

Cuba's inward-looking development policies: towards sustainable agriculture (1990-2008)

ELISA BOTELLA-RODRÍGUEZ

INTRODUCTION

While most Latin American countries followed outward-looking policies of agrarian development during the 1990s, Cuba shifted towards inward-looking development to face the harsh crisis that followed the Socialist demise of the late 1980s. Although it was an indispensable response to the worst crisis in Cuban history, the island has become one of the few countries, if not the only one, that is currently experimenting with this pattern of alternative development on a national scale. This alternative is based on food self-provisioning, input substitution, internal liberalisation, land decentralisation and sustainable small farming¹.

Considering Cuba as an isolated example of agriculture development in the current context of globalisation, this paper explores the extent to which inward-looking devel-

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Elisa Botella-Rodríguez is assistant professor of Economic History at University of Salamanca and PhD candidate in Latin America economy at University of London. Address: Institute for the Study of the Americas, School of Advanced Study, Malet Street, London WC1E 7HU (United Kingdom). ebotella@usal.es

1. This research coins the term inward-looking development to define the set of measures implemented in Cuba throughout the 1990-2008 period based on family farming, local inputs and sustainable technologies and food import substitution. The literature often call Cuba's agriculture model the 'Alternative Paradigm' (based on FUNES *et al.*, 2002; FUNES-MONZOTE, 2008; ROSSET and BENJAMIN, 1994).

opment created opportunities for small farming production throughout the island during and after the Special Period of the 1990s and early 2000s. In doing so, the article analyses three questions: 1) What were the main policies implemented under inward-looking agrarian development in Cuba between 1990 and 2008?; 2) What were the changes experienced in agriculture production patterns and land structures prompted by inward-looking development in Cuba?; 3) To what extent these new patterns of production and land decentralisation opened opportunities for sustainable small farming production?

The paper is organised in five sections, beginning -after the introductory one- with an historical description of the patterns of dependent development applied in Cuba's agriculture prior to 1990. Section three then explores Cuban agrarian responses and policies to overcome the depression after the Socialist Demise of 1989. Section four and five concentrate on the changes in agriculture production patterns and land structures that resulted from the implementation of the new model. The final section concludes with some general ideas and policy lessons from Cuba's alternative development.

2. THE CUBAN AGRARIAN MODEL PRIOR TO 1990

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 U.S. 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. Both of them conditioned the island to an export-led growth strategy extremely reliant on sugar mono-crop, influencing the ultimate responses of Cuba after the Socialist demise (Funes *et al.*, 2002; Rosset and Benjamin, 1994).

2.1. The Agrarian Model after the Revolutionary Triumph

Díaz-Briquets (2000) stresses 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 peasants were living in highly deprived conditions (Gastón *et al.*, 1957)². Unemployment, malnutrition and illiteracy were common characteristics of

2. According to the Population, Housing, and Electoral Census (1953), 36.5% of the total Cuban population lived in rural areas and slightly more than 77% of rural inhabitants (between 5 and 24 years) did not attend school. About 70% of the children and young people in the countryside (between 5 and 18 years) did not attend to school (GASTÓN *et al.*, 1957).

rural Cuba during this pre-revolutionary era, wherein 200,000 Cuban families were landless and 600,000 unemployed. Deprived social conditions and infrastructures were also severe in rural areas, rarely provided with electricity, sound health conditions or fixed running water (Álvarez, 2004; Nova, 2006a)³. At the same time, pre-1959 Cuba's countryside portrayed the pre-eminence of *latifundia* and sugarcane monocrops ruled by one main trading partner: the United States. On the eve of the 1959 Revolution, the largest 9% of farmers owned 62% of the land and the *latifundio* held over 4 million hectares of idle lands (Nova, 2006a; Rosset and Benjamin, 1994). Cuba's large export plantations produced over 6 million tons of sugar annually; although beef, tobacco and pineapple were other important export crops, sugarcane was planted on approximately half of the total harvested area (Rosset and Benjamin, 1994). Landholdings were controlled by US companies which comprised 25% of the Cuban land with significant investments in sugar, cattle, and tobacco. Over half of Cuban sugar exports went to the U.S., providing roughly one-third of U.S. sugar imports (Alvarez, 2004; Kost, 1998).

After the Revolutionary triumph of 1959, the government aimed to transform rural conditions in Cuba giving the land to the tillers through two consecutive agrarian reforms. The first Agrarian Reform Law, enacted in May 1959, proscribed *latifundia* (defined as estates larger than 402 hectares) 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 technical and efficient production forms (such as cooperatives). The law further aimed to prompt industrial development and boost diversified agricultural production to expand exports, supply raw materials for national industries and satisfy domestic consumption (Alvarez, 2004). Two years after the implementation of the first agrarian reform law, 58.4% of the land was in private hands, whilst the remaining 41.6% was under state control. Nonetheless, the first agrarian reform did not break up huge sugarcane plantations and cattle ranches, with large amounts of US expropriated land remaining in state hands (Funes, 2002; Rosset and Benjamin, 1994). The second Agrarian Reform Law, enacted in October 1963, virtually expropriated all private landholdings larger than 66.4 hectares. Unlike its predecessor, the 1963 law did not consider the redistribution of expropriated lands. The Cuban government quickly seized more than two million hectares of farmland, almost all of which were 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 private sector while 70% of the lands were under government control (Zimbalist and Eckstein, 1987). The aforementioned two

3. Only 5.8% of rural dwellings had electricity; 2.4% of dwellings in rural areas obtained water supplies through internal aqueducts; 3.4% through internal cisterns and 73.4% obtained water from rivers, wells, or springs (GASTÓN *et al.*, 1957).

agrarian reform laws were initially coupled with the Cuban Revolution's commitment to economic transformation, agrarian diversification and industrialisation to lessen the island's dependency on sugar exports. Yet, new commercial relations with the Soviet bloc ended up deepening Cuba's reliance on sugar exports.

2.2. Deepening Dependent Development: the failure of Green Revolution practices

The first three decades of the Cuban revolution (1959-1989) did not alter Cuba's economic dependence on sugar, its highly centralised production patterns, or its reliance on one primary trading partner. After an early attempt at agricultural diversification created serious balance-of-payment difficulties, the Cuban government decided to maintain the country's historic dependence on export-led sugar production (Thomas, 1998; Zimbalist and Eckstein, 1987). Cuba's decision was strongly influenced by significant subsidies from the socialist trading bloc, including long-term contracts with China, the Soviet Union, and several Eastern European countries. Specifically, Cuba's incorporation into the Council of Mutual Economic Assistance (CMEA) in 1972 gave the island highly favourable commercial conditions. CMEA countries subsidised the Cuban economy via price subsidies on imports and exports, Soviet Union's sales of petroleum and other commodities (all of them below world market prices), and loans at highly favourable terms. Between 1986 and 1990, for example, Cuba obtained US\$11.6 billion in Soviet loans and US\$10 billion in Soviet price subsidies (Gonzalez, 2004).

In this context, the revolutionary government embarked on an ambitious plan to modernise Cuban agriculture by developing large-scale capital-intensive industrial farms specialised in sugar cane and livestock production. Following Green Revolution principles, Cuba aimed to produce and sell (throughout the CMEA) sugar at highly subsidised prices (51 cents per pound compared with a world market price of 6 cents in 1986) (Alvarez, 2004; González, 2004; Kost, 1998). The government built hundreds of dairy farms, significantly increased the amount of land under sugar cultivation, invested in major irrigation projects, and sponsored massive increases in agrochemical use and mechanisation (González, 2000). In just three decades (between 1959 and 1989), pesticide application grew four-fold, tractor use increased nine-fold and fertilizer use rose ten-fold (Saéz, 1997).

By and large, revolutionary Cuba shifted its 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

CMEA countries during the period 1977-1988 was approximately 80% (Gonzalez, 2003; Decreto Ley 191, 1994; Díaz-Briquets and Pérez-Lopez, 2000, 1998). In 1988 CMEA economies accounted for 98% of Cuba's imported fuels and lubricants, 80% of imported machinery and equipment, 94% of fertilizers, 98% of herbicides and 97% of animal feedstock to maintain the island's industrial model of agricultural production (González, 2003; Díaz-Briquets and Pérez-Lopez, 2000, 1998, 1995; MINAG, 1988). In 1989 whereas CMEA countries purchased the majority of Cuba's exports (including 63% of sugar, 73% of nickel, and 95% of citrus) the island imported 100% of the cereals, 90% of beans and 49% of rice from these economies to cover the island's food requirements (Pastor 1992; Rosset and Benjamin, 1994).

Yet, by the early 1980s Cuba's industrial model of agrarian production began to show its failings (Mesa-Lago, 2009). In the mid 1980s an important proportion of arable land intensively farmed for export-led sugar production began to show signs of environmental degradation and inefficiency. The annual growth rate of agrarian production (in 1,000 tonnes) dropped from 3.5% in 1976-85 to 1.3% throughout the period 1986-89 (González, 2000; Nova, 2006a, 2008a); sugar monoculture and its contribution to agrarian GDP progressively decreased from 84% of total value of exports in 1980 to 75% in 1988 (Fernández-Domínguez, 2005; González, 2000). Beginning in 1986, Cuba's agricultural and livestock activities generally declined and even stagnated. Despite large investments in agriculture (around 30% of total investments in the country during the 1980s), the great availability of tractors and the high use of nutrients per hectare, increasing costs of production and labour force became obvious throughout the 1980s (Nova, 2006a). Ultimately, Cuba's capital-intensive patterns of agrarian development generated extensive soil degradation by imposing 'one-size-fits-all' production guidelines, extremely dependent on CMEA subsidies and trade. These patterns disregarded the unique physical, hydrological, and environmental conditions of Cuba's soils (González, 2004)⁴.

3. THE DRAMATIC SHIFT: TOWARDS INWARD-LOOKING DEVELOPMENT

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

4. Among the most destructive practices were large-scale irrigation in the absence of proper drainages; widespread use of heavy equipment in agriculture, resulting in soil compaction (in 21% of the lands); extreme dependency on chemical inputs also contributed to soil acidification (in 17% of the

to resist the effects of a second blockade provoked by changes in the international order... (Castro, 1992).

With the 1989 collapse of the centrally planned economies of Eastern Europe and the 1991 dissolution of the Soviet Union, Cuba lost both its major overseas markets and its primary source of foreign assistance. The loss of cheap Soviet oil fuelled an energy crisis and the island confronted an economic catastrophe. Cuban foreign trade fell by 75%, economic output dropped 50%, agricultural production dropped in 1994 to 54% of the 1989 levels and food consumption fell 36%. Meanwhile, imports decreased 50% during the period 1990-93, GDP dropped 30%, gross internal investment fell 86% and the fiscal deficit ballooned 158% (Mesa-Lago, 2005; Pastor, 1997; Rosset and Benjamin, 1994). Without credit lines, exports were the only connection to international markets on which the island was so dependent; yet they declined 67% in the early 1990s (Canler, 2000; ONE 1996). The collapse of the sugar sector and its poor prospects further showed the need to diversify agricultural production (Kost, 1998). Added to this, the American economic sanctions become more restrictive. In 1992, overnight, the Cuban Democracy Act (CDA) prohibited sales to Cuba by foreign subsidiaries of American companies, which during the period 1980-1992 alone exported US\$2.6 billion and imported US\$1.9 billion to/from Cuba (Canler, 2000; USCTEC, 1998). In 1996 the Cuban Liberty and Democratic Solidarity Act restricted foreign direct investment flows into Cuba (Canler, 2000).

These events amounted to an economic catastrophe, which as stressed by Canler (2000), was even deeper than the one of the United States during the Great Depression. The worst moment of the crisis occurred during the 1993 food crisis, when daily caloric intake declined from 2,908 to 1,863 kilocalories per day (Alvarez, 2004; Kost, 1998; Mesa-Lago, 2005)⁵. This situation forced the Cuban government to declare the 'Special Period in Peacetime' that put the country on a 'wartime economy style austerity program', implying a dramatic shift from dependent development (on Soviet bloc trade relations) towards domestic opportunities. The program rationed food, fuel, and electricity and gave priority to domestic food production, development of tourism, and biotechnology to open

lands) and contamination of lakes, rivers, and drinking water supplies; these practices ended up causing erosion over 64% of Cuban farming lands, degradation and poor drainage in 41% of the lands and salinization in 12% of the lands (DÍAZ-BRIQUETS and PÉREZ LÓPEZ, 2000; SÁEZ, 1997).

5. It should be noted that the minimum calorie intake recommended by FAO was 2,100- 2,300 kilocal per day. Even more dramatic was the situation of those people most dependent on state rations (very old and very young people). Their levels of kilocalorie intake fall to 1,450 Kcal per day during the worst years of the crisis (ALVAREZ, 2004; KOST, 1998; MESA-LAGO, 2005).

Interview with P. Fernandez, Ministry of Economy and Planning, Cuba, 20 June. 2006.

Interview with Dr. A. Nova, University of Havana, Centre for the Study of the Cuban Economy (CEEC), 27 June. 2006.

new spaces and reactivate Cuba's economy (Castro, 1992; Fernández-Domínguez, 2005)⁶. Monopolisation, deregulation and decentralisation policies were applied to improve the country's desperate foreign exchange position, diversify the economy (especially agriculture) and attract investment into different economic sectors (Alvarez, 2004)⁷. Deregulation, on the one hand, implied a new domestic economic policy based on liberalising foreign investment, the rules governing the possession of US\$ 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 enhanced new forms of mixed companies (joint-ventures) in different economic sectors (specifically in the tourist sector), the restructuring of management institutions and the banking system, and changes in territorial planning and agrarian structures distribution (Alvarez, 2004).

3.1. The pillars of inward-looking development in agriculture (1990-2004)

During the Special Period, Cuba's agriculture faced a difficult dilemma: how to maintain the social goals of the Revolution while feeding the Cuban population without strategic imports from the Socialist block. Considering the real possibilities of an economy extremely reliant on imports, the Cuban government extensively promoted measures to shift to domestic opportunities in order to raise internal production and feed the population (Alvarez, 2004).

This section groups the initiatives that guided the agrarian agenda during the years of the crisis in four groups: food import substitution, replacement of local alternatives (based on family farming) for costly external technology, decentralisation of production and land structures and internal market liberalisation.

3.1.1. Food import substitution

In the late 1980s the gloomy performance of the state agricultural sector (based on high capital investments and a great use of modern inputs) to feed the population was evident to state planners. The Food programme (*Plan Alimentario*) was the last attempt made

6. Interview with Dr. J. Cruz, Facultad de Economía, Universidad de La Habana, Havana, Cuba, 01-15 Nov. 2008.

7. Interview with Dr. J. Cruz, Facultad de Economía, Universidad de La Habana, Havana, Cuba, 01-15 Nov. 2008.

Interview with Dr. A. Nova, University of Havana, Centre for the Study of the Cuban Economy (CEEC), 2 October-27 Nov. 2008.

by the Cuban leadership to solve Cuba's food problems through central planning. Although this plan dates back to the mid-1980s, following the closing of the free farmers' markets, it gained relevance after the food crisis of 1993 (Alvarez, 2004)⁸. According to the Minister of Agriculture Adolfo Díaz, the Food programme was designed not only to maintain 1989 *per capita* daily consumption caloric and protein levels, but also to boost consumption levels for a population estimated to reach 11.1 million by 1995 (Deere *et al.*, 1992). In 1994, encouraged by the commitments that the International Nutrition Conference made in Rome, the Cuban government introduced the new National Programme of Action for Nutrition. Fostering civil participation in agriculture for improving food security, the programme aimed to buffer the consequences of the crisis throughout the island (Companiononi *et al.*, 2002; Enríquez, 2000; PNAN, 1994). The programme fuelled food import substitution with alternative production and consumption patterns to cover Cubans' food needs without strategic imports from the Soviet Bloc.

Following the National Programme of Action for Nutrition mandate on food import substitution, the Cuban government also prompted the urban agriculture programme during the 1990s. To deal with food shortages, imbalances between rural and urban areas, petroleum scarcity and transport difficulties, the programme started in Havana, where 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). Although at the beginning, urban cultivation was a matter of subsistence production, by the mid-1990s the initiative significantly contributed to the country's overall food security (GNAU, 2004). Urban gardens shortly became major sources of fresh vegetables for urban and suburban inhabitants. By 2000 urban agriculture approximately supplied 70% of all of the vegetables, 50% of rice and 39% of non-citrus fruits consumed in Cuba (ANAP, 2001; Sinclair and Thompson, 2001).

3.1.2. Alternative technologies

By the early 1970s, Cuban scientists and research institutions began to focus on the economic implications of substituting local raw materials for imported technologies (Lage, 1992). Conscious of the real failings of the dominant agrarian model during the

8. The general goal of the Food programme was to make Cuba self-sufficient in most agricultural commodities. ENRÍQUEZ (2000) mentions a threefold measure to ensure the success of the program: a) significant expansion in the areas planted; b) to promote higher levels of mechanization, irrigation, and improved seed varieties; and c) mobilisation of thousands of people to work in the food crop sector on either a temporary or permanent basis.

1980s, researchers from the Ministry of Agriculture and various universities began to seek alternative technologies and advanced research and development (R&D) based on family farming (Funes-Monzote, 2006)⁹. Considering pre-1989 technological and alternative agriculture advances, during the 1990s Cuba made a substantial progress in implementing these strategies¹⁰. As Table 1 illustrates, biological pest management, control of plant diseases and weeds, soil management, labour mobilisation and participatory methods for generating new input substitution technology were the main practices introduced during the decade (González, 2000; Rosset and Benjamin, 1994). Within this process, increasing partnerships and the generation and recovery of peasant knowledge were pivotal components in regaining traditional Cuban family farming methods while peasants were encouraged to participate actively in the generation and dissemination of new technologies and domestic food production (Ríos-Labrada, 2006a).

TABLE 1

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: Machín *et al.* (2010).

Machin *et al.*, (2010) stresses the benefits of alternative inputs in Cuba when compared to toxic imported chemicals; the former reduce environmental degradation, toxicity and

9. In the midst of the Special Period these researchers created the Cuban Association of Organic Agriculture (ACAO) to implement sustainable family farming and livestock alternatives. In the late 1990s, the state institutionalised ACAO and sustainable small farming and small-scale initiatives became official policy managed by The Cuba Association of Forestry and Agrarian Technicians (ACTAF) (Funes-Monzote, 2006). In 1999 ACTAF received The Right Livelihood Award. Then the Government recognised the potentialities and achievements of Cuba's sustainable family agriculture by institutionalising ACAO within ACTAF (ACTAF, 2008a; Funes-Monzote, 2006).

10. Interview with Dr. F. Funes, ACTAF, Havana, Cuba, 23-25 June. 2006.

Interview with Dr. F. Funes, ACTAF, Havana, Cuba, 2-15 October. 2008.

Interview with MSc. F. Funes-Monzote, Havana, Cuba, 3-29 June. 2006.

Interview with PhD F. Funes-Monzote, Havana, Cuba, 1 October-29 November. 2008.

associated problems in the ecosystem. Rosset and Moore (1998) further point out the low cost of producing alternative inputs in hard currency compared to imported ones in Cuba. Although alternative inputs obtain long-term results when compared to agrochemicals, integrated agroecological systems are less dependent on imported agrochemicals and present significant synergisms and interactions in the short term. Integrated crops can discourage pests of other associated crops, making unnecessary any additional chemical or biological insecticide (Machin *et al.*, 2010; Rosset, 1997). Agroecological systems also show higher capability to recover degraded resources than industrial systems (Machin *et al.*, 2010; Rosset, 1996; Treto *et al.*, 2002).

3.1.3. Decentralisation of production and land management

An additional response of the Cuban government to food scarcity during the Special Period was agricultural production reorganisation. In order to raise food import substitution, this restructuring process was based on two distinct elements. First, Cuba began a process of breaking up large state farms. The 20th of September of 1993, the Council of State enacted Law-Decree No. 142 by establishing a new form of cooperative (the Basic Unit of Cooperative Production, or UBPC) on previous state farms. Whereas land titles remained with the state, these cooperatives gained the right to use the land and make production and resource decisions. This legislation also aimed at eliminating the state monopoly on 75% of Cuba's agricultural lands. Although the land remained in state hands, it was given in usufruct to the tillers in the newly created cooperatives for an indefinite period of time (Alvarez, 2004; Nova, 2006a). Whereas state enterprises still provide marketing, technical assistance, production services, and agricultural inputs, producers began to sell production surpluses after meeting the contracted monthly quota with *Acopio*, the state food commercialisation company (Kost, 1993). Second, the state distributed land in usufruct to thousands of small producers, state workers and pensioners (González, 2004; Sinclair and Thompson, 2001). Decree Law No. 142 additionally authorised the distribution in usufruct of small, dispersed parcels of land that could not be incorporated into the UBPC sector and also idle lands formerly used to farm tobacco (Deere, 1997).

By 1994 101,588 hectares of land in usufruct had been distributed to family farmers interested in growing tobacco, coffee, cocoa and various crops in free usufruct (see Table 2). More than 55,986 producers acquired these lands with an estimated average area per farmer of 1.8 hectares. Along with the right to self-consumption activities, each family obtained additional hectares to cultivate non-traditional export crops like cocoa, coffee, flowers or tropical fruits; most of them produced in a sustainable way (González, 2000; Nova, 2003, 2006; Villegas, 1999).

TABLE 2
Distribution of usufruct lands in 1994

Crops	Area	Number of beneficiaries	Area per producer (Ha)
Coffee and cocoa	54,806	12,719	4.30
Tobacco	41,602	20,891	2.00
Various crops	5,180	22,376	0.23
TOTAL	101,588	55,986	1.80

Source: Lage (1997); Nova (2006a).

3.1.4. Internal market liberalisation

Since 1959 distribution and marketing of agricultural commodities to the whole population at accessible prices has been the responsibility of the state; except for a brief period (1980-1986) when the previous experiment with free market farmers' markets was carried out¹¹. The tightening circumstances of the Special Period forced the state progressively to liberalise access to inputs, technology, markets and rural funding. On 19 September, 1994 the Council of Ministers enacted 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*, at prices dictated by supply and demand (Álvarez, 2004; Fernández-Domínguez, 2005; Nova, 2006a). Undercutting the black market existent for agriculture goods was one of the objectives that led to this process of internal liberalisation¹². However, the opening of Agricultural Markets aimed to do much more than undercutting the black market. The Decree explicitly stated that their principal goal was to increase national food production. Farmers would be 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). By the spring of 1998 there were more than 300 agricultural markets throughout the island, approximately 65 only in the capital, handling 25-30% of the farm products available to Cuban consumers (Enríquez, 2000; Kost, 1993).

11. The free farmers' markets of the 1980s was based on the hypotheses that less state intervention, the more positive effect on the quantity, quality, and variety of food produced outside the state sector. The rapid response of farmers showed their ability to increase their production in response to market incentives. The poor performance of the state agricultural sector hindered its possibilities to meet national food demands. To a large extent, however, the portion of production by the non-state sector transferred to the state's procurement system allowed the government to distribute rationed quotas to consumers. Only the remaining production was available for sell in the free farmers' markets (ENRIQUEZ, 2000).

12. Given increasingly limited supply of goods available through official channels during the 1990s, almost all urban consumers were forced to go to unofficial channels to get a minimum supply of basic foods. At the same time, 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 means to get manufactured goods at inflated prices (ENRIQUEZ, 2000).

Prompting more flexible commercialisation and price systems, state policy also introduced the official law on prices in 1994, different methods of hard currency attraction to boost non-traditional crops and a slightly relaxed and redesigned *Acopio* price system (González, 2000; Nova, 2006a)¹³. Finally, financial mechanisms available for agriculture were further decentralised (Álvarez, 2004; González, 2000; Nova, 2006a). Yet, it was not until 1993 that foreign investors entered agriculture. Although foreign investment in agriculture has been relatively small, some associations have been created for citrus, tobacco, sugar, and rice since the early 1990s (Kost, 1993). In 1994, Israeli investors were partaking 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).

3.2. Further decentralisation and liberalisation since the early 2000s

Estamos ante el imperativo de hacer producir más la tierra... para lograr ese objetivo habrá que introducir los cambios estructurales y de concepto que resulten necesarios, para hacer producir más la tierra, a fin de aumentar la disponibilidad de alimentos y reducir las importaciones (Raúl Castro, 2008).

Although agricultural reforms of the early 1990s went only half-way in Cuba, partial openings introduced in 1993-1994 led to a rapid increase in food production and marketing channels (Nova, 2006a, 2008a). Market mechanisms and the decreasing interference from government entities showed fast, even if partial, results (Gayoso, 2009). Yet, Nova (2008a) and Cruz (2008) argue that Cuba's inward-looking development still needs to liberalise commercialisation and prices further, and decentralise production and landholding structures to enhance national food production. They also point out that since the early 2000s Cuba has undertaken a second era of agricultural transformation to respond to both internal constraints (specifically national food insecurity, worsened by the three hurricanes in 2005 and 2008) and external changing conditions, including the world food crisis in 2007-2008¹⁴.

13. Acopio, the state commercialisation company, controls 90% of agricultural commercialisation, distribution and food supply in Cuba.

14. Interview with Dr. J. Cruz, Facultad de Economía, Universidad de La Habana, Havana, Cuba, 01-15 Nov. 2008.

Interview with G. Betancourt, INIE, Havana, Cuba, 15 October-25 Nov. 2008.

Interview with Dr. A. Nova, University of Havana, Centre for the Study of the Cuban Economy (CEEC), 2 October-27 Nov. 2008.

Since December 2006, there has been explicit recognition by Cuba's government that significant structural change in the economy, particularly the agricultural sector, must be undertaken to solve food shortages (Gayoso, 2009, 2008). In 2008 the President of the National Association of Small Farmers (ANAP), Orlando Lugo, announced two parallel measures. First, the so-called Decree-law 259 to distribute idle lands under long-term usufruct contracts, to 'anyone who wants to produce' (especially individuals, cooperatives, small farmers and even some UBPCs) and making specific mention for tobacco and coffee (Granma, 18 July 2008). With 51% of land idle, insufficiently exploited and covered by *marabou* in 2008, this decision seemed to be directed at revitalizing the agricultural sector, particularly food production¹⁵. Contracts would last 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 a similar period if recipients have been successful in operating the land according to government regulations (Gayoso, 2008)¹⁶. Second, Lugo also declared the creation of agricultural delegations in all municipalities to decentralise decision-making and use appropriate (more deregulated) marketing techniques. This should enable UBPC and small farmers to commercialise their products directly in nearby communities and reduce *Acopio* control over production and commercialisation (Mesa-Lago, 2008)¹⁷.

From the second half of 2009 onwards, clearly linked the application of Decree-Law No. 259 state policy have advanced the so-called Suburban Agriculture (*Agricultura Suburbana*) programme (Carrobello, 2010; MINAG, 2010). While the idea of the Suburban Agriculture plan may indeed have come from the experience of the Urban Agriculture (*Agricultura Urbana*) created in the 1990s and shares some of its goals and characteristics, (e.g high labour intensity), the two alternatives are as distinct as urban and rural areas, horticulture and agriculture (Rodríguez Castellón, 2003). The basic structural model of *Agricultura Suburbana* is the *finca*, a small farm, most often in private hands,

15. Marabou is a difficult to eradicate deep root variety of acacia, not usable for any productive purpose.

16. Decree-Law No. 259 of 10 July 2008 was enacted to distribute 'a considerable percentage of idle state lands which makes it necessary to grant lands in usufruct to individuals and corporate bodies in order to increase food production of food and reduce its importation.' Accordingly, it was decreed that landless individuals could obtain up to 13.42 Ha and existing landholders could bring their total area up to 40.26 Ha under licenses valid for up to 10 years and successively renewable for the same period. Existing state farms, cooperatives and other legal entities could apply for the usufruct of an unlimited area for 25 years, renewable for another 25 years. Usufructs granted to individuals were transferable only exceptionally, because of age or disease to another person working on that land and authorised by the pertinent authorities (GAYOSO, 2008).

17. Interview with Ing. X. Acosta, Civil Servant, Project manager, ANAP, Cuba, 10 Nov. 2008. Interview with G. Betancourt, INIE, Havana, Cuba, 15 October-25 Nov. 2008.

located in an eight-kilometre-deep ring between two and ten kilometres from urban centres. The sub-urban *finca* responds to a new impulse of distributing idle lands to private producers and cooperatives to improve food supply from nearby crop and livestock farmers (mostly reliant on animal power) and transportation (Carrobello, 2010).

Finally, internal liberalisation has been broadened by including payments in hard currency (in an incipient phase since 2008) and improvement of logistic support¹⁸. In 2005-2006 a new estimation of *Acopio* prices based on The National Association of Small Farmers' previsions on production costs and prices was introduced¹⁹; in 2007 incentives to increase the price of milk that the government buys 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 agricultural sector have been also taken²⁰. Murillo Jorge announced in 2010 that the government would organise the creation in the majority of the municipalities throughout the island of an input market where producers could directly obtain the resources required for agriculture and livestock production, replacing existing central allocation mechanisms. The price policy governing this market must guarantee the real costs of production and the elimination of the great number of subsidies that the state currently pays through the budget (Hagelberg, 2010).

4. KEY TRANSFORMATIONS IN CUBA'S AGRICULTURE: TOWARDS SUSTAINABLE FAMILY FARMING

4.1. Changes in production patterns

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 the lack of extensive mechanisation. In this context, as stressed by Rosset (1996), Cuba undertook the largest conversion from conventional high-input chemical agriculture to organic or semi-organic farming in human history. A certain amount of research conducted in Cuba during the 1980s was aimed at reducing production costs in industrial agriculture

18. Interview with P. Fernandez, Ministry of Economy and Planning, Cuba, 27 November. 2008.

19. Interview with Ing. X. Acosta, Civil Servant, Project manager, ANAP, Cuba, 10 Nov. 2008.

Interview with G. Betancourt, INIE, Havana, Cuba, 15 October-25 Nov. 2008.

20. Interview with P. Fernandez, Ministry of Economy and Planning, Cuba, 27 November. 2008.

Interview with G. Betancourt, INIE, Havana, Cuba, 15 October-25 Nov. 2008.

through the substitution of biological inputs for agro-chemicals. Preliminary research and traditional family farming techniques in Cuba were the basis for scaling up the application of ecological practices when no other alternatives were available. This eventually occurred during the Special Period (Funes-Monzote, 2008; Rosset and Benjamin, 1994)²¹.

4.1.1. Biological pest control and soil management

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) worldwide (Rosset and Benjamin, 1994). Although Cuba only represents 2% of Latin America's population, the island comprises 11% of the region's scientists (Rosset and Benjamin, 1994). Prior investments in science, education, and agricultural research and development demonstrated to be a great asset during the years of the crisis (Rosset, 1996, 1997). Influenced by the international environmental movement, during the early 1980s Cuban agriculture scientists, aware of the long term consequences of monoculture, began to shift towards an integrated pest management (IPM) paradigm (the integrated use of a variety of alternative pest, disease and weed control tactics) in order to reduce reliance on agrochemicals (Funes-Monzote, 2006, 2008a; Rosset and Benjamin, 1994). In 1985, 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 these efforts enabled a reduction in pesticides application, in 1991 Cuba still imported US\$80 million in pesticides annually. However, soon after, these imports dropped by US\$30 million, speeding up the extensive application of alternative biological practices (Funes *et al.*, 2002). By the end of 1991, MINAG (1991) estimated that 56% of Cuban crop land was treated with biological controls, representing an annual savings, after costs, of US\$15.6 million. Progressively, integrated pest management was extended, covering over one million hectares in the non-sugar sector by 1999 (Pérez and Vázquez, 2002). In a 15-year period the use of pesticides on cash crops was reduced twenty-fold, dropping from 20Gg in 1989 to around 1Gg in 2004 (Funes-Monzote, 2008; Granma Internacional, 26 November 2004).

21. There are three stages in the process of converting from conventional to sustainable agro-ecosystems. At level 1, farmers 'increase the efficiency of conventional practices'. At level 2 they '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 (GLIESSMAN, 2001, 2006).

An additional challenge in the context of the crisis was soil fertility. To fill the void of declining fertilizer availability (which dropped 80% after 1989), local alternatives were required to obtain plant nutrients from organic sources. To this end, Cuba responded with a biofertiliser programme that by 1992 made up 30% of the deficit (MINAG, 1992). Recycled organic waste along with other biofertilisers like nitrogen fixing bacteria, earthworm humus, quarried minerals and peat helped to replace imported fertilisers. For instance, *rhizobium* bacterium was applied on legume crops to obtain nitrogen from the atmosphere. With the passage of time, the Institute for Research in Soil and Fertilisers laboratory in Havana produced enough *rhizobium inoculum* for the whole nation, providing up to 80% of the nitrogen required by leguminous crops (Funes-Monote, 2008). More unique to Cuba was the commercial use of the free-living nitrogen-fixer bacterium *azotobacter* applied to supply nitrogen to many non-legume crops. *Azotobacter* offered additional advantages of shorter crop production cycles and reduced blossom drop, helping Cubans to achieve a reported 30-40% increase in yields of maize, cassava, rice, and other vegetables (Rosset and Benjamin, 1994). By 1991, the Institute for Research in Soil and Fertilisers was producing 5 million litres of liquid *azotobacter*. This organic fertilizer has been applied to leaves or soils, providing 40-50% of the nitrogen needed by non-leguminous plants (Funes *et al.*, 2002; MINAG, 1991; Treto *et al.* 2002).

TABLE 3
Use of biofertilizers in Cuba's agriculture in 1995

Biofertilizers	Crops	Substitution
<i>Rhizobium</i>	Beans, Maní and vignas	75-80% of nitrogenous fertilizer
<i>Bradyrhizobium</i>	Soya and leguminous forages	80% of nitrogenous fertilizer
<i>Azobacter</i>	Vegetables, yucca, sweet potato, maize, rice	15-50% of nitrogenous fertilizer
<i>Azospirillum</i>	Rice	25% of nitrogenous fertilizer
<i>Fosfobacteria</i>	Vegetables, yucca, sweet potato, citrus and coffee nursery	50-100% of phosphorous fertilizer
<i>Micorrizas VA</i>	coffee nursery	30% of potassium and nitrogenous fertilizer

Source: Martínez Viera and Hernández (1995).

Table 3 shows the benefits of different biological fertilizers like *rhizobium* application in beans, which in 1995 substituted 75-80% of nitrogenous fertilizer; *bradyrhizobium* introduced in soya and leguminous forages demonstrated a 80% substitution of nitrogenous fertilizers; *azospirillumon* application in rice productions obtained a 25% substitution of nitrogenous fertilizer; *fosfobacteria* use on vegetables, yucca, sweet potato, citrus and coffee nursery substituted between 50% and 100% of phosphorus fertilizers the same year (Martínez Viera and Hernández, 1995).

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. The Cuban government planned to produce 18 tonnes of *vesicular arbuscular mycorrhizae* material for commercial purposes in 1993 (Funes *et al.*, 2002; Martínez Viera and Hernández, 1995). As Table 4 indicates, by 1995 *micorrizas VA* on coffee nursery was able to replace 30% of potassium and nitrogenous fertilizers (Martínez Viera and Hernández, 1995). Similarly, the substitution of worm humus for chemical fertilizers increased yields by 12-46% for various crops (Funes-Monzote, 2008). In the case of potato, earthworm humus with a dose of 5 tonnes per hectare obtained a reduction between 25% and 50% of mineral fertilisation. Outstanding results also showed tobacco with a reduction of 65% of mineral fertilisation, banana with a drop of 50%, garlic with a 100% reduction of mineral fertilisation and onion that obtained between 25% and 50% reduction of mineral fertilisation (Gandarilla, 1992)²².

TABLE 4

Earthworm humus applied to different crops in specific soil types

Crop	Doses (T/Ha)	Reduction of mineral fertilisation (%)
Potato	5	25-50
Tobacco	4	65 (Phosphorous and potassium)
Banana	10	50
Tomato	4	25-50
Garlic	4	100 (nitrogenous)
Onion	4	50-75
Pepper	4	25
Sweet potato	4	25

Source: Gandarilla (1992).

Given the desperate foreign exchange position of Cuba during the crisis and the lack of strategic imported inputs significantly cut governmental expenditures, in the context of the crisis, the aforementioned biofertilizers and biological pest control presented more

22. During the 1990s intercropping and reforestation were revived to diversify crop production and improve soil fertility and management (ROSSET and BENJAMIN, 1994). The island also began in the early 1990s to recycle its waste products on a massive scale, including household garbage, composted livestock and human waste. Wastewater was employed to irrigate cane fields; filter press cake (a by-product high in phosphorous, potassium, and calcium) served as fertilizer; bagasse, or dry pulp, was fed to livestock and burned to generate electricity for machinery in many sugar mills (ROSSET, 1996, 1997).

viable solutions. They presented lower costs than imported chemical inputs paid in hard currency. As shown by Table 5, whereas the cost of total bio-preparations in 1994 was US\$84,596 the charge of imported synthetic insecticides totalled US\$6,148,345. Prior to 1989 the most common pesticide used in Cuba was methyl parathion (one of the most toxic pesticides in the world). By the end of 1991, an estimated 56% of Cuban cropland was treated with such biological controls, representing savings of US\$15.6 million per year (Gellerman, 1996; Rosset and Benjamin, 1994).

TABLE 5

Cost of application of different entomo-pathogens and synthetic pesticides (in US\$)				
Crops	Bio-preparations	US\$ (1\$=24pesos)	Insecticides	US\$
Vegetables	B. thuringiensis	20,893	Thiodan	1,622,253
Various Crops	B. thuringiensis	10,138	Carbaryl	800,521
Pastures	B. thuringiensis	2,460	Carbaryl	397,613
Various crops	V. lecanii	2,252	Tamaron	431,788
Banana	B. bassiana	5,588	Carbofuran	1,680,760
Sweet potato	B. bassiana	36,619	Tamaron	926,790
Rice	M. anisopiae	3,345	Carbofuran	247,245
Banana	P. lilacinus	3,301	Carbofuran	41,375
TOTAL		84,596		6,148,345

Source: Maura (1994).

Although biological fertilizers and pesticides based on small farming were a necessary response during the Special Period, a fourfold reality cannot be underestimated. First, the great amount of autochthonous research and development advanced in Cuba throughout the 1990s and early 2000s. Second, the decreasing costs of these bio-preparations compared to imported ones as well as the low dependency on imported chemicals and technologies. Third, the sustainable environmental impact of these bio-pesticides and bio-fertilizers compared to industrial agriculture. Fourth, these practices are more appropriate to produce on a small scale. During the Special Period whereas state farms became extremely vulnerable to pests and disease *campesinos* quickly adapted to new technologies. Many small farmers belong to generations of peasants with long family and community traditions of low-input farming (e.g. intercropping and manuring). Even before the nationwide emphasis on organic agriculture in the 1990s, these small farmers had proven their efficiency: working only 20% of the land they produced more than 40% of domestic food (Rosset, 1996).

4.1.2. Mobilising Labour

The Classical Model imposed extensive mechanisation in Cuba's agriculture, increasing nine-fold tractor use during the period 1959-1989. In 1990, Cuba's agriculture presented the highest level of mechanisation in Latin America; the island had one tractor for every forty-three hectares of cultivated land and the number of tractors was almost 90,000, with annual imports of 5,000 (González, 2004; Saéz, 1997). However, the tightening circumstances after the socialist demise in 1989 affected the number of tractors in operation. They dropped dramatically due to the lack of spare parts, maintenance, and fuel to keep them working. Added to this, alternative farming practices in Cuba were underpinned upon traditional farming in two fundamental ways: agrodiversity and the small-scale and intensive use of labour and land space (Brookfield *et al.*, 1994; Sáez, 1997). These developments created the conditions for increasing labour demand and animal traction during the Special Period (Rosset and Benjamin, 1994). Facing new labour requirements of inward-looking development, Cuba responded in several ways.

First, one of the most striking changes in the agricultural landscape during the years of the crisis was the return to the use of oxen. Despite being more labour-intensive, oxen traction provided advantages, especially suited to small farming. Oxen were cheaper to operate, did not compact the soils, could be used in the wet season long before tractors, and their fodder provided organic fertiliser. At the same time, oxen teams offered effective mechanical control of weeds and serve as a substitute for herbicides (Funes-Monzote, 2008). Developing new oxen-powered plows, planters, and cultivators, the government encouraged oxen breeding programs to expand the herd (Rosset, 1996). As Table 6 shows, during the period 1990-1997 the use of oxen increased from 163,000 to 400,000 (Funes *et al.*, 2002; Ríos and Aguerrebere, 1998).

TABLE 6

Number of tractors and work animals, 1989-1997

Energy source	1989	1997
Tractors	85,000	73,000
Oxen	163,000	400,000
Horses	235,000	282,000
Mules	30,000	32,000

Source: Ríos and Aguerrebere (1998).

However, the use of oxen proved to be more appropriate for traditional small to mid-size farming systems than for large-scale monoculture (Funes-Monzote, 2008). As indicated by Table 7, the distribution of oxen in different agriculture sectors showed a significant

relationship between the type of productive structure and oxen traction application. Although small farmers (grouped in CCS) and individual peasants only had 15% of the land in 1997 they comprised 78% of oxen teams (see Table 7). By contrast, the state sector (still highly dependent on tractors) and cooperative forms of production (UBPC and CPA) only comprised 22% of oxen with 85% of farming land the same year (MINAG, 1997; Ríos and Aguerrebere, 1998). Tradition partly explains the permanence of oxen teams in peasant communities throughout the island during the 1970s and 1980s. In provinces with traditional agriculture models like Pinar del Río, small farming productions such as tobacco were extensively based on animal traction. Different farming tasks developed with oxen teams guaranteed the quality of tobacco leaves. These sort of traditional farming systems were the corner stone of animal traction revival during the years of the crisis (Ponce, 1996; Ríos and Ponce, 2002).

TABLE 7

Number of oxen employed in different sectors in 1997

Sector	Number	Percentage
State	40,000	10%
CPA	16,000	4%
CCS and individual peasants	312,000	78%
UBPC	32,000	8%
TOTAL	400,000	100%

Source: MINAG (1997); Ríos and Aguerrebere (1998).

Second, to cover much higher labour requirements of alternative practices during the Special Period, the governmental prompted temporary labour camps in the countryside. These camps accommodated workers who volunteered their labour for different periods varying from two weeks to two years. In 1991, the first year of two-week volunteer mobilisations, over 146,000 inhabitants of Havana engaged in these activities (MINAG, 1991). Two-year volunteers, on the other hand, were organised in work brigades called contingents. They often worked 12 hours per day and received higher salaries and above-average living conditions than in urban areas (Rosset and Benjamin, 1994). Following these developments during the 1990s and early 2000s, the state promoted food import substitution throughout the repopulation of rural areas and the rescue of traditional small farming. By offering moral and material incentives and creating more land attachment and rural life revitalisation, the state tried to return people to the countryside and reactivate small farming sector and alternative practices throughout the island²³.

23. Interview with Jesús Suárez, University of Matanzas, Cuba, 12 June. 2006.

4.2. Changes in Cuba's land structure: towards small farming structures

4.2.1. Cuba's land structure in the early 2000s

During the 1990s and early 2000s inward-looking development policies introduced important modifications on Cuba's land tenure. State farms were broken into smaller scale farms (UBPCs), the agricultural sector was opened to foreign investment (in joint ventures with the state) and unused lands were distributed in usufruct to new farmers. These changes broadened Cuba's land tenure matrix, generating a mixed economy based on ten different types of land organisations grouped in the state sector, the non-state sector, and the mixed sector (Alvarez, 2002; Figueroa Albelo, 1995, 2005; Martín, 2002). As illustrated by Table 8, state sector groups state farms, new-types of state farms, Revolutionary Army Forces farms and self-provisioning areas at workplaces and public institutions. The mixed sector is composed by state companies associated with foreign capital in the citrus sector and funding associated to specific productions (rice, cotton or tomato). This type of association is still made by the state, maintaining its role of socioeconomic regulator (Martín, 2002, 2007). Finally, the non-state sector is composed by two types of production entities: collective (UBPC and CPA) and individual production units (CCS and individual farmers).

TABLE 8
Organisation of Cuban agriculture

State sector	Non-state sector	Mixed sector
State farms	Collective production	Joint ventures between state and foreign capital
New-type State farms (GENT)	UBPC	
Revolutionary Armed Forces (FAR) farms, including farms of the Young Workers' Army (EJT) and the Ministry of the Interior (MININT)	CPA (Cooperative of Agriculture Production)	
Self-provisioning farms at workplaces and public institutions	Individual Production CCS (Cooperative of Credit and Services) Individual farmers, in usufruct Individual farmers, private property	

Source: Martín (2002).

Regarding the non-state sector, as shown by Table 9 Cooperatives of Agriculture Production (CPA) and Basic Units of Cooperative production (UBPC) are collective forms of production. UBPC are basically former state farms divided into smaller forms of production after the implementation of land reform Law in 1993. CPA and Credit and Serv-

ice Cooperatives (CCS) group small farmers. CPA is a voluntary association of traditional peasants that jointly work the land while management decisions are made through democratic processes within the cooperative (Martín, 2002; ONE, 1997). Credit and Service Cooperatives (CCS) on the other hand, are individual forms of production that group former renters, sharecroppers, agrarian workers and small farmers. These individuals own the land but engage in cooperatives to access services and credit, purchase inputs, and sell their produce; though production itself remains individual. They may also share certain machinery and equipment, especially in the case of ‘Strengthened CCSs’²⁴. CCS members purchase inputs and sell products at fixed prices through state agencies, based on production plans and contracts established under state distribution systems. Yet, they can sell any production above and beyond the contracted quantity in the farmers’ markets at free market prices (Alvarez, 2002; ANAP, 2008; Martín, 2002, 2007; ONE, 1997).

TABLE 9
Non-State sector in Cuba

Non-state sector STRUCTURE	ORIGIN	LAND AND RESOURCES
CPA	Farmers own the land	Voluntary association and delivery of land
CCS	Renters, agrarian workers, sharecroppers, owners	Private lands
UBPC	Former state farms	Collective usufruct of land. They buy the tools, animals etc.
LAND IN USUFRUCT IN THE RURAL SECTOR	State owned areas: coffee, cacao and tobacco.	Usufruct: state owned lands
URBAN AGRICULTURE	Courtyards, roofs, balconies, urban or semi-urban plots	Private land or in usufruct. They use organic methods.

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

Finally, usufruct farmers also belong to individual production structures. They appeared after the 1993 distribution of lands in usufruct to individuals working different plots in permanent and free usufruct to farm tobacco, coffee and cocoa. Within this group, there are small urban and suburban farmers cultivating small plots (of approximately 0.25hectares) in usufruct to produce food for their families and sell the surpluses in local markets (Martín, 2002). By 1996 the number of these so-called *usufructuarios* reached 43,015 farmers (Lage,1997). There is also a group of private, unaffiliated farmers (about 20,000 small producers) that own over 1% of the agrarian land (about 66,100 hectares) (Martín, 2002, 2007).

24. Interview with Ing. X. Acosta, Civil Servant, Project manager, ANAP, Cuba, 10 Nov. 2008. Strengthened CCS were created by The National Association of Small Farmers in 1998 as an attempt to improve production structures, labour organisation and increase average yield.

4.2.2. Changes in the use of land and agrarian structures (1993-2008)

Throughout the 1990s the transformation of Cuban landownership structure progressed quickly; UBPC rapidly came to predominate; between 1993 and 1997, approximately 2,856 UBPCs were created; by January 1995, the state had granted usufruct rights to 58% of the arable land it had controlled at the beginning of 1990²⁵. In 1997, UBPCs comprised 42% of the agriculture sector while state farms dropped by 33% (Pérez-Villanueva *et al.*, 2004). During a five-year period, approximately 150,000 workers (formerly employees of state farms) were integrated in the UBPC sector (Pérez-Rojas *et al.*, 1999). These non-state units (UBPC) were underpinned on self-management, self-sufficiency and diversification of landholding structures, including new actors on the agricultural scene (Pérez-Villanueva *et al.*, 2004). Fostering the attachment of man to the land (*vinculando el hombre a la tierra*) the state aimed at improving labour opportunities and defining individual and collective responsibilities within the UBPC sector, two major problems found in former state farms. Placing special emphasis on collective self-provisioning of associates and their families, UBPC promoted better housing and infrastructures and a rigorous attachment of workers' incomes to production results during the difficult circumstances of the Special Period (Enríquez, 2000; Funes-Monzote, 2008). At the same time, the reduced scale of UBPC improved the management of natural resources. Given UBPC's degree of diversification and more rational use of inputs, machinery, and infrastructure, these mixed structures helped to mitigate the losses in external inputs and capital during the Special Period (Funes *et al.*, 2002, Funes-Monzote, 2008; Nova, 2006a).

TABLE 10
Changes in Cuba's Land Distribution, 1992-2008
(in Percentage terms)

Years	State owned sector	Not state owned	UBPC	CPA	PRIVATE AND CCS
1992	75.0	25.0	0	10.0	15.0
2004	34.5	65.4	38.9	8.9	17.6
2008	23.2	76.8	39.8	10.2	26.8

Source: ONE (1990, 2007).

These developments extensively transformed Cuba's land distribution. Throughout the period 1992-2008 the state owned sector dropped from 75% to 23.2% while non-state

25. At that time the State controlled 83% of total arable land.

farms (UBPC, CPA, private and CCS) increased up to 50% (ONE, 2007). Specifically, in 2008 UBPC comprised 39.8% of total forms of production in Cuba; CPA slightly increased from 10% in 1992 to 10.2% in 2008; and CCS and private forms of production almost doubled from 15% in 1992 to 26.8% in 2008 (see Table 10).

This process of decentralisation clearly affected the use of land throughout the island. During the period 1989–2007 cultivated land decreased in all forms of tenancy, with the exception of CCS and individual farmers²⁶. As Table 11 indicates, total agricultural land experienced a compound annual rate of growth of -0.12% from 1989 to 2007; cultivated land dropped 2.13% whereas pasture and idle lands experienced positive compound annual rate of growth during the same period (1.33% and 5.47% respectively) (Hagelberg and Alvarez, 2007, 2009). In the state sector, agriculture, cultivated and pasture lands decreased (-4.09%, -8.5% and -0.92%) whereas idle lands increased 3.28% from 1989 to 2007. Similarly, CPA experienced declining trends in agriculture, cultivated and pasture lands (-1.5%, -2.12% and -1.5% respectively), increasing the amount of idle lands (2.34%). By contrast, CCS and private forms of production were the only production unit that experienced a decline in the number of idle land (-0.52%), showing positive compound annual rate of growth in agriculture and cultivated land throughout the same period (1.25% and 2.42%) (Hagelberg and Alvarez, 2009; ONE, 1990, 2008).

By and large, Tables 10 and 11 illustrate the substantial number of land transfers between sectors after the creation of the UBPC sector. As Table 12 shows, this process represented an approximate reduction of ten-fold the size of large mixed-crop enterprises, twenty-fold the size of livestock enterprises, five-fold the size of rice enterprises and one hundred and seventy-fold the size of citrus and fruits companies, reaching all of them a size similar to that of CPA (Nova, 2003; Villegas 1999). This strategy of dividing land into smaller plots within the mixed sector (UBPC) sector eventually implied the state acknowledgment of the greater efficiency of production at a smaller scale in Cuba. In this context, the performance of CPA was the model to project and shape the UBPC sector. The positive returns (Tonnes/Ha) of CPA during the 1980s demonstrated the solidity of these entities. Although sugar cane CPA showed decreasing returns during the 1980s, CPA generally accomplished better returns and organisation patterns than any other collective entity in Cuba (Funes *et al.*, 2002; Funes-Monzote, 2008; Nova, 2006a). From 1992 to 1996, the worst years of the crisis, the number of non-sugar cane CPA with increasing returns (tonnes/Ha) went up from 83 to 85; in the case of roots and vegetables they increased from 87 to 91 (Nova, 2006a).

26. Cultivated land area is the area planted, in preparation, or resting or awaiting preparation for planting and including tracks, ditches and headlands less than six meters wide.

TABLE 11
Land Areas by Type and Tenancy, 1989-2007 (1,000 ha)

	1989	2007	Compound annual rate of growth (CARG) (1989-2007) (%)
TOTAL			
Agricultural	6,772.0	6,619.5	-0.12%
Cultivated	4,410.4	2,988.5	-2.13%
Pasture	1,889.1	2,398.2	1.33%
Idle	472.5	1,232.8	5.47%
STATE			
Agricultural	5,032.5	2,371.2	-4.09%
Cultivated	3,441.4	694.4	-8.5%
Pasture	1,240.4	1,049.8	-0.92%
Idle	350.7	627.6	3.28%
UBPC			
Agricultural	n.a.	2,448.8	
Cultivated	n.a.	1,189.9	
Pasture	n.a.	792.9	
Idle	n.a.	465.4	
CPA			
Agricultural	769.8	585.8	-1.5%
Cultivated	449.4	305.3	-2.12%
Pasture	272.0	207.1	-1.5%
Idle	48.4	73.4	2.34
CCS AND PRIVATE			
Agricultural	969.7	1,214.3	1.25%
Cultivated	519.6	799.1	2.42%
Pasture	376.7	348.4	-0.43%
Idle	73.4	66.8	-0.52%

Source: Hagelber and Alvarez, (2009). Calculated from ONE (1990, 2008).

Sector columns may not add up to 100% due to rounding.

TABLE 12
Average size (Ha) of State enterprises, UBPC and CPA, 1989-1994

Main activity	State enterprises 1989	UBPC 1994	CPA 1994
Various crops*	4,300	416	483
Citrus and fruit	17,400	101	577
Coffee	—	429	470
Tobacco	3,100	232	510
Rice	27,200	5,040	—
Cattle	28,000	1,597	631

*Tubers, roots, vegetables, plantain, grains and seeds (beans, corn, soybean, sunflower, sesame, etc.).

Source: Funes-Monzote (2008); PNAN (1994).

However, the gap between the private sector and CPAs widened in the late 1990s and early 2000s, suggesting that this type of collective organisation were less able to adapt to difficult economic conditions during the years of the crisis than private forms of production (e.g. CCS) (Hagelberg and Alvarez, 2009; Pérez Cabrera, 2009, 2010). According to Figueroa Albelo *et al.* (2006) CPA became weaker during the second half of the 1990s, losing efficiency and internal cohesion. In practice, sugarcane occupied a much smaller proportion of private sector land and, consequently, reduced private farmers' exposure to government sugar policies during the 1990s. More importantly, the CPA model provided for collective self-consumption did not leave room for individual units, while the economic and food crisis of the 1990s reinforced individual forms of production (Figueroa Albelo, 2006).

In summary, three developments stand out in the evolution of Cuba's land structure from the early 1990s to 2008. First, UBPC, though they currently face many problems, at least represent a substantial improvement over large state farms in Cuba. They essentially identified mechanisms favouring the transition to decentralised production that tends to imitate the values, efficiency, and potential of traditional *campesino* production (Funes-Monzote, 2008). Second, Cuba showed a reduction by almost one third in the total cultivated land area, and a two-and-a-half-fold overall increase in idle land, particularly notorious in state and collective forms of production. Third, whereas CPA declined by nearly 25% in terms of agricultural land, the agricultural land owned or leased by private farmers grew 25% (Halgerberg and Alvarez, 2007, 2009).

4.2.3. Recent developments on land decentralisation (2008-2010)

The gradual expansion of the agricultural land owned or leased by private operators that took place between 1990 and 2008 was clearly enlarged by the structural change in land tenancy prompted by Decree-Law No. 259 in 2008. Although it is too soon to evaluate the impact of the Decree-Law No.259, official data show that the non-state shares in crop areas harvested and in production in seven out of eight categories show higher levels in 2009 than in 2008 (Hagelberg and Alvarez, 2009; Hagelberg, 2010). Taken as a whole, the total area harvested and in production of non-sugar crops increased by 28% from 2008 to 2009 (ONE, 2010). The expansion of the non-state share was higher in 2009 than 2008, experiencing an increase of 32.7% (Hagelberg, 2010; ONE, 2010).

As cited in Hagelberg and Alvarez (2009) no detailed statistics of operations under Decree-Law No. 259 seem to have been published since the mid-2009. Yet, Raúl Castro informed the National Assembly towards the end of 2009 that around 920,000 hectares had been transferred to more than 100,000 beneficiaries, which represented 54% of the to-

tal idle area (González, 2009, Saéz Chávez, 2009). This would put the magnitude of the total idle area at the outset at 1.7 million hectares. Almost five months later the Minister of Economy and Planning, Marino Murillo Jorge, gave the congress of the National Association of Small Farmers (ANAP) the same figure of 920,000 hectares as the land transferred under Decree-Law No. 259, adding that around half of the areas so assigned remained idle or insufficiently exploited (Granma, 17 May 2010). At the beginning of 2010, clearly linked to the application of Decree-Law No. 259, the so-called Suburban Agriculture program has been introduced in 18 municipalities. According to ANAP president Orlando Lugo Fonte the programme would be progressively extended to some 600,000 hectares across the whole country (Bosch, 2010).

In short, at the end of the first four years of Raúl Castro's administration, the structural change worth mentioning in agriculture is the mass grant in usufruct of idle state land, mainly to small farmers and landless. Although these transfers are surrounded by conditions, Decree-Law No. 259 of 10 July 2008 later connected to suburban agriculture development is highly revisionist in concept. It represents more clearly the conversion of state farms into individual production units than UBPCs in 1993. These developments also represent the abandonment of the long-held Cuban doctrine of the superiority of state large-scale mechanised agriculture reliant on hired labour and imported inputs and the prominence of private small farming throughout the island (Hagelberg, 2010).

5. CONCLUSIONS

Though they said we were a satellite of the Soviets, our planet has disappeared and we are still here circling around. (Cuban officials interviewed by Rosset and Benjamin, 1994: 8).

In the midst of the most severe crisis in its history, Cuba dramatically shifted from 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 has become one of the few countries, if not the only one, that has experimented with this type of inward-looking development.

This paper discussed the set of agrarian policies implemented in Cuba during the 1990s and early 2000s under the inward-looking paradigm, exploring to what degree these policies introduced changing production patterns (such as improved techniques for soil management, crop rotation and crop/animal integration, application of animal manures,

composting, green manures, and the use of animal traction instead of heavy machinery) and land ownership decentralisation throughout the island. Accordingly this article suggests the superiority of private small farmers to produce food for national consumption during the years of the crisis. Despite Cuba's exceptional history, geography, climate and political system, this paper argues that its experience of inward-looking development in the 1990s and 2000s raises important points that should be considered when designing national and international policy in small economies and discussing the future of small farmers in the era of globalisation, which can be summarised as follows:

1. While in other regions similar strategies of sustainable rural development are mere pilot projects rarely acknowledged by official policy, in Cuba these initiatives represent official agrarian policy (Pretty, 2002). So far, what Cubans have achieved under conditions of adversity deserves special attention and in-depth understanding. An increasing number of small farmers abandoned the conventional production model, developing avant-garde biotechnology and supplying their members and neighbours with organic alternatives for poisonous pesticides, chemical fertilisers, animal feedstuffs and expensive technologies imported from Western countries (Rosset and Benjamin, 1994; Wright, 2005).

2. As a result of trade liberalisation since the 1980s, in most Latin American countries (e.g. Costa Rica) land is highly controlled by TNCs and large producers, while many smallholders have commonly been cut off from their lands, now devoted to NTAEs dependent on expensive and polluting inputs. These developments have also led to dismantle basic grains production and producers, replacing these crops with lesser quality (and artificially cheapened) food imports. From an opposite angle, this chapter describes how practices in the current context of globalisation the Cuban experience has promoted the revival of peasant farming based on food self-sufficiency and organic practices (linked to research and development advanced by academics and professionals), which reduces small farmers' vulnerability to international shocks, increasing oil, inputs and food prices and contaminating farming.

3. The global food crisis in 2007-2008 opened avenues for further thinking and research regarding other initiatives aimed at feeding less developed countries, with special emphasis on local and sustainable small farming strategies. If international oil prices, increasing costs of basic grains, inputs and raw materials and environmental contamination are taken into account, the Cuban alternative may provide an option with the potential to lessen external dependency and improve food security in small developing nations while fostering family farming production and environmental sustainability.

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ACRONYMS

ACAO	<i>Asociación Cubana de Agricultura Orgánica</i> (Cuban Association of Organic Agriculture)
ACTAF	<i>Asociación Cubana de Técnicos Agrícolas y Forestales</i> (Cuban Association of Agricultural and Forestry Technicians)
ANAP	<i>Asociación Nacional de Pequeños Agricultores</i> (National Association for Small Farmers)
CARG	Compound Annual Rate of Growth
CEEC	<i>Centro de Estudios de la Economía Cubana</i> (Centre for Research of the Cuban Economy)
CMEA	Council of Mutual Economic Assistance
CPA	<i>Cooperativas de Producción Agropecuarias</i> (Agricultural Production Cooperative)
CSS	<i>Cooperativas de Crédito y Servicio</i> (Credit and Service)
CUC	Cuban Convertible Peso (equivalent to one dollar) (<i>Peso Convertible Cubano</i>)
INIE	<i>Instituto Nacional de Investigaciones Económicas</i> (National Institute for Economic Research)
IPM	Integrated Pest Management
IRSF	The Institute for Research in Soil and Fertilisers
MINAG	Ministry of Agriculture (Cuba)
NGO	Non-Governmental organisation
NTAEs	Non-traditional Agrarian Exports
ONE	National Bureau of Statistics
PIAL	<i>Programa de Innovación Agraria Local</i> (Local Agrarian Innovation Program)

PSD	Participatory Seed Diffusion project
R&D	Research and Development
RNFE	Rural non-farm Employment
SAPs	Structural Adjustment Programs
TNCs	Trans-national Corporations
UBPC	<i>Unidades Básicas de Producción Cooperativa</i> (Basic Units for Cooperative Production)

REFERENCES

- ACTAF (2008): *Plan Estratégico de la actividad de Cultivos varios*, Havana, Biblioteca ACTAF.
- ÁLVAREZ, J. (2004): *Cuba's agricultural Sector*, Gainesville, University Press of Florida.
- ANAP (2001): *statistics*, Havana, ANAP.
- ANAP (2008): *statistics*, Havana, ANAP.
- BLUTSTEIN, H. I., KNIPPERS BLACK, J., *et al.* (1971): *Area Handbook for Cuba*, Washington DC, The American University.
- BOSCH, H. (2010): 'Amplia incorporación campesina a la Agricultura Suburbana' *Granma*, 17 February.
- BROOKFIELD, H., PADOCH, C., PARSONS, H. and STOCKING, M. (1994): 'Cultivating Biodiversity: Setting the scene', in BROOKFIELD, H. PADOCH, C., PARSONS, H. STOCKING, M. (eds.), *Cultivating Biodiversity: Understanding, Analysing and Using Agricultural Diversity*, London, ITDG Publishing, pp. 1-8.
- CANLER, E. (2000): 'The miracle of the Cuban economy in the 1990s', *Cuba in Transition*, ASCE, pp. 64-69.
- CARROBELLO, C. (2010): 'Agricultura Suburbana: Abrazo productivo a la ciudad', *Bohemia*, 11 March 2010.
- CASTRO, F. (1992): 'Discurso pronunciado en la Conferencia de Naciones Unidas sobre Medio Ambiente y Desarrollo,' Rio de Janeiro, Brasil (available at <http://www.cuba.cu/gobierno/discursos/1992/esp/f120692e.html>).
- CASTRO, R. (2008): 'Mientras mayores sean las dificultades, más exigencia, disciplina y unidad se requieren.' Speech at the conclusion of the Constitutive Session of the National Assembly of the Cuban Parliament, *Granma*, February 25.
- COMPANIONI, N., HERNANDEZ, Y., PAEZ, E. and MURPHY, C. (2002): 'The growth of urban agriculture,' in: FUNES, F., GARCÍA, L., BOURQUE, M., PÉREZ, N. and ROSSET, P. (eds.), *Sustainable agriculture and resistance: Transforming food production in Cuba*, Oakland, Food First Books, pp. 220-236.
- Decreto-Ley No. 191 (1994) [DECREE LAW NO. 191], arts. 1, 4.

- DEERE, C. D. *et al.* (1992): 'Toward a Periodization of the Cuban Collectivization Process: Changing Incentives and Peasant Response,' *Cuban Studies*, 22, pp. 115-149.
- DEERE, C. D. (1997): 'Reforming Cuban Agriculture,' *Development and Change*, 28, pp. 649-669.
- DÍAZ-BRIQUETS, S. (2000): 'Land Use in Cuba Before and After the Revolution: Economic and Environmental Implications,' *Cuba in Transition*, 10, pp. 162-171 (available at <http://lanic.utexas.edu/la/cb/cuba/asce/cuba10/diazbriquets.pdf>).
- DÍAZ-BRIQUETS, S. and PÉREZ-LÓPEZ, J. (1995): 'The Special Period and the Environment,' *Cuba in Transition*, 5, pp. 281-292.
- DÍAZ-BRIQUETS, S. and PÉREZ-LÓPEZ, J. (1998): 'Socialism and Environmental Disruption: Implications for Cuba,' *Cuba in Transition*, 8, pp. 154-172.
- DÍAZ-BRIQUETS, S. and PÉREZ-LÓPEZ, J. (2000): *Conquering Nature: The Environmental Legacy of Socialism in Cuba*, Pittsburgh, University of Pittsburgh Press.
- ENRÍQUEZ, L. (2000): *Cuba's New Agricultural Revolution: The Transformation of Food Crop Production in Contemporary Cuba*, Oakland, Food First Books.
- FERNÁNDEZ-DOMÍNGUEZ, P. (2005): 'La evolución de la agricultura cubana y su contribución al desarrollo económico', Havana, MINAG papers.
- FIGUEROA ALBELO, V. M. (1995): *La Reforma de la Tenencia de la Tierra en Cuba y la Formación de un Nuevo Modelo Mixto de Economía Agrícola*, Santa Clara, Universidad Central de Las Villas.
- FIGUEROA ALBELO, V. M. (2005): 'Los campesinos en el proyecto social cubano', *Temas*, 44 (September- December). Also in FIGUEROA ALBELO, V. M. *et al.* (2006), *La Economía Política de la Construcción del Socialismo* (available at <http://www.eumed.net/libros/2006b/vmfa/3e.htm>).
- FIGUEROA ALBELO, V. M. *et al.* (2006): *La Economía Política de la Construcción del Socialismo*, (available at <http://www.eumed.net/libros/2006b/vmfa/3e.htm>).
- FORNÉS, F. (2008): 'La Leche que Prometió Raúl...', *Encuentro en la Red, Havana*, 26 February 2008 (available at <http://www.cubaencuentro.com/cuba/articulos/fuera-de-la-via-lactea-70877>).
- FUNES-MONZOTE, F. (2006a): 'Towards sustainable agriculture in Cuba,' private email to Elisa Botella, 18 March 2006.
- FUNES-MONZOTE, F. (2008a): *Farming like we're here to stay: The mixed farming alternative for Cuba*. PhD thesis, Wageningen University, The Netherlands.
- GANDARILLA, H. (1992): *Uso de la rotación papa-col-boniato en el manejo de nematodos*, Informe del Laboratorio Provincial de Sanidad Vegetal, Ciudad de La Habana.
- GASTÓN, M. W. *et al.* (1957): *¿Por Qué Reforma Agraria?*, Havana, Agrupación Católica Universitaria.
- GAYOSO, A. (2008): 'An Agricultural Transition Policy for Cuba: A Message to Raúl', *Cuba In Transition*, 18, pp. 266-274.

- GAYOSO, A. (2009): 'The Art of doing nothing: agricultural policy making in Cuba,' *Cuba in Transition*, 19. pp. 68-77.
- GELLERMAN, B. (1996): *Organics in Cuba. Living on Earth*, National Public Radio, Cambridge, MA (available at <http://www.loe.org/html/susag/cuba.html>).
- GLIESSMAN, S. R. (2001): *Agroecology: Ecological processes in sustainable agriculture*, Boca Raton, CRC Lewis Publishers.
- GLIESSMAN, S. R. (2006): *Agroecology: The ecology of sustainable food systems*, Boca Raton, CRC Lewis Publishers.
- GNAU (Grupo Nacional de Agricultura Urbana) (2004): *Lineamientos para los subprogramas de La Agricultura Urbana (2005-2007)*, Havana, MINAG.
- GONZÁLEZ, A. (2000): *Cuba: El sector agropecuario y las políticas agrícolas ante los nuevos retos*, Mep-Asdi-Universidad.
- GONZÁLEZ, A. M. (2009): 'Entrega de tierras (I): Realidades y manipulaciones.' *Trabajadores*, 6 July. 'Entrega de tierras (II): Con premura, pero sin chapucerías.' *Trabajadores*, 13 July.
- GONZÁLEZ, C. G. (2003): 'An agricultural law research article. Seasons of resistance: sustainable agriculture and food security in Cuba', *Tulane Environmental Law Journal*, 16, pp. 685-732.
- GONZÁLEZ, C. G. (2004): 'Trade Liberalization, Food Security and the Environment: The Neoliberal Threat to Sustainable Rural Development', *Transnational Law and Contemporary Problems*, 14, pp. 419-498.
- GRANMA (La Habana): «Felicitación de Raúl por los resultados de la agricultura urbana» *Granma*, 30 January 2001.
- GRANMA (La Habana): «Decreto-Ley No. 259 sobre la entrega de tierras ociosas en usufructo», *Granma*, 18 July 2008.
- GRANMA INTERNACIONAL (La Habana): «En 15 años: La Isla redujo 20 veces uso de plaguicidas», *Granma Internacional*, 26 November 2004.
- HAGELBERG, G. B. (2010): «If it were just the marabú... Cuba's Agriculture 2009-10», *Cuba in Transition*, 20, pp. 32-46.
- HAGELBERG, G. B. and ALVAREZ, J. (2007): 'Cuba's Disfunctional agriculture,' *Cuba in Transition*, 16, pp. 144-158.
- HAGELBERG, G. B., and ALVAREZ, J. (2009): 'Cuban agriculture: The return of the campesinado», *Cuba in Transition*, 19, pp. 229-241.
- KOST, W. (1998): 'Cuba's Agriculture: Collapse and Economic Reform', *Agricultural Outlook*, October, pp. 26-30.
- LAGE, C. (1992): «Interview on Cuban television», 6 November, 1992.
- LAGE, C. (1997): 'Palabras de Carlos Lage ante el Congreso...', *Granma*, 10 October 1997.

- MACHÍN, B., ROQUE, A. D., ÁVILA, D. R. y. ROSSET, D. R. (2010): *Revolución agroecológica: el movimiento de campesino a campesino de la ANAP en Cuba*, Havana, ANAP.
- MARTIN, L. (2002): 'Transforming the Cuban countryside: Property, markets, and technological change,' in FUNES, F., GARCÍA, L., BOURQUE, M., PÉREZ, N. y ROSSET, P. (eds.), *Sustainable agriculture and resistance: Transforming food production in Cuba*, Oakland, Food First Books, pp. 57-71.
- MARTÍN, L. (2007): «Equidad y movilidad social en el contexto de las transformaciones agrarias de los años noventa en Cuba» *The David Rockefeller Center for Latin American Studies*, working paper series No. 07/08-2.
- MARTÍNEZ VIERA, R. and HERNÁNDEZ, G. (1995): «Los biofertilizantes en la agricultura cubana», *Proceedings of the Second National Meeting of Organic Farming. Conferences and Round tables. Animal Sciences Institute, ICA* (May 17-19), ACAO, Havana, pp. 43-47.
- MAURA, J. A. (1994): «Producción de Biopesticidas. El caso de Cuba» *Informe Taller Regional sobre Tecnologías Integradas de Producción y Protección de Hortalizas*, Cuernavaca, FAO, pp. 69-74.
- MESA LAGO, C. (2005): 'Social and economic problems in Cuba during the crisis and subsequent recovery,' *CEPAL Review*, 86, pp. 177-199.
- MESA-LAGO, C. (2008): «The Cuban Economic at the Crossroads», *Boletín Real Instituto Elcano*, May 2008, Working paper WP 19/2008.
- MESA-LAGO, C. (2009): 'Balance económico-social de 50 años de Revolución en Cuba,' *América Latina Hoy*, 52, pp. 41-61.
- MINAG (Ministerio de Agricultura) (1988): *Datos básicos*, Havana, MINAG
- MINAG. (1991): *Datos básicos*, Havana, MINAG.
- MINAG (1992): *Datos básicos*, Havana, MINAG.
- MINAG (1997): *Statistics bulletin*, Havana, MINAG.
- MINAG, Grupo Nacional de Agricultura Urbana y Suburbana (2010): *Lineamientos 2010 de la agricultura suburbana*, Havana, Biblioteca ACTAF.
- NOVA, A. (2003): 'La UBPC y el cooperativismo en la agricultura cubana.' CEEC working papers, Havana.
- NOVA, A. (2006a): *La agricultura en Cuba: evolución y trayectoria 1959-2005*, Havana, Editorial Ciencias Sociales.
- NOVA, A. (2008a): 'El modelo agrícola cubano en la etapa 1993-2008', CEEC working papers, Havana.
- ONE (National Bureau of Statistics) (1990): *Anuario estadístico de Cuba*, 1991, Havana.
- ONE (1996): *Anuario estadístico de Cuba*, 1996, Havana.
- ONE (1997): *Anuario estadístico de Cuba*, 1997, Havana.
- ONE (2007): *Panorama uso de la tierra*, Cuba 2007, Havana.
- ONE (2008): *Panorama Económico y Social 2007*, Havana.

- ONE (2010): *Anuario estadístico de Cuba*, 2010, Havana.
- PASTOR, M. Jr. (1992): «External shocks and adjustment in contemporary Cuba», The International and Public Affairs Center, Occidental College, Working Paper.
- PÉREZ CABRERA, F. (2009): 'Contratar bien, esa es la clave.' *Granma*, 2 October.
- PÉREZ CABRERA, F. (2010): 'Anuncian medidas para elevar la eficiencia en la Agricultura.' *Granma*, 15 March.
- PÉREZ, N., and VÁZQUEZ, L. L. (2002): 'Ecological Pest Management' in FUNES, F., GARCÍA, L., BOURQUE, M., PÉREZ, N. and ROSSET, P. (eds.), *Sustainable agriculture and resistance: Transforming food production in Cuba*. Oakland, Food First Books, pp. 109-143.
- PÉREZ ROJAS, N., GARCÍA AGUIAR, M., GONZÁLEZ MASTRAPA, E. and MORELL, R. (1999): *Cambios tecnológicos, sustentabilidad y participación*, Havana, Universidad de La Habana.
- PÉREZ-VILLANUEVA and EVERLENY, O. (2004): *Reflexiones sobre la Economía Cubana*, Havana, Editorial de Ciencias Sociales.
- PNAN (Plan Nacional de Acción para la Nutrición) (1994): *Plan Nacional de Acción para la Nutrición*, Havana.
- PONCE, F. (1996): «Determinación del grado y la intensidad de apisonamiento del suelo por los animales de tracción y los tractores ligeros», II Congreso Internacional de Tracción Animal, FAO-IIMA, Havana.
- PRETTY, J. (2002): *Agri-Culture. Reconnecting People, Land and Natur*, London, Earthscan Publications Limited.
- REGO, G., COLLAZO, D. and BORGES, A. (1986): 'Eficacia técnico-económica de *Lixophaga diatraeae* basada en el índice poblacional de *Diatraea saccharilis*,' *Revista Protección Vegetal*, 1, pp. 255-260.
- RÍOS-LABRADA, H. et al. (2006a): *Fitomejoramiento participativo: Los agricultores mejoran cultivos*, Havana, Instituto Nacional de Ciencias Agrícolas (INCA).
- RÍOS, A. and PONCE, F. (2002): «Tracción animal, mecanización y agricultura sostenible», in FUNES et al. (eds.), *Sustainable agriculture and resistance: Transforming food production in Cuba*, Oakland, Food First Books.
- RÍOS, A. and AGUERREBERE, S. (1998): «La tracción animal en Cuba», *Evento Internacional Agroingeniería*, Havana.
- RODRÍGUEZ CASTELLÓN, S. (2003): 'La agricultura urbana y la producción de alimentos: la experiencia de Cuba.' *Cuba Siglo XXI*, 30, pp. 77-102.
- ROSSET, P. (1996): «Cuba: alternative agriculture during crisis», in THRUPP, L. A. (eds.), *New Partnerships for Sustainable Agriculture*, Washington, DC, World Resources Institute, pp. 64-74.
- ROSSET, P. (1997): «The crisis of modern agriculture: toward an agroecological alternative», in *Feeding the world without poisons: supporting healthy agriculture. Proceedings*

- of the Fourth Pesticide Action Network (PAN) International Meeting, May 18-21, 1997, Santa Clara, pp. 10-24.*
- ROSSET, P. and BENJAMIN, M. (1994): *The Greening of the Revolution: Cuba's Experiment with Organic Agriculture*, Melbourne, Ocean Press.
- ROSSET, P. and MOORE, M. (1998): 'La seguridad alimentaria y la producción local de biopesticidas en Cuba,' *ILEIA*, June, pp.18-19.
- SÁEZ CHÁVEZ, A. (2009): 'La familia campesina a las puertas del X congreso de la ANAP,' *Granma*, 4 April.
- SÁEZ, H. (1997): 'Resource Degradation, Agricultural Policies, and Conservation in Cuba,' *Cuban Studies*, 27, pp. 49-50.
- SINCLAIR M. and THOMPSON, M. (2001): *Cuba Going Against the Grain: Agricultural Crisis and Transformation*, Oxfam America.
- THOMAS, H. (1998): *Cuba or the pursuit of freedom*, New York, Da Capo Press.
- TRETO, E., GARCÍA, M., MARTÍNEZ VIERA, R. and MANUEL FEBLES, J. (2002): 'Advances in organic soil management', in FUNES *et al.* (eds.), *Sustainable agriculture and resistance: Transforming food production in Cuba*, Oakland: Food First Books, pp. 164-189.
- USCTEC (U.S.-Cuba Trade and Economic Council) (1998): *Economic Eye on Cuba*, September 14 to September 20.
- VILLEGAS, R. (1999): '¿Qué tipo de propiedad representan las UBPC?', in PÉREZ ROJAS, N., ECHEVARRÍA, D., GONZÁLEZ, E. and GARCÍA, M. (eds.), *Cambios tecnológicos, sustentabilidad y participación*, Havana, Universidad de La Habana, pp. 167-183.
- WRIGHT, J. (2005): *¡Falta Petroleo! Cuba's experiences in the transformation to a more ecological agriculture and impact on food security*, PhD thesis, Wageningen University, The Netherlands.
- ZIMBALIST, A. and ECKSTEIN, S. (1987): 'Patterns of Cuban Development: The First Twenty Five Years,' *World Development*, 15/1, pp. 5-22.

LIST OF INTERVIEWS AND MEETINGS

- ACOSTA, X. (2008): Interview with Ing. X. Acosta, Civil Servant, Project manager, ANAP, Cuba, 10 Nov. 2008.
- BETANCOURT, G. (2008): Interview with G. Betancourt, INIE, Havana, Cuba, 15 October-25 Nov. 2008.
- CRUZ, J. (2008): Interview with Dr. Jesús Cruz, Facultad de Economía, Universidad de La Habana, Havana, Cuba, 01-15 Nov. 2006.
- FERNÁNDEZ-DOMÍNGUEZ, P. (2006): Interview with P. Fernandez, Ministry of Economy and Planning, Cuba, 20 June. 2006.

- FERNÁNDEZ-DOMÍNGUEZ, P. (2008): Interview with P. Fernandez, Ministry of Economy and Planning, Cuba, 27 November. 2008.
- FUNES, F. (2006): Interview with Dr. F. Funes, ACTAF, Havana, Cuba, 23-25 June, 2006.
- FUNES-MONZOTE, F. (2006b): Interview with MSc. Fernando Funes-Monzote, Havana, Cuba, 3-29 June. 2006.
- FUNES, F. (2008): Interview with Dr. F. Funes, ACTAF, Havana, Cuba, 2-15 October, 2008.
- FUNES-MONZOTE, F. (2008b): Interview with PhD F. Funes-Monzote, Havana, Cuba, 1 October-29 November. 2008.
- NOVA, A. (2006b): Interview with Dr. A. Nova, University of Havana, Centre for the Study of the Cuban Economy (CEEC), 27 June. 2006.
- NOVA, A. (2008b): Interview with Dr. A. Nova, University of Havana, Centre for the Study of the Cuban Economy (CEEC), 2 October-27 Nov. 2008.
- RÍOS LABRADA, H. (2006b): Interview with Dr. H. Ríos and his Research Team of INCA, 29 June. 2006.
- RÍOS LABRADA, H. (2008): Interview with Batabano's campesinos, Batabanó, Havana province, Cuba, 13 November, 2008.
- SUÁREZ, J. (2006): Interview with J. Suárez, University of Matanzas, Cuba, 12 June. 2006.

APPENDIX I

Classical versus Alternative Model

<i>Classical Model: Costa Rica</i>	<i>Alternative Model: Cuba</i>
<p>External dependence of: the country on other countries provinces on the country localities on the province and the country</p> <p>Cutting edge technology: - Imported raw materials for animal feed. - Widespread utilisation of chemical pesticides and fertilizers - Utilisation of modern irrigation systems - High consumption of fuel and lubricants.</p> <p>Tight relationship between bank credit and production; high interest rates.</p> <p>Priority given to mechanisation as a production technology.</p> <p>Introduction of new crops at the expense of autochthonous crops and production systems.</p> <p>Search for efficiency through intensification and mechanisation.</p> <p>Real possibility of investing in production and commercialisation.</p> <p>Accelerated rural exodus.</p> <p>Satisfying ever-increasing needs has serious ecological or environmental consequences such as soil erosion, salinisation water logging etc.</p>	<p>Maximum advantage taken of:</p> <ul style="list-style-type: none"> - the land - human resources of the zone or locality - broad community participation - cutting edge technology, but appropriate to the zone where it is used - organic fertilisers and crop rotation - biological control of pests - biological cycles and seasonality of crops and animals - natural energy sources (hydro, wind, solar, slopes, biomass, etc) - animal traction - Rational use of pastures and forage for both grazing and feedlots, search for locally supplied animal nutrition. <p>Diversification of crops and autochthonous production systems based on accumulated knowledge.</p> <p>Introduction of scientific practices that correspond to the particulars of each zone; new varieties of crops and animals, planting densities, seed treatments, post postharvest storage etc.</p> <p>Preservation of the environment and the ecosystem Systematic training (management, nutritional, technical).</p> <p>Systematic technical assistance.</p> <p>Promotes cooperation among producers, within and between communities</p> <p>Obstacles to overcome:</p> <ul style="list-style-type: none"> - difficulties in the commercialisation of agricultural products because of the number of intermediaries with control over the market - poverty among the peasantry - distances to markets and urban centres (lack of sufficient roads and means of transport) - illiteracy

Source: Rosset and Benjamin (1994); Rosset (2005).

APPENDIX II

Cuba's Structural Economic and Agricultural Reforms during the 1990s

- Demonopolisation** **1992:** Constitutional reform, decentralisation of state monopoly on foreign trade
- 1994:** Vice President Carlos Lage announces that all sectors of the Cuban economy are open to foreign investment. It only permits financial arrangements with foreign companies for the purchasing of agricultural inputs.
- 1995:** The Council of State enacts Law 77 on foreign investment, more transparent than the previous legislation it supersedes.
- Deregulation** **1992:** Constitutional reform, approval of mixed property and other types.
- 1993:** Fidel Castro announces a series of policies intended to collect foreign exchange currency. The most important one is the free circulation of convertible currencies, mainly the U.S. dollar.
- Council of State promulgates **Law-Decree No. 140** dealing with free circulation of convertible currencies. In essence, this repeals previous legislation that penalized possession and use of convertible currencies by the general public.
- Council of State enacts **Law-Decree No. 141** authorizing **self-employment** in several areas of economic activity. Joint Resolution No. 1 authorizes 117 activities, 16 of which are related to agriculture.
- The Politburo of Cuba's Communist Party agrees to apply new principles to state agriculture in search of efficiency.
- 1994:** Decree No. 192 of the Council of Ministers authorizes the establishment of free markets for industrial products and crafts throughout the island.
- 1995:** Foreign investment law

The opening of CADECAS

1996: Decree on free trade zones and modification of tariff law

1997: reordering and enhancement of national consumer markets.

Decentralisation

1993: Third land reform, Council of State enacts Law-Decree No. 142 establishing BUCP on previous state farms to eliminate state monopoly on most agricultural lands. Although the land remains the property of the state, it is given in usufruct for an indefinite period of time to the newly created cooperatives.

The Minister of Agriculture announces that more than 268 hectares were given in free usufruct to families interested in growing tobacco in the eastern province of Ciego de Avila. In addition to the right to self-consumption activities, each family received an average of 4.5 hectares.

Self-funding strategies in hard currency for state companies.

New types of mixed companies: joint ventures.

1994: Law-Decree No. 147 by the Council of State restructures the state bureaucracy. 17 previous state committees, national commissions, and institutes are integrated under six new ministries:

1. Economics and Planning
2. Foreign Investment and Economic Collaboration
3. Tourism
4. Finances and Prices
5. Labour and Social Security
6. Sciences, Technology, and Environment.

Council of Ministers enacts **Decree No. 191 authorizing the establishment of free agricultural markets** throughout the island where farmers

and state enterprises can sell their surplus production, after fulfilling their commitments to the state, at prices dictated by supply and demand.

1995: changes in companies and territorial planning.

Orlando Lugo, President of ANAP announces that 5,835 families throughout Cuba had received in usufruct approximately 12,000 hectares of tobacco lands and 1,153 individuals had received coffee lands. In Ciego de Avila a total of 19,870 hectares of pasturelands had been transferred to 369 livestock workers for milk production. Each worker received 50 hectares and 40 cows. Another 619 hectares were given to 46 workers for vegetable and vianda production for self-consumption and sales in agricultural markets.

1997: Decree-law to restructure the banking system

Others

1994: Council of Ministers announces sharp price increases beginning June 1, September 1, and October 1 for cigarettes, beer, rum, railroad, aerial, and inter-provincial transportation, gasoline, electricity, water, and sewage.

Alfredo Jordán, Minister of Agriculture, announces **payments in hard currency** of a small part of their salaries to workers in all stages of the tobacco sector.

Cuban newspaper *Trabajadores* announces that the first middle school in the countryside (ESBEC) has been converted into an agricultural community for workers in the area of Jagüey Grande (Matanzas). For many years, the ESBEC program brought middle school students from urban areas to participate in a 4-hour work, 4-hour study program in the countryside.

1995: National Assembly of People's Power approves the **1995 State Budget Law**. It anticipates revenues at around 12 billion pesos (the same amount of dollars at the official exchange rate of one peso to one U.S. dollar) and expenses at about 113 billion pesos. The one billion pesos deficit is 4.6% lower than in 1994.

Cuban government announces the introduction of a «**convertible peso**» to be used in international transactions. Equivalent to the U.S. dollar, the new peso will circulate along with hard currencies.

Source: Álvarez (2004); Cruz (2008); Nova (2006a).

APPENDIX III

DIFFERENT INSTITUTIONS/PROGRAMS PROMOTING SUSTAINABLE SMALL FARMING IN CUBA

a) *Asociación Cubana Para la Agricultura Urbana* (ACTAF/ACAO): ACTAF (a governmental association founded in 1987) is focused on agrarian transition towards an ecological balance, with a gender perspective, which has a participatory approach and respect for the technical-professional ethic. At the forefront of the transition towards sustainable agriculture, ACAO, formed in 1993, brought together farmers, field managers, field experts, researchers and government officials to enhance the spread of organic-based alternatives to produce enough food for Cubans (Pretty, 2002). Today ACTAF is formed by agricultural researchers, producers, and activists who promote organic research and production to 'create a national conscience to support agriculture harmonious with human beings and nature (Monzote, 1997).' It also holds workshops and training, publishes a quarterly journal, *Agricultura Orgánica*, and sponsors an annual international organic agriculture conference which many of the world's most recognized organic agriculture professionals have attended in recent years (Murphy, 1999; ACTAF, 2006, 2008).

b) *The National Association of Small Farmers (ANAP)*: a good example of Cuba's family farmers and state connectedness. ANAP is a non-governmental organisation that in harmony with the government enhances small farmers' interests towards Cuba's agricultural progress. Today this NGO (dependent from the state) is composed of more than 3800 cooperatives (CPA and CCS) and produces 63 percent of Cuba's overall agrarian production (Acosta, 2008). By spreading the 'farmer to farmer' technology nationally, and organising workshops between officials of the Ministry of Agriculture or Higher Education and *campesinos*, and international gatherings with other small farmers' groups (like the MST of Brazil or *Vía Campesina*), ANAP and the Cuban government share a true project of transformation. Their consensus is based on sustainability, reducing scarcity and viewing domestic markets as an emergent property of valuable systems of social, human and natural capital (Acosta, 2008; ANAP, 2008).

c) *Fundacion de la Naturaleza y El Hombre* (The Foundation for Nature and Man). This integrated, multidisciplinary organisation has an ecological focus. The foundation works closely with the Cuban Ministry of Culture to promote the blossoming ecological consciousness of Cuba. This NGO sponsors Havana's Permaculture Project carried out through the Australian/Cuban 'Green Team,' which does direct agricultural work at the neighbourhood level. This Foundation sees urban agriculture as a way of sustaining the family in the city against the harsh crisis as well as a cultural approach that reshapes the interaction between humans and nature. By recovering a good cultural balance between humans and nature (lost for many years under the Green Revolution mentality) this Foundation attempts to spread the family farmer knowledge across the island. Thus, it organises workshops and agroecological meetings to educate both urban inhabitants and rural farmers and

also publishes the ecology magazine *Se Puede* (You can do it) (Sánchez, 2006).

d) Asociación Cubana de Producción Animal (Cuban Association of Animal Production-ACPA) is an NGO (also dependent on the state) that currently focuses on developing local seed stock in grains and legumes to promote organising national self-sufficiency in livestock feed, traditionally imported from abroad. ACPA is helping to support the community-based animal raising associations across the country, focusing primarily on Havana (Murphy, 1999).

e) INCA (Instituto Nacional de Ciencias Animales, Universidad de La Habana): this research institution is formed by researchers and farmers engaged in the international project of participatory seed diffusion throughout the island. These PSD projects concentrate on improved seeds and the diffusion of organic practices amongst peasant communities. By integrating diversity, organising seed fairs and local markets, and experimenting with many varieties, peasants choose the types they find most appropriate for their land and climate conditions. Once farmers see the favourable effects of genetic diversity testing, they organise themselves in farmer research groups. These groups are in charge of promoting knowledge, social organisation and entrepreneurial centres that sponsor intensive genetic flows and continued discussion surrounding local innovation (Ríos-Labrada, 2006a). The project has evolved by defining PIAL (Programas de Innovación Agraria Local) groups through the island.

Source: ACTAF (2008a); Cruz and Sánchez (2005); Funes (2006, 2008); Murphy (1999); Ríos-Labrada, (2006a, 2006b, 2008); Sánchez (2006).