



# SCALING SUSTAINABLE AGRICULTURE

## The Farmer-to-Farmer Agroecology movement in Cuba

This is the inspiring story of the Farmer-to-Farmer Agroecology Movement (MACAC) which has spread across Cuba and inspired over 200,000 farmers to take up agroecological farming practices. The case study shows that it is possible for a social movement to take sustainable agroecological farming systems to scale. Their experience counters the logic of conventional top-down approaches of agricultural extension and shows that locally specific solutions developed and disseminated by farmers themselves can provide significant and sustainable benefits for food production, rural livelihoods and environmental restoration. The experience provides valuable insights about how agroecology can help improve farmers' wellbeing while simultaneously restoring the ecological health of the environment on which people's livelihoods depend, increasing climate resilience and reducing carbon emissions from agriculture.

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# EXECUTIVE SUMMARY

By 2018, 200,000 families, or half of Cuba's *campesino* (small farmer) population, were participating in the Farmer-to-Farmer Agroecology Movement (MACAC) (Mier y Teran 2018, p. 641). They use agroecological methods on their farms, benefiting from higher productivity, incomes and food self-sufficiency (Mier y Teran et al. 2018, p. 641).<sup>1</sup> The membership has almost doubled from the 110,000 families that had joined by 2009 (Machin Sosa et al. 2013). While this impressive spread occurred during the years of improving prosperity from 2001 onwards, the initial growth of the agroecology movement was catalysed by the economic crisis in the early 1990s precipitated by the collapse of the Soviet Bloc. Agroecology is widely credited with averting a major food crisis, increasing small peasant farmers' self-sufficiency and resilience, and restoring soil health (see for example, Machin Sosa et al. 2013; Mier y Teran et al. 2018; Iozzi 2016).

The *Campesino a Campesino* (CaC, 'Farmer-to-Farmer') initiative began in 1997 as a series of programmes run by the National Association of Small Farmers (ANAP), supported by external funding. Based on principles of horizontal learning and learning-by-doing, it snowballed into the decision by ANAP to build a self-sustaining movement. In 2001, ANAP turned CaC into a movement led by farmers, without central leadership or permanent funds.

Agroecological practices have spread beyond members of MACAC and are now applied by between 38% (soil conservation techniques) and 91% (agroecological pest management) of all *campesino* farms in the country. Small farmers' productivity increased by almost 200% between 1988 and 2009, with *campesino* production exceeding the National Planting Plan in 2009 (Gürçan 2014; Machin Sosa et al. 2013). Interviews with farmers in 2011 showed that many were producing 70–100% of the food needed for family consumption, while producing some surplus for the market (Altieri and Funes-Monzote 2012). Higher-tier agroecological farms are found to have higher incomes (Machin Sosa et al. 2013). Moreover, agroecological diversification led to the diversification of roles and income-earning opportunities for women, youth and elderly people. These included women taking charge of the management of animals, vermiculture and medicinal plants, and directly taking the income (Rosset et al. 2011).

Agroecology has also helped *campesino* increase their farms' resilience to climate change-related events such as hurricanes, as well as improve energy access and water resource management. For example, many farms integrate clean-energy generation and food production by growing biofuel crops and incorporating windmills and biogas systems. This results in both reduced expenditure on fuel and lower carbon emissions from agriculture. The 'low-input' farming system, which uses little to no chemical fertilizers or pesticides, provides an important way reducing carbon emissions and restoring environmental health<sup>2</sup> which is becoming

increasingly relevant the further we breach environmental planetary boundaries.

## Key insights

The spread of MACAC across Cuba in just 20 years provides compelling evidence that it is possible for a social movement take agroecological farming systems to scale when there is a conducive external environment. It also provides valuable insights about how agroecology can help strengthen food production and rural livelihoods while simultaneously restoring the ecological health of the environment on which people's livelihoods depend, increasing climate resilience and reducing carbon emissions from agriculture. This experience is relevant to all countries and perhaps particularly for lower-income countries that lack the infrastructure or capital to implement high-cost or high-tech solutions to rural poverty, hunger and climate change adaptation as well as for countries that seek to reduce carbon emissions while protecting their natural resources for a sustainable and food-secure future. More widely agroecology has a positive role to play in the transition to more sustainable food systems that operates within planetary resource boundaries; for example, currently 25% of greenhouse gas emissions are attributable to agriculture and forestry activities alone (IPCC, 2014). Other solutions are likely to be needed to help feed the world's growing population and the challenge will be to ensure these are also inclusive and sustainable.

As a horizontal movement that relied mostly on peasant cadre, MACAC counters the logic of conventional top-down approaches of agricultural extension, showing that locally specific solutions developed and disseminated by farmers themselves can provide significant and sustainable benefits for poverty reduction and environmental restoration. The case study shows that social movements can achieve change at a significant scale; the Cuban agroecology movement is not only nationally recognized but is inspiring the spread of similar movements internationally, in particular through the global small farmer movement, La Via Campesina.<sup>3</sup>

The historical socioeconomic conditions that catalysed CaC in Cuba demonstrate important lessons for other countries that may face similar hardships today due to climate change and other factors affecting food security. Its continued growth today under more auspicious circumstance shows the durability of locally specific grassroots-led initiatives over projects that rely on external funding cycles and timeframes.

However, even an inspiring grassroots movement such as MACAC can hit a ceiling unless there is a corresponding shift in national and international policy. Cuba still imports around 60% of its food, although much of this goes to supplying the booming tourist industry. Movements such as MACAC could usefully play a stronger role in national agricultural and economic policy, which would allow small farmers to secure sustainable channels for marketing their produce.



# WHAT HAS CHANGED?

## THE CHALLENGE

### **Environmental degradation and climate change**

More than 70% of Cuba's agricultural land suffers soil degradation, a figure that is likely to increase with worsening climate change (FAO 2017; Rodriguez and Gonzales 2018). The Cuban agricultural sector is vulnerable to further environmental degradation and the impacts of climate change (Rodriguez and Gonzalez 2018).

Cuba's median temperature is set to rise by three degrees by 2100 (World Bank 2019). Studies have predicted more frequent and extreme drought and hurricanes, as well as generally unpredictable rainfall patterns, which will have significant impacts on agricultural planning (Rosset et al. 2011; Nature 2019). Recent reviews have warned that sea levels will rise much more than previously expected: by 29cm by 2050 and 95cm by 2100 (up from previous predictions of 27cm and 85cm, respectively) (Pérez-Parrado 2019).

Cuba's Institute of Meteorology in Havana is already reporting the incidence of stronger and more frequent hurricanes, which have flattened crop fields and caused damage worth billions of dollars (Nature 2019). In 2014–17, Cuba experienced its worst drought in over a century. 75% of the country's land was dry; 141 out of 168 of municipalities were affected, with particularly severe impacts in the Central and Eastern farming provinces (Avril 2017). In 2017, Hurricane Irma affected crops and agricultural infrastructure in 13 of the country's 15 provinces. In recognition of these risks, the government has enshrined climate action in its constitution, and launched '*Tarea Vida*' (Project Life) to tackle the issue. This includes banning the construction of new homes in potential flood zones and evacuating high-risk areas.

### **Cuban development indicators**

Cuba is now a middle-income country and has achieved rising human development indicators over recent decades, despite being seriously affected by a US blockade for 60 years. The collapse of the Soviet Bloc and tightening of the US trade embargo in the early 1990s caused Cuba to lose 85% of its external trade in under three years, as well as an 80% drop in the availability of the chemical fertilizers and pesticides upon which its conventional farming models were based (Machin Sosa et al. 2013). The ensuing economic crisis led the government to declare a 'Special Period in Peacetime'. The country's agriculture had primarily consisted of monocropping sugarcane and tobacco for export to the

Soviet Bloc; by the end of the 1990s, the government had ordered the closure of almost half of the island's sugar refineries (Atwood 2017). This caused Cuba to post the worst annual per capita rate of food production growth in Latin America and the Caribbean in the 1990s (-5.1% for the period 1986–95, against a regional average of -0.2%). The island's GDP collapsed by more than 30% (Iozzi 2016). More seriously, Cubans faced chronic hunger; interviews of citizens, conducted by journalists, reveal stories of living off a diet of sugar water when rations failed to come through, and of people fainting in the street from hunger.<sup>4</sup>

Although Cuba is now classified as an upper-middle income country with a high Human Development Index score (UNDP 2018), much of the wealth is concentrated in urban areas and large cities such as Havana (Everleny 2019). There is no official poverty line in part because monetary data does not take into account the high level of state-provided services such as healthcare and education, and subsidized water and electricity (Serbin 2017).<sup>5</sup>

## Gender

Cuba was placed 32nd out of 189 countries in the 2020 Global Gender Gap Report (World Economic Forum 2020). Cuba has achieved important gains for women since the revolution, for example in terms of the formal political representation of women, for which it ranks 18<sup>th</sup>. However, it lags behind in other important indicators for example relating to economic participation and opportunity where it is ranked below the global average at 97<sup>th</sup>.

A study conducted by Echevarría noted that rural women experience disproportionate economic vulnerability, given that most paid work for women is concentrated in urban state sector jobs (Díaz Fernández et al. 2013). According to the National Office of Statistics (ONEI), only 3.2% of people hired in the state's agriculture, livestock and forestry jobs are women (Acosta 2011). Meanwhile, traditional farming communities operate under a patriarchal structure in which only men have access to direct income-generating work; traditional female roles of raising livestock, tending gardens and raising children are not remunerated, making women economically dependent. In a time-use survey published by ONEI in 2002, it was found that Cuban women dedicate 71% of their working hours to unpaid domestic work (Grogg 2014a). Cuban researchers have also found that rural women's lack of access to income-generating work is one of the strongest contributors to inequality in rural areas (Grogg 2014b). Furthermore, Echevarría argues that land reforms following the Cuban revolution which reduced overall economic inequality have been unable to achieve the same for gender inequality, having failed to foster active female participation in the redistribution process (Villanueva et al. 2013). In fact, a survey published in 2017 of both rural and urban neighbourhoods in the more impoverished Holguin province found that women were experiencing physical and sexual abuse, which was traced back to a culture of silence and coercion in male-dominated community and law enforcement structures (Feinberg 2019:10).



Farmers selecting seeds and sharing learning at a Seed Fair. ©Humberto Mayol.

## The farmer to farmer initiative

The *Campesino a Campesino* (CaC, 'Farmer-to-Farmer') initiative began in 1997 as a series of programmes within the National Association of Small Farmers (ANAP), supported by external funding. Based on principles of horizontal learning and learning-by-doing, it snowballed into a self-sustaining movement. In 2001, ANAP transformed CaC from a programme into a movement led by farmers, without central leadership or permanent funding but in a context where there was a relatively supportive national policy framework and institutional support from universities and research institutes. By 2008, 85% of municipalities in the country were participating in the MACAC movement with 9,211 active promoters. By 2011, this number had grown to 11,935 (Gürcan 2014, p. 140).

The *Campesino a Campesino* (CaC, 'Farmer-to-Farmer') methodology was developed in Central America as a peer-to-peer pedagogy, based on the educational philosophy of Paolo Freire (Machin Sosa et al. 2013) and previous movements in Central America. It focuses on local needs, knowledge and environmental conditions, with a key tenet being that campesino ('small farmers') are more likely to trust and replicate advice from fellow farmers than from extension workers or agronomists. Farmers who learn about agroecology through CaC then innovate and share practices themselves. Prior to being trialled in Cuba, it was successfully used in Guatemala, Mexico, Honduras and Nicaragua. However, while it reached just 30,000 farmers in 30 years across Central America, in Cuba it spread to 100,000 families in one decade (Machin Sosa et al. 2013).

# POVERTY REDUCTION

## Increased productivity and incomes for small farmers<sup>6</sup>

By 2018, 200,000 families, or half of Cuba's *campesino* population, were participating in MACAC (Mier y Teran 2018, p. 641). The application of agroecological methods goes beyond registered participants of MACAC; indeed, diverse agroecological practices are applied by between 38% (soil conservation techniques) and 91% (agroecological pest management) of all *campesino* farms in the country; what is more, only a third of these farms are active members of MACAC, showing the wide reach of agroecology beyond the core of the movement even though only a third of these farms belong to official MACAC members (Machin Sosa et al. 2013).

Small farmers' productivity increased by almost 200% between 1988 and 2009, with *campesino* production exceeding the National Planting Plan in 2009 (Gürcan 2014; Machin Sosa et al. 2013). Even though the proportion of farmland held by *campesino* only went from 25% to 27% in this time period, the contribution of the *campesino* sector to national food production increased for all key food crops. For example, proportional production of maize rose from 50% to 80%, while for beans it rose from just over 50% to almost 95% (ANAP 2013, p. 25). A study conducted in 2008 showed that farms with high levels of agroecological integration showed higher levels of productivity per unit area (Machin Sosa et al. 2013, p. 24). Under a three-tier categorization of farms by agroecological integration,<sup>7</sup> income from agricultural products (excluding production for self-provisioning) stood at 6,700 Cuban pesos (253 USD) annually per unit of labour for the top-tier farms in 2008, compared to 2300 pesos (87 USD) for the lowest tier (Machin Sosa et al. 2013).

## Increased food self-sufficiency and access to nutritious food

As a social model, agroecological cooperatives have increased the availability of nutritious food for communities. Qualitative interviews with farmers in 2011 showed that many were producing 70–100% of the food needed for family consumption, while also producing surpluses for the market (Altieri and Funes-Monzote 2012). In Jagüey Grande, a predominantly agricultural municipality of 60,000 residents, 80% of the food consumed within the community is produced by cooperatives (Gürcan 2014).



### **Box 1: The Finca del Medio Farm**

A longitudinal study of the Finca del Medio family farm between 1995–2015 provides a more in-depth insight into the multiple poverty reduction benefits that *campesino* have experienced. At 10ha, Finca del Medio is a mid-sized farm in Cuba, and had been a standard monoculture tobacco and maize farm before being abandoned. In 1995, it was taken over in a state of disrepair by a family who moved from the city to try and survive the food crisis. With very little economic capital for investments, the family attended MACAC capacity-building workshops to implement agroecological systems. By 2015, their profits had increased by eleven times compared to 2005. The family's nutritional quality improved steadily and constantly throughout the transition process, as did the productivity levels of both each unit of cultivable area, and the total system

Source: Casimiro Rodríguez and González 2018, p. 8

## **Increased rural inclusion**

The benefits of agroecology can extend beyond immediate food and farming needs, as it allows investment in other areas of poverty alleviation. In the province of Villa Clara, the La Riviera cooperative devotes 40% of its total production to community's social consumption, supplying schools, day-care centres and hospitals with affordable food. A study conducted in 2010 showed that between February and March of that year, the cooperative still had an 18,000 peso surplus which was shared out for community needs (Gürcan 2014). The cooperative's reserve fund also helped it to recover its communal assets after hurricanes (Ibid.). In Jagüey Grande, the cooperative's collective fund is dedicated to community development, with spending priorities decided at a monthly general assembly (Gürcan 2014).

## **Reduced emissions, more secure access to resources and increased resilience to climate change**

Altieri and Funes-Monzote (2012) found that a large number of agroecological farms in Cuba integrate clean energy generation and food production by growing biofuel crops and incorporating windmills and biogas into agroforestry systems. The agroecological model's rejection of synthetic chemical fertilizers has reduced emissions in the farming supply chain. Currently, industrial fertilizer production accounts for 1–2% of global energy use, and around the same proportion of global greenhouse gas emissions (GRAIN 2015). Once chemical fertilizers are applied to the soil they contribute further to emissions; for every 100kg of nitrogen fertilizer used, around 1kg ends up in the atmosphere as nitrous oxide, which is 300 times stronger than carbon dioxide in its greenhouse gas effect (GRAIN 2015).

The emissions-reducing practices outlined above also have manifold benefits for farmers, including reducing expenditure on energy and

fertilizers (Bogdanski et al. 2010). For example, the integration of energy solutions including anaerobic digesters and windmills, meant that 83.61% of the energy needs on the Finca del Medio farm were met without the need for external inputs. Water holes and natural hedgerows allow for efficient soil and water resource management, while providing benefits for surrounding wildlife (Casimiro Rodríguez and González 2018).

There is also evidence that farms with higher levels of agroecological integration are less vulnerable to extreme weather events such as hurricanes. A study comparing the impact of Hurricane Ike in 2008 on industrial monoculture and agroecological *campesino* farms showed that, while almost 95% of the former's plants were destroyed, this figure was only 50% for multi-storeyed agroforestry systems (agroecological farms with higher levels of integration). There were higher levels of both biological/physical resistance (to the initial impact), as well as more rapid biological recovery (leaf regrowth on stripped branches). Interviews with *campesinos* also showed greater levels of social resilience due to stronger cooperative associations. (Rosset et al. 2011)

Although Rosset et al. noted that these results were suggestive rather than conclusive, subsequent studies have also pointed to the greater resilience of agroforestry systems. A study on the effects of Hurricane Irma in 2017 on the neighbouring island of Puerto Rico (Fernandez et al. 2018) showed that agroecological farms were back to harvesting days after the hurricane, with many crops such as cassava, yam, taro, and sweet potato surviving the storm. Unfortunately, no study has been published on the effects of Hurricane Irma on Cuban agriculture. But observations from projects supported by Oxfam (RedAR, APOCOOP) have demonstrated stronger resilience after the 2015-17 drought and the hurricane Irma in agroecological farms and in organized collective of cooperatives with high participation of women.

## Gender inequality

MACAC has also shifted power relations within *campesino* communities, allowing the diversification of roles and income-earning opportunities for women, young people and elderly people. In contrast to monocultures, where men typically owned and operated the machinery, chemicals and took most of the income, agroecological farms require a variety of duties, leading to a 'reintegration' of the family in the farming livelihood (Machin Sosa et al. 2013, p. 137). This includes women taking charge of the management of animals, vermiculture and medicinal plants, and directly taking at least some of the income from these activities (Rosset et al. 2011).

However, women are still underrepresented as activists and facilitators within MACAC, despite being proven contributors to and beneficiaries of the movement. Almost 40% of the higher-level coordinators are women; however, only around 8% of general promoters are women (Machin Sosa et al. 2013). This is despite women playing a major part in crucial practices including vermiculture, seed conservation and resource management. In response, ANAP developed a gender strategy in 2005,

collaborating with organizations such as the Federation of Cuban Women (FMC) and Oxfam (Machin Sosa et al. 2013).

## STRUCTURAL SOLUTIONS

### **Spread of sustainable farmers' practices and associated new knowledge and skills**

MACAC has supported *campesinos* to mobilize within and across their social networks to spread agroecological innovations. The horizontal process of farmer-to-farmer exchanges has led to deep-rooted changes in practice that are not only locally appropriate, but also encourage continual innovation and experimentation by the farmers themselves (Machin Sosa et al. 2013).

As noted above agroecology has spread widely among farmers accompanied by new farming skills. *Campesinos* who have taken part in MACAC have been able to improve their production while reducing expenditure on external inputs such as fossil fuels and chemical fertilizers (Altieri and Funes-Monzote 2012). This has direct benefits for the rural people as it increases the resilience of their livelihoods and assets to climate change, ensuring that they do not fall into poverty traps driven by natural disasters or resource shortages. It also points to the potential for low cost and environmentally sustainable rural poverty reduction strategies alongside other strategies.

### **Restoration of soil and water and protection of bio-diversity**

The spread of agroecological practices has helped restore environmental and hence ensure more secure access to resources for *campesinos*. Preserving soil health and preventing nutrient and resource losses from the farming system is one of the principle tenets driving agroecological practices (Rosset et al. 2011). This has happened by natural landscaping techniques such as water holes, hedgerows, and gravity-based water supply systems, which prevent soil degradation and allow for more efficient soil and water resource management (Casimiro Rodríguez and González 2018; Machin Sosa et al. 2010:119). In 2010, 82% of small farms (not just members of the ANAP movement) were using ecological pest management methods including worm humus and poultry manure (organic soil amendments), which helped to restore soil health and replaced harmful chemical pesticides that could pollute water sources (Rosset et al. 2011:177). The agroecological practices promoted by ANAP encourage 'self-generated field fertility' (Machin Sosa et al. 2010:117) by preserving the naturally fixed nitrogen and phosphorous solubility in the soil, thereby reducing the need for chemical fertilizers and promotes natural soil health. Furthermore, the agroforestry methods employed by the *campesinos*, which preserves natural forests and timber on the farming land, prevents erosion and landslides and, as noted above, provides resilience against extreme weather events; studies

showed that agroecological farms in Cuba following hurricanes showed less loss and faster recovery than conventional monoculture farms (Machin Sosa et al. 2010:120-121).

## Strengthened voice, collective organization and gender relations

The mobilization of large swathes of the *campesino* population through MACAC has empowered small farmers in their dealings with government institutions. As part of MACAC, the national body of ANAP represents farmers' innovations to government institutions, obtaining support for the expansion of such innovations across cooperatives. Often, farmers take their issues directly to central government, such as to sessions of *Poder Popular* (Popular Power), the Cuban National Assembly (Gürçan 2014). The strength of agricultural cooperatives has allowed them to contribute to designing production plans in line with community needs, as seen in the case of Jagüey Grande (Ibid).

## Changes to government policy

Government support and investment in agroecology projects, however disjointed, has allowed agroecology to spread to a national scale and take root as a significant contributor to *campesinos'* economic empowerment and food security. One example in the strong input from the Ministry of Agriculture in support of urban agriculture (Martín, L. 2020, personal email, 4 April 2020).



Producers selecting bean seeds at a Seed Fair. Photo by Humberto Mayol.



# DURABILITY OF CHANGE

The sustainability of the movement can be evidenced by the growing number of active promoters. By 2008, 85% of municipalities in the country were participating in the movement, with 9,211 active promoters. By 2011, this number had grown to 11,935 (Gürçan 2014). The success of MACAC has given ANAP the support and the credibility to make partnerships on a more equal and empowered footing with external organizations; for example, in winning government support for spreading farmers' innovations through different regions and cooperatives (Gürçan 2014), or in collaborating with INGOs to hold gender training workshops (Oxfam 2015).

Agroecology is supported at an institutional level by several national policies, including state support of farming cooperatives, as well as its cooperation on providing purchasing contracts (when the government buys a farmer's produce) (Mier y Teran 2018, p. 652). This has allowed for the 'persistence and growth' of scaling processes, allowing agroecological farms to take root across the country (Ibid., p. 653). However, the overarching vision of the Ministry of Agriculture is still geared towards normalizing trade relations and developing large-scale industrial agriculture. Therefore, despite policies that are more supportive of small-scale agroecological farms (e.g. including agroecology on the school curriculum and supporting urban agroecology programmes), there is no sign of an overall shift of resources or policy towards making it the dominant model of food production in the country (Ibid.)

# HOW CHANGE HAPPENED

## PATHWAYS TO SCALE

MACAC started with an intentional programme facilitating horizontal dissemination of agroecology by a central organization, ANAP. However, its strategic intention for scaling was always to create spaces for spontaneous and horizontal communication and learning, in order to create a mass grassroots movement. Following the adoption of the mass movement strategy in 2001, the rate of adoption increased rapidly. Change therefore occurred through an incremental spread via horizontal methods, with a snowball effect that led to its rapid growth as time went by. The MACAC methodology also involves functional scaling via continual learning and adaptation which in turn contributes to horizontal scaling

The CaC methodology of developing and disseminating agroecological methods has also spread horizontally to a global scale, with 'international encounters' taking place within a global network of schools for tenant

farmers. The global *campesino* movement La Via Campesina has also become a strong advocate on the international stage. For example, in November 2013, farmers from America (Nicaragua, Guatemala, Panama, Colombia, Brazil, Chile, Argentina, Haiti, the USA, Canada and Mexico) and Africa (Mozambique, Mali and Zimbabwe) took part in a CaC exchange hosted by ANAP and La Via Campesina (Machin Sosa et al. 2013). Cuban *campesino* frequently host Venezuelan farmers on learning exchanges, with ANAP agroecology schools set up in Venezuela reaching over 10,000 people by 2011 (Gürçan 2014).

There have been some elements of vertical scaling of agroecology within Cuba through supportive government policies; however, most of these have helped support the movement rather than providing a coherent policy framework and financial incentive structure.

## CHANGE STRATEGY

As noted the MACAC methodology is a Freirean horizontal communication and learning methodology (Freire 1970) that is based on farmer-promoters who have innovated new solutions to problems that are common among many farmers or have recovered/rediscovered older traditional solutions, and who use popular education methodology to share them with their peers. The methodology involves the following elements (Machin Sosa et al. 2013; Rosset et al. 2011):

- **Induction.** Rapid appraisal of key problems, for the purpose of establishing priorities. This is typically carried out by the family that is new to the movement, accompanied by an experienced promoter and/or facilitator (See box 1 below)
- **Exchanging experiences.** Farmers with the same identified problem visit a peer with a possible solution, and then begin to experiment with the new method on a small area of their farm.
- **Training in methodologies.** Promoters and facilitators receive specialized training, including in demonstrations, exhibitions of seeds/materials/innovations, songs and poetry, members' assemblies, and participatory mapping/drawing etc.
- **Workshops.** Promoters, who typically have already mastered one or more agroecological techniques, learn additional methods that they can try on their own farms, to expand their repertoire. These exchanges include self-evaluation, planning, follow-up monitoring and knowledge exchange.
- **Follow-up meetings.** Participants meet to review the process to date, identify achievements and detect problems, and establish new priorities.

### Box 1: Some definitions

**Promoter:** A farmer using agroecological practices who volunteers to educated fellow campesinos on agroecological principles and methods.

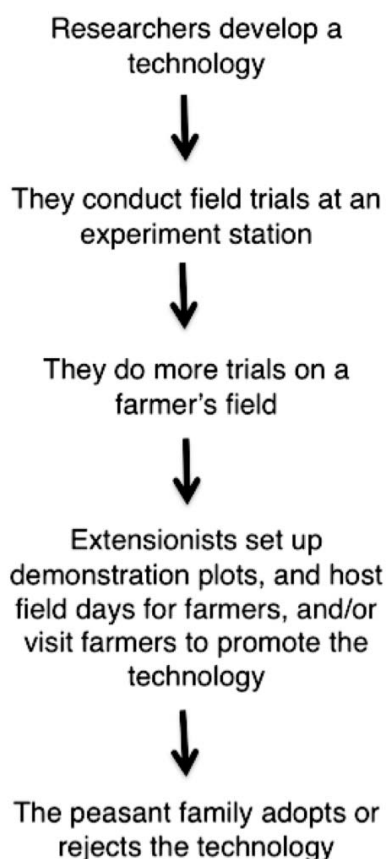
**Facilitator:** A member of a cooperative who works to facilitate the process of promoting agroecology through organising training, activities and educational programmes. Some facilitators are voluntary, other cooperatives pay their facilitator for their time.

(Source: Machin Sosa et al. 2013, pp.96-98)

The key differences between the MACAC methodology and conventional extension is summarised in the diagram below.

**Figure 1: Conventional agricultural extension versus Campesino-to-Campesino.**

### Conventional Extension



### Campesino to Campesino



Source: Machi'n Sosa et al. (2010, 38)

## ANAP's and Farmers' Role

The guiding role of ANAP in growing MACAC into a successful grassroots movement was crucial to the scaling of agroecology. It was ANAP president Orlando Lugo Fonte who made the original suggestion of turning MACAC into a movement. Subsequently, ANAP leadership was effective in identifying the strengths of existing networks and cooperatives, and took measures to leverage them for MACAC, while

mitigating their weaknesses. For example, from 1995 onwards, ANAP provided CCSs with management teams and tools, which in turn increased membership and the productivity of members. In addition, ANAP played a crucial role in strategically promoting the movement using its experience in political mobilization; for example, by linking small tenant farming and traditional knowledge to national symbols and heroes of the Cuban Revolution, such as José Martí and Che Guevara.

*'A people that cannot produce its own food is a people enslaved'*

José Martí, frequently quoted by ANAP in relation to agroecology

Although ANAP's central leadership remains involved in MACAC, most of the organization takes place through working groups of local farmers. These groups allow the movement to achieve in-depth scaling based on local conditions and resources, encompassing both organizational and agroecological strategies. For example, a local MACAC coordinator in Banes, Holguin province, collaborated with ANAP leadership to develop the Banes method, a rapid participatory inventory of agroecological practices in cooperatives. This enabled a more inclusive and accurate diagnosis of problems on each farm, allowing facilitators and coordinators to organise more targeted exchanges and training sessions (Machin Sosa et al. 2013).

## OTHER DRIVERS AND CONSTRAINTS

### **Strength of existing social networks and high levels of political education**

When MACAC began, virtually all non-state *campesino* in Cuba were already members of ANAP and belonged to either credit and service cooperatives (CCS) or agriculture production cooperatives. In the province of Villa Clara, where CaC was first trialled, there are currently over 10,000 such associations (Gürçan 2014). MACAC was able to cooperate with a network of civil society groups and other institutions already championing and enacting agroecology, including ACTAF (Cuban Association of Agricultural and Forest Technicians), ACPA (The Cuban Association for Animal Production), the Antonio Núñez Jiménez Nature and Man Foundation, and CMLK (Dr. Martin Luther King, Jr. Memorial Center) and the Sustainable Food Movement (MAS).

The high levels of political engagement among tenant farmer populations meant that the movement could effectively build on the structures and principles of existing associations, thus ensuring the most locally appropriate and sustainable approach to CaC and agroecology in each area. Each working group could decide the best strategy of change depending on their context, such as whether to use formal workshops or informal exchanges.



## Partnership with academics

The high volume of research being conducted around agroecology in Cuba facilitated a strong relationship between civil society groups including MACAC and academic centres. MACAC has been connected, for example, to the Urban and Suburban Agricultural programme led by the Ministry of Agriculture. This has had benefits for the exchange of knowledge, technologies and practices (Martín, L. 2020, personal email, 3 April 2020).

## International trade relations

Many observers of Cuban agroecology credit the 'Special Period' with creating the conditions in which alternatives to conventional agriculture could take root. ANAP suggests that the Special Period created 'new economic and social conditions', which could be harnessed for mobilization (Machin Sosa et al. 2013). A major change introduced by the government during the Special Period was the breaking up of large state farms: in 1994, 140,000 families were handed free land in usufruct in the hope that this would increase food production.<sup>8</sup>

The reforms initially had mixed effects for *campesinos*, due to a lack of corresponding access to credit and loans or basic inputs such as seeds and water (Ibid.), although there have been changes in policy since that have made it easier for the beneficiaries to construct houses and productive facilities on the land (Fernandez et al. 2018). Nevertheless, this period of decentralization, with responsibility for resource-use strategies being devolved to the municipal level, and an increase in the number of farmers making their own production decisions, allowed grassroots organizations to flourish and provided space for a movement like MACAC to take root (Altieri and Funes-Monzote 2012).

However, the largest uptake of agroecology and MACAC membership came in the years of improving economic prosperity from 2001 onwards, suggesting that the leadership and strategies of ANAP and farmers were more crucial to the scaling of the project than external circumstances and government responses to trade issues.

Nevertheless, Fernandez et al. (2018, p. 15) point out that Cuba's relations with the USA still play an 'outsized role in affecting not only Cuban agricultural systems, but the economy and society, in general'. The Ministry of Agriculture's policy priority of normalizing and liberalizing trade and investment relations with the US has prevented it from committing to promoting food self-sufficiency and agroecology as the dominant agricultural framework of the country. Powerful lobbying from agribusinesses has led to some major export openings into Cuba for US firms; for example, in 2016 Missouri company Martin Rice gifted the island 20t of rice (Fernandez et al. 2018, p. 16). Cuban small farmers have expressed concern that if such influxes of cheap crops continued, their produce would be drowned out.

Although a subsequent cooling in relations have somewhat quelled the small farmers' concerns, with no major increases in imports after 2016,

relations with the USA continue to influence agriculture in Cuba. New measures taken by the Trump administration since 2017 limit access to oil imports (which in turn limits transport and connections between provinces), imports of food and other goods.

## **National government policies**

The Cuban government recognized early on the benefits of low-input organic agriculture in reducing dependence on external resources and as a result included it in its agricultural development strategies, although it was understood more as survival response than an anti-poverty strategy. The success of agroecology in reducing the vulnerabilities in the agrarian system and improving rural livelihoods has gained it recognition and opened an important debate on limits of conventional agriculture.

The Ministry of Agriculture has implemented several supportive policy measures in response to demands from ANAP, including its promotion of low-input urban agriculture. The government has also introduced recent measures such as the Food Sovereignty and Nutritional Education Plan to address the pandemic. But government policy still largely favours conventional agriculture, especially in terms of public investment in access to machinery and chemicals (Martín, L. 2020, personal communication, 3 April 2020). Mier y Teran et al. (2018, p. 654) describe a situation of 'institutional policy lock-in' and 'infrastructural path dependence' towards high-input agriculture and import-led food distribution. This may indeed change as climate crisis intensifies and if interest in agroecology further grows in national and international policy circles.<sup>9</sup> Others note that, although agroecology in Cuba had a strong social and scientific foundation it still faces constraints relating to land tenure, markets and loans (Spoor and Thiemann, 2016; Fernandez et al. 2018).

## TIMELINE

- 1991 – Cuban government declares a ‘Special Period in Peacetime’, following the collapse of the Soviet Union
- 1994 – 140,000 families handed land in usufruct i.e. the right to use government owned land) for private production of food.
- 1996 – CaC meeting, with delegates from Mexico and Central America
- 1997 – First CaC programme trialled in Villa Clara with good results
- 1999 – CaC spread to neighbouring provinces of Cienfuegos and Sancti Spiritus
- 2001 – First national meeting of MACAC, leading to the launch of CaC as a movement
- 2003 – CaC movement has spread to all Cuban provinces
- 2009 – 100,000 families are practicing agroecology as part of MACAC
- 2012 – Law Decree 300: facilitates distribution of 1.7m hectares of land to over 200,000 farmers
- 2018 – 200,000 families are members of MACAC

## FURTHER DETAILS

The first CaC programme of ANAP took place in Villa Clara, with funding from German NGO Bread for the World. Its main objective was to identify key stakeholders and provide training. It used the farm itself as its primary teaching tool, with both visitors and hosts presenting their seeds, crops and materials to demonstrate their practices and innovations. By 2000, several CaC programmes had successfully taken root in regions including as Cienfuegos and Sancti Spiritus, with some uptake in other provinces including Havana.

The first national meeting of the Farmer-to-Farmer Agroecology Programme took place in 2001. At this meeting, Lugo Fonte, the leader of ANAP, proposed the idea of transforming CaC from a programme into a movement. This led to the establishment of MACAC, the movement. This was based on the principle of transitioning from a ‘technically based experience into a social process’ (Machin Sosa et al. 2013, p. 94). This allowed the movement to broaden its scope into how agroecology interacts with wider social and economic structures; since 2008, the movement has been in a permanent dialogue with the Cuban authorities about government policy regarding access to land, resource, and markets, as well as about decentralization of political institutions in favour of local decision-making spaces (Martín 2020, personal communication, 3 April 2020).

Although MACAC predominantly takes place in rural areas, urban farmers in Havana have reported adopting agroecological practices after reading works produced by ANAP in magazines and newspapers (Leitgeb et al. 2015).<sup>10</sup> These urban farmers also reported the importance of traditional knowledge and knowledge exchange in increasing their food security.



# ANNEX: AT A GLANCE

<i>Case study name</i>	<i>Scaling sustainable agriculture: Farmer-to-Farmer Agroecology Movement (MACAC), Cuba</i>
<i>Geographical location</i>	Rural areas of Cuba
<i>Geographical type</i>	<p><b>Cuba</b></p> <p><b>Income</b> – Upper-middle-income economy (World Bank, 2020)</p> <p><b>Inequality</b> – No recent figures. Gini coefficient of 38 in 2000 (UNU-WIDER, 2019).</p> <p><b>Human Development Index</b> – ranked 72<sup>nd</sup> out of 189 countries (UNDP, 2019).</p> <p><b>Gender Gap</b> – 31<sup>st</sup> out of 153 countries (WEF, 2020)</p> <p><b>Civic space</b> – rated as ‘Closed’ (Civicus, 2020) but contested by domestic civil society organisations</p> <p><b>Fragility</b> – ‘Warning’ (Fund for Peace, 2019)</p> <p><b>Climate risk index</b> – highly vulnerable to hurricanes, drought and sea-level rise (World Bank, 2019)</p> <p><b>Ecological threat</b> - Medium exposure, ETR count:3 (Ecological Threat Register, 2020).</p>
<i>Time period</i>	<p>Tail back to 1997</p> <p>Membership accelerated in 2001 when MACAC was transformed from a programme to a movement</p> <p>Membership and uptake of agroecology practices doubled between 2011 and 2018 from 100,000 farmers to 200,000 farmers</p>
<i>Case study themes</i>	<p>Climate crisis</p> <p>Economic inequality</p> <p>Gender injustice (partial)</p>
<i>Type(s) and scale of poverty reduction and environmental benefits</i>	<p>By 2018 more than 200,000 families - or half of Cuba’s campesino - population were participating in MACAC and converted to agroecological farming with a much larger number utilising some agroecological practices. Benefits include:</p> <ul style="list-style-type: none"> <li>• Small farmers productivity increased by almost 200% between 1988 and 2009 with associated inferred increases in income;</li> <li>• Increased food self-sufficiency and access to more nutritious food for farmers;</li> <li>• Reduced carbon emissions and more secure access to resources;</li> <li>• Increased resilience against climate change-related events;</li> <li>• Increased social cohesion and inclusion in rural communities; some cooperatives provide affordable produce to schools and hospitals;</li> <li>• Strengthened collective voice and organization;</li> <li>• Reduction in some aspects of gendered poverty (partial).</li> </ul>
<i>Changes to structural causes of poverty</i>	<p>Changed power relations – strengthened collective voice and organization of campesinos;</p> <p>Spread of low-cost, low-input, low-carbon agroecology farming practices;</p> <p>Restoration of soil and water and protection of bio-diversity;</p> <p>Associated new knowledge and skills;</p> <p>Some changes to government policies e.g. widespread acknowledgement of effectiveness of agroecology, agroecology now a mainstay in policy discussions, with some government investment and support in agroecology projects.</p>

<i>Dynamics and pathways to scale</i>	Incremental with subsequent snow-ball effect; In-depth, horizontal and functional scaling.
<i>Limitations</i>	Requires a more enabling policy environment
<i>Trade-offs linked to scaling</i>	Levels of agroecological integration vary, with likelihood that more sophisticated systems are only available to richer farmers.
<i>Quality of evidence base</i>	<p><b>Poverty impacts – medium</b>, inferred from qualitative evaluations and government data</p> <p><b>Outcomes – medium</b>, inferred from qualitative evaluations and government data</p> <p><b>Contribution of case study to outcomes – medium</b>, inferred from qualitative case studies with some longitudinal data</p>

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# NOTES

- 1 Although the term 'agroecology' was coined by Russian agronomist B.M. Bensen, its methods have been employed for thousands of years by farmers and pastoralists (Pimbert 2015). Agroecology in the broadest sense can be defined as methods of farming that work with the natural functioning and biodiversity of ecosystems, and draw heavily on experiential knowledge of traditional and indigenous farming methods. Its rejection of large-scale monocropping and heavy use of chemical fertilizers and pesticides means that it has also often become synonymous with a rejection of industrial agriculture and, in its most political incarnation, calls for food sovereignty and food justice (Pimbert 2015; La Via Campesina 2018).
- 2 Industrial fertilizer production accounts for 1–2% of global energy use, and around the same proportion of global greenhouse gas emissions. Chemical fertilizers contribute to climate change after being applied to the soil: for every 100kg of nitrogen fertilizer used, around 1kg ends up in the atmosphere as nitrous oxide (NO<sub>2</sub>), which is 300 times stronger than CO<sub>2</sub> in its greenhouse gas effect. (GRAIN 2015)
- 3 See: [www.viacampesina.org](http://www.viacampesina.org)
- 4 See: Roger Atwood (2017). 'Organic or starve: can Cuba's new farming model provide food security?', The Guardian, 28 Oct. <https://www.theguardian.com/environment/2017/oct/28/organic-or-starve-can-cubas-new-farming-model-provide-food-security>
- 5 Although more recently there have been debates about creating a poverty line for Cuba, depending on how this was measured it put up to 51% of the Cuban population would be below the poverty line, due to high prices in the state sector. Calculations such as these did not take into account the high level of state-provided services such as healthcare and education, and subsidized prices of basic utilities such as water and electricity (Everleny 2019).
- 6 Some key indicators, such as a rise in national productivity, are linked to other factors such as input substitution practices (Rosset et al. 2011). Leitzgeb et al. (2015) note the sparse data on foreign trade and agrochemical use, preventing a thorough statistical analysis of most recent production trends. However, Bellamy and Ioris (2015) point out that conventional statistical measures of productivity do not necessarily reflect the multiple benefits of agroecology, nor the goals of the CaC movement. As a multi-crop method, agroecological farms may not be able to compete on a crop-by-crop measure of yield, but often end up producing more secure levels of overall crop throughout the year (ibid.).
- 7 'Agroecological integration' refers to the level of practices that go beyond input substitution, to the level of incorporation of crops, trees and animals
- 8 The Raul Castro government built on this in 2008 and 2012, distributing over 1.7m hectares of mostly idle agricultural lands to more than 200,000 farmers, most of them previously landless (Fernandez et al. 2017, p. 5).
- 9 For example, Oliver De Schutter, the UN Special Rapporteur on the Right to Food, published a paper (2010) about the advantages of investing in agroecology as a socially and ecologically sustainable guarantor of the right to food.
- 10 Urban farming is a parallel and related movement in Cuba, more directly supported by the government in a bid to increase food security.



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