



Cuba, a Model of Sustainable Agriculture Towards Global Food Security

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With the collapse of the Soviet Union and the tightening of the U.S. embargo, the early 1990s saw Cuba facing a severe food crisis and a collapse of more than 30 percent of the island's GDP. In order to tackle this grave moment, in which the Havana's government was unable to deliver adequate food supplies to the population, Cubans were forced to develop a new method of farming: urban agriculture, hopefully a sustainable way of land exploitation and food production. Even though it was not the result of a deliberate government policy, but rather an unfortunate consequence of helpless events, the results of this new system led Cuban authorities to adopt specific measures to incentivize its expansion. This effort rendered the island a world leader in sustainable agriculture and its food production system became a model for other countries in the world to follow, especially developing societies that should be guarded against any damaging transformations.

A Model of Sustainable Agriculture Born out of Necessity

Following the collapse of the Soviet Union, Cuba faced a grave shortage of oil supplies, which cut it off from cheap imports. The island was plunged into what was called the "Special Period in Peacetime", further hardened by the relentless U.S. embargo. Indeed, in 1996 the Cuban Liberty and Democratic Solidarity Act – also known as the Helms-Burton Act – strengthened the already existing embargo against the island, applying sanctions extraterritorially to foreign firms trading with Cuba. The lack of fuel, fertilizers, and other farm inputs decreased agricultural productivity. According to statistical data, the per capita food production annual average growth was negative, by -5.1 percent, between 1986 and 1995.ⁱ Farmers had to switch to predominantly oxen traction because of fuel scarcity.ⁱⁱ Oil shortages also forced producers to move closer to consumers since fossil fuel-powered transportation was limited. City dwellers were the first hit by supply shortfalls, and, in order to effectively respond to the food crisis, they started to occupy unproductive state lands to produce their own food. Additionally, ordinary citizens used balconies, backyards, and roof terraces for cultivation and raising livestock.ⁱⁱⁱ Furthermore, rural farmers, out of necessity, adopted agro-ecological methods due to the lack of oil-based pesticides and fertilizers. Without having it as a main goal, they started to practice sustainable farming as a way of food production in order to guarantee nutritious and accessible food for everyone while natural resources are managed in a way that maintain ecosystem functions to support current as well as

future human needs.^{iv} This includes a full participation of farmers, pastoralists, and other rural dwellers who might benefit from the economic development. Sustainable agriculture includes promoting urban farming, which improves food security and favors equitable access to resources, managed in the most efficient way. The Cuban government understood the potential of this spontaneous citizens' initiative. The government soon started supporting and encouraging urban agriculture through a number of measures, which entailed the revision of property rights, a significant change for the socialist system. Cuba went through a drastic revision of the work paradigm: it shifted towards a decentralized production model and an acceptance by farmers that they obtained benefits from their own labor. The possibility of gaining from their efforts functioned as a major incentive for workers who had a greater interest in maximizing their production. The reorganization of agricultural production consisted mainly in converting the large state farms into smaller, more efficient, cooperative farms and distributing land in usufruct to small producers.^v Farmers had the right to enjoy the use of the soil and take advantage of its products, without necessarily owning the land. The aim of the Cuban leadership was to improve agricultural production and cut, if not eliminate, food imports into the country. For this reason, it supported the creation of the Department for Urban Agriculture at the Ministry of Agriculture in 1994 and of the National Group for Urban and Sub-urban Agriculture (GNAU) in 1998.^{vi} The GNAU coordinates and promotes the development of sustainable urban agriculture in Cuba and was charged with encouraging the recycling of nutrients and wastes. It frames guidelines with agro ecological principles and directives for individual production of compost and seeds, local use of resources, and organic plant protection for Cuban producers.^{vii} Later in 2008, the newly installed government of Raul Castro adopted Law Decree 259, a land reform targeted at the distribution in usufruct of unproductive parcels. In 2011, *Lineamientos*, a reform package aimed at modernizing the Cuban economy placed a large emphasis on agricultural production. In 2012, Law Decree 300 provided for the construction of buildings on the usufruct land, and the planting of forests and fruit trees.^{viii} The government, moreover, started to work on creating additional commercial possibilities for farmers, providing training and access to agricultural inputs. The promotion of Cuban agriculture had become so important that domestic food production was declared a national security issue.^{ix}

Riding on Agroecology

Cubans were not aware of their environmentalist turn. The scarcity of resources and farm inputs brought farmers to experiment with new methods and organic pest control. Organic principles were followed and locally available resources were used. They practiced crop rotation, intercropping, used green manure, and planted hedges. Furthermore, they used repellent plants such as common thyme, basil, marigold, maize or ruddles to reduce pest infestation or to attract beneficial insects.^x Government educational programs endorsed sustainable farming methods, but farmers used, above all, traditional knowledge derived from elders or their childhood memories.^{xi} Those new practices that we could define as agroecology represents “a whole-systems approach to agriculture and food systems development based on traditional knowledge, alternative agriculture, and local food system experiences.”^{xii} It turned out to be a model of food production that guarantees the preservation of natural resources and relies on minimum artificial inputs, from a sustainable perspective. A cornerstone of agroecology

is diversification of both crops and farming methods –including livestock integration– that contributes to the promotion of biodiversity and of a more efficient use of resources, such as sunlight, water, soil and natural pests. Diversification intensifies natural processes such as photosynthesis, nitrogen fixation, absorption of soil phosphorus, and the enhancement of biological activity both above and below ground.^{xiii} This diversification represented also a change of paradigm in Cuba, after the ultra-specialization on export of sugar and derivative products to the USSR during the Cold War.

According to the World Wildlife Fund (WWF) bi-annual Living Planet Report 2016, Cuba is the most sustainable country on the planet.^{xiv} Indeed, the Fund created an environmental footprint index that combines human development and the exploitation of natural resources. The island was found to have both an acceptable ecological footprint per capita, using an exemplary amount of energy and natural resources, and an acceptable Human Development Index rating. Such indicators demonstrate that a sustainable system of food production is compatible with a high level of literacy, life expectancy and low infant mortality.^{xv}

The Path Towards Global Food Security

According to the data collected by the Food and Agriculture Organization (FAO), some 795 million people in the world do not have enough food to lead a healthy active life – about one in nine people on Earth.^{xvi} This is a clear indication that the promotion of industrial agriculture has failed to deliver satisfactory results. Industrial food systems affect human health and broader ecological systems. There has been a dramatic increase of non-communicable diseases linked with poor quality of food consumption, with obesity being described as a pandemic.^{xvii} Worldwide obesity has more than doubled since 1980; in 2014, 600 million adults were classified as obese. This phenomenon is not restricted to industrialized societies; in developing countries it is estimated that over 115 million people suffer from obesity-related problems.^{xviii} Worse, industrial agriculture has tremendous environmental costs. Not only do chemical pests and fertilizers contaminate the surrounding areas, but they also contribute to the increase of carbon dioxide emissions, accelerating the pace of climate change. Out of the total emissions released in the atmosphere by agricultural activities, 11.5 percent comes from chemical pests and fertilizers.^{xix} The consequences of industrial land exploitation includes the desertification of agricultural land, deforestation, water consumption and contamination, land degradation, as well as global warming. Indeed, environmental fallout is not limited to agricultural production, but pollution continues to be present in all the other phases of the process, from food transportation to processing, and from storage to retailing.^{xx}

A sustainable agricultural model, such as the Cuban one, may be looked at as an alternative to improve food security and environment health. Even though its development was due to necessity, Cuba's urban agriculture has become a model for the rest of developing world. Cuba has a socialist political system in which property rights and agricultural policies are managed in a centralized way, significantly different from the rest of the world. As a result, the whole production process has been consigned to government oversight, from the distribution of the land, seeds and agricultural inputs to commercialization. However, the evidence of the island's success in sustainability

highlights the potential of urban agriculture, or “urban agroecology”, as a way of food production for sustainable megacities and even smaller towns around the world. Cities usually depend on imports from rural areas for their supply of water, energy or food. Thus, city dwellers are usually more vulnerable to unpredictable changes, such as a national food crisis.^{xxi} Therefore, food production within a city may reduce the dependency on external resources. Sustainable agriculture also promotes the amelioration of human health, encouraging the consumption of fresh fruit and vegetables. Indeed, following the changes in the agricultural system in Cuba there was a marked decline in death rates from diabetes and heart diseases.^{xxii} Diabetes incidence decreased by 53 percent from 1986 to 1996 when the agricultural production change was taking place.^{xxiii} Moreover, urban agriculture could provide employment and an income opportunity for marginalized parts of a city’s population; in addition to this, greater inclusion and community building could be side effects of urban farming, which could contribute to making cities more livable and pleasant, improving the population’s standard of living.^{xxiv} Furthermore, sustainable and urban agriculture could be a way to achieve food sovereignty, a term defined as self-sufficiency and national autonomy for food production. Developing countries could view this goal as an interesting one to attain, and provide them with the flexibility to shift their monetary resources from food import to local investments.

Agroecology and sustainable agriculture could be a solution to hunger and food security, and it is also a resilient system of food production. This means that it resists harmful environmental factors while recovering faster from the impacts of extreme climate events that recently are becoming more usual due to the impact of climate change. A survey conducted in the provinces of Holguin and Las Tunas forty days after hurricane Ike hit Cuba in 2008 found that diversified farms experienced losses of 50 percent compared to 90 or 100 percent in monocultures.^{xxv} Likewise, agro-ecologically managed farms showed a faster productive recovery (80–90 percent) 40 days after the hurricane hit.^{xxvi} Actually, many countries are already adopting this model not only in Latin America, but also in other regions of the world, including countries such as Laos and Malawi, and should be followed by countries such as Haiti in order to enable more communities with poor land quality to fight malnutrition.^{xxvii}

The development of urban agriculture will be difficult to promote and implement since there are many barriers to its unbridled success. Some of the challenges to face are access to land, the recognition of land rights, water availability, low soil fertility, pollution, and inexperience of new farmers, as well as the presence of cheap products on the market, produced in heavily subsidized agricultural sectors in the Western world. Also, urban land is usually a more valuable commodity than rural land and its use is fiercely contested.^{xxviii} The quantity of water needed for food production could be difficult to find in a city. Furthermore, urban soils are usually polluted and near roads or industrial areas that could contaminate the products.^{xxix} However, the urgency of food crises in developing countries and the negative impacts of climatic events on food production constitute a major effort towards the promotion and spreading of sustainable agriculture.

Defending a Precious Production System from the Capitalist’s Assault

Agricultural trade between the United States and Cuba, based mainly on sugar, was the bedrock of bilateral relations during the first half of the 20th century. The Castro revolution changed the situation with the interruption of trade relations between the two countries. Since then, U.S. interests have not influenced Cuba's agriculture policy, even though the U.S. trade embargo considerably affected the island's agricultural sector. Now, with the unfreezing of bilateral relations, U.S. agro-industry sector yearns for this new market. The question is whether the peculiar Cuban agrarian sector, small-scale and family-farmed agriculture, will survive a "capitalist assault". Cuba is already importing food from the United States. In 2000, the Trade Sanctions Reform and Export Enhancement Act (TSRA) allowed sales of certain food and medicines to Cuba.^{xxx} U.S. agricultural exports to Cuba averaged \$365 million USD per year between 2012 and 2014.^{xxxi} However, U.S. restrictions on extending credits to Cuban buyers have curtailed trade possibilities.^{xxxii} The complete dismantling of the embargo, including the abrogation of the Helms-Burton Act, will open a wide range of trading opportunities. Already in November 2015, the United States Agricultural Coalition for Cuba (USACC) started to plan for the full expanding of the agricultural investments in the historically adversarial country.^{xxxiii} There have been many U.S. agro-business groups lobbying for the end of the embargo; for instance the Arkansas Rice Growers Association is interested in expanding its market in Cuba, since the island's per capita rice consumption is fivefold greater than that of the United States.^{xxxiv} U.S. interests seem to be focused on technology transfer to Cuba and on consumer behavior detection in order to sell products to the island. Cubans could be potential major purchasers of U.S.-produced inputs, but also of meat, grain, or cooking oil.^{xxxv} However, what could be the advantages of the significant opening to U.S. agricultural products for the Cuban economy? Cuban agricultural production cannot compete with industrial U.S. production, in terms of both output quantity and costs. Firstly, the introduction of U.S. imports in Cuba will destroy the nascent non-state system; local producers will be driven out of business. Secondly, the Cuban products that could be sold in the U.S. market are numerous, among these tobacco, rum, tropical fruit, and seafood.^{xxxvi} They could compete on quality, through artisanal production, non-genetic modification or other niche merchandise. Thirdly, a tension between domestic market production, domestic prices, and agricultural export costs will arise. Until now, Cuban agriculture focused on producing for self-sufficiency and domestic consumption; there is the risk that turning to food-exports will subtract resources from this, with the subsequent worsening of the population's living conditions. But what will suffer more is the sustainable model that Cuba was able to develop in the last twenty years, an agrarian model that is based on small-scale production, on traditional and ecological methods that are not efficient enough to compete with industrial ones, but in the long term will prove better for the environment and those producers who employ them. The exchanges between U.S. and Cuban agricultural systems seem to be unidirectional. Indeed, in the USDA press release, reporting on a bilateral agricultural accord signed during President Obama's trip to Cuba, there was no mention of agroecology or organic agriculture, showing that there is little interest in bringing Cuban sustainable techniques in the States.^{xxxvii} "We will not renounce our ideals of independence and social justice, or surrender even a single one of our principles, or concede a millimeter in the defense of our national sovereignty. We will not allow ourselves to be pressured in regards to our internal affairs. We have won this sovereign right with great sacrifices and at the cost of

great risks,” affirmed Raul Castro commenting on Barack Obama’s visit to the island.^{xxxviii} The two major events in the leadership of both countries, Fidel Castro’s death and Donald Trump’s election, sprinkle the future of U.S.-Cuba relations with deep uncertainty. Whether the normalization will continue or new setbacks will occur, the Cuban government does not want to give up its method of agricultural production and is ready to fight the “capitalists’ infiltration.”^{xxxix}

Sustainable Agriculture to be Endorsed

Sustainable and urban agriculture was a logical response of Cubans to their resource constraints. Traditional low-input agricultural techniques, based on organic pests’ control and crop diversification, has been the backbone of the ecological food production in Cuba. This system is also resource conserving, environmentally sound, socially inclusive, and a model to be followed by other countries. Indeed, it furthers food security and sustainable development for megacities and large towns all over the world, and it is particularly important for developing countries. The Cuban model is not perfect and the system still has ongoing problems, but it has met significant challenges in public and environmental health, even if unintended. The new uncertainty on the future of U.S.-Cuban relations has put on hold the countless economic interests that U.S. businesses, specifically in the agrarian sector, have in the island. However, the Cuban sustainable agriculture model should certainly be promoted, protected, and spread abroad. The question would be: how can this be done in the context of the current opening to the U.S. economy? This food production may be the only alternative for many developing countries fighting hunger to be able to assure the necessary sustenance to their own population and an opportunity for everyone to live in a sustainable world.

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