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## THE AGROECOLOGICAL PERSPECTIVE,

SIAL ALTERNATIVE IN FOOD PRODUCTION IN THE URBAN FARM, ABREUS MUNICIPALITY

### LA PERSPECTIVA AGROECOLÓGICA, ALTERNATIVA SIAL EN LA PRODUCCIÓN DE ALIMENTOS EN LA GRANJA URBANA, MUNICIPIO ABREUS

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## **ABSTRACT**

The agroecological perspective, an alternative in food production in the Urban Farm, Abreus municipality, is the topic of the article, with the objective of analyzing the agroecological perspective that is manifested in Cuba, based on the legal framework, theoretical conceptions and results in practice, by revealing the application of science, technique and scientific innovation, as an alternative in the production of food in the Urban Farm, Abreus municipality, with the support of the Municipal University Center. Descriptive, explanatory, non-experimental study, which used theoretical and empirical methods that allowed us to reveal regularities in the agroecological perspective of food production. Results: the identification of challenges and agroecological perspectives in farm experiences, technologies, methodologies, innovative experiences. Conclusions: the Agroecological model in Cuba has a legal - theoretical - practical framework that allows projecting food sovereignty, the use of local resources, the protection of natural resources, and the use of knowledge, however, they are not sufficient in the face of the demand for food, a phenomenon that calls for promoting a strategy based on the precepts of the Local Food Innovation System (SIAL).

### **Keywords:**

Agroecology, food production, urban farm.

## **Resumen**

La perspectiva agroecológica, alternativa en la producción de alimentos en la Granja Urbana, municipio Abreus, es el tema del artículo, con el objetivo de analizar la perspectiva agroecológica que se manifiesta en Cuba, a partir del marco jurídico legal, las concepciones teóricas y los resultados en la práctica, al develarse la aplicación de la ciencia, la técnica y la innovación científica, como alternativa en la producción de alimentos de la Granja Urbana, municipio Abreus, con el acompañamiento del Centro Universitario Municipal. Estudio descriptivo, explicativo, no experimental, el cual empleó métodos teóricos y empíricos que permitieron develar regularidades en la perspectiva agroecológica de la producción de alimentos. Resultados: la identificación de retos y perspectivas agroecológicas en experiencias de fincas, tecnologías, metodologías, experiencias innovadoras. Conclusiones: el modelo Agroecológico en Cuba, tiene un marco jurídico - teórico - práctico, que permite proyectar la soberanía alimentaria, el aprovechamiento de recursos locales, la protección de recursos naturales, y el uso de saberes, sin embargo, no resultan suficientes ante la demanda de alimentos, fenómeno que convoca a impulsar una estrategia desde los preceptos del Sistema de innovación alimentario local (SIAL).

### **Palabras clave:**

Agroecología, producción alimentos, granja urbana.

## INTRODUCTION

The Food and Agriculture Organization of the United Nations (2021), recognizes the importance of Agroecology as a science that contributes to mitigate the effects of climate change; all of which guarantees healthier, tastier and more nutritious food for the present and the future, thus protecting the soil from erosion and degradation, would increase its fertility; and in such sense the Food and Agriculture Organization of the United Nations (2021), promoted ten elements of Agroecology, identified in: diversity, synergies, efficiency, efficiency, recycling, resilience, human and social values, food traditions, co-creation of knowledge, circular and solidarity economy and responsible governance.

From that idea Nicholls et al. (2017); Altieri & Nicholls (2018), considered that promoting Agroecology, as a science that contributes to ecological balance, maintenance of water quality, reduces desertification and in such interest, agroecological techniques that benefit crop fertilization are used, example of these techniques are organic fertilizers, green manures, crop residues, crop rotations, foliar fertilizers, biofertilizers, worm humus and manure, to the detriment of chemical fertilizers; all of which contribute to mitigating the greenhouse effect and global warming.

In the year 2023, the scientific debates on the use of Agroecology in the world were assumed by Cuba, manifesting the development of policies in favor of the agroecological model proposed by the Food and Agriculture Organization of the United Nations (2021), in the Conceptualization of the Cuban economic and social model of socialist development and the Guidelines of the economic and social policy of the Party and the Revolution for the period 2021-2026, in which the Model of economic management, the strengthening of sustainable development with the participation of the Organisms of the Central Administration of the State and the territorial governments, the strengthening of agricultural and livestock production, which is considered a fundamental economic base, are notorious.

In this direction, the Guidelines from 115 to 124 (Communist Party of Cuba, 2021), consider the improvement of the management model of the agricultural and forestry sector, in a perspective that indicates the transformation in food production with agroecological bases; perspective, which favors the use of natural procedures, and avoids the use of chemical products such as fertilizers or pesticides, which allows the protection of ecosystems.

This issue occupies spaces of scientific reflection and debate, which promote the search for new theoretical and practical ideas in favor of Agroecology, applied as an alternative for food production in Cuba, which considered issues such as the increase in food demand, the challenge in water management and the scarcity of this and other

natural resources, or the potential of bioenergy to change the bases of the agricultural system: Pérez & Caballero (2021); Terry et al. (2022); Núñez et al. (2023).

The ecological dimension is understood as the ecosystem must maintain its main characteristics, which are essential for its long-term survival; the economic dimension assumes the sustainable management of natural resources must provide sufficient income to make the continuation of such management attractive; and the social dimension contains the benefits and costs must be distributed equitably among the different groups, and the social and cultural values of the affected people must be respected (Quispe, 2022).

In attention to the challenges faced by the Agroecological model in Cuba, the objectives of the article are stated as:

1. To analyze the agroecological perspective manifested in Cuba, from the legal legal framework, the theoretical conceptions and the results in practice, by unveiling the application of science, technology and scientific innovation.
2. To show the experiences and results, which are manifested as an alternative in the production of food in the Urban Farm, Abreus municipality, with the support of the Municipal University Center, and on the foundations of the local food innovation system.

## METHODOLOGY

The study was determined to be descriptive, explanatory, non-experimental (Hernández & Mendoza, 2018), with the use of theoretical methods that allowed the analysis and synthesis of information, and the systematization of ideas for the realization of the theoretical foundation, and empirical methods that allowed the analysis of documents, and the literature review, to unveil regularities in the agroecological perspective in food production.

## DEVELOPMENT

In Cuba, one of the spheres of agroecology is its application in backyards, gardens, orchards and family plots. Peña (2023) recognizes that the agroecological approach emphasizes the social and knowledge benefits derived from the dialogue between researchers, farmers and producers of these various forms of traditional agricultural practices, which contribute perceptions that are specific to each place and context of action, depending on the associated sociocultural practices.

It is vital to develop national and local-territorial capacities in research, extension and agroecological education, from this doctrine, in Cuba, several authors propose the establishment of a framework that allows the implementation of agroecological production.

In this perspective Terry et al. (2022); Prieto et al. (2023); Núñez et al. (2023), insist on aspects in favor of agroecology: collaboration between farmers, researchers in the identification of problems, experimentation and innovation, the use of experiences under scientific direction, the organization of institutional priorities, professional incentives, allocation of resources to support these objectives in urban and family agriculture, strengthening of popular participation with emphasis on women and youth, development of economic support policies, financial incentives and market opportunities.

The main challenges for agroecological agriculture that are recognized in Cuba are the following: Use of natural resources, increased food demand, generational replacement and improvement and refinement of the agricultural system: Casimiro & Casimiro (2017); Pérez & Caballero (2021); González et al. (2022); Díaz (2023), which are argued below.

Use of natural resources: agriculture not only has to adapt to overcome the consequences of climate change, but must also minimize its environmental impact as much as possible to try to slow down the change and curb these consequences. These include the scarcity of natural resources, such as lack of rainfall, or the occurrence of extreme weather phenomena that have a very negative impact on harvests, such as droughts and floods. The current production model has proven to be obsolete, which affects the results of agricultural production.

Increased demand for food: The combination of several elements such as population growth, urbanization or a global increase in purchasing power, has led to an increase in the demand for food, and with it an increase in food prices; in addition, agriculture not only faces the challenge of having to increase food production in order to meet the food needs of the population, but also the demand for cereals and other vegetables for animal feed or biofuels is increasing; so if the agricultural system intends to be more productive and sustainable, it will need to rely on maximizing efficiency in all its processes.

Generational changeover: the generational changeover to work in agricultural work is an issue to keep in mind in family agriculture and in state forms of production that affects the continuity of food production in the face of the challenge of an aging population and the emigration of young people, a phenomenon that affects socio-productive development in Cuba, for this, agriculture needs to be an activity that is not only viable but also profitable, so that it attracts new generations and is a real option for the future, in which the principles of Agroecology play a very important role.

Improvement of the agricultural system: the greatest challenge facing agriculture is to place itself in a position to be able to face all the other challenges of being an island

blocked in economic and productive sectors, therefore, improvement is considered as the alternative to be able to reach a change, in order to improve different aspects that result in a new system strengthened from the perspective of the use of science, technology and innovation with an agro-ecological position, which in general, allows increasing productivity, when facing challenges such as climate change, The satisfaction of demands, balance in production, recognizing that agriculture in Cuba needs to adapt and offer customized solutions that address ecological and social diversity, in line with sustainable agroecological practices, investment in machinery and infrastructure, training of farmers and producers, access to technologies, attention to pest management and other crop problems, seed quality, soil improvement, water use, among others.

Several researchers agree in recognizing the prospects of sustainable agroecological practices in Cuba, and take as a starting point the consideration of being a country that has about 11 million hectares of available land, of which six million are destined to the agricultural sector and another 3.5 million are dedicated to forestry development, meaning in this the willingness to resort to organic production, and in the search for creative and innovative solutions, which allow reducing dependence on food imports: Casimiro & Casimiro (2017); Tito (2020); Pérez & Caballero (2021); Sierra et al. (2022); Quispe (2022); González et al. (2022); Díaz (2023).

To this end, the work being carried out in Cuba to achieve sustainable and ecological agriculture is driven by the scaling up of agroecology, with more than 250 innovative initiatives for sustainable rural development being recognized in the systematization of these initiatives, and in this sense, agroecology is part of a strategy towards a more sustainable agriculture, as it provides the ecological basis for the conservation of biodiversity in agriculture (Díaz, 2023).

Then, sustainable agroecological practices are recognized, in Cuba, in agroecological farms, appropriate technologies and promotion methodologies, with which there is a systematization of innovative experiences in agroecology and sustainable rural development, in a perspective of agroecological growth and import substitution (Sierra et al., 2022).

Thus, we proceeded to list some relevant agroecological initiatives in the Cuban context:

Integral farms: 1. Diversification of the agroecosystem of the Rincón Los Hondones farm, Chambas municipality, through agroecological practices to contribute to local development- Chambas-Ciego de Avila. 2. Continuity and sustainability of agroecology in La Ofelia-San Antonio del Sur farm, Guantánamo. 3. Integrated System of Agroecological Livestock (SIGA) - La Lisa, Havana. 4. Family Agroecological Project Finca Marta- Caimito,

Artemisa. Permaculture linked to agroecology in family agriculture. Its role in food sovereignty and rural development. Las Elenas Farm- Santiago de Cuba, Santiago de Cuba. Family agriculture in an integrated agroecological system. Jibacoa- Boyeros Farm, Havana. 7. Sustainable development in a rainfed ecological agricultural and livestock farm that maintains year-round production - Jatibonico, Sancti Spiritus.

Appropriate technologies: 1. Seed production with agroecological practices - Güira de Melena, Artemisa. 2. Donis Fer "powerful natural fertilizer made from rock flour, charcoal and efficient activated microorganisms - Perico, Matanzas. 3. Production of vegetable seedlings in root ball with the use of local substrates-Quivicán, Mayabeque. 4. Livestock agroforestry as a basis for sustainable livestock production in Cuba- Perico, Matanzas.

Promotion methodologies: 1. Local Agricultural Innovation System (SIAL): Participative management of development under agroecological principles for food production - San José de las Lajas, Mayabeque. 2. Agroecological Promotion using the methodology Campesino a campesino - Plaza de la Revolución, Havana. Urban, Suburban and Family Agriculture in Cuba. An initiative for the development of Cuban agriculture on agroecological bases- Plaza de la Revolución, Havana.

In Cienfuegos, agroecological initiatives that have contributed to food production are also recognized, such is the case of a study presented by Prieto et al. (2023), who present the research conducted at the Dionicio San Román Credit and Services Cooperative and at the Punta la Cueva Farm, with the use of the Agroecological Performance Evaluation Tool (Food and Agriculture Organization of the United Nations, 2021); this research showed as part of the agroecological initiative the potential of mastering digital tools and their implementation in the development of digital content and the socialization of the best productive experiences, and updated technical content generated from the science production centers.

The initiative in the Punta la Cueva farm is an example of how much can be achieved with agroecology to increase food production, complying with one of the government policies implemented throughout the country, by promoting in the productive practice the intercropping of crops, the production of worm humus, compost to provide nutrients and improve soil conditions.

In addition, in the Cooperativa de Créditos y Servicios (CCS) Dionicio San Román, results are identified that contribute to the identification of potentialities and the implementation of actions for climate change mitigation and soil recovery from the development and monitoring of agroecological innovations, presented by Prieto et al. (2023):

- Characterization of farms with the application of the TAPE tool (**Food and Agriculture Organization of the United Nations**, 2021), development of trainings, socialization workshops and the courses on digital competencies and technical updating to decision makers, producers and their families, teachers and students of Agronomy Engineering, implementation of agroecological innovations to mitigate the effect of climate change and soil recovery.
- The development of digital skills that allow the socialization today of the best experiences of producers and researchers through a working group with the use of innovative technologies in the diagnosis and monitoring of the main agroecological actions to ensure sustainable production.
- Geomatic survey of 8 farms with the objective of knowing their main potentialities in order to convert them into polygons for the application and validation of the use of agroecological innovations for soil recovery and climate change mitigation.
- Diagnosis and monitoring of soil recovery on farms using test fields for sampling to validate the effectiveness of the use of agroecological actions such as planting living barriers, crop rotation, application of organic fertilizers, among others, to evaluate their effectiveness in increasing soil fertility, organic matter content, enrichment of soil micro fauna, elements to ensure the recovery of soil health.
- Carrying out technical tasks and follow-up sampling for the evaluation at the Center for Environmental and Coastal Studies (CEAC), linked to the Ministry of Science, Technology and Environment of Cuba (CITMA), in Cienfuegos.
- Identification of the scientific groups in the different lines of research at different times for the diagnosis, and of the needs for the assembly of a training classroom, rabbit, goat, vermiculture and protected cultivation houses.
- Carry out a forestry management proposal for the Punta La Cueva farm, including all the potential for forestry activities on the farms (coastal strip, borders and silvopastoral), development of a vermiculture center and the production of liquid and leached humus and legia for pest and disease control on the Punta La Cueva farm.
- Articulation with researchers from the "Indio Hatuey" Experimental Station of the species of grasses resistant to salinity conditions, for their possible introduction in areas of the farms linked to the project and all affected by salinity due to their proximity to the coastal zone.
- The geolocation of the farms, and carrying out of pertinent evaluations to locate the facilities, evaluate the areas for reforestation and for the actions of agroecological cuts for the recovery of the entire coastal strip, its protective barriers and the eroded areas.

## Experiences and results of the Urban Farm, Abreus municipality

In the municipality of Abreus, an example is evidenced, which considered the challenge that implies the application of sustainable Agroecology from the scientific perspective, with the creation of a Scientific Group in the Municipal University Center (Núñez et al., 2023), as a starting point in the realization of the diagnosis of the yards and plots, in the districts of Constanca, Abreus and Cieneguita, under the direction of the Urban Farm, with the application of the Agroecological Performance Evaluation Tool (Food and Agriculture Organization of the United Nations, 2021).

The results endorsed a conception that implied the agroecological perspective, by unveiling an analysis of the theoretical-methodological foundations of the Guidelines for the Urban, Suburban and Family Agriculture Program, with specificities of the subprogram of patios and plots, by observing it as an alternative for food production; and in that direction they presented a digital folder, result of the bibliographic search and review, regarding the research topic, containing the following information: Policy documents (13); Master's and Doctorate Theses (21); Diploma Works (34); Scientific articles (23); of these correspond to Cienfuegos authors (13). In this result, reports were presented that generally summarize the behavior of the topic, establishing the following regularities:

- Existence of conceptual and political theoretical framework from an agro-productive and environmental conception, endorsed in the objectives of Agenda 2030, the recognition of the impacts of climate change and its effects on food production.
- In the Constitution of the Republic, Article 23 recognizes that the lands are socialist property of all the people, and will be used for the purposes of the economic and social development of the country, as long as they do not affect the political, economic and social foundations of the State; Article 169, assumes the autonomy of the municipality to decide on the use of its resources; in the Guidelines of the economic and social policy for the period 2021 to 2026, it is stated in 125: To strengthen and improve the execution of the Municipal Self-Supply and Urban, Suburban and Family Agriculture Programs to achieve and sustain the objectives, indicators and goals set for the production and consumption of food, vegetables, grains, fruits and animal proteins in each territory; and in 127, To implement the National Plan for Food Sovereignty and Nutritional Education (SAN Plan).
- In the Guidelines of the Urban, Suburban and Family Agriculture Program, the Objectives of the Yards and Plots Subprogram promote the linking to the Program of the greatest possible number of yards and family plots with food production, to strengthen family and local food self-sufficiency and calls for the transformation of vacant or underutilized spaces into productive

areas while beautifying the local urban environment, increasing biodiversity in plants and animals, stimulating the volume of food produced in backyards and family plots, and developing the agri-food culture.

The results showed the realization of the diagnosis in 123 yards and plots, in the districts of Constanca, Abreus and Cieneguita, from the application of the TAPE Tool (Food and Agriculture Organization of the United Nations, 2020), revealing that the element of greatest negative significance was the attention to the Diversity of crops, animals and trees and economic activities, products and services, recognizing the need in the search for added value to the productions and productive linkages, from recycling, use of organic practices, adaptation to climate change, and the need to improve the quality of the products and services, animals and trees and economic activities, products and services, recognizing the need to seek added value to production and production chains, based on recycling, the use of organic practices, adaptation to climate change, and connectivity between the elements of the agroecosystem. A total of 85 patios and plots, representing 69.1% of the study sample, resulted in the initial agroecological transition typology.

## CONCLUSIONS

The analysis of the challenges faced by the Agroecological model in Cuba considered three central aspects: the legal framework, the theoretical conceptions and the results in practice, revealing results linked to the application of science, technique and scientific innovation, a perspective that recognizes how Cuba has managed to become a reference in the assumption of Agroecology for the world. In this sense, the challenges imply the development of an agriculture that is sustained under the iron commercial, economic and financial blockade imposed for more than 60 years, and that affects food production due to low inputs, a phenomenon that considers the agroecological perspective as an innovative alternative that can counteract the adverse economic, social and environmental effects.

It is recognized the reaffirmation in the use of Agroecology, in the legal framework of Cuba, aware of its usefulness for current and future generations, and for the fulfillment of the expectations of food sovereignty by taking advantage of local resources with knowledge, creativity, science and innovation to obtain quality food, taking into account the protection of natural resources and the environment. Agroecological challenges and perspectives are based on the use of knowledge, reflection and collaboration, reciprocal coordination of positions and actions on family and peasant agriculture, food sovereignty and nutritional education, as well as seed production and conservation, and the use of organic fertilizers.

Agroecological initiatives show progress and achievements, however, they are not enough to meet the demand

for food, a phenomenon that calls for Cuba to promote a massive strategy of agroecological production, more than an option, it is a necessity, especially to achieve the food sovereignty to which we aspire and the transformation towards a new model of sustainable, resilient and sovereign agriculture.

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