

Community agroecology. Basis for food resilience in the face of extreme events

Abstract

The transition towards a decentralized and diversified agriculture is analyzed, as a response to the economic crisis unleashed in Cuba since the 90s, with greater prominence by the peasant family farming and urban agriculture movements. It is evident that agroecology has become popular in human settlements, facilitating the participation of the population in the development of small-area production systems (intensive gardens, organoponic gardens, plots, docks and farms), where they obtain more than 40 fresh products that are consumed in their own communities.

Keywords: socioecosystems, organoponic gardens, biodiversity, forestry species

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Introduction

Profound changes in the way food are grown, processed, distributed, consumed and wasted over the past few decades has posed increasing threats to the future of food locally, nationally and globally. When these changes are combined with the realities of climate change, species extinction, increasing globalization, and the pressures of advancing industrial agriculture in rural areas, threats to food systems intensify.¹

With social development, human populations were regrouped into urban socioecosystems (towns and cities), peri-urban and rural. These characteristics have contributed to the fact that today's society is composed of population conglomerates in anthropized habitats, where the quality of food and the state of health, which are still valued separately, have become important social problems, even in rural areas, where the influences of modernity have eroded food culture and traditional medication.²

By the way, the socio-ecological systems approach analyzes how different societies establish modes of resource management that can be more or less resilient, in which adaptive management would be one that is able to respond to disturbances by developing new modes of organization. Social networks and collective memory are recognized as important sources of resilience, constituting the basis on which to develop a creativity based on knowledge.³

From a broad perspective, agroecology is defined as the ecological management of natural resources through forms of collective social action. They present alternatives in the current crisis of modernity through proposals for participatory development⁴ from the areas of production and alternative circulation of their products and aims to establish forms of production and consumption that contribute to facing the eco-social crisis, and thereby restore the altered course of social and ecological coevolution.⁵

The strategy of agroecology has a systemic nature when considering the establishment or farm, the community organization and the rest of the relationship frameworks of the societies articulated around the local socio-environmental dimension, and where the local knowledge systems are located, carriers of the endogenous potential that allows to dynamize the ecological and sociocultural biodiversity.⁶

Since the economic crisis unleashed in Cuba in the 90s, the importance of communities as a scenario has been re-dimensioned, as a result of the limitations of central resources for the solution of their

problems and the increase in population and activities that take place in that area.⁷

The agroecological transition, initiated by the peasant family farming and urban agriculture movements since the nineties, has contributed to the diversification of fresh products and their availability in the urban, peri-urban and suburban-rural communities of the country, with greater intensity during the Covid-19 pandemic and the subsequent economic crisis, facilitating an increase in the self-management capacities of families and communities.

Precisely, based on experiences during the facilitation of projects in urban, peri-urban and suburban-rural areas of Cuba during the last 10 years, this article aims to demonstrate the appropriation of agroecology in communities and its contribution to food resilience to extreme events.

Transition towards decentralization and diversification of agricultural and livestock production

Since the seventies of the last century, the distribution of food to human settlements, urban and rural, was carried out mainly through long supply chains from state mega-companies of conventional agriculture, which exploited 80% of the land in rural areas from the country. However, in response to the economic crisis that began in the 1990s, in which conventional agricultural and livestock production has been progressively depressed, several alternatives were established that have contributed to decentralization and diversification in the production and access to fresh foods.

Large companies were divided into cooperatives;⁸ urban, suburban and family agriculture became widespread;⁹ idle lands have been given in usufruct to new farmers;¹⁰ the productive role of peasant family farming increased¹¹ and the marketing system for fresh products has diversified, among others.

As a result, 68.5% of the country's agricultural land (4,385.2 Mha) has been converted into production systems belonging to cooperatives and non-associated farmers in rural, peri-urban and suburban-rural areas. Of this, family farming occupies 2,398.9 Mha¹² and contributes more than 70% to the population's self-sufficiency of fresh food, evidence that justifies its capacity for resilience in the face of extreme events and the potential for the sustainability of the food future (Figure 1), proven by the effects of the pandemic caused by Covid-19 and the subsequent worsening of the economic crisis.

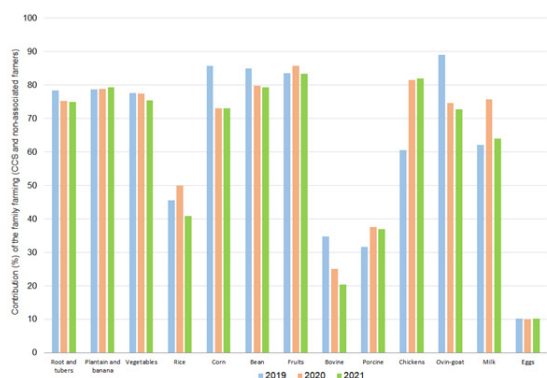


Figure 1 Contribution of family farming (Credit and Service Cooperatives-CCS and non-associated farmers) to the supply of fresh agricultural and livestock foods in Cuba. Source: ONEI 2019, 2020, 2021.

These figures correspond to official records of various basic products that are marketed through cooperatives; while another part of the production and a greater diversity of products, is destined for

family and neighbor self-consumption, which is not counted and has a significant contribution to the feeding of thousands of families, including those that manage ducks and plots solely for their own food. The magnitude of this population’s food resilience effort, which is evident throughout the country, should be considered as a basis for the construction of sustainable food systems.

For example, nine family ducks in the Los Pocitos community, Marianao municipality, province of Havana, obtain: vegetables (10 species), roots and tubers (5), dry and tender grains (7), fruit trees (10), meat (5) and milk (1), medicinal and condiment plants. In post-production they produce feed and creole food for the animals, preserved fruits, cheese and yogurt to feed the family.¹³

New capacities in the production and supply of fresh food in and around human settlements have emerged in response to the economic crisis, as an extreme event that depresses the conventional food system. In most communities, family farming and other forms of productive organization generate at least 40 fresh products of agricultural and livestock species, belonging to ten types of fresh foods most preferred by the population (Table 1).

Table 1 Various types of fresh foods and most frequent products generated in the communities according to their location in urban, peri-urban and suburban-rural areas

Types of fresh food	More frequencies products	Communities and availability*		
		Urbans	Periurban	Suburban-rural
1. Leafy vegetables	Lettuce, cabbage, chard, garlic, others	+++	++	+
2. Fruits vegetables	Tomato, cucumber, pepper, onion, beet, pumpkin, others	++	++	+++
3. Root and tubers	Sweet potato, yucca, taro, others	+	++	+++
4. Musaceae	Plantain and banana	++	+++	+++
5. Tender grains	Bean, corn, others	++	+++	+
6. Dry grains	Bean, chickpea, corn, rice, others	+	+	+++
7. Fruits trees	Avocado, mango, guava, orange, lemon, papaya, pineapple, water melon, others	+++	+++	+++
8. Meat	Chicken, pig, sheep, others	+	++	+++
9. Milk	Bovine, goats	+	++	+++
10. Eggs	Chicken, quail	+	++	+++

(*) Prepared according to the narrative of participants in workshops and exchanges on farms.

Products with high availability (+++) mean that the population of the communities accesses them more frequently, because the level of supply is higher, compared to those with medium (++) and low availability (+). This analysis of the availability of fresh products in urban, peri-urban and suburban-rural communities considers those offered by existing distribution chains and markets, those obtained and offered directly by community intensive garden and organoponic, and those self-managed by agriculture family and those shared-sold by it directly with its neighbors.

In urban communities, leafy vegetables and fruit trees have greater availability, mainly due to the diversity of leafy vegetables offered by the network of organoponics and intensive community gardens and the self-management of fruit trees in patios, plots and family farms.

Urban, suburban and family agriculture has led to the cultivation of 56 species of vegetables and fresh condiments. In each organoponic and intensive garden, at least 10 different species are required throughout the year. In fruit trees, more than 150 species are developed, spread and protected, including many endemic or in other cases typical of certain areas or agroecological niches, and a complete collection of fruit trees is encouraged in each province.¹⁴

In Cuba, the urban population represents 75% of the total.¹⁵ Most cities and towns have adopted urban agriculture and show growth in

peri-urban areas, where agricultural and livestock food production has grown progressively. For its part, suburban agriculture has contributed to integrating rural systems into towns and cities. These changes in urban-rural food integration have influenced a greater flow of fresh food from nearby areas.

The productions carried out in these small-sized systems, through agroecological designs with popular rationality, facilitate multifunctions of biodiversity, mainly through the use of the land, synergies in the temporal and spatial management of the diversity of agricultural, livestock and forestry species, recycling of by-products and use of bioinputs obtained in the system itself. As a result, ecological self-regulation capacities accumulate, so that energy interactions are optimized and resilience capacities in the face of extreme events are facilitated.

Community agroecology

The process of decentralization and diversification in obtaining fresh agricultural and livestock products has led to a greater rapprochement between production systems and human settlements, mainly under the Urban, Suburban and Family Agriculture program, which has also rescued and developed appropriate production systems to be exploited directly in the communities (Figure 2).

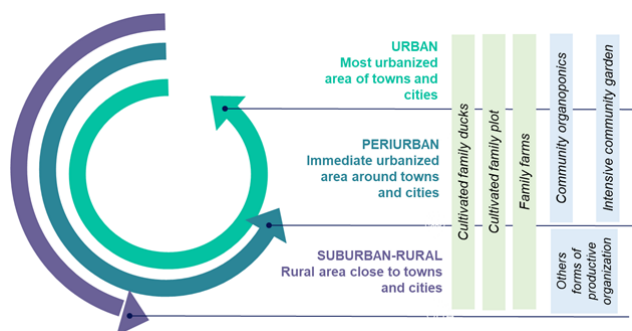


Figure 2 Various types of production systems that coexist in and around communities.

This program has been established in the 168 municipalities of the country, allowing 2,855 organic gardens to operate on 1,366 hectares and 6,875 intensive orchards on 6,787 hectares; In addition, 278 hectares of semi-protected organoponics and family agriculture are carried out in 382,815 ducks and more than 90,000 farms.⁹

People live in human settlements, as a physical expression of the settlement, and is defined by the presence of people residing in a specific place, where they carry out all their vital activities and can be of two types: concentrated, which due to its structure can be urban or rural, and dispersed.¹⁶

The community is a process (or several processes) of participation that takes place in a given physical space in which people and groups of people interact and develop a psychological sense of belonging or reciprocity.¹⁷ It is also socially defined as the capacity developed by community members to assume, promote and defend the values of their community, among others.¹⁸

Community development in Cuba is distinguished by a set of characteristics: revitalization, diversity and richness of experiences according to their purposes and methodologies, multiplicity of actors and social structures involved in them, and coexistence of trends that express different levels of social participation. all this in a scenario of increasing social complexity.¹⁹

Agroecology has been the protagonist and integrator of other sciences during the process of decentralization and diversification of production and access to food in Cuba. At the same time, as the economic crisis worsened during and after the Covid-19 pandemic, its popularization has increased in human settlements, which have become communities with resilience capacities in food self-management, mainly by facilitating the participation and inclusion in the development of small-area production systems (intensive gardens, organoponic gardens, plots, docks and farms).

A high percentage of the Cuban population that lives in towns and cities has basic knowledge about agriculture, either because they immigrated from rural areas or carried out agricultural work during their study period. Many people without a job have even approached neighbors or “organoponists” to learn how to grow plants in their docks or borrowed plots in places close to where they live. Self-management of food by families, in addition to being a need motivated by scarcity, is also an attitude of people who understand the importance of healthy and nutritious food.

Agroecology is “born” on the farm, in the human-scale production model, and therefore is directly linked to food sovereignty and access to good, healthy, cheap and nutritious food. For this reason, agroecology “enters” peasant and family farming systems, as well as those who

manage neo-ecosystems in systems linked to the urban-rural ecotone and currently “within” the city itself. The reasons why agroecology can expand in cities and towns and promote production processes that are totally different from the current ones are powerful.²⁰

The masterpiece of agriculture would be the agroecological communities, where all possible families are living on their farms with an infrastructure, by zones, with schools, clinics, credit stores and services, thus it would be easier to transport the products and any proportionally greater investment, such as electrification and a venue for exhibitions, peasant festivals.²¹

The popularization and massification of agroecology in communities throughout the country constitutes evidence of Community Agroecology (CA), as a popular attitude, based on peasant traditions, permaculture and urban agriculture, to integrate food self-management in the place where people live. This means that family farming and other agricultural production models that coexist, both in the communities themselves and in their surroundings, are functionally articulated to value and organize access to fresh food.

The sociotechnical approach of the CA also suggests that programs and projects that benefit urban, peri-urban and suburban-rural communities with resources and training are not limited to the delivery of supplies and equipment, maintaining the same productivist system of action that characterized conventional agriculture, but are based on the principles of agroecology and adopt transdisciplinary participation with equity, so that their efforts endure under the characteristics of each context.

In this sense, the principles of agroecology and permaculture contribute to socioecological systems from a philosophy of cooperation, focused on resilience, that is, the capacity for adaptation, learning, innovation, novelty and self-organization for permanent and desired from the social and ecological perspective, and to recover from any external disturbance.²²

Socioecological resilience in communities

The CA, by facilitating participatory processes for resilience in the face of extreme events, brings together critical local knowledge and co-innovations emerge that converge on the self-management of food, the rescue of food culture, the focus on health and the quality of life of settlements. humans; in turn, it influences the collective perception of family well-being.

In this regard, women who manage family docks and farms in peri-urban communities of Havana identified several lessons learned, mainly: (a) despite their small scale and popular management, they are units that perform different functions for the family, the community and the territory, with high potential for well-being and resilience; (b) are social-ecological systems with potential values for the communities, where they are promoted and managed; (c) they constitute a barrier or biological filter, because in most of them there is a diversity of tree species, whose altitude and crown structure, which is different, reduces the access of toxic emanations to families, animals, fruits and the leafy vegetables that are grown; (d) with no or little external support and very low resources (natural, physical, financial), they demonstrate capabilities to obtain products and sub-products to feed families, and to reduce the efforts and expenses involved in acquiring them externally.¹³

Communities can be considered as socio-agroecosystems, a characteristic that gives them a population niche with access to food, because producers, marketers, conservatives of traditional food culture and the population interact in these communities to facilitate flows

of agricultural and livestock products, synergies in action, solidarity between neighbors and sociocultural interactions, which converge in the creation of capacities for self-management of food according to their characteristics and traditions.

These are organized around food self-management, they constitute areas of family and community agriculture, which are complemented with a diversity of products during the different seasons of the year, interacting directly with the population with safe food, with very little manipulation after obtaining it. due to the short distance and time between its obtaining and ingestion by people, who leave behind the consumer approach to sustainable food.

A study on multifunctions of urban agriculture carried out in Havana identified the following types of agroecosocial functions: articulation in networks of actors and values, equity in employment, community feeding, conservation of natural resources, integration of agrobiodiversity, valorization of physical capital, self-management of financing, resilience to extreme events, efficiency of the production process.²³

In particular, human health is closely related to environmental factors. Due to this, the characteristics of urban settlements influence the health of their citizens in various ways.²⁴ Several studies indicate that contact with nature and the inclusion of green spaces in urban environments promote psychological well-being, reduce stress and improve the perception of health of its residents.²⁵⁻²⁷

In the search for a healthy diet, the redesign of food production systems under the principles of Agroecology, facilitates the functional interactions of biodiversity that contribute to its capacity for ecological self-regulation and that of the intestinal ecosystem of the people who consume said foods.²⁸

The different existing models on health determinants consider the environment as an important factor to take into account.²⁹ Considering that the city is the main environment in which the life of a large part of the population takes place and that, as has already been seen, it is possible that it will increasingly accommodate a greater number of people, it seems advisable to study how to make these ecosystems healthy spaces.²⁴

In fact, some authors maintain that good use of urban gardening can be a key element in intervention programs in the field of health, since it simultaneously addresses aspects of physical, mental, social and spiritual health of individuals and their communities.³⁰

Some of these people have a working life, in different occupations; however, they find a moment to take care of the plants and animals, which means a change in work that they do with pleasure, because it has the double function of contributing to the well-being of the family and their health, by doing physical work. This is the integral health of the family, because they live in harmony with plants and animals that provide them with different benefits, be they food, nutritional, medicinal and pleasure.

A contribution at the community level is the “one health” approach, which addresses health threats at the interface between humans, animals and the environment, with the ultimate goal of achieving optimal health outcomes by recognize the interconnections between people, animals, plants and their common environment, the solutions to which can only be adequately understood through interdisciplinary and multisectoral strategies that address the health of people, animals and the environment we share.³¹

Peri-urban agriculture is therefore a central element in the construction of alternative agri-food networks.³² The role it can play

in a context of growing demand for healthy, local food is becoming increasingly important. On the one hand, it is considered a necessary resource for the implementation of effective policies around urban agri-food systems,^{33,34} but also by the Alternative Agri-Food Networks that consider it as an urban pantry that supplies the city of fresh and local foods.^{35,36}

Considering the current state of degradation of natural resources and the limits of tolerance of human populations, it is not socioeconomically sustainable to try to solve food needs solely by increasing production anywhere, to transport them to different distances and deposit them in markets. dispersed and inaccessible (“food security”), but rather it is necessary to build food systems that have attributes of sustainability, so that productive complementarity and territorial economic circularity are achieved for food resilience.

The agroecological transition towards sustainable food systems requires combining local self-management capabilities and external productive complementarities, mainly from neighboring territories, that consider the spatial structure of human settlements as niches that integrate self-management and supply in a coherent manner, so that synergies are woven in the cultural performance and interactions that define food communities.

The main function of productive biota in family farming is to be a source of food for the family, workers, neighbors, the market and animals, with advantages for families in relation to conventional production, such as: having fresh food, less manipulated and free of pesticides, reduce purchases and reduce expenses in the market, as well as having the ease of harvesting and using it when necessary and being a reserve of nutritious foods.³⁷

Small-scale agriculture produces around 70% of the world's food, using only 30% of the productive resources, while industrial agriculture produces 30% of the food on 70% of the surface.³⁸

Although, in fact, community agriculture alone is not going to solve the demand for food and the complex socioeconomic problems of human settlements, it is considered a laboratory or starting point to move towards food sovereignty. The truth is that, in the face of recent crises, family and community farming guarantees direct access to a minimum of fresh food, which, well managed by families, offers a certain sovereignty, real and emotional, in food.

Regarding the principle of community self-development, Romero and Muñoz³⁹ highlight the essential nature of assuming the community as a subject of social transformations, the need to analyze it in a historical perspective, to characterize the elements that make it up, to identify the system of contradictions that They act as a driving force for development; all of which requires training processes in order to constitute a community in emancipation.

Sustainable quality of life, although it is a highly complex socioeconomic challenge, can be considered one of the priorities for the survival of human populations. It is a holistic approach to health conservation, which is particularly different in urban, peri-urban and rural systems, where factors that determine the quality of the habitat, healthy eating and natural medication converge.²

Until now, very little research has attempted to understand the relationships between food production systems, types of diet and community health, but one study indicates that, in rural communities, group cohesion and reciprocity (two forms of social capital) can contribute to positive health outcomes.⁴⁰

Conclusion

Family agriculture integrated into communities is a response of human settlements to the extreme events that are currently manifesting, mainly due to recurrent economic crisis, climate change and emerging diseases, whose frequency and intensity is putting pressure on the limits of tolerance of the human populations.

In the face of this emergency, Agroecology has provided the scientific and methodological bases for family self-management of fresh food, through the design and management of small family and community spaces for growing plants and raising animals in a sustainable manner.

Although the diversity and quantity of food obtained in the communities does not satisfy all the demand of the resident population, they show distinctive characteristics of great value for sustainable nutrition and health, mainly: semi-natural, diverse species, varieties and races, nutritious, harmless and without manipulations due to transfer. Furthermore, the implementation of agroecological practices in places around the family home contributes to sustainable quality of life.

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Conflict of interest

Authors declare that there is no conflict of interest.

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