for the observed patterns of agricultural labor productivity (ALP) in the transition economies of Central Asia (CA), Central and Eastern Europe (CEE), and in the Former Soviet Union (FSU) include: initial conditions (e.g., institutional and legal frameworks, levels of collectivization, previous experience with private farming, etc.), agriculture's share of GDP, factor endowments, access to technology and production techniques, types of economic reform policies implemented (their scope and speed of implementation), and types of land reforms policies (e.g., restitution of private property rights to previous landlords, transfers of physical land to agricultural workers, or distribution of land ownership certificates to state enterprise workers, etc.) (Swinnen, Van Herck, & Vranken, 2009).

## 2.3 Agricultural Yield

Agricultural yield (or crop yield) is another important measure of agricultural productivity (Anderson & Reynolds, 2016). Agricultural yield (or crop yield) is calculated by dividing crop production by area cultivated or harvested. Since land is the most permanent and fixed input among the principal factors of production used in the production process (e.g., land, labor, and capital), agricultural yields provide an important measure of agricultural efficiency (Anderson & Reynolds, 2016; Dharmasiri, 2012; Thompson, 1926).[1]

Crop yields are generally classified in two categories: (1) yields by area harvested and (2) yields by area planted (Anderson & Reynolds, 2016). Measures of crop yields by area harvested include: gross yield, harvested yield (or common crop yield), and economic yield (Anderson & Reynolds, 2016). Gross yield is calculated by dividing the total output produced (before harvest or post-harvest loss) by the total area harvested. Harvested yield is calculated by taking the ratio of the total quantity harvested before any post-harvest loss to the total area harvested (Fermont & Benson, 2011). Finally, economic yield, which takes into account harvest-related losses and post-harvest losses, is calculated by dividing the total quantity of output available for use before any post-harvest loss by the total area harvested (Anderson & Reynolds, 2016).

Crop yield by area planted is another (partial) measure of agricultural productivity (Fermont & Benson, 2011). For all intended purposes, yield by area planted is similar to harvested yield, with the exception that it is calculated by dividing the total quantity harvested before post-harvest losses by the total area planted (Anderson & Reynolds, 2016;

The transition from a centrally-planned economy (CPE) to a market-oriented economy in the former socialist countries of Central Asia (CA), Central and Eastern Europe (CEE), and in the Former Soviet Union (FSU) in the early 1990s had a direct impact on crop yields. Agricultural yields declined during the first years of the transition process, but recovered after the mid-1990s (Swinnen & Rozelle, 2006; Swinnen, Van Herck, & Vranken, 2009). This recovery was more pronounced in countries with larger scale farming operations, which enjoyed higher access to essential inputs and of foreign investment (e.g., Hungary), compared to those in which agriculture was dominated by small-scale farming with limited access to inputs and low levels of foreign investment (e.g., Romania) (Swinnen, Van Herck, &Vranken, 2009).

The variations in crop yields experienced by the transition of economies of Central Asia (CA), Central and Eastern Europe (CEE), and the Former Soviet Union (FSU) were primarily caused by the reorientation of agriculture (towards the market), reductions or the elimination of state subsidies, and the opening of agricultural to the external sector (Swinnen & Rozelle, 2006). Crop yields in these former socialist economies were also affected by the availability and use of capital inputs, particularly fertilizers, equipment, and machinery (Swinnen & Rozelle, 2006).

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[1]However, the use of crop yields to measure agricultural efficiency faces many limitations; since land is considered as the only input, crop yield excludes other factors that affect production such as labor and other inputs; it ignores the effects of environmental damage; and does not account for intercropping (Tittonell & Giller, 2013).

## 3. Methodology

Data for agricultural production and crop yields were obtained from the Annual Statistical Yearbook (*Anuario Estadístico de Cuba*) published annually by Cuba's National Statistics Office (*Oficina Nacional de Estadísticas e Información – ONEI*). Crop yields for annual crops were calculated by dividing total output by the cultivated area (ONEI, 2018). In the case of perennial crops, yields were calculated by dividing total output by the area cultivated and under production (ONEI, 2018).

We developed an index that sets 2007 values equal to 100 to analyze the evolution of agricultural output and crop yields for the ten (10) selected non-sugar crops in Cuba during the 2007-2017 period. [2]

Equation (2) was applied to the raw data to construct the index of agricultural production:

$$q = \left(\frac{qt}{q0}\right).100 \tag{2}$$

The variable *q* represents the new indexed value of agricultural output, *q0* represents the value of agricultural output in the initial time period (i.e., 2007), and *qt* represents the raw data in a given time period (t) ranging from 2007 to 2017.

Equation (3) was applied to the raw data to construct the index of agricultural yields (or crop yields):

$$y = \left(\frac{yt}{y0}\right).100 \tag{3}$$

Variable *y* represents the new indexed value of agricultural yields, *y0* represents the value of agricultural yields in the initial time period (i.e., 2007), and *yt* represents the raw data in a given time period (t) ranging from 2007 to 2017.

## 4. The Evolution of Agricultural Output and Yields in Cuba since 2007

Despite accounting for only 4 percent of GDP, and the expansion of the services sector, agriculture still plays an important role in the Cuban economy (Nova González & Figueroa Alfonso, 2018). The agricultural sector is an important source of direct and indirect employment; about 20 percent of the economically active population is employed in agriculture and close to four million Cubans depend on this vital sector of the economy for their daily livelihood (Nova Gonzalez & Figueroa Alfonso, 2018). Agriculture has strong linkages with other key sectors of the Cuban economy and agricultural activities generate considerable positive externalities or spillover effects (Nova González, 2018; Nova González & González-Corzo, 2015; Spadoni, 2014).

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[2] The raw data were normalized from the starting point in order to maintain the same percentage changes in the non-indexed series and subsequent values were calculated so that the percentage change is the same as the percentage change in the non-indexed series.

Cuban agriculture has been affected by a series of challenges and limitations in recent years. The most significant include: declining productivity, insufficient access to essential inputs (e.g., fertilizers, equipment, machinery, pesticides, spare parts, etc.), the lack of economic incentives to stimulate efficiency and production, excessive state intervention through price controls, control of procurement, distribution, and taxation, inadequate access to diversified forms of financing, the inexistence of input markets, a fragmented and inefficient supply chain, restrictions on property rights and the concentration of wealth, a dilapidated infrastructure, logistical challenges, relatively high levels of external sector dependency, and the effects of the U.S. embargo (González -Corzo, 2013; Mesa-Lago, 2018; Mesa-Lago & Pérez-López, 2015; Nova González, 2013; Spadoni, 2014).

Since 2007, the Cuban government has implemented several agricultural reforms to address these challenges, incentivize production, improve efficiency, and substitute imports  (Mesa-Lago & Pérez-López, 2015; Riera & Swinnen, 2016).  The most important include: increases in the prices paid by the state to producers of selected agricultural products, decentralization in the commercialization of selected agricultural products, microloans for non-state agricultural producers, and, most importantly, the expansion of usufruct farming (Nova González; 2013 González -Corzo, 2019).

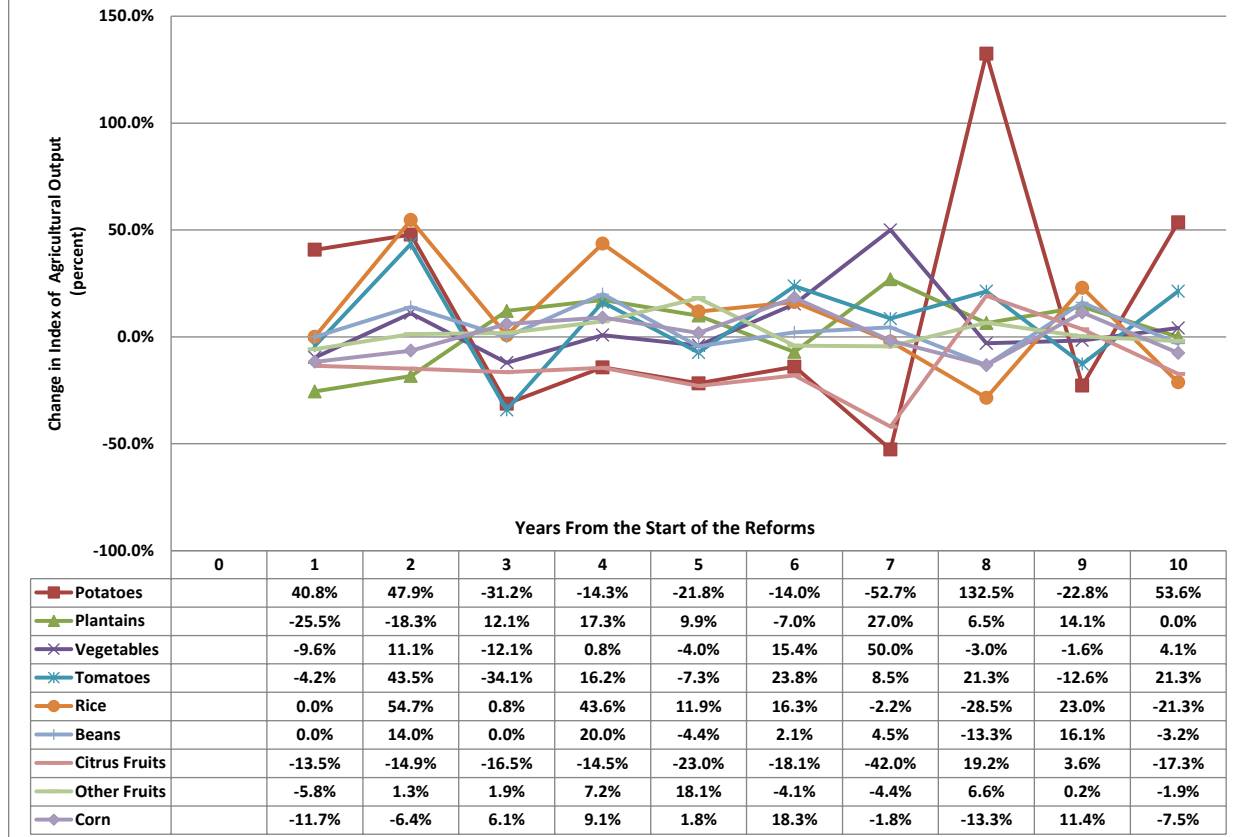As in the former socialist countries of Central Asia (CA), Central and Eastern Europe (CEE) and the Former Soviet Union (FSU), the agricultural reforms implemented in Cuba since 2007 have significantly impacted agricultural production and crop yields.

### 4.1 Agricultural Output

   Figure 1 shows the evolution of the index of agricultural output for selected non-sugar crops in Cuba during the 2007-2017 period.

## Figure 1. Cuba: Evolution of Agricultural Output, 2007-2017.



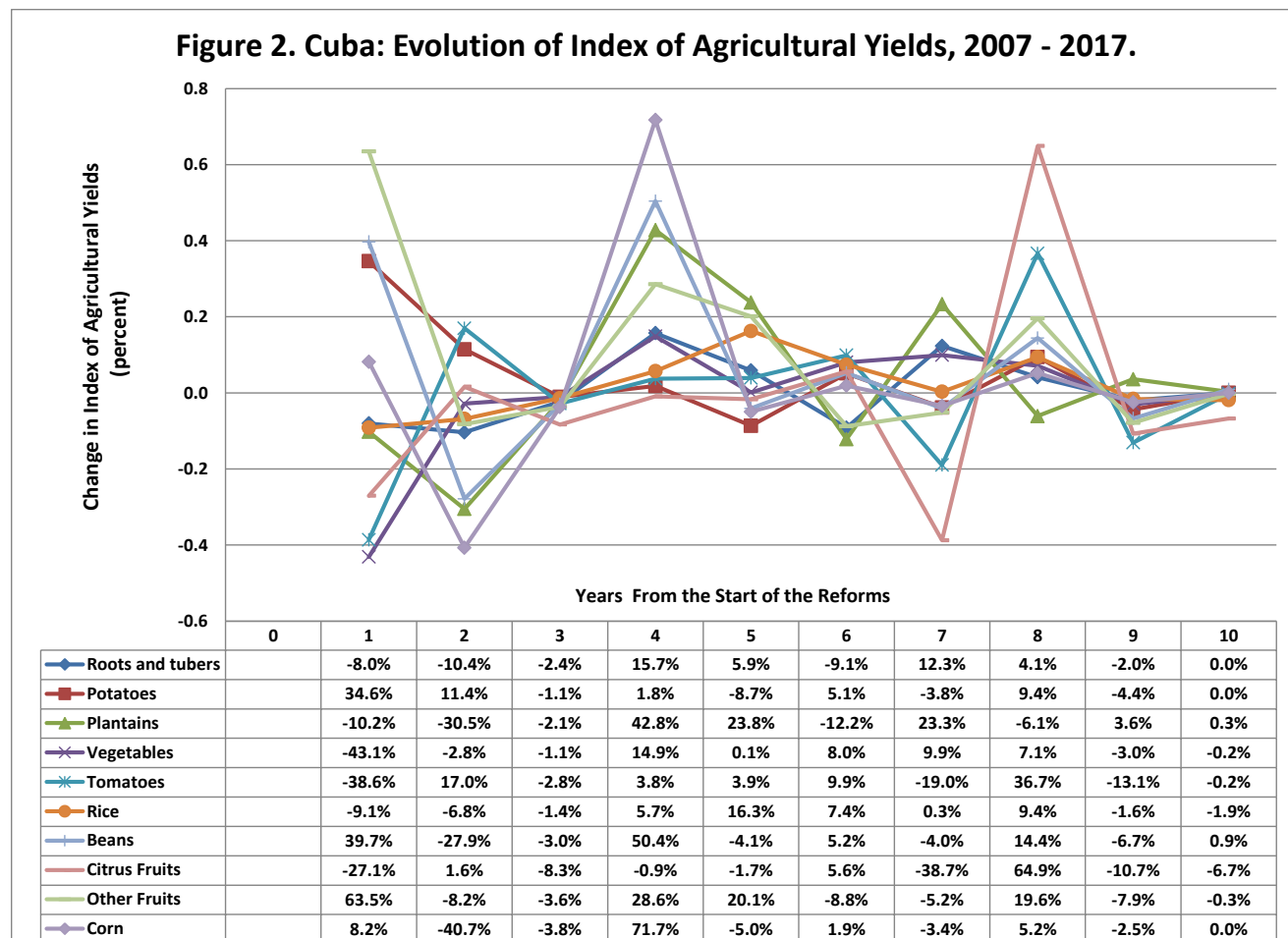| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Potatoes | | 40.8% | 47.9% | -31.2% | -14.3% | -21.8% | -14.0% | -52.7% | 132.5% | -22.8% | 53.6% |
| Plantains | | -25.5% | -18.3% | 12.1% | 17.3% | 9.9% | -7.0% | 27.0% | 6.5% | 14.1% | 0.0% |
| Vegetables | | -9.6% | 11.1% | -12.1% | 0.8% | -4.0% | 15.4% | 50.0% | -3.0% | -1.6% | 4.1% |
| Tomatoes | | -4.2% | 43.5% | -34.1% | 16.2% | -7.3% | 23.8% | 8.5% | 21.3% | -12.6% | 21.3% |
| Rice | | 0.0% | 54.7% | 0.8% | 43.6% | 11.9% | 16.3% | -2.2% | -28.5% | 23.0% | -21.3% |
| Beans | | 0.0% | 14.0% | 0.0% | 20.0% | -4.4% | 2.1% | 4.5% | -13.3% | 16.1% | -3.2% |
| Citrus Fruits | | -13.5% | -14.9% | -16.5% | -14.5% | -23.0% | -18.1% | -42.0% | 19.2% | 3.6% | -17.3% |
| Other Fruits | | -5.8% | 1.3% | 1.9% | 7.2% | 18.1% | -4.1% | -4.4% | 6.6% | 0.2% | -1.9% |
| Corn | | -11.7% | -6.4% | 6.1% | 9.1% | 1.8% | 18.3% | -1.8% | -13.3% | 11.4% | -7.5% |

Source: Sources: ONEI, 2010, 2012, 2016, 2018, and author's calculations.

The index of agricultural output in Cuba exhibited the "U effect" (characterized by an initial decline, followed by recovery) documented by Swinnen, Van Herck, and Vranken (2009) in nine (9) of the ten (10) non-sugar crops shown in Figure 1 during the 2007-2017 period. The index of agricultural output experienced positive average annual growth rates for the following crops during this period: roots and tubers (13.8 percent), potatoes (11.8 percent), plantains (3.6 percent), vegetables (5.1 percent), tomatoes (7.6 percent), rice (9.8 percent), beans (3.6 percent), other fruits (1.9 percent), and corn (0.6 percent). The index of agricultural output for citrus fruits, which were one an important source of export earnings, fell by an average annual rate of 13.7 percent between 2007 and 2017.

## 4.2 Agricultural Yields

Figure 2 shows the index of agricultural yields for selected non-sugar crops in Cuba during the 2007-2017 period.



**Figure 2. Cuba: Evolution of Index of Agricultural Yields, 2007 - 2017.**

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Roots and tubers | | -8.0% | -10.4% | -2.4% | 15.7% | 5.9% | -9.1% | 12.3% | 4.1% | -2.0% | 0.0% |
| Potatoes | | 34.6% | 11.4% | -1.1% | 1.8% | -8.7% | 5.1% | -3.8% | 9.4% | -4.4% | 0.0% |
| Plantains | | -10.2% | -30.5% | -2.1% | 42.8% | 23.8% | -12.2% | 23.3% | -6.1% | 3.6% | 0.3% |
| Vegetables | | -43.1% | -2.8% | -1.1% | 14.9% | 0.1% | 8.0% | 9.9% | 7.1% | -3.0% | -0.2% |
| Tomatoes | | -38.6% | 17.0% | -2.8% | 3.8% | 3.9% | 9.9% | -19.0% | 36.7% | -13.1% | -0.2% |
| Rice | | -9.1% | -6.8% | -1.4% | 5.7% | 16.3% | 7.4% | 0.3% | 9.4% | -1.6% | -1.9% |
| Beans | | 39.7% | -27.9% | -3.0% | 50.4% | -4.1% | 5.2% | -4.0% | 14.4% | -6.7% | 0.9% |
| Citrus Fruits | | -27.1% | 1.6% | -8.3% | -0.9% | -1.7% | 5.6% | -38.7% | 64.9% | -10.7% | -6.7% |
| Other Fruits | | 63.5% | -8.2% | -3.6% | 28.6% | 20.1% | -8.8% | -5.2% | 19.6% | -7.9% | -0.3% |
| Corn | | 8.2% | -40.7% | -3.8% | 71.7% | -5.0% | 1.9% | -3.4% | 5.2% | -2.5% | 0.0% |

Sources: Oficina Nacional de Estadísticas e Información (ONEI), 2010, 2012, 2016, 2018, and author's calculations.

For the most part, Cuba's agricultural yields have also followed the aforementioned "U-shaped pattern" in the post-reform years (similar to other post-socialist, transition, economies). The index of agricultural yields exhibited positive average annual growth rates for seven (7) of the ten (10) crops shown in Figure 2 during the 2007-2017 period. These were: roots and tubers (0.6 percent), potatoes (4.5 percent), plantains (3.3 percent), rice (1.8 percent), beans (6.5 percent), other fruits (9.8 percent) and corn (3.2 percent). By contrast, the index of agricultural yields recorded negative average annual growth rates for the following crops during the same period: vegetables (-1.0 percent), tomatoes (0.3 percent), and citrus fruits (-2.2 percent).

Even though Cuba's agricultural output and yields have recovered for the majority of the non-sugar crops shown in Figures 1 and 2 since 2007, agricultural production remains unable to satisfy national demand, and Cuba depends on food and agricultural imports to meet the nutritional needs of its population (Messina, Stefanou, & Royce, 2016). National agricultural

production satisfies about 20 percent of Cuba's demand for food and agricultural products, and imports account for the remaining 80 percent (González-Corzo, 2019; Nova González, 2018).

As Table 1 illustrates, food and agricultural imports increased from $1.7 billion in 2007 to $2.1 billion in 2017 (ONEI, 2018). The value of imported food and agricultural products represented 17.9 percent of the value of total merchandise imports in 2007; this figure increased to 20.9 percent in 2017, highlighting the island's dependency on the external (ONEI, 2018).

| Table I. Cuba: Merchandise Imports, *Thousand USD* | | | |
|---|---|---|---|
| Year | Total | Food and Agricultural Products | Food and Agricultural Products % of Total |
| 2007 | 10,082,557 | 1,746,402 | 17.3% |
| 2008 | 14,249,234 | 2,544,822 | 17.9% |
| 2009 | 8,906,010 | 1,755,604 | 19.7% |
| 2010 | 10,648,831 | 1,700,000 | 16.0% |
| 2011 | 13,952,403 | 1,835,000 | 13.2% |
| 2012 | 13,800,851 | 1,926,884 | 14.0% |
| 2013 | 14,706,619 | 1,848,051 | 12.6% |
| 2014 | 13,036,844 | 1,917,741 | 14.7% |
| 2015 | 11,702,367 | 1,800,910 | 15.4% |
| 2016 | 10,269,904 | 2,083,332 | 20.3% |
| 2017 | 10,171,983 | 2,129,572 | 20.9% |

Source: ONEI, 2010, 2016, 2018; author's calculations.

This situation can be explained by several factors. On the supply side, agricultural output has been adversely impacted by decreases in the area planted since 2007, the exodus of labor to other sectors of the economy, insufficient access to essential inputs, and the limited scope and nature of the agricultural reforms introduced since 2007 (Mesa-Lago, 2018). The area planted (with non-sugar crops) was reduced from 2,988,500 hectares (ha) in 2007 to 2,773,500 ha in 2017, representing a decrease of 8.5 percent during this period (ONEI, 2010, 2018). Agricultural employment fell from 919,700 workers in 2007 to 782,900 in 2017, representing a decrease of 14.9 percent, mainly as a result of demographic factors (e.g., the aging of the Cuban population) and the exodus of labor to other sectors of the economy) (ONEI, 2010, 2018).

Cuba's demand for imported food and agricultural products has also been driven by the expansion of self-employment since 2010, increases in remittances, and the growth of the tourism sector in recent years (Feingberg, 2018; González-Corzo, 2019; González-Corzo & Justo, 2017; Mesa-Lago, et al.,2018; Nova González, 2018; Ritter & Henken, 2015). As Table 2 demonstrates, the number of self-employed workers grew from 147,400 in 2007 to 583,200 in 2017, representing an increase of 295.7 percent during this period. Self-employed workers represented 13 percent of the occupied workforce in Cuba in 2017, compared to 3 percent in 2007 (ONEI, 2010, 2018).

| Table II. Cuba: Total Employment and Self-Employment, 2010-2017 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Change | % Change |
|---|---|---|---|---|---|---|---|---|---|---|
| **Total Employment** | 4,984,500 | 5,010,200 | 4,902,200 | 4,918,800 | 4,969,800 | 4,713,700 | 4,591,100 | 4,474,800 | -509,700 | **-10.2%** |
| **Self-Employed Workers** | 147,400 | 391,500 | 404,600 | 424,300 | 483,400 | 499,000 | 540,800 | 583,200 | 435,800 | **295.7%** |
| *Percent of Total Employment* | *3.0%* | *7.8%* | *8.3%* | *8.6%* | *9.7%* | *10.6%* | *11.8%* | *13.0%* | - | - |

Source: ONEI, 2010, 2012, 2016, 2018; author's calculations.

The influx of remittances from abroad has been an important driver of Cuba's demand for imported food and agricultural products. As Table 3 demonstrates, cash remittances increased from $1.477 billion in 2008 to $3.575 billion in 2017 (Morales Dopico, 2017). Remittances were the equivalent of 3.2 percent of Gross Domestic Product (GDP) in 2008; this figure doubled to 6.4 percent in 2017.

| Table III. Cuba: Cash Remittances, 2008-2016 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | Chg. | % Chg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Cash Remittances (million USD)** | 1,447.06 | 1,653.15 | 1,920.44 | 2,294.50 | 2,605.10 | 2,833.70 | 3,128.90 | 3,354.10 | 3,444.70 | 3,575.00 | **2,128** | **147.1%** |
| **Gross Domestic Product (GDP) at 1997 constant prices (Thousand pesos)** | 45,589.9 | 46,352.00 | 47,461.00 | 48,791.00 | 50,262.00 | 51,643.0 | 52,184.0 | 54,500.0 | 54,780.0 | 55,757.0 | **10,167.1** | **22.3%** |
| *Cash Remittances as percentage of GDP* | *3.2%* | *3.6%* | *4.0%* | *4.7%* | *5.2%* | *5.5%* | *6.0%* | *6.2%* | *6.3%* | *6.4%* | - | - |

Sources: ONEI, 2010, 2012, 2016, 2018; The Havana Consulting Group, 2018.

An estimated that 70 percent of the Cuban population receives remittances on a regular basis and more than two-thirds of such remittances are spent on consumption (Morales Dopico, 2017). Remittances are also used to cover other household needs such as financing auto repairs, home improvements, and cell phone use, payment for private tutoring services, purchasing household appliances, small business investments, and leisure and recreation (The Havana Consulting Group, 2018).

The expansion of international tourism, particularly after the improvement of diplomatic relations with the United States in December 2014, has also contributed to notable increases in Cuba's demand for imported food and agricultural products.

| Table IV. Economic Importance of Cuba's Tourism Industry | 2013 | 2014 | 2015 | 2016 | 2017 | Chg. | % Chg. |
|---|---|---|---|---|---|---|---|
| **Visitors** | 2,862,273 | 3,013,584 | 3,540,175 | 4,009,169 | 4,653,559 | **1,791,286** | **62.6%** |
| **Rooms** | 65,136 | 66,183 | 66,389 | 66,973 | 73,538 | **8,402** | **12.9%** |
| **SHARE OF GDP** | | | | | | | |
| **Gross Domestic Product (GDP) at 1997 constant prices (Thousand pesos)** | 51,643.0 | 52,184.0 | 54,500.0 | 54,780.0 | 55,757.0 | **4,114.0** | **8.0%** |
| *Expenditures in Hotels and Restaurants (Thousand pesos)* | *3,001* | *3,094* | *3,374* | *3,780* | *4,068* | **1,067** | **35.6%** |
| **% of GDP** | 5.8% | 5.9% | 6.2% | 6.9% | 7.3% | - | - |
| **Revenues from International Tourism (Millions CUC)** | 2,325.1 | 2,367.3 | 2,600.8 | 2,907.1 | 3,185.9 | **861** | **37.0%** |
| **%GDP** | 4.5% | 4.5% | 4.8% | 5.3% | 5.7% | - | - |
| **SHARE OF TOTAL EMPLOYMENT** | | | | | | | |
| **Total Employment (Thousands)** | 4,918.8 | 4,969.8 | 4,713.7 | 4,591.1 | 4,474.0 | **-445** | **-9.0%** |
| **Total Employment in Hotels and Restaurants (Thousands)** | 253.2 | 273.0 | 281.5 | 288.4 | 287.9 | **35** | **13.7%** |
| **% of Total Employment** | 5.1% | 5.5% | 6.0% | 6.3% | 6.4% | - | - |

Sources: ONEI, 2011, 2016, 2018.

As Table 4 illustrates, the number of international visitors grew from 2,862,293 in 2013 to 4,653,559 in 2017, representing an increase of 62.6 percent during this period. The number of rooms dedicated to the tourism sector increased by 12.9 percent, from 65,136 to 73,538 during the same period. Expenditures in hotels and restaurants by nationals and international visitors grew from $3 billion Cuban pesos (CUP) in 2013 to 4.1 billion CUP in 2017, representing a growth rate of 35.6 percent; and their share of GDP increased from 5.8 percent in 2013 to 7.3 percent during the same period. Gross revenues from international tourism were the equivalent of 4.5 percent of GDP in 2013, compared to 5.7 percent in 2017, highlighting the contribution of tourism to the Cuban economy.

Tourism is also an important source of employment. As can be observed in Table 4, hotels and restaurants (associated with tourism) employed 253,200 workers in 2013, accounting for 5.1 percent of total employment. This figure increased by 13.7 percent to 287,900 workers in 2017, representing 6.4 percent of total employment in that year (Table 4).

## 4. Conclusions

The economic reforms implemented in the transition economies of Central Asia (CA), Central and Eastern Europe (CEE), and the Former Soviet Union (FSU) after 1989 contributed to notable changes in agricultural output and productivity. Agricultural output declined during the first years of the transition in these countries, but recovered after the mid-1990s, exhibiting a "U-shaped" pattern; agricultural labor productivity and agricultural yields followed similar trajectories in the majority of these transition economies.

Beginning in 2007, Cuba introduced a series of agricultural reforms to incentivize production, improve efficiency, and substitute imports. The most important include: price liberalization, decentralized commercialization of selected agricultural products, microcredits for non-state agricultural producers, and the expansion of usufruct farming.

The agricultural reforms introduced in Cuba since 2007 have directly impacted agricultural output and yields. With the exception of citrus fruits, agricultural production declined during the first five years after the introduction of agricultural reforms (i.e., between 2007 and 2012), but recovered during the following five year period (i.e., between 2012 and 2017). Agricultural yields followed a similar trajectory, with the exception of citrus fruits.

However, after more than a decade of reforms, Cuba's agricultural sector remains unable to achieve the output levels and yields required to satisfy domestic demand and the island imports a considerable share of the food and agricultural products consumed by its population. This situation can be attributed to several factors. The area planted and under cultivation has declined significantly since 2007. Agricultural employment has decreased notably during the same period, mainly resulting from demographic changes, the exodus of labor to other sectors of the Cuban economy, and overseas migration. Agricultural production has also been affected by the limited scope of the reforms introduced since 2007, adverse climatic conditions, excessive bureaucratic and regulatory constraints, insufficient access to essential inputs, prohibitions on foreign investment, limitations on property rights and the concentration of wealth, an inefficient supply chain, and the deteriorated state of Cuba's infrastructure.

Despite ongoing efforts to substitute imports, Cuba remains highly dependent on imported food and agricultural products. The island's increased demand for food and agricultural imports has been driven by three fundamental factors: (1) the expansion of self-employment and the non-state sector, (2) the growth of international tourism, and (3) increases in remittances from abroad. Even though the agricultural reforms introduced in Cuba since 2007 represent a step in the right direction, more profound structural and institutional reforms are required to achieve long-term progress in the strategically-important agricultural sector.

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