



Reference elements of urban agriculture systems in Cuba and Italy for the Central American environment

Elementos referentes de sistemas de agricultura urbana en Cuba e Italia para el entorno centroamericano

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ABSTRACT: Urban agriculture functions as a tool to develop sustainable food systems in cities and their peripheries. The study consisted of a literature review to characterize the experiences of urban agriculture in Cuba and Italy, with the objective of proposing elements that contribute to a model for Central America. The experience of urban agriculture in Cuba has been massive, with broad participation of producers, of an agroecological nature and for the purpose of self-sufficiency and local marketing. Having public policies has favored the success of urban agriculture in Cuba. In Italy the initiative is linked to territorial planning, where spaces for forests and gardens are located where urban agriculture is practiced. The gardens have been promoted as occupational therapies, and promoted mainly by universities and municipalities. Both experiences contain elements that can contribute to the development of urban agriculture in Central America, where there is recurrent food insecurity and the potential to increase urban agriculture initiatives. The characterization included seven dimensions: productive, economic, social, environmental, political, territorial and cultural. The Cuban experience contains close elements that can serve as a reference to experiences in Central America, such as massive production under an agroecological approach, the use of idle lands around cities, the use of local resources, the inclusion of women and youth, the objectives of self-sufficiency and the commercialization of surpluses. The role of the State from institutions such as INIFAT in Cuba and territorial planning initiatives in Italy are aspects to be considered in Central America.

Key words: Agricultural policies, food security, self-sufficiency.

RESUMEN: La agricultura urbana funciona como una herramienta para desarrollar sistemas alimentarios sostenibles en las ciudades y sus periferias. La revisión bibliográfica buscó identificar elementos de la agricultura urbana en Cuba e Italia que pueden servir de referencia para la aplicación en otros países, particularmente, en Centroamérica. La experiencia de la agricultura urbana en Cuba ha sido masiva, con amplia participación de productores, de corte agroecológico y con fines de autoabastecimiento y comercialización local. El contar con políticas públicas ha favorecido el éxito de la agricultura urbana en Cuba. En Italia, la iniciativa se vincula con planeación territorial, donde se ubican espacios para bosques y jardines en los que se practica la agricultura urbana. Los jardines han sido promovidos como terapias ocupacionales e impulsados, principalmente, por universidades y alcaldías. Ambas experiencias contienen elementos que pudieran aportar al desarrollo de la agricultura urbana en Centroamérica, en aquellos países donde hay inseguridad alimentaria recurrente y exista potencial para fomentar la agricultura urbana. La caracterización incluyó siete dimensiones: productiva, económica, social, ambiental, política, territorial y cultural. La experiencia cubana contiene elementos cercanos que pueden servir de referencia a experiencias en Centroamérica, como la masiva producción bajo enfoque agroecológico, el uso de tierras ociosas alrededor de las ciudades, el uso de recursos locales, la inclusión de mujeres y jóvenes, los objetivos de autoabastecimiento y la comercialización de excedentes. El rol del Estado, desde instituciones como el INIFAT en Cuba, y las iniciativas de planeación territorial, en Italia, son aspectos a considerarse en Centroamérica.

Palabras clave: abastecimiento de alimentos, políticas públicas, seguridad alimentaria.

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INTRODUCTION

Population growth, massive migration from rural to urban areas (1,2), increasing poverty, and the impact of climate change on agriculture increase the pressure on urban food systems (3). Urban agriculture can alleviate the impact of COVID-19 on food insecurity (4). Food is concentrated in a small number of countries and international markets are unable to sustain the demand for food (5). Several Central American countries face food crises every year, which in turn fuel the migration of farmers to the outskirts of cities, where urban or peri-urban agriculture can be established (2,6).

Since the 1980s, urban agriculture has grown as a contribution to food security, food sovereignty, organic production and generation of family employment (1). Urban agriculture is defined as practices in cities and their surroundings, using local resources (7). Urban agriculture emerges as an alternative for food production, using a production model adapted to local conditions and resources (8,9). Spaces in which urban agriculture is practiced include backyards, rooftop gardens, urban gardens, open spaces that provide ecosystem services and benefits for human well-being (10). The design, area, crops and type of each experience is different according to context and application.

In Central America, urban agriculture has growth potential (11). Two attractive experiences are found in Cuba and Italy. In Cuba it is promoted by the government, while in Italy it is promoted through regional development plans in which municipalities and local associations participate (4). In Central America, short-range experiences have been developed, mainly promoted by food security projects (12,13). The participants consume part of the production and sell the surplus at local fairs, ecological markets or direct sales of plots of land (13). The number of projects is small, with limited knowledge management (14).

In Latin America, Cuba stands out for having public policies that have promoted an increase in the quantity and diversity of agroecological production in the cities (15). The use of sustainable technologies is part of the urban agriculture movement promoted by the Institute for Fundamental Research in Tropical Agriculture (INIFAT) (16). Since 2010, urban agriculture has been transformed from a subsistence production system to one of self-consumption and commercialization, based on the use of local resources (17), in which multiple actors are involved (18).

In Europe, Italy is a pioneer in incorporating peri-urban agricultural spaces into the urban system through parks or gardens (19). The creation of parks that include a strategic plan for the agricultural sector, such as the case of Bologna (19), could be a reference in the promotion of urban agriculture in Central America. The experience combines the agricultural landscape, agriculture, forests, culture, history, agro-tourism and economy (20). In the Italian territory there are urban farms, community gardens and agricultural parks, which provide landscape and socio-educational functions by contributing to urban employment (21).

In the Central American context, on the one hand, there is a lack of knowledge on how to establish urban crops, and on the other, there is a massive adoption of food patterns promoted by large international consortiums based on conventional agriculture (14). There is potential for sustainable agricultural production in Central America in urban areas. The literature review sought to identify elements of urban agriculture in Cuba and Italy that could serve as a reference for potential application in other countries, particularly in Central America. Two experiences of international scope with different and contrasting purposes were selected for convenience and for being pioneering experiences of urban agriculture in Latin America and the Caribbean and in Europe (22).

CONCEPTUAL FRAMEWORK OF THE DIMENSIONS OF URBAN AGRICULTURE

108 sources were reviewed in the elaboration of the conceptual framework. The literature review was conducted on the following concepts: history and emergence of urban practices, policies, economic and local development, job opportunities, social inclusion, basic aspects, biodiversity enhancement, conservation of natural resources, contribution to food security and implementation of agricultural projects (Table 1).

The study started from the selected dimensions (43) which introduced the environmental, economic, territorial, productive and social dimensions, however, the cultural and political dimensions were completed from the reviewed publications. The construction of the cases focused on 21 publications selected for greater linkage with the practice of urban agriculture in Cuba (11) and Italy (10) as shown in Table 2.

CHARACTERIZATION OF THE URBAN AGRICULTURE EXPERIENCE IN CUBA

In Cuba, in the 1990s, the transformation of the agricultural production model to more sustainable and small-scale models was promoted (17,52). The transformations in production patterns were due to the collapse of the supply of agricultural inputs (19). The State promoted national urban agriculture programs aimed at food security (16). As a result, the cultivation of vegetables, tubers and grains, which form part of the basic diet and whose surpluses are marketed, increased (48). The initial objective was to supply food shortages and later evolved into an activity that allowed the commercialization of surpluses, satisfying food demand and other needs of the population (48,49).

In the medium term, the practices generate economic viability by not depending solely on international markets for food and not involving long distances traveled between the production center and the consumer (52). The experience promotes job opportunities by achieving direct marketing of the products generated from points of sale or kiosks, thus increasing the decentralization of marketing (18). The experience has had a high impact as a source of

Table 1. Description of dimensions based on analyzed publications

Dimensions	Description of dimensions	Source
Productive	It establishes a link between producers and consumers by developing self-production initiatives, in which there are no intermediaries. It also contributes to the construction of resilient and sustainable agri-food systems that increase food security.	(14) (23) (24) (25) (26)
Economical	It describes the benefits of the activities in the economy of the participants. In addition, it develops jobs, marketing and local consumption that ensure the social reproduction of a significant number of people and families. Finally, it influences the separation of the international food market by making the participating groups independent.	(24) (27) (28) (29) (30) (31)
Social	It contributes to solutions aimed at urban poverty. In addition, it describes the social impact, generated from the integration of women, children, youth and senior citizens into society, to provide elements of social inclusion with the participation of different actors.	(14) (32) (33) (34) (35)
Environmental	It is linked to sustainable development and identifies effects on natural and ecological factors. It considers conditions such as air and soil quality, management of natural resources and increase of plant species. Promotes friendly practices for the use of local resources and inputs.	(36) (23) (25) (37) (38) (39)
Political	It is linked to sustainable development and identifies effects on natural and ecological factors. It considers conditions such as air and soil quality, management of natural resources and increase of plant species. Promotes friendly practices for the use of local resources and inputs.	(24) (37) (40) (30) (18)
Territorial	Describes the spaces in which practices are developed at the local, regional or national level. Identifies the diversity of forms of urban agriculture, from gardens managed on balconies, terraces and rooftops, to municipal plots and farms.	(18) (25) (41) (36) (39)
Cultural	Uses traditional and ancestral knowledge of agricultural practices. Conceptualizes the cultural services that urban agricultural practices provide to urban societies, based on traditional resources.	(17) (29) (42) (28) (42)

Table 2. Authors, title, year and country of the research analyzed to develop the case studies of urban agriculture experience

Number	Authors	Title of article	Year	Country
1	(44)	Agricultura urbana y periurbana en Cuba. Agricultura urbana integral: ornamental y alimentaria	2014	Cuba
2	(45)	Desarrollo y agricultura urbana en un municipio de La Habana, Cuba	2014	Cuba
3	(46)	Avances de la agricultura urbana, suburbana y familiar	2013	Cuba
4	(47)	La agricultura urbana y caracterización de sus sistemas productivos y sociales, como vía para la seguridad alimentaria en nuestras ciudades	2017	Cuba
5	(48)	Impacto de la agricultura urbana en Cuba	2006	Cuba
6	(49)	La soberanía alimentaria desde la agricultura urbana: un reto para el desarrollo de la producción de alimentos en cuba	2009	Cuba
7	(50)	La agricultura urbana y suburbana en el contexto cubano	2015	Cuba
8	(51)	Contribución cultural de la agricultura urbana	2013	Cuba
9	(17)	La Agricultura Urbana en Cuba. Conceptos y avances	2004	Cuba
10	(52)	La agricultura urbana y suburbana en el contexto cubano	2017	Cuba
11	(15)	Agricultura y ciudad. Una clave para la sustentabilidad. La Habana	2001	Cuba
12	(53)	A review of the role of urban agriculture in the sustainable city discourse	2019	Italy
13	(54)	Agriculture and the city: A method for sustainable planning of new forms of agriculture in urban contexts	2019	Italy
14	(55)	Modelling the impact of urban growth on agriculture and natural land in Italy to 2030	2014	Italy
15	(56)	Why farm the city? Theorizing urban agriculture through a lens of metabolic rift	2019	Italy
16	(57)	Urban food systems that involve trees in Northern America and Europe: A scoping review	2010	Italy
17	(42)	Sustainable Community Gardens Require Social Engagement and Training: A Users' Needs Analysis in Europe	2019	Italy
18	(58)	The urban nature of agriculture: Bidirectional trends between city and countryside	2019	Italy
19	(25)	Multitemporal Geospatial Evaluation of Urban Agriculture and (Non)-Sustainable Food Self-Provisioning in Milan, Italy	2019	Italy
20	(20)	Social Acceptance and Perceived Ecosystem Services of Urban Agriculture in Southern Europe: The Case of Bologna.	2018	Italy
21	(31)	How Can Innovation in Urban Agriculture Contribute to Sustainability? A Characterization and Evaluation Study from Five Western European	2019	Italy

employment, becoming a dynamic and active element for employment (46).

On the social side, the experience has had a positive impact on total employment, especially for women, the elderly and young people (53,49).

The urban agriculture experience reflects a positive impact from the environmental dimension, maintaining the country's biodiversity, with more than 300 cultivated species (fruit trees, vegetables and medicinal plants) (18). The agroecological production approach is another element of environmental impact.

Politically, in Cuba during the 1990s, idle land was given to natural and legal persons interested in cultivating it and producing food (46). Through the government, policies were created to promote urban agriculture practices and the transformation of subsistence production systems into self-sufficiency and commercialization agriculture, based on the use of local resources (52).

In the cultural dimension, urban agricultural practices in communities display knowledge such as technologies, work tools, traditions, belief systems and cosmogonic elements that have endured in mythological forms and legends (52,45).

CHARACTERIZATION OF THE URBAN AGRICULTURE EXPERIENCE IN ITALY

Urban agriculture in Italy originated from the creation of "war gardens" and "victory gardens", which were used to ensure the supply of fruits and vegetables (32). Gardens spread in city centers and in intramural spaces at the end of World War II, evolving into urban gardens intended for self-production of food (6).

The productive equilibrium point of urban agriculture in Italy is based on achieving a constant yield and having total areas available to achieve food self-sufficiency for all cities and, in the long term, to export vegetable and cereal production (26,59). The objective of the experience is to sustain the consumption of large strata of the population while guaranteeing food security and sustainability of food systems (26).

In economic terms, urban agriculture has achieved economic growth as a result of the development of the local economy, which makes it possible to reduce costs through self-production (55). Agricultural park models facilitate access to land for beginning and immigrant farmers by generating employment and economic income with the aim of achieving local food supply for various communities (56).

The experience has contributed to the promotion of gender equity through the participation of both men and women in the initiatives (54). Some participants in urban agriculture have developed improvements in their physical and mental health, and the integration of social groups such as children, retired adults and the unemployed has been achieved (44).

Some of the urban agriculture experiences have been coupled with food forest systems to provide eco-systemic services and habitat value, such as air and water purification, moderation of temperature extremes, and improvement of air quality (54,58).

The experience provides cultural services such as recreation and mental health activities, rural open spaces, landscapes and cultural heritage, which are related to urban lifestyles (59).

In Italy, the experiences are supported by local municipalities, however, most of the initiatives around Italy are self-managed (56). Each urban agriculture project is based on the Community Supported Agriculture model, which seeks agricultural production with active support to communities at sustainable levels (59).

The analysis of dimensions identified common elements and good practices of each experience (Figure 1) that can feed an urban agriculture model for Central America.

PROPOSAL OF ELEMENTS FOR A MODEL URBAN AGRICULTURE SYSTEM IN CENTRAL AMERICA

In the Central American context, technical advice and financial support for urban practices is scarce; however, the governments of each country have made efforts to promote urban gardens to promote urban agriculture (38,39). There are producers who develop urban agriculture practices out of tradition or economic necessity, but unlike in Cuba, there are no public policies (60).

The proposal of elements for the urban agriculture model was based on the criteria of dimensions previously studied for Cuba and Italy. The characterization of urban agriculture in Cuba and Italy based on the conceptual framework made it possible to identify those elements of both experiences that can inform an urban agriculture model for Central America. Based on the elements found in the dimensions of the Cuban and Italian experiences, each element was characterized for the seven dimensions found (Table 3).

Based on the analysis of the cases of Cuba and Italy, a model of urban agriculture can be developed in Central America with elements from both countries. Public policies, national strategies and promotion of urban agriculture through government, municipalities, community projects, educational centers, cooperatives, etc. are required. Initial government support and development projects are key to continue promoting urban agriculture on a massive scale in the cities. In such a way that production provides food security and income generation for families. By implementing urban agriculture practices in Central America, it will contribute to the food security of the population, making them self-sufficient as in the case of Italy and Cuba.

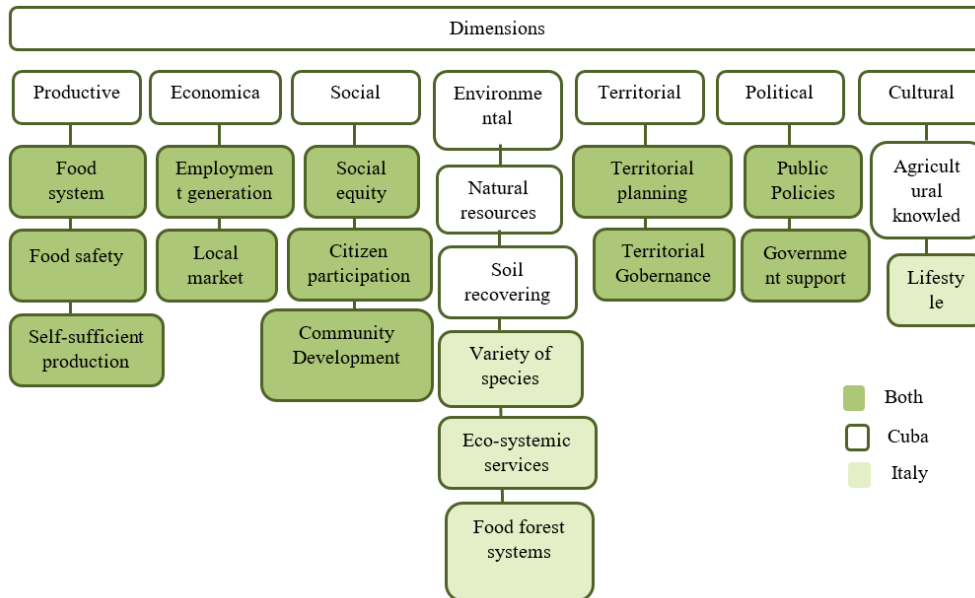


Figure 1. Dimension characteristics of the urban agriculture experience in Cuba and Italy

Table 3. Characterization of elements for the proposal of a model of urban agriculture in Central America

Dimension	Element	Cuba	Italy	Central America
Productive	Self-supply Trade	X	X	Productions may initially be intended for self-sufficiency, to supply the need for food, mainly basic grains and vegetables in low-income families.
Economical	Local marketing Contracts	X	X	Urban agriculture can favor the generation of income through the commercialization of surpluses in the long term in the practices of urban agriculture..
Social	Women Special capabilities	X	X	It can be aimed at men and women, youth, children, unemployed and/or retired people..
Environmental	Agroecological systems Use of natural resources	X	X	Urban agriculture can be based on agroecological systems using organic fertilizers, pest management and natural fertilizers, local and environmentally friendly inputs, among others.
Territorial	Urban gardens / Plots of land	X	X	In Central America there are unused or degraded lands that can be an opportunity for urban agriculture. Many of these public spaces are used as garbage dumps, so they can be used as urban gardens.
Political	State University	X	X	The State should increase the number of urban agriculture projects. The support of organizations such as FAO, PMI and WFP can be counted on to develop financially managed practices. Similarly, the role of the education sector plays an important role in school gardens.
Cultural	Maintains agricultural practices Lifestyle and recreation	X	X	Urban agriculture practices maintain cultural foundations through the adaptation of new agricultural practices and systems.

*PMI: Project Management Institute

* WFP: World Food Program

CONCLUSIONS

- The Cuban experience contains similar elements that can serve as a reference for experiences in Central America, being massive production under an agroecological approach, the use of idle land around the cities, the use of local resources, the inclusion of women and young people, the objectives of self-sufficiency and the commercialization of surpluses.
- The model of community-supported agriculture in Italy can be replicated in Central America, involving alliances between actors such as municipalities, environmental associations and community groups.
- Cuba's progress in agroecological production represents a replication opportunity for Central America that can improve the quality of life in Central American countries.
- The role of the State through institutions such as INIFAT in Cuba and the territorial planning initiatives in Italy are aspects that should be considered in promoting urban agriculture in Central America, where there is no coordination figure in this area.

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