Organic Agriculture in Cuba: Managing with Limited Resources

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The typical Cuban farming units are large-scale cooperatives, in which farming families are more or less loosely organized. In the low lands, these cooperatives normally specialize in a few products for the market and a higher diversity of self-sufficiency crops. In the mountain areas, these cooperatives produce in diverse agroforestry systems. This is especially the case for the eastern provinces Guantanamo and Santiago. Large-scale plantations were developed by the Spanish and US colonialists, and further developed by the socialist government. After Cuban Revolution in 1959, land was distributed to more than 200'000 small farmer families through the Agrarian Reforms of 1959 and 1963, while 70 percent of the latifundio lands passed over to state control. Since the collapse of the former socialist economic community in the early 1990s, Cuba's agriculture faces multiple challenges; there is a shortage of agricultural inputs and Cuba's farmers must learn to be self-sufficient and to manage with their own resources. This results in difficulties to meet Cuba's production goals. Domestic food markets are periodically under supplied, and export volumes are decreasing. Cuba has the challenging task to increase the output and efficiency of the complete food chain, based as much as possible on locally available resources.

Recycling as a national strategy

At the production level, the solution is low input agriculture. As early as the late 1980s, when agricultural input supplies from the Eastern Bloc slowed down, Cuba began nationwide production of biological pest control agents and, as a result, drastically reduced the use of pesticides. In the 1990s, thousands of primarily urban vegetable gardens for self-sufficiency (*organoponicos)* where established. They are not organically certified, but nevertheless they are one the pillars of the Cuban organic movement and internationally acknowledged for their achievements. Such urban gardens are of high value as they improve decentralized and low input food production near to the consumers. In conventional agriculture, there increasingly exists the strategy to apply synthetic fertilizers, pesticides and herbicides, especially after the hurricane-season 2008. A part of Cuba's agriculture can be considered as "organic by default," as conventional inputs are periodically not available or not available at all.

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Organic agriculture is a very attractive proposal for Cuban farmers as it is based on low input resource efficiency and as it opens new access to high value markets. Therefore, organic agriculture is promoted actively by Cuban producers, scientists and authorities since the nineties. The first certified organic crops from Cuba were coffee, honey, citrus and sugar, starting conversion by the end of the nineties. Step by step, new organic projects were launched; tropical fruits joined the product range, such as mangoes and coconut. The development of organic agriculture in Cuba started very promisingly with some experts even calling Cuba an "organic island," obviously based on wishful thinking. Reality shows that there is a long way to make this vision come true, and there is no governmental policy to support such a vision.

Picture: Compost is the basic fertilizer used on organic citrus farms. The production of good quality compost is a logistic challenge and demands considerable investment.

Picture: Lukas Kilcher

Organic production consolidates on a low level

Organic production reached its highest levels in 2005. Since then, the expansion slowed down and has stayed at a rather modest level, with less than one percent of the agricultural land. Compared to 2005, organic production decreased from 15'443 hectares to 14'314 hectares in 2008. By the end of 2008, there were 2954 certified organic farms in Cuba, many of them part of cooperatives inspected by internal control systems (ICS).

Organic agriculture has the potential to improve food security. Low and high input models are currently a hot issue in Cuba

Picture: Lukas Kilcher, FiBL

Table 41: Cuba: Organic production in Cuba end of 2008

Crop/Product	Production system	Area (ha)	Farmers (No)	Production (t)
Sugar**	Plantations with crop rotation	5'196	631	3'500
Citrus*	Plantations, agroforestry systems	4'195	579	301
Coffee*	Agroforestry systems	3'807	1'156	451
Coco*	Agroforestry systems	0	0	0
Coconut*	Agroforestry systems	1'056	100	82
Mango*	Extensive plantations	60	1	38
Honey*	Wild collection	27'758 bee colonies	487	1'201
Total		**14'314**	**2'954**	**5'573**

* Source: Ministry of Agriculture
** Source: Ministry of Sugar

Challenges for the development of organic agriculture

The consolidation of the organic agricultural development in Cuba came rather early compared to its young history. The lessons learned from existing experiences show that the investments required to overcome the challenges for organic agriculture in Cuba are rather high. Some barriers are not even in Cuba's control.

Hurricanes: several disastrous storms caused the loss of complete harvests and destroyed plantations, as well as packing and processing facilities. In 2008, Hurricane Ike destroyed a large part of the organic harvest. As a result, the harvest of some cooperatives is too small to justify certification costs. This is especially the case for organic cacao, which was an important organic product a few years ago, and to some extent also for organic citrus. The extension of the hurricane period and higher categorized storms are a direct result of global warming. Cuba suffers the consequences of climate change very dramatically, while its ecological footprint is one of the smallest in the world.

New pests and diseases: Such phenomena are another effect of the climate change, too. A few years ago, the Citrus Greening disease invaded Cuba with the intrusion of the Asian Citrus Psyllid *diaphorina citri*. Its organic management and the management of infested trees are subject of agricultural research. The same counts for the Coffee Berry Borer, *Hypothenemus hampei*, which has invaded Cuba since the nineties and presents a new challenge for organic coffee producers in the eastern provinces. Cuba's scientists are rather well prepared for such challenges, as they are very strong in locally adapted bio-control solutions. However, the harvest losses and research costs are considerable.

Economic constraints: The economic crisis has affected Cuba since the beginning of the nineties. Due to low purchasing power, the local population cannot afford premium products. Generally, the food market is not prepared for quality differentiation. With the excep-

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tion of small amounts of coffee and sugar, certified organic products are not available on the domestic market. Another barrier is the limited resources available for investments; larger-scale projects would need considerable investments in compost production, soil management practices such as cover crops, processing technologies and marketing. In most cases, such investments require the contribution of foreign capital.

Limited access to agricultural inputs: A challenge for organic producers in Cuba is limited access to agricultural inputs. Low input strategies, therefore, are of high interest. Such strategies are not easy to implement, as there is a great deal of competition in recycling products.

High quality compost production from locally available raw materials such as coffee pulp, manure and sugarcane bagasse is an excellent alternative to synthetic fertilizers. The production of good quality compost, however, is a logistical challenge. For holdings on a scale of 200 hectares and more, quantities of 5'000 to 10'000 metric tons of raw material are needed. Such amounts are relatively difficult to obtain in Cuba, since raw materials are in high demand. Some materials are preferentially used for animal feed, including citrus pulp. Raw materials from animal origin, such as manure, are generally scarce in Cuba.

Undersown legumes supply extra nutrients, improve soil fertility and reduce leaching of nutrients. For large farms, however, the associated additional work is often a barrier.

Picture: Lukas Kilcher, FiBL

Cover crops are an excellent solution for improving soil fertility, adding additional nutrients to the soil while contributing to the management of weeds. *Arachis pintoi*, for example, is very well suited to organic citrus farming, but virtually unobtainable in Cuba. Other legumes, such as *Neonotonia wightii* and *Teranmus labialis,* are reproduced by the Instituto de Pastos y Forrajes, but remains scarce. Some organic farmers reproduce their seeds themselves.

Soil cultivation and fertilization are the factors that make organic production expensive in comparison to conventional production. This is particularly crucial for large-scale farms, where labor is scarce and mechanization for soil cultivation, compost production and compost application is needed. Such investments are difficult to implement in Cuba, as in some cases these tools are not available, and in other cases, the cooperatives cannot afford them.

Opportunities on the international and domestic market

The challenges for organic agriculture in Cuba are many, but at the same time, there are great opportunities. The quality of Cuban organic products is highly regarded on the international market. Some fruit varieties used in Cuba are of extraordinary taste, such as the

coconut and the grapefruit varieties predominant in the eastern mountains. Another factor may be the low input and yield level, which leads to a higher concentration of aroma-substances in the harvest.

On the domestic market, the combination of ecotourism and organic agriculture is of considerable interest. Organic coffee producers discovered this opportunity, and they sell their coffee to international tourists. For local tourism, there is a high potential, especially for fruits and vegetables such as guava, papaya and tropical tubers.

Organic products from Cuba are exported with success in Europe. For Cuba, this is the first time that its tropical fruit products are sold with a label of origin

Picture: Lukas Kilcher, FiBL

Domestic food security is a top concern in Cuba, and has become more important since the enormous damage caused by the last hurricanes. One of the strong features of organic agriculture is its reliance on fossil-fuel independent and locally available production assets; working with natural processes increases cost-effectiveness and resilience of agro-ecosystems to climatic stress. Organic agriculture has the potential to improve food security in Cuba, with reduced inputs and environmental impacts. On the political level, this discussion of low input versus high input agriculture in order to solve food security problems is going on very intensively.

Organic movement on the move

The Cuban state has been supportive through the establishment of specialized institutions, legislation, research, teaching and extension, and through productive practice. Drafts for a national legislation are in preparation. However, organic inspection to date has been conducted exclusively by international certification bodies. In the view of the Ministry of Agriculture, the critical mass for a Cuban inspection and certification body has not yet been reached.

The Cuban initiatives on organic agriculture are supported by a grouping of agrarian researchers and advisers who have pooled their specialist knowledge on organic agriculture and organized themselves since 1992 as the *Grupo de Agricultura Organica* (GAO), which was transformed after a couple of year into the *Asociación Cubana de Técnicos Agrícolas y Forestales* (ACTAF). ACTAF periodically organizes national meetings with international guests. The most recent one took place in May 2008, the VII International Meeting on Organic and Sustainable Agriculture. The first years of the Cuban movement (late 1980s and early 1990s) were more focused on technical alternatives, resulting in clear demand for technological support during the transition process for a more sustainable agriculture. Consequently, Cubans have developed an exemplary scientific approach, especially in biological control and other products within a framework of inputs substitution. This has changed in the last years. The Cuban movement is step by step integrating with the small

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farmers' movement (ANAP - ACTAF) and pursuing a holistic approach, understanding organic agriculture beyond the mere technological tool. Organic agriculture is not only a tool for agroecology; it can also contribute to solving critical national and global challenges, such as food security and climate change.