Planning and Management of Urban Green Areas:
a systematic literature review

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Planejamento e Gestão de Áreas Verdes Urbanas:
uma revisão sistemática de literatura

RESUMO

Objetivo - O presente artigo tem como principal objetivo identificar as contribuições mais relevantes para o planejamento e gestão das áreas verdes, por meio de uma revisão bibliográfica sistemática de artigos científicos nacionais e internacionais publicados entre 2014 a 2024. Assim como, busca oferecer um panorama abrangente do estado da arte no campo da pesquisa científica com enfoque na temática de estudo.

Metodologia - Para a realização desta revisão bibliográfica sistemática, foi adotado o método PRISMA (Principais Itens para Relatar Revisões Sistemáticas e Meta-análises) como referência para seleção e triagem de artigos científicos. As plataformas de pesquisa utilizadas foram o Portal de Periódico CAPES, para seleção das publicações nacionais e o *Web of Science* para as publicações internacionais.

Originalidade/relevância - Embora existam diversos trabalhos que abordam os espaços livres e áreas verdes, poucas pesquisas focam especificamente o planejamento e gestão pública dessas áreas. Nesse sentido, reunir as publicações mais recentes sobre o tema, permitindo a identificação do estado da arte, representa uma importante contribuição para compreender as discussões em andamento nesse campo, bem como para evidenciar possibilidades de aprofundamento e lacunas que a pesquisa científica pode abordar.

Resultados - A pesquisa revelou que o campo de pesquisa relacionado às áreas verdes, ao planejamento e à gestão permanece amplo e ainda pouco explorado, evidenciando a diversidade de abordagens existentes. A maior parte dos artigos consistiram em análises quantitativas e qualitativas sobre espaços livres públicos e áreas verdes em estudos de caso. Outros estudos destacaram-se pela proposição de metodologias de análise e avaliação, além dos artigos que tiveram por objetivo avaliar políticas públicas para gestão de espaços livres. A análise desses artigos permitiu identificar contribuições significativas para proposição de diretrizes e instrumentos de gestão.

Contribuições sociais e ambientais - A pesquisa realizada reforça a importância dos espaços livres públicos, com destaque para as áreas verdes, na promoção da qualidade de vida urbana. Esses espaços desempenham um papel essencial não apenas nos aspectos ecológicos e ambientais, ao contribuírem para a melhoria das condições climáticas, mas também nos aspectos sociais, ao oferecerem oportunidades para atividades de lazer, recreação e convivência. Além disso, são fundamentais para a valorização estética das cidades e para a   promoção da saúde não somente física, como saúde mental da população. O panorama das pesquisas científicas analisadas nesse campo, reforça a necessidade de avanços nas políticas públicas para garantir a efetividade desses benefícios e atender às demandas contemporâneas dos centros urbanos.

PALAVRAS-CHAVE: Revisão bibliográfica sistemática. Áreas verdes. Planejamento e gestão pública.

Planning and Management of Urban Green Areas:
a systematic literature review

ABSTRACT

Objective – The main goal of this article is to identify the most relevant contributions to the planning and management of green areas through a systematic literature review of national and international scientific articles published between 2014 and 2024. Additionally, it aims to provide a comprehensive overview of the state of the art in the field of scientific research with a focus on the study's theme.

Methodology – For the development of this systematic literature review, the PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) was used as a reference for selecting and screening scientific articles. The research platforms used were the CAPES Journal Portal for selecting national publications and the Web of Science for international publications.

Originality/Relevance – Although there are several studies addressing open spaces and green areas, few focus specifically on the planning and public management of these areas. In this sense, compiling the most recent publications on the subject, allowing for the identification of the state of the art, represents an important contribution to understanding ongoing discussions in this field, as well as highlighting opportunities for further research and gaps that scientific research can address.

Results – The research revealed that the field related to green areas, planning, and management remains broad and still underexplored, highlighting the diversity of approaches. Most of the articles consisted of quantitative and qualitative analyses of public open spaces and green areas in case studies. Other studies stood out for proposing

methodologies for analysis and evaluation, in addition to articles aimed at evaluating public policies for the management of open spaces. The analysis of these articles allowed for the identification of significant contributions to the proposal of guidelines and management instruments.

Social and Environmental Contributions – The conducted research reinforces the importance of public open spaces, with a focus on green areas, in promoting urban quality of life. These spaces play a key role not only in ecological and environmental aspects, by contributing to improved climatic conditions, but also in social aspects, by offering opportunities for leisure, recreation, and social interaction. Furthermore, they are essential for the aesthetic enhancement of cities and for promoting health, not only physical health but also mental health of the population. The overview of the scientific research analyzed in this field highlights the need for advances in public policies to ensure the effectiveness of these benefits and meet the contemporary demands of urban centers.

KEYWORDS: Systematic literature review. Green areas. Planning and public management.

Planificación y Gestión de Áreas Verdes Urbanas:
una revisión sistemática de la literatura

RESUMEN

Objetivo – El objetivo principal de este artículo es identificar las contribuciones más relevantes para la planificación y gestión de las áreas verdes, mediante una revisión bibliográfica sistemática de artículos científicos nacionales e internacionales publicados entre 2014 y 2024. Además, busca ofrecer un panorama integral del estado del arte en el campo de la investigación científica con enfoque en la temática de estudio.

Metodología – Para la realización de esta revisión bibliográfica sistemática, se adoptó el método PRISMA (Elementos Principales para Reportar Revisiones Sistemáticas y Meta-análisis) como referencia para la selección y cribado de artículos científicos. Las plataformas de investigación utilizadas fueron el Portal de Periódicos CAPES para la selección de publicaciones nacionales y el Web of Science para las publicaciones internacionales.

Originalidad/Relevancia – Aunque existen diversos trabajos que abordan los espacios libres y las áreas verdes, pocas investigaciones se centran específicamente en la planificación y gestión pública de estas áreas. En este sentido, reunir las publicaciones más recientes sobre el tema, permitiendo la identificación del estado del arte, representa una contribución importante para comprender las discusiones en curso en este campo, así como para evidenciar posibilidades de profundización y vacíos que la investigación científica puede abordar.

Resultados – La investigación reveló que el campo de investigación relacionado con las áreas verdes, la planificación y la gestión sigue siendo amplio y aún poco explorado, lo que pone de manifiesto la diversidad de enfoques existentes. La mayoría de los artículos consistieron en análisis cuantitativos y cualitativos sobre espacios públicos libres y áreas verdes en estudios de caso. Otros estudios se destacaron por la proposición de metodologías de análisis y evaluación, además de los artículos que tuvieron como objetivo evaluar políticas públicas para la gestión de espacios libres. El análisis de estos artículos permitió identificar contribuciones significativas para la proposición de directrices e instrumentos de gestión.

Contribuciones sociales y ambientales – La investigación realizada refuerza la importancia de los espacios públicos libres, con énfasis en las áreas verdes, en la promoción de la calidad de vida urbana. Estos espacios desempeñan un papel esencial no solo en los aspectos ecológicos y ambientales, al contribuir a la mejora de las condiciones climáticas, sino también en los aspectos sociales, al ofrecer oportunidades para actividades de ocio, recreación y convivencia. Además, son fundamentales para la valorización estética de las ciudades y para la promoción de la salud, no solo física, sino también mental de la población. El panorama de las investigaciones científicas analizadas en este campo refuerza la necesidad de avances en las políticas públicas para garantizar la efectividad de estos beneficios y atender a las demandas contemporáneas de los centros urbanos.

PALABRAS CLAVE: Revisión bibliográfica sistemática. Áreas verdes. Planificación y gestión pública.

1 INTRODUCTION

Green areas play an important role in both environmental balance and the quality of the built environment in urban settlements (Lima; Amorim, 2011). The intense process of urbanization, combined with the configuration of cities, has generated significant impacts, such as the increase in impervious surfaces, the reduction of tree cover, the rise in urban temperatures, pollution of watercourses, worsening air and noise pollution, and the scarcity of green spaces for leisure, recreation, and social interaction, among others. In this context, the presence of urban green areas has become increasingly essential to ensure quality of life in urban centers.

Bartalini (1986) highlights three main functions performed by open spaces and green areas in urban centers: qualities related to the visual aspect, recreational values, and environmental function. According to the author, regarding the visual aspect, these areas are essential for creating the identity of places and promoting landscape quality. In environmental terms, green areas contribute to urban tree coverage, providing more shaded areas, improving air quality, reducing temperatures, and aiding in the preservation of flora and fauna species. As for recreational value, they are crucial in creating pleasant spaces for leisure activities and are important for promoting physical activities. Hoffmann (2017) emphasizes that outdoor activities have a positive influence on individuals' mental health, highlighting the multifaceted relevance of green areas for urban quality of life.

In this context, although green areas play an essential role in mitigating environmental impacts and reducing natural disasters, such as floods and severe droughts, their effectiveness has been insufficient for them to occupy a priority position in urban planning, both in the Brazilian context and in other global contexts. This reality is evidenced by various international literatures, analyzed in this research. Therefore, understanding how the planning and management of green areas have been conducted in different urban contexts is essential for the development of guidelines and tools capable of promoting more effective and efficient management. These efforts are crucial for enhancing green areas, both in their environmental and social aspects.

This systematic literature review aims to contribute to the understanding of the discussions and approaches present in scientific research on the planning and management of green areas, both in the Brazilian and international contexts, highlighting the main contributions developed in this research field.

1.2 Open Spaces and Green Areas: A Brief Conceptualization

Considering that there are different conceptualizations of open spaces and green areas, this article aims to briefly clarify the main concepts adopted by the authors studied throughout the research.

According to the Brazilian Ministry of the Environment (2024), urban green areas are characterized by the presence of vegetation cover, which can be arboreal, shrubby or creeping

– which can be native or introduced, and which contribute in some way to improving quality. of life in cities. However, this definition is not unanimous in academia. Some scholars, such as Lima et al. (1994), argue that green areas would be, specifically, those with a predominance of tree vegetation. In this research, we opted for a broader approach, not limiting the concept of green areas, but considering it as any urban space, public or private, that has vegetation cover. The precise definition of the term will be further discussed throughout this analysis, according to the focus of the research covered.

Another central concept in this study is that of open spaces or free areas. According to Magnoli (2006), open spaces are those without buildings and can be either public or private, presenting various configurations such as squares, parks, backyards, waterfronts, and streets. These spaces are of great importance in the field of landscape architecture, as pointed out by Queiroga (2007). The author emphasizes that, in a broader perspective, open spaces form an integrated system, characterized by connectivity, complementarity, and hierarchy among its different parts. In this context, green areas play an important role as fundamental components of this system of open spaces.

Assim, nesta revisão bibliográfica, optou-se por adotar os dois termos – *áreas verdes* e *espaços livres* – para abranger a totalidade dos elementos relevantes para o planejamento e gestão urbana. Embora o foco principal da pesquisa esteja nas áreas verdes vegetadas, a inclusão dos espaços livres em geral é crucial para uma compreensão mais abrangente dos aspectos relacionados à qualidade ambiental e ao planejamento urbano. Vale destacar que, embora o estudo se concentre nas áreas públicas, pois estas são de responsabilidade direta do poder público em termos de gestão, os espaços livres privados também desempenham um papel crucial na análise da qualidade ambiental das áreas verdes urbanas como veremos nos artigos analisados.

In this literature review, both terms – *green areas* and *open spaces* – were adopted to encompass all relevant elements for urban planning and management. While the primary focus of the research is on vegetated green areas, the inclusion of open spaces in general is crucial for a more comprehensive understanding of aspects related to environmental quality and urban planning. It is worth noting that, although the study focuses on public spaces, as they are directly managed by the government, private open spaces also play a crucial role in the analysis of the environmental quality of urban green areas, as we will see in the analyzed articles.

2 OBJECTIVES

The main objective of this study is to identify the most significant contributions to the planning and management of green areas through a systematic literature review of national and international scientific articles published between 2014 and 2024. Additionally, it aims to provide an overview of the state of the art in scientific research focused on this specific topic.

3 METHODOLOGY

To ensure the inclusion of relevant discussions in both the Brazilian and international contexts, the literature search was conducted using the databases of the *Periódico Capes* and Web of Science. The construction of the selection criteria flowchart followed the PRISMA method (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). To this end, the review was structured in the following stages: 1) Identification, 2) Screening, 3) Eligibility, and 4) Inclusion, as presented in Figure 01.

Only scientific articles that address the planning and management of public green areas and public open spaces were selected.

3.1 Justification for the Terms of the Research

An initial search conducted on Google Scholar allowed for the identification of the most commonly used terminologies in the field of study, which guided the selection of keywords to be used for article searches in the chosen databases. Given the abundance of research and studies related to open spaces and green areas, it was essential to complement the keywords with Boolean operators to refine the results. The expressions used were: "Espaços livres públicos" OR "áreas verdes" AND "planejamento" OR "gestão". The boolean operators OR and AND were employed to ensure the selection of articles addressing plans or planning or management of public areas and/or green areas. These keywords were used in the *Periódico Capes* database. For the international search in Web of Science, the following terms in English were used: *("Open spaces" OR "public open spaces" OR "green areas" OR "public green areas")* *AND* (*"public police" OR "Management" OR plan*). The use of parentheses was avoided in the search on national platforms, as it limited the search and did not yield a satisfactory number of articles.

Figure 1 - Graphical flowchart of the PRISMA method
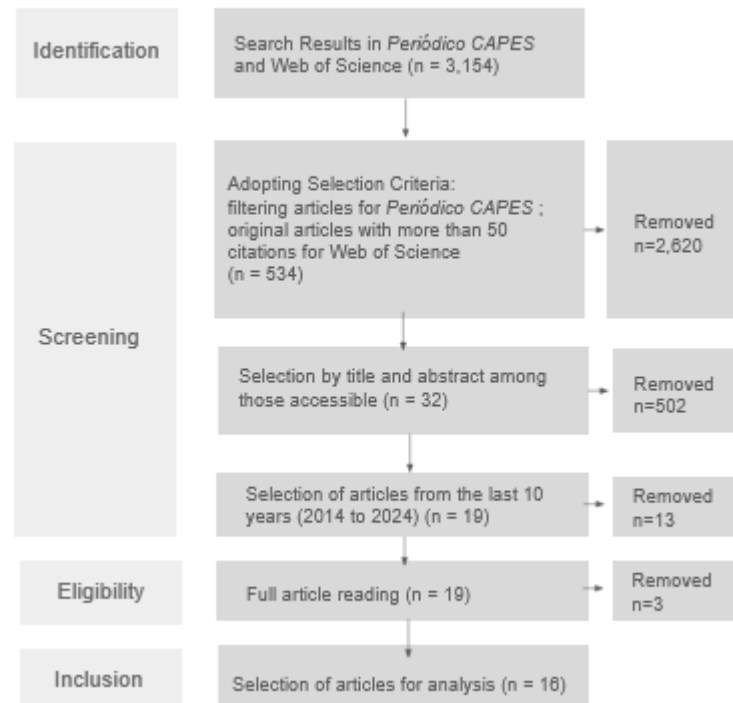
Source: Own authorship, following the PRISMA model, 2024.

Below, each step of the review process based on the PRISMA method will be presented.

3.2 identification of articles

For this step, searches were conducted in two databases: *Periódico Capes* and Web of Science. The initial search resulted in 3,154 identified titles. The search strategy was crucial to achieving this volume of results. In the Capes Periodical portal, a search was conducted with the result expansion feature to select the maximum number of titles possible. In the Web of Science portal, the search was carried out using the Search of Topic (TS) feature, where the selected topic indicates that the search was performed using the title, abstract, and keywords of the articles, ensuring a more specific and relevant scope. Below, Table 01 presents the search data for each database.

Table 1 - Number of articles found with the keywords and Boolean operators used.

Database	Keywords	Type of Search	Amount
Periódicos CAPES	"Espaços livres públicos" OR "áreas verdes" AND "planejamento" OR "gestão"	Expansão dos resultados	354
Web of Science	*("Open spaces" OR "public open spaces" OR "green areas" OR "public green areas") AND ("public police" OR "Management" OR plan)*	TS	2.800
Total articles found			**3.154**

Source: own authorship (2024).

3.3 Screening

The screening process involves determining the number of remaining articles after the removal of duplicates and the exclusion of items based on their titles and abstracts. In the *Periódico CAPES* database, the "*Artigos*" filter was applied to refine the search, ensuring that only scientific articles published in journals were considered. This process resulted in the identification of 305 articles, after eliminating 49 titles that did not meet the established criteria.

In the search conducted on Web of Science, the "original articles" filter was initially applied, which resulted in the exclusion of 544 articles, reducing the total to 2,256. Given the still large volume of articles found, it was decided to further refine the selection to include only those with more than 50 citations, resulting in 233 articles, with 2,223 articles being discarded. The results of the first screening are presented in the following table:

Table 2 - Number of articles found in the first screening

Database	Criterion	Amount
Periódicos Capes	Filter "Artigos"	301
Web of Science	Original Articles + Articles with more than 50 citations	233
Total articles found		534

Source: own authorship, 2024.

After completing the first phase of screening, a total of 534 articles were identified. The next step involved reading the titles and abstracts to select the articles that met the research objective: to present content related to the planning and management of public open spaces and green areas.

Of the 301 articles initially filtered from the Capes Periodical, access was only available to 265 articles, resulting in a total of 494 articles reviewed.

Based on the reading of titles and abstracts, 20 articles were selected from Web of Science and 22 from the Capes Periodical, totaling 32 articles. From these selected articles, the decision was made to choose those published in the last decade, between the years 2014 and 2024, in order to have more up-to-date data on the topic. By applying this criterion, a total of 19

articles were selected for full-text reading. The following table presents the titles of the selected articles.

3.4 Eligibility

For this stage, which consists of the full review of the selected articles, it was necessary to identify the analysis criteria that should be evaluated to effectively select those that meet the research objective. The following criteria were chosen for this purpose:

- **Objective:** Understand the main objective of the research.
- **Main Results:** Highlight the main findings presented in the article.
- **Planning and Management Guidelines and Tools:** Identify the contributions of the articles for the development and identification of planning and management guidelines and tools that could support a public green space system.

Based on the established criteria, 16 articles were selected for analysis, which corresponds to the inclusion stage according to the PRISMA method, and will be presented in the following section.

4 RESULTS

Based on the readings conducted, it was identified that only four articles had the central objective of researching, analyzing, or discussing models of planning and management of green areas. The others addressed these topics indirectly, focusing on propositional actions, with the main goal of developing methodologies for the mapping and quantitative and qualitative assessment of green areas, aiming to guide public policies. These efforts aim to inform effective public policies. Furthermore, at various levels of depth, these articles discuss, to a greater or lesser extent, the public policies related to the existing open spaces in the case studies presented.

Thus, in the data systematization, it was possible to identify that some articles share similar objectives. Based on these similarities, the articles were grouped into three distinct thematic categories:

- **Thematic Group 1 - Proposing methods for systematization and analysis of green spaces**: This group includes articles aimed at establishing methodologies for the analysis of open spaces and green areas.
- **Thematic Group 2 - Evaluation of public policies for green areas**: The articles identified in this group propose an analysis of master plans and public policies.
- **Thematic Group 3 - Quantitative and qualitative analysis of green areas:** This group includes articles that propose a comprehensive analysis of green areas, addressing both the quantitative aspect, in terms of distribution, and the qualitative aspect, considering factors such as use, landscape configuration, and environmental quality through case studies.

Next, four tables will be presented, each organized according to the thematic groups previously established. These tables identify the objectives of each article, the results achieved, as well as the contributions for the development of proposed planning and management guidelines and tools.

4.1 Thematic Group 1 - Proposing methods for systematization and analysis of green spaces:

Of the 16 articles analyzed, 5 articles were classified into this group, organized in the following table.

Table 3 - Summary of articles in the Thematic group 01

Thematic Group 1 - Proposing methods for systematization and analysis of green spaces			
Citation	**Objective**	**Result**	**Guidelines for Planning and Management Instruments**
SANTOS, R. G.; FERREIRA, M. F. M. (2017)	Proposal of a qualitative index for the analysis of green areas in Poços de Caldas-MG, Brazil.	Creation of the "Public Green Areas Qualitative Index"	Instrument for the quantitative and qualitative evaluation of green areas, considering aspects such as comfort, leisure, accessibility, socialization, maintenance, and tree cover.
BARÓ, F. *et al.* (2016)	Present a framework for mapping and evaluating ecosystem services to assist in the planning of green areas.	The study proved to be efficient and reveals that the existing landscape planning only protects areas of high capacity.	The mapping of capacity contributes to urban and landscape planning by considering ecological and social factors.
MONTIS, Andrea de. *et al.* (2016)	Propose a methodological framework based on network modeling for the study of ecological networks to evaluate urban scenarios based on the Master Plan of the city of Sardinia, Italy.	Mapping with land occupancy simulation based on the definitions of the Master Plan.	Evaluation of scenarios based on the legislation established for ecological networks, using a spatial analysis methodology of ecological networks to assist in urban planning.
MADUREIRA, H., ANDRESEN, T. (2014)	Development of a method to detect spatial priority areas for green infrastructure planning, taking into account multifunctionality	Multifunctionality should be considered a stage to be achieved through a decision-making process.	Planning for multifunctional green infrastructure requires local evaluation for its adaptation to the environmental, social, cultural, economic, and institutional context.
BELMEZITI, A.; CHERQUI, f.; KAUFMANN, B. (2018)	Relating expected urban services, planning, and maintenance through the concept of multifunctionality.	Creating a relationship between green space components and urban services linked to green infrastructure, and its application on the university campus of Doua, Lyon, France.	Multifunctionality of green areas, aiming to concentrate the maximum number of urban services within a limited green space.

Source: Own authorship (2024)

The analyzed articles aimed at proposing methodologies for the analysis of green areas, such as the study by Santos and Ferreira (2017), who proposed a qualitative index. Two other studies, by Baró et al. (2016) and Montis et al. (2016), developed mapping methodologies for the analysis and evaluation of open spaces and green areas. Notably, the article by Montis et al. (2016) conducted an evaluation through network modeling in the simulation of land-use scenarios based on guidelines from the Master Plan, aiming to identify the connectivity of green areas through the application of the proposed planning for the city of Sardinia, Italy. This work highlights the importance of using computational technologies and mapping tools to validate planning and management proposals or even assess existing public planning. Similar methods can become important tools in urban planning.

Two other articles by Madureira and Andresen (2014) and Belmeziti, Cherqui, and Kaufmann (2018) addressed the multifunctionality of green areas. This concept is based on the premise that a single green area can perform multiple functions, such as ecological functions and urban drainage regulation, while also serving as a space for leisure and recreation.

The article by Belmeziti, Cherqui, and Kaufmann (2018) proposes a method for identifying multifunctional green areas to support urban planning. Given the scarcity of public open spaces and green areas in urban centers, this method aims to address this issue by identifying areas that can fulfill multiple functions. Additionally, two other articles by Madureira and Andresen (2014) and Belmeziti, Cherqui, and Kaufmann (2018) addressed the multifunctionality of green areas. This concept is based on the premise that a single green area can perform multiple functions, such as ecological functions and urban drainage regulation, while also serving as a space for leisure and recreation.

The proposal aims to optimize the use of existing green spaces by identifying the maximum number of urban services that can be provided in a given green area. The analysis tool also focuses on creating typologies and classifications of green areas with this objective. This approach is particularly relevant in densely populated urban centers, highlighting the importance of planning green spaces alongside green infrastructure, integrating ecological, infrastructure, and collective public use aspects.

In this regard, Madureira and Andresen (2014) also highlight the relevance of the multifunctionality of green areas. However, the authors emphasize that the planning of multifunctional green infrastructure must take into account a comprehensive assessment that includes the environmental, social, cultural, economic, and institutional contexts of each specific reality. In other words, multifunctionality should be applied as a management tool subject to continuous evaluation, adapting to the specific needs of each location.

The articles selected within this thematic line presented important tools that can be used in the survey, study, analysis, and evaluation, directly contributing to planning and the formulation of guidelines, as well as the definition of management instruments. These tools go beyond the preliminary analysis of green space plans, being essential for continuous evaluation focused on the management and constant maintenance of these areas. Thus, they play a crucial role not only in the initial planning but throughout the entire management process of green areas.

4.2 Thematic Group 2 - Evaluation of public policies for green areas

In this group, 5 articles were identified that focus on the evaluation and proposal of public policies aimed at green areas.

Table 4 - Summary of Articles in Thematic Group 02

Thematic Group 2 - Evaluation of public policies for green areas			
Citation	Objective	Result	Guidelines for Planning and Management Instruments
MOTA, M. T. de; et al. (2016)	Propose a categorization of Open Spaces for the creation of a municipal system.	Creation of a System for Green Areas in Sorocaba/SP: Public Participation and Government Engagement.	Systematization (identification and classification) of Open Spaces for improved planning and management: A participatory process involving universities, the population, and public authorities.
ALMEIDA, R. L.; SILVA, D. N. de B.; GUIMARÃES, J. de C. (2022)	Analysis of the Master Plan of Teresina/PI regarding Open Spaces.	Lack of clear guidelines for public spaces in the new Master Plan of Teresina.	Integration of master plans with other planning instruments, such as Mobility Plans, for more effective guidelines for Open Public Spaces; Urban instruments from the City Statute as a means to define new public open spaces in cities.
GOMES, M. A. S. (2023)	Analyze the areas designated for public parks in the city of Uberaba/MG that are included in the Master Plan but have not been implemented.	More than half of the areas designated for public parks in Uberaba have not been implemented.	Continuous revision of plans for the implementation of parks and other green areas.
GREEN, O. O. et al. (2016)	Present the proposal for adaptive governance of green spaces through the use of vacant lots in post-industrial North American cities.	Proposal for the use of vacant lots to promote activities such as drainage, afforestation, planting, and pollination gardens, among others.	Use of idle areas, participation in a collaborative network, continuous evaluation and monitoring: Adaptive governance.

Source: Own authorship (2024)

The article by Mota et al. (2016) could also be classified as a methodological proposition since it aims at the systematic categorization of public open spaces in the city of Sorocaba/SP. However, the article highlights the contribution of public authorities and popular participation, which resulted in a bill for the creation of an open space system for the city. For this reason, it was understood as a public policy proposition, important for demonstrating the relationship between scientific research as a technical basis for the categorization of green areas and its transformation into a public policy proposal. The authors emphasized the challenges faced by public authorities; even after the creation of the law for the public open space system in Sorocaba, little progress has been made in managing these spaces. This underscores the need

for management that goes beyond laws and master plans, requiring municipal organization that truly promotes the effectiveness of actions.

he articles by Almeida, Silva, and Guimarães (2022) and Gomes (2023) evaluated public policies related to the Master Plan, focusing on the cities of Teresina/PI and Uberaba/MG, respectively. Almeida, Silva, and Guimarães (2022) analyzed the new Master Plan of Teresina, particularly regarding public open spaces, and identified the absence of clear and objective guidelines for these areas. Additionally, they emphasized the importance of integrated planning, aligning the Master Plan with other plans, such as the mobility plan.

The issue highlighted by the authors reveals a common flaw in urban planning: the lack of alignment between proposals and guidelines, which compromises the effectiveness of public policies and the coordination among different planning sectors. Furthermore, the authors pointed out the importance of considering urban instruments from the City Statute (Federal Law N. 10,257/2001) as tools for defining new public open spaces. While this proposal is still under study, it is of great significance given that public open spaces are essential for collective quality of life in urban centers.

Gomes (2023) conducted an analysis of urban parks based on the provisions of the Master Plan of the city of Uberaba. The author identified that most of the planned parks were not actually implemented, while other parks created in the city were not included in the city's planning. The author suggests that this may sometimes be linked to the interests of the real estate market, highlighting the conflicts of interest associated with the implementation of green spaces such as public parks and the lack of planning that is effectively put into practice.

In light of these issues, a parallel can be drawn with Villaça's (1999) critique of Master Plans. According to the author, these plans often serve merely to meet the formalities required by the Constitution and federal legislation, without fulfilling their effective role of guiding urban development in a way that benefits the collective good. The ineffectiveness of Master Plans is evident, especially considering that, in many cases, public open spaces are not even addressed.

When mentioned, as in the case of Uberaba, where parks were included in the Master Plan, this planning has failed to function as an effective guide for public authorities' actions. In this context, it is important to emphasize that, beyond the inefficacy of public management in implementing the plans, there is also a lack of periodic review of these plans. Such reviews are essential to adapt them to the ever-changing dynamics of urban areas, ensuring that planning remains relevant and effective over time.

Another article from this thematic group, Green et al. (2016), sought to analyze the proposal for adaptive governance related to the use of private open spaces, such as lots and vacant land in cities in the United States. Although the focus of this systematic review is not on private open spaces, understanding their role in systemic planning is important, as they significantly contribute to improving urban quality of life through permeable yards, afforestation, and landscaping.

In this context, the article highlights the importance of utilizing idle areas in urban centers for tree planting and floral vegetation that promote pollination, enhance urban ecology, and improve permeability, among other benefits. Green et al. (2016) emphasize the importance of collaborative network participation to make this proposal effective, accompanied by constant

evaluation and monitoring. Adaptive governance is presented as essential to addressing current urban demands, which often fail to allocate sufficient green spaces to maintain adequate environmental quality in urban centers.

4. 3 Thematic Group 3 - Quantitative and qualitative analysis of green areas

In this thematic group, 7 out of the 16 analyzed articles were classified. These articles focused on the quantitative and qualitative aspects of open spaces and green areas. Although their primary focus was on analysis, the studies also provided significant contributions to the planning and management of these spaces, even if not as the main emphasis. For this reason, it was deemed important to include them in this analysis.

Table 5 - Summary of articles in the Theme 03 group

Thematic Group 3 - Quantitative and qualitative analysis of green areas			
Citation	Objective	Result	Guidelines for Planning and Management Instruments
BALDISSARELLI, M.; LENHARD, M.; WEISS, R. (2023)	Analyze intra-lot open spaces in the city of Santa Maria/RS from the perspective of Landscape Ecology.	The importance of private open spaces in improving the environmental and landscape quality of urban centers.	Open spaces understood as a system, integrating private spaces in contributing to environmental quality. Regulation of private open spaces concerning vegetation permeability indices.
MONTEZUMA, R. DE C. M. (2021)	Analysis of urban space production based on open spaces in Jacarepaguá/RJ.	Socio-environmental conflicts in access to the benefits of green areas	Democratization of the distribution and provision of public open spaces to promote equity.
RAMOS, L. L. A.; PALHANO, P. S. T.; RAMOS, S. R. (2019)	Analyze green area in Vila Velha, ES.	Lack of equitable distribution of green areas.	Mapping and green area indices for the evaluation and proposal of green spaces, considering potential public and private areas.
COCCO, R. M.; WEISS, R.; AITA PIPPI, L. G. (2024)	Conduct a quantitative and qualitative analysis of leisure and recreational open spaces in the city of Santa Maria/RS using Multi-Criteria Analysis.	Multi-criteria map identifying potential areas for the implementation of leisure and recreational open spaces based on the following criteria: Permanent Preservation Areas, special natural areas, urban voids, population, income, open spaces of historical and cultural interest, and circulation open spaces.	Mapping of potential areas to be designated for leisure and recreation based on a data cross-analysis.

HOFFMANN, E. ; BARROS, H.; RIBEIRO, A. I. (2017)	Investigate socioeconomic inequality in geographic accessibility and the quantity of green spaces in the city of Porto (Portugal).	Green spaces in the most deprived neighborhoods significantly reflect concerns about safety, signs of damage, lack of equipment for leisure activities, and fewer community amenities such as seating, restrooms, etc.	Urban planning as a promoter of socio-environmental justice through the distribution, implementation, and maintenance of green areas in underserved areas.
PIETRZYK-KASZYNSKA, Agata. et al. (2017)	Urban planning as a promoter of socio-environmental justice by ensuring the equitable distribution, implementation, and maintenance of green areas in underserved communities.	Difference in the valuation of formal and informal green spaces.	Inclusion of informal green spaces in green space governance. Social participation.
LI, F. et al. (2019)	Understand the process of green space fragmentation in Beijing, China, through a spatial-temporal perspective.	The research revealed that urbanization processes within the city of Beijing influenced the spatial patterns of urban greenery over different periods, with rapid city growth leading to the occupation of green areas and subsequent fragmentation.	Continuous and effective evaluation of green spaces is necessary for the revision of policies, planning, and implementation.

Fonte: Autoria própria (2024)

Hoffman, Barros, and Ribeiro (2017), Montezuma (2021), and Ramos, Palhano, and Ramos (2019) address the spatial distribution of open spaces associated with socioeconomic inequality. The analyses conducted by these authors contribute to understanding the conflicts arising from the concentration of open spaces and green areas in central and more affluent urban areas.

Hoffman, Barros, and Ribeiro (2017), in their case study of the city of Porto, Portugal, highlight the neglect of these public spaces, as well as issues of insecurity and a lack of facilities to enhance the quality of open spaces as important public environments for leisure and recreation. Similarly, Montezuma (2021) underscores the same problems in her case study of Jacarepaguá/RJ, emphasizing that while green areas are essential for urban quality of life from an environmental perspective, their distribution must be more equitable in cities.

Despite urbanistic and cultural differences, the issues of poor distribution of open spaces and green areas and their degradation in urban peripheries are recurring. Ramos, Palhano, and Ramos (2019) suggest using a green area index as a tool for evaluating and planning the distribution of these spaces, guiding the identification of potential areas for their implementation. In this context, the contributions to formulating planning and management

guidelines lie in democratizing the distribution of public open spaces, promoting socio-environmental justice.

Baldissarelli, Lenhard, and Weiss (2023) and Cocco, Weiss, and Aita Pippi (2024) conduct a case study analysis in the city of Santa Maria, Rio Grande do Sul. Their work focuses on analyzing intra-lot open spaces, considering them as a viable solution to increase afforestation and improve environmental quality in urban areas lacking vegetated public open spaces.

Although these spaces are privately owned, the article emphasizes the importance of integrating them into the general open space system. It also highlights the significance of municipal legislation that promotes permeability and afforestation rates and indices for private open spaces as an integral part of planning an open space system with a focus on environmental quality.

Li et al. (2019) present an important analysis of open spaces on a regional scale, focusing on the fragmentation process of green areas in Beijing, China. In the context of a highly dense metropolis, rapid urban growth has failed to prevent the city's expansion into green area reserves. The study adopted a spatial-temporal approach, investigating the history of urban occupation to understand how the fragmentation of green areas occurred alongside the expansion of the urban grid. The research highlighted the extent to which public policies have failed to preserve green areas designated for conservation, underscoring the importance of continuous and rigorous evaluations in urban planning.

Another important aspect of public planning and management is social participation. In this context, Pietrzyk-Kaszynski et al. (2017) proposed an evaluation of green areas based on user perceptions, aiming to understand the values and attributes people associate with these spaces. Using a mapping platform, the research highlighted the perspective of the users themselves, revealing that open spaces with public access but private ownership met the population's demands. This underscores the importance of considering people's perceptions in formulating urban plans that reflect residents' desires and in implementing effective governance for the management of open spaces and privately-owned green areas.

The articles classified in this group provide valuable contributions to understanding the analyses of open spaces and green areas in both national and international cities. They reveal the inefficiency of policies and public management in promoting higher quality for these spaces, highlighting failures in distribution, access, and maintenance, as observed in the case of Beijing.

Therefore, the importance of constant revisions to urban planning, more inclusive management, and the incorporation of public participation is emphasized.

4.4 Summary of Results

In this context, all the articles presented a diversity of themes related to public open spaces and green areas, addressing aspects of planning and management. This diversity allowed for the identification of various contributions toward proposing more effective management guidelines and tools, such as:

- Highlighting the importance of green areas for urban quality of life, both environmentally and socially;
- Utilizing analytical methodologies, indices, and mapping as important tools for evaluation, serving as a basis for defining planning and management guidelines;
- Integrating the planning of open spaces and green areas with other urban management plans;
- Emphasizing the need for continuous evaluation of existing green areas and planning to ensure the continuity of management processes and adaptations when necessary;
- Aligning the multifunctionality of green areas with the promotion of environmental and social quality;
- Ensuring equitable distribution and maintenance of green areas to promote socio-spatial justice;
- Adopting a systematic approach to planning and management that also considers the role of private open and green spaces.

5 CONCLUSIONS

This systematic literature review revealed that, despite varying global realities, open spaces and green areas remain a significant challenge for urban planning and public management. Furthermore, much progress is still needed to ensure the effectiveness and efficiency of maintaining public spaces that meet environmental, landscape, and social quality requirements, particularly from the perspective of collective use.

The analyzed articles highlighted the importance of open spaces in urban centers and presented various relevant tools to support research, analyses, planning, and public management. The review also underscored the need for continuous evaluations and revisions of these plans to keep pace with the ever-evolving dynamics of urban areas.

This analysis provided an overview of public open spaces, focusing on planning and management, highlighting important aspects that can be applied to improve the quality and effectiveness of public management actions. However, these aspects need to be further explored in future studies and analyses.

The review also revealed significant contributions to the development of guidelines and management tools that could lead to more effective plans and legislation.

Finally, the research demonstrated a continued scarcity of specific studies in urban planning and green area management, underscoring the need for further investigations in this field. This is crucial for enhancing the understanding and practice of managing these vital urban spaces.

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DECLARAÇÕES

CONTRIBUIÇÃO DE CADA AUTOR

Ao descrever a participação de cada autor no manuscrito, utilize os seguintes critérios:

- **Concepção e Design do Estudo**: Informe quem teve a ideia central do estudo e ajudou a definir os objetivos e a metodologia. Jeane Aparecida Rombi de Godoy e Priscila Wolff Sampaio Santiago
- **Curadoria de Dados**: Especifique quem organizou e verificou os dados para garantir sua qualidade.
- **Análise Formal**: Indique quem realizou as análises dos dados, aplicando métodos específicos. Priscila Wolff Sampaio Santiago
- **Aquisição de Financiamento**: Identifique quem conseguiu os recursos financeiros necessários para o estudo. Não houve.
- **Investigação**: Mencione quem conduziu a coleta de dados ou experimentos práticos. Os dados foram selecionados por plataformas digitais por Priscila Wolff Sampaio Santiago.
- **Metodologia**: Aponte quem desenvolveu e ajustou as metodologias aplicadas no estudo. A metodologia usada já era existente.
- **Redação - Rascunho Inicial**: Indique quem escreveu a primeira versão do manuscrito. Priscila Wolff Sampaio Santiago
- **Redação - Revisão Crítica**: Informe quem revisou o texto, melhorando a clareza e a coerência. Jeane Aparecida Rombi de Godoy
- **Revisão e Edição Final**: Especifique quem revisou e ajustou o manuscrito para garantir que atende às normas da revista. Jeane Aparecida Rombi de Godoy
- **Supervisão**: Indique quem coordenou o trabalho e garantiu a qualidade geral do estudo. Jeane Aparecida Rombi de Godoy

DECLARAÇÃO DE CONFLITOS DE INTERESSE

Nós, **Priscila Wolff Sampaio Santiago e Jeane Aparecida Rombi de Godoy**, declaramos que o manuscrito intitulado "**Planejamento e Gestão de Áreas Verdes Urbanas: uma revisão sistemática de literatura**":

1. **Vínculos Financeiros**: Não possui vínculos financeiros que possam influenciar os resultados ou interpretação do trabalho.

2. **Relações Profissionais**: Não possui relações profissionais que possam impactar na análise, interpretação ou apresentação dos resultados

3. **Conflitos Pessoais**: Não possui/possui conflitos de interesse pessoais relacionados ao conteúdo do manuscrito.