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Urban gardens in promoting Food and Nutrition Security and sustainable development in Salvador, Brazil

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Abstract: Urban agriculture is an alternative for generating jobs, food production and sustainable development in cities. However, the activity has faced challenges being carried out in Brazil, often spontaneously and lacking government support. Thus, this work aimed at highlighting the contribution of urban gardens to the promotion of Food and Nutrition Security (production and availability) and sustainable development in the city of Salvador, Brazil. A descriptive study was carried out, with data collection from farmers in urban gardens in the city. It was shown that the gardens have been promoting work and generating income for families, contributing to food supply and security. In addition to producing fresh vegetables for the local population, the activity contributes to the balance of ecosystems and sustainability. Due to its strategic relevance, the findings point to the need for urban gardens to be included in the formulation of supply and sustainable development policies in the city.

Keywords: Urban horticulture; work; food supply; urban planning; sustainable development.

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Introduction

From the food production perspective, the increase in urbanization, climate change and the decrease in arable land have contributed to agriculture facing major challenges. In this context, valuing a more sustainable agriculture, as well as maintaining the balance of the environment, has become essential to promote food security for local populations. Likewise, urban agriculture has been highlighted as an important strategy for increasing food production and sustainable development (EIGENBROD; GRUDA, 2015; CORRÊA *et al.*, 2020).

The term "urban agriculture" covers the location – in and around cities – and the spaces used. The activities are carried out in individual or collective areas and may involve public roads, squares, parks and areas that are not being used, such as empty lots and vacant plots of land (SOUZA; GUSKE, 2017). It aggregates production practices aimed at their own consumption or for sale in the local market, and generally happens informally, spontaneously and punctually in cities and towns. In the context of food and health, these activities play an important role in Food and Nutrition Security (FNS), especially in poorer countries or countries with food supply problems (MATA, 2014; CHAGOMOKA *et al.*, 2018).

The benefits associated with urban agriculture practices are numerous, especially: the generation of work and income, the reduction of food costs, the encouragement of the local market, the improvement of food and the maintenance of green spaces in cities. However, in different parts of the world, urban farmers have faced social, political, technical, environmental and economic difficulties, which reinforce the need for greater investments in public policies aimed at the segment (CRUSH; HOVORKA; TEVERA, 2011; MOK *et al.*, 2014; FAO, 2014; SOUZA; GUSKE, 2017; SOUZA *et al.*, 2019; BATITUCCI *et al.*, 2019).

Studies worldwide have shown that food production through urban agriculture is increasing, with potential yields of up to 50 kg/m^2 annually, with at least 100 million people involved (EIGENBROD; GRUDA, 2015; WILHELM; SMITH, 2017; VIEIRA *et al.*, 2018). In Brazil, however, the practice of urban agriculture has encountered numerous challenges, such as insufficient financial support, limited technical assistance, lack of legal ownership of spaces and the absence of a legal framework or legislation that promotes its strengthening, which leads to the slow development of the activity (VILELA; MORAES, 2015; ZAAR, 2015; SANTANA *et al.*, 2017).

In Salvador, capital of Bahia state, Brazil, urban agriculture is characterized by horticulture, carried out mainly by family farmers. Many of them use the vegetables produced to feed their families or for donations, with most of the production destined for commercialization, which is usually done in street markets, local markets or directly in the gardens (MATA, 2014; SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020).

In the city, which is marked by social inequalities and pockets of poverty (SANTOS *et al.*, 2021), urban agriculture presents itself as a relevant strategy for the generation of work and income and for the promotion of local food security, since it provides a greater supply of fresh food and healthier eating practices, in addition to encouraging agroecologi-

cal and sustainable activities. However, for the most part, urban horticulture in Salvador is conducted spontaneously and with hindrances to its operationalization, lacking state support (PARAGUASSÚ, 2013; SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020).

Based on the above, this study sought to highlight the contribution of urban gardens to the promotion of Food and Nutrition Security – considering the dimensions of food production and availability – and sustainable development, in the city of Salvador, Brazil.

Methodology

This work is part of the broader research project *Non-Conventional Food Plants in urban agriculture in Salvador, BA: availability and potential for use in school meals*, which comprises a cross-sectional study, with a quantitative approach, carried out with farmers in urban gardens in the municipality of Salvador, Brazil. The present study complements the first phase of the research, which carried out the mapping of urban gardens (private and community) in the municipality, through data collection on site, with the application of a semi-structured questionnaire, and identification of Non-Conventional Food Plants (DA CUNHA *et al.*, 2020). In this second phase, the research focuses on FNS and sustainability. Fieldwork was conducted between September 2018 and May 2019.

In the research, two types of gardens were considered: the urban community gardens (UCG), those managed by a farmer while other members of the community worked with the crops; and the urban private gardens (UPG), which were under the administration of a farmer who might have an assistant.

For data collection, a previously tested questionnaire was used, organized into four dimensions: 1. Farmer identification and socioeconomic aspects; 2. Garden information; 3. Characteristics of the work and workers; and 4. Consumption of Non-Conventional Food Plants. In the present study, dimensions 2 and 3 were assessed (a total of 23 questions), seeking to address aspects related to the emergence of vegetable gardens, possession and legalization of cultivated areas, characteristics of work and workers, marketing/supply channels and types of food and vegetables offered.

Considering the previous mapping (DA CUNHA *et al.*, 2020), eighteen active vegetable gardens (with vegetable and/or fruit production) were located in neighborhoods across the urban area of Salvador. Questionnaire application was carried out in all but one of them. Two attempts were made to approach its manager, to no avail.

From the total number of gardens identified, five (Community type) only donated their products, while twelve of them (three Community and nine Private ones) sold the food produced, generating income for the families involved and continuous participation in the supply system of the city. Thus, these twelve urban gardens made up the sample of the present study.

There was no formation of a probabilistic sample. A convenience sample was constituted, based on information from studies with vegetable gardens previously carried out in the city (PARAGUASSÚ, 2013; SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020).

This happened due to the lack of up-to-date records in public agencies regarding the existing vegetable gardens in the municipality. Data obtained were tabulated in Excel spreadsheets and analyzed using descriptive statistics for all variables (continuous and discrete), in IBM SPSS software, version 20, for Windows.

The larger research project has been approved by the Research Ethics Committee of the School of Nutrition, Federal University of Bahia (Opinion n. 2.848.192). To participate in the study, the farmers responsible for the gardens (administrator and main caregiver) expressed their agreement by signing the Free and Informed Consent Term.

Results and Discussion

Urban gardens as an activity that promotes work and income

Table 1 presents the results related to general characteristics of UCGs and UPGs with activities developed, considering the gardens, work and workers.

Table 1 – Characterization of urban gardens in Salvador, regarding establishment and indicators related to gardens, work and workers, Salvador, Brazil, 2019

INDICATOR	DISTRIBUTION		
	UCG (*n*=3)	**UPG (*n*=9)**	**TOTAL**
Vegetable garden lifespan (years)			
Amplitude	17*	1 – 67	1 – 67
Average (standard deviation)	17.00 (0.00)	27.33 (18.34)	24.75 (16.33)
Time working in the garden (years)			
Amplitude	14 – 17	1 – 39	1 – 39
Average (standard deviation)	15.33 (1.53)	17.67 (14.59)	17.08 (12.51)
	% (n)	% (n)	% (n)
Emergence of the vegetable garden			
Own initiative	-	88.9 (8)	66.7 (8)
Public organ initiative	100.0 (3)	11.1 (1)	33.3 (4)
Cultivated area property			
Public power	100.0 (3)	66.7 (6)	75.0 (9)
Own	-	11.1 (1)	8.3 (1)
Occupation	-	22.2 (2)	16.7 (2)
Garden legal status			

Yes	100.0 (3)	22.2 (2)	41.7 (5)
No	-	77.8 (7)	58.3 (7)
Technical assistence			
Yes	-	-	-
No	100.0 (3)	100.0 (9)	100.0 (12)
Previous agriculture experience			
Yes	33.3 (1)	88.9 (8)	75.0 (9)
No	66.7 (2)	11.1 (1)	25.0 (3)
Daily working time in the garden			
< 8 hours	66.7 (2)	11.1 (1)	25.0 (3)
≥ 8 hours	33.3 (1)	88.9 (8)	75.0 (9)
Weekly work frequency			
5 to 6 days/week	-	11.1 (1)	8.3 (1)
Everyday	100.0 (3)	88.9 (8)	91.7 (11)
Average weekly revenue from products sale (BRL - R$)**			
30.00 – 120.00	66.6 (2)	20.0 (1)	42.9 (3)
150.00	-	20.0 (1)	14.2 (1)
200.00 – 300.00	-	60.0 (3)	42.9 (3)

*The three gardens were established in the same year, sharing the same period of existence.
** It was possible to consider only seven of the studied gardens. BRL 1.00 = USD 0.19 (2022)

Source: prepared by the authors, 2021.

The gardens' existing time reported by the farmers varied consistently. Although one of the gardens has only existed for a year, the other gardens had been in operation for at least 13 years. The oldest of them has been in operation for over 67 years, which confirms that the activity is carried out for a considerably long time. The oldest vegetable garden was located in the suburb of Salvador, in an area still dense with native vegetation. Due to more restricted responses from the owner, however, it was not possible to obtain a history and details regarding its activity and longevity.

Previous studies conducted with the city's vegetable gardens have also pointed out that urban agriculture has a long history of activity in Salvador, with records since its foundation (1549 CE). Even at the time of Colonial Brazil, vegetable gardens were established on the outskirts of the city (peri-urban areas) or in gardens, backyards and terraces of houses, initially by the indigenous people and the Jesuits; later, by enslaved people and Portuguese merchants, who incorporated the habit of cultivating vegetables

(PARAGUASSÚ, 2013).

In the three UCGs and one of the UPGs, the farmers interviewed stated that crops emergence took place as a result of the initiative of a public agency, more specifically the São Francisco river's Hydroelectric Company – CHESF –, a federal government company that operates in the field of energy transmission. In order to generate work and income in peripheral communities in Salvador, a few years ago, CHESF invested in the implementation of vegetable gardens in areas close to transmission lines, training residents to work in vegetable cultivation. Although the partnership had already ended, some of these residents continued to work in the gardens (MATA, 2014; MARQUES, 2015).

Four other UPGs, which, according to the interviewed farmers, emerged from their own initiative, were also established in areas belonging to CHESF, over which the transmission and/or distribution powerlines pass. The company was aware of the use of these spaces for this purpose and used to encourage agricultural production in the areas, in order to contain irregular occupation of the site and preserve the lines' structures. In addition, the cultivation of vegetables contributes to soil stability and does not harm the electrical network (PARAGUASSÚ, 2013).

According to the farmers of the other four gardens surveyed, these also emerged by their own initiative. One of them was established in another area belonging to the government (city hall land), two implanted in areas not belonging to the farmer (occupation/de facto ownership) and only one vegetable garden was on private property. However, five of the participating farmers stated that their gardens were legal, although they were unable to inform what type of supporting document they had.

Additionally, most respondents did not have legal ownership of the cultivated areas and were not registered as family farmers. Besides, all the farmers interviewed reported that the gardens did not receive any type of technical assistance. These conditions constitute obstacles to insertion and fair competition in the market, making it impossible for them to provide for state food and nutrition programs (SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020).

Regarding the work carried out, despite the time the farmers worked in the studied gardens is quite variable, most (75%) reported working in the gardens for more than a decade, accumulating a lot of knowledge in the area. In addition, most of them (75%) claimed to have previous experience with agriculture and, when asked about the time of experience, one of the farmers replied that it would be approximately 5 years, two respondents claimed to be between 30-40 years and six farmers reported participating in agricultural activities since childhood.

In this context, it is worth noting that none of the respondents was born in the capital of Bahia. All were born in cities in the interior, in Bahia or Sergipe states, and migrated to Salvador in search of better living conditions. These characteristics were also found in other studies, confirming that most families that practice urban agriculture come from rural environments, having experience with agricultural activities (EICHEMBERG *et al.*, 2009; CARNIELLO *et al.*, 2010; SANT'ANNA DE MEDEIROS *et al.*, 2020).

The rural exodus process is characterized as a problem in urban spaces, since it favors

the disorderly growth of cities, generating infrastructure problems, lack of access to public and private goods and increased unemployment (FONSECA *et al.*, 2015; NASCIMENTO *et al.*, 2018). The migratory population is often concentrated in the peripheral regions of urban centers, contributing to the increase in pockets of poverty and, due to difficulties in entering formal work, tends to be inserted in segments of urban agriculture, developing agricultural activities, as was already the case in their cities of origin (FONSECA *et al.*, 2015; SOUZA *et al.*, 2019).

Additionally, it is worth mentioning that the urban gardens studied have been promoting work and income, not only for the farmers interviewed, but also for other members of the communities in which they are inserted. At UCGs, for example, there are other farmers involved in the activities and each one is responsible for cultivating their share and selling what they produce. In the UPGs, farmers usually hire helpers, during certain periods of production, who receive payments for the work carried out.

Most farmers (75%) reported working eight or more hours a day in the gardens and, when asked about their weekly work frequency, eleven of them said they performed activities in the gardens every day. Farmers who agreed to inform the range of weekly revenue from the sale of food produced (seven respondents) reported values between 30 and 300 BRL. One of the farmers from a UPG claimed to collect more than 300 reais a week, but did not detail the amount, while other four (one from a UCG and three from UPGs) were afraid to talk about this issue, preferring not to answer.

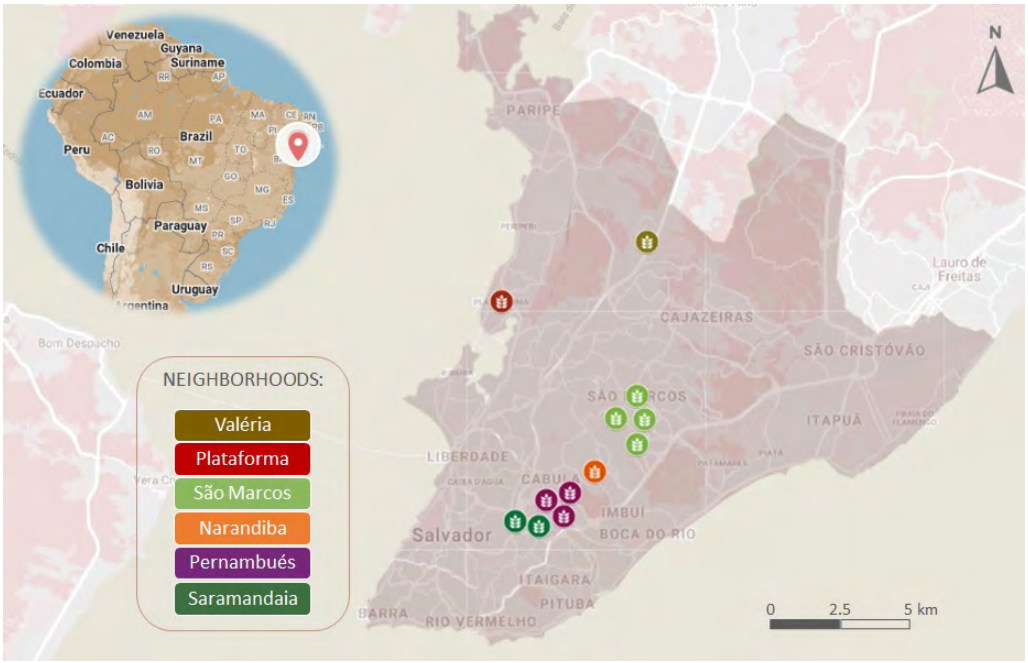
In this context, it is important to emphasize that only two respondents claimed to have another profession (driver and night watchman), confirming that the activity carried out in the urban gardens of Salvador is, for most farmers, the main source of income and essential for the sustenance of their families.

Other studies also emphasize the role of urban gardens as promoters of work and income, in different cities in Brazil and in developing countries, and show that, in many cases, the activity supports the income generation of several families. In this scenario, surveys indicate that the promotion of public policies aimed at urban agriculture constitutes a strategy for generating work and income, encouraging local economies in large cities (HIRATA *et al.*, 2010; FAO, 2014; POULSEN *et al.*, 2015; ALBERTIN *et al.*, 2016; CALBINO *et al.*, 2017; CARNEIRO *et al.*, 2018; CANCELIER *et al.*, 2020).

Contribution of urban gardens to food supply

At the moment, Salvador has 170 neighborhoods, spread over a territorial extension of 693.453 km^2 (IBGE, 2021; SALVADOR, 2020). The twelve urban gardens participating in the present study were located in six of them (Figure 1).

Figure 1 – Spatial distribution of urban gardens in the neighborhoods of Salvador, Brazil, 2019



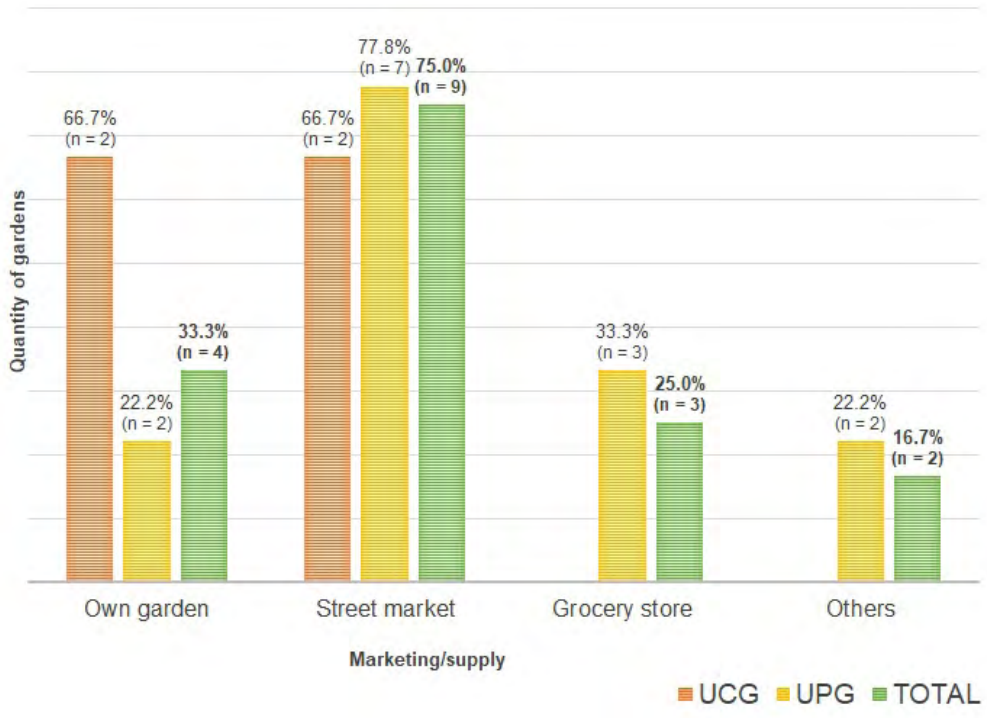
Source: adapted from Google Maps, 2020 (https://www.google.com/maps).

In the neighborhood of São Marcos, three UCGs and one UPG were established. The other UPGs were located in the neighborhoods of Valéria, Plataforma, Narandiba, Pernambués and Saramandaia. Together, these neighborhoods add up to 175,560 inhabitants – 6.1% of the total population of the municipality (2,886,698 inhabitants) – (IBGE, 2010; 2021), who benefit from the presence of vegetable gardens close to their homes.

According to the interviewees, the food produced was offered not only in these neighborhoods, but also in other regions of the city, reaching a greater number of inhabitants. In addition, part of the production used to be consumed by the families of the farmers themselves or donated to schools and long-stay homes (SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020). In their studies, Paraguassú (2013) and Mata (2014) reinforce that the urban gardens of Salvador, located predominantly in the outskirts of the city, contribute to supplement the city's food supply, and that cultivated foods reach the table of several families, especially low-income ones.

Chart 1 shows the different channels for selling the vegetables grown in the gardens studied.

Chart 1 – Marketing/supply channels for food produced in urban gardens in Salvador, Brazil, 2019



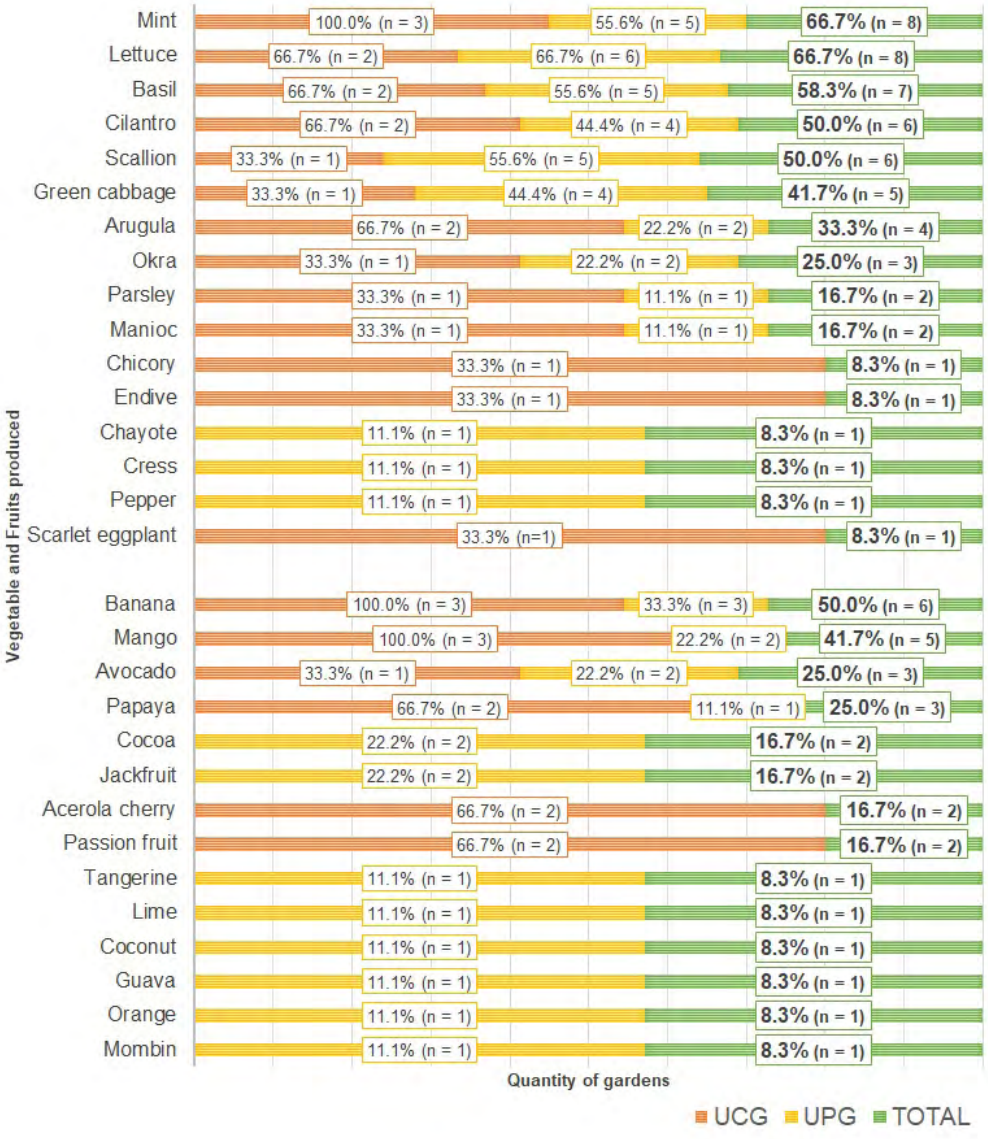
Source: prepared by the authors, 2021.

According to the farmers, the sale of food took place mainly in open markets or in the gardens themselves. However, UPG farmers reported supplying fruit and vegetables to grocery stores, street vendors and the Bahia Supply Center (CEASA) – one of the largest wholesale horticultural markets in Salvador, which plays an important role in supplying the city, serving supermarkets, hotels, restaurants, hospitals and small businesses (BAHIA, 2020).

Therefore, the findings indicate that the gardens have contributed to the supply of fresh and healthy food to the population, collaborating to promote FNS in the municipality. This observation corroborates data described in previous works carried out in the city (PARAGUASSÚ, 2013; SOUZA *et al.*, 2019).

The main crops grown and offered by the gardens studied are shown in Chart 2.

Chart 2 – Food grown in urban gardens in Salvador, Brazil, 2019



Source: prepared by the authors, 2021.

According to the farmers, 30 types of vegetables were grown in the gardens (16 species of vegetables and 14 of fruits). Mint and lettuce were the most cited vegetables, being produced in a total of eight gardens. Among fruits, banana and mango stood out, produced in six and five urban gardens, respectively.

Although several urban agriculture initiatives and a number of studies on the de-

velopment of this activity already exist, information specifying the species of vegetables produced in the gardens is still scarce. In general, it is observed that fruits are more prevalent in the North and Northeast of the country, while in the Center-West and Southeast, vegetables are more cultivated. In the Southern region, fruits and vegetables are grown in the same proportion (SANT'ANNA DE MEDEIROS *et al.*, 2020).

The number of vegetables produced in each garden can be an indication of the potential for food production and usually varies between 13 and 47 species (SANT'ANNA DE MEDEIROS *et al.*, 2020). In Salvador, each farmer reported growing two to 14 types of vegetables in their garden, including fruits and vegetables. It is also worth noting that some species, classified in the Brazilian literature as Non-Conventional Food Plants – NCFP –, such as mint, coriander and gherkin (KINUPP; LORENZI, 2014), but which are traditionally consumed by the Bahian population, were also produced in the gardens, as reported by Da Cunha *et al.* (2020).

Another 56 species of NCFP were found in the urban gardens of Salvador. However, these were not cultivated, they were born spontaneously and, although some were consumed by the farmers' families, for the most part, they used to be uprooted because they did not have significant commercial value and had low demand in the market (DA CUNHA *et al.*, 2020).

Based on the findings, the importance of initiatives to stimulate the consumption of fruits and vegetables was demonstrated, as well as actions that seek to strengthen the production of these vegetables, especially of local species, as strategies to promote the diversification of the population's diet (FIGUEIRA *et al.*, 2016; CUNHA *et al.*, 2021). From this perspective, the practice of urban agriculture can contribute to urban food production systems, in order to promote and strengthen FNS (RIBEIRO *et al.*, 2015).

Studies reinforce that urban agriculture has benefited the poorest sections of the population, providing changes in hunger and poverty in cities in different countries, and that urban gardens are strategically important activities for the promotion of FNS (LYNCH *et al.*, 2013; BARTHEL; ISENDAHL, 2013; EIGENBROD; GRUDA, 2015; CHAMINUKA; DUBE, 2017; FAO, 2019; CORRÊA *et al.*, 2020; SANT'ANNA DE MEDEIROS *et al.*, 2020).

In addition, research indicates that the Covid-19 pandemic has worsened food insecurity in urban centers, at a global level (LAL, 2020). A recent study, carried out in the context of the Covid-19 pandemic in Brazil, revealed that 54.4% of Brazilian families living in urban areas lived with some degree of food insecurity. In the Northeast region, this number was even higher, with 72.2% of households located in urban areas (REDE PENSSAN, 2021).

In Salvador, a survey carried out between 2018 and 2020 describes that the condition of food insecurity is faced by 40.9% of the population, which highlights a worrying scenario and points to an urgency concerning this problem (SANTOS *et al.*, 2021). Therefore, in a city like Salvador, where food is one of the items with the highest financial expense, the availability of vegetables produced in urban gardens means nutritional support for economically vulnerable families. The activity should, therefore, be considered

strategic for promoting local food security (PARAGUASSÚ, 2013; SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020).

In the municipality, however, there is no FNS policy and/or a supply policy that encompasses different programs/strategies for the production and supply of food to the population. There are also no specific policies for promoting, regulating and strengthening urban agriculture initiatives, as is already the case in some capitals of the country, such as São Paulo, Belo Horizonte, and Rio de Janeiro (SÃO PAULO, 2004; BELO HORIZONTE, 2011; RIO DE JANEIRO, 2019).

Despite the relevance of urban agriculture, from the perspective of social, economic, food and environmental contribution, the conduct of this practice has encountered many challenges in the municipality, which are reflections of the insufficiency of government policies. In the competent public bodies, there are not even records on the number of vegetable gardens and/or on urban agriculture activities carried out in the city (SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020).

Actions in favor of the activity are sporadically carried out (workshops, fairs and the like), falling under the necessary rate to promote the strengthening of the segment, which leads to the discontinuity of the practice in the city. Over the years, a reduction in the number of urban gardens has been observed in Salvador. While in 2013 there were 49 urban gardens in the municipality, in 2019 this number dropped to 18 active urban gardens with food production, that is, a reduction of 63.3% in six years (PARAGUASSÚ, 2013; DA CUNHA *et al.*, 2020).

The urban gardens that have shown to be more resilient are the community gardens, implemented in the city's most affluent neighborhoods. However, these are cared for by volunteer residents who have better socioeconomic conditions when compared to gardeners in peripheral areas of Salvador (SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020).

There is a need for policies that can work to reduce food insecurity registered in the municipality and that recognize the development of urban agriculture activities as promoters of work, income and health. The resolution of this problem will be more easily achieved if these policies are instituted permanently and with popular participation.

In this context, as an important strategy to promote public policies aimed at the activity, scholars highlight the pressure from social movements linked to urban agriculture (FERNANDEZ; BAPTISTA FILHO, 2019). However, in Salvador, these movements are still fragile, needing to gain strength and establish dialogues with government representatives in defense of urban agriculture.

Gardens from the perspective of sustainable urban development

Urban agriculture has emerged as an alternative capable of performing sustainable relations in cities, in the social, economic and environmental dimensions (CAHYA, 2016; BATITUCCI *et al.*, 2019). In this sense, integrating agriculture into urban planning processes and promoting public policies aimed at this activity is fundamental for the

sustainable development of municipalities (RIBEIRO *et al.*, 2017).

Evidently, this activity alone cannot meet the total demand for food in cities, nor solve other common challenges of large urban centers, such as unemployment and soil permeability and thermal comfort issues. However, urban agriculture can contribute, to a greater or lesser extent, to the protection of the urban environment (MATA, 2014).

With regard to food supply, records indicate that the main sources of food supply in Salvador have always been outside the municipality and, until the beginning of the 20th century, food came mainly from cities in the Recôncavo Baiano region (MATA, 2014). However, the complementary supply has always existed, being initially carried out by ranches and farms, located in the outskirts of the city, and currently by urban gardens, distributed in some neighborhoods of the municipality (PARAGUASSÚ, 2013; MATA, 2014; SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020).

In this context, scholars reinforce that urban agriculture can contribute to the food sovereignty of cities, from the production of quality fruits and vegetables to serve local populations (EIGENBROD; GRUDA, 2015; MOK *et al.*, 2014; AZEVEDO *et al.*, 2020). In Salvador, in addition to contributing to the supply of food, the activity has been encouraging agroecological practices and the production of healthy foods, playing an important role in FNS and in building a more sustainable urban environment (PARAGUASSÚ, 2013; SOUZA *et al.*, 2019).

Vegetables offered by urban gardens are usually fresher and have a longer shelf life, since they can reach the marketing channels in shorter time intervals - even hours after harvest (EIGENBROD; GRUDA, 2015; MOK *et al.*, 2014). In addition, as they are located within cities, urban gardens have the advantage of proximity to consumer markets, which facilitates the flow of their production. Another positive point is the fuel economy, as the distances traveled to the marketing channels are smaller, compared to the transport of food produced in rural areas, contributing to the reduction of pollution and food costs (MATA, 2014; EIGENBROD; GRUDA, 2015; RANA *et al.*, 2015).

The practice of urban agriculture also plays the role of greening cities, improving urban environmental quality, and preserving remaining vegetation (MATA, 2014; EIGENBROD; GRUDA, 2015; FILKOBSKI *et al.*, 2016). In Figure 2, it is possible to observe spaces of vegetation where three urban gardens included in the present study are located.

Figure 2 – Vegetation spaces and urban gardens in Salvador, Brazil, 2019

Source: images recorded by the authors during the field research, 2019.

The desire for sustainable green spaces is one of the main motivations for carrying out activities in urban gardens in developed countries (COSTA, 2012; SCHEROMM, 2015; RUGGERI, *et al.*, 2016), while in cities in developing countries, like Salvador, the main motivation for the practice of urban agriculture is still income generation. Even so, the establishment of vegetable gardens in the city is reinforced, as spaces for the preservation of green and permeable areas in the urban environment (MATA, 2014; DA CUNHA *et al.*, 2020).

In this context, studies indicate that, in addition to producing food, green areas are important for water regulation, as they help in water management, improve soil drainage, reduce the volume of rainwater surface runoff (in places intended for cultivation and its surroundings), reduce the risk of flooding, decrease soil loss through erosion and increase groundwater reserves (MACHADO, 2002; CORRÊA *et al.*, 2020), aspects that even benefit the gardens themselves. In Salvador, for example, all the gardens investigated had water for crop irrigation and, according to respondents, in 58.3% of them (seven gardens) the water came from underground, collected from wells or springs.

The presence of green areas within urban centers also favors thermal comfort. The process of constantly watering the crops and the evapotranspiration generated by the vegetable gardens allow a significant reduction in thermal amplitudes and heat islands (typical of urban environments). This, in turn, directly affects the quality of life and the reduction of energy consumption, such as the use of fan and air-conditioning devices (PARAGUASSÚ, 2013; MATA, 2014).

In view of the above, it is a fact that urban agriculture reveals potential far beyond food production, configuring itself as an important tool for the balance of urban ecosystems, contributing to the promotion of sustainability in municipalities. Thus, it must be considered in urban development (BATITUCCI *et al.*, 2019).

It is worth emphasizing that the formulation of policies aimed at urban agriculture becomes crucial to support activities in urban gardens in cities such as Salvador, where the activity has been taking place without recognition and encouragement from government spheres. It should also be considered as one of the solutions for food production and sustainable urban development (PARAGUASSÚ, 2013; MATA, 2014; SOUZA *et al.*, 2019; DA CUNHA *et al.*, 2020).

Unlike Salvador, other Brazilian metropolises have implemented policies and actions to support urban agriculture in a more systematic way. Since the 1980s, the city of São Paulo has registered initiatives in urban agriculture, aiming to better respond to the supply needs (CALDAS; JAYO, 2019). In Belo Horizonte, since the 1990s, public policies aimed at strengthening food security have been implemented, highlighting the Municipal Policy to Support Urban Agriculture, which was instituted in 2011 and regulates activities, including: the cultivation of vegetables, fruits and medicinal plants; breeding small animals; fish farming and artisanal food production (SÁ, 2021; BELO HORIZONTE, 2011). In Rio de Janeiro, there is also the Municipal Policy to Support Urban and Periurban Agriculture, established in 2019, which regulates urban agriculture practices on a sustainable basis, with the increase in agroecology actions and sustainability strengthening the activity (RIO DE JANEIRO, 2019; ENSP/FIOCRUZ, 2021).

In this scenario, research points to the importance of urban agriculture, both for relieving central issues of access to food, in a country that lives with high levels of food insecurity, and for its contribution to the formation and preservation of green areas, which promote the environmental sustainability in urban space.

Conclusions

The investigation has proven that the practices of urban agriculture, carried out for decades, promote work and income generation for families in the peripheral regions of the city. In most cases, it is the main source of income for the families involved.

The activity contributes to the promotion of FNS, considering different perspectives in food production. In addition to offering fresh and healthy food to the local population, urban gardens contribute to the balance of ecosystems. It is also important for the preservation of green spaces, water regulation and thermal comfort, favoring the

environmental sustainability of cities.

Therefore, the findings of this study demonstrate the relevance of urban gardens, as they constitute an important strategy for generating work and income, for promoting Food and Nutrition Security and for more sustainable urban development. From the above, it is assumed that the activity must be recognized and guided by the political agenda of rulers and decision makers, at different levels of government, in line with global guidelines.

In this sense, it is also important to consider the successful experiences of other Brazilian cities, which stand out in public policies and actions aimed at urban agriculture. Municipalities such as São Paulo, Belo Horizonte, and Rio de Janeiro are references that reveal advances to feed the city and promote environmental sustainability.

Further research is suggested towards: strengthening urban agriculture activities; investigating the nutritional contribution of the food produced; evaluating the prices practiced, in comparison with food from other locations, seeking to increase the consumption of locally grown food; and assessing access and use of the gardens by the communities.

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References

ALBERTIN, Ricardo Massulo *et al*. Hortas urbanas de Maringá (PR): estudo socioeconômico dos produtores e perceptivo dos transeuntes. **Boletim de Geografia**, v. 34, n. 2, p. 98-115, 2016.

AZEVEDO, Francisco Fransualdo de; PERXACS, Helena; ALIÓ, Maria Àngels. Dimensão social da agricultura urbana e periurbana. **Mercator** (Fortaleza), v. 19, e19005, 2020.

BAHIA. Governo da Bahia. **Centro de Abastecimento da Bahia – CEASA**, 2020. Available at: <http://www.sde.ba.gov.br/index.php/2020/01/17/centro-de-abastecimento-da-bahia-ceasa/>. Access: 06 Apr. 2021.

BARTHEL, Stephan; ISENDAHL, Christian. Urban gardens, agriculture, and water management: Sources of resilience for long-term food security in cities. **Ecological economics**, v. 86, p. 224-234, 2013.

BATITUCCI, Thayza de Oliveira *et al*. A agricultura em ecossistemas urbanos: um passo para a

sustentabilidade das cidades. **Ambiente & Sociedade**, v. 22, e02773, 2019.

BELO HORIZONTE. **Lei nº 10.255, de 13 de setembro de 2011**. Institui a Política Municipal de Apoio à Agricultura Urbana e dá outras providências. Available at: <https://leismunicipais.com.br/a/mg/b/belo-horizonte/lei-ordinaria/2011/1026/10255/lei-ordinaria-n-10255-2011-institui-a-politica-municipal-de-apoio-a-agricultura-urbana-e-da-outras-providencias>. Access: 12 Dec. 2021.

CALBINO, Daniel *et al*. Avanços e desafios das hortas comunitárias urbanas de base agroecológica: uma análise do município de Sete Lagoas. **COLÓQUIO-Revista do Desenvolvimento Regional**, v. 14, n. 2, p. 59-80, 2017.

CALDAS, Eduardo de Lima; JAYO, Martin. Agriculturas urbanas em São Paulo: histórico e tipologias. **CONFINS: Revista Franco-brasileira de Geografia**, v. n. 39, p. 1-11, 2019.

CANCELIER, Janete Webler; DE DAVID, Cesar; FACCO, Janete. A prática da agricultura urbana e o cultivo de hortícolas no município de Santa Maria-RS. **Geosul**, v. 35, n. 76, p. 684-705, 2020.

CARNEIRO, Cristianne Teixeira *et al*. Iniciativas de hortas comunitárias municipais em Teresina: práticas promotoras de renda e trabalho. **Revibec: revista iberoamericana de economía ecológica**, v. 28, p. 149-167, 2018.

CARNIELLO, Maria Antonia *et al*. Quintais urbanos de Mirassol D'Oeste-MT, Brasil: uma abordagem etnobotânica. **Acta Amazônica**, v. 40, n. 3, p. 451-470, 2010.

CHAGOMOKA, Takemore *et al*. Urban and peri-urban agriculture and its implication on food and nutrition insecurity in northern Ghana: a socio-spatial analysis along the urban–rural continuum. **Population and Environment**, v. 40, n. 1, p. 27-46, 2018.

CAHYA, Darmawan Listya. Analysis of Urban Agriculture Sustainability in Metropolitan Jakarta (Case Study: Urban Agriculture in Duri Kosambi). **Procedia - Social and Behavioral Sciences**, v. 227, p. 95–100, 2016.

CHAMINUKA, Nyasha; DUBE, Ernest. Urban Agriculture As a Food Security Strategy for Urban Dwellers: a Case Study of Mkoba Residents in the City of Gweru, Zimbabwe. **PEOPLE: International Journal of Social Sciences**, v. 3, n. 2, p. 26–45, 2017.

CORRÊA, Carina Júlia Pensa *et al*. Semeando a cidade: Histórico e atualidades da agricultura urbana. **Ambiente & Sociedade**, v. 23, e00751, 2020.

COSTA, Carlos Smaniotto. Kleingärten – um componente da infraestrutura urbana: aspectos urbanísticos, ecológicos e sociais dos jardins arrendados na Alemanha. **Revista Brasileira de Gestão Urbana** (Brazilian Journal of Urban Management), v. 4, n. 1, p. 103-122, 2012.

CRUSH, Jonathan; HOVORKA, Alice; TEVERA, Daniel. Food security in Southern African cities: The place of urban agriculture. **Progress in development studies**, v. 11, n. 4, p. 285-305, 2011.

CUNHA, Manuela Alves da *et al*. Plantas Alimentícias Não Convencionais na perspectiva da promoção da Segurança Alimentar e Nutricional no Brasil. **Research, Society and Development**, v. 10, n. 3, e20610313306, 2021.

DA CUNHA, Manuela Alves *et al*. Urban gardening and neglected and underutilized species in Salvador, Bahia, Brazil. **Journal of Ethnobiology and Ethnomedicine**, v.16, n. 67, p. 1-16, 2020.

EICHEMBERG, Mayra Teruya; AMOROZO, Maria Christina de Mello; MOURA, Leila Cunha de. Species composition and plant use in old urban homegardens in Rio Claro, Southeast of Brazil. **Acta Bot. Bras.** [online], v. 23, n. 4, p.1057-1075, 2009.

EIGENBROD, Christine; GRUDA, Nazim. Urban vegetable for food security in cities. A review. **Agronomy for Sustainable Development**, v. 35, n. 2, p. 483-498, 2015.

ENSP/FIOCRUZ - Escola Nacional de Saúde Pública Sergio Arouca/Fundação Oswaldo Cruz. Agricultura urbana está em expansão no Rio de Janeiro e tem protagonismo de mulheres, 2021. Available at: <http://informe.ensp.fiocruz.br/secoes/noticia/45013/51146>. Access: 27 May. 2022.

FAO - Food and Agricultural Organization. **Growing greener cities in Latin America and the Caribbean - An FAO report on urban and peri-urban agriculture in the region**, 2014. Available at: <http://www.fao.org/3/a-i3696e.pdf>. Access: 26 Mar. 2021.

FAO - Food and Agricultural Organization. **City region food systems programme**, 2019. Available at: <http://www.fao.org/3/ca6337en/ca6337en.pdf>. Access: 02 Apr. 2021.

FERNANDEZ, Annelise Caetano Fraga; BAPTISTA FILHO, Almir Cezar. Agricultura familiar urbana. Limites da política pública e das representações sociais. **Cidades, Comunidades e Territórios**, n. 39, p. 141-154, 2019.

FIGUEIRA, Taís Rocha; LOPES, Aline Cristine Souza; MODENA, Celina Maria. Barreiras e fatores promotores do consumo de frutas e hortaliças entre usuários do Programa Academia da Saúde. **Revista de Nutrição**, v. 29, n. 1, p. 85-95, 2016.

FILKOBSKI, Ina; ROFÈ, Yodan; TAL, Alon. Community gardens in Israel: Characteristics and perceived functions. **Urban Forestry and Urban Greening**, v. 17, p. 148–157, 2016.

FONSECA, Wéverson Lima *et al*. Causas e consequências do êxodo rural no nordeste brasileiro. **Nucleus**, v. 12, n. 1, p. 233-240, 2015.

HIRATA, Andréia Cristina Silva; GOLLA, Amarílis Rós; DE MEDEIROS HESPANHOL, Rosangela Aparecida. Caracterização da horticultura como uma estratégia de agricultura urbana em Presidente Prudente, Estado de São Paulo. **Informações Econômicas, SP**, v. 40, n. 1, p. 34-43, 2010.

IBGE – Instituto Brasileiro de Geografia e Estatística. **Censo Demográfico**, 2010. Available at: <https://censo2010.ibge.gov.br/>. Access: 01 Apr. 2021.

IBGE – Instituto Brasileiro de Geografia e Estatística. **IBGE/Cidades**: Panorama de Salvador – População; Território e ambiente, 2021. Available at: <https://cidades.ibge.gov.br/brasil/ba/salvador/panorama>. Access: 26 Mar. 2021.

KINUPP, Valdely Ferreira.; LORENZI, Harri. **Plantas Alimentícias Não Convencionais (Panc) no Brasil:** guia de identificação, aspectos nutricionais e receitas ilustradas. São Paulo: Instituto Plantarum de Estudos da Flora, 2014. 768p.

LAL, Rattan. Home gardening and urban agriculture for advancing food and nutritional security in response to the COVID-19 pandemic. **Food Security**, v. 12, p. 871-876, 2020.

LYNCH, Kenneth *et al*. Meeting the urban challenge? Urban agriculture and food security in post-conflict Freetown, Sierra Leone. **Applied Geography**, v. 36, p. 31–39, 2013.

MACHADO, A. T. Agricultura urbana. **A Lavoura**, v. 636, n.36, p. 48-59, 2002.

MARQUES, Leo. **Hortas urbanas geram emprego e renda em bairros de Salvador**, 2015. Available at: <https://medium.com/@cursoatardejornalismo/hortas-urbanas-geram-emprego-e-renda-em-bairros-de-salvador-af19c1c7a9c2>. Access: 17 Mar. 2021.

MATA, Damile Menezes Pessoa. Agricultura urbana de produção orgânica: desafios e oportunidades para a formulação de uma política pública na cidade de Salvador, Salvador-BA. 2014. 171f. Thesis (Master's Degree in Environment, Waters and Sanitation) –Federal University of Bahia. Politechnical School, Salvador, 2014.

MOK, Hoi-Fei *et al*. Strawberry fields forever? Urban agriculture in developed countries: a review. **Agron. Sustain. Dev**, v. 34, p. 21–43, 2014.

NASCIMENTO, Carlos Alberto Sarmento *et al*. A migração do campo para os centros urbanos no Brasil: da desterritorialização no meio rural ao caos nas grandes cidades. **Brazilian Journal of Development**, v. 4, n. 5, p. 2254-2272, 2018.

PARAGUASSÚ, Lídice Almeida Arlego. **A agricultura urbana como estratégia de sustentabilidade da cidade do Salvador, Bahia, Brasil**, Salamanca-Spain. 2013. 370 f. Dissertation (Doctorate in Geography) - Universidad de Salamanca. Facultad de Geografía e História, Salamanca, 2013.

POULSEN, Melissa N. *et al*. A systematic review of urban agriculture and food security impacts in low-income countries. **Food Policy**, v. 55, p. 131-146, 2015.

RANA, Shreema; RIJANTA, R.; RACHMAWATI, Rini. Multifunctional Peri-Urban Agriculture and Local Food Access in the Kathmandu Valley, Nepal: A Review. **Journal of Natural Resources and Development**, v. 5, p. 88–96, 2015.

REDE PENSSAN - Rede Brasileira de Pesquisa em Soberania e Segurança Alimentar. **Inquérito Nacional sobre Insegurança Alimentar no Contexto da Pandemia da Covid-19 no Brasil**, 2021. Available at: <http://olheparaafome.com.br/VIGISAN_Inseguranca_alimentar.pdf>. Access: 12 May 2021.

RIBEIRO, Silvana Maria; BÓGUS, Cláudia Maria; WATANABE, Helena Akemi Wada. Agricultura urbana agroecológica na perspectiva da promoção da saúde. **Saúde e Sociedade**, v. 24, p. 730-743, 2015.

RIBEIRO, Helena; JAIME, Patrícia Constante; VENTURA, Deisy. Alimentação e sustentabilidade. **Estudos avançados**, v. 31, n. 89, p. 185-198, 2017.

RIO DE JANEIRO. **Lei nº 6691, de 19 de dezembro de 2019**. Dispõe sobre a Política Municipal de Apoio à Agricultura Urbana e Periurbana. Available at: <https://www.legisweb.com.br/legislacao/?id=387776>. Access: 12 Dec. 2021.

RUGGERI, Giordano; MAZZOCCHI, Chiara; CORSI, Stefano. Urban Gardeners' Motivations in a Metropolitan City: The Case of Milan. **Sustainability**, v. 8, n. 11, 1099, 2016.

SÁ, Eduardo. Belo Horizonte (MG): três décadas inovando na agricultura urbana e na agroecologia. **Articulação Nacional de Agroecologia**, 2021. Available at: <https://agroecologia.org.br/2021/03/04/belo-horizonte-mg-tres-decadas-inovando-na-agricultura-urbana-e-na-agroecologia/>. Access: 27 May 2022.

SALVADOR. **Prefeitura oficializa criação de sete novos bairros em Salvador**, 2020. Available at: <http://www.comunicacao.salvador.ba.gov.br/index.php/todas-as-noticias/57099-prefeitura-oficializa-criacao-de-sete-novos-bairros-em-salvador>. Access: 25 Mar. 2021.

SANTANA, Antônio Cordeiro *et al*. Mercado Institucional e Agricultura Urbana e Periurbana em Curuçambá, Ananindeua, Pará: Oportunidades e Desafios. **Revista Brasileira de Gestão e Desenvolvimento Regional**, v. 13, n. 1, 2017.

SANT'ANNA DE MEDEIROS, Natália *et al*. Diverse food in urban gardens in the promotion of food and nutrition security in Brazil: a review. **Journal of the Science of Food and Agriculture**, v. 100, n. 4, p. 1383-1391, 2020.

SANTOS, Elisabete *et al*. **QUALISalvador:** qualidade do ambiente urbano na cidade da Bahia. Salvador: Edufba, 2021. 531p. Available at: <https://repositorio.ufba.br/ri/handle/ri/34177>. Access: 08 Dec. 2021.

SÃO PAULO. **Lei nº 13.727, de 12 de janeiro de 2004**. Cria o Programa de Agricultura Urbana e Periurbana - PROAURP no município de São Paulo e define suas diretrizes. Available at: <http://legislacao.prefeitura.sp.gov.br/leis/lei-13727-de-12-de-janeiro-de-2004>. Access: 12 Dec. 2021.

SCHEROMM, Pascale. Motivations and practices of gardeners in urban collective gardens: The case of Montpellier. **Urban Forestry & Urban Greening**, v. 14, p. 735–742, 2015.

SOUZA, Mariana Barbosa; GUSKE, Ana Claudia. Agricultura urbana: um olhar a partir da agroecologia e da agricultura orgânica. **Colóquio**, v. 14, n. 1, p. 157-168, 2017.

SOUZA, Joeli Silva de *et al*. The experience of community urban gardens: Social organization and food security. **Revista de Nutrição**, v. 32, e180291, 2019.

VIEIRA, Leticia Canal *et al*. Unpacking components of sustainable and resilient urban food systems. **Journal of Cleaner Production**, v. 200, p. 318-330, 2018.

VILELA, Sérgio Luiz de Oliveira; MORAIS, Maria Dione Carvalho. Agricultura urbana e periurbana: limites e possibilidades de constituição de um sistema agroalimentar localizado no município de Teresina – PI. **Revista Econômica do Nordeste**, v. 46, n. 1, p. 97-114, 2015.

WILHELM, Jennifer A.; SMITH, Richard G. Ecosystem services and land sparing potential of urban and peri-urban agriculture: A review. **Renewable Agriculture and Food Systems**, v. 33, n. 5, p. 481-494, 2018.

ZAAR, Miriam Hermi. A Agricultura Urbana e Periurbana (AUP) no marco da Soberania Alimentar. **Sociedade e Território**, v. 27, n. 3, p. 26-44, 2015.

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AMBIENTE & SOCIEDADE 25 anos 25 años 25 years

SciELO

Hortas urbanas na promoção da Segurança Alimentar e Nutricional e desenvolvimento sustentável em Salvador, Brasil

Manuela Alves da Cunha
Ryzia de Cassia Vieira Cardoso

Resumo: A agricultura urbana constitui uma alternativa para a geração de trabalho, produção de alimentos e desenvolvimento sustentável nas cidades. No Brasil, entretanto, a atividade tem enfrentado desafios, sendo realizada, muitas vezes, de modo espontâneo e sem apoio governamental. Assim, este trabalho buscou destacar a contribuição das hortas urbanas para a promoção da Segurança Alimentar e Nutricional (produção e disponibilidade) e do desenvolvimento sustentável, no município de Salvador, Brasil. Realizou-se um estudo descritivo, com coleta de dados junto aos agricultores das hortas urbanas da cidade. Evidenciou-se que as hortas vêm promovendo trabalho e renda para famílias e contribuindo para o abastecimento e a segurança alimentar. Além de produzir vegetais frescos para a população local, a atividade contribui para o equilíbrio dos ecossistemas e sustentabilidade. Pela relevância estratégica, os achados apontam a necessidade de que as hortas urbanas sejam incluídas na formulação de políticas de abastecimento e de desenvolvimento sustentável da cidade.

Palavras-chave: Horticultura urbana; trabalho; abastecimento de alimentos; planejamento urbano; desenvolvimento sustentável.

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SciELO

Huertas urbanas para promover la Seguridad Alimentaria y Nutricional y desarrollo sostenible en Salvador, Brasil

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Ryzia de Cassia Vieira Cardoso

Resumen: La agricultura urbana es una alternativa para generar empleo, la producción de alimentos y el desarrollo sostenible en las ciudades. En Brasil, la actividad enfrenta desafíos, siendo realizada, espontáneamente y sin apoyo gubernamental. Este trabajo buscó resaltar la contribución de las huertas urbanas para la promoción de la Seguridad Alimentaria y Nutricional (producción y disponibilidad) y el desarrollo sustentable en la ciudad de Salvador, Brasil. Se realizó un estudio descriptivo, con recolección de datos de agricultores en huertas urbanas de la ciudad. Se evidenció que las huertas vienen promoviendo el trabajo, los ingresos de las familias, y contribuyendo al suministro y la seguridad alimentaria. Además de producir hortalizas frescas para la población local, contribuye al equilibrio de los ecosistemas y la sostenibilidad. Por su relevancia estratégica, los hallazgos apuntan a la necesidad de incluir las huertas urbanas en la formulación de políticas de abastecimiento y desarrollo sostenible de la ciudad.

Palabras-clave: Horticultura urbana; trabajo; abastecimiento de alimentos; planificación urbana; desarrollo sostenible.

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