

*From Classical Dependence  
to Inward-looking Development  
in Cuba (1990-2006)*



***Elisa Botella-Rodríguez***  
***Universidad de Salamanca***

DOI: 10.4422/ager.2015.13

***ager***

Revista de Estudios sobre Despoblación y Desarrollo Rural  
Journal of Depopulation and Rural Development Studies

### ***From Classical Dependence to Inward-looking Development in Cuba (1990-2006)***

*Abstract:* When Cuba had already developed a model based on industrial agriculture, the global context changed. These changes forced the island to search for new answers. In the midst of the Special Period, the island dramatically shifted from export dependency to inward-looking development. The new model enhanced food import substitution and decentralised land structures and commercialisation. This paper discusses the lights and shadows of Cuba's shift to inward-looking development from the Special Period to the last days of Fidel Castro's administration (1990-2006).

*Keywords:* Cuba, classical dependence, inward-looking development, industrial agriculture, alternative agriculture.

### ***De la dependencia clásica al desarrollo 'mirando hacia dentro' en Cuba (1990-2006)***

*Resumen:* Cuando Cuba había conseguido el desarrollo pleno de su modelo de agricultura industrial, el contexto global cambió. Estos cambios impulsaron la búsqueda de nuevas respuestas locales. En pleno período especial, Cuba se vio obligada de manera dramática a abandonar su dependencia de las exportaciones tradicionales e impulsar un nuevo modelo de desarrollo "mirando hacia dentro". El nuevo modelo promovió la sustitución de alimentos importados y la descentralización de la estructura agraria y comercial del país. Este artículo describe algunas de las luces y sombras de esta transición desde el período especial hasta los últimos días de la administración de Fidel Castro (1990-2006).

*Palabras clave:* Cuba, dependencia clásica, desarrollo "mirando hacia dentro", agricultura industrial, agricultura alternativa.

Recibido: 24 de diciembre de 2014  
Devuelto para revisión: 2 de abril de 2015  
Aceptado: 9 de junio de 2015

## Introduction

*When we had already found all the answers,  
the questions changed.*

(Indios Aymara, Región Andina, en De Souza Silva, 2003: 1)

When Cuba had already developed a model based on industrial agriculture and, to a lesser extent, import substitution (1959-1989), the global context changed. These changes forced the island to search for new answers. In the midst of the most severe crisis of its history, the Special Period, the island dramatically shifted from export dependency to inward-looking development<sup>1</sup>. Cuba is a unique case in terms of agricultural development. The island's isolation from neoliberal policies due to its political system and the fall of communism in 1990 forced the initial stimulus for the development of this alternative agriculture. The new model enhanced food import

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- 1• The article defines inward-looking development as an agriculture strategy based on three pillars: 1) low-input and sustainable technologies based on small farming with little reliance on external inputs, machinery and imported technology; 2) food import substitution; and, 3) improved access to land (via redistributive agrarian reform) and domestic markets. The literature often calls Cuba's agriculture model the 'Alternative Paradigm' (based on Funes *et al.*, 2002; Funes-Monzote, 2008; Rosset and Benjamin, 1994).

substitution and decentralised land structures and commercialisation. This paper discusses the lights and shadows of Cuba's shift to inward-looking development from the Special Period to the last days of Fidel Castro's administration (1990-2006)<sup>2</sup>.

In order to discuss these issues thoroughly, this research is divided into six sections. After this introduction, the next section summarises Cuba's agrarian evolution from colonial and classical dependence (under the Spaniards and the US respectively) to dependent development on the Soviet bloc<sup>3</sup>. The following section describes the collapse of Cuba's conventional agriculture in the early 1990s and the measures implemented to overcome the economic depression; specifically agriculture policies. Next, the evolution of Cuba's inward-looking development from 1990 to 2006 is explored. This section discusses the main players behind low input agriculture implementation and the long process of convergence and social capital formation between academics, farmers and the state. The section also describes the current level of Cuba's conversion called input substitution agriculture. The following section presents some of the results of Cuba's inward-looking development in terms of production patterns, land use and structures. The final section concludes with some general reflections on Cuba's alternative development and their usefulness for other economies applying distinct or similar policies.

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## *From classical dependence to dependent development*

Cuban agricultural history has been one of colonisation. Pre-Columbian Cuba was first inhabited by the *Ciboneys* who arrived on the island about 6,000 years ago. They were fisher folk and gatherers. The *Arawak* arrived later (about 1,500 years ago), and practiced low-input agriculture, gathering and fishing (Fernández, 2005).

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- 2• Since July 2006 agriculture decentralisation and increasing food production have been one of the key pillars of Raul Castro's economic agenda. A more updated analysis of Cuba's inward-looking development can be found in Botella-Rodríguez (2012; 2014).
  - 3• Dependency refers to Cuba's patterns of trade, development and agriculture that for almost five centuries were shaped by external forces and interests. Cuba's dependency has taken different forms but has continually limited the island's capacity to achieve sustainable growth.

Columbus arrived in 1492 and claimed the island for Spain. By 1511, land was given to Spanish settlers who began to cultivate and spread over sugarcane cultivation (a crop introduced into Cuba after Columbus' second expedition) (Wright, 2005). The new labour regime of African slaves (that by the eighteenth century were brought from Nigeria to work in the emergent sugar plantations) and the Haitian slave upheaval in 1789 impelled the Spaniards to enhance Cuba's sugar production. The Spaniards also brought other products from the 'Old World' (e.g. wheat, citrus, cattle, sheep, goats and pigs). These products seemed to adapt adequately to Cuba's tropical conditions and promoted agricultural diversification. Accordingly, sugar was not the island's most significant crop until the beginning of the nineteenth century. In the early 1800s the Spaniards and the emergent class of autochthonous small and medium farmers promoted diversified practices. They left parts of fertile land to beef cattle while expanding the island's sugar production (Fernández, 2005).

After the War of Independence against Spain from 1895 to 1898, a small group of US capitalists and TNCs began to control sugar production<sup>4</sup>. Pre-1959 Cuba's countryside was dominated by *latifundia* and sugarcane monocrops ruled by the United States. On the eve of the 1959 Revolution, the largest 9% of farmers owned 62% of the land and *latifundia* held over 4 million hectares of idle lands (Nova, 2006a; Rosset and Benjamin, 1994). Cuba's large export plantations produced over 6 million metric tonnes of sugar annually. Although beef, tobacco and pineapple were also important export crops (produced with more diversified practices by family farmers), sugarcane was planted on over half of the total harvested area (Rosset and Benjamin, 1994). Landholdings were controlled by US companies which accounted for 25% of the Cuban land with significant investments in sugar, cattle, and tobacco. Approximately half of Cuban sugar exports went to the US, providing over one-third of US sugar imports (Álvarez, 2004; Kost, 1998). This period represented Cuba's export-led growth phase characterised by its classical dependence on US holders and TNCs. This period was based on sugar monoculture, industry promotion and urbanisation (see Table 1). These developments widened the gap between a highly urbanised population and the very many poor peasants. Díaz-Briquets (2000) emphasises the existence of two pre-1959 Cubas. Whereas Havana city was living an era of extraordinary affluence, in rural areas, people, especially agricultural workers, landless and poor farmers, were living in sluggish and deprived conditions (Gastón *et al.*, 1957). Unemployment, malnutrition and illiteracy were common characteristics of rural Cuba during the Pre-Revolutionary era, 200,000 Cuban families were landless and 600,000

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4• See list of acronyms/glossary at the end of the article.

people unemployed. On the eve of the Cuban Revolution conditions were deprived and access to electricity, health services and fixed running water was limited (Álvarez, 2004; Nova, 2006a)<sup>5</sup>.

After the 1959 Revolution and before the collapse of trading relations with the Soviet Bloc in 1990, economic development in Cuba was primarily shaped by two external forces. One was the US trade embargo and its associated efforts to isolate the island economically and politically (Álvarez, 2004). The other was Cuba's inclusion in the Council of Mutual Economic Assistance (CMEA) with highly positive terms of trade<sup>6</sup>. Both of them conditioned the island to an export-led growth strategy extremely reliant on sugar production (Funes, 2002; Rosset and Benjamin, 1994).

After the Revolution of 1959, the government aimed to transform rural conditions in Cuba, giving the land to the tillers through two consecutive Agrarian Reform Laws. The first Agrarian Reform Law, enacted in May 1959, proscribed estates larger than 402 ha and eliminated certain forms of exploitation (e.g. sharecropping). The law granted ownership to those who worked the land to ensure a better use of resources with more efficient production forms (such as cooperatives). Yet, the law did not break up huge sugarcane plantations or cattle ranches expropriated from US owners and owned by the state (Funes, 2002; *Gaceta Oficial*, 1959; Rosset and Benjamin, 1994)<sup>7</sup>. The second Agrarian Reform Law, enacted in October 1963, expropriated the remaining landholdings larger than 66.4 ha. Unlike its predecessor, this law did not redistribute expropriated lands. The Cuban government hastily seized more than two million hectares of farmland, almost all of which was retained by the state (Blutstein *et al.*, 1971). In the aftermath of the 1963 agrarian reform, only 30% of agricultural lands and 30% of the agrarian labour force remained in the private sector while 70% of the lands were under government control (Zimbalist and Eckstein, 1987). These laws were initially coupled with the Cuban Revolution's commitment to transformation, agrarian diversification and industrialisation to lessen the island's dependency on sugar exports. Yet, new commercial relations and subsidies with the

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5• According to the Population, Housing, and Electoral Census (1953), in 1953 about 70% of the children and young people in the countryside (between 5 and 18 years) did not attend school (Gastón *et al.*, 1957). In the late 1950s only 5.8% of rural dwellings had electricity; 73.4% obtained water from rivers, wells, or springs (Gastón *et al.*, 1957).

6• The CMEA was an international trade coalition formed by socialist countries after World War Two.

7• Two years after the implementation of the first Agrarian Reform Law, 58.4% of the land was in private hands, with the remaining 41.6% was under state control (Álvarez, 2004).

Soviet Bloc ended up deepening Cuba's reliance on sugar exports<sup>8</sup>. Specifically, Cuba's incorporation into the CMEA in 1972 gave the island favourable commercial opportunities via price subsidies on imports and exports. In particular the Soviet Union sold petroleum and other commodities well below world market prices in exchange for sugar and provided loans on highly favourable terms. Between 1986 and 1990 alone, Cuba obtained US\$11.6 billion in Soviet loans and US\$10 billion in Soviet price subsidies (Gonzalez, 2003).

Within this context, the revolutionary government embarked on an ambitious plan to modernise Cuban agriculture by developing large-scale, capital-intensive industrial farms specialised in the production of sugar cane and livestock. Following Green Revolution principles, large, capital-intensive farms produced and sold (throughout the CMEA) sugar at highly subsidised prices (51 cents per pound compared with a world market price of 6 cents in 1986) during the 1970s and 1980s (Álvarez, 2004; González, 2003; Kost, 1998). The government also built hundreds of dairy farms, invested in major irrigation projects, and sponsored massive increases in agrochemical use and mechanisation (González, 2003). In just three decades (between 1959 and 1989), pesticide use grew four-fold, tractor use increased nine-fold, and fertilizer application rose ten-fold (Sáez, 1997).

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8• In the early 1960s the Cuban government aimed to stimulate industrial development and boost diversified agricultural production to expand exports, supply raw materials for national industries, and satisfy domestic consumption (e.g. a programme to extent import substitution crops such as rice, potatoes, onions, soya, and peanuts was deepened when the United States suspended the Cuban sugar quota at the end of 1960) (Blutstein *et al.*, 1971; Deere, 1992). The long-term consequences of failing to plant new sugar cane became patent in the early 1960s. By 1962, sugar production had declined by 30% relative to 1961 levels (Deere, 1992). In the same year, Cuba faced a huge trade deficit that created tensions with the island's foreign creditors and pushed the government to abandon agricultural diversification (Deere, 1992; González, 2003; Thomas, 1998; Zimbalist and Eckstein, 1987).

*Table 1.*  
*From colonial and classical dependence*  
*to dependent development in Cuba (1492-1989)*

1492-1898	Colonial dependence 1898-1959	Classical dependence 1959-1989	Dependent development
Relations with the rest of the world	Export-oriented towards the Spanish market.	Export-led growth: US capital and interests.	The Cuban Revolution: shift to socialism and CMEA.
Main actors of the economy	Small and medium farmers. Less significant: an agrarian elite (sugar planters) and Spanish landholders. African slaves: labour force for sugar plantations.	Development of latifundia (sugarcane): foreign capital (US-TNCs). Cheap labour force (from Jamaica and Haiti).	USSR and CMEA. State farms employees; Less significant: small farmers.
Prospects for growth	Four centuries of agrarian development: small farming, diversification (agriculture and livestock).	Sugar mono-crop and industry promotion. Tensions between agriculture and urban industry.	Green Revolution technology. Very good terms of trade and cheap imported inputs. Benefits oil re-exportation.
Level of trade	High but reliant on the Spaniards.	High and dependent on US interests	High but highly dependent on CMEA's imports.
Role of the state	Intermediate state sometimes captured by vested interests	Generally captured and moved by US interests.	A socialist state committed with the island's equitable and social development that forgot the costs of industrial agriculture.
Key sectors of the economy	Primary goods exports (tobacco, sugar and tropical fruits) and livestock.	Sugar cane latifundia. Urban industrialisation	Sugar monoculture. To a lesser extent, industrialisation based on imports.
Income inequality	High but not extreme	Extreme income and social inequalities: rise of political and social tensions.	Promotion of social equality: education, health, infrastructures.
Type of dependence	Colonial dependence: dependent on the empire's interests, Spain. Relatively small plantations and diversified agriculture. Balance between agriculture and industry.	A model merely attached to US interests and its experimentation with sugar monoculture.	Lack of agricultural diversification. Vulnerability of the island's economy to external shocks.

Source: author's elaboration, based on Evans (1979).

As shown by Table 1, the Revolution and the export-led growth phases failed to eliminate Cuba's extreme dependence on sugar exports. Cuba shifted pre-revolutionary trade dependence on the United States to trade reliance on CMEA countries. While the United States accounted for 69% of Cuba's foreign trade from 1946 to 1958, the equivalent figure for the CMEA countries during the period 1977-1988 was approximately 80% (Gonzalez, 2003). Classical dependence under the US influx and dependent development under Soviet influence formed the breeding ground of the crisis of the 1990s. Specifically, dependent development on the USSR gave Cuba's agriculture an impulse entirely unaware of the ecological limits of growth.

### *The Special Period: the forced shift towards an alternative model*

*"Today Cuba faces the most difficult challenge in its history"...  
in addition to the worsening blockade exercised for more than  
30 years by the United States, it now has to resist the effects  
of a second blockade provoked by changes in the international  
order... (Castro, 1992)*

By the early 1980s Cuba's industrial model of agricultural production began to show its failings (Mesa-Lago, 2009). In the mid-1980s capital-intensive patterns of agriculture ultimately generated extensive soil degradation by imposing 'one-size-fits-all' production guidelines, extremely dependent on CMEA subsidies and trade<sup>9</sup>.

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9• By 1988 CMEA countries accounted for 63% of Cuba's food imports, 98% of imported fuels and lubricants, 80% of imported machinery and equipment, 94% of fertilizers, 98% of herbicides, and 97% of animal feedstock (Díaz-Briquets and Pérez-Lopez, 1998, 2000). These socialist economies also purchased the majority of Cuba's exports, including 63% of sugar, 73% of nickel, and 95% of citrus (Díaz-Briquets and Pérez-López, 1995, 1998, 2000; González, 2003). By 1989 (in terms of import coefficients for agricultural products: the percentage of value added contributed by imports to final products and/or imported inputs used in their production) 100% of the cereals, 90% of beans and 49% of rice were imported from socialist countries to sustain the Cuban diet (Pastor 1992; Rosset and Benjamin, 1994).

These patterns ultimately disregarded the unique physical, hydrological, and environmental conditions of Cuba's soils (González, 2004)<sup>10</sup>.

With the collapse of the Soviet Union in the early 1990s, Cuba lost the basis of its general economic policy (Canler, 2000). Cuban foreign trade fell by 75%, imports decreased 50% during the period 1990-93, GDP dropped 30%, gross domestic investment fell 86% and the fiscal deficit ballooned by 158% (Canler, 2000; ONE 1996). Without credit lines, exports were the country's only connection to international markets. Yet, they declined by 67% (Canler, 2000; ONE 1996). To make matters worse, the US economic sanctions became more restrictive in the early 1990s. In 1992 the Cuban Democracy Act (CDA) prohibited sales to Cuba by foreign subsidiaries of US companies, which during the period 1980-1992 alone exported US\$2.6 billion and imported US\$1.9 billion from Cuba (Canler, 2000; USCTEC, 1998). In 1996 the Cuban Liberty and Democratic Solidarity Act restricted foreign direct investment flows into Cuba (Canler, 2000).

Moreover, the loss of cheap Soviet oil fuelled an energy crisis and the island confronted an economic catastrophe, even worse than the crisis of the 1930s in the United States (Canler, 2000). Within this context, the island was forced to design a set of strategies to overcome the depression that put the country on a 'wartime economy style austerity program'. The worst moment of the crisis occurred during the 1993 food crisis when average daily calorific intake declined from 2,908 to 1,863 kilocalories per person per day (Álvarez, 2004; Kost, 1998; Mesa-Lago, 2005; Nova, 2006a)<sup>11</sup>. This severe famine propelled the whole island to search for answers to guide the agricultural agenda during the years of the crisis. The answers emerged from the two main social poles of the economy: academia and the state.

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10• Annual production growth rates dropped from 3.5% in 1976-85 to 1.3% during the period 1986-89 (González, 2000; Nova, 2006a, 2008a) and sugar monoculture began to decline. Beginning in 1986, Cuba's agricultural and livestock activities stagnated. Despite large investments in agriculture (around 30% of total investments in the country during the 1980s), the great availability of tractors and the intensive use of fertilizers, increasing production costs became evident in the 1980s (Nova, 2006a).

11• According to FAO, in the early 1990s the minimum intake was 2,100- 2,300 kcal/person/day. During the food crisis of 1993, the situation of those people most dependent on state rations (very old and very young people) was dramatic. Their levels of nutrition fell to 1,450 Kcal/person/day during the worst years of the crisis (Álvarez, 2004; Kost, 1998; Mesa-Lago, 2005).

### ***Academia's response to the crisis***

Cuba was not totally unprepared to face the crisis. One of the main blueprints of the Revolution was the broad development of higher education, research institutions and technological expertise. During the 1980s the Cuban state invested up to \$12 billion to enhance skilled workers and human capital. All of them were trained to make advances that would, in the next decade, confront the crisis (Rosset and Benjamin, 1994).

To counteract widespread famine during the 1990s, Cuba had to find a way to produce twice the amount of food with just half of its previous agricultural inputs and a low number of tractors and other machinery. Research institutions and academics enhanced alternative practices. They ranged from biological pest management to participatory methods for generating new input substitution technology (see Table 2) (González, 2000; Rosset and Benjamin, 1994). In doing so, they used the research that had been accumulated since the early-1980s, when Cuban scientists and research institutions (conscious of the limitations of the dominant agricultural model) began to seek alternative technologies and advance research and development (R&D) based on family farming. Alternative practices aimed to reduce production costs in industrial agriculture through the substitution of biological inputs for agro-chemicals (Funes-Monzote, 2008a; Lage, 1992)<sup>12</sup>. Traditional family farming techniques were also instrumental in the development of ecological practices where no other alternatives were available.

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12• In the early 1980s, young scientists from the Ministry of Agriculture and universities began to search for alternatives. A split emerged between younger scientists that favoured alternatives. At the other extreme, older researchers or bureaucrats at leadership positions in the government remained attached to industrial agriculture (Funes-Monzote, 2008a; Rosset and Benjamin, 1994). In the midst of the Special Period these researchers created the Cuban Association of Organic Agriculture (CAAO) to implement sustainable family farming. In the late 1990s, the state institutionalised CAAO and sustainable small farming became official policy managed by The Cuba Association of Forestry and Agrarian Technicians (ACTAF). In 1999 ACTAF received The Right Livelihood Award. Then the Government recognised the potentialities and achievements of Cuba's sustainable family agriculture by institutionalising CAAO within ACTAF.

**Table 2.**  
***Agroecological practices introduced during  
the Special Period (1990-1997)***

Organic fertilizers  
Biofertilizers  
Biopesticides: biological control of pests  
Alternative animal feeders, pastures and fodders  
Cultivation of resistant varieties and the beginning of traditional  
varieties rescue of crops and traditional animal varieties.  
Animal traction and innovation on alternative tools  
Food conservation through traditional methods  
Farm and production systems diversification  
The return to wind mills and hydraulic batteries rams

Source: Machin *et al.* (2010).

The first challenge during the Special Period was the lack of imported pesticides. More than twenty years of research in biological control and other biological strategies had prepared Cuba for one of the most ambitious enterprises in integrated pest management (IPM) (the integrated use of a variety of alternative pest, disease and weed control tactics) in the world (Rosset and Benjamin, 1994). In the early 1990s these efforts were transformed into a major campaign and biological control began to replace pesticides as the conceptual basis for pest management (Funes *et al.*, 2002; Rego *et al.*, 1986). Although IPM efforts enabled a reduction in pesticides application, in 1991 Cuba still imported US\$80 million in pesticides annually. Soon, these imports dropped by US\$30 million, speeding up the extensive application of biological pesticides (Funes *et al.*, 2002; Pérez and Vázquez, 2002).

An additional challenge in the context of the crisis was soil fertility. To fill the void of declining fertiliser availability (which dropped 80% after 1989), local alternatives were required to obtain plant nutrients from organic sources. On this front, Cuba responded with a biofertiliser programme that by 1992 was making up 30% of the deficit (MINAGRI, 1992). In a parallel effort, the Institute for Research in Ecology and Taxonomy developed *Vesicular Arbuscular Mycorrhizae* (VAM) (fungi that penetrate roots and help with uptake of phosphorus and other nutrients) as a mechanism for increasing plant absorption of mineral nutrients (Funes *et al.*, 2002; Martínez Viera and Hernández, 1995; Pérez and Vázquez, 2002).

Following these practices, Cuba undertook the largest conversion from conventional high-input chemical agriculture to organic or semi-organic farming in human history (Rosset, 1996). Within this process, increasing partnerships between the state, researchers and farmers and the generation and recovery of peasant knowledge were pivotal components in regaining traditional Cuban family farming methods. Within this context, peasants were encouraged to participate actively in the generation and dissemination of new technologies and domestic food production (Ríos, 2006, 2008).

### ***The state's answer to the crisis***

In 1993 the Cuban government declared the 'Special Period in Peacetime' that implied a dramatic shift from dependent development (on Soviet Bloc trade relations) towards domestic options. The Cuban state was forced to ration food, fuel, and electricity (Castro, 1992; Fernández-Domínguez, 2005). Demonopolisation, deregulation and decentralisation policies were applied to improve the country's desperate foreign exchange position, diversify the economy (strongly based on export agriculture) and attract investment into different economic sectors (e.g. tourism) (Álvarez, 2004; Nova, 2006a). Deregulation implied a new domestic economic policy based on liberalising foreign investment, the rules governing the possession of US dollars by Cuban citizens, and the granting of licenses for private work or self-employment in various activities (Fernández-Domínguez, 2005; Mesa-Lago, 2005). Finally, decentralisation encouraged new forms of mixed companies (joint-ventures) in different economic sectors (especially in the tourist sector) and the restructuring of management institutions and the banking system (Álvarez, 2004).

In the agricultural arena, the state implemented a great range of structural adjustment measures to halt its negative pattern of growth during the crisis. In 1994 agricultural production dropped to 54% of 1989 levels. The production of sugar and tobacco was particularly badly affected, while food consumption fell 36%. Within this context, Cuban agriculture faced a difficult dilemma during the Special Period: how to maintain the social goals of the Revolution while feeding the Cuban population without strategic imports from the Soviet Bloc. The Cuban government, initially forced by the external shock and economic crisis, introduced measures to exploit domestic opportunities in order to raise internal production and feed the population (Álvarez, 2004). The three pillars that guided the agricultural agenda during the years of the crisis were the following:

*Food import substitution.* In 1994, encouraged by the commitments that the International Nutrition Conference had made in Rome, the Cuban government introduced the National Programme of Action for Nutrition. Forced by market conditions, the programme fuelled food import substitution. Based on alternative production the programme aimed at buffering the consequences of the crisis by improving food security and nutritional requirements throughout the island without strategic imports from the Soviet Bloc (Companiononi *et al.*, 2002; Enríquez, 2000; PNAN, 1994). Following the National Programme of Action for Nutrition mandate on food import substitution, the Cuban government also promoted urban agriculture during the 1990s. Urban agriculture started in Havana to deal with food shortages, imbalances between rural and urban areas, petroleum scarcity and transport difficulties. Urban gardening encouraged the production of perishable food to cover urban and peri-urban food requirements, which were more dependent on rural production before the food crisis. In the capital every available space (balconies, terraces, gardens and small peri-urban plots) was used to grow fruits, roots or vegetables (Companiononi *et al.*, 2002; *Granma*, 30 January 2001)<sup>13</sup>. While at the beginning, urban cultivation was a matter of subsistence production, by the mid-1990s, the Urban Agriculture Programme was making a significant contribution to the country's overall food security (GNAU, 2004). Urban gardens quickly became major sources of fresh vegetables for urban and suburban inhabitants, supplying approximately 70% of vegetables, 50% of rice and 39% of non-citrus fruits consumed in Cuba in 2000 (ANAP, 2001; Sinclair and Thompson, 2001).

*Decentralisation of production and land management.* An additional response of the Cuban government to food scarcity during the Special Period was the basic reorganisation of agricultural production and land tenure. This was based on two distinct elements. First, in September 1993 Cuba began a process of breaking up large state farms. Law Decree No. 142 established a new form of cooperative (the Basic Unit of Cooperative Production, or UBPC) on previous state farms. Although land titles remained with the state, these cooperatives gained the right to use the land in usufruct (for an indefinite period of time) and make production decisions (Álvarez, 2004; Nova, 2006a). Whereas state enterprises still provided marketing, technical

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13• Urban agriculture integrates different forms of production coordinated by the Ministry of Agriculture, the Ministry of Sugar, the Ministry of Internal Affairs, the Armed Forces, and the Ministry of Education and Higher Education (Rodríguez Nodals and Companiononi, 2006). The programme covers the city centre of the capitals of each municipality and province, within a 10 km radius (Companiononi *et al.*, 2002; Fuster Chepe, 2006; GNAU, 2004).

assistance, production services, and agricultural inputs, producers began to sell production surpluses after meeting the contracted monthly quota with *Acopio*, the state food marketing company (Kost, 1993).

Second, Law Decree No. 142 authorised the distribution in usufruct of small plots of land that could not be incorporated into UBPCs and also idle lands formerly used to farm tobacco (Decreto Ley No. 142, Cuba, 1988; Deere, 1997; Sinclair and Thompson, 2001). By 1994, 101,588ha of land in usufruct had been distributed to family farmers, state workers and pensioners interested in growing tobacco, coffee, cocoa and various crops in free usufruct. More than 55,986 producers acquired these lands for auto-consumption with an estimated average area per farmer of 1.8ha (González, 2000; Nova, 2003, 2006a; Villegas, 1999).

3. *Internal market liberalisation.* On 19 September 1994 the Council of Ministers enacted Law Decree No. 191/94 to authorise free agricultural markets where farmers and cooperatives could sell their surplus production at free-market prices, after fulfilling their commitments to *Acopio* (Álvarez, 2004; Fernández-Domínguez, 2005; Nova, 2006a)<sup>14</sup>. One of the factors that led to internal liberalisation was the need to undercut the black market for agriculture goods<sup>15</sup>. However, the opening of agricultural markets aimed to do much more than that. The decree explicitly stated that the principal goal was to increase national food production in the context of the crisis. Accordingly, farmers were encouraged to work harder by being rewarded with extra income for everything produced in excess of their stipulated quotas with *Acopio*, obtaining higher prices in farmers' markets (Enríquez, 2000)<sup>16</sup>. By the spring of 1998 there were more than 300 agricultural markets throughout the island, approximately

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14• Since 1959 the state distributed agricultural commodities to the whole population at accessible prices. This was the case except for a brief period (1980-1986) when the previous experiment with free market farmers' markets showed that the less state intervention, the more positive effect on the quantity, quality, and variety of food produced by CPAs and CCSs (Enríquez, 2000).

15• Limited supply of goods available through official channels during the 1990s, led urban consumers went to unofficial channels to get a minimum supply of basic foods. Extreme shortages of manufactured goods (e.g. soap, detergent, shoes, clothes, etc.) in rural areas drove some producers to engage in this kind of '*desvío*' of their production as the only way to get manufactured goods at inflated prices (Enríquez, 2000).

16• *Acopio* is the state marketing company. In the early 2000s *Acopio* controlled 75-80% of agricultural commercialisation, distribution and food supply in Cuba. Before the 1990s, it accounted for more than 90% of agricultural commercialisation, distribution and food supply in Cuba (Fernández, 2008; Nova, 2008b).

65 in the capital alone, handling 20-25% of the farm products made available to Cuban consumers (Enríquez, 2000; Kost, 1993).

With the aim of creating more flexible commercialisation and price systems, the state also introduced the Law of Prices in 1994. The Law created different methods of hard currency attraction to boost non-traditional crops and slightly relaxed and redesigned the *Acopio* price system (González, 2000; Nova, 2006a). Lastly, in 1993 the state tried to attract foreign direct investment into agricultural activities in Cuba (Álvarez, 2004; González, 2000; Nova, 2006a). Although foreign investment in agriculture was relatively small, some associations were created for citrus, tobacco, sugar, and rice (Kost, 1993). In 1994, Israeli investors were involved in Cuban citrus production while Spanish capital was engaged in the processing of Cuban tobacco. By the spring of 1998, there were 17 joint ventures in agriculture, representing an investment of approximately US\$60 million (Enríquez, 2000).

## *Understanding the evolution of Cuban inward-looking development (1993-2006)*

*If sustainability is an emergent property of human interaction, likely sustainable solutions will rise just through social learning... an interactive process through what the main actors of the development process are committed to implement and go forward with concerted actions. (De Souza, 2003: 2)*

While inward-looking development in other regions has been frequently spurned from mainstream policy, Cuba's exceptional circumstances forced the implementation of this alternative strategy on a nationwide scale. Inward-looking was initially based on low-yielding farming to enhance food import substitution. After the Cuban Association of Organic Agriculture's (ACAO) institutionalisation in 1999, the state put sustainable production on the map to enable market-oriented production (Wright, 2005). Both the failure of Green Revolution production and the long tradition of its *campesinos* pushed Cubans to see family farming as a more efficient production pattern (Wright, 2005). The 'Special period' forced an indispensable consensus based on human and social capital formation in the search for new, permanent and systemic paths of sustainable food production (García Trujillo, 1997).

***Cuba's social capital formation  
on inward-looking development (1993-2006)***

Conventional wisdom defines social capital as 'the structure of relations between actors and among actors that encourages productive activities.' Social capital decreases the costs of working together, enhances cooperation and lessens unencumbered private actions that result in resource degradation (Pretty, 2002: 152). Social capital formation in Cuba was achieved once the state, researchers and institutions became aware of the changes needed to quit Green Revolution mentality and confront the crisis. This awareness took time. Initially, Cuba's agrarian institutions and the state had to be reshaped through different phases of knowledge generation.

Right after the Revolution, from 1962 to 1975, Cuba basically sketched out the design of the knowledge and institutions required to support agriculture (Table 3). From 1976 to 1985, the government further consolidated Cuban knowledge assets of agriculture under the Green Revolution mentality. In 1986-93, the direction of knowledge generation process began to show deficiencies and had to be readdressed. The exhausted Green Revolution production should be readapted to shifting international circumstances. Simultaneously, Cuban dependence on both external ideologies and relations (mainly enhanced by USSR's anthropocentrism) needed to be reduced. In 1993, Cuba started to build-up a new strategic set of research and knowledge assets. These assets were based on Cuba's primary resources. They also rested on autochthonous physical and human capital developed during decades (Suárez, 2006).

**Table 3.**  
*Cuba's social capital formation on inward-looking development*

Main actors	Institutionalisation and consolidation 1962-1985	The need for changes 1986-1993	Strategic innovations 1993-1999	Social capital maturity and social learning formation 1999-2006
The role of the state	Under the USSR' ideology: anthropocentrism and gigantism.	The state began to understand the crisis adopting some measures. The change of paradigm took time.	The realisation of sustainable agriculture possibilities.	Coherent interaction: academia, institutions and peasants.
The role of academia	Attached to USSR's mentality and the lack of strong cohesiveness.	Reactive dependence: ACAO's gestation and rise.	Realisation independence From ACAO to ACTAF	Awareness independence. ACTAF: long term sustainable development.
The role of farmers	Important: first and second land reforms to give the land to the tillers.	They were not taken into account. However, they were highly affected by the crisis.	Sustainable agriculture: shifting technology and mentality	Understanding between peasants, the state and academia. Recovery of peasant knowledge tradition.

Source: author's elaboration, based on Pretty (2002) and fieldwork developed in 2006.

Cuba's knowledge generation process on agriculture demonstrates that social capital formation requires time. Both knowledge generation and sustainability required local knowledge and familiarity with rural areas attached to traditional farming. If a society forgets where it lives, landscape could be manipulated by mixing up means and ends of agriculture development (Pretty, 2002). Misreading means and ends of agrarian development was precisely the mistake of the anthropological mentality in which Cuba's industrial agriculture was embedded before 1990. A misconception of agricultural growth that lacked embedded nature in the socioeconomic progress. Such patterns of industrial agriculture, however, were fuelled by Cuba's scientific community without general awareness of the limits of industrial monoculture. The state's incapacity to radically shift agrarian policy in the late 1980s when the country accomplished impressive agrarian records (e.g. 3,100 tons of roots and vegetables, 913,000,000 litres of milk or 1,000,000 tons of citrus fruits) further justified industrial agriculture in Cuba (Machado, 2006).

A significant shift occurred during the third phase of Cuba's knowledge generation process in agriculture: the need for changes (1986-1993). This phase was fuelled by the exhausted Green Revolution agriculture and the economic crisis, especially the food crisis of 1993. These factors led the necessary general awareness within the scientific community to shift former mentality. As a result, ACAO emerged in 1993 from the young scientist community by searching for answers to face the crisis. ACAO needed time to attain social capital maturity.

The Cuban experience demonstrates that development of sustainable sector's groups is usually shaped in three periods (Funes-Monzote, 2006): reactive dependence, realisation independence and awareness independence (Table 3). First, reactive dependence implies the group formation to face a critical situation and attain a desired outcome (e.g. eco-efficiency, by diminishing costs and damage). Still they did not apply regenerative components. This is exactly the Cuban case when in the midst of the crisis the academic sphere, represented by ACAO, began to demand sustainable practices implementation. Their scope for action was limited. Both the state and many farmers, still attached to Green Revolution mentality, needed time to come to an ideological agreement (Pretty, 2002). The second phase, realisation independence, involves the group's growing independence. The group develops initial general awareness of a new long-term reality. The group begins to build horizontal links with other organisations. At the same time, individuals tend to engage in active experimentation by sharing results. This is the evolution experienced by ACAO from 1993 to 1999, when the group received The Right Livelihood Award. Then the state acknowledged the achievements of Cuba's sustainable agriculture by institutionalising ACAO within the creation of The Cuban Association of Agrarian and Forestry Technicians (ACTAF). This was the starting point of understanding on sustainability between academia and the state. Finally, awareness independence implies the group's engagement in developing their own realities. This is the stage in which ACTAF has been placed since 1999. In 2006 ACTAF was promoting a great array of activities working in consonance with both Cuba's government and *campesinos* to support local and agrarian development (e.g. urban and sub-urban agriculture programmes) (Nova, 2006b; Funes-Monzote, 2006).

In the early 2000s Cuba's sustainable agriculture was placed in the phase of social capital maturity and social learning formation (1999-2006). At that stage the understanding between academia, state and farmers began to work and showed interesting outcomes<sup>17</sup>. However, Cuba's sustainable agriculture presents relevant

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17• For example in 2000, urban agriculture produced 50% of the rice consumed nationally, 70% of the vegetables, and 39% of non-citrus fruits (GNAU, 2001).

shortcomings in its current state of agrarian conversion: a middle level known as 'input substitution,' that still should evolve to fully achieve sustainability.

### ***Cuba's path towards sustainability in the early 2000s***

Cuba is the largest example of conversion from conventional agriculture to inward-looking development based on low-input and sustainable small farming. However, the island has not entirely achieved a full conversion. Cuba is situated on a middle step called input substitution agriculture. This level portrays a less industrialised agriculture, an increased use of ecological technologies and an intentional process towards sustainable practices (Rosset and Benjamin, 1994).

Gliessman (2006) identifies four stages in what he calls agroecological transition. At level 1, farmers increase the efficiency of conventional practices. This system is highly dependent on external inputs. It also presents low sustainability, limited technology generation and plant diversity and the lack of autonomy and flexibility. This has been the type of industrial agriculture developed in Cuba from 1959 to 1990. At level 2 farmers substitute conventional inputs and practices with alternative practices. Input-substituted systems at the second level, though demonstrably more sustainable than conventional systems, may nevertheless have many of the same problems that occur in conventional systems (e.g. the use of monoculture). These problems will persist until changes in agro-ecosystem design (i.e. on the basis of a new set of ecological processes) take place at level 3. Level 3 of conversion is focussed on redesigning the agroecosystem to function on the basis of a new set of sound ecological processes. At level 4, the culture of sustainability is developed by bringing producers and consumers together through farmers markets, community supported agriculture (Gliessman 2001, 2006).

**Table 4.**  
*Characteristics of Conventional,  
Input Substitution and Sustainable systems*

Characteristics	Conventional	Input substitution	Sustainable (low-input and sustainable technologies based on small farming)
Main goal	Maximize	Maximize→Optimize	Optimize
Meaning of Agriculture	A business	Dependent on subjacent worries: external factors	Multifunctionality
<i>Socio-economic impact</i>			
Externalities	Negative	Negative→Positives	Positive
Comparative advantage	Static	Static→Dynamic	Dynamic
Reliance on external inputs (petroleum)	High	High	Low
Labour requirements	Low, hired	High, hired	High, family and communal
Labour productivity	Low	Low→Medium	High
Productivity of land (long-term)	Low to medium	Low to medium	High
Production (land)	Highest	Medium	Low/medium
Incentives structure	Really low	Low to medium	High: participatory
Space for local market	None	Little	High
Prices: rural earnings	Low	Low	Fair
Quality of food	Low	Medium→High	Healthy: natural
Access to land	Unequal: concentrated	Medium	Equal
Autonomy	Low	Medium	High
<i>Environmental impact</i>			
Sustainability	Low	Low→Medium	High
Plant diversity	Low	Low→Medium	High
Integration of crops and livestock	None	Little	High
Plant nutrition	Chemical	Biological and organic	Reconstruction of living soils
Decomposition and nutrient cycling	Low	Low to medium	High
Human displacement of ecological process	High	Medium	Low
<i>Technological impact</i>			
Generation of technology	Top down, imported	Top down, imported	Participatory, local knowledge
Research design	Conventional agronomic	Conventional agronomic	Participatory research
Reliance on external human inputs	High	Medium	Medium→Low

Source: based on Gliessman (2001) and Rosset (1997).

According to Table 4, in the early 2000s Cuba was precisely situated in level 2 of conversion called 'input substitution'. This paradigm presents similarities to conventional agriculture, such as high external inputs dependency, low-medium productivity of land, scarce generation of technology, or low autonomy and flexibility. Yet this level partly shows several sound environmental aspects of sustainability. For instance, input substitution demonstrates a certain degree of plant diversity, less environmental damage, less reliance on petrochemicals among other genuine characteristics of the level 3. At this level of conversion Cuba's agriculture faced a complex implementation process that firstly requires a shift of mentality among the primary players of the sector. In 2006 Cuba still presented a strong Green Revolution mentality highly attached to anthropocentric philosophy. This mentality overestimated the role of technology in research design and misread means and ends of agrarian development. Science strategies were basically seen as institutional building to fill in the science-development gap. Policies implemented never included the science result users. They adopted a management model pushed by science (push approach) and never based on demands (pull approach) (García Capote, 1996). At the same time, during decades scholars were unable to understand peasants' needs; the change of mentality was usually misunderstood just as the shift on farmers' behaviour. Regulations and economic incentives were common mechanisms to promote behavioural changes. They never guaranteed the required shift on attitudes. Many Cuban farmers commonly reverted Green Revolution methods when incentives ended or regulations were no longer enforced (Pretty, 2002). Technological and mentality advances must come across together to properly advance to level 3 of conversion (Rodríguez Castellón, 2004).

## *The outcomes of Cuba's inward-looking development (1990-2008)*

### ***Changing production patterns and land structures***

During the 1990s and early 2000s, the so-called inward-looking paradigm in Cuba introduced new production patterns less reliant on external inputs and improved techniques for soil management. An increasing number of small farmers shifted to an alternative model based on two specific dimensions: first, input substitution with local

alternatives that presented lower costs than imported technologies<sup>18</sup>; and second, the return to animal traction (Botella-Rodríguez, 2012; Rosset and Benjamin, 1994; Wright, 2005)<sup>19</sup>.

Inward-looking policies also promoted changes in Cuba's land structures during the 1990s and early 2000s. The process of land decentralisation broke state farms into smaller scale cooperatives (Basic Units of Cooperative Production, UBPCs) and also distributed unused lands in usufruct to new farmers. Internal market liberalisation also opened agriculture to foreign investment (in joint ventures with the state). These changes diversified Cuba's land tenure matrix in the early 1990s, generating a mixed agriculture sector based on ten different types of land organisations grouped in the state sector, the non-state sector, and the mixed sector (Álvarez, 2004; Figueroa Albelo, 1995, 2005; Martín, 2002)<sup>20</sup>. The creation of in 1993 UBPCs was a substantial improvement over large state farms. However, the most important change experienced in Cuba's land ownership was the gradual expansion of the agricultural land owned or leased by private small farmers that took place between 1989 and 2007 (Hagelberg and Álvarez, 2009; Hagelberg, 2010)<sup>21</sup>. Specifically, the most important reform was the so-called Law Decree 259 implemented by Raúl Castro in 2008 to distribute idle lands under long-term usufruct contracts, to 'anyone who wants to produce' (especially individuals, cooperatives, small farmers and even some UBPCs)

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- 18• For example, the benefits of different biological fertilisers like *Rhizobium*, which in 1995 substituted 75–80% of the nitrogenous fertiliser used on beans, and *Bradyrhizobium* which replaced 80% of the nitrogenous fertilisers used on soya and leguminous forages. Other biological fertilizers like *Fosfobacteria* were applied on vegetables, yucca, sweet potato, citrus and coffee nursery, substituting between 50% and 100% of phosphorus fertilisers in the same year (Martínez-Viera, 1997; Martínez-Viera and Hernández, 1995).
- 19• Oxen teams were cheaper to operate, did not compact the soils, could be used in the wet season long before tractors, and their digestion of fodder provided required organic fertiliser. In addition, oxen teams offered effective mechanical control of weeds and served as a substitute for herbicides (Funes-Monzote, 2008a). During the period 1989–1997 the use of oxen increased from 163,000 to 400,000 (Funes *et al.*, 2002; Ríos and Aguerrebere, 1998).
- 20• See Appendix I for a more detailed description on Cuba's land structures.
- 21• Cuban small farmers are grouped in two distinct types of cooperatives: Cooperative of Agriculture Production (CPAs) and Cooperative of Credit and Service (CCSs). In CPAs small farmers own the land collectively, while in CCSs small farmers own the land individually. Usufruct and disperse farmers are also engaged in small scale production on an individual basis with much smaller plots than CPAs and CCSs. Specifically, private small farmers are grouped in CCSs and other usufruct and disperse units. There is not a standard size to define small holders in Cuba.

(Granma, 18 July 2008). Although in 2008 51% of the land was idle, insufficiently exploited and covered by the invasive *marabou* weed, Raul Castro's decision was directed at revitalising the agricultural sector, particularly food production<sup>22</sup>. Although these transfers were surrounded by conditions, the mass grant in usufruct of idle state land, mainly to small farmers and the landless was highly revisionist in concept. Law Decree 259 was even more significant than the conversion of state farms in 1993. The Law represented the abandonment of the long-held Cuban doctrine of the superiority of state or parastatal, large-scale, mechanised agriculture reliant on hired labour and imported inputs (Hagelberg, 2010).

### ***Changes in the use of land***

The dismantling of the sugar sector in Cuba in the early 1990s, while being forced by the crisis, enhanced agricultural diversification. Leaving behind the island's historical dependence on the export of sugar, Cuba began to combine fruits and vegetables with other traditional crops and livestock activities (mainly pig rearing) (Funes *et al.*, 2002). Diversification also responded to the high degree of alternative technologies implemented to feed the population and the rediscovery of traditional small farming throughout the island. Although there is no data available on the use of land per crop, this section presents some figures on the use of land per type of farms.

Puerta and Álvarez (1993) show (based on ONE, 1990, 2007a) how the non-state sector, especially CPAs, CCSs and disperse private farms used their land more intensively than state farms during the 1990s and early 2000s. Considering the evolution on land use and idle land indexes (see Table 5), in 1989 state farms cultivated higher proportions (68.4%) of their available agricultural land compared to CCSs (53.6%) and CPAs (58.4%). However, in 2007 state farms only cultivated 29.2% of their available agricultural land compared to CCSs (65.8%), CPAs (52.1%) and UBPCs (48.6%) (see how these indexes are calculated in Table 5) (ONE, 2007a, 2007b).

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22• Contracts were set at 10 years in the case of individuals and 25 years in the case of cooperatives or government institutions. In both cases, contracts could be extended for similar periods if recipients operated the land in accordance with government regulations (Gayoso, 2008).

*Marabou* (*Dichrostachys cinerea*) is a difficult to eradicate deep root variety of acacia, not usable for any productive purpose.

CPAs, collective organisations of small producers, were less able to adapt to difficult economic conditions during the last years of the crisis (Hagelberg and Álvarez, 2009; Pérez Cabrera, 2009, 2010). The CPAs model did not leave room for individual units, while the economic and food crisis of the 1990s reinforced individual forms of production (Figueroa Albelo *et al.*, 2006). Within this context, the gap between private small farms (CCSs, *usufructuarios* and disperse farmers) and CPAs widened in the late 1990s and early 2000s. Private small producers developed more diversified agricultural activities. They combined basic grains with vegetables and tropical fruits; they also raised some livestock (mainly pigs). Surpassing any other land structure in Cuba, private small farms (CCSs and disperse *campesinos*) obtained the highest land use index and the lowest idle land index during the period 1989-2007 (65.8% and 5.5% respectively) (Figueroa Albelo *et al.*, 2006; ONE, 2007b).

**Table 5.**  
*Land use and idle land indexes under different structures (1989-2007), considering agricultural, cultivated, livestock and idle lands in 1,000ha.<sup>23</sup>(non-sugar agriculture)*

Concept	Land use index in 1989 (%) <sup>a</sup>	Land use index in 2007 (%) <sup>a</sup>	Idle land index in 1989 (%) <sup>b</sup>	Idle land index in 2007 (%) <sup>b</sup>
TOTAL	65.1	45.1	7.0	18.6
State	68.4	29.2	7.0	26.5
Non-state sector	n.a.	54.0	n.a.	14.2
UBPC	n.a.	48.6	n.a.	19.0
CPA	58.4	52.1	6.3	12.5
CCS, disperse <i>campesinos</i> and other private farmers	53.6	65.8	7.6	5.5

Notes: a Cultivated area /Agricultural area; b Idle area / Agricultural area

Source: author's calculations from Hagelberg and Álvarez (2009) and ONE (1990; 2007b).

- 23• The *cultivated land* area is defined in Cuba as the area planted, in preparation, or resting or awaiting preparation for planting and including tracks, ditches and headlands less than six meters wide. *Idle land* in Cuba is the area that may be cultivated but does not have any specific use for agricultural activities. While their geographical and topographical conditions may be prepared for farming, these areas are not cultivated. *Agricultural land* is the area devoted to agricultural production that includes cultivated and non-cultivated areas.

In sum, CCSs and other private small farms used the land more intensively than the rest of land structures in Cuba. The variety of non-traditional crops harvested appeared to be much smaller in Cuba than in other countries where non-traditional crops were extensively promoted. However, the island included basic grains, vegetables, tropical fruits and other traditional and non-traditional crops within the process of agricultural diversification. By mixing traditional, non-traditional crops and livestock production in UBPCs, CPAs and especially, CCSs, Cuba promoted producer diversification, leaving behind its former dependency on large scale sugar cane monocrop.

### ***The drawbacks of Cuba's agriculture model***

Although Cuba's inward-looking development has created some opportunities for sustainable small farming, agriculture still faces many difficulties to enhance production and productivity levels<sup>24</sup>. Several pillars of inward-looking development tried to boost national food production, especially after Raul Castro came to power. Yet improvements in total production levels were extremely variable during the period 1990-2008. The government traditionally blamed external factors, particularly the US trade embargo and climatic adversities, for the inability of agricultural production to cover food requirements. It is true that hurricanes in 2005 (Dennis, Katrina and Wilma) and 2008 (Ike, Gustav and Paloma) caused severe losses in agriculture. However, climate conditions in 2006 were favourable and agricultural production still declined (Mesa-Lago, 2008). According to a good number of the civil servants and economists the author interviewed during her fieldwork, this might be partly caused by the lack of further and parallel changes within agricultural and macroeconomic policies (Arteaga, 2008; Betancourt, 2008; Cruz, 2006; Funes, 2008; Nova, 2008b). Existing land structures lacked autonomy (e.g. many livestock UBPCs); cooperative and private small farmers had limited access to inputs, basic tools and credits (Puerta and Álvarez, 1993); and, non-complementarities between local and national initiatives of rural development may have hindered higher growth rates in total production levels. Yet, in the context of the crisis, given the absence of subsidised machines and imported chemicals, Cuba's small farms generated much higher levels of agricultural production

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24• A more detailed analysis on production and productivity levels from 1990 to 2008 can be found in Botella-Rodríguez (2014), based on Álvarez (2000), Puerta and Álvarez (1993) and ONE (2008; 2010).

for national consumption than large production units; particularly evident in the case of vegetables, tropical fruits, basic grains and meat (Botella-Rodríguez, 2012; 2014)<sup>25</sup>.

In terms of productivity, Cuba also presents clear deficiencies. Evidence on average yields in state and non-state farms per crop is rather mixed. This may be partly due to the lack of further decentralisation and liberalisation in Cuba's land structures and commercialisation channels. Another reason could be the inclusion of UBPCs (though they imitate the size and patterns of CPAs) in the non-state sector with the high degree of inefficiencies these units continued to exhibit<sup>26</sup>. Also the lack of credit and basic tools clearly hindered small and private farmers' possibilities to increase productivity levels further in the non-sugar sector. There was insufficient evidence available to demonstrate the lack of access to productive assets by different type of producers. Yet, productivity levels demonstrated that non-state farms significantly surpassed the productivity per hectare of state farms engaged in basic grains and vegetable production. These crops were primarily oriented towards national consumption and were produced by private small farmers (Botella-Rodríguez, 2012, 2014; Álvarez, 2000; Puerta and Álvarez, 1993; ONE, 2008, 2010). Although Cuba is still dependent on food imports for national consumption, the contribution of private small farmers to total production is rising. From 1990-92 to 2005-07 the island significantly reduced the import ratios of pulses, cereals and meat from to 2005-07 (FAO, 2009; see Appendix II).

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25• For example in 2008, Cuba's private smallholders (CCSs and individual farmers) produced 64-70% of national food production across 26.80% of the farming land (ONE, 2007b). Data released by ONE for January-May 2008 show that CCSs and disperse peasants alone produced 50% of total national production of roots and vegetables, 64.1% of vegetables, and 74% of tropical fruits, 82% of maize (82%) and 81% of beans (ONE, 2010).

26• The lack of resources makes many UBPCs almost unmanageable while the sector still holds over 19% of idle areas in Cuba (ONE, 2008b). UBPCs have high debts with the Central Bank after the initial purchase of machinery and equipment from the state (in many cases this equipment has deteriorated) (Nova, 2006a; Pérez-Villanueva *et al.*, 2004). The unclear circumstances of usufruct contracts (until Law Decree 259 in 2008) have generally hindered UBPCs efficiency (Fernández-Domínguez, 2005). The average size of many UBPCs is still large for several agricultural activities (e.g. livestock) (Álvarez, 2004; Nova, 2006a, 2008a).

## Concluding remarks

*An experiment that the world should be watching.*

(Rosset and Benjamin, 1994: 7)

In the midst of the most severe crisis in its history, Cuba dramatically shifted from classical export dependency to inward-looking development. By substituting local food and inputs for imported technologies, decentralising land structures (imitating the values and practices of family farming) and progressively liberalising markets and commercialisation channels, Cuba became one of the few countries, if not the only one, that experimented with this type of inward-looking development. Although agricultural reforms forced by the internal crisis of the early 1990s went only half-way in Cuba, market mechanisms introduced in 1993-1994 and the decreasing interference from government entities showed fast, even if partial, results (Gayoso, 2009). This concluding section summarises some of these results:

*The great amount of autochthonous alternative methods advanced in Cuba during the 1990s and early 2000s.* Cuba presents a unique experience in participation, social learning and social capital formation. By developing sustainable know-how Cuba achieved considerable improvements on social capital formation and low-input agriculture implementation. An increasing number of small farmers abandoned conventional agriculture. They began to develop sustainable biotechnology and supplied their neighbours with biological alternatives to poisonous pesticides, chemical fertilisers and expensive technologies imported from Western countries (Rosset and Benjamin, 1994; Wright, 2005). Moreover, Cuba's paradigm can illustrate the idea of 'globality' based on shared concerns of an emergent global civil society surrounding environmental quality, social cohesion, gender equality and ethnic diversity. Because after many years of misreading means and ends of development, Cuba enhanced policy makers to work with professionals and farmers. As a result, these strategies based on local people's demands might benefit natural ecosystems in Cuba (Beck, 2000; Pretty, 2002). Despite its exceptional history, geography, climate and political system Cuba emerged from the crisis, offering interesting lessons of low input agriculture and rural development for developing economies. In Brazil or Venezuela sustainable small farming appears to be a necessary - but not sufficient - condition to deal with rural crisis and improve their livelihood options of production, resilience and food security. Venezuela produces enough petroleum to

sustain industrial agriculture. Yet, the country confronted recurrent rural and agrarian crisis during the early 2000s. The opposition of landlords, the failure to address the dumping effects of massive food imports, and the relative lack of an active peasants' organisation left land reform and sustainability uneven at best. Brazil counts with an active social movement, The Landless Workers' Movement (MST), pressuring the government to solve rural difficulties. The MST showed some of the advantages of agroecology, organisation in settlements, access to land, the relationship between environment and local economic development. However, the MST lacks a true engagement with academia, institutions and state (Rosset, 2005).

*The higher ability of small farmers to adopt input substitution technologies.* Alternative methods were one of the cornerstones of inward-looking development in Cuba. However, these methods alone could not bring Cuba out of its agricultural slump. They were strongly linked to small farming with long traditions of low-input farming. Before the nationwide emphasis on sustainable agriculture in the 1990s, small farmers had proven their efficiency: working only 20% of the total agriculture land they produced more than 40% of the domestic food (Rosset, 1997). During the Special Period, whereas state farms became extremely vulnerable to pests and disease, *campesinos* quickly adapted to new technologies. Specifically, private small farms (CCSs and disperse *campesinos*) obtained the highest land use index during the period 1989–2007 (Figuerola Albelo *et al.*, 2006; ONE, 2007b). The degree of diversification achieved by small farmers partly explains the intensive use of land developed by CCSs and other private small farms in Cuba compared to other land structures. Within this context, Cuba left behind its classical dependency on sugar cane monocrop.

*The continuity of inward-looking development policies in the mid-2000s.* Can inward-looking development evolve towards a further integrated approach rather than being just a temporary solution? (Cruz and Sánchez, 2005). Between 2006 and 2008, there was explicit recognition by Cuba's government that additional changes in the agricultural sector must be undertaken to solve food shortages with more decentralised land structures and markets (Gayoso, 2008, 2009). Accordingly, in 2008 the President of the National Association for Small Farmers (ANAP), Orlando Lugo, declared the creation of agricultural delegations in all municipalities to decentralise decision-making to take responsibility and use appropriate marketing techniques (Mesa-Lago, 2008). This enabled UBPC and small farmers to market their products directly in nearby communities and reduced *Acopio* control over production and commercialisation (Mesa-Lago, 2008). Internal liberalisation was also broadened by including payments in hard currency and the improvement of logistical support. In 2005–2006, a new estimation of *Acopio* prices based on the National Associations for Small Farmers (ANAP) forecast for production costs and prices was introduced. In 2007 incentives to increase the price of milk that the government

purchased from peasants and cooperatives raised milk production (which increased 17% in 2007, though it had also risen 18% in 2006) and reduced imports of powdered milk (Fornés, 2008). Initial steps towards the creation of an agricultural input market and further investment attraction towards the agriculture sector were also pursued in the early 2000s (Betancourt, 2008; Fernández Domínguez, 2008). All these measures at least showed the state's acknowledgment to further decentralise land structures and increase market liberalisation. However, would Cuba require another external or internal shock to fully promote inward-looking development and the final level of agricultural conversion? The last events occurred in the island, the imminent end of US embargo, might involve important political, social and economic changes in Cuba's agriculture. These potential transformations should be watched alertly.

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## *Acknowledgements*

I am greatly indebted to all the Cuban institutions and individuals who welcomed me by giving me access to their valuable testimonies, knowledge and time. Especially, I sincerely show my gratitude to Dr. Fernando Funes-Monzote and Dr. Diego Sánchez-Ancochea for his constant advice and understanding. I am indebted to all the feedback and constructive comments provided by external referees. However, I alone am responsible for the all the ideas and mistakes represented here.

This paper is based on a MSc thesis defended at the Institute for the Study of the Americas, University of London, in 2006. The paper partly considers some of the results of a PhD thesis defended in the same institution in 2012. The research was supported by the following research projects: HAR2013-40760-R; MEC-HR2010-18544 (sub-programme HIST) and MEC-AECID postgraduate grants programme, 2003-2007, 2007-2009. ISA-travel grant, University of London.

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## Glossary

ACAO	Cuban Association of Organic Agriculture
CPA	Agricultural Production Co-operative
ACTAF	Cuban Association of Agricultural and Forestry Technicians
ANAP	National Association of Small Farmers
UBPC	Basic Units for Co-operative Production
CMEA	Council of Mutual Economic Assistance
CCS	Credit and Service Co-operative
CUC	Cuban Convertible Peso
INCA	National Institute of Agricultural Sciences
MINAGRI	Ministry of Agriculture
MST	Landless Workers' Movement
ONE	National Statistics Office
TNCs	Trans-National Corporations

## Appendix I

*Table A1.*  
*Organisation of Cuban agriculture*

State sector (large farms and small production units)	Non-state sector (medium)	Mixed sector (large farms)
State farms	Collective production	Joint ventures between state and foreign capital
New-type state farms (GENT)	Basic Units of Cooperative Production, UBPCs: large/medium farms (much smaller than state farms)	
Revolutionary Armed Forces (FAR) farms, including farms of the Young Workers' Army (EJT) and the Ministry of the Interior (MININT)	Agriculture Production Cooperatives, CPAs: small farms	
Self-provisioning farms at workplaces and public institutions	Individual Production (small private farms)	
	Credit and Service Cooperatives, CCSs	
	Individual farmers, in usufruct	
	Individual farmers, private property	

Source: Martín (2002).

In the early 2000s, the state sector comprised of various types of large farms: state farms, new-types of state farms, Revolutionary Armed Forces farms, and self-provisioning areas at workplaces and public institutions. The mixed sector was comprised of state companies associated with foreign capital, generally large farms, in the citrus sector and other specific crops (rice, cotton or tomato). This type of association was only established by the state, maintaining its role as socioeconomic regulator (Martín, 2002, 2007). Finally, the non-state sector was comprised of two types of production entities: collective (UBPCs and CPAs) and individual production units (CCSs and individual farmers). Whereas the state and mixed sector were generally organised into large farms, the non-state sector was characterised by much smaller land holdings.

**Table A2.**  
**Non-state sector in Cuba**

	Type	Characteristics	Type of land ownership
Collective large, medium and small farms depending on sectors	UBPCs	Former state farms Much smaller than state farms and imitate CPA size and their patterns of small farming production during the 1990s They buy tools, animals etc.	Collective usufruct of land
Collective small farms	CPAs	Voluntary association of small farmers in a cooperative to combine production and technologies	Voluntary association and delivery of land to the cooperative
Private small farms	CCSs and Individual/disperse farmers	Renters, agrarian workers, sharecroppers, owners who form a cooperative to organise agricultural work and obtain credits and services from the state. Plots to farm coffee, cacao and tobacco	They own the land (private lands) They own the land in usufruct under well-defined periods and conditions (at least ten years)

Source: Funes *et al.* (2002), Martin (2002).

CPAs and UBPCs were collective forms of production. UBPCs were basically former state farms divided into smaller units after the implementation of the Third Land Reform Law in 1993. Although they imitated the size and patterns of production developed in CPAs, they were large (though much smaller than state farms), medium or small farms depending on the sector. The rest of the structures presented in Appendix II were small farms. Agriculture and Livestock production Cooperatives, CPAs, were voluntary associations of traditional peasants that jointly worked the land while management decisions were made through democratic processes within the cooperative (Martin, 2002; ONE, 1997).

Credit and Service Cooperatives (CCSs) were private small farms, grouping together former renters, sharecroppers, agrarian workers and small farmers. These individuals owned their own land but engaged in cooperatives to access services and credit, purchase inputs, and sell their produce. However, production itself remained at the individual level. They were able to sell any production above and beyond the contracted quantity in farmers' markets at free market prices (Álvarez, 2004; Martin, 2002, 2007; ONE, 1997).

## Appendix II

*Table A3.*  
*Evolution of ratios of imported food (Kg/person/year), 1990-2007*

<b>Food groups</b>	<b>Difference in percentage points</b> (2005-07/1990-92)
Cereals - Excluding Beer	-6.7
Starchy Roots	-1.28
Sugar and Sweeteners	14.06
Pulses (e.g. peas, beans and lentils)	-20.6
Oilcrops	58.2
Vegetable Oils	-21.3
Vegetables	-0.66
Fruits - Excluding Wine	0.28
Meat	-19.04
Offal	9.09
Animal Fats	53.65
Milk - Excluding Butter	24.2

Source: Author's calculation from FAO country statistics, 2009.

Based on FAO data (2009) on food imports (Kg/person/year) and food available for consumption (Kg/person/year) from 1990-92 to 2005-07 the island experienced decreasing ratios of imported cereals, starchy roots, pulses, vegetable oils, vegetables and meat, basic food crops to sustain the Cuban diet. By contrast, during the same period, import ratios for other food groups increased (e.g. sugar, oil-crops, fruits, offal, animal fats and milk). In the group of cereals and pulses, decreasing import ratios were largely attributable to the contribution of the non-state sector to the basic grains available for national consumption. In 2008 private small farmers alone produced 82% of maize, 81% of beans and 36% of rice available for national consumption (ONE, 2010).

