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Peasant balances and agroecological scaling in Puerto Rican coffee farming

Crisis, coffee, and agroecological scaling in Puerto Rico

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ABSTRACT

This paper examines the relationship between agroecological scaling and the agrarian question, based on Puerto Rico's contradictory agricultural and demographic tendencies in the aftermath of Hurricanes Irma and Maria. We find that labor-based intensification, literally rebuilding and recovering the diversity of farms devastated by the hurricanes, is a necessary step toward scaling out agroecology in Puerto Rico. The rebuilding of farms requires both ample manual labor and accumulated local knowledge, two elements which are difficult to bring together in Puerto Rico due to a complex interplay of historical and social factors. Decades of public policy based on the belief that the small farmer is not essential to Puerto Rico have produced a series of obstacles for farmers who wish to recover their farms. The peasant economy, a field of study that recognizes peasant farmers as capable subjects of their own historical resistance – within and against economies of empire – can be a powerful tool in the effort to recover local food systems and (re)create a vibrant small farmer sector. Here, we explore peasant balances, a capacity to aggregate daily farm management decisions into coherent, multifunctional economic strategies that allow for dynamic responses to changing environmental, social and market conditions, and how these balances relate to Puerto Rican coffee farmers' capacity to stay on the land and transition toward agroecological production. Fieldwork included qualitative interviews with leaders of small farmers' organizations, Puerto Rican government officials and farmers in the mountainous central region between August 2017 and March 2018.

KEYWORDS

Peasant balances; agrarian political economy; Chayanov; agroecology; just recovery

Introduction: disaster capitalism and food imperialism in Puerto Rico

Along with the rest of the Caribbean islands, Puerto Rico was devastated by the unprecedented hurricane season of 2017. Puerto Rico's lack of national sovereignty was an immediate barrier for receiving emergency aid from neighboring countries, due to colonial legislation of the US federal government (Jones Act 1917) that bars any ship not of US make or bearing the stars-and-stripes from landing in the San

Juan port. But even before the twin hurricanes of Irma and Maria tore down hillsides, sliced through highways and leveled forests in September 2017, Puerto Rico was agonizing in eye of an invisible cyclone: a debt crisis that the US government had used to usurp the already-feeble capacity for policy-making of the Puerto Rican government in order to push through neoliberal shock therapy.

Indeed, Puerto Rico has a long history of being a guinea pig of the colonial-modernization project. Centuries after the sweat of enslaved indigenous and African peoples made plantation agriculture profitable, Puerto Rico continued to provide cannon fodder, offshore tax havens, and lands for contaminating with depleted uranium. [Table 1](#) is a brief periodization of colonialism in Puerto Rico, with emphasis on the agrarian and food regimes that correspond to each historical stage. As the corporate food regime has reached a high level of development, the democratic veneer of Puerto Rico's status as a "free associated state" of the US has practically disappeared, revealing dramatic levels of poverty, vulnerability, and dependency.

A study by Harvard's T.H. Chan School of Public Health on deaths resulting from Hurricane Maria estimated that over 4,600 people may have died, many due to delayed medical care (Kishore 2018). Over a year later, parts of the archipelago remained without electrical power and post-traumatic stress has led to skyrocketing rates of suicide and depression, as up to 14% of the remaining population of 3.4 million people was expected to leave by the end of 2019 (Meléndez and Hinojosa 2017). These trends compound the general composition of the aging Puerto Rican population. Since 1960, the percentage of the population under 14 years old has declined steadily from over 40% to under 20%, a trend that feeds into school closures, a reduced workforce and a dwindling tax base, even as the ratio of elderly dependents to working-age population has soared, from 10% in 1955 to 23% in 2016 (World Bank 2017).

Coffee farming, the most stable mainstay of Puerto Rican agriculture since the 1800s, has been reduced to just one-fifth of the area it occupied in 1985 (Borkhataria et al. 2012). Even more dramatic is the loss of shade coffee, which has lost over 90% of its area in the same time period. With electricity, water and education in line for privatization in post-hurricane Puerto Rico, small-scale agriculture continues to be deeply impacted. Public transportation is unavailable, so producers must maintain vehicles that can transport harvests. Rural clinics and hospitals are being closed down, forcing farmers to travel farther and lose more work days to health care. Sending children and grandchildren to school requires that family members live in cities or are willing to embark on expensive daily commutes. The lack of services also means a lack of workers, even during peak periods of coffee harvest or plantation establishment.

Massive layoffs have compelled some young people to return to family farms, but by and large, there is an aging agricultural population with little

Table 1. Periodization of Puerto Rican agriculture and food regimes in relation to colonialism.**Spanish colonial period (1502–1898)**

Characterized by peasant agriculture with important entrepreneurial *colono* sugarcane, tobacco and coffee plantations directly connected with imperialist value chains and transnational slave economies, but without the same level of financing and technology as in other centers of sugar production, such as Cuba or Louisiana (Scott 2005).

US direct military occupation (1898–1917)

Weak de-peasantization process in inland areas, as the major changes take place in coastal sugar plantations, which become increasingly consolidated as US capital assumes a controlling share. Initial concerns among Creole elite of US capital's instrumentalization of sugarcane *colonos* and the replacement of the elite family-owned *ingenios* by more corporate *centrales* linked to financial interests.

US direct colonial regime (1917–1945)

Sugar endures a crisis after US import tariffs are lifted at the end of the World War, US markets are flooded by cheap beet sugar and prices collapse (Nazario Velasco 2014). Ensuing recovery implies a greater degree of exploitation of workers, increasing economies of scale, more pervasive direct ownership of land by US companies, and intensified labor strife (Nodín Valdés 2011). Coffee battered by hurricanes in 1928 and 1932 as well as Great Depression. Eugenics experiments, sophisticated FBI repression of independence movement, repeated US military massacres of civilians, and growing opposition to US sugar interests comprise political trends.

US indirect colonial regime in context of Cold War (1945–1992)

Structural reform of Puerto Rican economy begins slowly after 1940, and accelerates with Operation Bootstrap, in 1947. Export-focused industrialization based on US corporate direct investment and tax breaks creates powerful pull factor to stimulate migration from the countryside, as do programs to encourage migration to US mainland (Berman Santiago 1998). Later, in the 1970s, the inclusion of Puerto Ricans in federal food stamp programs pulls more labor out of the countryside, as farm wages are not necessarily competitive with livelihood strategies of full dependence on anti-poverty programs. Sugarcane production is the first victim of the new development strategy, while USDA policies support industrial farming – medium and large-scale monocrops (mainly plantains and coffee) begin to push out small farmers in regions of the island previously characterized by peasant production.

With the advent of food stamps, there occurs a simultaneous leap in food consumption and food imports: local producers were unable to take advantage of the increased purchasing power of food consumers, as supermarkets came to control food consumption (Carro-Figueroa 2002). In 1989, *Organización Boricúa de Agricultura Ecológica* (Boricuá) is formed by a diverse group of Puerto Ricans actively participating in struggles related to environmental justice, independence and health who decided to focus on ecological agriculture as a material basis for sovereignty.

US indirect colonial regime in neoliberal period (1992–2016)

As the need to portray Puerto Rico as an unmitigated success wanes in the post-Cold War period, several of the policies that guaranteed ongoing US capital investment in the island also disappear, particularly the tax breaks entailed in Section 936 of the Federal Tax Code. By the time the final provisions of Section 936 are phased out in 2006, the island's pharmaceutical industry has entered a crisis that would continue over a decade later (Schoan 2017). Industrial employment declines, and the service sector proves unable to produce adequate employment opportunities. The government used triple-exempt bonds to compensate for the loss of industrial income. At the same time, the US military maintains a large number of military and military intelligence facilities, including the base in Vieques, where it bombs the inhabited island with conventional and chemical weapons until international outcry leads to a moratorium in 1999 (Lindsay-Poland 2009). The Vieques base is even rented out to the militaries of other nations to carry out live-ammunition exercises, with no compensation for the local population of farmers and fisher people who endure an ongoing crisis of cancer and other chronic diseases.

In the meantime, the agricultural subsidy regime which had become firmly established, begins to give way (Borkhataria et al. 2012), with less technical assistance, more paperwork, less state support for cooperatives, etc. The quantity of small farms continues its downward trend. Large land purchases by transnational corporations takes place, and massive production of GMO seeds is carried out by Monsanto, Pioneer, Dow, Bayer and Syngenta. Puerto Rico Coffee Roasters, fully owned by Coca-Cola, is founded in 2008 and purchases the 11 largest local brands, effectively monopolizing the market for green and roasted coffee. Puerto Rico has a higher ratio of Walmart stores to unit land area than any US state or indeed any country where Walmart is present (Cintrón Arbasetti 2014).

US direct disaster colonialism regime under fiscal control board (2016-present)*(Continued)*

Table 1. (Continued).

In light of Puerto Rico's unpayable sovereign debt and a shrinking economy, Obama signs the PROMESA Act into law, effectively claiming federal control over Puerto Rico's public policy, and designates an unelected seven-person fiscal control board to negotiate, in the name of Puerto Rico, the largest bankruptcy in US history. The PROMESA board, or junta as it is known in Puerto Rico, is untouchable to Puerto Rican law as it enacts a privatization and austerity program that threatens public education, health care and social security on the islands (González 2017).

By 2016, 85% of the food consumed in Puerto Rico is imported. In 2017, up to 90% of crops are lost due to the catastrophic damage inflicted by Hurricane Maria (Robles and Ferré-Sadurní, 2017). Supermarkets experience shortages for months as the situation becomes a humanitarian crisis. Meanwhile, both US and Puerto Rican governments lose prestige because of their mishandling of the crisis and incapacity to revitalize agriculture in time to prevent acute economic shortfall among small and medium farmers.

generational renewal taking place. Land remains a commodity too expensive for many would-be farmers. Corporate behemoth Monsanto rents tens of thousands of hectares in southern Puerto Rico from the Land Authority to produce genetically modified corn, soy, cotton, and sorghum seeds (Martínez Mercado 2013), and was reportedly among the first farm entities in Puerto Rico to receive insurance payments in the months after the hurricanes. Small farmers, in contrast, have consistently faced obstacles renting land from the Land Authority, and received late and insufficient crop insurance payments, putting hundreds of farm operations in peril in the coffee sector alone. The Coca-Cola beverage company, through its subsidiary founded in 2008, Puerto Rico Coffee Roasters, has quietly purchased nearly all the Puerto Rican coffee brands.

Amid the disaster capitalism that has enveloped Puerto Rico, there is a vibrant resistance movement of small-scale farmers, food workers, students, and consumers. This article compiles evidence from open-ended interviews before and after the hurricanes with coffee farmers, farm workers, members and national leadership of Organización Boricúa, as well as researchers and government officials. We sought to understand Puerto Rico's potential food system recovery from ecological, cultural, socioeconomic and political perspectives, recognizing the inseparability of the food question and the national sovereignty question, particularly in times of growing intolerance emanating from the US government. Alexander Chayanov's theory of peasant economy (Chayanov 1986a, 1986b), expanded and contextualized by authors such as van der Ploeg (Van der Ploeg 2008, 2013) is useful for connecting the dots between food empires, everyday resistance, and alternative economies for scaling agroecology. The social relations that structure agriculture will need to be dramatically transformed in order for Puerto Ricans to recover and manage their own food systems, and one of the first steps has been for movements to find ways to work outside the formal, commoditized economy (Félix, Rodríguez, and Vázquez 2018).

In this journal, Sevilla Guzmán and Woodgate (2013) wrote an authoritative history of how heterodox sociological thought contributed to the

development of agroecological theory. In section one of this paper, we build upon these authors' seminal work by locating Chayanov's contribution to the agrarian question, highlighting the differences between capitalist economies and peasant economies, and exploring how these differences influence agroecological scaling. Then, we focus on the concept of peasant balances as the mechanism by which farmers use labor-based economies to avoid or mitigate the impacts of shocks in ways that fully capitalist farms cannot do, giving small-scale farmers that opt for the 'peasant path' an important advantage in the era of climate instability.

In section two, we examine Chayanovian balances in Puerto Rico, using data from interviews carried out with coffee farmers in 2018, just months after the hurricanes of September 2017. We find that demographic issues such as out-migration and an aging farm population, combined with the legacy of decades of anti-peasant policy, imperiled small-scale farmers long before their plantations were destroyed by hurricanes. We also find a long-term process of differentiation among small farmers, in terms of their relationships with markets, the State, and grassroots organizations. The farmers that have been most completely incorporated into the policies of the Puerto Rican government are divided into two camps: one tiny group of successful, middle to large monoculture farms, and one large group of families that are in downward economic spirals with no solutions in sight. On the other hand, those farmers who have sought autonomous development through the use of Chayanovian balances tend to be embedded in dense social relations, strategic participation in markets, and ongoing local processes of agroecological transition. Our results lead us to conclude that the forms of resistance and persistence of small farmers – particularly those organized in visible, dynamic agroecological movements – manifest the importance of peasant economies in overcoming system perturbations and developing a labor-based strategy for scaling agroecology.

Peasant economies and agroecology

The agrarian question was born out of Marx's premise that capital expands in the countryside through primitive accumulation mechanisms such as land enclosure and resource grabs. Dialectically, these movements to free up capital also displace people from their territories, creating 'surplus' labor that can be utilized in extractive industries, plantation agriculture or the factory system (Wood 2002). Marx (Marx 1991, 949) noted that capitalist property relations "provoke an irreparable rift in the interdependent process of social metabolism, a metabolism described by the natural laws of life itself." Primitive accumulation associated with the European invasion of the Americas and slave economies became the primordial means for depeasantization, on one hand, and the development of imperialist and industrial powers on the other. Subsequent development of agricultural capitalism and proletarianization, in each specific

context, were by no means endogenous transitions, but rather related to the expansion of a global capitalist economic system (Wallerstein 1979).

Peasants are often defined by their deep connection with and control over the farming activities occurring in a specific place, self-organization of labor at the family level, and emergence as a social class whose economic activity is subordinated to capital, yet not capitalist (Bryceson 2000). Often the community level of social organization, mediating between family and class dynamics, is highly important for peasant societies. Peasantries are the historic result of agrarian labor processes that constantly respond to changing environmental, political, cultural and economic conditions of production and reproduction. As capital relations have expanded into the countryside, theorists have debated the fate of the peasantry, in what is known as the agrarian question (Kautsky 1988; Lenin 1961). Many have used arguments of efficiency, labor productivity and even natural resource conservation to insist that the peasantry is bound by the laws of history to disappear, as capitalism encloses its lands and differentiates it socially into opposing groups of agrarian bourgeoisie and proletarians (Bernstein 2010; Lenin 1961). There is a hegemonic tendency to discount the ‘peasant path’ of autonomous democratic development in Marxist and liberal economic orthodoxy, both of which have enthusiastically supported industrialization and equated a growing social division of labor with progress (Moyo, Jha, and Yeros 2013). Steckley and Weis (Steckley and Weis 2016, 1) note that “while critical agrarian studies tends to focus more on the ways that capital shapes conditions facing peasant producers, there has been much less attention to the ways that peasant decision-making can restrict how capital operates.”

The peasantry has not disappeared, and some authors see its absolute numbers to be growing (Van der Ploeg 2008). A counterhegemonic view of the peasantry, based not on its perceived inferiority to capitalist economies but on its capacity to resist and survive despite them, has survived in the margins of Marxist and emancipatory thought for over a century and a half, and contributed to the creation of agroecology as a discipline (Sevilla Guzmán and Woodgate 2013). In the early Soviet Union, agricultural economist Alexander Chayanov (1888–1937) carried out empirical studies of the workings and internal organization of peasant family economies. Chayanov (1986a) found that, unlike capitalist economies in which each factor of production can be represented in monetary values, peasant families operate “natural economies” based on the interaction of labor and ecological processes in which a gambit of non-monetary concerns are present in decision-making. Despite being embedded in market economies, peasants are able to autonomously decide what and how to produce, based on internal calculations and priorities.

In the prevailing context of agrarian capitalism, farms are compelled by competition and production costs to capitalize: maximizing the generation of

surplus value even at the cost of future productivity. In contrast, even while existing within larger capitalist economies, peasants create economies with internal organizing principles that limit the effects of competition and avoid production costs by maintaining access to non-commodified factors of production, such as land and labor, as well as “historically guaranteed” factors provided by their own previous labor cycles, such as well-adapted seeds and animal breeds, fertile soil and homemade plows. In [Table 2](#), we present a comparison between peasant and capitalist economies with regard to key issues for agroecological scaling, such as labor, resource use, knowledge, and control.

Chayanov ([1986b](#)) observed that the family labor unit’s main objective is to provide for its own food consumption. To that end, the family will be willing to engage in high levels of labor output until all mouths are fed. However, once the family’s needs have been met, additional labor is seen as drudgery – detrimental to family well-being. Van der Ploeg ([2013](#)) further develops the notion of Chayanovian balances, recognizing the balances that peasants manage between past and present production, income, and ecology, as well as individual and collective responsibilities. By using non-commoditized labor and concentrated local knowledge, peasants exercise the power to mediate their relationships with other components of their agroecosystems. This enables peasants to develop autonomy from markets – to the degree that it is advantageous to them. At the same time, merchants and capitalists look for ways to co-opt peasant production – using through low prices, but increasingly through such mechanisms as payments for environmental services – in order to support processes of capital accumulation (Giraldo and Rosset [2018](#); Steckley and Weis [2016](#)).

Chayanovian balances have been identified as mechanisms wielded by Haitian peasants who resisted transforming their farms into mango plantations, despite pressure from the state, private capital and transnational institutions and NGOs after the 2010 earthquake (Steckley and Weis [2016](#)). In Brazil, Petersen and Silveira ([2017](#)) found that intensification can be capital-centered, which tends to lead toward depeasantization and rural out-migration, or driven by skilled labor applying specific management strategies dependent on local ecological contexts. Labor-driven intensification, in their study, is dependent on access to communities of agroecological thinking and practice. Fraser et al. ([2018](#)) explore the political economy of the mutuality-market dialectics of Amazonian peasants who develop community labor regimes in concert with ecological cycles, unless market forces coerce them into becoming extractivists. Valencia Mestre, Ferguson, and Vandermeer ([2018](#)) propose that the patterns of tree cover in Panamanian cattle pastures can be understood as resulting from the continuum between peasant and capitalist economies. In each of these cases, peasants are found to be active, collective subjects who constantly shift their degree of self-sufficiency and

Table 2. Comparing capitalist and peasant agricultural models (adapted from work by Chayanov 1986a; Rosset 2003; Van der Ploeg 2008).

Category	Capitalist Agriculture	Peasant Agriculture
Basic goals	Maximize production and profit	Achieve sufficiency and stability
Value	Value is not added, but taken away, mainly by <i>expropriating resource bases</i> , or mobilizing capital and labor in short-term exploitative production processes that appropriate surplus value by externalizing environmental and social costs. Mobilized value moves toward the financial sectors of the economy.	Peasant farming is geared toward producing as much <i>added value</i> as possible under the given circumstances. This value, once created, can materialize as use-values or exchange-values, depending on the needs and plans of the household, i.e. selling a cash crop in order to build a new bedroom for a growing family.
Labor-Capital Relationship	In capitalist exploitation, labor is mobilized in order to maximize accumulation.	In family labor units, accumulation is a means by which to provide employment and assure the reproduction of labor.
Resource base	Capitalist agriculture must expand the production of commodities in order to avoid crisis; to do so, it exists upon a <i>constantly expanding resource base</i> by becoming more dependent on market or states, i.e. by grabbing water, taking out loans to rent more land and/or becoming part of a subsidy program to maintain profitability of monocrop production.	The peasant unit of production and consumption generally works with a <i>limited and threatened resource base</i> . Peasants seek to maximize output by working with the existing local resources, implying a resistance process based on gradually increasing technical efficiency.
Investment	<i>Capital is mobilized externally through the market</i> , i.e. banks, reducing the flexibility of operations. Debts must be serviced, so productivity is key, leading to labor exploitation, pollution and overproduction.	Within the peasant economic unit, <i>labor is generally more abundant</i> than the objects of labor, such as land or animals. This means that capital is formed and expanded through labor investments, rather than through loans or external development plans.
Knowledge and Technology	Production takes place through <i>intensive use of externally-sourced technologies</i> that de-skill farming, enrich transnational corporations and gloss over differences between agroecosystems.	Related to the previous aspects, the productivity and future development of a peasant farm depend upon the <i>quantity and quality of labor</i> , highlighting the importance of labor investments (terraces, irrigation systems, crop and animal varieties, etc.) and skill-oriented technologies.
Control over Farm System	The resources of the farm system are <i>privatized and parceled</i> into parts controlled by banks, loan sharks, input companies, corporate land renters, profiteers or the state.	The available social and material resources represent an <i>organic whole that is controlled</i> by those directly involved in the labor process – not loan sharks, corporate land renters, or other outside actors. The peasant farm is a self-regulating unit.
Relationship to Food Consumers	Capitalist agriculture and food consumers, <i>alienated through chains of intermediaries</i> , have contrary interests with regard to prices, health, and labeling.	The peasant family tends to be the primary consumer of the farm's products. Relationships with other consumers are flexible and <i>may include barter, trade, direct marketing</i> or other means.
Relationship to Time and Space	<i>Hit-and-run investments</i> are by nature short-term, with no lasting physical or cultural infrastructure.	Peasant agriculture is typically grounded upon previous cycles and embraces <i>relatively autonomous, historically guaranteed reproduction</i> .

market orientation in order to guarantee future productive cycles. Peasants shift along balances including social and natural demands, production and reproduction, the scale and intensity of farming, internal and external resources, and autonomy and dependence (Van der Ploeg 2013).

Chayanovian balances in Puerto Rican coffee farming

Qualitative interviews were carried out with leaders of small farmers' organizations, Puerto Rican government officials and coffee farmers in their homes in the mountainous municipalities of Utuado, Jayuya, Adjuntas, Lares and Orocovis, between August 2017 and March 2018. Interviews before the hurricanes tended to focus on the agroecological movement and the impact of austerity measures on farm subsidies and supports, while 31 farmers – 29 of them coffee farmers – interviewed after the hurricanes often talked about the trauma of having their farms destroyed and being without food and water for weeks, communications and electricity for months.

Two-thirds of the farmers could be considered conventional farmers, in the sense of using agrochemicals, paying waged labor and participating in government programs that subsidize certain inputs. The other 11 farmers either do not use any agrochemicals (9), pay no waged labor (10), or avoid government programs (7), or overlap these strategies in some way or another. The conventional and non-conventional farmers showed strongly divergent paths in the wake of the hurricanes of 2017.

Among the 20 conventional farmers, only 2 were rebuilding their farm or had mostly rebuilt their farm by the time of fieldwork in January–March of 2018. These two were among the largest family-owned estates (>25 ha.), and made up of mostly sun coffee in monoculture, reflecting their capacity to mobilize capital in order to rebuild. Another five could be considered middle farmers that were strongly impacted by the hurricanes, and were not rebuilding because they had other sources of income. This category includes some farmers from professional backgrounds who were already operating at or near a loss and cannot currently continue to operate their farm. The largest section, however, of conventional farmers was comprised of 13 small farmers who faced severe economic hardship and total loss of income after the hurricanes. This group, of whom seven were over 65 years old, is particularly vulnerable to selling their land and migrating to the United States. [Table 3](#) describes the impacts of Hurricane Maria on these farms and their products.

Labor availability plummeted after the hurricanes as many workers – left without electricity, water, schools, health clinics, and jobs – migrated to the United States. In January 2018, Puerto Rico governor Ricardo Roselló announced plans to sell the public utility company and introduce a charter school system to replace public schools. All of the highways and roads between farms were lined with abandoned houses. None of the farmers had yet received

Table 3. General situation of small, conventional coffee farmers affected by Hurricane Maria.

Before Hurricane Maria	<ul style="list-style-type: none"> • Production of coffee, plantains, banana, citrus and tubers with shade trees • Coffee is the main income-earning crop and is used to enter into a system of subsidies: agrochemical packages, half-priced seedlings and half-priced workforce • Citrus is a favorite of farmers: simple management, trees can be forgotten most of the year, one straightforward harvest, good income source • Plantains and bananas represent a cash flow, with harvests each week or monthly, depending on the farm • Tubers are for eating, selling or giving away among neighbors
After Hurricane Maria	<ul style="list-style-type: none"> • The situation is unbearable, after months without electricity • Major losses of citrus, coffee, Musaceae and shade trees, but with large variability from one hillside to another • Increased out-migration and farm labor is scarce • Farmers are selling tubers or firewood, but the income is insufficient
Economic Principles of System	<ul style="list-style-type: none"> • It is more advantageous to live from insured crops with steady demand, even if this means formally considering farms as monoculture to access insurance • Citrus are a complement to coffee and are oriented toward markets • Other crops (such as plantains, banana and tubers) are mostly for home consumption, although their sale is an option

insurance payments, so even when there existed available labor and a desire to rebuild, the economic possibility of doing so was very limited.

Interviews showed that farmers had diverse reasons for no longer contracting farm laborers or hiring fewer workers. Many made reference to an agrarian economy that no longer works for small farmers, particularly as family size has declined, the farming population has aged and farm labor has become scarce in recent decades:

- “I am waiting to receive my insurance payment.” (n = 26)
- “Since Maria, I have no income.” (n = 20)
- “Workers no longer arrive here to my farm.” (n = 8)
- “Working isn’t worth the trouble. They’re better off not working.” (n = 6)
- “There isn’t a workforce anymore, and what exists is no good.” (n = 5)
- “Here, half of Puerto Rico could be unemployed and they still wouldn’t pick coffee.” (n = 1)

The lack of labor makes family farming much more difficult, as elder farmers are called upon to carry out the work that they would rather assign to younger family members or hired workers, or simply must reorganize the farm based on having less labor to mobilize. Farmers without the capacity to shift toward more labor inputs were basically stuck waiting for State intervention to recover their farms, because they were physically isolated and alienated from non-monetary means to mobilize labor.

The conventional farmers interviewed lacked relative autonomy from market institutions and the State. The decades-old, bureaucratic system of subsidies for small farmers entered into crisis along with the rest of the

Table 4. Pillars of dependence, knocked out by combined effect of Hurricane Maria and austerity measures.

Type of subsidy or support received by interviewees	Number of interviewees receiving the support	
	Before Hurricane Maria	Being received at the time of the interview
The government paid half the salary of each employee	19	4
Farmer received fertilizer and herbicide	22	0
Subsidies to buy equipment	6	0
Harvest or plantation insurance	25	0

Puerto Rican economy, becoming a source of acute vulnerability for farmers who had developed a path dependence upon government support. Contrary to expectations, it was not only the most market-focused farmers that depended on the State. Rather, dependence on subsidies took several forms among interviewed farmers and spanned the differences in economic status and distance from cities (Table 4). These pillars of dependence upon federal programs are the most direct legacy of Puerto Rican neo-colonial public policy since the creation of the “free associated” status in 1950 (Dietz 2018).

Food stamps make up a fundamental part of the family economy for over half of the farmers interviewed. The relationship between Puerto Ricans and federal anti-poverty programs is complex and problematic; created during the Cold War, consumer food subsidies dramatically increased food consumption while not deterring agricultural decline (Carro-Figueroa 2002; Weisskopf 1985). Federal welfare programs compete with locally available wages and encourage people to avoid full-time non-professional employment. Interviewees mostly felt that the food stamp program had accelerated the disintegration of the small farmer sector; however, in the post-hurricane context, food stamps were what prevented a more desperate humanitarian disaster, and many small farmers lived on food stamps as they waited to rebuild their farms. In this very limited sense, participation in food stamp programs can be considered part of a peasant strategy to balance consumption with autonomy.

In stark contrast to the dire situation of conventional small farmers, 10 of the 11 unconventional farmers had made significant advances rebuilding their farms. Only one was in a similar situation as the five middle farmers mentioned above – not rebuilding her farm while she focused on her alternative income source. Of the 10 who had partially or completely rebuilt their farms, seven had done so through agroecological brigades – groups of people, often other farmers, who traveled to farms in the days, weeks and months after the hurricanes to physically rebuild damaged structures, plow fields, fix greenhouses and replant farms, focusing on short cycle crops that could produce food quickly. In this group, age was less of a factor: three of the 10 were over 70 years old. This suggests that age is not as much a limitation

for mobilizing labor as is isolation from autonomous organizational processes in the countryside.

The only farms that had been replanted in their entirety were those of farmers who participate in Organización Boricuá, a *Vía Campesina* member organization founded in 1989 through farm labor exchanges. Boricuá had been organizing reconstruction brigades in agroecological farms since 21 September 2017, the day after Hurricane Maria passed over the island. These agroecological brigades were made possible through broad alliances of urban and rural social movements in Puerto Rico and the United States, and particularly through the leading efforts of Organización Boricuá, which would be honored with the Food Sovereignty Prize in October 2018 for its innovative approach to disaster recovery.

The post-hurricane agroecological brigades were examples of a peasant moral economy (Scott 1976), as volunteer labor teams, generally infused with high levels of political and ethical commitment to peasant farming, mobilized labor that the conventional economy has not been able to mobilize before or after the hurricanes. Félix, Rodríguez, and Vázquez (Valencia Mestre, Ferguson, and Vandermeer 2018, 1) explain further:

These brigades followed months of impromptu, voluntary immediate relief brigades in which members of these organizations engaged to support farmers and their communities. Organización Boricuá's brigades were held in the format of moving camps, spending 3-4 days in each farm rebuilding farming structures, houses and planting. These brigades incorporated spaces for political training, dialogues, workshops, cultural exchanges and reflection while promoting active group participation during the process. Exchanges like these not only help farmers get stabilized and better positioned to confront the next hurricane season(s), but also help bolster the movement work of organizers, educators, activists and farmers that often spills over beyond a farm's perimeters into diverse communities and across many issues.

Historical and personal connections run deep between grassroots groups and social movements in the US, Latin America and the Caribbean due to the shared history of colonialism, occupation, and slavery that characterizes the Caribbean region and the development of the global agricultural sector. The group's efforts served to strengthen relationships and knowledge exchange between farms as a regional resiliency strategy that embraces the *campesino-a-campesino* methodology and combats the physical, social, and emotional isolation that can characterize reconstruction and recovery. The brigades serve to not only speed up production preparations and infrastructure reconstruction, but to re-energize farmers and those who support them to continue the work that is now more urgent than ever.

A high initial labor input has been noted as a necessary ingredient in agroecological transitions by both proponents and detractors of agroecology (Altieri and Hecht 1990). Few authors, however, have recognized the transformative potential of the knowledge-intensive labor involved in agroecological change (Timmermann and Félix 2015). The organized agroecological movement transforms the need for large

amounts of labor from a weakness, as it exists in conventional economics, into a strength, as a pretext for building new social relations and consolidating organizations. The hurricanes became an opportunity for developing stronger organicity (Rosset 2015) in the countryside, and tested the movements' capacity to fill a need that neither the State nor the market could fill.

Of the 10 unconventional farmers who had partly or completely rebuilt their farms, three had done so through family labor alone, without a Boricúa brigade. These were the few large families that had enough young people living on the farm to mobilize the labor needed to rebuild. As a general trend, however, the reliance on work brigades appeared to be a phenomenon likely to continue growing. Furthermore, the brigades appear to be linked to a cultural process of decolonization. As one farmer reflected after a day of brigade work:

The root of Boricúa is cooperative work. Habi comes here and helps me, I go to Habi's farm, and we both succeed in bringing in our harvests. I don't call it voluntary work because we all benefit. It's like a change of paradigm, right? You know, capitalism makes it impossible for you to live. So, what we are doing are alternatives so we can live with dignity. This work in solidarity is the only alternative that one has in order to survive. These people are friends we have had for a long time and we all knew what we came to do today. The routine of capitalism is from home to work, from work to home, and it takes away the social aspect. But if you talk to people from the countryside, this is what they did before. The peasants visited each other, and worked. It was a time for sharing, for relaxing, having a beer and telling a joke. It is something that is *ours*. It is in our collective memory, it's there. The history of humanity is this kind of cooperative work.

The sense of belonging was closely linked to whether or not farms had been rebuilt. The sense of historical memory is evidence of a Chayanovian balance between past and present, as well as between individual and social goals. The small conventional farmers unable to rebuild often recounted stories of family troubles or children who had left as migrants with as great a sense of tragedy as their lost crops, implying that farmers perceived a causal relation between their family's loss of a long-term relationship to the land and their incapacity to rebuild after Hurricane Maria. This suggests that conventional farmers were experiencing the loss of a balance between past and future production.

Conclusions

The high level of economic vulnerability that conventional agroecosystems showed after the disturbance of Hurricane Maria indicates that decades of public policy since 1945, and austerity measures introduced since 2016, have created dependencies rather than robust food and agricultural systems. Instead of allowing for the autonomous development of peasant economies, farm policy has distorted peasant balances by focusing on productivity indicators. The Puerto Rican

development model has discounted the reproductive sphere and the need for farming to exist within a rural culture that renews itself over the course of time. Neither subsidies for agrichemicals, nor complex and ineffective crop insurance programs, nor food stamp programs, have helped make small farming a more viable and sustainable way of life. Furthermore, the demographic tendencies of an aging population in Puerto Rico are combining with the increasing risk of climate-related disaster to contribute vulnerability to household-based coffee farming and increase the risk of continuing depeasantization.

Long-term increased vulnerability, especially for small farmers and rural people in general, are unfortunately consistent with trends of US colonialism in the Caribbean and Pacific Ocean, as well as in changing climates under global capitalism. Just as Patel and Moore (2018) have noted that it is easier for most people to imagine the end of the world than the end of capitalism, it is easier for more Puerto Ricans to imagine migrating to the US than agreeing on how to build a sovereign Puerto Rico. In the meantime, the ongoing role of the agroecological movement is fundamental for developing local food economies, a sense of belonging on the land, and momentum for scaling up agroecological solutions.

The capacity of young people to enter peasant farming may depend on their ability to “become peasants” by applying balances that previous generations were unable to do. The long apprenticeship toward becoming a peasant farmer is extremely challenging in the austere environment of post-Maria Puerto Rico. Becoming a peasant farmer is much more of a conscious decision, and even a form of principled political and social resistance, than ever in the past (Van der Ploeg 2013). One of the flagship agroecology schools, *Proyecto Agroecológico El Josco Bravo* (Organización Boricuá member project), was facing an eviction order and incipient criminalization process at the time of fieldwork, despite its impressive achievements successfully training hundreds of young people in the arts of agroecological peasant farming.¹

In the aftermath of the dual hurricanes, the ability of farmers to activate social organizations and mobilize labor outside of commoditized economies is crucial for rebuilding farms. Continuing challenges include reconciling the need to survive on food stamps and the need to sell at high-priced farmers’ markets in order for family farmers to maintain themselves on the land, with priorities of a social and organizational order. Farm labor brigades are an ancient practice that have become highly relevant in the wake of the collapse of the conventional labor economy in Puerto Rico. Peasant balances that bring together production and ecology, elder knowledge and youth interest, family economies and food sovereignty, are key mechanisms in the struggle for agroecology and against food dependency in Puerto Rico.

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Note

1. *Proyecto Agroecológico El Josco Bravo* is carried out on land rented from the Puerto Rican Land Authority, which, despite holding tens of thousands of hectares of unused land, has opted toward an aggressive anti-peasant policy that uses bureaucratic means to pressure the few small farmers who rent small parcels of land. It also rents thousands of hectares of farmland to transnational corporations such as Monsanto for the production of genetically modified seeds.

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References

- Act, J. (1917). Sixty-fourth Congress, Session II. “Chap. 145. An Act To provide a civil government for Porto Rico, and for other purposes. [sic]” Accessed February 8, 2019. <https://www.loc.gov/law/help/statutes-at-large/64th-congress/session-2/c64s2ch145.pdf>
- Altieri, M. A., and S. B. Hecht (Eds.). (1990). *Agroecology and small farm development* (No. 306.349091724/A468). Boca Raton (FL): CRC Press. doi:10.1099/00221287-136-2-327
- Bank, W. 2017. *Data bank: Age dependency ratio (% of working age population)*. Puerto Rico. Accessed November 14, 2018. <https://data.worldbank.org/indicator/SP.POP.DPND?locations=PR>.
- Berman Santiago, D. 1998. Puerto rico’s operation bootstrap: colonial roots of a consistent model for “third world” development. *Revista Geográfica* 124:87–116.

- Bernstein, H. 2010. *Class dynamics of agrarian change*, Vol. 1. Halifax, Canada: Kumarian Press.
- Borkhataria, R., J. Collazo, M. Groom, and A. Jordan-Garcia. 2012. Shade-grown coffee in Puerto Rico: Opportunities to conserve biodiversity while reinvigorating a struggling agricultural commodity. *Agriculture, Ecosystems and Environment* 149:164–70. doi:10.1016/j.agee.2010.12.023.
- Bryceson, D. 2000. Peasant theories and smallholder policies: Past and present. *Disappearing Peasantries* 1: 1–36.
- Carro-Figueroa, V. 2002. Agricultural decline and food import dependency in puerto rico: A historical perspective on the outcomes of postwar farm and food policies. *Caribbean Studies* 30 (2):77–107.
- Chayanov, A. 1986a. *On the theory of non-capitalist economic systems*. in: *The theory of peasant economy*. Madison: University of Wisconsin Press.
- Chayanov, A. 1986b. *The theory of peasant economy*. Madison: University of Wisconsin Press.
- Cintrón Arbasetti, J. (2014). Walmart: Salarios bajos todos los días. Centro de Periodismo Investigativo 6. Accessed March 28, 2018. <http://periodismoinvestigativo.com/2014/03/walmart-salarios-bajos-todos-los-dias/>
- Dietz, J. L. 2018. *Economic history of Puerto Rico: Institutional change and capitalist development*. Princeton, New Jersey: Princeton University Press.
- Félix, G., H. Rodríguez, and J. Vázquez. (2018). Puerto rican ecofarms after maria: Bouncing back with a little help from our friends. *FoodFirst Blog* 3. 12.2018. Accessed May 24, 2018. <https://foodfirst.org/puerto-rican-ecofarms-after-maria-bouncing-back-with-a-little-help-from-our-friends/>
- Fraser, J. A., T. Cardoso, A. Steward, and L. Parry. 2018. Amazonian peasant livelihood differentiation as mutuality-market dialectics. *The Journal of Peasant Studies* 45 (7):1382–409. doi:10.1080/03066150.2017.1296833.
- Giraldo, O. F., and P. M. Rosset. 2018. Agroecology as a territory in dispute: Between institutionality and social movements. *The Journal of Peasant Studies* 45 (3):545–64. doi:10.1080/03066150.2017.1353496.
- González, J. (2017). Puerto Rico’s \$123 Billion Bankruptcy is the Cost of US Colonialism. The Intercept, Accessed May 9, 2017. <https://theintercept.com/2017/05/09/puerto-ricos-123-billion-bankruptcy-is-the-cost-of-u-s-colonialism/>
- Kautsky, K. 1988. 1899. *On the Agrarian Question*. Vol. 1. London: Zwan Publications.
- Kishore, N., others (15 authors). 2018. Mortality in puerto rico after hurricane maria. *New England Journal of Medicine* 379:162–70. Accessed September 24, 2018. <https://www.nejm.org/doi/full/10.1056/NEJMsa1803972>.
- Lenin, V. 1961. The Agrarian Question and the “Critics of Marx.” In *Collected Works*, ed. V. Lenin, Vol. 5, 1901 103–222. Moscow: Foreign Languages Publishing.
- Lindsay-Poland, J. 2009. US Military Bases in Latin America and the Caribbean. In *The Bases of Empire: The Global Struggle against U.S. Military Bases* (pp. 71–95), ed. C. Lutz. London: Pluto Press.
- Martínez Mercado, E. (2013). El dinero público subsidia a Monsanto. CPI. Accessed October 23, 2018. <http://periodismoinvestigativo.com/2013/05/el-dinero-publico-subsidia-a-monsanto/>
- Marx, K. 1991. 1894. *Capital: A Critique of Political Economy*, Vol. 3: 949. New York: Penguin Classics.
- Meléndez, E., and J. Hinojosa. 2017. *Estimates of Post-Hurricane Maria Exodus from Puerto Rico*. City University of New York: Center for Puerto Rican Studies, Hunter College.
- Moyo, S., P. Jha, and P. Yeros. 2013. The classical agrarian question: Myth, reality and relevance today. *Agrarian South: Journal of Political Economy* 2 (1):93–119.

- Nazario Velasco, R. 2014. *El paisaje y el poder: La tierra en el tiempo de Luis Muñoz Marín*. San Juan: Ediciones Callejón.
- Nodín Valdés, D. 2011. *Organized Agriculture and the Labor Movement Before the UFW: Puerto Rico, Hawai'i, California*. Austin: University of Texas Press.
- Patel, R., and J. Moore. 2018. *A history of the world in seven cheap things: A guide to capitalism, nature and the future of the planet*. Oakland, California: University of California Press.
- Petersen, P. F., and L. M. Silveira. 2017. Agroecology, public policies and labor-driven intensification: Alternative development trajectories in the Brazilian semi-arid region. *Sustainability* 9 (4):535. doi:10.3390/su9040535.
- Rosset, P. 2003. Food sovereignty: Global rallying cry of farmer movements. *Food First Backgrounder* 9 (4):1.
- Rosset, P. (2015). Social organization and process in bringing agroecology to scale. In: *Agroecology for Food Security and Nutrition- Proceedings of the FAO International Symposium*. Rome, Italy.
- Schoan, J. (2017). Here's how an obscure tax change sank Puerto Rico's economy. 26 September, 2017. Accessed August 25 2018. <https://www.cnbc.com/2017/09/26/heres-how-an-obscure-tax-change-sank-puerto-ricos-economy.html>
- Scott, J. 1976. *The Moral Economy of the Peasant: Rebellion and Subsistence in Southeast Asia*. New Haven: Yale University Press.
- Scott, R. 2005. *Degrees of Freedom: Louisiana and Cuba after Slavery*. Cambridge: Harvard University Press.
- Sevilla Guzmán, E., and G. Woodgate. 2013. Agroecology: Foundations in Agrarian Social Thought and Sociological Theory. *Agroecology and Sustainable Food Systems* 37 (1):32–44.
- Steckley, M., and T. Weis. 2016. Peasant balances, neoliberalism, and the stunted growth of non-traditional agro-exports in Haiti. *Canadian Journal of Latin American and Caribbean Studies/Revue Canadienne Des Études Latino-Américaines Et Caraïbes* 41 (1):1–22. doi:10.1080/08263663.2015.1130293.
- Timmermann, C., and G. F. Félix. 2015. Agroecology as a vehicle for contributive justice. *Agriculture and Human Values* 32 (3):523–38. doi:10.1007/s10460-014-9581-8.
- Valencia Mestre, M. C., B. G. Ferguson, and J. Vandermeer. 2018. Syndromes of production and tree-cover dynamics of Neotropical grazing land. *Agroecology and Sustainable Food Systems* 43 (4): 1–24.
- Van der Ploeg, J. 2008. *The new peasantries: Struggles for autonomy and sustainability in an era of empire and globalization*. Sterling: Earthscan.
- Van der Ploeg, J. 2013. *Peasants and the art of farming: A chayanovian manifesto*. Winnipeg: Fernwood.
- Wallerstein, I. 1979. *The capitalist world-economy*, Vol. 2. Cambridge, England: Cambridge University Press.
- Weisskopf, R. 1985. *Factories and food stamps - the puerto rico model of development*. Baltimore and London: Johns Hopkins University Press.
- Wood, E. M. 2002. *The origin of capitalism: A longer view*. London and New York: Verso.