URBAN AND PERI-URBAN AGRICULTURE IN BRAZILIAN CAPITALS: WHAT DOES RECENT ACADEMIC PRODUCTION REVEAL?

AGRICULTURA URBANA E PERIURBANA NAS CAPITAIS BRASILEIRAS: O QUE A PRODUÇÃO ACADÊMICA RECENTE REVELA?

AGRICULTURA URBANA Y PERIURBANA EN LAS CAPITALES BRASILEÑAS: ¿QUÉ REVELA LA PRODUCCIÓN ACADÉMICA RECIENTE?

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ABSTRACT

Urban and peri-urban Agriculture (UPA) is intertwined with a comprehensive sustainability agenda, being a key element of a robust and resilient food system, while promoting greener cities. However, UPA is not fully understood by researchers, governments and general population, partly due to the heterogeneity of its forms. This article seeks to contribute to the understanding of the debate on UPA initiatives in Brazil by presenting the results of a systematic literature review of UPA's article, published from 2018 to 2022, that intended to outline: a quantitative overview of recent academic production on UPA in Brazil; a qualitative analysis of recent academic production on UPA in Brazilian capitals states and the Federal District. The results indicate a quantitative increase in the number of articles published on the subject. Additionally, the spatial distribution of cited cases in the articles shows that they are concentrated in cities located in the south and southeast Brazil. Also, the frequency of keywords found in the papers highlights the social character and environmental aspects of the discussion about UPA. Qualitatively, the overview indicates that UPA initiatives are primarily located intra-urban, often in common/public places rather than private ones. The majority of initiatives operate within a community system, focusing on the production of vegetables for self-consumption.

KEYWORDS

Urban and peri-urban Agriculture; Literature review; City; Urban planning; Brazil

RESUMO

A Agricultura Urbana e Periurbana (AUP) está ligada a uma ampla agenda de sustentabilidade, sendo chave para um sistema alimentar robusto, resiliente e para cidades mais verdes. As ocorrências da AUP, todavia, não são plenamente compreendidas por pesquisadores, governos e população em geral, em parte devido à heterogeneidade de formas que ela tem adotado. Buscando contribuir com a compreensão sobre as iniciativas de AUP no país, o presente artigo apresenta os resultados de uma revisão sistemática da literatura em artigos sobre AUP publicados entre 2018 a 2022, com objetivo de traçar: um panorama quantitativo da produção acadêmica recente sobre a AUP no Brasil; e uma análise qualitativa da produção acadêmica recente sobre AUP nas capitais dos estados da federação e no Distrito Federal. Como resultados, percebe-se, quantitativamente, um crescimento no número de trabalhos publicados sobre a temática. Adicionalmente, a

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distribuição espacial dos casos citados nos textos mostra que eles estão concentrados em cidades das regiões sul e sudeste do Brasil. Além disso, as palavras-chave destacam o caráter social e ambiental da discussão sobre a AUP. Qualitativamente, o retrato formado pela amostra aponta que as iniciativas de AUP têm localização intraurbana, realizada em espaços comuns/públicos. A maioria das iniciativas opera em sistema comunitário, focando na produção de vegetais destinados ao autoconsumo.

PALAVRAS-CHAVE

Agricultura Urbana e Periurbana; Revisão da Literatura; Cidade; Planejamento Urbano; Brasil

RESUMEN

La Agricultura Urbana y Periurbana (AUP) está vinculada a una amplia agenda de sostenibilidad, siendo clave para un sistema alimentario robusto, resiliente y para ciudades más verdes. Las ocurrencias de la AUP, sin embargo, no son completamente comprendidas por investigadores, gobiernos y la población en general, en parte debido a la heterogeneidad de formas que ha adoptado. Buscando contribuir a la comprensión de las iniciativas de AUP en el país, el presente artículo presenta los resultados de una revisión sistemática de la literatura en artículos sobre AUP publicados entre 2018 y 2022, con el objetivo de trazar: un panorama cuantitativo de la producción académica reciente sobre la AUP en Brasil; y un análisis cualitativo de la producción académica reciente sobre AUP en las capitales de los estados de la federación y en el Distrito Federal. Como resultados, se percibe, cuantitativamente, un crecimiento en el número de trabajos publicados sobre el tema. Además, la distribución espacial de los casos citados en los textos muestra que están concentrados en ciudades de las regiones sur y sudeste de Brasil. Asimismo, las palabras clave destacan el carácter social y ambiental de la discusión sobre la AUP. Cualitativamente, el retrato formado por la muestra apunta a que las iniciativas de AUP tienen una ubicación intraurbana, realizadas en espacios comunes/públicos. La mayoría de las iniciativas opera en un sistema comunitario, enfocándose en la producción de vegetales destinados al autoconsumo.

PALABRAS CLAVE

Agricultura Urbana y Periurbana; Revisión de la Literatura; Ciudad; Planificación Urbana; Brasil

1. INTRODUCTION

Urban and peri-urban agriculture (UPA) has garnered increasing attention in discussions concerning sustainable urban development both in Brazil and globally (KUHN et al., 2023; SARKER et al., 2019). UPA exhibits various positive attributes, including the reduction of greenhouse gas emissions, mitigation of heat island effects, and the potential management of urban compostable waste. Additionally, urban agriculture contributes to the aesthetic enhancement of areas and facilitates opportunities for community engagement, recreational activities, and therapeutic practices (MELLO et al., 2002). Furthermore, it serves as a local alternative to food produced in distant areas from the point of consumption. As a result, there is growing concern about the environmental and territorial impact of mass food production and its impact on human health. (HEARN, 2018).

According to the Food and Agriculture Organization of the United Nations (FAO), UPA is linked to a broader sustainability agenda, being key to a robust and resilient food system while promoting greener and more sustainable cities (FAO, 2014).

International academic literature, in turn, suggests that UPA is a diverse phenomenon, which manifests itself in particular ways in each country and even within a single city or region. The practices of UPA are still not fully understood by researchers, governments, and the general population, in part due to the heterogeneity of forms it has adopted (ZAAR, 2017).

Therefore, understanding how UPA initiatives are characterized in Brazilian capitals is relevant. One of the most comprehensive studies on the subject in the country (SANTANDREU, LOVO, 2007) indicates that 75% of the researched UPA experiences were located in the capitals of metropolitan regions. Consequently, as capitals concentrate a considerable portion of the population and exhibit a high degree of urbanization, conflicts between urban, peri-urban, and rural areas are more explicit.

Seeking to contribute to a broader understanding of the debate on UPA initiatives in the country, this article presents the results of a systematic literature review aimed at: a) providing a quantitative overview of recent academic production on UPA in Brazil; b) offering a qualitative analysis of recent academic production on UPA in the capitals of the states and in the Federal District.

The systematic literature review examined Brazilian academic articles on UPA published from 2018 to 2022. The literature review followed four key stages: a) surveying the following digital repositories: Scielo, Scopus, DOAJ, and Web of Science; b) filtering based on predefined criteria; c) classifying according to frameworks by Mougeot (2000) and Cabannes (2021); and d) conducting quantitative and qualitative analysis of the results.

This article is organized into three parts, besides the introduction and conclusion. The first part presents a theoretical discussion on the concept of UPA that will be used in the classification of results. The second part outlines the methodology used to collect data for the systematic literature review. The third part presents the main quantitative and qualitative findings, with a brief discussion at the end of each subtopic.

2. CHARACTERIZING UPA

Although UPA remains a polysemic concept to this day, referring to diverse practices, there is one constant in its definition: UPA seeks to differentiate itself from agriculture practiced in rural areas (ZAAR, 2017).

Mougeot (2000) conceptualizes UPA as an activity present in urban or peri-urban areas, encompassing cities of different sizes, which involves the production, processing, and distribution of food and non-food products. This practice is intrinsically linked to urban dynamics, making extensive use of human resources, materials, products, and urban services. Additionally, it contributes by providing human resources, materials, products, and services back to urban areas. According to Mougeot (2000), the fundamental characteristic of UPA is its greater or lesser integration with the urban economic and ecological system.

Furthermore, Mougeot (2000) suggests that to understand the different forms of UPA manifestation, it can be broken down into the following categories of analysis:

- Location: intra-urban or peri-urban;
- Types of areas where it is practiced;
- Scale and production system;
- Destination of products;
- Categories and subcategories of products;
- Types of economic activity.

Location is the most common element in delineating UPA. It is also the criterion that generally problematizes the definition of concepts such as intra-urban and peri-urban, urban, and rural spaces. The category of types of areas where it is practiced relates to modes of ownership or enjoyment of lots: residential areas, shared spaces, etc. Scale and production system refer to individual, family,

or business initiatives of micro, small, and medium scales, generally opposed to initiatives by large producers and companies. The criterion of product destination is attentive to the purpose for which production is reserved: self-consumption, trade, barter, gift, among others. Categories and subcategories of products encompass various agricultural productions, whether food or non-food. Lastly, types of economic activity refer to various phases of agricultural production such as processing, trade, among others.

Another form of characterization, used by the FAO (CABANNES, 2012), relates to the objectives of different UPA initiatives and recognizes the existence of three main typologies:

- Social dimension;
- Economic dimension;
- Ecological dimension.

The social dimension encompasses initiatives aimed at the subsistence of urban poor and the middle class during crises. They include domestic, community, and institutional gardens and other small-scale plantings with minimal investments. The objective is to generate positive impacts such as social inclusion, poverty reduction and community development. Generally demonstrate low direct profitability (CABANNES, 2012).

The economic dimension refers to UPA initiatives oriented towards the market aiming to generate economic impact and profitability. They are mainly carried out by small-scale family businesses or cooperatives and producer associations but may also include farms managed by private investors. They generally involve the entire food chain, from production to processing and marketing (CABANNES, 2012).

The ecological dimension encompasses initiatives directed towards leisure, recreation, and environmental management. Its primary aim is to foster connections between urban inhabitants and nature, while also promoting awareness of environmental concerns. Additionally, it endeavors to provide essential environmental services, including but not limited to composting, wastewater treatment, and landscape management within multifunctional green areas. This typology of UPA typically employs agroecological production methods and is observed to be more prevalent in developed countries compared to developing ones (CABANNES, 2012).

Identifying the specific characteristics of each initiative is crucial for advancing understanding of the UPA phenomenon, as well as in its theoretical debate.

3. METHOD

This research centered on the examination of Brazilian academic articles concerning Urban and Peri-Urban Agriculture (UPA) published within the timeframe of the last five years (2018 to 2022). The choice of this specific temporal scope is substantiated by the study's objective, which aims to delineate and assess the ongoing academic discourse surrounding UPA initiatives in Brazil. In essence, the methodological approach adopted for this literature review comprised four principal stages, as illustrated in Figure 01: surveying, filtering, classifying, and analyzing the outcomes. Subsequently, each stage will be expounded upon in detail.

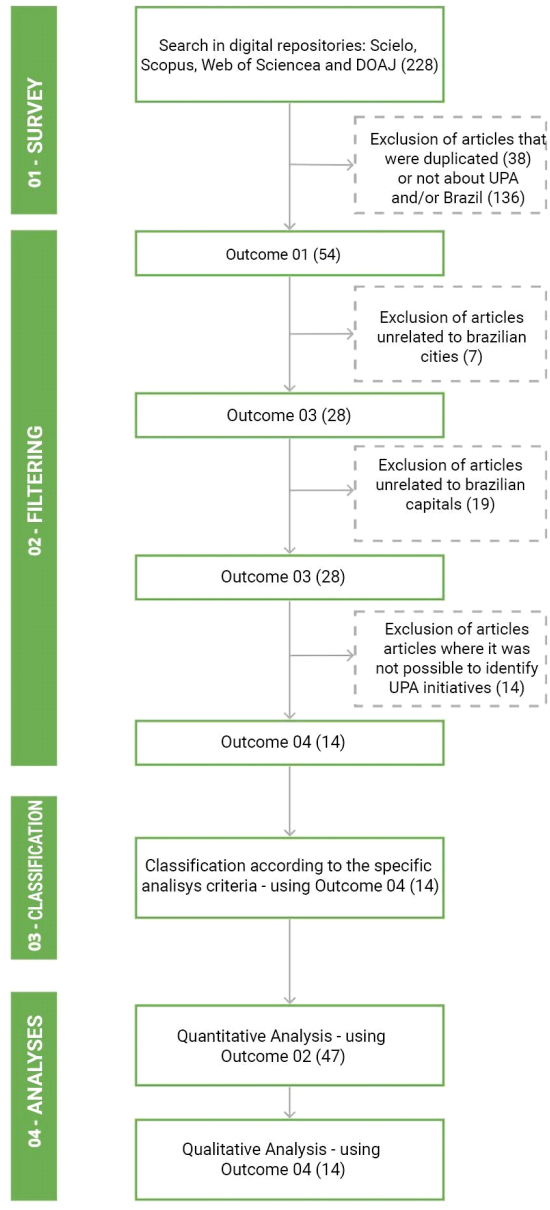

Figure 01: Literature review method.

3.1. Step 1: Survey

The survey phase consisted of searching for articles conducted between November 9th, 2022, and December 4th, 2022, in Scielo, Scopus, DOAJ (Directory of Open Access Journals), and Web of Science, which are digital open access databases repositories. Search terms were adapted to the search logic of each platform to ensure comprehensive coverage. The objective was to identify articles produced between 2018 and 2022 on Urban and Peri-Urban Agriculture (UPA) in Brazil, as previously mentioned. The data retrieved were exported in .xml or .csv format and aggregated into a single spreadsheet. Subsequently, articles were selected for inclusion in the research corpus. In total, 228 articles were found. First, 38 duplicates (studies indexed on more than one platform) were excluded. Next, 136 articles that, despite being indexed in research repositories with keywords related to urban agriculture, were clearly unrelated to the UPA theme, were excluded.

For details on the search terms and Boolean operators used in searching for articles, refer to Figure 02.

Repositories	Search terms
Web of Science	Urban agriculture OR urban farm* OR peri-urban agriculture OR peri-urban farm* OR urban garden* OR peri-urban garden* OR periurban garden* OR commun* garden AND case* OR experi* OR essay OR review OR study* OR case study* AND brasil OR brazil
	Urban agriculture* OR agricultura periurbana OR horta urbana OR horta periurbana OR horta* comunitária* OR quinta* urbano*
Scopus	"Urban agriculture" OR "urban farm*" OR "peri-urban agriculture" OR "peri-urban farm*" OR "urban garden*" OR "peri-urban garden*" OR "periurban garden*" OR "commun* garden" AND case* OR experi* OR essay OR review OR study* OR "case study*" AND brasil OR brazil
	"Urban agriculture*" OR "agricultura periurbana" OR "horta urbana" OR "horta periurbana" OR "horta* comunitária*" OR "quinta* urbano*" AND brasil OR brazil
DOAJ	“Urban agriculture” OR “urban farm*” OR “peri-urban agriculture” OR “peri-urban farm*” OR “urban garden*” OR “periurban garden*” OR “commun* garden” AND brasil OR brazil
	“Urban agriculture” OR “agricultura periurbana” OR “horta urbana” OR “horta periurbana” OR “horta comunitária” OR “quintal urbano” AND brasil OR brazil
Scielo	"Urban agriculture" OR "agricultura periurbana" OR "horta comunitária" OR "horta urbana" OR "horta periurbana" AND "brasil"
	"Urban agriculture" OR "agricultura periurbana" OR "horta comunitária" OR "horta urbana" OR "horta periurbana" AND "brazil"
	"Urban agriculture" OR "agricultura periurbana" OR "horta comunitária" OR "horta urbana" OR "horta periurbana" AND "brasil" OR "brazil"
	“urban agriculture” OR “urban farm” OR “peri-urban agriculture” OR “peri-urban farm*” OR “urban garden” OR “periurban garden” OR “commun garden” AND case OR study OR “case study” AND brasil OR brazil

Figure 02: Repositories and search terms

3.2. Step 2: Filtering

During the survey phase, 174 articles were preliminarily excluded based on predefined criteria. This left 54 publications (Outcome 1). Subsequently, publications without a direct relation to Brazilian cities were removed, totaling 7 articles. These mainly comprised articles with a more theoretical bias providing a comprehensive overview of UPA in Brazil. The pool of articles was reduced to 47 publications (Outcome 2). Following this, articles unrelated to the capitals of the 26 states of the federation and the Federal District, where UPA initiatives were identifiable, were filtered, resulting in 28 publications (Outcome 3). Finally, articles where it was not possible to identify urban and peri-urban agriculture initiatives were removed, leaving 14 publications (Outcome 4).

3.3. Step 3: Classification

The third part of the method involved classifying the 14 publications according to specific criteria characterizing the UPA initiatives they described. These criteria were based on Mougeot (2000) and Cabannes (2012) and included: a) dimension; b) intra-urban or peri-urban location; c) type of area where it is practiced (typology); d) scale and system; e) product destination; f) product category; g) type of economic activity.

3.4. Step 4: Analyses

Two types of data analysis were conducted: quantitative and qualitative. For the quantitative analysis, publications from Outcome 02 (47 studies on UPA in Brazilian cities) were considered. Here, descriptions of the temporal and

spatial distribution of the studies found were performed, as well as the occurrence of keywords.

The analysis of temporal distribution consisted of counting the studies by their year of publication. Spatial analysis, on the other hand, involved analyzing the studies according to the Brazilian city where the described initiative was located. The examination of keyword occurrence involved extracting these terms from each publication, followed by translation into English when they were only available in Portuguese. Additionally, similar terms were grouped and counted for analysis purposes.

For the qualitative analysis, publications from Outcome 4 were considered. The discussions were organized based on categories described in section 3.3 and the research results were compared with the outcomes of the previous literature review.

It is necessary to underline that, for qualitative classification, only the information present in the selected articles was analyzed, without seeking additional information about the initiatives from other sources. Therefore, it was not possible to evaluate all studies based on all categories. Additionally, in one of the articles (REC01), only the information present in the abstract was used because it was not an open access article. A more detailed description of these qualitative evaluation criteria is indicated in section 4.2.

4. RESULTS

The results of the quantitative and qualitative analyses are presented in sections 4.1 e 4.2, respectively.

4.1. Quantitative and Descriptive Analysis of the Literature on UPA

In the following subsections, quantitative analyses are subdivided into articles' temporal and spatial occurrence

4.1.1. Temporal Distribution

The temporal distribution of articles by year (Figure 03) reveals an increase in publications related to UPA from 2019, with a peak in the year 2021. This data demonstrates a growing academic interest in the topic.

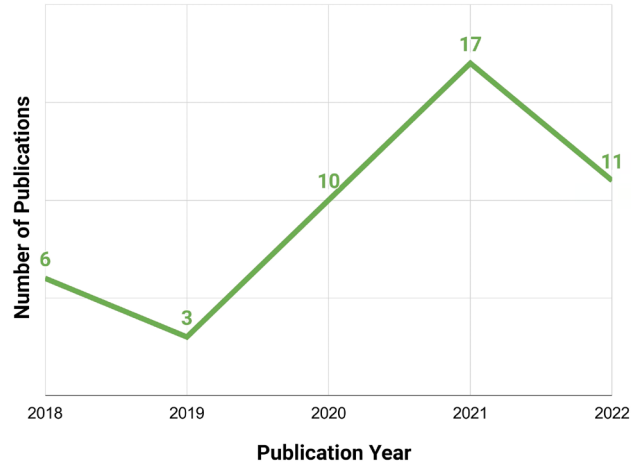

Figure 03: Temporal distribution of articles: number of publications per year of publication.

4.1.2. Spatial analysis

The spatial distribution of the cases mentioned in the articles shows that publications more frequently mention cities in the South and Southeast regions, while there is a low frequency of citations of cities in the Midwest, Northeast, and North regions of the country. The most cited cities in the articles are those that are more urbanized - São Paulo (9 articles) and Rio de Janeiro (3 articles), followed by other state capitals (Figures 04 and 05). It can be inferred, therefore, that the most urbanized regions have been the predominant, but not exclusive, locus of studies on UPA in Brazil.

Out of the 47 articles selected in Outcome 2, 19 (40%) mention cities that are not state capitals, totaling 23 municipalities: Planaltina (GO); Campos dos Goytacazes and São João da Barra (RJ); Lavras and Muzambinho (MG); Campina Grande (PB); Herval D'Oeste, Rio do Sul, Lages, Chapecó, and Ibirama (SC); Araras, Vale Histórico, Uchoa, and Araraquara (SP); Maringá and Campo Magro (PR); Alta Floresta (MT); Castanhal and Santarém (PA); Arapiraca (AL); Porto Nacional (TO); Pelotas (RS). On the other hand, 28 articles (60%) mention 14 state capitals (São Paulo, Rio de Janeiro, Curitiba, Florianópolis, Manaus, Natal, Recife, Teresina, Belém, Belo Horizonte, Fortaleza, Macapá, Porto Alegre and Salvador). No articles were found that mentioned the capitals of the other 12 states and the Federal District (Vitória, Campo Grande, Goiânia, Cuiabá, Aracaju, Maceió, João Pessoa, São Luís, Porto Velho, Rio Branco, Boa Vista, Macapá, Palmas, and Brasília).

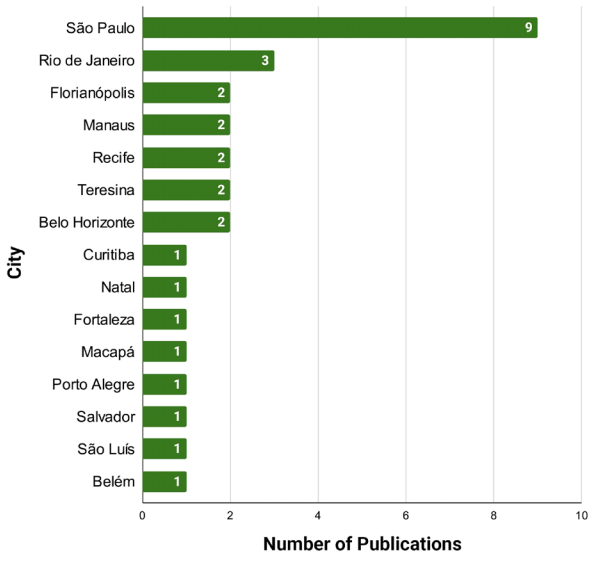

Figure 04: Occurrences of publications about each capital..

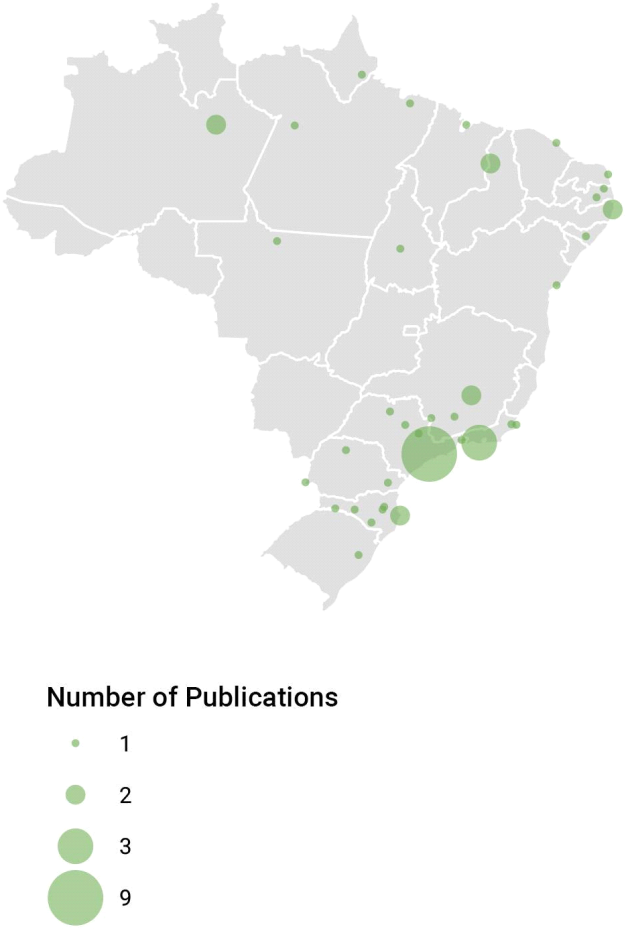

Figure 05: Map illustrating the number of publications in each city.

The analysis of keyword occurrence (Figures 06 and 07) demonstrates that, in addition to obvious terms like "Urban Agriculture" (24 occurrences) and "Brazil" (9), terms such as "Community Gardens" (9) and "Sustainability" (8) stand out. The emphasis on the term "Community Gardens," in turn, suggests a particular interest from the academic community in the community dimension of UPA, which is typically familial and lacks an entrepreneurial or mass-commercial production aspect. It's worth noting that the community perspective of the initiatives may be linked to municipal programs that value this dimension.

The keywords mentioned above highlight a dual perspective of the discussion on UPA in Brazilian capitals: on one hand, they reinforce its environmental character and positive ecological impact; on the other hand, they corroborate its social/community dimension. Both aspects align with findings by RAO et al (2022), who conducted a systematic literature review globally and found, among six thematic outcomes of UPA, themes of environmental sustainability and subjective/relational well-being.

Figure 06: Keyword cloud (excluding the most obvious terms: "Urban Agriculture" and "Brazil").

Despite the term UPA being widely disseminated in Brazil, it is still common for urban agriculture practices to be referred to in various ways by practitioners, social media, academic literature, and legal instruments. There is an abundance of terms used in academic, political, and community debate spaces, such as urban gardens, community gardens, urban farms, productive gardens, among others. This mention is necessary, as it may explain the presence of other terms beyond urban agriculture.

N°	Keyword	Quantity
1	Urban Agriculture	24
2	Community Gardens	11
3	Brazil	9
4	Sustainability	8
5	Enviroment* (Awareness/Contamination/Ethics/Health/Psycology/Se	7
6	Food (Markets/Production/Supply Chains/Systems)	6
7	Agroecology	6
8	Public Policies	5
9	Urban Gardens	4
10	Sustainable (Agriculture/Cities/Development/Development Goals)	4
11	Food/Nutrition Security	4
12	São Paulo	3
13	Organic (Agriculture/Farming/Production System)	3
14	Family (Agriculture/Farming)	3
15	Covid-19/Pandemic	3
16	(Urban) Soil	3
17	Vegetables	2
18	Urban Planning	2
19	Urban And Periurban Agriculture	2
20	Subsidence	2
21	Socio-Spatial (Development/Transformations)	2
22	Slum	2
23	Marketing	2
24	Land Use	2
25	Knowledge (Dissipation/Transmission)	2
26	Informal Settlement	2
27	Inclusive Urbanism	2
28	Histosols	2
29	Genetic (Heritage/Resources)	2
30	Food-Energy-Water Nexus	2
31	Ecosystem Services	2
32	Contamination/Pollution	2
33	Community Of Practices	2
34	Acid Sulfate Soils	2
35	Watershed Management	1

Figure 07: The 35 most frequently occurring keywords.

4.2. Qualitative analysis

For the qualitative analysis, the categories mentioned in section 3.3 were adopted. To facilitate reading, the articles were cataloged by a code referring to the capital to which the initiative refers. The code, city, and article reference can be found in Attachment A.

The sample includes reports from 9 capitals: Belo Horizonte (1), Florianópolis (2), Natal (1), Porto Alegre (1), Recife (1), Rio de Janeiro (2), Salvador (1), São Paulo (3), and Teresina (2).

The analyzed publications total 74 cases. Most publications report only one case, except for article BHZ01, which mentions 2 gardens, SSA01, which mapped 17 gardens, and THE01 which mentions 45 gardens. The two articles from Florianópolis (FLN01 and 02) address the same case, counted only once. In articles SAO02 and SAO03, which compare gardens in São Paulo with experiences in other cities, only initiatives in São Paulo were considered.

The selected articles use UPA initiatives as the subject of study through different approaches. In two articles, community gardens are used to understand social dynamics: Zambrano-Gutierrez et al (2018) - FLN01 analyzes collaborative management learnings, and Bonatti et al (2022) - FLN02 seeks to understand the "Social Learning" process occurring in the Revolution of the Buckets Project.

Three focus on the educational process: in Carvalho et al (2021) - POA01, the UPA practice is exposed as an approach to sustainability issues, Mota et al (2021) - NAT01 exposes the "Horticulture-Based Learning (HBL)" methodology applied in higher education context, and finally, Santos et al (2019) - SAO01, reports the experience of changing sustainability views in students from a school where a vertical garden was implemented.

Two articles compare production processes: Michelon et al (2020) - THE02 compares the yield between Simplified soilless cultivation system and conventional bean production system; David et al (2022) - SAO03 compares the energy synthesis of hydroponic gardens to assess their sustainability.

Two articles discuss public policies: Fernandez and Filho (2019) - RIO02 study the application of public policy for family farming in urban areas and Hearn (2018) - RO01 studies UPA programs to understand the creation of trust between producers, consumers, and governments.

There are also three articles focused on natural sciences: two evaluate gardens from a chemical perspective, discussing water quality (DO ESPÍRITO SANTO SILVA et al, 2020 - THE01) or the presence of heavy metals in crops and soil (DALA-PAULO et al, 2018 - BHZ01); and Cunha et al (2020) - SSA01, identifies the species produced, especially "Neglected and Underutilized Species (NUS)", from a botanical perspective.

Nagib and Giacche (2021) - SAO02 expose ideas and practices of urban farmers in São Paulo and Rennes. Santos Silva et al. (2018) - REC01 reports changes implemented in the CEASA/PE garden with technical assistance from the local university.

Therefore, it is noticeable that the approaches, issues, and themes of the articles are quite diverse. Below, we present the classification of existing initiatives in the capitals of Brazilian states in the already listed categories.

4.2.1. Characterization of existing initiatives in the capitals of Brazilian states

In general, initiatives characterized as community practices (THE01, REC01, SSA01, POA01, and SAO01) are more closely associated with the social dimension (THE01,

REC01, and SSA01), promoting food security and nutritional safety among participants, and/or the ecological dimension (POA01 and SAO01) by facilitating environmental education at the site. SAO03 is the only initiative related to the social dimension that is not a community practice. The initiative is managed by an organization with the aim of reintegrating individuals in situations of social vulnerability.

The private practices described in the articles (SSA01 and RIO02) are all related to the economic dimension as their production objective is profitability and/or serving as a supplementary source of income for those who engage in them.

Educational initiatives (NAT01 and SAO01), on the other hand, are more related to the ecological dimension, as their primary objective is environmental education and studies of natural flows. However, there is also an interface with the social dimension by promoting healthy eating, thereby promoting food security and nutritional safety.

The "Revolução dos Baldinhos" (FLN01 and FLN02) is a case that deviates from the typical community initiatives linked to urban poverty, which are usually associated with the social dimension. The initiative primarily focuses on environmental management of solid waste through composting, thus linked to the ecological dimension. However, it is also not a classic case of the ecological dimension because it is not inherently related to the environmental agenda. Environmental management was a necessity to find a local solution to public health issues (leptospirosis contamination). Today, the project is more closely linked to the environmental agenda, with a strong role in environmental education for its participants (BONATTI et al., 2022 - FLN02).

Another noteworthy case is the Manguinhos Garden (RIO01). The social dimension is common in community initiatives, with the program's objective being to "promote social inclusion and improve nutritional health indicators" (HEARN, 2018). However, the distinctive feature of this project lies in addressing the economic dimension as well. The project presents a "business model" structured by the municipality, organized as follows: while the garden depends on subsidies, it must donate part of its production; after becoming self-sustainable, it may sell this portion. Additionally, the article reports that part of the population's engagement with the program was obtained through the payment of a monthly salary to some key participants who work in the garden's daily maintenance, as the need for alternative income sources was a concern for the population.

(b) Intraurban or peri-urban Location:

For this analysis, the authors primarily considered the description of the location. For example, the article that mentions a "community garden on the outskirts of Teresina" (DO ESPÍRITO SANTO SILVA et al., 2020 - THE01) was classified as peri-urban, while the one referring to "located in downtown São Paulo" (SAO03, DAVID et al., 2022), was classified as intraurban. There is a greater volume of articles reporting initiatives in intraurban areas (FLN01, FLN02, NAT01, SSA01, SAO01, SAO02, SAO03, RIO01), totaling 25 initiatives. Initiatives in peri-urban areas were reported in 5 articles (BHZ01, POA01, REC01, THE01, and THE02) and total the highest value, with 48 initiatives. It was not possible to classify the location of the case considered in RIO02, described as "quite urbanized." The article also describes the agriculture practiced in the Maciço da Pedra Branca as "an expression of agriculture in the city" that "even though located in the city, preserves strong traits of rural landscapes and ways of life" (FERNANDEZ and FILHO, 2019), a description close to the idea of peri-urban. The article presents an important debate regarding the location, exposing the views of Almeida (2016) and Mougeot (2000) that the classification of urban agriculture is not related to the location of the phenomenon but its incorporation into urban dynamics (FERNANDEZ and FILHO, 2019). This perspective complicates and challenges the concept of peri-urban since if the classification does not depend on location, the classification of peri-urban agriculture would be based on its lesser interaction with the urban environment rather than its location away from the urban center.

(c) Types of Areas Where it is Practiced (Typology):

It was possible to identify mention of typology in 25 initiatives, divided as follows: 10 in private spaces (nine in SSA01 and one in RIO02); and 15 in common/public spaces (nine in SSA01, RIO02, SAO02, POA01, NAT01, SAO01, FLN02, RIO01, and REC01), with two clearly classified as green areas with some level of environmental preservation as they are close to bodies of water (SAO02 and POA01) and five in institutional areas, with two in universities (NAT01 and SAO01), 1 in a school (FLN02), one in a non-buildable area (RIO01), and REC01 that occurs in federal areas and under high-voltage lines.

Regarding land ownership, SSA01, with a sample of 17 gardens, reports that most initiatives do not operate in a legalized manner (13), implemented in public areas

without land ownership. The report is similar to SAO02, which describes the garden occupying an area under the "guerrilla gardening" tactic and which later secured ownership for the initiative.

In BHZ01 (DALA-PAULO et al., 2018), the studied gardens were described as abandoned areas used as waste dumps, without explaining how these spaces turned into gardens. However, the study shows that the soil presented acceptable values for the studied metals (cadmium, copper, and lead) and indicated that atmospheric deposition is likely an important route for lead to pollute plant leaves.

Five initiatives had their area described, ranging from 162 m^2 (RIO02), a small producer's backyard, to 33 hectares (REC01), unused spaces in the road system. There was a certain pattern in community gardens, with sizes ranging from 800 (SAO02) to 1200m^2 (NAT01), in addition to the Manguinhos Garden, the largest in Latin America, with 2km in length.

(d) Scale and System:

Community production (FLN01 and FLN02, SAO01, POA01, THE01, SSA01, RIO01) overlaps among the types of systems, with few reports (SSA01 and RIO02) of individual production. Within the community production system, it is difficult to classify institutional initiatives, as they are related to the surrounding community. However, the impact of the initiative on the community and participation in educational spaces is collective. There is only one report of a garden (SAO03) belonging to an NGO.

Regarding production systems, some initiatives identify as a type of "non-traditional/conventional" production, such as hydroponic (SAO03) or agroecological and organic (NAT01 and POA01).

(e) Product Destination:

There are reports of products destined for commercialization (RIO01, RIO02, SSA01, and FLN01), totaling 15 initiatives, self-consumption (SSA01 and THE01) with 59, and consumption for the community/donation (SSA01, POA01, RIO01, and FLN01) with 11.

Although not directly associated with economic value like commercialization, self-consumption or donation to the community are always seen as positive aspects of the experiences, often linked to an economic gain, as beneficiaries "buy less food and learn to produce it themselves," as exposed in BONATTI et al (2022) (FLN02).

In initiatives aimed at the learning process, in SAO01, the production is donated for preparations in the institutional kitchen for the students, and in NAT01, the food is directed to the test kitchen of the Nutrition Department.

(f) Product Category:

The most recurring production is vegetables (SSA01, THE02, POA01, NAT01, RIO01, and RIO02). Only two experiences (POA01 and RIO02) process the production. Fruits are mentioned only in the gardens of Salvador (SSA01) and herbs in the Vertical Garden Project (SAO01). Two reports (THE01 and FLN02) mention food production, citing self-consumption as a benefit of production, but without specifying the type of food. And the report SAO03 mentions hydroponic production without specifying if it's fruits, vegetables, or herbs. Among food items, it is important to highlight the production of Neglected and Underutilized Species (NUS) in SSA01.

None of the reports mention animal production.

There are some mentions of "Non-food" production of inputs such as seeds (POA01) and fertilizer in NAT01, FLN01, and FLN02). The Revolution of the Buckets (FLN01) includes soap production.

(g) Type of Economic Activity:

Almost all publications (FLN02, NAT01, POA01, RIO01, RIO02, SSA01, SAO01, SAO03, and THE01), where it was possible to identify the type of economic activity, report the production of some food. Few (FLN01, FLN02, NAT01, and RIO02) report transformation processes, such as composting or processing. Four initiatives develop service activities, such as promoting courses and workshops (POA01), agritourism/visitation (SAO03), and research activity (NAT01 and SAO01). Commercialization activity is mentioned in two initiatives (RIO02 and REC01). One initiative (SAO02) prohibited the commercialization of produced food.

There are initiatives where food production is not the focus. The Revolution of the Buckets (FLN01 and FLN02) stands out as an initiative for composting organic solid waste, with the garden not playing a prominent role in the project reports. However, it can be verified that the project has a garden installed in the community school (FLN02). Also notable are the Vertical Garden Project (SAO01) and LabNutrir (NAT01), which use gardens as learning methods. LabNutrir also has academic production with what is produced in the garden.

5. CONCLUSION

The present article aimed to present the results of a systematic literature review that intended to outline: a) a quantitative overview of recent academic production on Urban and Peri-urban Agriculture (UPA) in Brazil; b) a qualitative analysis of recent academic production on UPAin the capitals of the states and the Federal District.

Regarding the quantitative overview, the data demonstrate that between 2019 and 2021, there was a growth in the number of publications on UPA, indicating an increasing interest from the academic community in the topic. It was also observed that the spatial distribution of the cases mentioned in the articles shows a concentration of cities in the southern and southeastern regions, while there is a low frequency of citations from cities in the central-western, northeastern, and northern regions of the country. The most cited cities in the articles are the most urbanized ones: São Paulo and Rio de Janeiro. The analysis of the occurrence of keywords indicates that, in addition to obvious terms like "Urban Agriculture" and "Brazil," terms such as "Community Gardens," "Sustainability," and "Environment" stand out, highlighting the social and environmental nature of the discussion on UPA in Brazilian capitals.

Regarding the qualitative analysis, the sample reinforces that UPA is a heterogeneous phenomenon. The sample presented initiatives in all dimensions pre-established by the analysis methodology. It is also worth noting the intersection of various dimensions, with a higher occurrence of the ecological dimension over the others. Concerning the characteristics of the initiatives, it can be said that the portrait formed from the sample regarding UPA practiced in Brazilian capitals is as follows: they are predominantly located intraurban, usually carried out in public/common spaces rather than private ones, most initiatives are carried out in a community system, with the production of vegetables intended for self-consumption.

Finally, it is noticed that UPA is an emerging phenomenon that has mobilized society to carry out initiatives with a wide variety of formats and approaches. The academic environment is also attentive to this fact, given the growth in the number of publications on the topic. However, it seems necessary to conduct more comprehensive analyses that seek to synthesize the characteristics of these initiatives. A look in this direction could contribute to public policies that create rules, stimulate, and reinforce UPA in Brazil.

ATTACHMENT A – QUALITATIVE ANALYSES ARTICLES

ID	CAPITAL	TITLE	INITIATIVES	REF
BHZ01	Belo Horizonte (MG)	Cadmium, copper and lead levels in different cultivars of lettuce and soil from urban agriculture	Horta Comunitária do Cafezal (Cafezal) e Jardim Produtivo (Jardim)	DALA-PAULO et al, 2018
FLN01	Florianópolis (SC)	Individuals in Collaborative Governance for Environmental Management	Revolução dos Baldinho	ZAMBRANO-GUTIERREZ et al, 2018
FLN02	Florianópolis (SC)	Social learning as an underlying mechanism for sustainability in neglected communities: The Brazilian case of the Bucket Revolution project	Revolução dos Baldinho	BONATTI et al, 2022
NAT01	Natal (RN)	A Laboratory without walls: biodiversity education in nutrition training using a garden-based learning method	LabNutrir	MOTA et al, 2021
POA01	Porto Alegre (RS)	Education and sustainability: learning in an urban garden	Horta Comunitária da Lomba do Pinheiro	CARVALHO et al, 2021
REC01	Recife (PE)	Peri-urban allotment gardens: A successful experience in Recife/ Pernambuco, Brazil	Alças Comunitárias	SANTOS SILVA et al, 2018
RIO01	Rio de Janeiro (RJ)	Beanstalks and Trust in Chinese and Brazilian Food Systems	Hortas Cariocas - Manguinhos	HEARN, 2018
RIO02	Rio de Janeiro (RJ)	Agricultura familiar urbana	Quintal da Andreia	FERNANDEZ e FILHO, 2019
SAO01	São Paulo (SP)	Vertical Gardens: Sustainability, Youth Participation, and the Promotion of Change in a Socio-Economically Vulnerable Community in Brazil	Vertical Garden Project	SANTOS et al, 2019
SAO02	São Paulo (SP)	A vida cotidiana das hortas comunitárias: casos de Rennes (França) e São Paulo (Brasil)	Horta das Corujas	NAGIB e GIACCHE, 2021

ID	CAPITAL	TITLE	INITIATIVES	REF
SAO03	São Paulo (SP)	Sustainability of urban aquaponics farms: An emergy point of view	Farm B	DAVID et al, 2022
SSA01	Salvador (BA)	Urban gardening and neglected and underutilized species in Salvador, Bahia, Brazil	17 hortas não nomeadas/identificadas no artigo	CUNHA et al, 2020
THE01	Teresina (PI)	Irrigation Water Quality of a Community Garden Complex in the State of Piauí, Northeastern Brazil	45 hortas comunitárias em 10 bairros pobres de Teresina não nomeadas/identificadas no artigo	DO ESPÍRITO SANTO SILVA et al, 2020
THE02	Teresina (PI)	Strategies for Improved Yield and Water Use Efficiency of Lettuce (Lactuca sativa L.) through Simplified Soilless Cultivation under Semi-Arid Climate	Fazenda Nova Esperança	MICHELON et al, 2020

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BCEM: conceptualization, supervision, writing - original draft and writing - review & editing.

CCF: data curation, formal analysis, investigation, methodology, validation and writing - original draft.

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