



Interrogating Structural Conditions for Agricultural Production A Comparative-Historical Study of Cuban Incorporation, Delinking and Exile

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Abstract

An important, contemporary focus of scholarship is on the necessary structural conditions to promote a sustainable transition in agriculture. This study examines the possible role of anti-systemic structures, delinked and exilic, in conditioning transitions to agroecological production. I conduct a comparative-historical analysis of two periods, 1959–1991 and 1992–2016, within a single case, Cuba. The results provide evidence that the prevalence of delinking with incorporation maintains an industrial model of agricultural production, even while bringing the law of value under sovereign control. In this way, the existence of delinking as one type of anti-systemic structure is not a sufficient condition for increasing agroecological production; although data suggests that delinking can provide important tools to support sustainable transitions in future periods. In the second period characterized by increasing prevalence of an exilic structure in conjunction with delinking, results demonstrate that anti-systemic structures operate complementary to one another and can maintain partial incorporation while increasing the application of agroecological production. As such, this study provides a rationale for future research and action on anti-systemic structural mixture conditioning sustainable transitions.

Keywords: Incorporation, Delinking, Exile, Agricultural Production, Cuba



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In the twenty-first century, industrial agricultural production has an increasingly negative environmental impact, from deleterious land-system change to disruption of biogeochemical flows and loss of biosphere integrity (SRC 2015). The exacerbation of these harmful conditions tends toward a crisis, wherein increasing droughts and pests and decreasing yields push higher food prices and conflicts over resources (IPCC 2014). The Food and Agriculture Organization of the United Nations (FAO 2017) argues for agroecology as one adaptation and mitigation strategy to address these challenges.

However, while organizations like the Intergovernmental Panel on Climate Change (IPCC) and FAO present agroecosystemic crisis and possible solutions, they often omit structural obstacles to beneficial change. Critical scholars argue that incorporation into the capitalist world-economy conditions a rise in farms employing ecologically harmful agricultural production practices more dependent on external, capital-intensive, and synthetic inputs (Foster 1999). Additionally, recent scholarship contends that current structural conditions are likely to decrease the long-term resilience of farms that implement agroecological production practices (Holt-Gimenez, Shattuck, and Lammeren 2021). Therefore, does an agroecological transition in production require anti-systemic, agrarian structural change?

In offering a response to that question, this article contributes to current debates on conditions for sustainable transitions by comparing agricultural production in different structural arrangements (see Antonio and Clark 2015 and Clark et al. 2021 for reviews of competing frameworks within the debate). Within this debate, there has been a tendency to over-determine anti-systemic structures by centering state socialist experiments in the twentieth century and committing an absolutist error about state control of economic development (Engel-Di Mauro 2021). There is an assumption, often explicit in liberal scholarship, that the state operates as an all-encompassing system able to act without regard for the dynamics of the capitalist world-economy, internal contestation of state control or the ecological impacts of prior (neo-)colonial development (McIntyre and Thornton 1978; Díaz-Briquets and Pérez-López 2000; Engel-Di Mauro 2021). This overemphasis on absolutist state socialism ignores a more complex and dynamic view of anti-systemic structures presented by world-system analysis, foreclosing epistemologically the terrain of the possible (Sousa Santos 2014).

To address this omission, I interrogate the question, how do different structural amalgams condition agricultural production? I accomplish this task through a comparative-historical analysis of Cuba across two periods from 1959 to 2016, representing differing mixtures of incorporation (within-capitalist world-economy structure), delinking (state-led, in-between, anti-systemic structure), and exile (outside, non-state, anti-systemic structure). Based on the results of this analysis, I argue that what type of structure is more prevalent within the overall mixture differentiates agricultural production, with evidence that increasing the prevalence of an exilic, anti-systemic structure conditions a transition toward more agroecological production.

Structural Conditions

The main premise is that contemporary agricultural production is conditioned by structural amalgams of capitalist world-economy and anti-systemic structures. These structures are produced through three processual conditions, incorporation, delinking, and exile (see Table 1 for characteristics).

Table 1. Characteristics of Structural Conditions.

Structural Condition	Incorporation	Delinked	Exile
Characteristics	<ul style="list-style-type: none"> ● Commodified social relations with the capitalist class and core countries controlling the production process ● (Inter)state administration of class relations, market exchange, and trade with the goal of capital accumulation 	<ul style="list-style-type: none"> ● Mixture of commodified and decommodified social relations with a strengthened sovereign state that reduces or abolishes capitalist class and core control of the production process ● (Inter)state administration of class relations, market exchange, and trade with the goal of national development 	<ul style="list-style-type: none"> ● Decommodified social relations based on mutual aid and substantive reproduction ● Egalitarian, direct democracy controls the production process, market exchange, and trade

Incorporation

Wallerstein (1974, 1979) describes incorporation as a world-historical process of geographic expansion commodifying social relations and increasing (inter)state administration. Commodification is a process through which the dominant mode of valuation becomes exchange value, able to be exploited in the pursuit of a singular goal, capital accumulation (Marx [1867] 1976; Longo, Clausen, and Clark 2015). Worldwide, labor and natural resources become

exploitable things (Clausen and Longo 2012a). Exploitation confers enormous power on the capitalist class, who concentrate economic resources and decide what and how society will produce. This influences the development of technology that can enable the production of more units for less cost over time, thereby increasing the amount of material flowing through the system (Marx [1867] 1976; Schnaiberg 1980). *In toto*, technology is largely instrumentalized and put to use by the capitalist class to reduce the cost of production and increase their capacity to exploit, thereby increasing their capacity to accumulate.

The state plays a key role in the incorporation process. This is because the state requires revenues to sustain and expand overtime, making it a participant in a growth coalition with the capitalist class (Schnaiberg 1980). As well, state administrators can share ideological affinities with the capitalist class, and thus are selected into positions of power because they will participate in commodification (Allen, Longo, and Shriver 2018). Politicians change laws to privatize property relations and make things (more) saleable in the market. Therefore, through the state's role in dictating what is commodified, it has the capacity to alter who is and what is market dependent. As such, the state sets formal rules in modern, hierarchical societies that rationalize market exchange, labor conditions, extent of monopoly, and regulate the production process to instrumentally administrate the accumulation of capital (Portes 2010; Howard 2016).

Delinking

One type of anti-systemic structure, delinking, is conceptualized by Amin (1990) as a “refusal to subject the national development strategy to the imperatives of ‘worldwide expansion’” (Amin 1990: 62). The dominant development policies locked periphery and semi-periphery countries into a dependent position vis-à-vis the core as points in the commodity chain for extracting surplus value. To break this damaging dynamic, Amin (1990) argued for peripheral and semi-peripheral states to bring the law of value under popular control and develop regional associations based on sovereign development (Rosero and Erten 2010). In its most radical form, the argument was for development,

starting from abolition of the dominant forms of private ownership of land factories, and taking agriculture as its base, that is, not envisaging any forced appropriation from the peasants to “hasten industrialization” and opting for the most egalitarian possible income distribution (notably between rural earnings and workers' pay). (Amin 1990: 63)

A quintessential example of delinked states are the twentieth century's socialist states, generally understood as anti-systemic (Arrighi, Hopkins, and Wallerstein 1989; Wallerstein 2014). These states, at times, resisted imperialist aggression from the core (e.g., the United States) and established sovereignty and national identities. Importantly, this increased sovereignty altered the role of the state vis-à-vis industrial and agriculture policy and shifted class structures.

Even while these movements decommodified social relations, reduced exploitation, and reclaimed sovereignty, certain delinking policies reinforced incorporation into the capitalist world-

economy. Socialist states externally operated through capitalist markets, commodifying the goods they produced by appropriating from primary producers to bring in foreign exchange to purchase imports for economic development (Resnick and Wolff 2002). In that, delinking co-occurs with incorporation. Therefore, these socialist states represented more radical variation for how a state can administrate itself within a capitalist world-economy, just like the distinction between the Welfare State and the Neoliberal State. This is especially true of a delinking tendency toward (inter)state administration to manage incorporation, such as the Soviet model's emphasis on state-led, bureaucratic control over production and exchange with more fully incorporated, core states.

Exile

I interrogate anti-systemic structures through an anarchist lens following the work of Grubačić and O'Hearn (2016) on exile as a structure outside of the capitalist world-economy and (inter)state control, pursuing construction of egalitarian, direct democracy. For example, Scott (2009) points to the use of geography, like steppes, to produce friction between state administration and autonomy. Clastres (1987) describes how various indigenous societies throughout Central and South America enact non-statist political institutions, such as lacking the institution of chief or having a chief who must constantly give and broker rather than take and compete. During the 1700s and 1800s, the Maroons of the Great Dismal Swamp in North Carolina and Virginia utilized a non-state structure to resist slavery, proletarianization, and to band together in solidarity (Shirley and Stafford 2015). In each instance, a non-state structure supports a distance, social and geographical, between encroaching administration and the autonomous reproduction of everyday life.

However, Grubačić and O'Hearn (2016) note that these formulations of non-state structures can omit the role of capital accumulation and call for an anarcho-Marxist synthesis to analyze escape from economic exploitation *and* political domination (O'Hearn and Grubačić 2016). In the case of Scott (2009), there is a totalization of (inter)state administration's current reach, that can erase existing political and economic projects outside the bounds of the state. Rather than totalizing, Braudel (1979) saw that capitalist social relations relied on the continuing reproduction of material life beyond formal exchange. Similarly, Aguirre Beltrán (1967) points to indigenous territories as "regions of refuge" based on a socio-cultural economy in contradistinction to modernity's transactional economy. Building on this economic conception of non-state structures, Grubačić (2014) and Grubačić and O'Hearn's (2016) theory of exile outlines this anti-state *and* anti-capitalist, anti-systemic structure.

Exile is a strategy for territories to de-commodify, deform states and reclaim autonomy, constructing an alternative to the capitalist world-system's commodification through territorial exit (O'Hearn 2005, 2009; Grubačić 2014; Grubačić and O'Hearn 2016; O'Hearn and Grubačić 2016). Territorial exit involves autonomous control over a geographic area and material means of production outside structural imperatives to accumulate (Scott 1990, 2009). A further set of four characteristics are necessary for exile: substantive exchange (social forms of exchange plus ownership over means of production [Polanyi 1944; Federici 2012]), mutual aid (reciprocal,

altruistic community-based action [Kropotkin 2012]), direct democracy (participation of all affected in decision-making process), and egalitarianism (equal power in what decisions get made and how they are executed [Grubačić and O’Hearn 2016]).

Delinking and Exile: Complements and Conflicts

Delinking and exile are not absolutely opposed to one another. Often periods of exile and delinking co-occur in various parts of the world-system. While the Soviet sub-system and other nationalist and communist revolutions of the twentieth century did not break free from the capitalist world-economy, they did fundamentally alter their internal and external social relations through their threat of a more absolute exit. For instance, the revolutionary nationalist revolution in Mexico and its subsequent consolidation led to redistribution policies that expropriated, decommodified and communalized land. Smolski, Castro, and Ross (2018) argue that during revolutionary periods, such as occurred in Mexico from 1910 to 1917 or Russia from 1917 to 1924, exile had a role in subsequent state (de)formation, levels of commodification, and the egalitarianism of subsequent political institutions.

As such, it is necessary to examine how delinking and exile co-occur and shift opportunities to challenge incorporation into the capitalist world-economy. Grubačić (2019) calls for this dialogue, an exilic rethinking of delinking as a series of autonomous and connected communities, similar to Rojava, a revolutionary Kurdish project. Ajl (2018) points toward a much more peasant-centered delinking with the role of the state informed by a populist understanding of the sovereign political subject as the “people.” Scholars of delinking in the global South argue for the state to support peasant movements in developing agroecology by expanding their ownership of land and autonomous control over the production process (Ajl 2018, 2019).

This is because delinking tends to lead to decommodification of parts of the economy, such as land, which is pivotal for exile. By reducing control over social decisions by the capitalist class and core countries, delinking empowers alternative practices to occur. Yet, because delinking is about the expanded power of the state, it can also negate exile through centralization of control over the production process as an anti-systemic strategy to challenge incorporation’s subjugation of production to the capitalist class. Delinking is then a both/and, a possible structure for expanding exile or incorporation.

Structural Mixes and Agricultural Production

Mixing Delinking and Incorporation to Condition Industrial Agricultural Production

States representing a higher prevalence of delinking in conjunction with incorporation often relied on land redistribution strategies to break the power of large estates that did not uniformly increase peasant autonomy (Enríquez 2010). In certain circumstances, sovereign control over resources and commodification increased intensive, industrial agricultural production and consolidation (Scott 1999; Moore 2008). This was based on a shared view that agriculture should be transformed into

the model implemented by Britain in the 1800s or the United States in the twentieth and twenty-first centuries (Friedmann and McMichael 1989; McMichael 2009; Patel 2013).

A classical example is Lenin's ([1899] 2003) argument that attempts to guard the peasantry and protect the small farm were "reactionary and harmful." The peasantry was primarily conceived as a subordinate revolutionary class to the proletariat or as petty bourgeois impediment to social revolution (Harris 1978). As well, Lenin ([1913] 2004a, [1905] 2004b) presented capitalist agriculture as an advance in terms of the forces of production, and that dividing up and distributing estates to peasants was "a step back from the standpoint of the capitalist development of the given estate" (Lenin [1905] 2004b).

Based on this conception of agricultural production and agrarian structure in the Soviet Union, collectivization brought about larger tracts of land on which standardization of the production process could occur (Scott 1999). This was premised on increasing competitive capacity within the capitalist world-economy. Thus, even though Soviet intellectuals differed ideologically from their US counterparts, they still argued for industrial intensification that, intended or not, reproduced the capitalist world-economy (Clarkson 1978). Industrially scaling up agriculture was good, even if it spurred on the loss of farmers and led to increasing food dependence. Therefore, I argue that a structural amalgam in which delinking and incorporation are more prevalent tends to condition a rise in industrial agricultural production.

Mixing Exile and Delinking to Condition Agroecology

Inferring from prior scholarship, I argue that the increasing prevalence of an exilic anti-systemic structure is a necessary condition for transitioning to agroecological production. I utilize agroecology as a concrete representation of sustainable agricultural production deployed by existing social movements (Altieri and Toledo 2011; Sevilla Guzman and Woodgate 2013; Holt-Giménez et al. 2021). Grassroots activism, such as La Via Campesina, frames agrarian struggle in terms of agroecology as a way to build sovereignty over the food system and rehabilitate the environment (Nyéléni 2007; Borras Jr. 2008; Wittman 2009; Rosset and Martinez-Torres 2012; Meek 2014).

In Zapatista autonomous territories based on voluntary territorial exile there has been a push for agroecology. A pesticide ban was implemented, along with a reduction in the purchase of external inputs that tend to make farmers and peasants dependent upon debt-financed production (Grubačić and O'Hearn 2016; Manning and Bender 2019). This has involved the development of community education programs with coffee growers. Education provides lessons about how herbicides lead to weeds that are harder to combat, as well as the beneficial health effects of reducing the use of toxic chemicals (Manning and Bender 2019).

The Brazilian Landless Workers Movement's (MST) agroecological production also shares characteristics with exile. Due to agroecological practice typically being more labor intensive, there have been moves toward collectively organized labor, which the MST organized at the community level (Wolford 2010; Meek 2014). In both cases, rather than the state or businesses (in this case, transnationals and monopolies), community-based political associations and

cooperatives—representations of exilic formations—leverage culturally relevant knowledge to link the social system sustainably to the ecological system through agroecological practices.

Yet, in both the case of Zapatista autonomous territories and the MST, the role of delinking continues. For Zapatista autonomous territories, the state-led development of *ejidos* provided a land basis for their struggle (Grubačić and O’Hearn 2016). The MST provided support for the Workers’ Party (PT), and received support in kind, which expanded its political capacity (Vergara-Camus 2009). Thus, it is about what structures are more prevalent in the mixture, rather than the existence of one negating the existence of another. The increasing prevalence of delinking and exile within the structural amalgam in a given period is what I argue conditions a transition to agroecological production.

Comparative-Historical Method

This study employs comparative-historical methods to analyze two periods in Cuban history. I classify these periods nominally, with cases chosen for comparative utility (Mahoney 2000; George and Bennett 2005). To nominally measure the prevalence of incorporation, delinking, and exile as structures, I rely on a set of components (see Table 2):

- trade utilizing export data;
- (inter)state administration based on political control externally and internally of production;
- (de-)commodification indicated by whether agriculture’s products and inputs were for exchange value or substantive exchange; and,
- agrarian structure assessed with land tenure data.

Table 2. Components of Nominal Measurement for Structural Condition.

	Incorporation	Delinking	Exile
Trade	Increasing exports based on world market fluctuations	Increasing exports with non-core countries	Decreasing exports
(Inter)state Administration	Lack of sovereignty in periphery	National sovereignty	Direct producer autonomy
(De-)Commodification	Exchange value	State control of the commodification process	Substantive exchange based on mutual aid and reciprocity
Agrarian Structure	Capitalist and/or latifundia land tenure	State land tenure	Smallholder and Cooperative land tenure

To nominally measure agricultural production as industrial or agroecological, I utilize a fixed set of practices as data:

- machinery in the form of tractors, harvesters, oxen, and so on;
- fertilization indicated by type of fertilizer applied and quantity;
- pest management assessed with practices like herbicide application and hand weeding; and,
- land use based on land in cultivation and land in different cultivars.

Agricultural production based on increasing the amount of land in cultivation, especially a monocrop, with increased heavy machinery use and application of synthetic inputs, is representative of industrial production. Agricultural production based on reducing the amount of land in cultivation, expansion of land in cultivation with diverse cultivars, with increasing use of animal traction and biological inputs, is characteristic of a transition toward agroecological production.

Case Justification

The Cuban case is theoretically interesting because of its structural shifts vis-a-vis the capitalist world-economy and their impact upon Cuban agricultural development. The first period, 1959–1991, begins with the triumph of the Cuban Revolution. From that critical juncture, Cuba gained a certain degree of autonomy over its economic development through anti-systemic delinking with support from the Soviet sub-system. This is an important structural condition for understanding how incorporation through a delinked state impacts agricultural production. The second period, 1992–2016, represents the confluence of exilic and delinked anti-systemic structures. Cuba was forced relatively outside of the capitalist world-economy after the collapse of the Soviet sub-system. During this period, Cuba is known for development policy transforming agriculture models from industrial toward agroecological (Funes 2002). As such, Cuba permits a comparative-historical analysis of the conditioning effects of two distinct mixtures of structural conditions on agricultural production.

Data Sources

In this study, I rely on primary data sources. I collected data on secondary descriptive statistics from various censuses and official statistics published by the Cuban government, such as the *Anuarios Estadísticos de la República de Cuba*, *Censos Agrícolas*, and *Boletín Estadístico de Cuba*. These provided descriptive quantitative data on land use, agrarian practices, demographic trends, commercial exchange, and other key data. Additionally, secondary sources, primarily historical, provide important details that contextualize the primary data.

Case Comparison

1959–1991

The period, 1959–1991, begins with the revolutionary triumph that severed incorporative bonds with the United States and ended the dictatorial regime of Fulgencio Bautista. Middle-class intellectuals joined by rural proletarians and industrial workers recruited directly from the peasantry in the Sierra Maestra, who then became the majority of the rebel forces (Wolf 1999). This led the head of the *Instituto Nacional de Reforma Agraria* (INRA), Carlos Rafael Rodríguez, to characterize the revolution as an *agrarian* revolution in the pages of *Cuba Socialista* (Rodríguez 1959). One goal of the revolution was to address the role of sugar monocrop exports in Cuba's economic development (Rodríguez 1959). Specifically, the aim was to control the accumulation and distribution of surplus value derived from sugar exports.

During this period, for Cuba the most important part of inter-state administration was the Soviet sub-system, providing a basis for delinked control over incorporation. U.S. hostility pushed Cuba into agreements with the Soviet Union, as there was a clear economic rationale to shift trade toward a partner that was supportive of the revolution's social justice goals (Mills 1960). When the United States applied sanctions on Cuba, refused to honor its purchases of sugar, and then applied a trade embargo, the Soviet Union stepped in to purchase Cuban sugar exports upon which Cuba was economically dependent (Eckstein 2003). This shift can be clearly seen in a comparison of trade data, with the percentage of trade with socialist countries going from 18.7 percent in 1960, to 70 percent in 1961, and 82.8 percent in 1962 (CEC 1965/66).

Through this relationship, Cuba was able to access oil at below world market price, which Cuba could use for energy, as well as for re-sale to bring in foreign exchange (Pérez-López 1979). Even more, Cuba accessed credit, received scientific support for agricultural production, technical assistance in the form of agricultural inputs, and import food (Blasier 1979). These links with the Soviet sub-system solidified further in 1972, when Cuba became a formal member of the Council for Mutual Economic Assistance. From this moment, Cuban exports and imports began to increase rapidly (Bain 2016). The Soviet Union even renegotiated debt payments and deferred payments to allow for Cuba to continue debt-financing development (Eckstein 2003).

Competition continued within the international division of labor, which had a major role in keeping prices low. Competition in the capitalist world-economy's sugar market steadily increased over this period. Across the globe sugar production rose, with many regions registering 37 to 85 percent increases in production between 1972 and 1984 (Brown 1987). European beet sugar producers were protected to encourage domestic production and discourage imports of cheaper sugar beyond a set quota (Hannah and Spence 1996). That quota provided entry to the European market, but only as a small part of the larger sugar sector. Even more, the European Economic Community would increase its export production from 1974 to 1983 and dump subsidized surpluses when it was convenient (Pollitt 1985). Then, there was the expansion of high fructose corn syrup in the late 1970s, a major change in the world sugar economy. It was transported in liquid form, cheaper, and uniform, increasing demand from processors (Brown 1987). This meant

that sugar cane and beet sugar producers were now competing with corn producers for the same market in sweeteners.

Even with this competition, Cuba remained an important sugar exporter, largely due to the Soviet Union, which also allowed Cuba to sell at world market prices when they would spike. Cuba predominantly exported raw sugar lacking value-added processing, maintaining around one-fifth to one-sixth of global exports over the period when measured in tons (Hannah and Spence 1996). Therefore, it maintained its peripheral status within the hierarchy of production processes, even with the preferential economic prices offered by the Soviet sub-system's form of inter-state administration. Cuba's position in the socialist international division of labor led to production increases by assuring a profitable, continuous export market. As such, while delinked inter-state administration permitted control over the law of value in sugar, it maintained agriculture's incorporation in the capitalist world-economy. This structural mix had important impacts on Cuba's agrarian structure and agricultural production.

The change in land tenure types was the result of agrarian reforms, implemented by the revolutionary government in 1959 and 1963, along with shifting ideas on optimal socialist forms of production and continued support for smallholder farmers. The Agrarian Reform Law of 1959 actualized constitutional provisions that curtailed the owning of large-scale plantations and restricted private property in agriculture (Bianchi 1964; Pérez-López 1991). It did this by restricting ownership to a maximum of 402 hectares, with exceptions for highly productive growers and cattle ranchers (DuMont 1970). The 1959 law's redistribution of land began an important process of providing land to peasants, with up to 32,823 titles granting 382.4 thousand of hectares (Bianchi 1964). Institutionally, this law established INRA, which would execute the nationalizations, redistributions, taxes, tariffs, and other agriculture policies (Bianchi 1964).

In 1963, there was a Second Agrarian Reform Law, that solidified the delinking of land tenure. In part, this second law was meant to counter the reactionary forces in rural areas that had been attacking volunteer brigades and supporters of the revolution, while also abolishing rural capitalists and landowners (Ghai, Kay, and Peek 1988). An even larger portion of land was given over to cooperatives and a state-controlled sector, and the limit on private landholding was set at 67 hectares (Kapcia 2008). With this transfer of land, there was no longer a capitalist or latifundia class in agriculture. In a major way, these reforms brought about an incredible simplification of the land tenure system, resulting in three basic types: smallholder, state, and cooperative. These different types of farms were differentiated not only by size and social relations, but also in terms of the crops that they grew and how decisions were made internally.

Of these types, the state farm, or *granjas del pueblo*, was the dominant type, representing a commitment to socialization based on state ownership. It also meant the continuation of large farms, with their predominant focus on sugar production, as well as dairy, egg, and beef production. By the 1970s, these state farms represented 70 to 79 percent of total land, including non-agricultural land (Pollitt 1982). For the years 1973 to 1976, state land cultivated was approximately 86 to 88 percent of land in production (DCE 1973; CEE 1980). Therefore, in terms of agriculture, state land tenure was dominant with a major focus on exports (i.e., incorporation).

Smallholder farms were the next important land tenure type during this pathway. The first agrarian reform led to 150,210 smallholder farms, which by the 1970s had risen to approximately 213,000 smallholders, if measured by National Association of Small Farmer (ANAP) membership (Burgess 1985). These smallholder farms did not have to pay for their land, either by possessing the title or usufruct rights, and were represented by their mass organization ANAP in terms of affecting state policy.

While the state did not see smallholders as the optimal type of land tenure, they also did very little toward reducing the number of smallholder farmers. There were certain controls at times on production and the government could rent private land, but these waned when they detrimentally impacted rural support (Eckstein 1982). It was more difficult for smallholder farmers to access technology, inputs, and other resources through the state, as preference was given to state and cooperative farms (Alvarez 2004).

What the state did do was to work to persuade smallholder farmers to form and join cooperatives, with some success. Many smallholders participated in Credit and Services Cooperatives (CCS), where they retained autonomous control over production. The CCS was a way to pool together to access economic resources, from loans to technology, without pooling land (González 2012).

Production cooperatives were originally established in sugar production following the first agrarian reform, with 630 cooperatives operating, and converted into state farms in 1962 (González 2012). The next phase of cooperativization occurred in 1975, with the establishment of Agricultural Production Cooperatives (CPA). The CPAs pooled together smallholder farms into a single farm, thereby consolidating fragmented parcels of land (Kay 1987). These CPAs made the use of heavy machinery easier, as it consolidated fragmented land segments, as well as making it easier to provide utilities, such as electricity and schools, as was done in the state land tenure system (Lehmann 1985; Pollitt 1992). Land in cooperatives would rise from 383,000 hectares with 1,128 cooperatives in 1980 to 1,008,800 with 1,378 cooperatives in 1985 (CEE 1980, 1985). These were increasingly seen as a more optimal form of socialist production.

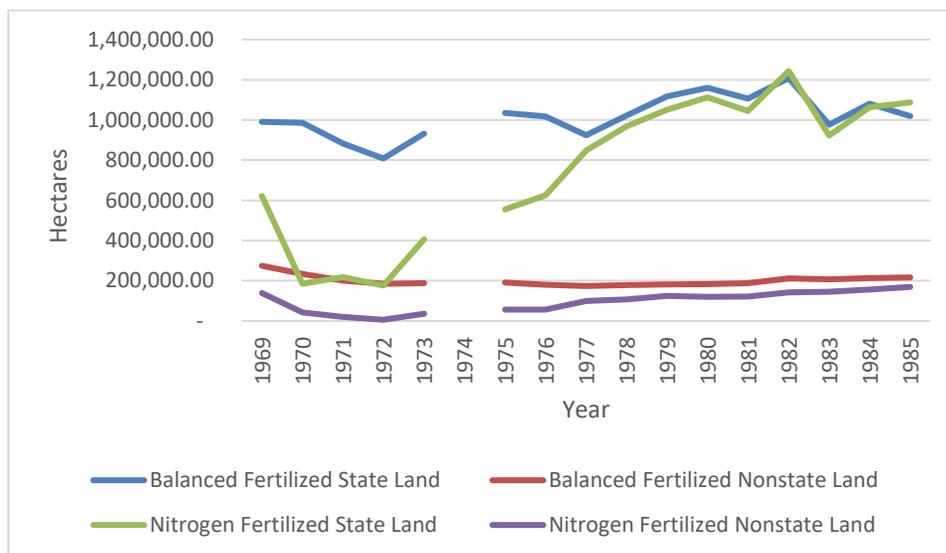
Therefore, during this period land tenure was decidedly marked by delinked relations, in that whether the farm was state or not did not alter the reality that the land had been de-commodified, the capitalist class abolished. The state farms were administered by the bureaucratic class in power and operated by rural proletarians. In the case of cooperatives and smallholder farms, they were directly operated by the peasant class. However, the purpose of production was uneven, with part of production alienated from the direct producers to be sold under the law of value for an exchange value in external markets. Another part was directed toward the state to be distributed in the ration, which while not free, was not meant to produce a surplus value. As such, land tenure is delinked, even while a major reason for production is incorporated.

During this period, there is a long-term trend of intensification (i.e., increasing use of capital-intensive inputs and machinery over labor-intensive) and extensification (i.e., increasing use of land in production). Land in cultivation would see an approximate 26 percent increase from the early 1960s to 1980s (DCE 1966, 1973; CEE 1980, 1985). A large portion of overall land in

cultivation was planted with sugarcane in any given year. From 1962 to 1985, land planted with sugarcane ranged from 127,282 hectares to 540,009 hectares per year (DCE 1966, 1973; CEE 1980, 1985). When added to existing land in sugarcane approximately 60 percent of cultivated land was in sugarcane, a trend that would remain relatively stable over the period. Over this same period, there was an increasing planting of non-sugarcane crops. The majority of non-sugarcane was in rice, citrus, tobacco, and other crops for export and domestic consumption. From 1970 to 1985, the area planted in non-sugarcane crops went from 513,000 hectares to 798,400 hectares (DCE 1973; CEE 1980, 1985).

This increasing use of land was connected to a push to modernize agriculture in terms of technology and inputs. A primary area of modernization was the push to mechanize agriculture, bringing in tractors, crop-dusters, combines and other heavy machinery. For instance, in terms of cane harvesters, there was the Libertadora model, designed in Cuba and produced in Germany and Cuba, the MF201 produced in Australia, and the KTP-1 designed in Cuba and produced in the Soviet Union (Edquist 1983). From 1971 to 1982, the number of cane harvesters would rise from 172 to approximately 3,000 (Edquist 1983). While there is this increase in heavy machinery use, there is also evidence of the continued use of traditional agricultural implements, especially for smallholder farms. For instance, the continued use of plows that are pulled by livestock was still found by Toirac (1989) in Camagüey and Holguín in 1986. Even in sugarcane harvesting, the most mechanized part of agriculture, by 1980 only 45 percent was mechanized, with the rest still harvested by canecutters (Edquist 1983). Other factors also shaped production with heavy machinery, like ecological barriers, such as terrain, and non-contiguous parcels of land (Pollitt 1992).

Figure 1. Fertilizer Application on State and Nonstate Land in Sugar, 1969-1985.

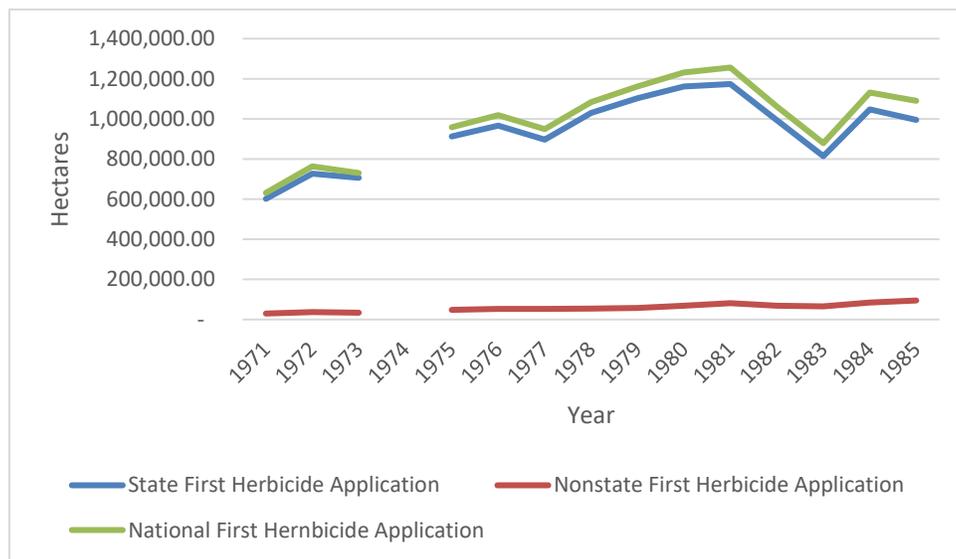


Source: DCE 1973; CEE 1985.

Importantly, there is an increase in the use of chemical control and synthetic fertilizer to intensify agricultural production. In terms of nitrogen fertilizer, the amount of state land fertilized with nitrogen initially declined from 1969 to 1973, and then increased from 1975 to then become relatively stable starting in 1980 (see Figure 1). When examining pesticide use, there is also an increase in use for sugarcane cultivation (see Figure 2). Herbicide was utilized on the majority of sugarcane in order to control weeds.

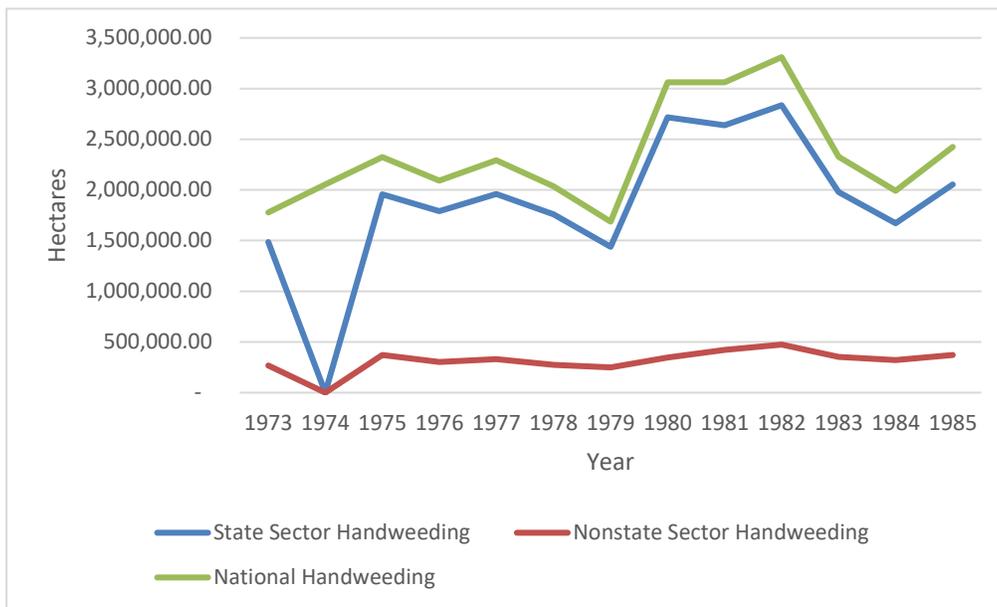
The increase of land in cultivation, fertilizer application, use of heavy machinery, and herbicide application provides evidence that incorporative pressures under the control of delinking conditions an increase in industrial agricultural production. Export-oriented production based on a mono-crop to bring in foreign exchange, even when a state-led development strategy that re-distributes and de-commodifies land, does not transition toward agroecological production. If anything, during this period the Cuban state focuses on demonstrating the superiority of socialist production, encapsulated famously in the drive to produce 10,000,000 tons of sugar (Vasconcelos 2016).

Figure 2. First Herbicide Application in Sugarcane.



Source: DCE 1973; CEE 1985.

I should note that there is also the continued, and increasing, use of hand weeding on a large scale (see Figure 3). That is, traditional agricultural methods continue to be employed, representing an alternative agrarian practice for pest control with less damaging ecological impacts. As with heavy machinery, in part this is because Cuba cannot economically industrialize all of agricultural production.

Figure 3. Hand Weeding on National, State and Non-State Land.

Source: DCE 1973; CEE 1985.

The continuation of non-industrial agricultural production is important in terms of exile. Onis (1964) reports in *The New York Times* that there was a difference in planting systems between state farms and non-state farms. On non-state farms, there is evidence of intercropping and integrated farming practices. Onis (1964) reports:

On the other side of the road [from a state farm] are lots, ranging from 15 to 75 acres of small private farmers. They are owners or former tenants who now pay no rent. They plant tobacco, corn, beans and tubers, and if they are lucky there is some pasture for a few head of cattle. Pigs, chickens, ducks and guinea hens are under foot in every yard. (Onis 1964)

This matches with Figures 1 and 2 that show major differences in intensification between the state and the non-state sector. In general, the state sector is more likely to rely on mechanical methods and external inputs as a percentage of its land, while only in hand weeding is it that the non-state sector in certain years will employ this method more than the state sector (Alvarez and Puerta 1994; Alvarez 2004).

Therefore, while this period is dominated by delinking as sovereign control over incorporation, there also existed exilic conditions for production tending toward agroecology due to the maintenance of smallholder farms with decommodified land. When incorporation was more likely to structure production decisions, as it did in the state sector focused on exports, there was an overall tendency toward industrial intensification. This case then provides evidence for a delinked-led incorporation structuring industrial, agricultural production, demonstrating the

possibility that the prevalence of delinking alone is an insufficient anti-systemic condition to bring about a transition toward agroecological production.

1992–2016

The most important factor for understanding the increasing prevalence of exile was the disintegration of the Soviet Union and the Soviet sub-system. Cuba's main trading partner had transformed into the Russian Federation and substantially reduced the amount of credit it was willing to provide Cuba (Eckstein 2003). Cuba could no longer depend upon its links to the Soviet sub-system to support trade, causing a major drop in exports and imports that it would not recover from until the 2000s. 1992 saw a more than 50 percent reduction in petroleum, fertilizer, pesticides, and animal feeds, devastating the agriculture sector that had been developed during the prior period (Rosset and Benjamin 1994). Additionally, the United States increased pressure on Cuba by strengthening the blockade through the Helms-Burton and Torricelli Acts. These measures constrained international shipping and prohibited U.S. subsidiaries in other countries from trading with Cuba (Gordon 2016). That, plus the existing sanctions regime, led to the loss of trade, worsening conditions for trade through harsher terms due to added obstacles, and a reduction of shipping to the island as vessels feared prohibition on their access to ports in the United States (Alvarez and Castellanos 2001).

Within this panorama, Cuban agriculture commenced a major exit from the capitalist world-economy, both by force, with the loss of the Soviet Union as a preferential buyer, and voluntarily, with a shift in agricultural production toward agroecology to survive. The heavy reduction in sugar purchases by Cuba's main preferential buyer left Cuba to sell a higher percentage of a lower total produced on the world market, where the price per pound has historically been lower than Cuba's cost of production (Hagelberg 2005). Russia continued to purchase sugar and swap oil for sugar with Cuba, but not nearly enough to maintain sugar exports at their level in the prior period. As global production continued to climb, Cuban production continued a steady decline, halving from 1996 to 2003 (ISO 2003). This was during a period of relative price stability, although often below the 11 cents per pound price that would make Cuban sugar profitable (Rosset and Benjamin 1994). And so, since 1991, sugar's export value has reduced by more than 500 percent (ONEI 2019). This reduced emphasis on sugar meant a reduction in incorporative pressure on agricultural production.

Cuba has increased the export of other agricultural crops, but the overall export of agricultural goods remains low in comparison to other sectors of the Cuban economy (ONEI 2019). Instead, other export sectors, like pharmaceuticals and mining, ascended in prominence, while tourism became a principal sector for accruing foreign exchange to purchase imports (Eckstein 2003). Since the 1980s, Cuba has increasingly entered joint ventures with foreign capital, such as Spain's Iberostar hotel company, to bring in foreign investment to support its tourism development strategy (Eckstein 2003). Through tourism, Cuban agriculture remains partially incorporated, because part of domestic production and food imports are destined for this sector (Enríquez 2010). And, during this period Cuba continued to import more than 50 percent of food for consumption and sale, even while a sizable portion of the population is dedicated to agricultural production (Botella-Rodríguez

2019). So, incorporative pressure is reduced on agriculture, which is no longer export-oriented. Although, Cuban agriculture is not in absolute exile from the capitalist world-economy due to its continued sugar exports and ties to tourism.

By the end of the 1990s, Cuba began to strengthen delinked inter-state administration through an emerging intra-Latin America/Caribbean bloc of countries led by Leftists with connections to social movements that came to be known as the Pink Tide (Campos and Prevost 2017). Cuba developed strong ties with Venezuela, Bolivia, Ecuador, and Brazil, amongst other Latin American and Caribbean countries, who supported Cuba through trade. For example, Venezuela became a major conduit for accessing oil through a barter agreement based on Cuba exporting doctors and nurses (Campos and Prevost 2017). As well, the Pink Tide governments supplied diplomatic pressure that led to lifting Cuba's suspension from the Organization of American States, which Cuba subsequently declined to re-join.

Even more important was regional integration, like the Bolivarian Alliance for the Peoples of Our America (ALBA). ALBA was expressly set up as a project to regionally delink, by creating an interlocked political-economic sub-system of states (Yaffe 2011). This was a demonstration of changing hemispheric conditions concerning the United States' capacity to isolate Cuba based on a growing movement for sovereignty. Therefore, delinked inter-state administration provided Cuba an alternative avenue to manage incorporation while maintaining internal exilic structures.

Internally, the Special Period in Time of Peace marks a state deformation period (i.e., increasing prevalence of an exilic structural condition) for agricultural production through increasing control over production by cooperatives and small farms. This includes the aforementioned re-commodification through the tourism sector, as well as direct-to-consumer sales. At the same time, by maintaining state sovereign control over the agriculture sector (i.e., delinking), Cuba was capable of sustaining the decommodification of land, thereby demonstrating an interaction between incorporation, delinking and exile. This provides the basis for a fundamental alteration in the agrarian structure, one that supports dramatic changes to agrarian practice.

In terms of state deformation, the main component is the reduction of direct state administration of farming. In 1993, "the Cuban Council of State enacted Decree Law No. 142, which transformed the state farms into new units of agricultural production known as the Basic Units of Cooperative Production or UBPCs" (Gonzalez 2003: 713). This meant a dramatic move away from delinked control of farming, reducing hierarchical control and increasing farmer and farm worker autonomy, characteristics of exile. The UBPCs are based within a system of usufruct rights, whereby the state maintains ownership over land while providing perpetual title to the producers. The same decree also provided usufruct land to smaller producers as parcels. Based on interviews, Enriquez (2003) describes advantages to accessing this land as "economic benefits (from no longer having to purchase the food items they grew and from produce sales), being able to make this contribution to the revolution, and feeling more useful as a person" (Enriquez 2003: 211). That is autonomy over production provides for a capacity to participate in subsistence production, a principle of de-commodified food.

The state would no longer administrate agricultural production through a centralized system, thereby increasing direct control over production by the producers. Yet, this was dependent upon state de-commodification of the land, thereby permitting the state to re-distribute land without interference by private owners that speculate in disregard of the public good. This is usufruct land occurring within the coordinates of a delinked structure yet based on increasing egalitarian control over production that leads to a capacity for substantive exchange and mutual aid. This is another demonstration of how one type of anti-systemic structure could be a necessary condition for the existence of the other anti-systemic structure.

Because of these changes, by 1997, state ownership of land was reduced to 33.4 percent and remained around this level over the period. By 2007, the state represented less than a quarter of cultivated land, demonstrating a reduction of approximately 70 percent in state-led cultivation. The UBPCs became the main form of non-state farm type, although based within usufruct land. Of total land and land in cultivation, the UBPCs represented almost 40 percent. The other major cooperative farm type was the CPAs, discussed in the prior period. The CPAs represented less than ten percent of all land and land in cultivation, remaining a more minor farm type. However, the CPAs directly owned the land, like the CCS and private farms (that could also be labeled smallholder farms). CCS and private farms represented approximately 18 percent of total land and more than a quarter of land in cultivation. As well, private farms were incentivized to operate in cooperatives to access credit and inputs. Together this amounts to almost three-fourths of land in production under private and cooperative ownership outside of state administration. This represents an exilic shift in the agrarian structure away from delinking's promotion of state control.

State deformation in agriculture was supported by substantive ties in agriculture based within ANAP, the Cuban Association of Agriculture and Forestry Technicians (ACTAF), and the growing farmer-to-farmer movement. These represent exilic structural conditions based on mutual aid, substantive exchange, and egalitarian, direct democracy in the sharing of practical knowledge to support shifts toward agroecological production and the more egalitarian administration of the production process. Beginning in the Special Period, ANAP increased its role for coordinating and representing the interests of small farmers in relation to the state (Machí Sosa et al. 2011). In 1997, and following on examples from Guatemala and Mexico, a farmer-to-farmer movement sprouted in Cuba motivated by ANAP (Holt-Giménez 2006). With support from NGOs, the program extended throughout the country as farmers operated as the teachers and students of a more agroecological form of agriculture (Machí Sosa et al. 2011). Not only was knowledge de-commodified, even more, it meant an egalitarian approach to deciding on production practices throughout much of the country. This reversed the trend of state imposition of best practices based on the industrial model.

Thus, the internal changes during this period led a major shift in the agrarian structure, one from delinked, state-dominant, toward exilic, cooperative-dominant. This was in part about utilizing economic incentives to motivate increases in production, but also about an increasing focus on subsistence production as a sovereign strategy and relying on the existing knowledge base to navigate decreasing resources. It also means that discussions of Cuba that solely focus on

the Cuba state are ignoring the substantial power held by the cooperative economic sector, especially in agriculture. The increasing prominence of this exilic structure conditioned changes in agricultural production.

In this period, there is a reduction in land use for agriculture, reversing a century-long trend. In 1996, 3,766.5 thousand hectares were in cultivation (ONE 1998). By 2013, this had reduced to 2,645.8 thousand hectares (ONE 2014). In contrast with the prior period where increasing land in cultivation led to diversification, in this period diversification was maintained as a goal while land in cultivation for sugar was drawn down. This can be seen in terms of the reduction in land in sugar harvested, which went from 1,451.7 thousand hectares in 1992 to 400.3 thousand hectares in 2013 (ONE 1998, 2014). At the same time, total land harvested and in production for other crops went from approximately 900 thousand hectares in 1993 to approximately 1,400 thousand hectares in 2013 (ONE 1998, 2014). Thus, while sugar was reduced to almost a quarter of its former level, land in other crops increased by more than 50 percent. This is a marked transition away from a monocrop agriculture system that brought large amounts of land out of production. Concurrently with pulling land out of production, there is a decline in the use of heavy machinery. Tractor use declined, from 85,000 in 1990, to 73,000 in 1997 (Rios and Ponce 2002). Tractors were replaced by oxen-pulled plow, increasing from 163,000 to 400,000 over the same period, and no-till or minimal till systems (Rios and Ponce 2002; Treto et al. 2002).

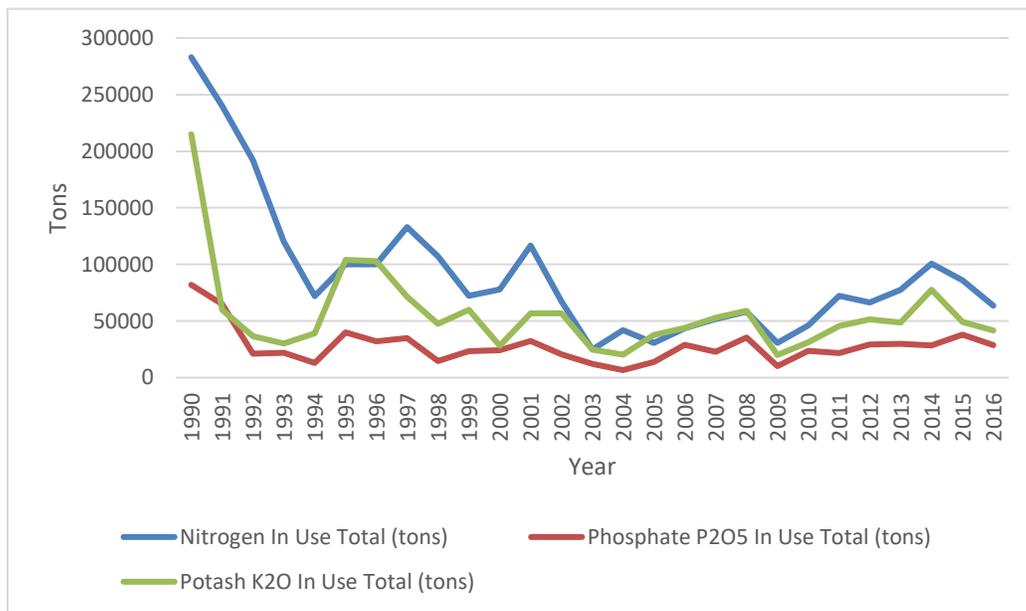
Conjoined with this de-intensification dynamic was the rise of input substitutes and agroecological practices, shared through farmer-to-farmer networks and supported by a set of state institutions. Cuba saw dramatic declines in external and synthetic inputs into the system. Over this period, synthetic fertilizer use saw heavy declines over this period, ranging from approximately one-fifth to one-sixth of use dependent on the fertilizer type in comparison with the prior period (see Figure 4). That points to a reduced application of chemicals, whether fertilizer or pesticides, which can contaminate waterways, harm human health, and reduce biodiversity.

Low-input substitutes were utilized instead, such as manure and vermicompost, which involve recycling nutrients from the production process and waste back into the agroecosystem. A principal form of organic fertilizer is based on sugarcane byproducts, representing a recycling of sugarcane back into the system it withdraws from to be produced. This *cachaza* “has high percentages of phosphorous, calcium, and nitrogen” and “contains more than 50 percent organic matter” (Treto et al. 2002: 167). Manure is another key form of recycling nutrients from agricultural production, this time from livestock. Cattle, sheep, and poultry all produce manure that can be utilized as an organic fertilizer, which recycles nutrients rather than converting them into a waste byproduct.

Additionally, herbicide imports saw major reductions, dropping by half from more than 12,000 tons in 1995 to approximately 6,000 tons in 2013 (FAO 2021). Pesticide imports overall were reduced by three-fourths in 1998 from a peak in the 1970s. As with fertilizer decline, this was tied into the import drop post-Soviet collapse that led to a substitution by other methods. However, it was also part of a trend beginning in the 1980s that saw an increasing number of Production Centers for Entomophages and Entomopathogens (CREE), going from 82 in 1988 to

227 by 1999 (Pérez and Vázquez 2002). The CREE produced biological pesticides (i.e., bacteria or other natural-based) and biological control agents (e.g., *trichogramma* wasps) that can substitute for chemical pesticides. Chemical control of pests and weeds was no longer the major strategy, with other forms of controls being centered.

Figure 4. Fertilizer Use, 1990–2016.



Source: FAO 2021.

For example, Vázquez and colleagues (2010) report that 17 parasitoids were utilized to control 73 pest-cultivar combinations and 6 predators to control 14 pest-cultivar combinations. In the 2000s, *trichogramma* wasps were released as an augmentative biocontrol measure on 685 thousand hectares in a multitude of cultivars, like yuca, corn, sugar cane, and tobacco, with Cuba producing more than six billion per year (Van Lenteren and Bueno 2003; Massó 2007; Vázquez et al. 2010). In total, more than 900 thousand hectares had entomophages or biopesticides applied on them in 2003 (Pérez and Vázquez 2002). This amounts to nearly 30 percent of land in that year utilizing a more sustainable form of pest management. Additionally, agroecological practices sought conservation biocontrol as a strategy by building natural reservoirs through polyculture systems and crop rotation (Pérez and Vázquez 2002). This meant increasing biodiversity within the agroecosystem as a check on herbivorous insects that could damage cultivars. This was linked with cultural and mechanical/physical control practices, such as intercropping and hand weeding, the latter present in the prior period demonstrating a certain level of continuity.

In general, Cuban agrarian practice has seen a fundamental change from an industrial model toward an input-substitution and agroecological model. Across numerous indicators, Cuba represents a shift in agricultural production, whether reduced use of synthetic fertilizers, or

herbicides, or the increased use of methods that recycle nutrients, increase biodiversity, and preserve the soil. Thus, a more pronounced exilic structure, in the form of a cooperative-dominant, less export-oriented structure tended more so in an agroecological direction. This is the case even with the ongoing, reduced role of delinking and incorporation.

Discussion and Conclusion

In the preceding section comparing two periods, I have shown evidence concerning the possible role of different structural mixtures of incorporation, delinking, and exile in the performance of agricultural production (see Table 3). Based on the decisions being made during the period of increased prevalence for delinking and incorporation, there was an increasing extensive use of land and intensification, specifically with the increasing use of heavy machinery and synthetic inputs. These agrarian practices are part of dual goals, diversification of what is produced and exporting sugarcane. Because the former could not come at the expense of the latter, the only possibility was more land in production with increasing inputs. Importantly, smallholder farms, which are the most representative of exilic structure while still the most oriented internally to the market, were the most likely to implement agroecological production during this period. This is due to less access to technology and inputs that were used in the state land tenure system. As well, it is tied into the continuing use of intercropping and traditional agrarian practices that were criticized by the bureaucratic class.

Furthermore, delinking's connection with incorporation is not merely, as is often put forward by certain Cubanologists (see Díaz-Briquets and Pérez-López 2000 for an important example), the outgrowth of some innate authoritarian tendency. Instead, Cuba faced real threats from the United States in its attempts to harm the population through the blockade, terrorist attacks, and assassination attempts against Fidel Castro (see Bolender 2010 for an in-depth discussion of terrorism against Cuba and Lamrani 2013 for an analysis of the blockade's detrimental and criminal impacts). These obstacles had to be confronted to provide the social services Cuba did. As a matter of survival and anti-systemic objectives, maximizing delinking without increasing exile could be claimed as a choice for revolutionary leadership based on existing conditions. And, in an important sense, it also could be said to provide the structural conditions for the following period, in which Cuba survived as a delinked state with exilic conditions after the collapse of the Soviet Union.

Table 3. Structural Conditions and Agricultural Production Across Periods.

Cases	1959–1991	1992–2016
Trade	Sugar export dominance; reliant on food imports	Sugar and agriculture are no longer principal exports; reliant on food imports
(De-)Commodification	Land and food de-commodified; inputs de-commodified in state sector, commodified to an extent in private sector	Land de-commodified; food re-commodified, to an extent; inputs both commodified and de-commodified depending on the type of input
Interstate Administration	International agreements with the Soviet Union and Soviet sub-system in terms of sugar exports; Participant in international agreements on the production and sale of sugar; Blockaded by the United States	International agreements with the Pink Tide, especially Venezuela, however not linked with sugar; international cooperation with NGOs and international bodies on sustainable agricultural development; participation in international agreements on the production and sale of sugar; Blockaded by the United States
State Administration	Sovereign control over economic development; law of value impacts external relations with the capitalist world-economy, but is controlled or abolished for internal distribution and production	State deformation through increasing egalitarian and direct control over means of agricultural production; re-introduction of market mechanisms in food distribution; maintenance of state control over input distribution and land tenure
Agrarian Structure	Dominated by state ownership; abolition of the capitalist class	Cooperatives and small farms dominant farm types with usufruct and private ownership; ongoing abolition of capitalist class; ongoing state ownership of approximately one-third of farming sector
Structural Conditions	Delinked and incorporated most prevalent, through the maintenance of high sugar exports and state land tenure	Increasingly prevalent exilic structure with ongoing delinking and reduced incorporative pressure on agricultural production
Agricultural Production	Predominantly industrial agricultural production	Moving toward agroecological production led by the smallholder and cooperative sector

Cuba confronted the end of the Soviet Union by utilizing its delinked social structure to support a partial exile of agriculture from the capitalist world-economy. State deformation into cooperatives and small farmers led to increasing production for subsistence and the development of strong farmer-to-farmer networks. This was possible because delinking provided the Cuban state de-commodified land to distribute in usufruct, as well as maintaining private ownership of small farms and cooperatives. Additionally, exile provided a de-commodified basis for substantive exchange and mutual aid through ANAP and farmer-to-farmer networks that aided the proliferation of input-substitution and agroecological practices. Because the incorporative focus on exports was no longer a motivating factor for agriculture, Cuba could experiment with and expand endogenous, biologically based inputs that recycle nutrients, recuperate soil health, and diversify the production of crops.

Importantly, the transition toward agroecological production had already begun in the delinked period, as a group of agricultural scientists and ecologists promoted the idea as a way to address environmental degradation brought about by industrialized agricultural production (Oppenheim 2001). The Cuban government invested heavily in education that trained scientists and technicians. Even more, there was an increasing awareness of the perils of dependence upon the Soviet Union, leading to the development of alternative agricultural inputs in the 1980s (Stricker 2007). Therefore, delinking via state sovereignty and socialist central planning provided important conditions to make viable the acceleration of a transition toward agroecological production when a crisis occurred.

That means that delinking should also be considered a necessary, but not sufficient, condition for supporting a sustainable transition. This provides supporting evidence to Smolski and colleagues (2018), who argue that delinking and exile interacted in producing the outcomes of both the Russian and Mexican revolutions of the early twentieth century. Rather than either being a sufficient condition or in absolute opposition, it could be their interplay that opens up possibilities in a world dominated by incorporation into the capitalist world-economy.

The argument and case evidence I present in this study have important implications for the transition to agroecological production. One could argue that a sustainable transition in agriculture requires a more radical adjustment to the existing world-system than is currently proposed, even by policies like the Green New Deal (Ajl 2021). It is exile that appears to be a necessary condition for a transition toward agroecological production. It is not that decentralization or local are a priori more sustainable, but instead how social relations involving autonomous control and substantive exchange can support a different type of agrarian practice. As direct producers navigate reduction in intensive inputs, they share knowledge that they are able to apply to the conditions of their specific agroecosystem. This is an egalitarian and direct democratic way to establish technologies and inputs that can be beneficial for ecology. If this is the case, as evidence from this study tends to show, then land redistribution and cooperative ownership may be a sensible policy for promoting a sustainable transition in agricultural production.

However, this is only a necessary condition, and not a sufficient condition on its own for a sustainable transition. One reason is that agroecology at the farm level may be resilient, but only insofar as the system at higher levels is also resilient (Holt-Giménez et al. 2021). While agroecology and input substitution reduce costs to the farmer, this does not automatically entail a capacity to supply farmers with the necessary implements to carry out these agrarian practices. For example, while the Cuban government is able to invest in surveilling fields for weeds and pests, it does not necessarily have the capacity to supply the input substitutes to all farmers to address these problems, as seen in statistics on cultivated areas applied with the differentiated set of biological input substitutes (Febles-González et al. 2011). This can be a reason that farmers often note a problem with accessing inputs, and that farmer support for agroecology is more often pragmatic than idealistic in Cuba (Nelson et al. 2009; Enríquez 2010). Nor does exile prevent harsh deprivation being foisted upon a population. For instance, the Cuban population faces a multitude of obstacles to securing their meals, even while they do not face conditions of undernourishment (Garth 2020).

In this sense, exile may need to be a generalized, global condition, in which case it would no longer be exile, but an alternative world-system. The problem of “socialism in one country” continues as a quintessential problem, regardless of its status as a possible necessary condition for more agroecological production in conjunction with exile.

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