Seasons of Resistance: Sustainable Agriculture and Food Security in Cuba

Carmen G. Gonzalez*

* Assistant Professor, Seattle University School of Law. The author would like to thank Janet Ainsworth, James Bond, and John Mitchell for helpful comments on earlier drafts of this Article.

I. INTRODUCTION

The collapse of trade relations between Cuba and the Soviet Union in 1990 plunged the Cuban economy into a state of crisis known as the "Special Period in Peacetime."[1] In the late 1980s, Cuba relied on the Soviet Union and other members of the Council for Mutual Economic Assistance (CMEA) for approximately 80% of its foreign trade and received significant subsidies from the Soviet Union in the form of preferential prices for Cuban exports.[2] The demise of the socialist trading bloc led to a catastrophic reduction of trade with Cuba, a drop in Soviet oil deliveries, and the termination of Soviet price subsidies.[3] Cuba experienced severe shortages of food, fuel, fertilizer, chemicals, spare parts, and other inputs needed for agricultural and industrial production.[4] Food imports and domestic food production were severely curtailed.[5] Average caloric, protein, and vitamin intake dropped by 30% from the levels achieved during the 1980s,[6] and the first signs of malnutrition appeared.[7] As one commentator astutely observed, "[f]ood security had shown itself to be the Achilles' heel of the revolution."[8]

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1. *See* José Alvarez & William Messina, Jr., *Cuba's New Agricultural Cooperatives and Markets: Antecedents, Organization and Early Performance and Prospects*, 6 CUBA IN TRANSITION 175, 175 (1996), *available at* http://lanic.utexas.edu/la/cb/cuba/asce/cuba6/28alvmess.fm.pdf.

2. *See id.* at 175-76. The Soviet Union subsidized the Cuban economy by paying above market prices for Cuban exports. Some analysts estimate that Cuban trade revenues from 1980 to 1990 were approximately 50% higher than they would have been if Cuban exports had been purchased at world market prices. *Id.* at 176.

3. CARMELO MESA-LAGO, MARKET, SOCIALIST AND MIXED ECONOMIES 289 (2000). Between 1990 and 1994, trade with Russia declined by 94%, and Russian fuel exports to Cuba were cut in half. *Id.* at 312.

4. *Id.* at 289.

5. Julio A. Díaz Vázquez, *Consumo y distribución normada de alimentos y otros bienes en Cuba*, *in* LA ÚLTIMA REFORMA AGRARIA DEL SIGLO: LA AGRICULTURA CUBANA ENTRE EL CAMBIO Y EL ESTANCAMIENTO 33, 50 (Hans-Jürgen Burchardt ed., 2000) [hereinafter LA ÚLTIMA REFORMA AGRARIA DEL SIGLO].

6. *Id.*

7. The first signs of inadequate nutrition were reported among children between six months and twelve months old. Many pregnant women were subsequently diagnosed with anemia. Finally, a mysterious neurological ailment affecting approximately 40,000 Cubans in 1992-1993 was believed to be caused by vitamin B deficiency. *See* GLOBAL EXCHANGE, THE GREENING OF THE REVOLUTION: CUBA'S EXPERIMENT WITH ORGANIC AGRICULTURE 24 (Peter Rosset & Medea Benjamin eds., 1994) [hereinafter THE GREENING OF THE REVOLUTION].

8. *Id.* at 4.

In response to the crisis, the Cuban government adjusted its methods of agricultural production and adopted a series of measures that have been hailed as the "greening of the revolution"[9] and as a model of socially equitable and ecologically sustainable agriculture.[10] Cuba shifted from an export-oriented, chemical-intensive agricultural development strategy to one that promoted organic agriculture and encouraged production for the domestic market.[11]

Is this transformation of Cuban agriculture a transitory phenomenon or a deliberate shift in development strategy? Has Cuba broken its dependence on the sugar monoculture and on large-scale, capital-intensive agriculture or will this model reassert itself when the U.S. economic embargo is lifted?

This Article examines the evolution of Cuban agriculture from the colonial period to the present time through the lens of food security and ecological sustainability in order to suggest ways that one might begin to answer the questions posed above. The objective of this Article is to provide background and context for the Cuban reforms and to illustrate the ways that development models imposed during the colonial period, and reinforced through international trade and investment, can present formidable obstacles to the achievement of food security and ecological sustainability.

An analysis of the transformation of Cuban agriculture during the Special Period requires an understanding of the historical origins of the problems that the recent reforms were intended to address. Part II of this Article provides an overview of the development of the sugar monoculture from the colonial period until the years preceding the Revolution, with an emphasis on how the sugar monoculture promoted trade dependency, inequitable land tenure, food insecurity, and environmental degradation.

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9. *See id.* at 8 (describing the changes in Cuban agriculture in the aftermath of the Special Period as "unprecedented, with potentially enormous implications for other countries suffering from the declining sustainability of conventional agricultural production"); *see also* Peter Rosset, *The Greening of Cuba*, 28 NACLA REP. ON THE AMS. 37, 38 (1994) (characterizing the measures adopted by the Cuban government during the Special Period as "the first national transformation in history from conventional modern agriculture to large-scale organic and semi-organic farming"). *But see* SERGIO DÍAZ-BRIQUETS & JORGE PÉREZ-LÓPEZ, CONQUERING NATURE: THE ENVIRONMENTAL LEGACY OF SOCIALISM IN CUBA 272-80 (2000) (questioning Cuba's commitment to environmentalism).

10. Miguel A. Altieri, *The Principles and Strategies of Agroecology in Cuba*, *in* SUSTAINABLE AGRICULTURE AND RESISTANCE: TRANSFORMING FOOD PRODUCTION IN CUBA, at xi-xii (Fernando Funes et al. eds., 2002) [hereinafter SUSTAINABLE AGRICULTURE AND RESISTANCE].

11. *See generally* Marcos Nieto & Ricardo Delgado, *Cuban Agriculture and Food Security*, *in* SUSTAINABLE AGRICULTURE AND RESISTANCE, *supra* note 10, at 40-56.

In Part III, the inquiry shifts to agricultural policy during the first thirty years of the Revolution. Part III begins with a discussion of the agrarian reform undertaken by the revolutionary government and concludes by assessing how agricultural policy during the first three decades of the Cuban Revolution ameliorated or exacerbated the problems of trade dependency, inequitable land tenure, food insecurity, and environmental degradation. This Part concludes that Cuba, on the eve of the Special Period, was highly trade dependent, food insecure, and ecologically compromised as a direct consequence of the export-oriented, capital-intensive model of agricultural development adopted by the Cuban government.

Part IV examines the economic crisis provoked by the collapse of the socialist trading bloc in 1990 and the reforms undertaken by the Cuban government in response to that crisis. During the Special Period, the Cuban government transformed the agricultural sector by breaking up many of the inefficient, unproductive state farms into a series of smaller cooperative farms, by authorizing the creation of farmers' markets, and by actively promoting organic and semi-organic farming techniques.

Part V evaluates the impact of the reforms and finds that the reforms have promoted food security and ecological sustainability, and have reduced trade dependency.

Part VI concludes by discussing the challenges to the consolidation and expansion of Cuba's experiment with sustainable agriculture. As agribusiness in the United States looks to Cuba for new export markets, renewed trade relations between Cuba and the United States are on the horizon. One of the key challenges for Cuba will be to maintain the right to adopt agricultural policies that run counter to the prevailing neoliberal model in the face of overwhelming political and economic pressure. The future of sustainable agriculture in Cuba is, therefore, uncertain. Much will depend on the degree of understanding and support for the new agricultural development model both at the grassroots and at the highest levels of the Cuban government, and on the ability of the Cuban government to manage the economic integration with the United States effectively.

II. CUBAN AGRICULTURE FROM THE COLONIAL PERIOD TO THE EVE OF THE REVOLUTION

A. Origins of the Sugar Monoculture

Although sugar cultivation was introduced in Cuba as early as the 1500s,[12] the sugar monoculture did not become the defining feature of the Cuban economy until the late eighteenth century.[13] Prior to that time, Cuba was an important port for the Spanish empire and a launching pad for expeditions to diverse parts of the New World.[14] The earliest Spanish settlers made a living by raising cattle, growing tobacco, and producing small quantities of sugar for domestic consumption.[15] Tobacco was the primary export product, but leather, meat, and dyewoods were also exported.[16]

Between 1763 and 1838, Cuba was transformed from a sparsely populated colony of small towns, cattle ranches, and tobacco farms to the world's foremost producer of sugar.[17] This transformation was a function of three interrelated factors that allowed Cuba to import the labor, capital, and skills necessary to develop the sugar sector and to adapt its system of land tenure to the needs of plantation agriculture.[18]

The first factor that facilitated the development of the sugar monoculture in Cuba was liberalized trade in African slaves.[19] During the mid-eighteenth century, the slave trade in Cuba was dominated by a Spanish-chartered company that failed to supply a sufficient number of slaves to satisfy planters' demands for agricultural labor.[20] As the commercial importance of Havana increased between 1760 and 1778, the Spanish Crown realized that access to slaves was critical to the development of the sugar industry.[21] In 1789, the Spanish government removed all restrictions on the slave trade, and suspended all taxes on this lucrative trade for a period of nine years.[22] While approximately 60,000

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12. *See* HUGH THOMAS, CUBA OR THE PURSUIT OF FREEDOM 28 n.8 (1998). Christopher Columbus, whose first mother-in-law owned a sugar estate in Madeira, brought sugar to the Caribbean on his second voyage. By the 1520s, several sugar mills had been established in Cuba. *Id.*

13. FRANKLIN W. KNIGHT, SLAVE SOCIETY IN CUBA DURING THE NINETEENTH CENTURY 4 (1970).

14. *Id.*

15. *Id.*

16. *Id.* at 4-5.

17. *Id.* at 3.

18. *Id.* at 6, 13.

19. *Id.* at 11.

20. THOMAS, *supra* note 12, at 31.

21. *See* KNIGHT, *supra* note 13, at 10-11.

22. *Id.* at 11.

slaves were imported into Cuba between 1512 and 1761 (just under 250 years), the corresponding figure for 1762 to 1838 (just over 75 years) was 400,000.[23]

The second factor that contributed to the development of plantation agriculture in Cuba was the extension of the French Revolution to the colony of St. Domingue and the subsequent creation of the independent republic of Haiti.[24] Prior to the Revolution, St. Domingue was the world's largest producer of sugar.[25] The successful slave revolt, and the radical agrarian reform that followed, destroyed the French sugar trade in the Caribbean,[26] and the price of sugar on European markets increased sharply as demand outstripped supply.[27] Moreover, French refugees from St. Domingue flooded Cuba, bringing their skills, their slaves, and their capital.[28] These refugees were later joined by French exiles from Louisiana after Napoleon sold the territory to the United States.[29]

The third event that facilitated the development of the sugar monoculture in Cuba was the disruption caused by the Latin American wars of independence.[30] As a consequence of those wars, the amount of capital available for investment in Cuban agriculture increased.[31] In addition, the wars brought defeated royalist supporters to Cuba.[32] The influx of immigrants to Cuba at the beginning of the nineteenth century increased the demand for land and put pressure on the Spanish Crown to reform the colony's system of land tenure in order to promote plantation agriculture.[33]

Prior to the reform of land tenure in Cuba, all land was deemed the personal domain of the Spanish Crown, and was parceled out either in usufruct or in outright grants called *mercedes*.[34] Land granted in usufruct was subject to an annual fee based upon the size of the plot or its agricultural purpose, and could be inherited but not sold, sublet, or subdivided.[35] Land granted as a *merced* could be used only for the

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23. *Id.* at 10.
24. *Id.* at 12.
25. *Id.*
26. THOMAS, *supra* note 12, at 76-77.
27. KNIGHT, *supra* note 13, at 12.
28. *Id.* at 12; *see also* THOMAS, *supra* note 12, at 78 (describing the technical innovations introduced by the French immigrants to Cuba).
29. KNIGHT, *supra* note 13, at 13.
30. *Id.* at 13.
31. *Id.*
32. *Id.*
33. Franklin W. Knight, *Esclavitud y tenencia de la tierra en Cuba*, *in* LA ÚLTIMA REFORMA AGRARIA DEL SIGLO, *supra* note 5, at 17.
34. KNIGHT, *supra* note 13, at 14.
35. *Id.*

cultivation of the particular crop for which the *merced* was granted.[36] Furthermore, all landholders were prohibited from cutting hardwood trees without express permission from the Spanish Crown because these trees were critical to the construction of the Spanish fleet in Havana.[37] These restrictions on land use, along with the forest preservation system, impeded the development of large-scale plantations or *latifundia*.[38]

When the Napoleonic wars depleted the resources of the Spanish Crown, Cuban landholders seized the opportunity to demand fee simple ownership of lands previously held in usufruct in exchange for cash, thereby altering both land tenure and the natural environment in Cuba.[39] Between 1795 and 1820, royal decrees authorized outright ownership of land and permitted the destruction of hardwood forests for the purpose of agricultural expansion.[40] The right to cut timber on private lands did not result in the immediate deforestation of the island because cane growers chose to preserve the forests in order to obtain a steady supply of timber for fuel and for the construction of the boxes used to transport sugar.[41] However, as rail transport became available throughout the sugar cane-growing regions of Cuba, it became more profitable for cane growers to replace forests with cane fields and to import lumber, firewood, and coal.[42] By the late 1860s, the central section of Cuba had suffered almost complete deforestation.[43]

The development of the sugar monoculture in Cuba was accompanied by increasing reliance on imports to satisfy the basic food requirements of the population.[44] Cuba imported items that it was capable of producing, and the availability of cheap imported food created disincentives for domestic production.[45] By 1861, over 25% of the cultivated land in Cuba was devoted to sugar cane.[46] Sugar and coffee accounted for over 70% of the value of all Cuban agricultural production, and tobacco represented an additional 16%.[47] As sugar plantations expanded, small farmers producing fruits and vegetables for domestic

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36. *Id.*
37. *Id.* at 15.
38. *Id.* at 14-15.
39. *Id.* at 17-18.
40. *Id.* at 17.
41. *Id.* at 18.
42. *Id.*
43. *Id.*
44. Max Zeuske, *Notas retrospectivas sobre la sociedad agraria cubana en los siglos XIX y XX*, *in* LA ÚLTIMA REFORMA AGRARIA DEL SIGLO, *supra* note 5, at 23-24.
45. *Id.* at 26.
46. KNIGHT, *supra* note 13, at 40.
47. *Id.*

consumption were displaced, and many became sharecroppers or tenant farmers.[48] By 1899, 16% of Cuba's farmers controlled 70% of the cultivated land.[49]

The United States quickly became Cuba's primary trading partner as a consequence of its geographic proximity, large merchant marine fleet, strong economy, large population, and enormous sugar consumption.[50] In 1865, Cuba exported 65% of its sugar to the United States.[51] The United States, in turn, supplied almost all of Cuba's flour, codfish, and food and clothing for slaves.[52] The sugar monoculture and the commercial dependence on the United States would remain fixtures of the Cuban economy through the 1950s.[53]

B. The Sugar Monoculture and Dependent Development

The Cuban economy remained highly dependent on sugar during the first half of the twentieth century. In the forty years preceding the Revolution, sugar accounted for 82% of Cuba's export earnings,[54] and was cultivated on nearly half of the country's irrigated land.[55] The Cuban economy was highly vulnerable to fluctuations in the world market price for sugar.[56] When sugar prices were high, Cuba prospered. When they were low, all sectors of the economy suffered.[57] The sugar monoculture also contributed to rural unemployment.[58] The sugar industry employed one-third of the Cuban labor force (approximately half a million workers) during the four-month sugar harvest, but most of these workers were unemployed, or underemployed, for the remainder of the year.[59] While residents of Havana enjoyed a high standard of living, conditions in rural Cuba were very poor.[60] The overwhelming majority of rural Cubans lived in dwellings without electricity (93%), running water (85%), an indoor or

48. Zeuske, *supra* note 44, at 23-25.
49. THOMAS, *supra* note 12, at 1562.
50. KNIGHT, *supra* note 13, at 44-45.
51. *Id.* at 44.
52. *Id.* at 45.
53. MARIFELI PÉREZ-STABLE, THE CUBAN REVOLUTION: ORIGINS, COURSE, AND LEGACY 14-24 (1999).
54. THOMAS, *supra* note 12, at 1152.
55. *Id.* at 1151. In 1950, sugar comprised 80% of the tonnage hauled by the nation's public railway system, and the sugar mills controlled half of Cuba's electric power generation. *Id.*
56. *Id.* at 1152.
57. *Id.*
58. PÉREZ-STABLE, *supra* note 53, at 14.
59. *Id.* at 14; THOMAS, *supra* note 12, at 1565-66.
60. PÉREZ-STABLE, *supra* note 53, at 29-30.

outdoor toilet (54%), or a refrigerator (96%).[61] Less than half of 5-to-14-year-old rural children were enrolled in school.[62] By the 1950s, it was widely recognized that economic diversification was necessary to promote economic growth, create jobs, and raise the standard of living.[63]

The sugar monoculture increased Cuba's economic dependence on the United States.[64] The Cuban sugar industry was, in many respects, a foreign enclave, highly dependent on foreign capital, foreign machinery, and to a lesser extent, foreign workers.[65] In the 1920s, U.S. investors held a 60% interest in the sugar industry and controlled 95% of the harvest.[66] Although the U.S. share of the Cuban sugar industry declined in the twenty years prior to the Revolution, the United States continued to dominate Cuba's foreign trade.[67] In the decade before the Revolution, the United States received 66% of Cuba's exports and supplied 75% of Cuba's imports.[68] Consistent with the pattern established in the late eighteenth century, food accounted for nearly 30% of Cuba's imports from the United States[69] and approximately 20% of Cuba's total imports.[70] Indeed, in 1958, the United States exported more agricultural products to Cuba than to any other Latin American nation, including many items (such as oil, lard, and half of Cuba's consumption of fruits and vegetables) that could easily be produced in Cuba.[71]

The primacy of sugar in the Cuban economy was maintained by tariff agreements between Cuba and the United States that gave preferential treatment to Cuban sugar in the U.S. market in exchange for equivalent treatment of U.S. products in the Cuban market.[72] Because Cuba's preferential access to the U.S. sugar market was conditioned on

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61. *Id.* at 29.
62. *Id.* at 28.
63. *Id.* at 14-22; *see also* THOMAS, *supra* note 12, at 1181-82.
64. PÉREZ-STABLE, *supra* note 53, at 14.
65. THOMAS, *supra* note 12, at 1150.
66. *Id.* at 557.
67. *Id.*
68. *Id.* at 1187-88.
69. *Id.* at 1188.
70. CARMEN DIANA DEERE, THE EVOLUTION OF CUBA'S AGRICULTURAL SECTOR: DEBATES, CONTROVERSIES AND RESEARCH ISSUES 5 (Int'l Agric. Trade & Dev. Ctr., Working Paper IW96-3, 1996).
71. THOMAS, *supra* note 12, at 1186-88.
72. PÉREZ-STABLE, *supra* note 53, at 19-22. Between 1903 and 1948, a series of bilateral agreements between the United States and Cuba accorded Cuban sugar a 20% preferential tariff reduction in the U.S. market in exchange for similar tariff reductions on U.S. exports to Cuba. This relationship was preserved after the negotiation of the General Agreement on Tariffs and Trade (GATT) through a separate supplemental agreement between Cuba and the United States. HOWARD I. BLUTSTEIN ET AL., AREA HANDBOOK FOR CUBA 384 (1971).

the entry of U.S. goods into Cuba, the Cuban government was unable to protect domestic producers by imposing high tariff barriers on U.S. imports.[73] For example, Cuban efforts to stimulate domestic rice cultivation were frustrated by Cuba's obligation to reduce tariffs on U.S. rice.[74] Moreover, when Cuban rice production increased, U.S. rice growers protested the decline in exports to Cuba, and the U.S. Department of Agriculture hinted that the Cuban sugar quota might be reduced.[75] In order to protect the sugar quota, the Cuban government agreed to import massive quantities of rice from the United States over the strenuous protests of Cuban rice producers.[76] Between 1955 and 1959, Cuban rice imports from the United States increased by more than 40% while domestic production grew by only 10%.[77] On the eve of the Revolution, the United States exported 75% of its rice production to Cuba, and Cuban growers produced less than 50% of the rice consumed in Cuba.[78] The preferential tariff arrangement for sugar frustrated efforts to diversify the Cuban economy and encouraged reliance on imports for the single most important item in the Cuban diet.[79]

The decades preceding the Revolution were also marked by an increased concentration of landholding in Cuba.[80] In 1946, less than 1% of all Cuban farmers controlled 36% of the farmland, and 8% of the farmers controlled 70% of farmland.[81] Most farms in Cuba were single family subsistence farms consisting of less than sixty acres,[82] and nearly 64% of Cuban farmers were sharecroppers, tenants, subtenants, or squatters.[83] Approximately half a million landless laborers were employed during the four-month sugar harvest.[84] In sum, rural land tenure on the eve of the Revolution bore a stark resemblance to the pattern established during the era of slavery: a few large sugar estates upon which the national wealth depended, many small subsistence farms, and a large cadre of landless wage earners, many of whom were the

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73. JULES R. BENJAMIN, THE UNITED STATES AND THE ORIGINS OF THE CUBAN REVOLUTION 69 (1990). Indeed, the flood of goods from large-scale U.S. enterprises prevented the development of a strong manufacturing sector in Cuba. *Id.*

74. PÉREZ-STABLE, *supra* note 53, at 25-26.

75. *Id.* at 26.

76. *Id.*

77. *Id.*

78. *Id.*

79. *Id.*

80. Zeuske, *supra* note 44, at 29.

81. THOMAS, *supra* note 12, at 1562.

82. *Id.*

83. Zeuske, *supra* note 44, at 29.

84. THOMAS, *supra* note 12, at 1565-66.

grandchildren of former slaves.[85] Just as Spaniards and North Americans owned a substantial share of the Cuban economy at the end of the colonial period,[86] U.S. corporations produced 30% of the island's raw sugar and had substantial investments in mining, manufacturing, and public utilities.[87]

C. Agriculture and the Environment

The development of large-scale sugar plantations from the late eighteenth century to the eve of the Revolution resulted in widespread deforestation in Cuba.[88] At the time of Columbus' arrival in the Americas, 60% to 75% of Cuba's land was covered with forests, while the remainder consisted of fields and meadows.[89] From 1800 to 1920, the clearing of land to expand sugar cultivation resulted in the wholesale destruction of Cuba's forests.[90] By 1900, only 35% of Cuba's land was forested.[91] Deforestation continued during the first half of the twentieth century,[92] and by 1959, only 14% of Cuba's total land area was forested.[93]

Soil degradation was another consequence of large-scale sugar cultivation.[94] Throughout the nineteenth century, sugar production was concentrated in the central and western regions of Cuba, sites of the country's most fertile soils.[95] However, as sugar production shifted eastward during the first quarter of the twentieth century, soil fertility began to decline.[96] Forest lands cleared and planted with sugar cane lost their fertility within five years, resulting in declining yields and eventual conversion of the land to pasture.[97] Erosion was common in the eastern, mountainous regions of Cuba due to the texture, incline, and permeability of the soil.[98] The expansion of sugar plantations into forested areas had largely ceased by the mid-1940s, although logging,

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85. *Id.* at 1572-73.
86. *Id.* at 499-501.
87. BLUTSTEIN ET AL., *supra* note 72, at 384.
88. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 140-43.
89. *Id.* at 140.
90. *Id.* at 141.
91. *Id.* at 142.
92. *Id.* at 143.
93. Sergio Díaz-Briquets, *Land Use in Cuba Before and After the Revolution: Economic and Environmental Implications*, 10 CUBA IN TRANSITION 162, 164 (2000), *available at* http://lanic.utexas.edu/la/cb/cuba/asce/cuba10/diazbriquets.pdf.
94. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 83.
95. *Id.*
96. *Id.* at 83-84.
97. *Id.* at 84.
98. *Id.*

mining, and subsistence agriculture continued to encroach into forested regions.[99]

Agriculture in pre-revolutionary Cuba was characterized by its reliance on low-input, labor-intensive, traditional methods.[100] Indeed, a 1950 World Bank report concluded that even the Cuban sugar industry, the economic mainstay of the island, displayed "a conspicuous lack of technological progress."[101] As a result of this lack of technical development, Cuba's cane yield per hectare was one of the lowest in the world.[102] During the 1950s, mechanization was introduced in the sugar and rice estates, but was largely unknown in other agricultural sectors.[103] In 1945, only 3% of farmland was irrigated.[104] By 1959, as irrigation increased (especially for rice), the figure rose to 10%.[105] Moreover, only 7.4% of the total cultivated land was fertilized.[106] Agricultural training, research, and extension programs were very weak or nonexistent.[107] In sum, the capital–intensive agricultural technologies that would later characterize socialist Cuba were virtually nonexistent in pre-revolutionary Cuba.[108]

III. CUBAN AGRICULTURE AFTER THE REVOLUTION

A. Land Tenure in Rural Cuba: From Latifundia *to State Farms*

1. The First Agrarian Reform: Land to the Peasants

One of the earliest reforms undertaken by the revolutionary government was to change the inequitable structure of landholding in Cuba.[109] The Agrarian Reform Act of 1959[110] abolished *latifundia* in Cuba by expropriating agricultural lands in excess of 1000 acres.[111] The

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99. *Id.*

100. *See id.* at 97.

101. Andres Bianchi, *Agriculture*, *in* CUBA: THE ECONOMIC AND SOCIAL REVOLUTION 65, 90-91 (Dudley Seers ed., 1964) (quoting a 1950 report on Cuba prepared by the International Bank for Reconstruction and Development).

102. *Id.* at 91.

103. *See id.* at 92-93; *see also* LOWRY NELSON, RURAL CUBA 136-37 (1950).

104. Bianchi, *supra* note 101, at 92.

105. *Id.*

106. *Id.*

107. *Id.* at 92-93.

108. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 5.

109. THOMAS, *supra* note 12, at 1215.

110. Agrarian Reform Act, 17 May 1959 (Cuba), *translated in* 3 UNITED NATIONS FOOD & AGRIC. ORG., FOOD AND AGRICULTURAL LEGISLATION (1959) [hereinafter Agrarian Reform Act of 1959].

111. *Id.* ch. I, art. 1. However, the statute contained exemptions for unusually productive farms, such as sugar and rice plantations with yields exceeding the national

expropriated land would either be converted into cooperatives or distributed in parcels of sixty-seven acres per family of five to those cultivating the land, including tenants, subtenants, sharecroppers, squatters, and agricultural laborers.[112] As a consequence of the reform, land was distributed to more than 100,000 farmers.[113] However, most of the large estates (especially sugar plantations and cattle ranches) were turned over to state-controlled cooperatives in order to avoid declines in efficiency and productivity that might result from partitioning.[114]

The creation of the cooperatives distinguished land reform in Cuba from the "land to the tiller" model of agrarian reform that was the age-old dream of agricultural workers in Spain and Latin America.[115] However, the term "cooperative" was a misnomer.[116] The National Agrarian Reform Institute (INRA), which was responsible for implementing the Agrarian Reform Act and organizing the cooperatives,[117] did not issue regulations for the management of the cooperatives.[118] Due to lack of experienced personnel, the management of the cooperatives was anarchic and the financial accounting haphazard.[119] Cooperative workers were paid a fixed daily wage as an "advance" on the cooperative profits, but no profits were distributed in 1959 or 1960.[120] Workers were often unaccustomed to taking individual initiative.[121] In many instances, cooperative workers were more interested in higher wages than in making sacrifices for the Revolution.[122] Indeed, labor shortages were common because workers were tempted by the higher wages and better living conditions on the state farms.[123]

Although the Agrarian Reform Act did not authorize the creation of state farms, INRA nevertheless operated as state farms the land seized by the revolutionary government from Fulgencio Batista (the former head of state) and from allies and supporters of the Batista regime.[124] After the

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average by 50%. These unusually productive farms were limited to 3333 acres. *See id.* ch. I, art. 2.

112. *Id.* ch. II, arts. 16-18, 22.
113. BLUTSTEIN ET AL., *supra* note 72, at 316 (1971).
114. *Id.* at 316; *see also* MESA-LAGO, *supra* note 3, at 176.
115. THOMAS, *supra* note 12, at 1218.
116. *Id.*
117. Agrarian Reform Act of 1959, *supra* note 110, ch. V, arts. 43-47, ch. VI, arts. 48-53.
118. THOMAS, *supra* note 12, at 1323.
119. *Id.* at 1323-25, 1328.
120. *Id.*
121. *Id.* at 1326-27.
122. *Id.* at 1324.
123. *Id.* at 1325.
124. *Id.* at 1218.

1959 agrarian reform, INRA was also placed in charge of the expropriated cattle estates and rice farms.[125] In 1961, as the deficiencies of the cooperatives became apparent, INRA became responsible for the conversion of all of the nonsugar cooperatives into state farms.[126] INRA's mandate was again expanded in 1962, when the sugar cooperatives were converted into state farms.[127] By 1963, INRA was operating the majority of Cuba's agricultural land.[128] Cuba's agricultural policy would become increasingly focused on the promotion of state farms.[129]

2. The Second Agrarian Reform: The New *Latifundia*

The second agrarian reform law was enacted on October 3, 1963,[130] in the wake of a dramatic deterioration in relations between Cuba and the United States and the growing radicalization of the Cuban Revolution.[131] The new law provided for the expropriation of virtually all private

125. *Id.* at 1325-26.
126. *Id.* at 1326.
127. DEERE, *supra* note 70, at 3.
128. *Id.* at 5.
129. THOMAS, *supra* note 12, at 1328.
130. Act of 3 October 1963, (Providing for the Nationalization of Rural Landholdings) (Cuba), *translated in* UNITED NATIONS, 1963 Y.B. on H.R. 81-82 [hereinafter Agrarian Reform Act of 1963].
131. The deterioration of U.S.-Cuba relations was precipitated by the 1959 land reform. U.S. corporations whose lands were expropriated protested to the U.S. government, claiming that the compensation provided was inadequate. In response, the U.S. State Department sent the Cuban government a diplomatic note insisting on "prompt, adequate and effective compensation." BENJAMIN, *supra* note 73, at 179-80; *see also* THOMAS, *supra* note 12, at 1223. Despite the protests of U.S. corporations, nationalization proceeded rapidly in the second half of 1960. Between June and October 1960, the Cuban government nationalized all foreign-owned refineries and all remaining U.S.-owned properties, including sugar mills, banks, telephone corporations, and electric utilities. By the end of 1960, all domestic wholesale and foreign trade and banking and most transportation, industry, construction, and retail trade had been nationalized as well. THOMAS, *supra* note 12, at 1223-34. MESA-LAGO, *supra* note 3, at 181. The United States responded to these developments by cutting Cuba's sugar quota in 1960 and by placing a partial embargo on exports to Cuba later the same year. BLUTSTEIN ET AL., *supra* note 72, at 385. The year 1961 marked the break of diplomatic relations between the United States and Cuba, the defeat of the U.S.-sponsored Bay of Pigs invasion, the declaration by Fidel Castro that the Cuban Revolution was socialist and that he was a Marxist-Leninist, and Cuba's growing rapprochement with the Soviet Union. MESA-LAGO, *supra* note 3, at 181. These events were followed by the nearly complete U.S. economic embargo in 1962, and by the freezing of Cuban assets in the United States and the prohibition of dollar transactions with Cuba in 1963. BLUTSTEIN ET AL., *supra* note 72, at 385. In addition, in October-November 1962, the Cuban Missile Crisis brought the United States and the Soviet Union to the brink of nuclear war. *See* THOMAS, *supra* note 12, at 1395, 1385-1419 (providing a detailed account of the Cuban Missile Crisis).

landholdings in excess of 166 acres.[132] Unlike its predecessor, the new legislation did not contemplate the redistribution of expropriated lands.[133] Pursuant to the new law, the Cuban government quickly seized more than five million acres of farmland, almost all of which was retained by the state.[134] In the aftermath of the 1963 agrarian reform, only 30% of agricultural lands and 30% of the agrarian labor force remained in the private sector.[135]

Several justifications have been proffered for the Cuban government's decision to expropriate additional private lands and to adopt state farms as the principal means of organizing agricultural production. First, the collectivization of medium-to-large farms was justified as a political offensive against private farmers who opposed the regime and had taken to the hills during periodic revolts in mid-1963.[136] Second, state farms enabled the government to control the food supply and to avoid food shortages or disruptions in food production.[137] Third, the decision to collectivize was attributed to Soviet pressure to adopt an agricultural model based on the Soviet Union's historical experience.[138] Fourth, the state farms were viewed as a superior form of agricultural organization because they enabled the government to "modernize" Cuban agriculture by introducing mechanization, agrochemicals, and large-scale irrigation.[139] Finally, some analysts have argued that even though productivity on state farms was generally lower than on private farms, collectivization was consistent with the Cuban government's goal of promoting production for export.[140] Once in possession of the

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132. Agrarian Reform Act of 1963, *supra* note 130, art. 1. The only exemptions were for extremely productive farms and for farms cultivated jointly by brothers and sisters, so long as no brother or sister had more than 166 acres. *Id.* arts. 2-3.

133. *See id.* (detailing the requirements for expropriation but remaining silent on the question of redistribution).

134. BLUTSTEIN ET AL., *supra* note 72, at 385.

135. Andrew Zimbalist & Susan Eckstein, *Patterns of Cuban Development: The First Twenty-five Years*, *in* 15 WORLD DEVELOPMENT 5, 8 (1987).

136. THOMAS, *supra* note 12, at 1439.

137. *See id.* at 1439. It was alleged, for example, that private farmers who retained land in the aftermath of the 1959 agrarian reform were leaving their land uncultivated rather than selling their output at the unreasonably low prices offered by the state. Nevertheless, it appears that the private sector was generally far more conscientious about fulfilling its production quota than the state farms or cooperatives. *Id.* Indeed, productivity was higher on private farmlands, and most state farms operated at a loss. Consequently, it is unlikely that maximization of food production for the domestic market was a primary rationale for the 1963 agrarian reform. Zimbalist & Eckstein, *supra* note 135, at 8.

138. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 11-13.

139. Héctor Sáez, *Resource Degradation, Agricultural Policies, and Conservation in Cuba*, 27 CUBAN STUD. 40, 49-50 (1997).

140. Zimbalist & Eckstein, *supra* note 135, at 8.

nationalized farmland, the government was able to divert production from domestic staples to sugar for export in order to address the state's pressing need for export earnings.[141] Within one year of the reform, the percentage of state-owned lands devoted to sugar production increased by 38% and continued to grow for the remainder of the 1960s.[142]

Beginning in 1964, the state centralized productive activities on the newly expropriated farms in order to further socialize the relations of production and to maximize export production.[143] The state mobilized unpaid, urban "volunteers" for seasonal agricultural tasks in the sugar cane fields, thereby maximizing sugar earnings while minimizing production costs.[144] Finally, the government sought to maximize sugar production by seizing the private parcels used by state farm workers to produce goods for domestic consumption.[145]

The 1960s also witnessed the consolidation of government control over private farms.[146] The state pressured private farmers to sell all of

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141. *Id.*

142. *Id.*

143. *Id.*

144. *Id.* The use of "voluntary" labor during the sugar harvest was in response to increasingly severe labor shortages after 1961. Urban dwellers, students, prisoners, and military conscripts were recruited to work in the sugar cane fields during the sugar harvest. BLUTSTEIN ET AL., *supra* note 72, at 317-18. In 1968, approximately 15% to 20% of agricultural laborers were mobilized from other sectors of the economy. In 1970, over one-third of the labor force was involved in part-time agricultural labor. While one of the state's proffered reasons for the mobilization of urban "volunteers" was to eliminate distinctions between manual and intellectual labor and to promote moral incentives over material work incentives, the financial benefits to the state cannot be overlooked. Had the state relied on monetary incentives to attract agricultural laborers, the costs would have been considerable given the much higher urban wages and the strong preference of Cuban workers for city jobs. Zimbalist & Eckstein, *supra* note 135, at 8. Even so, the "volunteers" were a mixed blessing. Before 1961, the average duration of the sugar harvest was four months. After 1961, the harvest reached an average length of eight months due to the extremely low productivity of the inexperienced "volunteers" and the low morale and poor incentives within the permanent farm labor force. BLUTSTEIN ET AL., *supra* note 72, at 317-18.

145. Zimbalist & Eckstein, *supra* note 135, at 8-9

146. Despite the fact that the first agrarian reform more than tripled the number of small farmers in Cuba, the revolutionary government took a series of steps to increase their dependence on the Cuban state. *See* BLUTSTEIN ET AL., *supra* note 72, at 316-17 (discussing the early measures taken by the Cuban government to limit the autonomy of private farmers); Carmen Diana Deere et al., *Toward a Periodization of the Cuban Collectivization Process: Changing Incentives and Peasant Response*, 22 CUBAN STUD. 115, 117 (1992) (providing statistics on small property owners in rural Cuba). First, the government transferred responsibility for agriculture and marketing to INRA. Private farmers were obligated to sell a fixed percentage of their produce to local procurement centers at prices established by INRA. Second, the government established the National Association of Small Farmers (ANAP) in 1961 to help execute official policy. ANAP quickly came to control the activities of service and credit cooperatives and to play a key role in regulating the flow of technical assistance, equipment, fertilizer, and seed to private farmers. The overall effect was to give the state a

their agricultural production to the state at low prices, to incorporate their property into the state sector, and to work part-time on state farms.[147] When these measures failed to produce sufficient cooperation from private farmers, the state began to rent private holdings in order to increase the total acreage devoted to sugar cane, and subsequently lowered rents below the amount deemed necessary to cover essential expenses in order to induce peasants to cede the land to the state and become state workers.[148] Between 1967 and 1971, at least 24,500 private farms were incorporated into the state sector, and additional private lands were purchased by the state when the owner became old or ill and had no heirs willing to work the land.[149] Until the third agrarian reform (discussed in Part IV.A below), the Cuban government continued to pursue policies designed to bring private farmers into the state sector, including the use of incentives (modern housing for peasants willing to cede their lands to the state), as well as disincentives (limited access by private farmers to agricultural inputs).[150]

3. Land Tenure Before the Special Period: Private, State, and Cooperative

The transformation of the agricultural sector in Cuba resulted in the predominance of three forms of land tenure in the decades preceding the Special Period: private farms, state farms, and cooperatives.[151] By 1992, state farms accounted for approximately 80% of the arable land in Cuba, while the remaining 20% was evenly divided between private farmers and production cooperatives, known as CPAs (*Cooperativas de Producción Agropecuarias*).[152]

State farms were generally large enterprises controlled by officials from the Ministry of Agriculture and the Ministry of Sugar.[153] They were notorious for their inefficiency and low productivity as compared to the private sector, and many operated at a loss.[154] Nevertheless, state farms produced much of Cuba's sugar, rice, milk, and meat,[155] and received

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monopoly over agricultural investment, marketing, and distribution. BLUTSTEIN ET AL., *supra* note 72, at 316-17.

147. Zimbalist & Eckstein, *supra* note 135, at 9.

148. *Id.*

149. Deere et al., *supra* note 146, at 119.

150. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 89.

151. *See* DEBRA EVENSON, REVOLUTION IN THE BALANCE: LAW AND SOCIETY IN CONTEMPORARY CUBA 189 (1994).

152. Sáez, *supra* note 139, at 49.

153. *Id.*

154. Zimbalist & Eckstein, *supra* note 135, at 8.

155. Deere et al., *supra* note 146, at 119-20.

massive state investment in the form of fertilizers, pesticides, herbicides, agricultural equipment, and irrigation projects.[156] In 1987, on the eve of the collapse of the Soviet Union, Cuba was among the three socialist countries with the highest concentration of agricultural land in state farms, a percentage surpassed only by Sao Tome (96.2%) and Bulgaria (90%).[157]

Private farms consisted of approximately 205,000 smallholders, at least half of whom were beneficiaries of the 1959 agrarian reform.[158] Private ownership of small farms and associated productive assets was recognized by Article 19 of the Cuban Constitution,[159] but this right was contingent on the continued productive use of the land and on the production of crops in accordance with state production plans.[160] Moreover, private farms could only be transferred, with state approval, to the state, to a cooperative farm, to another farmer, or to the farmer's immediate family members.[161] Private farmers were the primary producers of tobacco, coffee, fruits, vegetables, and *viandas* (plantains and root crops).[162] Despite their important contribution to agricultural production, the Cuban government's bias in favor of large-scale agriculture led to the neglect of private agriculture.[163] For example, the state's agricultural investments frequently bypassed private farmers,[164] who continued to rely on traditional farming techniques and human and animal labor, with only limited access to agrochemicals, mechanization, and irrigation.[165] Despite this neglect, private farmers were consistently more productive than the state sector.[166]

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156. Sáez, *supra* note 139, at 51-52.

157. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 89. The Democratic Republic of Sao Tome and Principe is the smallest country in Africa. The country's two main islands straddle the equator in the Gulf of Guinea, West of Gabon. *See* U.S. CENT. INTELLIGENCE AGENCY, THE WORLD FACTBOOK 2002—SAO TOME AND PRINCIPE 1-10 (2002), *available at* http://www.cia.gov/cia/publications/factbook/geos/tp.html.

158. Hans-Jürgen Burchardt, *La última reforma agraria del siglo: cambio o estancamiento*, *in* LA ÚLTIMA REFORMA AGRARIA DEL SIGLO, *supra* note 5, at 171.

159. CUBA CONST. art. 19 (as proclaimed on February 24, 1976 and amended by the National Assembly of People's Power on July 10, 11, and 12, 1992).

160. EVENSON, *supra* note 151, at 191 (citing Régimen de Posesión, Propiedad y Herencia de la Tierra y Bienes Agropecuarios, DECRETO-LEY NO. 125, arts. 8-10 (1984) (Cuba)).

161. *Id.*

162. *See* Burchardt, *supra* note 158, at 171; *see also* Deere et al., *supra* note 146, at 120.

163. Deere et al., *supra* note 146, at 119.

164. *Id.*

165. Sáez, *supra* note 139, at 56-57.

166. Alvarez & Messina, *supra* note 1, at 176; MESA-LAGO, *supra* note 3, at 554.

Beginning in the 1970s, the Cuban government devised incentives to encourage private farmers to pool their small plots into cooperative farms (CPAs).[167] Farmers who formed CPAs were compensated for the land, livestock, and other means of production that they brought into the cooperative.[168] They were also provided with old age pensions, paid sick leave, disability insurance, paid maternity leave, and preferential access to building materials, machinery, agricultural inputs, technical services, and credit.[169] CPAs were subject to state production quotas, but enjoyed a fair degree of autonomy under the direction of an internally elected board.[170] Cooperative members owned the land and other productive assets collectively, received a share of the cooperative's earnings, and were allocated a small parcel of land to cultivate crops for personal consumption.[171] The number of CPAs increased from 44 in 1977 to 1472 in 1983, but then leveled off as aging cooperative members, attracted to the CPAs by the availability of pension benefits, retired in large numbers.[172]

B. The Sugar Monoculture and Socialist Dependency

After an early attempt at agricultural diversification, the economic development model adopted by the revolutionary government replicated the one-crop, trade-dependent economic structure of pre-revolutionary Cuba. In the early years of the Revolution, the Cuban leaders identified the sugar monoculture as the source of many of the island's economic woes, and sought to diversify agricultural production.[173] Diversification efforts commenced almost immediately on the expropriated cattle estates and emphasized import substitution crops such as rice, potatoes, onions, soya, and peanuts.[174] When the United States suspended the Cuban sugar

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167. Deere et al., *supra* note 146, at 120. The cooperative movement received its earliest boost at the 1975 Congress of the Cuban Communist Party and was made increasingly attractive by the construction of new housing, day care centers, and other amenities. EVENSON, *supra* note 151, at 189. However, it was not until 1982 that the government passed the Law on Agricultural Cooperatives that codified in one location the rules and regulations governing the establishment and operation of the cooperatives, including governance, property rights, and commercialization of produce. *Id.* at 193.

168. Deere et al., *supra* note 146, at 121.

169. *Id.*

170. EVENSON, *supra* note 151, at 193.

171. *Id.*

172. Deere et al., *supra* note 146, at 122, 131.

173. BLUTSTEIN ET AL., *supra* note 72, at 319-20; MESA-LAGO, *supra* note 3, at 177; Sáez, *supra* note 139, at 53.

174. CARMEN DIANA DEERE, SOCIALISM ON ONE ISLAND? CUBA'S NATIONAL FOOD PROGRAM AND ITS PROSPECTS FOR FOOD SECURITY 8e (Inst. of Soc. Studies, Working Paper No. 124, 1992).

quota at the end of 1960, the Cuban government decreed that large amounts of sugar cane land be diverted to other types of crops.[175] Because sugar is a perennial crop, the high production figures for the 1959-1961 period obscured the long-term consequences of failing to plant new sugar cane.[176] By 1962, sugar output had declined by 30% relative to 1961 levels,[177] without offsetting increases in industrial production or in the production of other agricultural products.[178] As a result, Cuba faced a huge trade deficit in 1962 and experienced difficulty appeasing its foreign creditors.[179]

The 1962 balance of payments crisis persuaded the Cuban government to abandon its diversification and import-substitution program and to rely on sugar to generate export revenues.[180] The willingness of China, the Soviet Union, and, to a lesser extent, Eastern European countries, to enter into long-term contracts to purchase Cuban sugar at stable, above world market prices, led Cuban officials to view sugar exports as a means of reducing the foreign deficit, accumulating capital to finance the island's agricultural investment program, and, in the long run, supporting its industrialization program.[181] In August 1963, the Cuban government formally announced that it was abandoning agricultural diversification and renewing its emphasis on sugar production.[182] In accordance with the new policy, the five-year plan for 1966 to 1970 provided for yearly increases in sugar production, culminating in an output of ten million metric tons in 1970.[183] Sugar would once again become the mainstay of Cuba's economy.[184]

The abandonment of agricultural diversification and the resurgence of the sugar monoculture replicated Cuba's pre-revolutionary dependence on sugar for export earnings.[185] From the 1920s to the 1950s, sugar accounted for an average of 81% of Cuba's exports.[186] The corresponding figure for 1959 to 1976 was 82%.[187] After 1976, and before the collapse

175. BLUTSTEIN ET AL., *supra* note 72, at 321.
176. *See id.*
177. DEERE, *supra* note 174, at 9.
178. *Id.*
179. *Id.* at 10.
180. Zimbalist & Eckstein, *supra* note 135, at 7.
181. *See id.*; *see also* Sáez, *supra* note 139, at 53.
182. BLUTSTEIN ET AL., *supra* note 72, at 321.
183. *Id.*
184. Sáez, *supra* note 139, at 53.
185. *See* Burchardt, *supra* note 158, at 172-73; *see also* Robert A. Packenham, *Cuba and the Soviet Union: What Kind of Dependency?*, *in* CUBAN COMMUNISM 130, 134 (Irving Louis Horowitz & Jaime Suchlicki eds., 9th ed. 1998).
186. Packenham, *supra* note 185, at 134.
187. *Id.*

of the socialist bloc in 1990, sugar's contribution to Cuban exports ranged from a high of 86.7% in 1978 to a low of 73.2% in 1989.[188] The Soviet Union subsidized the Cuban economy by importing sugar at above world market prices and exporting oil and other commodities at below world market prices.[189] The Cuban government did not pursue agricultural diversification because the Soviet Union's price subsidies distorted Cuban investment and production decisions.[190] When the Soviet Union collapsed, Cuba's excessive reliance on sugar exports, and the relatively low world market price for that export, plunged the economy into a state of crisis.[191]

Cuba's pre-revolutionary trade dependence on the United States was replaced by trade dependence on the Soviet Union and the other members of the CMEA.[192] From 1946 to 1958, an annual average of 69% of Cuba's foreign trade was with the United States.[193] From 1977 to 1988, the comparable figure for Cuba's trade with the CMEA countries was approximately 80%.[194] By the late 1980s, the CMEA countries supplied 63% of food imports, 98% of imported fuels and lubricants, 80% of imported machinery and equipment, and 57% of imported chemical products.[195] They also purchased the majority of Cuba's exports, including 63% of sugar, 73% of nickel, and 95% of citrus.[196] In addition, the Soviet Union subsidized the Cuban economy by providing price subsidies on imports and exports and by offering loans on highly favorable terms.[197] Between 1986 and 1990, Cuba received $11.6 billion in Soviet loans and $10 billion in Soviet price subsidies.[198] As a consequence of its high level of dependence on the CMEA countries, Cuba suffered severe economic dislocation after the collapse of the socialist trading bloc in 1990.[199]

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188. MESA-LAGO, *supra* note 3, at 370-71.
189. *Id.* at 257-58.
190. Jorge F. Pérez-López, *Bringing the Cuban Economy into Focus: Conceptual and Empirical Challenges*, 26 LATIN AM. RES. REV. 7, 27-28, 32-33 (1991).
191. MESA-LAGO, *supra* note 3, at 575 n.2.
192. Packenham, *supra* note 185, at 135.
193. *Id.* at 134.
194. *See* MESA-LAGO, *supra* note 3, at 374-75.
195. Alvarez & Messina, *supra* note 1, at 175.
196. *Id.*
197. *See* MESA-LAGO, *supra* note 3, at 560-61.
198. *Id.* at 284.
199. *Id.* at 578.

C. Agriculture and Food Security

The sugar monoculture and Cuba's trade dependence had significant consequences for food security. For purposes of this Article, food security is defined as "physical and economic access by all people at all times to sufficient, safe and nutritious food to maintain a healthy and active life."[200] A food secure state is one that can produce, purchase, or receive as aid, the food necessary to satisfy the needs of its population.[201] The most food insecure states are those that combine inadequate domestic food production with reliance on one or two export commodities for the bulk of their foreign exchange.[202] These states are highly vulnerable to external political and economic pressures, such as the vicissitudes of world market prices for their imports and exports or, in the case of Cuba, the collapse of their major trading partners.[203]

Prior to the Special Period, Cuba was able to produce or import the food necessary to satisfy the nutritional needs of its population.[204] However, Cuba was fundamentally food insecure because it relied on a single crop for a significant portion of its export earnings, depended on a single group of countries for most of its foreign trade, and satisfied the nutritional needs of its population through imported food and agriculture inputs. On the eve of the Special Period, Cuba depended on imports for most of its agricultural inputs, including 48% of its fertilizers, 82% of its pesticides, 98% of its herbicides, and 97% of its animal feeds.[205] Cuba also depended on imports for a significant portion of its food staples, including 100% of its cereals, 90% of its beans, and 49% of its rice.[206] By the beginning of the 1990s, Cuba was dependent on imports to supply 55% of the Cuban population's caloric consumption, 50% of its protein consumption, and 90% of its consumption of oil and lard.[207] The dietary

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200. Carmen G. Gonzalez, *Institutionalizing Inequality: The WTO Agreement on Agriculture, Food Security and Developing Countries*, 27 COLUM. J. ENVTL. L. 433, 469 (2002) (discussing the World Bank and World Food Summit definitions of food security). This definition is derived from the food security definition utilized by the World Bank in its influential 1986 report on world hunger and with the definition adopted at the 1996 World Food Summit in Rome. *Id.*

201. *See id.* at 469-73 (explaining the concept of food security developed by economist Amartya Sen and translating this concept from the individual or household level to the state level).

202. *Id.* at 473.

203. *See id.*

204. *See* THE GREENING OF THE REVOLUTION, *supra* note 7, at 23-24.

205. *Id.* at 18.

206. *Id.* at 19. It should be noted that these figures reflect both imports of final products and imported inputs necessary for production.

207. Díaz Vázquez, *supra* note 5, at 47.

problems occasioned by the collapse of the socialist bloc, described in Part I of this Article, can be traced directly to the development model adopted during the colonial period, perpetuated after independence, and promoted by the Cuban government after the Revolution.

D. Agriculture and the Environment

In Cuba, as in much of the world, ill-conceived agricultural development policies left a lasting legacy of environmental degradation, including soil erosion, water pollution, and loss of biodiversity.[208] In contrast to the low-input, labor intensive agricultural model that characterized pre-revolutionary Cuba, the agricultural model adopted by the socialist government bore a striking resemblance to the industrial agriculture practiced in capitalist countries.[209]

Revolutionary Cuba embarked on an investment strategy designed to produce a large-scale, capital-intensive farming system specializing in sugar cane production and livestock.[210] Between 1960 and 1989, the government constructed hundreds of dairy farms, breeding facilities, and incubating centers.[211] The government increased the amount of cultivated land in Cuba by 66.6% over 1945 levels by bringing marginal lands into cultivation in order to increase the cultivation of sugar and other crops.[212] Over 100 dams were added to the existing dam capacity,[213] and total irrigated land increased from 10% of cultivated land in 1959[214] to 25% of cultivated land in 1992.[215] Tractor use increased ninefold between 1959 and 1989, and by 1990 Cuba had one tractor for every forty-three

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208. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 88; *see also* Sáez, *supra* note 139, at 40-41. The impact of agricultural production on the global environment is enormous. Agriculture is a significant source of greenhouse gases, the largest consumer of freshwater resources, a prime contributor to the loss of global biodiversity, a major source of water pollution, and a leading cause of soil erosion. Some observers have gone so far as to suggest that agriculture may be the primary human influence on the global environment. Despite the magnitude of agriculture's effects, government programs designed to regulate and mitigate the environmental impact of agricultural production have generally been ineffective. *See* David E. Adelman & John H. Barton, *Environmental Regulation for Agriculture: Towards a Framework to Promote Sustainable Intensive Agriculture*, 21 STAN. ENVTL. L.J. 3,4 (2002).

209. *See* DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 6.

210. Sáez, *supra* note 139, at 51.

211. *Id.*

212. Díaz-Briquets, *supra* note 93, at 165-66. Of the total amount of additional land under cultivation, land devoted to sugar production accounted for 66.4%. If one considers only the newly cultivated land devoted to permanent crops, then sugar accounts for 72.8% of the increase. Other significant changes were increases in the amount of land devoted to coffee, fruit trees, and rice. *Id.*

213. Sáez, *supra* note 139, at 51.

214. Bianchi, *supra* note 101, at 92.

215. Sáez, *supra* note 139, at 51.

hectares of cultivated land, the highest level of mechanization in Latin America.[216]

The modernization of Cuban agriculture was also accompanied by massive increases in the use of fertilizers, pesticides, and other chemical inputs.[217] During the first three decades of the Revolution, fertilizer use increased tenfold and pesticide use increased fourfold.[218] By 1989, Cuba's consumption of herbicides and pesticides was close to 34,000 tons per year, and herbicides were being applied to approximately one-third of the country's cultivated land.[219] Many of the highly toxic chemicals used in Cuban agriculture, particularly the organochlorine compounds (such as the pesticide dieldrin), were banned in the United States and posed a serious risk to human health.[220] Fertilizer and pesticide use was particularly high in the sugar industry.[221]

The capital-intensive agricultural development model adopted by the Cuban government produced extensive soil degradation by imposing one-size-fits-all production guidelines that disregarded the unique physical, hydrological, and environmental properties of Cuba's soils and ignored Cuban peasants' intimate knowledge of local ecological conditions.[222] Among the most damaging practices were large-scale irrigation in the absence of appropriate drainage;[223] extensive use of heavy equipment in agriculture, resulting in soil compaction;[224] and excessive reliance on chemical inputs, which contributed to soil acidification and contamination of lakes, rivers, and drinking water supplies.[225] Erosion affected approximately 64% of Cuban agricultural

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216. *Id.*

217. *See* DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 105.

218. *Id.* at 105; *see also* Sáez, *supra* note 139, at 50.

219. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 105.

220. *Id.*

221. Sáez, *supra* note 139, at 52.

222. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 95-97.

223. *Id.* at 97. Lack of proper drainage impairs root development, reduces crop yields, and contributes to salinization, a problem that affects approximately 15% of Cuba's agricultural land. Sáez, *supra* note 139, at 47.

224. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 95-97. The use of heavy tilling equipment has resulted in soil compaction, which reduces the soil's ability to absorb water and nutrients, limits the growth of plant roots, and makes the soil more vulnerable to erosion. Sáez, *supra* note 139, at 45.

225. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 95-97. Surface waters in Cuba have been contaminated by pesticides and herbicides in agricultural runoff. Fertilizer contamination can produce eutrophication of lakes and rivers. In addition, agricultural runoff containing agrochemicals can contaminate potable water and create serious human health risks. For example, well water in a community located near a sugar agro-industrial complex in the municipality of Ranchuelo was found to contain seventy-eight parts per million of nitrates, a contaminant that has been linked to cancer in the United States. The community

lands, while poor drainage affected 41%, soil compaction 21%, acidification 17%, and salinization 12%.[226]

E. Land Tenure and Sustainability

The ecological sustainability of farming practices in Cuba varied immensely depending on land tenure.[227] In general, state farms relied on chemical and machinery intensive practices that produced significant ecological harm.[228] Small landholders utilized more environmentally benign farming techniques that combined traditional methods with limited amounts of agrochemicals, mechanization, and irrigation.[229] Cooperative farms utilized both traditional techniques and modern, capital-intensive methods.[230]

A case study of the municipality of Santo Domingo, in the province of Villa Clara, sheds light on the relationship between land tenure and ecological sustainability.[231] The author of the case study examined two state farms, two cooperatives, and three family farms, in order to compare their efforts to protect the natural resource base upon which agricultural production depends.[232]

State farms in Santo Domingo conformed to the large-scale, capital-intensive model promoted by the revolutionary government.[233] Their productivity was based on monocropping, heavy application of agrochemicals, and extensive mechanization.[234] State farm managers could be dismissed for failing to fulfill the enterprise's production plan, but were not penalized for failing to conserve natural resources.[235] Consequently, the state farms failed to implement even simple and

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has suffered a disproportionate incidence of metahemoglobinema, a disease that can be fatal to children. Contamination of water supplies with high levels of nitrates occurs most frequently in the Cuban sugar cane-producing regions. Excessive fertilizer use can also produce soil acidification, which damages soil nutrients and results in poor plant growth. Excessive use of pesticides has resulted in extensive soil contamination and in the appearance of secondary pests. Sáez, *supra* note 139, at 47-48; DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 105-06, 132-33.

226. Díaz-Briquets, *supra* note 93, at 168.

227. *See* Sáez, *supra* note 139, at 43.

228. *Id.* at 49-50.

229. *Id.* at 56-57; *see also* Díaz-Briquets, *supra* note 93, at 162.

230. *See* Sáez, *supra* note 139, at 43.

231. Héctor Sáez, *Property Rights, Technology, and Land Degradation: A Case Study of Santo Domingo, Cuba*, 7 CUBA IN TRANSITION 472, 472 (1997), *available at* http://lanic.utexas.edu/la/cb/cuba/asce/cuba7/saez.pdf.

232. *Id.*

233. *Id.* at 483.

234. *Id.*

235. *Id.* at 474.

inexpensive anti-erosion measures and rejected organic fertilization techniques that did not yield short-term productivity increases.[236] Furthermore, crop specialization requirements and the obligation to comply with production quotas discouraged the adoption of traditional pest control and soil conservation practices, such as crop rotation, intercropping, or allowing fallow periods.[237] Planting and harvesting deadlines, imposed by the Ministry of Agriculture or the Ministry of Sugar, disregarded local ecological conditions and often required workers to hastily plant vast tracts of land, without sufficient time to conduct pre-planting soil preparation to conserve soil quality and fertility.[238] The belief by workers, managers, and planners that flatlands were not subject to erosion and that conservation measures interfered with "real" productive activity served as additional obstacles to the adoption of appropriate soil conservation practices.[239] Finally, poorly designed irrigation projects produced flooding and erosion, and the use of heavy agricultural equipment resulted in soil compaction, which contributed to water-logging.[240]

In sum, capital-intensive farming techniques, centralized "top-down" decision making, lack of incentives to promote environmental protection, and the limited ecological awareness of workers, managers, and planners resulted in serious environmental degradation in state farms.[241] Indeed, resource degradation on the state farms in Santo Domingo was so severe that it contributed to declining productivity even before the Special Period.[242]

Private farmers had both the knowledge base and the incentives to conserve natural resources.[243] First, private farmland could only be transferred by inheritance, sold to the state, or incorporated into a cooperative farm.[244] This restriction eliminated the incentive to deplete natural resources in order to maximize short-term production and later sell the land for alternative uses.[245] Second, while small farmers were bound by state production quotas, they were free to consume their own surplus, share it with neighbors, or exchange it for other valued goods.[246]

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236. *Id.*
237. *Id.* at 474-75.
238. *Id.* at 475-76.
239. *Id.* at 474, 476-77.
240. *Id.* at 475-76.
241. *See id.* at 477.
242. *Id.* at 472-73.
243. *Id.* at 477.
244. EVENSON, *supra* note 151, at 193.
245. Sáez, *supra* note 231, at 477.
246. *Id.* at 477, 479.

Control over surplus, combined with relative autonomy in decision making and the ability to leave the land to their children, created incentives to ensure the long-term productivity of the land.[247] Third, small farmers' limited access to agricultural inputs created incentives to utilize and refine traditional organic and semi-organic techniques.[248] In general, small farmers combined labor-intensive, traditional methods with modest amounts of agrochemicals, small tractors, and irrigation equipment.[249] They increased local biodiversity and maintained soil fertility by planting a variety of crops, made use of organic pest control and fertilization techniques, and carried out labor-intensive, anti-erosion measures.[250] Small farmers created less pollution and soil degradation than state farms and produced a wide variety of crops and livestock products.[251]

Finally, cooperative farms occupied an intermediate position between private farms and state farms in their use of ecologically sustainable production techniques.[252] Cooperative farms were generally more mechanized, chemical-intensive, and specialized than private farms, but less so than state farms.[253] Common ownership of land and other productive assets, the ability to transfer membership to their children, collective appropriation of surplus production, and collective decision making by an internally elected board created incentives akin to those of private farmers to protect their resource base by using ecologically friendly production methods.[254] However, because the state played a pivotal role in allocating inputs and credits, and in determining the technology to be utilized and the production target and price, the state was able to promote capital-intensive technologies.[255] Therefore, the cooperatives tended to utilize more machinery, irrigation equipment, and agrochemicals, and to have a higher level of specialization than private farmers.[256]

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247. *Id.* at 479.
248. *Id.* at 479-80.
249. *Id.* at 483.
250. *Id.* at 478-80.
251. *Id.* at 483.
252. *See id.* at 480.
253. *Id.* at 480.
254. *Id.* at 480-81.
255. *Id.*
256. *Id.* at 483.

IV. CUBAN AGRICULTURE DURING THE SPECIAL PERIOD

The 1990 collapse of the Soviet Union spelled the end of Cuba's chemical- and machinery-intensive model of agricultural production.[257] Before the Special Period, Cuba had imported 48% of its fertilizers, over 80% of its pesticides and herbicides,[258] and 92% of its petroleum.[259] After the collapse of the Soviet Union, petroleum imports declined by 53%, fertilizer imports by 77%, and pesticide imports by 63%.[260] Spare parts for farm equipment became scarce,[261] and Cuba experienced a sharp decline in both food production and food imports.[262] The demise of the Soviet Union created an economic crisis so severe that average caloric, protein, and vitamin intake in 1993 was 30% lower than the levels achieved in 1989.[263] The crisis was exacerbated by the tightening of the U.S. embargo with the passage of the Cuban Democracy Act of 1992[264] and the Helms-Burton Act of 1996.[265]

In response to the crisis, the Cuban government introduced significant changes in the organization of agricultural production, authorized the creation of agricultural markets, and launched an ambitious program to promote organic and semi-organic farming techniques.[266]

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257. Sáez, *supra* note 139, at 58.

258. *Id.* at 58.

259. MESA-LAGO, *supra* note 3, at 376-77.

260. Sáez, *supra* note 139, at 58.

261. *Id.* at 59.

262. Díaz Vázquez, *supra* note 5, at 50.

263. *Id.* By 1993, average caloric intake was 1863 calories per day—far below the 2100-2300 per day minimum recommended by the U.S. Department of Agriculture. For those most dependent on the state rationing system (primarily the very old and the very young), caloric intake dropped to 1450 calories per day. *See* ECON. RESEARCH SERV., U.S. DEP'T OF AGRIC., CUBA'S AGRICULTURE: COLLAPSE AND ECONOMIC REFORM, AGRICULTURAL OUTLOOK 26 (Oct. 1998), *available at* http://www.ers.usda.gov/publications/agoutlook/Oct 1998/ao255h.pdf.

264. *See* Cuban Democracy Act, 22 U.S.C. §§ 6001-6010 (1992). The Cuban Democracy Act prohibited ships that docked in Cuban ports from entering U.S. ports for 180 days and proscribed sales to Cuba by foreign-based subsidiaries of U.S. companies. As originally enacted, the statute also prohibited family remittances to Cuba. *See* Pub. L. No. 102-484, 106 Stat. 2575 (1992).

265. *See* The Cuban Liberty and Democratic Solidarity (Helms-Burton) Act, Pub. L. No. 104-114, 110 Stat. 785 (1996) (codified in scattered titles of U.S.C.). The Helms-Burton Act imposed penalties on foreign companies doing business with Cuba, permitted U.S. citizens to sue foreign investors who made use of American-owned property confiscated by the Cuban government, and denied entry into the United States to those foreign investors.

266. Sáez, *supra* note 139, at 59. Even before the Special Period, the Cuban government had been concerned about the declining productivity of Cuban agriculture and the mounting costs of imported inputs. In 1985, the Ministry of Agriculture announced a new Food Program (*Programa Alimentario*) designed to diversify agricultural production, to

A. Decentralizing Agricultural Production: The Third Agrarian Reform

The Cuban government responded to food scarcity during the Special Period by reorganizing agricultural production to promote greater productivity. This reorganization consisted of two distinct elements: converting the large state farms into smaller cooperative farms and distributing land in usufruct to thousands of small producers.[267]

1. Conversion of State Farms to Cooperatives

On September 20, 1993, the Cuban Council of State enacted Decree Law No. 142, which transformed the state farms into new units of agricultural production known as Basic Units of Cooperative Production or UBPCs (*Unidades Básicas de Producción Cooperativa*).[268] According to its preamble, the objective of the new law was to increase the efficiency of agricultural production and to create incentives for greater productivity.[269] The expectation was that replacing state farms with smaller, self-managing cooperatives would increase productivity by rewarding UBPC members for exceeding production goals.[270] Moreover, the smaller farms could more easily adopt sustainable farming practices in light of the scarcity of imported agricultural inputs.[271]

Pursuant to Decree Law No. 142, UBPCs were organized as production cooperatives, and were given state lands in permanent usufruct free of charge.[272] Other productive assets (such as buildings, machinery, and tools) were sold to the cooperatives at low prices and on favorable credit terms, and constituted the private property of the

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increase the amount of food produced for domestic consumption, to make the cities of Havana and Santiago self-sufficient in vegetables and root crops, and to boost the production of export crops. Because the Food Program was based on continued aid and trade with the Soviet Union, the program failed to meet its targets and was abandoned in 1993. *See* MESA-LAGO, *supra* note 3, at 272-74, 289; *see also* DEERE, *supra* note 174, at 3-7 (providing a detailed description and analysis of the Food Program).

267. MINOR SINCLAIR & MARTHA THOMPSON, CUBA: GOING AGAINST THE GRAIN: AGRICULTURAL CRISIS AND TRANSFORMATION 18 (2001), *available at* http://www.oxfamamerica.org/publications.

268. DECRETO-LEY NO. 142 [DECREE LAW NO. 142], pmbl., arts. 1, 2 (1993) (Cuba).

269. *Id.* pmbl.

270. *See* SINCLAIR & THOMPSON, *supra* note 267, at 20.

271. *Id.* at 19. One of the resolutions implementing Decree Law No. 142 specifically required UBPCs to utilize animal traction, biopesticides, and biofertilizers to the maximum extent possible and to comply with policies related to the propagation of fruit trees and forests. *See* Ministry of Agriculture Regulations Governing the Basic Units of Cooperative Production, RESOLUCIÓN NO. 354/93, art. 9(t)-(u) (1993) (Cuba).

272. *See* Lucy Martín, *Transforming the Cuban Countryside: Property, Markets, and Technological Change*, *in* SUSTAINABLE AGRICULTURE AND RESISTANCE, *supra* note 10, at 61.

cooperative.[273] UBPCs were, however, subject to state production quotas,[274] and had little autonomy as to what crops they would produce.[275] As a production incentive, the UBPCs were required to sell to the state marketing agency (the *acopio*) only 80% of the overall production goal, and could sell the remaining 20% of the production goal (plus 20% of any surplus amount exceeding the production goal) at the farmers' markets.[276] UBPC members elected the UBPC management, and were paid out of the UBPC revenues in accordance with the incentive scheme developed by each cooperative (including payment in kind out of surplus production).[277] The major difference between the UBPCs and the CPAs is that the CPAs owned their own land, while UBPCs leased state lands for an indefinite period of time.[278]

The transformation of Cuban agriculture proceeded quickly. Between 1993 and 1997, approximately 2856 UBPCs were created.[279] By 1997, UBPCs comprised 42% of the agriculture sector and the state farms' share had been reduced to 33%.[280] CPAs, credit and service cooperatives, and private farmers accounted for the remaining 25%.[281] The creation of UBPCs brought about an important shift in farm size in Cuba, with UBPC farms roughly approximating the size of CPA farms.[282]

The track record of UBPCs with respect to productivity and sustainability has been mixed. On the positive side, production of staple crops rebounded to 95% of 1988 peak production levels by 1996.[283] By 1997, UBPCs were producing more than 70% of Cuba's sugar, 42% of milk, 32% of staples, 12% of vegetables, 36% of citrus, 16% of tropical

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273. *Id.*

274. DECRETO-LEY NO. 142 [DECREE LAW NO. 142], art. 2(c) (1988) (Cuba).

275. Alvarez & Messina, *supra* note 1, at 178. Resolution No. 354/93 provides that UBPCs shall produce the crops specified at their creation and may not deviate from this production plan without state approval. However, UBPC land may be used for subsistence agriculture or to grow crops that are complementary to the main line of production. *See* Resolución No. 354/93, arts. 34-35.

276. Alvarez & Messina, *supra* note 1, at 179.

277. *Id.* at 179-80; *see also* MESA-LAGO, *supra* note 3, at 297.

278. Alvarez & Messina, *supra* note 1, at 180.

279. Omar Everleny Pérez Villanueva, *La reestructuración de la economía cubana: el proceso en la agricultura*, *in* LA ÚLTIMA REFORMA AGRARIA DEL SIGLO, *supra* note 5, at 86.

280. *Id.* at 83.

281. *Id.* Credit and service cooperatives (CCS) are not a distinct form of land tenure. Rather, they are associations of private landholders who receive services and credit through the CCS and may take advantage of economies of scale for certain farming activities. *See* Nieto & Delgado, *supra* note 11, at 54.

282. William A. Messina, Jr., *Agricultural Reform in Cuba: Implications for Agricultural Production, Markets and Trade*, 9 CUBA IN TRANSITION 433, 435 (1999), *available at* http://lanic.utexas.edu/la/cb/cuba/asce/cuba9/messina.pdf.

283. *Id.* at 437.

fruits, 38% of rice, 22% of coffee, and 7% of tobacco.[284] However, many UBPCs, like their predecessor state farms, were operating at a loss.[285] In 1995-1996, 94% of UBPCs suffered losses and required state subsidies.[286] By 1999-2000, UBPC performance had improved, but 37% of UBPCs continued to operate at a loss.[287] Furthermore, even though many UBPCs adopted more ecologically friendly farming techniques (such as the use of biopesticides and animal traction in lieu of chemical pesticides and tractors), these were generally viewed as necessary adaptations to the Special Period, rather than elements of a more sustainable model of agricultural development.[288]

Five major obstacles stood in the way of greater UBPC productivity and greater adoption by UBPCs of ecologically sustainable farming practices. First, notwithstanding the formal autonomy of UBPCs, the state continued to exercise very close operational control over UBPC activity.[289] The state typically dictated how much land would be cultivated, what crop would be grown, what agricultural inputs and technical services would be provided, how much would be produced, and the price for this output.[290] This dependency on the state, coupled with the purchase by the state of virtually all UBPC output at prices set below the market price, created disincentives to increase the efficiency, or the amount, of agricultural production.[291] Second, UBPCs (especially those in sugar cane) experienced labor shortages due to inadequate housing, compensation, and working conditions.[292] Without a federation to represent their interests, it was difficult for UBPC members to bargain with the state.[293] Third, UBPC members often lacked the leadership and technical skills necessary to function as a self-managing cooperative.[294]

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284. *Id.*

285. Carmelo Mesa-Lago, *The Cuban Economy in 1999-2001: Evaluation of Performance and Debate on the Future*, 11 CUBA IN TRANSITION 1, 9 (2001), *available at* http://lanic.utexas.edu/project/asce/pdfs/volume11/mesa-lago.pdf.

286. *Id.*

287. Messina, *supra* note 282, at 437-38.

288. Miriam García Aguiar, *Prácticas productivas y ecológicas en las UBPC. Realidades y desafíos. Estudios de casos*, *in* LA ÚLTIMA REFORMA AGRARIA DEL SIGLO, *supra* note 5, at 231, 238-39, 243-44, 246; *see also* Alvarez & Messina, *supra* note 1, at 182-83.

289. SINCLAIR & THOMPSON, *supra* note 267, at 20-21; *see also* Alvarez & Messina, *supra* note 1, at 182.

290. SINCLAIR & THOMPSON, *supra* note 267, at 20-21; *see also* Burchardt, *supra* note 158, at 178.

291. Mesa-Lago, *supra* note 285, at 8-9.

292. *See* SINCLAIR & THOMPSON, *supra* note 267, at 20-21; *see also* Alvarez & Messina, *supra* note 1, at 183.

293. SINCLAIR & THOMPSON, *supra* note 267, at 20; *see also* Burchardt, *supra* note 158, at 179.

294. Alvarez & Messina, *supra* note 1, at 182.

For example, few UBPC members were well-versed in the complexities of the accounting system, the principles of economics, or the science of biopesticides and biofertilizers.[295] Fourth, after decades of serving as wage laborers, many UBPC members lacked an appreciation for concepts of property and ownership that could translate into entrepreneurial behavior in the context of a self-managed enterprise.[296] Finally, UBPC members were trained to believe in the superiority of high-input, capital-intensive agriculture and considered traditional farming methods as backward.[297] It would take aggressive state promotion of alternative technologies to change this belief system and to prevent UBPC members from reverting to conventional, high-input practices as soon as economic conditions permitted.[298]

2. Distribution of State Land in Usufruct to Small Producers

In addition to converting the state farms to cooperatives, the Cuban government promoted agricultural production by distributing thousands of hectares of state land in usufruct to pensioners, state workers, and private farmers and by promoting urban agriculture.[299]

Decree Law No. 142 authorized the distribution in usufruct of small, dispersed parcels of land that could not be incorporated into UBPCs and of idle lands formerly used to cultivate tobacco.[300] This legislation was enacted to regulate and promote the self-help measures undertaken by the Cuban population to survive the food shortages of the Special Period.[301] For example, in a major departure from past practice, state farms had begun to allow workers to cultivate small plots of land for self-provisioning.[302] In some cases, the land was leased to workers for one crop cycle.[303] In other cases, workers were granted a long-term

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295. *Id.* at 182-83.

296. *See id.* at 183; *see also* SINCLAIR & THOMPSON, *supra* note 267, at 20; Burchardt, *supra* note 158, at 178.

297. *See* Sáez, *supra* note 139, at 62.

298. *See id.*

299. SINCLAIR & THOMPSON, *supra* note 267, at 18.

300. DECRETO-LEY NO. 142 [DECREE LAW NO. 142] (1988) (Cuba). Decree Law No. 142 authorized the granting in usufruct of small (less than half of one half hectare), dispersed parcels of land that could not be incorporated into UBPCs to families and individuals (such as pensioners and regularly employed individuals cultivating the parcels outside of work hours) for subsistence provisioning. It also authorized the distribution in usufruct of dispersed parcels formerly used for the production of tobacco that were not then under cultivation.

301. Carmen Diana Deere et al., *The View from Below: Cuban Agriculture in the 'Special Period in Peacetime'*, 21 J. PEASANT STUD. 194, 213-14 (1994).

302. *Id.* at 211-12.

303. *Id.* at 213.

usufruct akin to private property.[304] It was also common for workers and for local residents not associated with the state farm to simply take over and cultivate unused lands in the absence of any formal arrangement with the state farm.[305] Indeed, even the public lands surrounding the roads and highways of rural Cuba were frequently seized for agricultural production as food became scarce, and as Cubans put into practice Fidel Castro's October 1991 exhortation (during the Fourth Congress of the Cuban Communist Party) that not an inch of land be left uncultivated.[306]

Pursuant to Resolution No. 356/93, the Ministry of Agriculture authorized the distribution in usufruct of small parcels of idle state land for self-provisioning.[307] By the end of 1998, 12,900 hectares had been distributed to 52,500 individuals.[308] Subsequent resolutions authorized the distribution of state lands in usufruct to private farmers for the cultivation of tobacco, coffee, and cocoa.[309] By the end of 1998, 105,576 hectares had been distributed for the cultivation of these crops to just under 20,000 private farmers.[310] The National Association of Small Farmers (ANAP) claimed that its membership increased by 35,000 as a result of these reforms, and now includes retirees, urban workers with rural backgrounds, and college-educated urban dwellers who chose to leave the towns and cities in order to earn a living off the land.[311]

Finally, the Cuban government promoted food production by supporting the booming urban agriculture movement.[312] Prior to 1989, urban gardening was rare in Havana and was viewed as a symbol of

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304. *Id.*

305. *Id.* at 212.

306. *Id.* at 211-12.

307. Juan Valdés Paz, *Notas sobre el modelo agrario cubano en los años 90*, *in* LA ÚLTIMA REFORMA AGRARIA DEL SIGLO, *supra* note 5, at 111; *see* RESOLUCIÓN NO. 356/93 [RESOLUTION NO. 356/93] (1993) (Cuba).

308. Valdés Paz, *supra* note 307, at 111.

309. *Id.* at 112; *see* RESOLUCIÓN NO. 357/93 [RESOLUTION NO. 357/93] (1993) (Cuba) (authorizing the distribution of idle state lands in usufruct for tobacco cultivation); RESOLUCIÓN NO. 419/94 [RESOLUTION NO. 419/94] (1994) (Cuba) (authorizing the distribution of idle state lands in usufruct for the cultivation of coffee and cocoa); RESOLUCIÓN NO. 223/95 [RESOLUTION NO. 223/95] (1995) (Cuba) (authorizing the distribution of idle state lands in usufruct to small farmers with specific production commitments).

310. Valdés Paz, *supra* note 307, at 112. Pursuant to Ministry of Agriculture Resolution No. 357/93, the government distributed 22,960 hectares of land to 12,512 farmers for the cultivation of tobacco. Pursuant to Ministry of Agriculture Resolution No. 419/94, the government distributed 72,616 hectares to 6975 farmers for the cultivation of coffee and cocoa. *Id.*

311. SINCLAIR & THOMPSON, *supra* note 267, at 22.

312. CATHERINE MURPHY, CULTIVATING HAVANA: URBAN AGRICULTURE AND FOOD SECURITY IN THE YEARS OF CRISIS 11 (Inst. for Food Dev. Pol'y, Dev. Rep. No. 12, 1999).

poverty and underdevelopment.[313] During the Special Period, however, Cubans spontaneously began to grow food on balconies, patios and rooftops, and on any available public or private land, including vacant lots and garbage dumps.[314] The Ministry of Agriculture responded to this public initiative by creating an Urban Agriculture Department, which secured land-use rights for urban gardeners and provided technical assistance and information.[315] Urban gardens included privately owned household gardens, community gardens cultivated by local gardening organizations, enterprise and factory gardens designed to provide food for workers and their families, organoponics (where cultivation occurred in raised beds filled with organic matter and soil mix), intensive gardens (where cultivation occurred directly in fertilized soil), hydroponics (state-owned enterprises cultivating crops indoors in a nutrient rich solution), and suburban farms located on the periphery of the cities.[316] Urban gardens soon became significant sources of fresh vegetables for urban and suburban populations, supplying approximately 60% of all of the vegetables consumed in Cuba.[317] By growing food in the city, urban gardeners reduced the pressure on rural areas to feed the entire country, and reduced reliance on energy-intensive transportation and refrigeration systems.[318] Finally, because the use of agrochemical inputs was prohibited within city limits, the urban gardens were also models of organic agriculture, using low cost and environmentally sound cultivation methods based on locally available resources.[319] In short, urban gardening promoted food production, increased food availability, and encouraged ecologically benign cultivation methods.[320]

B. Opening Agricultural Markets

The second major reform undertaken by the Cuban government was to open agricultural markets throughout the country in order to improve food distribution and stimulate food production.[321] On September 19, 1994, the Council of Ministers enacted Decree Law No. 191, which

313. Miguel A. Altieri et al., *The Greening of the "Barrios": Urban Agriculture for Food Security in Cuba*, 16 AGRIC. & HUM. VALUES 131, 133 (1999). Indeed, local ordinances prohibited cultivation of food in front yards, rooftops, and patios and relegated food cultivation to backyards. *Id.* at 133-34.

314. *Id.* at 133-34; MURPHY, *supra* note 312, at 12.

315. Altieri et al., *supra* note 313, at 134.

316. *Id.* at 133.

317. *Id.* at 132; SINCLAIR & THOMPSON, *supra* note 267, at 24.

318. MURPHY, *supra* note 312, at 43.

319. Altieri et al., *supra* note 313, at 135.

320. *See* SINCLAIR & THOMPSON, *supra* note 267, at 23-25.

321. *See id.* at 28-29.

established agricultural markets (*mercados agropecuarios*) where farmers could sell their products at prices determined by supply and demand.[322] The stated purpose of the new legislation was to create incentives for farmers to produce more food for domestic consumption.[323] Only agricultural production in excess of the mandatory state production quota could be commercialized,[324] and sellers would be taxed for the space and other services provided by the market.[325] Among the entities and individuals currently authorized to participate in the markets are state farms, nonsugar cane UBPCs, CPAs, credit and service cooperatives, private farmers, tillers of dispersed parcels of farmland, and tillers of private subsistence plots.[326]

The immediate impetus for the creation of the agricultural markets was the need to increase food production, to combat the booming black market, and to address food shortages in the state's food rationing system.[327] Before the Special Period, Cubans obtained most food items through the rationing system, established in 1962,[328] which entitled each household to purchase a specific number of rationed items at subsidized prices.[329] As food imports and domestic production declined during the Special Period, black market prices experienced a sharp rise,[330] and many farmers diverted agricultural production to the black market.[331] This resulted in severe disarray of the state food distribution system and food shortages in the government-run ration stores.[332] Even though Fidel Castro was adamantly opposed to the establishment of free peasant markets based on Cuba's short-lived experiment with such markets in the 1980s,[333] declining agricultural production during the Special Period forced his hand.[334]

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322. DECRETO-LEY NO. 191 [DECREE LAW NO. 191], arts. 1, 4 (1994) (Cuba).

323. *Id.* pmbl.

324. *Id.* art. 2(a).

325. *Id.* art. 5.

326. Joint Resolution of the Ministry of Agriculture and the Ministry of Internal Trade, RESOLUCIÓN NO. 1/00, art. 16 (2000) (Cuba) (superseding earlier versions of this regulation).

327. MESA-LAGO, *supra* note 3, at 301.

328. Jose Alvarez, *Rationed Products and Something Else: Food Availability and Distribution in 2000 Cuba*, 11 CUBA IN TRANSITION 305, 306 (2001), *available at* http://lanic.utexas.edu/project/asce/pdfs/volume11/alvarez.pdf.

329. *Id.*

330. Alvarez & Messina, *supra* note 1, at 183.

331. *Id.*

332. *Id.*; *see also* MESA-LAGO, *supra* note 3, at 301.

333. MESA-LAGO, *supra* note 3, at 301-302. The agricultural markets created during the Special Period were Cuba's second experiment with farmers' markets. The first farmers' markets were introduced in 1980 in order to encourage agricultural production, eliminate the black market, and provide an incentive for the labor force to work harder in order to earn more money with which to buy the products sold in the market. In 1982, Castro accused the

The agricultural markets played an important role in expanding access to food outside the rationing system.[335] Prior to the opening of the agricultural markets, black market prices were high and sales were conducted almost entirely in U.S. dollars.[336] As a result, Cubans without access to U.S. dollars were precluded from using the black market to supplement their basic food allowance.[337] The opening of the agricultural markets enabled Cubans to purchase food with pesos, and also lowered black market prices by eliminating the "risk premium" associated with illegal activity.[338] The increased availability of food was important from the perspective of food security given the inability of the state's food distribution system to fulfill the population's needs.[339] For example, in the city of Havana, the rationing system was able to supply only 60% of the population's caloric intake, with workplace and school meals providing an additional 8%.[340] Consequently, Havana residents had to rely on the agricultural markets and other sources (such as the black market and backyard production) for approximately one-third of their nutritional needs.[341]

Cubans responded favorably to the opening of the agricultural markets, but prices remained high relative to the purchasing power of the average consumer.[342] It is unclear whether the high prices stemmed from

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farmers of enriching themselves by charging excessively high prices, and threatened to increase their taxes and set a price ceiling. He was also sharply critical of middlemen who hired trucks to transport the agricultural products and then earned significant sums of money selling at the peasant markets. In 1986, Castro again accused the farmers of profiteering and of failing to deliver their production quota to the state in order to divert production to the farmers' markets. The farmers' markets were officially abolished in 1986. *See id.* at 229-30, 265-66; *see also Cuba to Abolish Farmer Markets*, N.Y. TIMES, May 20, 1986, at A5. *See generally* Jennifer Abbassi, *The Role of the 1990s Food Markets in the Decentralization of Cuban Agriculture*, 27 CUBAN STUD. 21-39 (1997) (analyzing the agricultural markets of the 1990s in the context of other economic reforms and contrasting these markets with the 1980s market experiment); Juan Carlos Espinosa, *Markets Redux: The Politics of Farmers' Markets in Cuba*, 5 CUBA IN TRANSITION 51-73 (1995), *available at* http://lanic.utexas.edu/la/cb/cuba/asce/cuba5/FILE.08.PDF (comparing the agricultural markets introduced during the Special Period to the farmers' markets of the 1980s); Jonathan Rosenberg, Politics and Paradox in the Liberalization of a Command Economy: The Case of Cuba's Free Peasant Markets, 1980-1986 (1992) (unpublished Ph.D. dissertation, UCLA) (on file with author) (analyzing the history of Cuba's first experiment with free peasant markets).

334. MESA-LAGO, *supra* note 3, at 301-02.
335. Messina, *supra* note 282, at 438.
336. *Id.*
337. *Id.*
338. *Id.*
339. *Id.*
340. *Id.*
341. *Id.*
342. *Id.*; *see also* SINCLAIR & THOMPSON, *supra* note 267, at 28.

underproduction, from price gouging by farmers, or from excessively high premiums charged by the relatively few individuals who owned trucks and could ship the goods to market.[343] In any case, Cuban consumers could avoid the high agricultural market prices by sporadically and informally purchasing food from a variety of other sources, including urban gardeners (often friends or neighbors), small farmers cultivating land on the periphery of cities, and organoponics.[344] In August 2000, the Cuban government attempted to regulate this informal commercial activity, and to mitigate the high prices charged on the agricultural markets, by authorizing the sale of food in various outlets, including fixed maximum price agricultural markets, organoponics, urban gardens, dispersed parcels, CPAs, and state-run food fairs.[345] In the aftermath of these reforms, low-income Cubans purchased most of their food in these other outlets rather than in the agricultural markets.[346] These outlets came to handle approximately 50% of all fruit and vegetable purchases in Cuba, while the agricultural markets handled only 10%.[347] In addition, the state continued to promote food security by providing targeted food assistance to the unemployed, low-income workers, children, pregnant women, and the elderly.[348]

C. Promoting Sustainable Agriculture

The third major reform promoted by the Cuban government during the Special Period was organic farming.[349] The Cuban experiment with

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343. SINCLAIR & THOMPSON, *supra* note 267, at 29.

344. *See* MARÍA CARIDAD CRUZ & ROBERTO SÁNCHEZ MEDINA, AGRICULTURA Y CIUDAD: UNA CLAVE PARA LA SUSTENTABILIDAD 83-85 (2001) (describing the informal commercialization of agricultural products prior to the reforms allowing direct sales to the public).

345. *See* RESOLUCIÓN NO. 1/00 [RESOLUTION NO. 1/00], arts. 7, 10, 16 (2000) (Cuba) (authorizing the sale of food in fixed maximum price agricultural markets and in various other outlets, including urban gardens, cooperatives, and dispersed parcels); *see also* Alvarez, *supra* note 328, at 308-19 (describing the various food outlets in Cuba and comparing them on the basis of assortment, quality, quantity, and price); CRUZ & MEDINA, *supra* note 344, at 86-93.

346. SINCLAIR & THOMPSON, *supra* note 267, at 29.

347. *Id.*

348. Nieto & Delgado, *supra* note 11, at 49.

349. This Article uses the term "organic" in accordance with the definition provided by the U.S. Department of Agriculture. Organic production is defined as follows:

> a production system which avoids or largely excludes the use of synthetic compounded fertilizers, pesticides, growth regulators and livestock feed additives. To the maximum extent feasible, organic farming systems rely upon crop rotations, animal manures, legumes, green manures, off-farm organic wastes and aspects of biological pest control to maintain soil productivity and tilth, to supply plant nutrients and to control insects, weeds and other pests.

organic agriculture rested on three pillars: private farmers, the scientific infrastructure, and the state.

As explained in Part III.E of this Article, private farmers, using traditional low-input agricultural techniques, had been the backbone of ecologically sustainable agriculture in Cuba.[350] They had economic incentives to protect the land they cultivated, limited access to capital-intensive farming inputs, and generations of experience with ecologically benign agricultural methods.[351] When the collapse of the socialist bloc produced a shortage of agricultural inputs, private farmers were quick to adapt because they had not become dependent on imported petroleum, animal feed, pesticides, or fertilizers.[352] Moreover, declining food imports and declining food production in the state sector created enormous demand for agricultural products and a booming black market.[353] Rather than declining, the productivity of many private farmers either remained steady or increased during the Special Period.[354] The accumulated knowledge of the Cuban farmer played a critical role in helping Cuba recover from the food crisis precipitated by the 1990 collapse of the socialist trading bloc.[355]

The second pillar of organic agriculture in Cuba was the scientific infrastructure. After the 1959 Revolution, Cuba developed an extensive

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NICHOLAS PARROTT & TERRY MARSDEN, THE REAL GREEN REVOLUTION: ORGANIC AND AGROECOLOGICAL FARMING IN THE SOUTH 12 (2002), *available at* http://www.blauen-institut.ch/tx/tp/tpg/525green (quoting the USDA definition). A related term used in this Article is "agroecology." Agroecology focuses less on the technical standards of production and more on interrelated sociocultural and ecological aspects of the production system. It is an interdisciplinary approach to agricultural issues that is rooted in the environmental movement, in the science of ecology, in the analysis of indigenous agroecosystems, and in rural development studies. Such an approach recognizes that social factors, such as a collapse in market prices or changes in land tenure, are as relevant to the study of agricultural ecosystems as drought, pests, and declining soil fertility. In other words, the agricultural ecosystem is influenced by both endogenous biological and environmental factors as well as exogenous social and economic factors, and both factors must be examined in order to explain a system of agricultural production. *See generally* MIGUEL A. ALTIERI, AGROECOLOGY: THE SCIENCE OF SUSTAINABLE AGRICULTURE 4-19 (1995).

350. Sáez, *supra* note 139, at 56.

351. See *supra* notes 228-258 and accompanying text for a discussion of the relationship between land tenure and agricultural practices.

352. Deere et al., *supra* note 301, at 225.

353. *Id.*

354. *Id.*; *see also* Peter M. Rosset, *Cuba: Ethics, Biological Control, and Crisis*, 14 AGRIC. & HUM. VALUES 291, 296 (1997) [hereinafter Rosset, *Cuba: Ethics, Biological Control, and Crisis*]; Peter M. Rosset, *Alternative Agriculture Works: The Case of Cuba*, MONTHLY REV., July-Aug. 1998, at 137, 141; Rosset, *supra* note 9, at 37.

355. *See* Fernando Funes, *The Organic Farming Movement in Cuba*, *in* SUSTAINABLE AGRICULTURE AND RESISTANCE, *supra* note 10, at 15.

and sophisticated network of crop and animal research institutes.[356] Cuban researchers had been experimenting with biopesticides since the 1960s, and had developed pest control strategies involving ants, trap crops, bacteria, and parasitic wasps.[357] Beginning in 1982, some researchers openly began to criticize the capital-intensive model of agricultural development for its reliance on foreign inputs and for its ecological consequences, and directed their research toward agroecological alternatives.[358] When the Special Period plunged the Cuban economy into a state of crisis, Cuba, with 2% of Latin America's population but 11% of its scientists, was able to mobilize its research infrastructure to develop substitutes for the unavailable agricultural inputs.[359] By 1993, Cuba had 14 centers for ant production and 222 mini-centers for the production of biopesticides and biofertilizers.[360] As a consequence of many years of research and experimentation, green manure crops such as sesbania, sorghum, cowpeas, soybeans, and velvet beans were being promoted, and vermicomposting (the use of earthworms to produce high quality humus) was being used to produce fertilizer.[361] Other nonchemical fertilization techniques, such as crop residues, composted municipal waste, sugar cane wastes, animal manure, and composted wastes from food processing plants, were also being utilized.[362]

The third pillar of organic agriculture in Cuba was the state.[363] The shift to organic agriculture was spearheaded by the Ministry of Agriculture, which applied agroecological research results on a large scale to mitigate the effects of the Special Period on agriculture.[364] In response to the sharp decline in the availability of chemical inputs, the Ministry of Agriculture launched a national program to convert the agricultural sector to low-input, self-reliant farming practices.[365] Chemical fertilizers were replaced by biofertilizers, and chemical pest management was replaced by the ecological management of pests, diseases, and weeds through the use of predators, insect pathogens, and plants with insecticidal, fungicidal, bactericidal, and herbicidal

356. THE GREENING OF THE REVOLUTION, *supra* note 7, at 74.
357. Sáez, *supra* note 139, at 59.
358. THE GREENING OF THE REVOLUTION, *supra* note 7, at 27.
359. Rosset, *supra* note 9, at 38.
360. Sáez, *supra* note 139, at 59.
361. *Id.*
362. *Id.*
363. THE GREENING OF THE REVOLUTION, *supra* note 7, at 29.
364. Funes, *supra* note 355, at 15.
365. Rosset, *Cuba: Ethics, Biological Control, and Crisis*, *supra* note 354, at 294.

qualities.[366] Tillage with oxen rather than tractors, although initially prompted by the lack of fuel, tires, and spare parts, became an important tool to reduce soil erosion and cut down on weeds.[367]

The shift to organic agriculture in Cuba resulted in the recovery and restoration of farmland that had been depleted by decades of capital-intensive agricultural practices.[368] Organic amendments, biofertilizers, and green manure were applied on state farms on a massive scale to increase the productive capacity of the land.[369] Traditional conservation techniques developed by Cuban farmers were utilized in conjunction with alternative techniques developed by research institutes for the management, conservation, and recovery of compacted, salinized, eroded, and otherwise degraded soils.[370]

One of the distinguishing features of agricultural production in Cuba after the Special Period was crop diversification.[371] Diversification was made possible by the reduced scale of Cuban agriculture after the third agrarian reform.[372] In sharp contrast to the prevalent practice of monocropping on state farms and cooperatives prior to the Special Period, nearly all Cuban farms are currently producing food alongside their cash crop.[373] Intercropping of corn and cassava, plantains and cassava, coffee and taro, and soybean and sugar cane, for example, has become a common practice.[374] This practice provides food for farmers and their families, earns greater income for the agricultural enterprise,[375] enhances agricultural productivity, improves soil condition, and helps control harmful pests and diseases.[376]

Finally, other successful examples of organic farming in Cuba include urban agriculture, widespread small-scale organic rice production, and the production of medicinal plants.[377] Cuba has also been experimenting with organic sugar production, organic citrus production,

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366. Funes, *supra* note 355, at 16-17.

367. *See* Rosset, *Cuba: Ethics, Biological Control, and Crisis*, *supra* note 354, at 294; *see also* SINCLAIR & THOMPSON, *supra* note 267, at 26.

368. Rosset, *Cuba: Ethics, Biological Control, and Crisis*, *supra* note 354, at 294.

369. SINCLAIR & THOMPSON, *supra* note 267, at 26.

370. Funes, *supra* note 355, at 18.

371. SINCLAIR & THOMPSON, *supra* note 267, at 27.

372. *Id.*

373. *Id.*

374. *Id.*

375. *Id.* at 27-28.

376. Antonio Casanova et al., *Intercropping in Cuba*, *in* SUSTAINABLE AGRICULTURE AND RESISTANCE, *supra* note 10, at 145.

377. Funes, *supra* note 355, at 18-19.

organic tropical fruits for the tourism sector and for export, and organic coffee and cocoa.[378]

V. EVALUATING THE REFORMS OF THE SPECIAL PERIOD

The reforms introduced by the Cuban government during the Special Period have produced a remarkable turnaround in agricultural production. Among the most significant accomplishments are the following:

A. Enhanced Agricultural Productivity

The establishment of the UBPCs, the distribution of land to small producers, and the opening of the agricultural markets enhanced food production and food availability relative to the 1993-1994 levels.[379] With the exception of the sugar, meat, and dairy sectors,[380] agricultural production steadily recovered from the economic crisis of the mid-1990s.[381] The gain was achieved by increasing productivity rather than increasing land under cultivation, and reflected a reorientation of Cuban agriculture to produce more food for the domestic market in addition to producing for export.[382] Production levels for staple crops such as plantains, beans, cereals, potatoes, and tomatoes have increased significantly since 1994, and are often higher than pre-crisis levels.[383] For example, from 1989 to 2000, production of tubers and root crops increased by 106%, and bean production and corn production increased by 318% and 332%, respectively.[384] With respect to export crops, tobacco, citrus, and coffee have experienced significant recovery, while

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378. *Id.* at 19-20.

379. Messina, *supra* note 282, at 441.

380. In the year 2000, production of milk had declined by 48% relative to 1989 production levels. Egg production had declined by 37%. The number of cattle heads, which peaked at 6.8 million in 1967 and dropped to 4.6 million in 1993, declined to 4.4 million in 1999. The reason for this decline is that the model for animal production developed through Soviet aid was highly dependent on imported feed, medicine, and sophisticated shelter. Reorienting animal production using native breeds and locally produced feed would take time. *See, e.g.*, Funes, *supra* note 355, at 17-18; Rosset, *Cuba: Ethics, Biological Control, and Crisis*, *supra* note 354, at 8; SINCLAIR & THOMPSON, *supra* note 267, at 34.

381. SINCLAIR & THOMPSON, *supra* note 267, at 33-36; *see also* Nieto & Delgado, *supra* note 11, at 44 (comparing the production of selected commodities in Cuba in 1989 and 1998).

382. SINCLAIR & THOMPSON, *supra* note 267, at 33.

383. *Id.*

384. Alvarez, *supra* note 329, at 320.

sugar production remained well below the levels attained before the Special Period.[385]

B. Agricultural Diversification and Reduction of Trade Dependency

Cuban agriculture has become more diverse in terms of the variety of crops cultivated and in terms of land tenure and production methods.[386] With the conversion of the state farms to cooperatives, the expansion of urban agriculture, the growing practice of self-provisioning in state enterprises and on state farms and cooperatives, and the increase in the number of small producers, agricultural production in Cuba has become more varied and decentralized than before the Special Period.[387] Rather than concentrating on a handful of export-oriented crops, Cuban farms now produce food crops alongside cash crops.[388] Between 1994 and 1999, production of root crops and plantains tripled and vegetable production quadrupled.[389] Between 1994 and 1998, potato production increased by 75% while cereal production rose by 83%.[390]

The Cuban economy has also become more diversified in terms of exports and less dependent on a single trading partner. In the year 2000, Cuba's primary trading partners were Venezuela (13.9% of trade), Spain (13.4%), Canada (9%), the Netherlands (8.3%), China (7.6%), Russia (6.7%), Mexico (5.1%), France (5.1%), and Italy (4.8%).[391] Sugar continues to be the main source of export revenue, but nickel production is quickly catching up.[392] As a percentage of total export revenues, sugar dropped from 70% in 1992 to 39% in 1998.[393] However, the poor performance of the sugar sector, rather than the strong performance of other sectors, accounts for this shift in export composition.[394] Sugar production occupies 48% of Cuba's cultivated land, employs 400,000 people, and receives more resources than any other sector of Cuban

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385. SINCLAIR & THOMPSON, *supra* note 267, at 35-36. Sugar production in 1989 was 8.1 million tons. It dropped to 3.3 million tons in 1995 and rose to 4.4 million in the 1999-2000 harvest. These results have been attributed to declining soil fertility and to technical mistakes, such as cutting sugar too early. The economic consequences of the decline in sugar production were exacerbated by low world market prices for sugar in the 1990s. *Id.*

386. *See id.* at 27-28, 37.

387. *See id.* at 27-28.

388. *Id.* at 27.

389. *Id.*

390. *Id.*

391. Mesa-Lago, *supra* note 285, at 5.

392. *Id.* at 7.

393. SINCLAIR & THOMPSON, *supra* note 267, at 36.

394. *Id.*

agriculture.[395] The Cuban government must decide whether to continue to invest in sugar production (including sugar byproducts, such as rum, paper, fertilizer, and fuel) or to divert some of this land into the production of crops which are currently imported or show greater export potential.[396] Finally, tourism has become a significant source of revenue for the Cuban government with revenues reportedly reaching 1.8 billion pesos in 1998.[397]

C. Improved Food Security

Between 1989 and 1994, per capita caloric intake in Cuba had dropped from 2908 to 1863 calories.[398] According to some estimates, the average Cuban lost twenty pounds during this period.[399] As explained in Part IV of this Article, Cuba was able to survive the crisis by restructuring productive relations to increase food production and by improving food distribution. As a consequence of the opening of the farmers' market, the growth of private production, and the availability of multiple venues for the marketing of production, food consumption began to climb in 1994.[400] By 2000, per capita caloric intake had risen to 2585, just under the minimum level recommended by the World Health Organization.[401]

D. Ecological Sustainability

Cuban agriculture is now more ecologically sustainable as a consequence of the drop in agricultural inputs occasioned by the Special Period and of the Cuban government's promotion of low-input organic methods. By the end of 1998, Cuban farmers were cultivating 4.5 million hectares of arable land.[402] According to one estimate, approximately 1.5 million hectares were being cultivated using organic methods.[403] Nearly 50% of fresh vegetables and 65% of rice are currently organic.[404] However, the behavior of key export sectors raises questions

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395. *Id.*
396. *Id.*
397. Gary H. Maybarduk, *The State of the Cuban Economy 1998-1999*, 9 CUBA IN TRANSITION 1 (1999), *available at* http://lanic.utexas.edu/la/cb/cuba/asce/cuba9/maybar1.pdf; *see also* Mesa-Lago, *supra* note 285, at 6.
398. SINCLAIR & THOMPSON, *supra* note 267, at 42.
399. *Id.* at 10.
400. Nieto & Delgado, *supra* note 11, at 47-48.
401. SINCLAIR & THOMPSON, *supra* note 267, at 42.
402. *Id.* at 43.
403. *Id.* at 26.
404. PARROTT & MARSDEN, *supra* note 349, at 28.

about Cuba's long-term commitment to organic agriculture. Cuba continues to rely on chemical-intensive methods for the production of export commodities such as sugar and tobacco, and it is unclear that the vast majority of Cuban agricultural engineers and technicians see "green" agricultural techniques as anything but an accommodation to economic exigencies.[405] While the current scarcity of foreign exchange favors the development of organic agriculture, it remains to be seen whether the Cuban government will continue to promote this model once economic conditions improve.

VI. CONCLUSION

From the colonial period through the early 1990s, the Cuban economy has been characterized by the concentration of landholding in either private or state hands, the sugar monoculture, debilitating dependency on a primary trading partner, and reliance on imports to satisfy the nutritional needs of the population. Furthermore, during the first three decades of the Revolution, the Cuban government adopted a capital-intensive, export-oriented agricultural development model that produced serious ecological harm and did little to promote food security. When the collapse of the socialist trading bloc in 1990 plunged the Cuban economy into a state of crisis, the Cuban government responded by transforming its agricultural development model. The first step was to change the organization of agricultural production by altering land tenure. The Cuban government converted the large, inefficient state farms into smaller agricultural cooperatives, distributed land to private producers, and supported the booming urban agriculture movement. The second step was to open agricultural markets in order to improve food distribution and encourage food production. The final step was to promote low-input, ecologically sustainable agricultural practices.

As a consequence of the reforms undertaken by the Cuban government, Cuba has achieved an unprecedented degree of agricultural diversification as well as enhanced food security, reduced reliance on one or more trading partners, and improved environmental stewardship. Despite these achievements, problems remain. Sugar production continues to absorb tremendous resources and to constitute Cuba's primary export product.[406] Agricultural productivity remains low, and may be difficult to remedy without resort to high-input agriculture.[407]

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405. DÍAZ-BRIQUETS & PÉREZ-LÓPEZ, *supra* note 9, at 272-74.
406. SINCLAIR & THOMPSON, *supra* note 267, at 36.
407. *Id.* at 42.

State control over cooperatives (UBPCs and CPAs) and over private farmers continues to discourage greater efficiency and productivity.[408] Labor-intensive organic production may be difficult to maintain in the face of rural labor shortages.[409]

Notwithstanding these problems, the greatest challenge to the agricultural development strategy adopted by the Cuban government in the aftermath of the Special Period is likely to be external—the renewal of trade relations with the United States. From the colonial era through the beginning of the Special Period, economic development in Cuba has been constrained by Cuba's relationship with a series of primary trading partners. Cuba's export-oriented sugar monoculture and its reliance on imports to satisfy domestic food needs was imposed by the Spanish colonizers, reinforced by the United States, and maintained during the Soviet era.[410] It was not until the collapse of the socialist trading bloc and the strengthening of the U.S. embargo that Cuba was able to embark upon a radically different development path.

Cuba was able to transform its agricultural development model as a consequence of the political and economic autonomy occasioned by its relative economic isolation, including its exclusion from major international financial and trade institutions.[411] Paradoxically, while the U.S. embargo subjected Cuba to immense economic hardship, it also gave the Cuban government free rein to adopt agricultural policies that ran counter to the prevailing neoliberal model and that protected Cuban farmers against ruinous competition from highly subsidized agricultural producers in the United States and the European Union.[412] Due to U.S.

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408. *Id.* at 41.

409. *Id.* at 26.

410. Cuba's pattern of agricultural development is hardly unique. Export-oriented agricultural production and dependence on food imports are key features of the agricultural development model adopted in the Caribbean basin and in much of the developing world. *See* Laura J. Enriquez, *Cuba's New Agricultural Revolution: The Transformation of Food Crop Production in Contemporary Cuba*, FOOD FIRST DEV. REP. NO. 14 (May 2000), *available at* http://www.foodfirst.org/pubs/devreps/dr14.html.

411. SINCLAIR & THOMPSON, *supra* note 267, at 43.

412. *Id.* at 44-45. For example, in 1998, the industrialized countries that are members of the Organization for Economic Cooperation and Development (OECD) provided subsidies of approximately $352 billion to domestic agricultural producers. OECD, AGRICULTURAL POLICIES IN OECD COUNTRIES: MONITORING AND EVALUATION 2000, tbl. III.1 (2000). These subsidies enable agribusiness in wealthy countries to undercut competitors on world agricultural markets by selling agricultural products at prices well below the cost of production—a practice known as export dumping. The dumping of agricultural commodities on world markets harms developing countries by depressing international prices for agricultural exports, reducing the market share and revenues of developing country agricultural exporters, and driving out of business developing country farmers producing for the domestic market. When farmers in developing countries are driven off the land, domestic

pressure, Cuba was excluded from regional and international financial institutions, including the International Monetary Fund, the World Bank, and the Inter-American Development Bank.[413] Cuba also failed to reach full membership in any regional trade association and was barred from the negotiations for the Free Trade Area of the Americas (FTAA).[414] However, as U.S. agribusiness clamors to ease trade restrictions with Cuba, the lifting of the embargo and the end of Cuba's economic isolation may only be a matter of time.[415]

It is unclear how the Cuban government will respond to the immense political and economic pressure from the United States to enter into bilateral or multilateral trade agreements that would curtail Cuban

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food production declines, and the country becomes increasingly dependent on food imports to satisfy subsistence needs. A country that relies on food imports for a significant percentage of the domestic food supply must maintain steady and reliable access to foreign exchange in order to purchase the food. Countries that rely on one or two export commodities (such as sugar, coffee, cotton, or cocoa) for the bulk of foreign exchange earnings are highly vulnerable to the declining terms of trade for primary agricultural exports and to fluctuations in world market food prices. Consequently, export dumping by the United States and by other industrialized countries poses a serious threat to food security. According to a recent study by the Institute for Food and Agricultural Trade Policy, the United States is one of the world's leading export dumpers. *See* INST. FOR AGRIC. TRADE & POLICY, CANCUN SERIES PAPER NO. 1, UNITED STATES DUMPING ON WORLD AGRICULTURAL MARKETS 2-14 (2003), *available at* http://www.tradeobservatory.org.

413. SINCLAIR & THOMPSON, *supra* note 267, at 45. The structural adjustment policies mandated by the World Bank and the International Monetary Fund (IMF) as a condition for obtaining financing or as a precondition to the restructuring of existing debt have required developing countries to open up their markets to foreign competition, to reduce domestic food subsidies, and to prioritize the production of export commodities at the expense of domestic food self-sufficiency. *See* INST. FOR AGRIC. TRADE & POLICY, *supra* note 412, at 13; *see also* JOHN MADELEY, HUNGRY FOR TRADE 57-59 (2000). Cuba's exclusion from these financial institutions has enabled Cuba to pursue policies directly at odds with these World Bank and IMF prescriptions.

414. Mesa-Lago, *supra* note 285, at 5. Free trade agreements, such as the WTO Agreement on Agriculture, have required developing countries to open up their markets to ruinous and unfair competition from industrialized country producers while doing little to curb industrialized country export dumping. *See generally* Gonzalez, *supra* note 200 (analyzing the asymmetries in the WTO Agreement on Agriculture that enable industrialized countries to maintain agricultural subsidies while requiring market openness in developing countries).

415. *See* Lizette Alvarez, *U.S. Agribusiness Peddles to the Proletariat in Cuba*, N.Y. TIMES, Sept. 27, 2002, at A6 (describing the efforts of U.S. agribusiness to ease trade restrictions with Cuba); Joaquin Oramas, *Trade with the United States Would Benefit More than 30 States*, GRANMA INT'L (English), Oct. 6, 2002, at 8 (describing the prospects of resolving relations with the United States as positive). In 1990, the U.S. Congress agreed to permit the sale of food and agricultural products to Cuba despite the opposition of influential Republican lawmakers. Cuba is expected to purchase $165 million of agricultural products from the United States in 2002. Alvarez, *supra*.

sovereignty and erode protection for Cuban agriculture.[416] If Cuba accedes to the dictates of agricultural trade liberalization, it appears likely that Cuba's gains in agricultural diversification and food self-sufficiency will be undercut by cheap, subsidized food imports from the United States and other industrialized countries.[417] Furthermore, Cuba's experiment with organic and semi-organic agriculture may be jeopardized if the Cuban government is either unwilling or unable to restrict the sale of agrochemicals to Cuban farmers—as the Cuban government failed to restrict U.S. rice imports in the first half of the twentieth century.[418]

Cuba is once again at a crossroads—as it was in 1963, when the government abandoned economic diversification, renewed its emphasis on sugar production, and replaced its trade dependence on the United States with trade dependence on the socialist bloc. In the end, the future of Cuban agriculture will likely turn on a combination of external factors (such as world market prices for Cuban exports and Cuba's future economic integration with the United States) and internal factors (such as the level of grassroots and governmental support for the alternative development model developed during the Special Period). While this Article has examined the major pieces of legislation that transformed agricultural production in Cuba, and the government's implementation of these laws, it is important to remember that these reforms had their genesis in the economic crisis of the early 1990s and in the creative legal, and extra-legal, survival strategies developed by ordinary Cubans.[419] The

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416. *See* Gonzalez, *supra* note 200, at 478-484 (explaining how the WTO Agreement on Agriculture deprives developing countries of essential tools to promote food security).

417. *See id.* at 476-478 (discussing empirical studies that assess the impact of agricultural trade liberalization in developing countries).

418. Cuba's experiment with organic agriculture may survive if Cuba is able to capture an export niche in the lucrative market for certified organic products. Cuba is already exporting organic grapefruit to Germany and organic winter vegetables to Canada. SINCLAIR & THOMPSON, *supra* note 267, at 45. However, the development of organic agriculture as an export enclave could undermine food security if it displaces domestic food production rather than displacing chemical-intensive export production.

419. The extra-legal survival strategies of Cuban workers and farmers are part of Cuba's informal economy. For purposes of this Article, informality is defined as practices that run counter to the code of conduct prescribed by the state. This behavior may occur even within state bureaucracies. *See, e.g.*, Damian J. Fernandez, *Informal Politics and the Crisis of Cuban Socialism*, *in* CUBA AND THE FUTURE 69, 71 (Donald E. Schulz ed., 1994). A more colorful definition of the informal economy was provided by sociologist Teodor Shanin.

> The concept [of the informal economy] emerged in Africa 25 years ago. Researchers began to notice that there was no economic explanation for how the majority of the population survived. They didn't own land. They didn't seem to have any assets. According to conventional economics they should have died of

distribution of land to thousands of small producers and the promotion of urban agriculture were in response to the self-help measures undertaken by Cuban citizens during the Special Period. As the economic crisis intensified, Cuban citizens spontaneously seized and cultivated parcels of land in state farms, along the highways, and in vacant lots, and started growing food in patios, balconies, front yards, and community gardens. Similarly, the opening of the agricultural markets was in direct response to the booming black market and its deleterious effect on the state's food distribution system. Finally, it was the small private farmer, the neglected stepchild of the Revolution, who kept alive the traditional agroecological techniques that formed the basis of Cuba's experiment with organic agriculture. The survival of Cuba's alternative agricultural model will therefore depend, at least in part, on whether this model is viewed by Cuban citizens and by the Cuban leadership as a necessary adaptation to severe economic crisis or as a path-breaking achievement worthy of pride and emulation.

The history of Cuban agriculture has been one of resistance and accommodation to larger economic and political forces that shaped the destiny of the island nation. Likewise, the transformation of Cuban agriculture has occurred through resistance and accommodation by Cuban workers and farmers to the hardships of the Special Period. The lifting of the U.S. economic embargo and the subjection of Cuba to the full force of economic globalization will present an enormous challenge to the retention of an agricultural development model borne of crisis and isolation. Whether Cuba will be able to resist the re-imposition of a capital-intensive, export-oriented, import-reliant agricultural model will depend on the ability of the Cuban leadership to appreciate the benefits of sustainable agriculture and to protect Cuba's alternative agricultural model in the face of overwhelming political and economic pressure from the United States and from the global trading system.

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hunger long ago, but they survived. To understand this, researchers looked at how these people actually lived, rather than at economic models.

Teodor Shanin, *How the Other Half Live*, NEW SCIENTIST, Aug. 3, 2002, at 44.