URBAN PARKS AS INSTRUMENTS FOR SOCIO-ENVIRONMENTAL PLANNING AND PUBLIC POLICY: A SYSTEMATIC REVIEW

PARQUES URBANOS COMO INSTRUMENTOS PARA O PLANEJAMENTO SOCIOAMBIENTAL E POLÍTICAS PÚBLICAS: UMA REVISÃO SISTEMÁTICA

PARQUES URBANOS COMO INSTRUMENTOS PARA LA PLANIFICACIÓN SOCIOAMBIENTAL Y LAS POLÍTICAS PÚBLICAS: UNA REVISIÓN SISTEMÁTICA

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ABSTRACT

This study sought to analyze urban parks by assessing their contributions to sustainability, social justice, and community well-being. The research was conducted through a systematic review structured according to the PRISMA 2020 protocol, including bibliometric and bibliographic analyses of international databases (Scopus and Web of Science) covering the period from 2020 to 2025. The tools used included Rayyan for screening and duplicate exclusion; VOSviewer and Bibliometrix for bibliometric analysis; and Zotero, Mendeley, and Excel for reference management and organization. Five questions guided the study in order to achieve its objective: (i) which dimensions are addressed by recent research on sustainable urban parks? (ii) what are the main themes discussed within these dimensions? (iii) which methodologies and analytical tools have been applied? (iv) which conceptual and methodological gaps remain in the literature? and (v) which future research directions can be suggested? A total of 61 highly relevant articles were selected, confirming that parks function as instruments of social inclusion, health promotion, and mitigation of environmental impacts, while also fostering sustainability. In response to the proposed questions, the review showed that recent studies on urban parks have increased, particularly those addressing health, sociospatial justice, quality, management, and socioeconomic impacts, and discussing themes such as mental health, accessibility, green gentrification, and civic participation. Although diverse methodologies have been applied, gaps persist, including the limited number of longitudinal studies, differences between developed and developing countries, lack of maintenance and safety, and the absence of studies on the effects of parks as therapeutic spaces for neurodivergent populations. It is concluded that urban parks should

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be recognized as critical infrastructures for public health, social inclusion, and climate resilience.

Keywords: Urban Parks. Green Infrastructure. Sustainability. Environmental Justice. Smart City. Urban Planning.

RESUMO

Este estudo buscou analisar os parques urbanos, avaliando suas contribuições para a sustentabilidade, a justiça social e o bem-estar comunitário. A pesquisa foi conduzida por meio de uma revisão sistemática estruturada de acordo com o protocolo PRISMA 2020, incluindo análises bibliométricas e bibliográficas de bases de dados internacionais (Scopus e Web of Science), abrangendo o período de 2020 a 2025. As ferramentas utilizadas incluíram Rayyan para triagem e exclusão de duplicatas; VOSviewer e Bibliometrix para análise bibliométrica; e Zotero, Mendeley e Excel para gerenciamento e organização das referências. Cinco questões orientaram o estudo para alcançar seu objetivo: (i) quais dimensões são abordadas pelas pesquisas recentes sobre parques urbanos sustentáveis? (ii) quais são os principais temas discutidos dentro dessas dimensões? (iii) quais metodologias e ferramentas analíticas têm sido aplicadas? (iv) quais lacunas conceituais e metodológicas permanecem na literatura? e (v) quais direções futuras de pesquisa podem ser sugeridas? Um total de 61 artigos altamente relevantes foi selecionado, confirmando que os parques funcionam como instrumentos de inclusão social, promoção da saúde e mitigação de impactos ambientais, ao mesmo tempo em que fomentam a sustentabilidade. Em resposta às questões propostas, a revisão demonstrou que os estudos recentes sobre parques urbanos têm aumentado, especialmente aqueles que abordam saúde, justiça socioespacial, qualidade, gestão e impactos socioeconômicos, discutindo temas como saúde mental, acessibilidade, gentrificação verde e participação cívica. Embora diversas metodologias tenham sido aplicadas, persistem lacunas, incluindo o número limitado de estudos longitudinais, diferenças entre países desenvolvidos e em desenvolvimento, falta de manutenção e segurança, e a ausência de estudos sobre os efeitos dos parques como espaços terapêuticos para populações neurodivergentes. Conclui-se que os parques urbanos devem ser reconhecidos como infraestruturas críticas para a saúde pública, inclusão social e resiliência climática.

Palavras-chave: Parques Urbanos. Infraestrutura Verde. Sustentabilidade. Justiça Ambiental. Cidade Inteligente. Planejamento Urbano.

RESUMEN

Este estudio tuvo como objetivo analizar los parques urbanos, evaluando sus contribuciones a la sostenibilidad, la justicia social y el bienestar comunitario. La investigación se llevó a cabo mediante una revisión sistemática estructurada de acuerdo con el protocolo PRISMA 2020, incluyendo análisis bibliométricos y bibliográficos de bases de datos internacionales (Scopus y Web of Science), cubriendo el período de 2020 a 2025. Las herramientas utilizadas incluyeron Rayyan para el cribado y la eliminación de duplicados; VOSviewer y Bibliometrix para el análisis bibliométrico; y Zotero, Mendeley y Excel para la gestión y organización de referencias. Cinco preguntas guiaron el estudio para alcanzar su objetivo: (i) ¿qué dimensiones son abordadas por las investigaciones recientes sobre parques urbanos sostenibles? (ii) ¿cuáles son los principales temas discutidos dentro de estas dimensiones? (iii) ¿qué metodologías y herramientas analíticas se han aplicado? (iv) ¿qué vacíos conceptuales y metodológicos permanecen en la literatura? y (v) ¿qué direcciones futuras de investigación pueden sugerirse? Se seleccionaron un total de 61 artículos

altamente relevantes, confirmando que los parques funcionan como instrumentos de inclusión social, promoción de la salud y mitigación de impactos ambientales, al mismo tiempo que fomentan la sostenibilidad. En respuesta a las preguntas planteadas, la revisión mostró que los estudios recientes sobre parques urbanos han aumentado, especialmente aquellos que abordan la salud, la justicia socioespacial, la calidad, la gestión y los impactos socioeconómicos, discutiendo temas como la salud mental, la accesibilidad, la gentrificación verde y la participación cívica. Aunque se han aplicado diversas metodologías, persisten vacíos, incluyendo el número limitado de estudios longitudinales, las diferencias entre países desarrollados y en desarrollo, la falta de mantenimiento y seguridad, y la ausencia de estudios sobre los efectos de los parques como espacios terapéuticos para poblaciones neurodivergentes. Se concluye que los parques urbanos deben ser reconocidos como infraestructuras críticas para la salud pública, la inclusión social y la resiliencia climática.

Palabras clave: Parques Urbanos. Infraestructura Verde. Sostenibilidad. Justicia Ambiental. Ciudad Inteligente. Planificación Urbana.

1 INTRODUCTION

Accelerated urbanization since the late twentieth century has increased pressure on urban systems and, as a result, has led to the emergence of sociospatial inequalities, climate change, and public health challenges [1][2][3][4]. Simultaneously, the need for resilient infrastructure has led policymakers to rethink urban structures and open spaces, and to recognize urban parks as strategic solutions [5][6][7][8].

Urban parks function as multifunctional green infrastructure, providing environmental benefits such as thermal regulation, flood mitigation, and improved air quality [9][10][11][12][13]. In addition, they offer social and health benefits, including encouragement of physical activity, stress reduction, and strengthening of community cohesion [14][15][16][17][18][19]. The global literature on this topic indicates that the presence of green areas is associated with improvements in urban quality of life [20][21][22][23]. Despite this, the unequal distribution of these benefits reflects barriers to access, sociospatial segregation, and processes of green gentrification [24][25][26][27][28][29][30] as well as shortcomings in urban planning [31]. Structural factors such as income level, ethnicity, housing, and living conditions directly influence health and intensify inequalities in areas undergoing gentrification [32]. Similar results were identified in Beijing, where older adults and low-income residents showed greater dependence on park quality for health maintenance [33][34]. In New York City, the unequal distribution of green spaces reflected different socioeconomic profiles across neighborhoods, resulting in varied impacts on different social groups [21]. Similarly, in Hong Kong, areas with a higher concentration of ethnic minorities have parks with fewer resources and lower quality, highlighting disparities in the distribution of socioenvironmental services [35]. The creation of new parks may, paradoxically, generate processes of environmental gentrification, in which rising property values and commercial transformations ultimately displace vulnerable residents, calling for “just green enough” policies that reconcile equitable access with community permanence [36]. This concept proposes the creation of green areas that improve quality of life without triggering intense real estate valorization processes that result in the displacement of low-income residents, thereby promoting a more just and inclusive greening. Overall, these studies demonstrate the urgency of implementing urban public policies that consider justice.

In light of this, the objective of this research is to analyze and critique the international literature on urban parks as socioenvironmental infrastructure, using the PRISMA 2020 protocol [37] and bibliometric tools to ensure methodological rigor. The study seeks to answer the following five guiding questions:

(i) which dimensions are addressed by recent research on sustainable urban parks?

(ii) what are the main themes discussed within these dimensions?

(iii) which methodologies and analytical tools have been applied?

(iv) which conceptual and methodological gaps remain in the literature?

(v) which future research directions can be suggested?

2 METHODOLOGY

This research adopted a methodology based on the PRISMA 2020 protocol (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which is widely recognized for its transparency and scientific rigor. Since its first publication [37], PRISMA has been extensively used across different fields of knowledge, providing standardization and clarity in the stages of study identification, screening, eligibility, and inclusion. The method was structured in two complementary stages—bibliometric review and bibliographic review—supported by specialized software for data organization, analysis, and synthesis. The following subsections describe the methodological framework, the databases consulted, the PICO strategy used to formulate the search, the inclusion and exclusion criteria, the article selection process, and the instruments applied.

2.1 METHODOLOGICAL STRUCTURE OF THE SYSTEMATIC REVIEW

In the present study, searches were conducted in the Scopus and Web of Science databases using combinations of keywords formulated in accordance with the research objectives. For article screening, the Rayyan software was used [38], supporting the removal of duplicates and the selection of the most relevant studies. This tool optimizes the review process by offering filtering and classification features, ensuring greater efficiency and accuracy during the selection stage. Subsequently, VOSviewer [39], was employed for bibliometric analysis and visualization of co-authorship networks and keyword co-occurrence, and is widely used to identify trends and thematic interconnections. In addition, Bibliometrix [40] was used for advanced statistical analyses and for generating maps and scientific performance indicators, integrating the quantitative and qualitative dimensions of the review.

The systematic review was structured in two complementary stages:

A) Bibliographic review: In the initial stage, the keywords were organized into four major thematic groups, each composed of four sub-descriptors, totaling 16 search combinations. Different configurations using Boolean operators (AND/OR) were tested to adjust query precision and reduce thematic noise. After a preliminary analysis, the descriptors were refined by eliminating redundant terms and adjusting expressions that

generated results outside the scope of the study. Subsequently, systematic filters were applied (2020–2025; articles and reviews; English language), in accordance with PRISMA guidelines [37]. To ensure conceptual precision, the PICO strategy was adopted in the final formulation, resulting in the following search string: (“urban parks” OR “urban park”) AND (“green infrastructure” OR “sustainability” OR “smart city” OR “urban planning”).

The search in the Scopus and Web of Science databases returned 2,044 records. The results were imported into the Rayyan software for duplicate identification and screening by title and abstract, resulting in 123 eligible articles. The data (123 articles) were organized and analyzed using VOSviewer, enabling the generation of graphs and clusters that highlight co-authorship networks, recurring themes, and research patterns. After full-text reading and application of the exclusion criteria, 61 studies comprised the final sample.

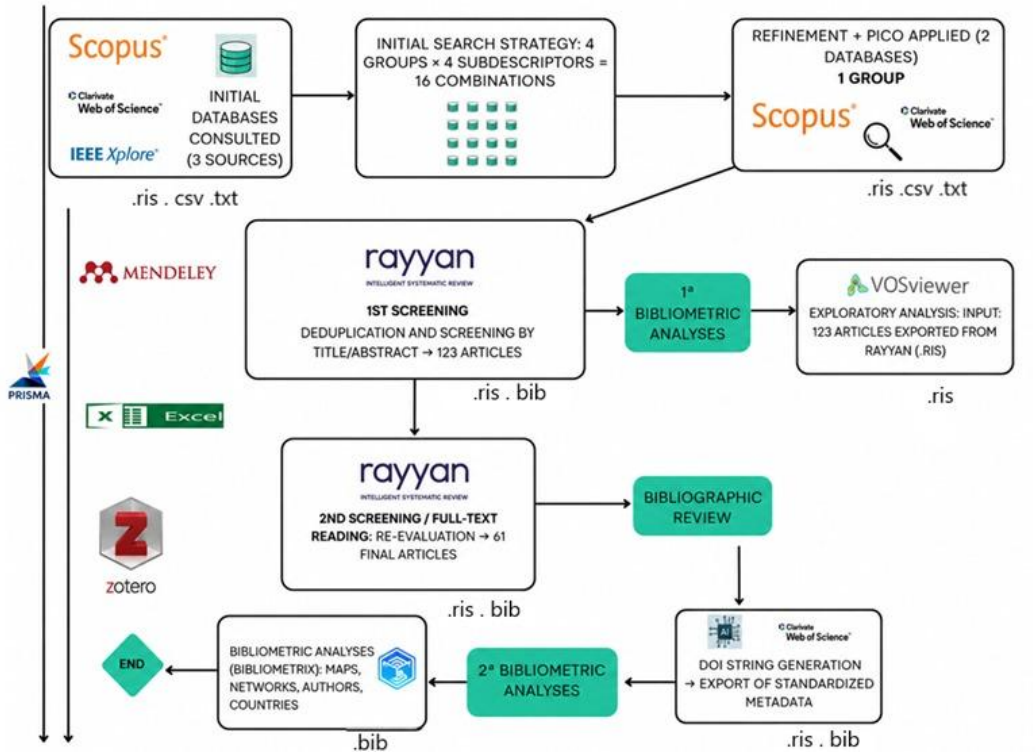
B) Bibliometric review: After defining the final set of 61 articles, the quantitative stage was initiated. Prior to the final filtering, an exploratory analysis was conducted in VOSviewer using the 123 articles previously selected in Rayyan and exported in RIS format. This preliminary step made it possible to broadly observe initial patterns, highlighting term co-occurrence networks, thematic clusters, and co-authorship relationships, thereby helping to situate the research field and to confirm the thematic consistency of the screened sample. Subsequently, the metadata of the 61 final articles were standardized. As the databases use different structures, an artificial intelligence tool was employed to generate a string containing all DOIs of the selected studies, enabling their use in the Web of Science to export complete and standardized metadata. With the standardized files, the data were processed in Bibliometrix (R), allowing advanced bibliometric analyses such as thematic maps, temporal evolution of terms, co-authorship networks, and collaboration between countries, as well as the identification of the most influential authors and journals. Mendeley was used to organize the reference database, while Excel supported the systematization and control of the studies throughout the process. This methodological workflow—exploratory analysis in VOSviewer with the initial sample of 123 articles, data standardization of the 61 final studies in the Web of Science, and advanced analysis in Bibliometrix—ensured analytical rigor, traceability, and robustness of the bibliometric results.

Thus, the chosen methodological approach ensured precision and clarity across all stages of the review, beginning with the development of the search strategy and extending

through the critical evaluation of the results obtained. The combination of bibliometric and qualitative methods enabled a comprehensive mapping of recent academic production related to urban parks, as well as the identification of global trends and conceptual gaps, thereby ensuring the reproducibility of the research. The following sections specify the databases consulted, the selection criteria, the screening process, and the tools employed, in accordance with the principles established by the PRISMA 2020 protocol [37].

Figure 1

Systematic Review Approach



2.2 DATABASES AND PICO STRATEGY

The search process followed an iterative refinement trajectory. Initially, four major keyword groups were structured: Urban Innovation and Governance, Environmental Justice and Inclusion, Circularity and Sustainability, and Urban Parks and Green Infrastructure, each subdivided into up to four subgroups of descriptors combined using the AND or OR connectors. This broad strategy aimed to capture the largest possible number of studies, even with a high level of noise. However, the preliminary analysis revealed thematic redundancies and the presence of articles outside the scope, which led to the reduction and synthesis of the groups. After successive tests, syntactic adjustments, and the application of filters (2020–2025; articles and reviews in English), a loss of relevant studies was observed, which motivated the adoption

of the PICO strategy as the basis for redefining the descriptors. Finally, a single search group was consolidated with the terms: ("urban parks" OR "urban park") AND ("green infrastructure" OR "sustainability" OR "smart city" OR "urban planning"), applied to the Scopus and Web of Science databases, resulting in 2,044 records exported to the subsequent stages of screening and bibliometric analysis.

In compliance with PRISMA protocol criterion no. 6 (Information sources), the information sources considered in this study were therefore the Scopus and Web of Science databases, covering the period from 2020 to 2025, with the last search conducted on August 26, 2025.

According to PRISMA protocol criterion no. 5 (Eligibility criteria), it was necessary to define the inclusion and exclusion criteria for the studies in advance. To structure this process, the PICO tool (Problem, Intervention, Comparison, and Outcomes) was adopted, as it supports the formulation of research questions and the organization of search strategies.

Table 1 presents the PICO strategy developed for this study, indicating how each element (P, I, C, O) was translated into keywords and eligibility criteria, serving as the basis for defining the search terms and for selecting the articles included in the review.

Table 1

PICO Research Strategy.

PICO	Questions	Responses
P (Problem)	Which urban populations are affected by the availability and quality of urban parks and green spaces?	Communities in urban areas, with emphasis on vulnerable groups (low-income residents, minorities, children, elderly, and people with disabilities).
I (Intervention)	How can urban parks and green spaces act as green infrastructure promoting sustainability, justice, and equity?	Implementation of parks as nature-based solutions (NbS), inclusive design, sustainable urban planning, and community-oriented management.
C (Comparison)	How do cities without adequate urban parks compare in terms of health, equity, and well-being to those with well-planned parks?	Differences in health outcomes, social equity, and overall well-being between cities with well-structured urban parks and those lacking adequate green infrastructure.
O (Outcomes)	What are the impacts of urban parks on justice, equity, and community well-being?	Improved health, greater social cohesion, reduction of inequalities, promotion of environmental justice, and enhancement of urban

	resilience.

Based on the PICO strategy, keyword analyses were developed to guide the searches in the databases. The combinations of terms were structured gradually, undergoing several adjustments until a refined format was achieved that was capable of retrieving studies aligned with the central research problem. This process ensured that the search was sufficiently broad to map the existing literature, while also being specific enough to avoid results outside the scope of the research.

2.3 INCLUSION CRITERIA

This systematic review included articles published between 2020 and 2025, written in English, and classified as original research articles or review papers. Additionally, studies directly related to the scope of this review were considered, namely, urban parks understood as green infrastructure, with a focus on sustainability, environmental justice, resilience, and community well-being.

2.4 EXCLUSION CRITERIA

Following PRISMA protocol criteria no. 5 and no. 7, articles that did not fall within the human and urban scope were excluded from the review, including those focused on biodiversity, fauna, microbiology, environmental chemistry, air quality, and soil and physicochemical studies. Studies with an exclusive focus on transportation, commuting, and mobility were also excluded, as were those adopting an excessively technical approach, such as physical modeling of urban heat islands or analyses of generic vegetation without a direct connection to urban parks. Studies presenting high thematic redundancy, characterized by repetitive findings and limited methodological innovation, were excluded to prevent overrepresentation of similar evidence in the final sample.

2.5 STUDY SELECTION PROCESS (PRISMA FLOW DIAGRAM)

Following PRISMA criterion no. 7 (Search Strategy), the previously defined search string was applied to the Scopus and Web of Science databases, resulting in 3,606 records with no restrictions applied at this stage. After applying the predefined eligibility criteria, 2,044 records were retained. Due to database export limitations, 1,615 records were successfully imported

into Rayyan and constituted the final dataset for screening. The detailed selection process is presented in Figure 2 (PRISMA flow diagram).

Table 2

Results from the databases with applied filters

Name	Number of Documents	
	Before the Filter	After the Filter
Scopus	1143	615
Web of Science	2463	1429
Total	3606	2044

In accordance with PRISMA criterion no. 9 (Data Collection Process), which requires researchers to specify the methods used as well as any automation tools employed in the process, after the previous steps the database files in ".ris" format were imported into Rayyan, a web-based tool that supports the organization and screening of articles for systematic reviews. Using Rayyan's automated detection tool, 402 potential duplicate records were identified, of which 201 were confirmed and removed prior to screening.

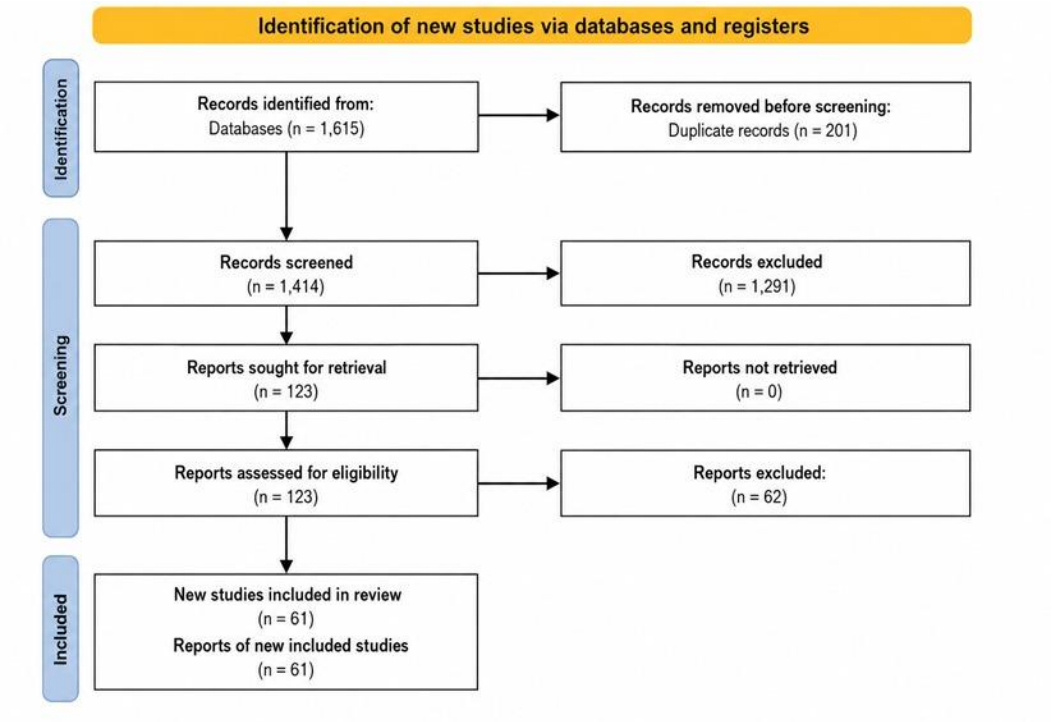
Subsequently, an initial screening was conducted based on titles and abstracts to assess thematic relevance, resulting in the exclusion of 123 documents that were not aligned with the research objectives.

In a new round of analysis, all abstracts were read in greater detail to verify alignment with the two main research terms and to assess the relevance of the documents. From this analysis, 62 documents were excluded.

In compliance with PRISMA criterion no. 11 (Study risk of bias assessment), which requires the specification of the methods used to assess the risk of bias in the included studies, and PRISMA criterion no. 12 (Effect measures), which calls for the specification of effect measures, the remaining 123 documents were subjected to full analysis. At this stage, documents that did not demonstrate a clear focus on the specific areas of study during full-text reading were excluded, resulting in a total of 61 documents included in the review.

Figure 2

PRISMA Analysis Flow Diagram



2.6 TOOLS AND SOFTWARE USED

The main tools used in the research were Rayyan, employed for systematic screening, duplicate removal, and organization of the selection process; VOSviewer, used in the exploratory phase with the 123 articles identified prior to full-text reading to generate keyword co-occurrence maps, co-authorship networks, and thematic clusters, allowing visualization of the scope and initial structure of the research field; and Bibliometrix (R package), subsequently applied to the final sample of 61 articles for the execution of consolidated bibliometric analyses.

Within the R environment, Bibliometrix was used to generate 11 main outputs derived from the biblioAnalysis and biblioshiny functions, enabling quantitative and visual analyses of scientific production. The outputs generated were:

1. Annual scientific production chart (Annual Scientific Production) – evolution of the number of publications between 2020 and 2025;
2. Most relevant sources chart (Most Relevant Sources) – journals with the highest number of articles;
3. Most relevant authors chart (Most Relevant Authors) – researchers with the highest volume of publications;
4. Most local cited sources chart (Most Local Cited Sources) – the most influential journals within the sample;

5. Most local cited authors chart (Most Local Cited Authors);
6. Most global cited documents chart (Most Global Cited Documents);
7. Country scientific production map (Country Scientific Production);
8. Co-authorship network;
9. Treemap country/frequency – proportional visual representation of scientific production;
10. Co-occurrence network (Co-Occurrence Network) – basis for generating the Thematic Map and the Thematic Evolution Map).

These outputs made it possible to examine the intellectual and thematic structure of the field, identifying publication patterns, central authors, collaboration networks, thematic cores, and emerging trends.

Some graphical results were exported to Excel, where adjustments to scale, colors, and explanatory legends were applied, ensuring visual clarity and standardization across the figures presented. The Mendeley and Zotero software packages were used for reference management and organization, while Excel was also employed for spreadsheet systematization and consolidation of the final data.

Thus, the integrated use of Rayyan, VOSviewer, Bibliometrix, Mendeley, Zotero, and Excel ensured methodological rigor, reproducibility, and analytical consistency across all stages of the systematic review, from initial screening to the generation of graphics and the integrated interpretation of results.

2.7 METHODOLOGICAL SYNTHESIS

The applied methodology sought to combine quantitative rigor (bibliometrics, network analysis, and pattern analysis) and qualitative rigor (critical reading and conceptual systematization), thus ensuring a comprehensive view of trends, gaps, and future research directions on urban parks as green infrastructure.

3 RESULTS

The results of this research are organized into two main stages, corresponding to the methodological approaches applied. The first stage refers to the bibliometric review, in which publication patterns, co-authorship networks, and recurring terms in the literature were quantitatively analyzed. The second stage corresponds to the bibliographic review, which qualitatively synthesized and discussed the 61 selected articles, allowing the identification of the main dimensions, emerging themes, and conceptual gaps in the field of study on urban parks and sustainability.

3.1 BIBLIOMETRIC REVIEW

The bibliometric review stage was carried out through the construction and interpretation of bibliometric maps, using specific software to analyze term co-occurrence, author networks, and the temporal evolution of publications. This stage aimed to preliminarily address research questions (i) and (ii), related to the main dimensions and themes discussed in the literature on sustainable urban parks. In this process, a spatial analysis of authors' affiliations was also conducted, highlighting the geographic distribution of scientific production, as well as a classification analysis of the articles according to specific criteria, in order to organize the body of studies into comparable categories and generate relevant data for researchers interested in the topic.

3.1.1 Bibliometric Maps

In order to meet PRISMA protocol criterion no. 13 (Synthesis methods), bibliometric maps were developed, which are useful for organizing the research and supporting the identification of the current state of the topic addressed. For this analysis, a file containing the 123 studies selected in Rayyan was exported in .ris format and subsequently processed in the VOSviewer software.

At this stage, the minimum threshold was set to five occurrences. To create the maps, the options "create a map based on bibliographic data," "read data from reference manager files," and type of analysis: "co-occurrence" and "keywords" were selected, followed by the "full counting" option. A total of 50 terms were identified, of which the 35 most relevant terms were selected by VOSviewer. Prior to generating the map, some terms were excluded. These manual exclusions were applied to terms that did not represent the research focus, that is, terms that did not indicate study dimensions. The terms excluded at this stage were: "China," "human," "article," "humans," "male," "spatial analysis," "strategic approach," "perception," "adult," "United States," "decision making," "housing," "assessment method," "Shanghai," and "open space." The results can be observed in Table 5, and the map with the list of keywords is presented in table 3:

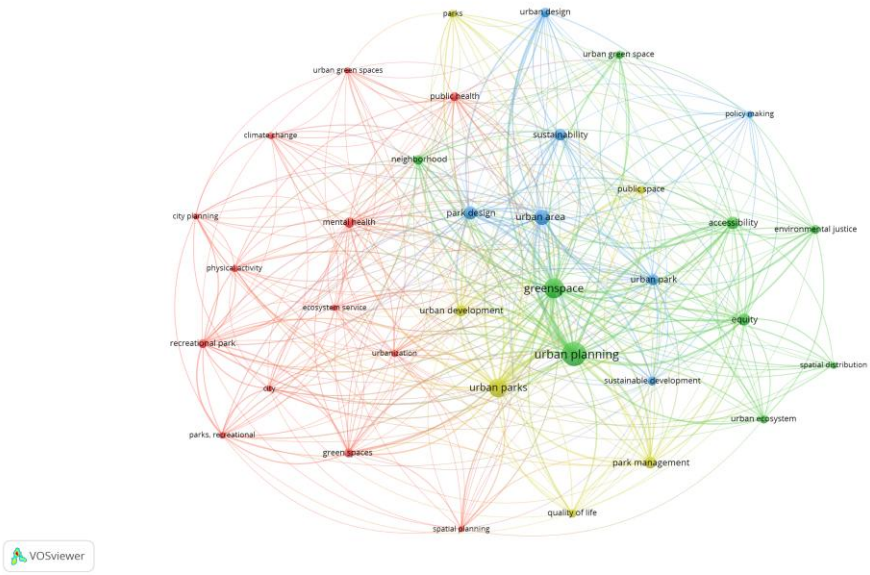
Table 3

Number of occurrences in the bibliometric map

Terms Threshold	Number of Terms to be deleted	Clusters	Group Cluster			Links	Items
			Nº Cluster	Color	Nº Items		
50	15	4	1	Red	13	403	35
			2	Green	9		
			3	Blue	7		
			4	Yellow	6		

Figure 3

Bibliometric map generated in VOSviewer



Bibliometric map generated in VOSviewer

The red cluster groups 13 items: city, city planning, climate change, ecosystem service, green space, mental health, parks recreational, physical activity, public health, recreational park, spatial planning, urban green spaces, and urbanization.

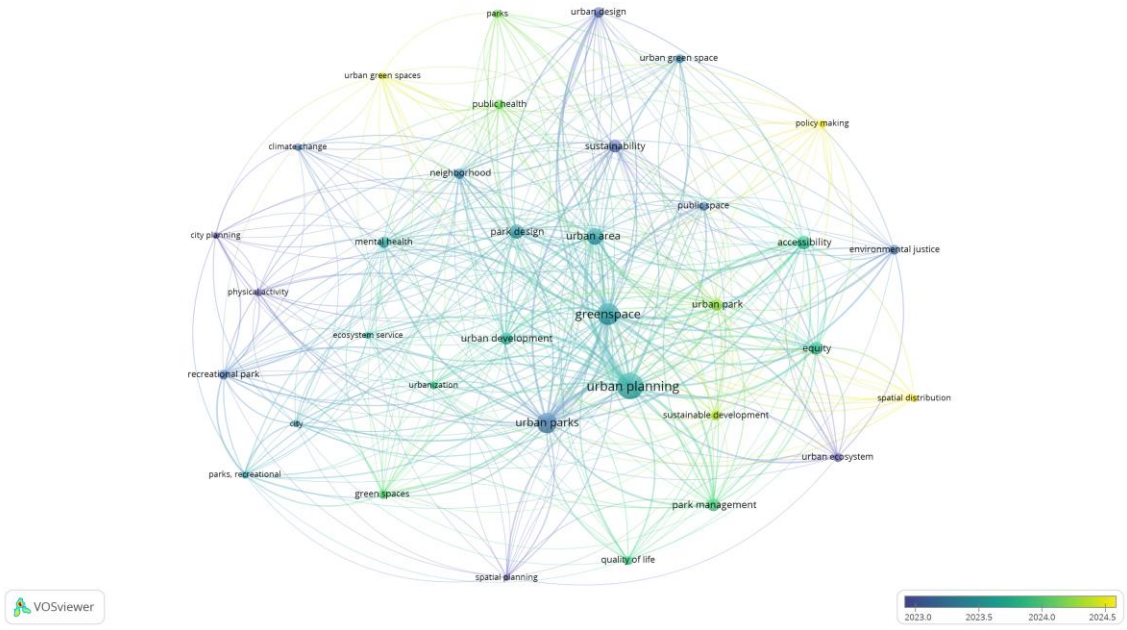
The green cluster, with 9 items, brings together: accessibility, environmental justice, equity, greenspace, neighborhood, spatial distribution, urban ecosystem, urban green space, and urban planning.

The blue cluster, with 7 items, includes: park design, policy making, sustainability, sustainable development, urban area, urban design, and urban park.

The yellow cluster, with 6 items, is composed of: park management, parks, public space, quality of life, urban development, and urban parks.

Figure 4

Overlay visualization chart generated in VOSviewer



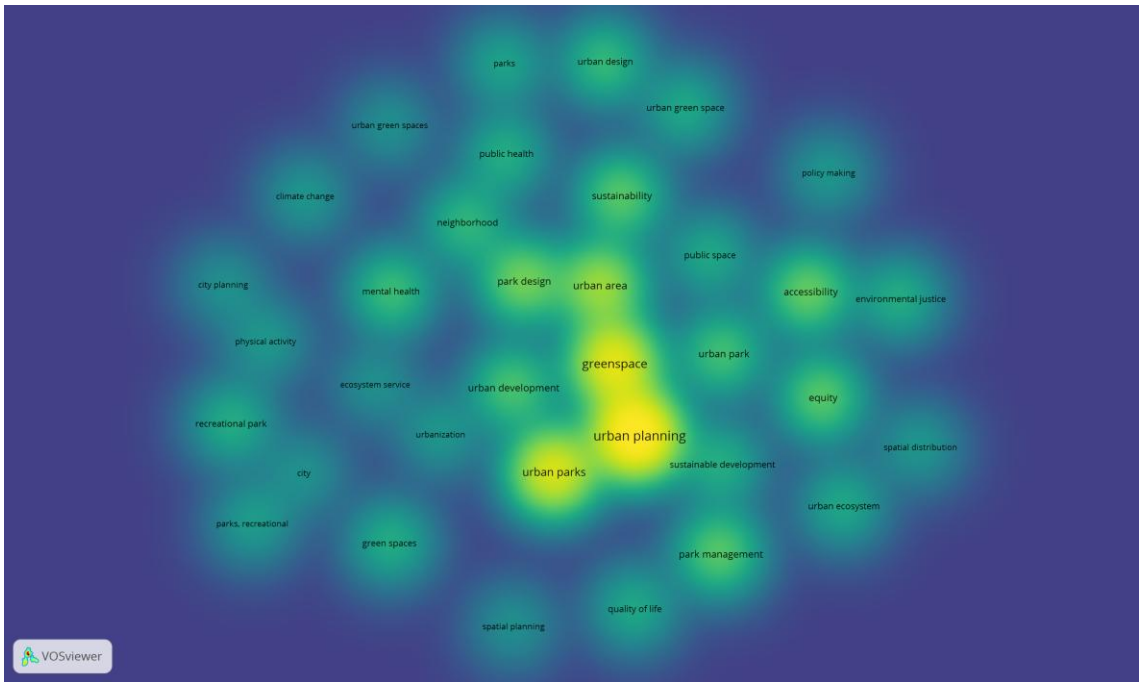
Analysis of the overlay visualization chart

The chart shows the temporal evolution of the literature on urban parks and planning. Central terms such as urban planning, greenspace, and urban parks appear in blue and green, indicating that they are already consolidated and have been widely discussed since 2023, in connection with areas such as public health (public health, mental health), urban planning (city planning, urban design), and sustainability (sustainability, ecosystem service). These concepts structure the foundation of the field, consolidating the importance of urban parks for quality of life, urban resilience, and well-being.

In contrast, more recent terms, shown in yellow, highlight emerging trends such as equity, environmental justice, accessibility, policy making, and spatial distribution, which gained prominence in 2024. This indicates a shift in the focus of the literature, from the traditional debate on planning and health toward a more critical and inclusive approach that connects urban parks to issues of socioenvironmental justice, equity, and governance. In this way, the field is expanding and opening space for research that links green infrastructure with social participation and public policy.

Figure 5

Density visualization chart generated in VOSviewer



Analysis of the density visualization chart.

This chart highlights which themes are most frequently studied within the literature on urban parks and planning. The yellow areas represent topics that appear most often and occupy the center of the discussions, such as urban planning, greenspace, and urban parks. These concepts form the foundation of the field and serve as starting points for connecting research on health, quality of life, sustainability, and urban design.

As one moves away from the yellow areas, green and blue points appear, indicating themes that are present but still less explored. This is the case for environmental justice, equity, and policy making, which appear more peripheral but already connected to the core. This suggests that these topics are still gaining ground and represent research opportunities for scholars seeking to contribute new perspectives. Thus, the chart reveals both what is already consolidated and what is emerging as a promising path for future investigations.

In accordance with PRISMA protocol requirements, questions (i) and (ii), related to the dimensions and main themes of the literature, were initially addressed. Based on the exploratory analysis conducted in VOSviewer (123 articles), it was preliminarily identified that research on sustainable urban parks is organized around five major dimensions: health and well-being; sociospatial equity and environmental justice; park quality and user experience; planning, management, and governance; and socioeconomic impacts and mobility. Within these dimensions, themes such as restorative effects on mental health, biophilic design and

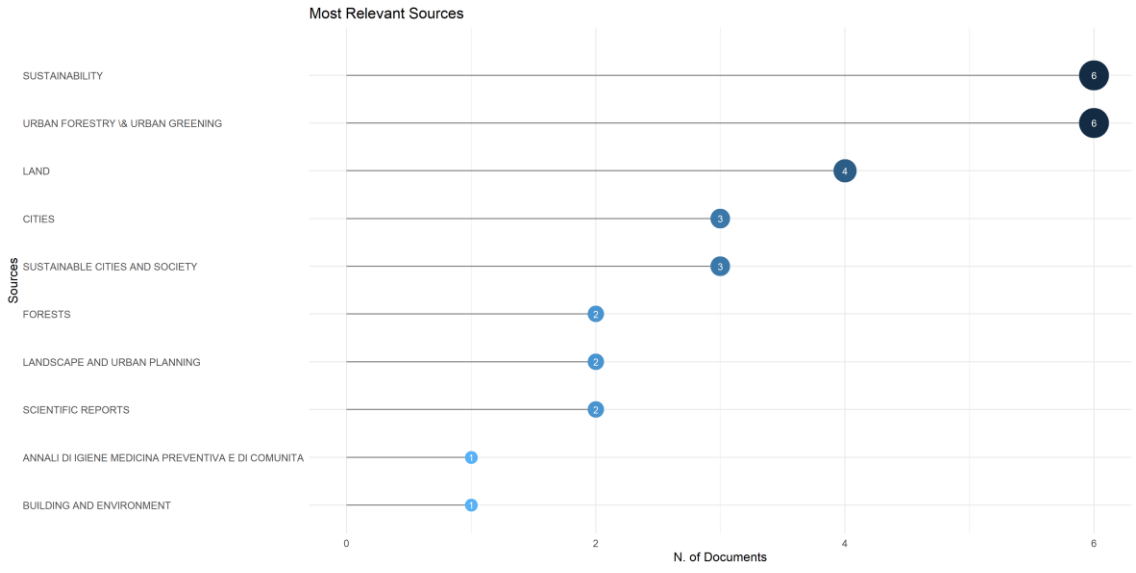
multisensoriality, accessibility and inequalities of access, green gentrification, and civic participation stand out. These initial observations guided the refinement of the analysis in subsequent stages. In addition, the overlay visualization made it possible to observe both themes that are already consolidated in the literature and those emerging as new research trends, highlighting the role of VOSviewer as an essential exploratory step for structuring the field and guiding in-depth investigation of the selected articles.

3.1.2 Bibliometric analysis of the 61 selected articles

After consolidation of the final sample, a bibliometric analysis of the 61 selected articles was conducted using the Bibliometrix software. This stage aimed to identify publication patterns, the most relevant journals, the most productive authors, co-authorship networks, and the temporal evolution of research on sustainable urban parks. The results were organized into charts and tables, allowing observation of both the concentration of scientific production in specific journals and the recent growth of interest in the topic. The findings of this analysis are presented in graphical form, accompanied by interpretation, and allow a more specific response to questions (i), (ii), and (iii) of the PRISMA protocol, serving as a bridge to the qualitative discussion in the following chapter.

Figure 6

Most Relevant Sources



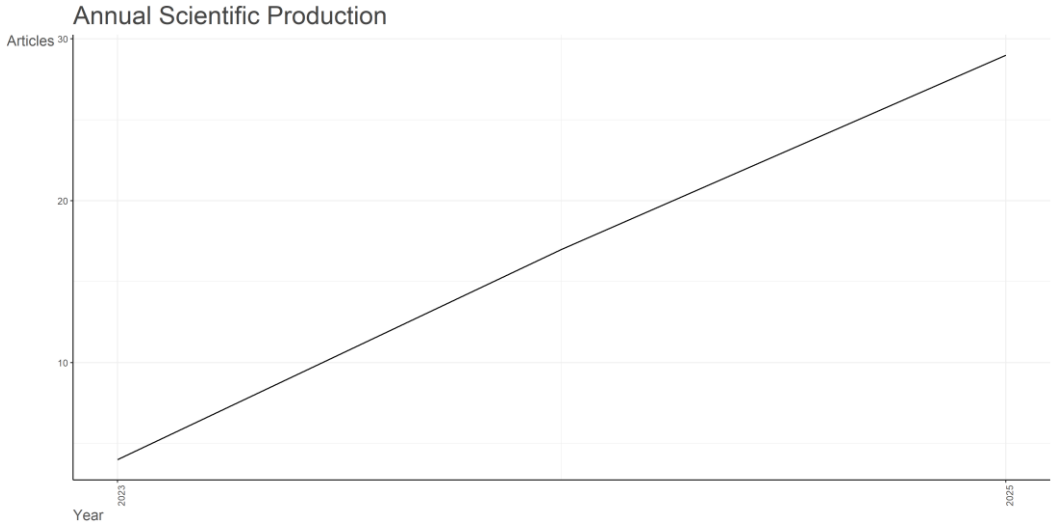
This graph shows which journals published the largest number of articles on the topic within the analyzed database. The x-axis presents the names of the journals, and the y-axis indicates the number of articles identified in the analyzed data. The journals with the highest

number of publications were Sustainability and Urban Forestry & Urban Greening, with six articles each, followed by Land with four articles, and Cities and Sustainable Cities and Society, each with three articles on the topic. The remaining journals had fewer publications (two or one article).

This highlights that the scientific discussion is concentrated in a small number of strategic journals, which function as the main vehicles for disseminating research on the topic.

Figure 7

Annual Scientific Production



Annual Scientific Production

Plot | Table

Show 25 rows | Excel

Year	Articles
2023	4
2024	17
2025	29

Showing 1 to 3 of 3 entries

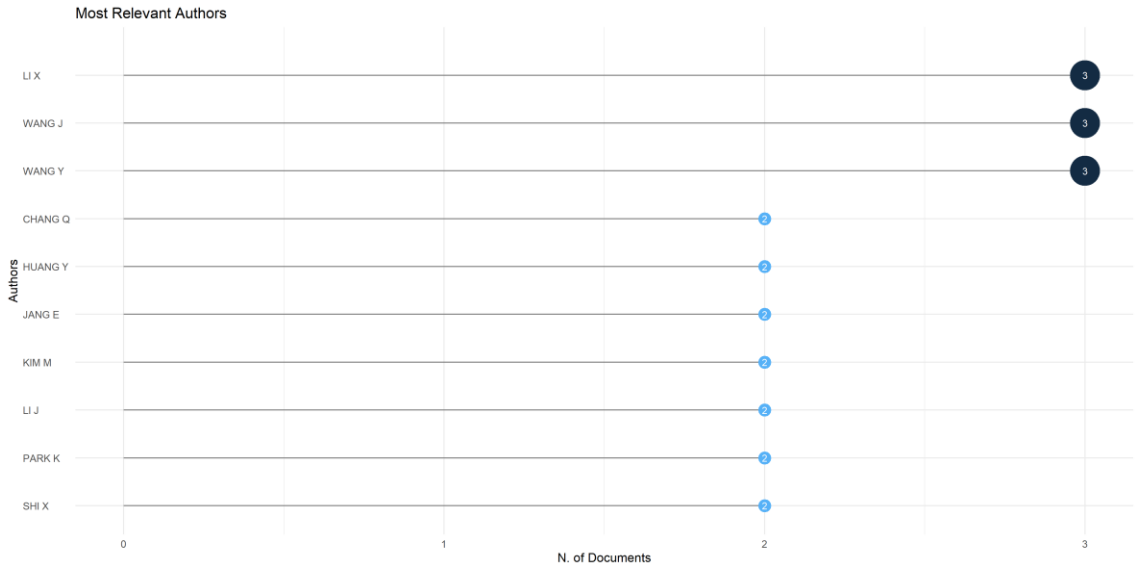
Previous | 1 | Next

A significant growth in scientific production on the topic can be observed, increasing from only four articles in 2023 to 17 in 2024 and reaching 29 in 2025.

This increase demonstrates that the field has been gaining relevance and attracting greater interest from the academic community in recent years, indicating an expanding field in the process of consolidation.

Figure 8

Most Relevant Authors

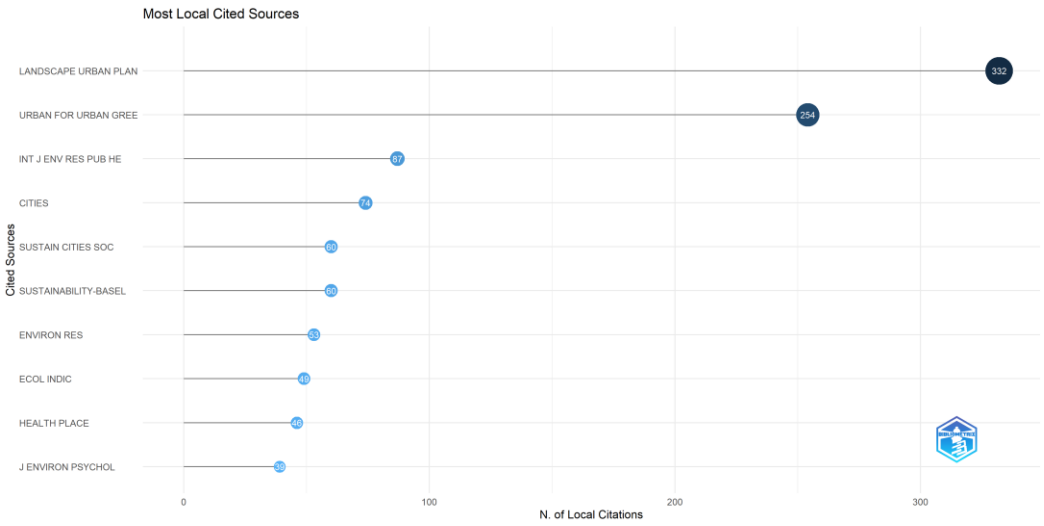


The most productive authors identified in the field were Li X, Wang J, and Wang Y, each with three articles. Following them, a group of researchers (Chang Q, Huang Y, Jang E, Kim M, Li J, Park K, and Shi X) appears with two publications each. This demonstrates that there is a diverse network of authors contributing to the field, without concentration on a single researcher.

This scenario reveals a broad network of contributions, without the predominance of a single scholar, suggesting plurality and collaboration in the development of the field.

Figure 9

Most Local Cited Sources

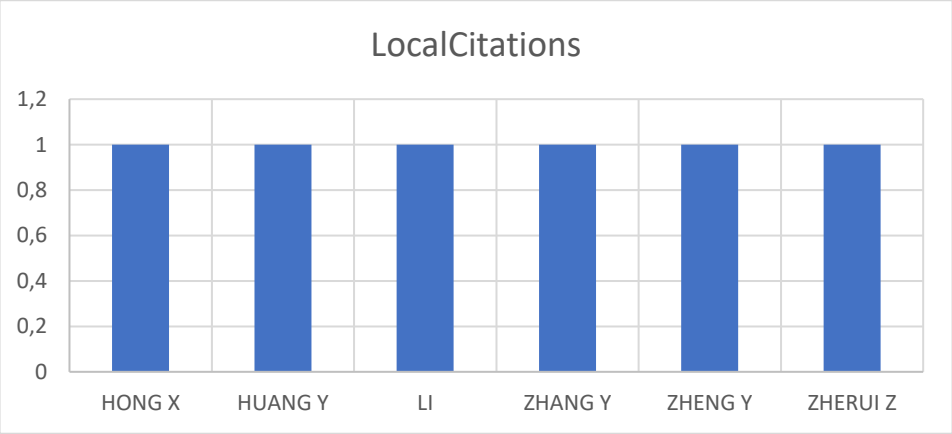


The most locally cited sources were Landscape and Urban Planning (332 citations) and Urban Forestry & Urban Greening (254), followed by the International Journal of Environmental Research and Public Health (87) and Cities (74). These journals are established as central references in the field, supporting the theoretical and methodological foundations that guide studies on urban parks and sustainability.

These journals exert strong influence within the literature, positioning themselves as core references for researchers in the field.

Figure 10

Most Local Cited Authors

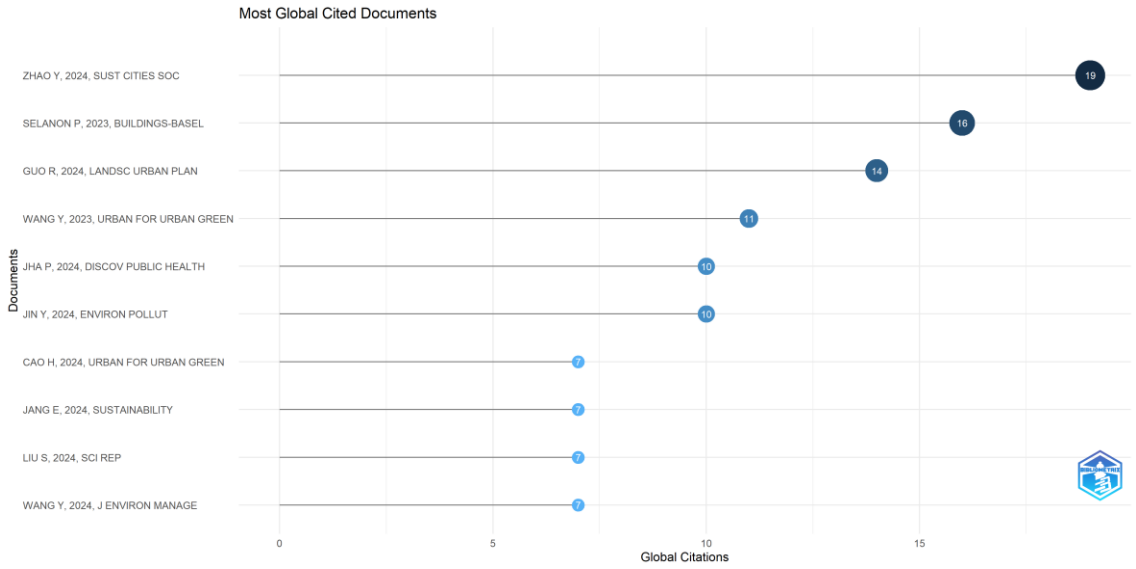


The analysis of local author citations shows that the names Hong X, Huang Y, Li, Zhang Y, Zheng Y, and Zherui Z appear sporadically, each with one citation. This indicates that, within the analyzed set, there is no predominance of a single widely cited author, but rather a balanced distribution of references among different researchers.

This demonstrates that, within the analyzed corpus, there is no broadly dominant author, but instead an even distribution of references across multiple scholars.

Figure 11

Most Global Cited Documents



The analysis of the most globally cited documents shows that the article by Zhao Y (2024), published in Sustainable Cities and Society, was the most influential, with 19 citations. This is followed by Selanon P (2023), published in Buildings–Basel (16 citations), and Guo R (2024), in Landscape and Urban Planning (14 citations). These results demonstrate that studies published in internationally high-impact journals have exerted greater influence on the dissemination of knowledge on the analyzed topic.

These results demonstrate that articles published in high-impact international journals have greater diffusion power and are fundamental to consolidating the research field.

Figure 12

Country Scientific Production

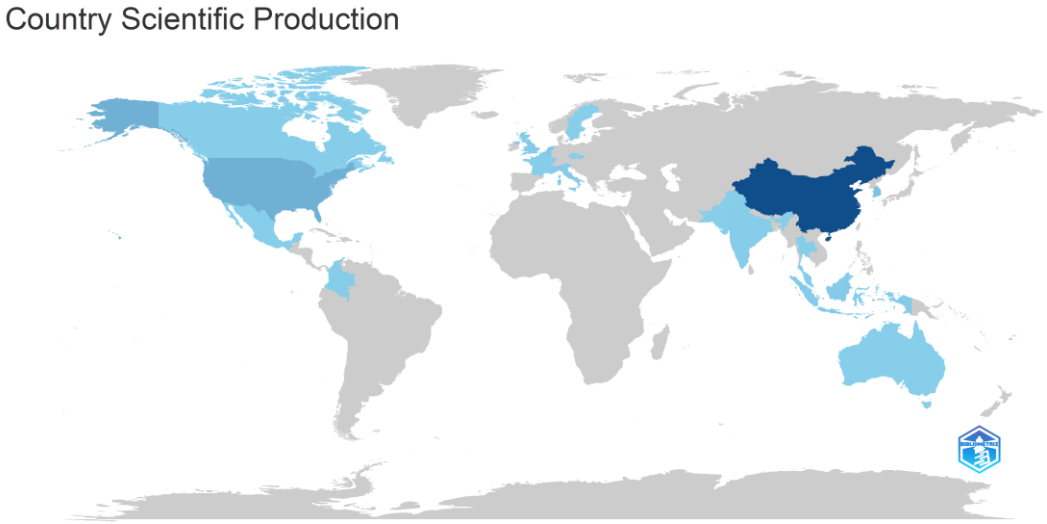


Table 4

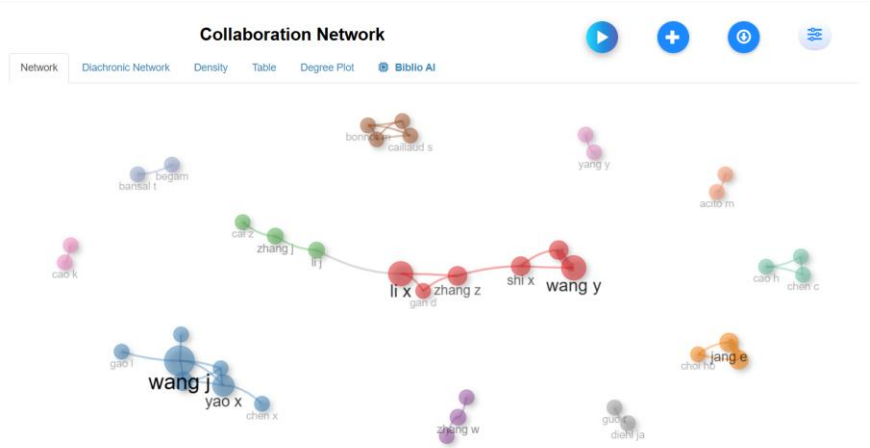
Frequency of publications by country (2020–2025)

Country	Freq
CHINA	106
USA	24
SOUTH KOREA	10
BELGIUM	6
NETHERLANDS	5
UK	4
INDONESIA	3
ITALY	3
CANADA	2
COLOMBIA	2
FRANCE	2
INDIA	2
MALAYSIA	2
THAILAND	2
AUSTRALIA	1
CZECH REPUBLIC	1
MEXICO	1
PAKISTAN	1
SINGAPORE	1
SWEDEN	1

The country scientific production map (Figure 12) uses shades of blue to indicate the intensity of publications. Countries shown in darker blue, such as China (106 articles) and the United States (24 articles), stand out for their leadership in academic production on sustainable urban parks. Intermediate shades of blue represent nations with moderate output, such as South Korea (10 articles), Belgium (6 articles), and the Netherlands (5 articles). Lighter shades indicate more limited contributions, exemplified by Latin American countries such as Colombia (2 articles) and Mexico (1 article). Finally, countries shown in gray did not present records during the analyzed period, reinforcing the regional concentration of the scientific literature.

Figure 13

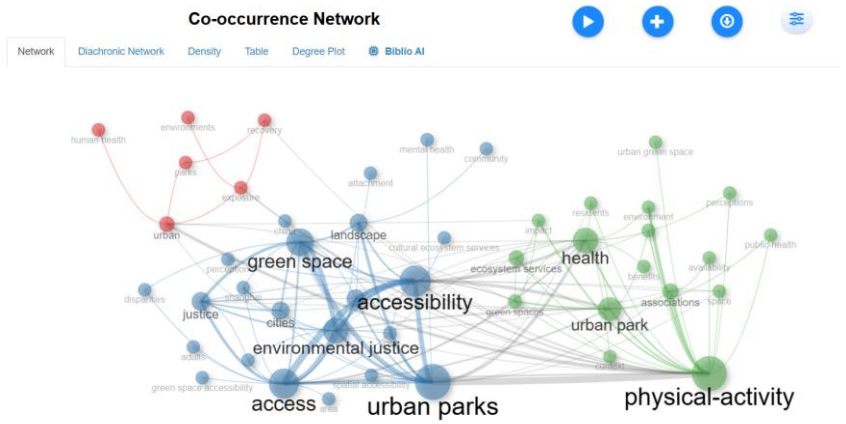
Co-Authorship Network



The co-authorship network reveals the formation of distinct clusters of scientific collaboration. Notable groups include those led by Li X and Wang Y (red cluster) and by Wang J and Yao X (blue cluster), which display high centrality and act as connecting nodes among researchers. These findings indicate well-defined research hubs in which certain authors assume strategic roles in knowledge diffusion.

Figure 14

Co-occurrence Network

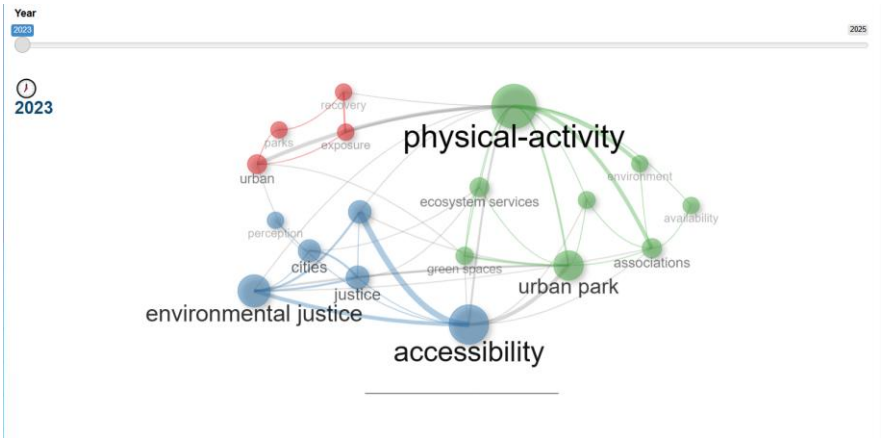


The analysis of the co-occurrence network shows that research on urban parks is organized around three interconnected axes: accessibility and socioenvironmental justice (blue), health and ecosystem services (green), and the urban environment and human health

(red). Urban parks act as a central node that integrates these themes, revealing parks as multifunctional spaces oriented toward health, social equity, and environmental sustainability.

Figure 15

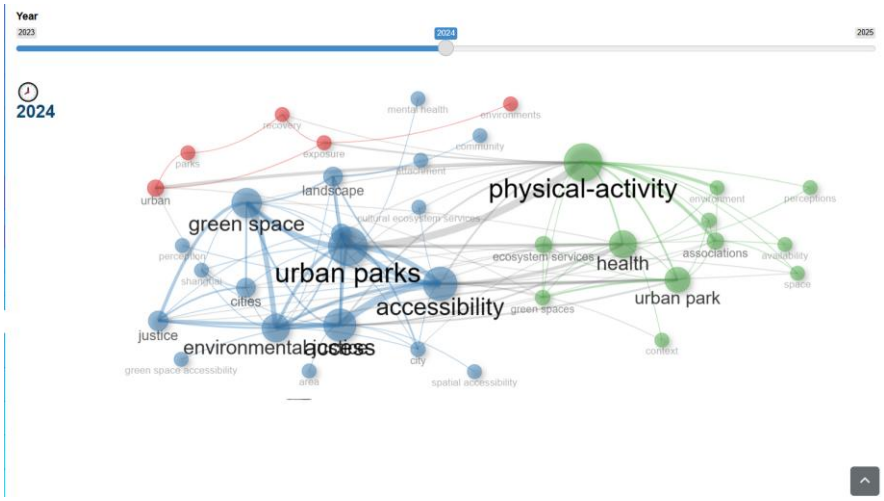
Temporal analysis - 2023



In 2023, the research was organized into three main thematic groups: physical activity, environmental justice, and accessibility. During this period, there was limited integration between social and environmental dimensions.

Figure 16

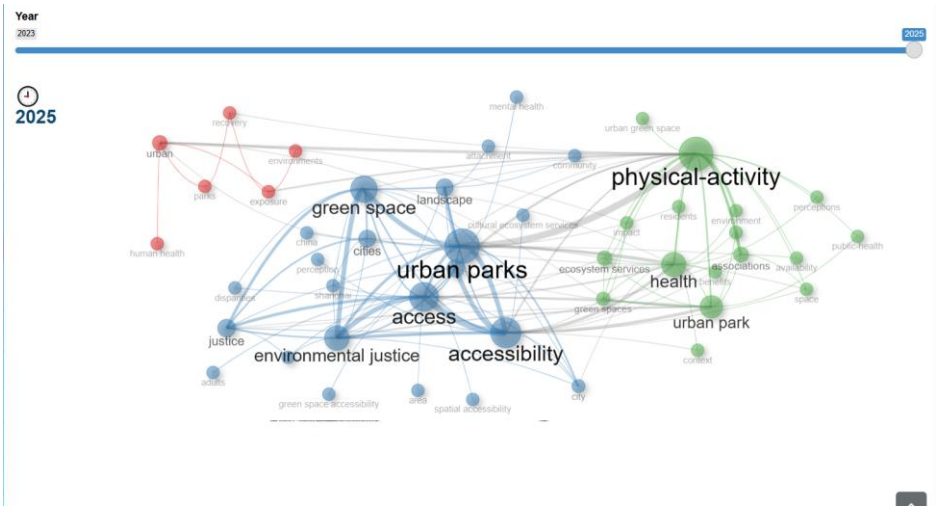
Temporal analysis - 2024.



In 2024, a greater integration among the clusters can be observed, with a strengthening of the terms urban parks, green space, and health. The emergence of the theme of mental health in the blue cluster is also noted.

Figure 17

Temporal analysis - 2025.

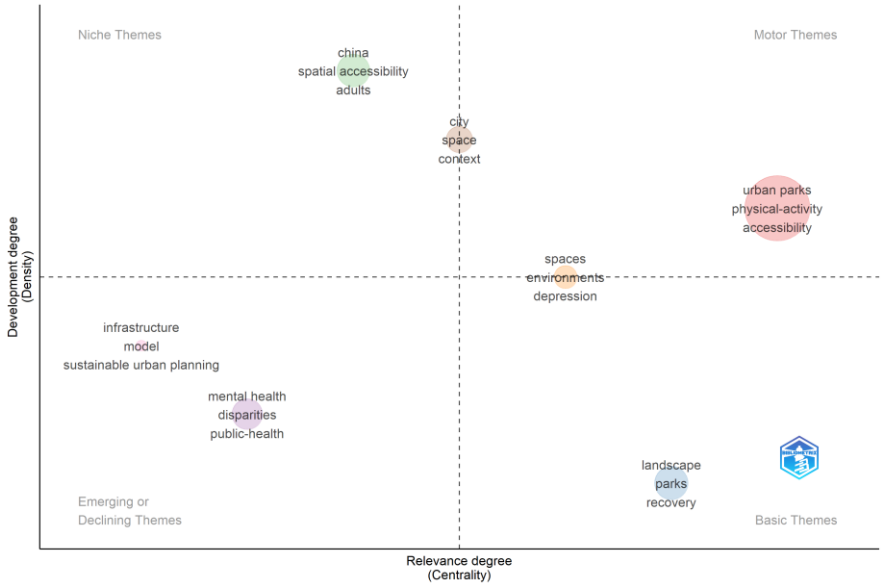


In 2025, consolidation of the field can be observed, with urban parks at the center of the discussions, articulating accessibility, environmental justice, and health benefits linked to physical activity. The term human health also appears, emphasizing benefits to human health associated with exposure to the environment.

In summary, the temporal analysis highlights the maturation and consolidation of the field of studies on urban parks between 2023 and 2025. Research evolves from isolated approaches to an integrated perspective, in which parks are understood as essential infrastructure for human health, socioenvironmental equity, and urban sustainability. This trajectory reinforces the growing importance of urban parks as strategic spaces for social inclusion, well-being, and adaptation to climate change.

Figure 18

Thematic Map



The Thematic Map, generated from the analysis of keyword co-occurrence in Bibliometrix, organizes the themes of the literature into four quadrants that reflect the degree of development (density) and relevance (centrality) of each cluster. Accordingly, the themes are classified as Motor Themes (well developed and central), Basic Themes (structuring but weakly developed), Niche Themes (highly developed but peripheral), and Emerging/Declining Themes (still underexplored or in decline). This graphical representation makes it possible to identify both consolidated areas and gaps and opportunities for future investigation in the study of urban parks.

Table 5

Datiled legend of the Thematic Map (Bibliometrix)

Cluster / Color	Keywords (with frequency)
Motor Themes (red)	urban parks (16); physical-activity (14); accessibility (12); access (11); green space (11); health (10); urban park (10); environmental justice (8); cities (6); equity (6)
Basic Themes (blue)	landscape (6); parks (6); recovery (3); attachment (2); community (2); happiness (2); motivation (2); preference (2)
Niche Themes (green)	China (3); spatial accessibility (3); adults (2); area (2); green space accessibility (2); health-care (2); people (2); preferences (2); scale (2); service (2)
Niche Themes (brown)	city (5); space (3); context (2); index (2); urban green spaces (2); vegetation (2)

Emerging/Declining Themes (lilac)	mental health (4); disparities (3); public-health (3); urban green space (3); income (2); obesity (2); proximity (2); public health (2)
Tema intermediário (orange)	spaces (4); environments (3); depression (2); mortality (2); urbanization (2)
Tema de transição (light orange)	spaces (4); environments (3); depression (2); mortality (2); urbanization (2)

The Emerging/Declining Themes quadrant highlights topics such as mental health, disparities, public health, and sustainable urban planning, which, although still showing low density and centrality in the literature, emerge as promising areas for new investigations. These results suggest that the relationship between urban parks, mental health, and sociospatial inequalities remains underexplored, but is likely to gain relevance in the context of contemporary cities, especially after the COVID-19 pandemic, which intensified discussions on psychological well-being in urban environments.

At the same time, the marginal positioning of themes related to sustainable urban planning and health equity indicates the need to deepen studies that frame urban parks not only as leisure spaces, but as critical infrastructure for promoting public health, mitigating social vulnerabilities, and building more inclusive cities. In this way, a research agenda is opened that can contribute both to the theoretical advancement of the field and to the development of public policies guided by socioenvironmental justice and urban resilience.

3.2 BIBLIOGRAPHIC REVIEW

In the classificatory analysis stage, each article was organized according to specific relevance criteria, in line with PRISMA protocol criterion no. 13 (Synthesis methods). The initial search resulted in 1,414 articles, from which those not directly related to the human and urban theme were excluded in a first filter, such as studies on biodiversity, microbiology, environmental chemistry, or sectors unrelated to urban planning. Subsequently, only studies that directly addressed urban parks as green infrastructure, nature-based solutions, climate change, resilience, and socioenvironmental justice were retained, reducing the set to 123 articles. This initial sample was exported to Rayyan, where titles and abstracts were read, and duplicates and tangential articles were removed.

The analysis revealed a strong concentration of publications in a small number of journals, notably Sustainability (Switzerland) (17 articles), Land (10 articles), and Urban Forestry and Urban Greening (10 articles), followed by Cities and Sustainable Cities and Society (five articles each) and Landscape and Urban Planning (four articles). Although the first two

journals show a high volume of publications, priority was given to studies with greater methodological rigor and stronger alignment with the objectives of this review. In contrast, highly prestigious journals such as Landscape and Urban Planning and Sustainable Cities and Society were prioritized due to their consistency and scientific relevance.

To ensure analytical consistency, studies presenting high thematic redundancy, repetitive findings, or limited methodological contribution were excluded, preventing the overrepresentation of similar evidence in the final sample. This refinement process consolidated the sample into 61 final articles, representing international diversity and strong alignment with the research objectives. Thus, the classificatory analysis made it possible to reduce redundancy, ensure methodological balance, and retain studies that effectively supported the subsequent stage of bibliographic analysis and the response to the research questions.

Based on this set of 61 selected and analyzed articles, the following discussion stage interprets the results in light of the guiding questions of the PRISMA protocol, highlighting trends, gaps, and future directions in the literature.

4 DISCUSSION

The discussion stage aims to integrate the results of the bibliometric analysis with the reviewed literature, systematically responding to the guiding questions established by the PRISMA protocol. To support this stage, a table containing the 61 final selected articles was prepared and is presented as an appendix, compiling the title, objective, methodology, and main results of each study. This systematization made it possible to organize comparisons, highlight patterns, and identify gaps in a clear and consistent manner, serving as the empirical basis for the critical interpretation of the findings.

Based on this set of articles, and in accordance with the established objectives, the responses to the questions formulated at the beginning of the research are presented below.

4.1 MAIN DIMENSIONS OF RECENT RESEARCH

Based on the 61 articles systematized in the table presented in the appendix, it was possible to identify that recent literature on sustainable urban parks is concentrated around five major dimensions. The first is health and well-being, with studies showing that parks contribute to both physical and mental health by providing spaces for psychological restoration, stress reduction, and the promotion of physical activity [2][41][42]. The second dimension is sociospatial equity and environmental justice, which involves the analysis of accessibility, territorial distribution, and differentiated access for vulnerable groups, such as older adults,

children, and low-income populations [14][16][35][43][44]. A third dimension concerns park quality, design, and user experience, considering biophilic aspects, multisensory elements, and types of facilities that encourage different forms of use [1][15][20][30]. Another relevant dimension is planning, management, and governance, including co-design practices, citizen participation, and management evaluation methods [45][46][47][48][49]. Finally, there is a focus on socioeconomic impacts and urban mobility, which address visitation patterns, preferences for local parks, and the effects of processes of environmental gentrification [5][32].

4.2 MAIN THEMES DISCUSSED WITHIN THESE DIMENSIONS

Critical reading of the articles listed in the table shows that, within these dimensions, the main themes include the restorative effects of parks on mental health and the positive association between contact with nature and the reduction of symptoms related to stress and chronic diseases [9][20][41], In addition, the contribution of green spaces to social vitality is emphasized. In this context, satisfaction with green spaces in the residential environment shows a consistent positive relationship with subjective well-being, indicating that neighborhood green areas and private gardens may exert an influence equal to or even greater than that of urban parks, including through indirect effects associated with perceptions of local greenery [50].

Equity has been discussed based on the observation that children and older adults often face barriers to access, as do low-income groups and ethnic minorities [14][51][52][53]. Studies on quality and user experience emphasize how biophilic design, sensory elements, thermal comfort, and recreational facilities can enhance attractiveness and encourage different patterns of use [1][54]. Inequalities related to recreational opportunities tend to be more visible than those associated with environmental quality, indicating that the unequal distribution of facilities and recreational functions contributes to the formation of privileged urban areas and underserved ones, even in contexts of generally good environmental quality [55].

In the field of management, debates focus on how to integrate digital tools, participatory methodologies, and quality indicators capable of balancing efficiency and social inclusion [3][56]. In the socioeconomic dimension, the most recurrent theme is green gentrification, which emerges as a dilemma between expanding green infrastructure and avoiding the displacement of lower-income residents [32].

4.3 METHODOLOGIES AND ANALYTICAL TOOLS APPLIED

The methodologies employed range from advanced spatial analyses, such as the 2SFCA method, geographically weighted regressions, and inequality indices [57] [51], to big data–

based approaches, which use mobile phone data, social media, and artificial intelligence to map visitation patterns [16][46][46][58]. Multisensory analysis tools, such as EEG and heart rate measurements, have also been applied to understand psychophysiological responses to the environment [10]. Structured questionnaires, interviews, and participatory mapping complement the qualitative dimension, revealing the perceptions of users and managers [15][59][60]. Systematic reviews and meta-analyses have been used to synthesize evidence, while composite indices, such as ParkScore, seek to integrate dimensions of quality, access, and equity [61][62][63]. Despite methodological sophistication, fragmentation is still observed: few studies consistently integrate health, equity, and user experience.

4.4 CONCEPTUAL AND METHODOLOGICAL GAPS

Despite the advances, important gaps remain. First, there is a lack of longitudinal studies capable of demonstrating causality between the presence of parks and the observed effects on health and social inclusion. There is also a noticeable absence of integrated approaches that combine space quality, sociospatial justice, and health outcomes in a standardized and comparable way across different cities. Another critical issue is the limited attention given to neurodivergent populations, such as children diagnosed with autism, ADHD, and other neurodevelopmental disorders. Although the literature recognizes the role of parks for children in general [64], there are very few investigations that explore how outdoor environments can mitigate excessive screen exposure, reduce sensory overload, and promote specific benefits for the well-being and cognitive development of neurodivergent groups. This gap points to the need to expand the notion of equity beyond age-based and socioeconomic categories, also incorporating mental health conditions and neurodiversity.

4.5 FUTURE RESEARCH DIRECTIONS AND PROMISING AGENDAS

Future research agendas may prioritize longitudinal studies and impact evaluations that track park interventions over time [19], allowing for the understanding of changes in physical and mental health, usage patterns, and urban transformations. Another promising direction is the development of integrated indices that combine environmental quality, sociospatial justice, and health benefits, in order to support more consistent public policies [22]. In this context, the case of Chengdu (2025) shows that the application of quantitative green equity indicators, such as the Theil Index combined with spatial optimization models, can guide the reorganization of the distribution of urban parks, helping to address inequalities that persist even with the expansion of green areas [65]. There is also a need to develop urban planning strategies that

link park creation with housing policies, avoiding green gentrification and promoting the permanence of vulnerable populations [36]. Beyond this, an innovative field of investigation opens up by considering the role of parks for children and youth with neurodivergent diagnoses. Studying how outdoor areas can become healthy alternatives to excessive screen time, how they can contribute to reducing stress symptoms, and how they can foster sensory and social inclusion represents a relevant pathway. The co-design of parks with the participation of families, educators, and health professionals may result in more inclusive urban environments, capable of responding to the growing number of diagnoses and demands related to autism and other neurodevelopmental conditions.

5 CONCLUSIONS

The present study aimed to critically analyze the international literature on urban parks as green infrastructure, with a focus on the dimensions of sustainability, environmental justice, and community well-being. The research sought to answer five guiding questions: (i) which dimensions are addressed by recent research on sustainable urban parks; (ii) what are the main themes discussed within these dimensions; (iii) which methodologies and analytical tools have been applied; (iv) which conceptual and methodological gaps remain in the literature; and (v) which future research directions can be suggested.

The investigation was conducted in accordance with the PRISMA 2020 protocol, using the Scopus and Web of Science databases, recognized for their scientific rigor and broad coverage. The methodological process involved two complementary stages: a bibliometric review, supported by the tools Rayyan, VOSviewer, Bibliometrix, Mendeley, Zotero, and Excel, aimed at organizing and quantitatively analyzing scientific production; and a bibliographic review of a qualitative nature, focused on the conceptual and theoretical interpretation of the selected studies.

The combination of the terms “urban park,” “sustainability,” “urban planning,” “smart city,” and “environmental justice” proved appropriate for retrieving representative studies in the field, allowing the identification of consistent thematic and theoretical patterns. This search strategy made it possible to obtain a corpus of 61 articles, which provided a solid basis for answering the proposed questions and mapping the main research trends.

The results indicate that recent scientific production on urban parks is structured around five main dimensions: health and well-being; sociospatial equity and environmental justice; park quality and user experience; planning and governance; and socioeconomic impacts and mobility [66]. Within these dimensions, themes such as the restorative effects of nature,

accessibility, green gentrification, participatory planning, and the integration of parks into urban sustainability policies stand out. The expansion of the field in recent years is also evident, with significant growth between 2023 and 2025, particularly in well-established international journals. However, theoretical and methodological gaps persist, including the scarcity of longitudinal studies and the limited attention given to neurodivergent populations, which remain underrepresented in discussions of inclusion and equity in green spaces.

During the development of this study, challenges were identified in the standardization and refinement of keywords, a process that required successive combinations and adjustments to ensure precision and comprehensiveness in the search. This experience reinforced the importance of terminological consistency and the use of controlled descriptors in systematic reviews, in order to enhance the quality and reproducibility of scientific research.

This research acknowledges limitations related to the temporal scope (2020–2025) and language restriction (English-language articles), which may have excluded relevant contributions from other regions and languages. In addition, a methodological challenge was the selection and combination of keyword groups, whose definition required successive testing until a set of descriptors capable of accurately reflecting the scope and objectives of the research was achieved. Even so, the study provides a comprehensive and up-to-date synthesis of the topic, offering valuable inputs for public policies and for the expansion of the research agenda. Future investigations are recommended to incorporate longitudinal analyses, interdisciplinary approaches, and integrated indicators of environmental quality, equity, and health, as well as to expand the focus to underrepresented population groups, such as people with disabilities and neurodivergent individuals. Further research is also suggested on sensory and inclusive planning of urban parks, considering parks not only as leisure spaces, but as essential infrastructure for public health, social cohesion, and climate resilience.

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APPENDIX

Table 6

Studies Included in the Systematic Review

	TITLE	YEAR	GOAL	METHODOLOGY	RESULTS
1	Park use patterns and park satisfaction before and after citywide park renovations in low-income New York City neighborhoods	2025	The objective of the study was to evaluate the impact of the *Community Parks Initiative (CPI)* park renovation program in New York City, analyzing changes in use patterns and satisfaction among residents of low-income neighborhoods in relation to parks.	Cross-sectional surveys applied to residents of neighborhoods near 31 parks undergoing renovation and also in 21 parks in socio-demographically comparable control neighborhoods. Interviews were conducted before and after the park renovations.	The renovations increased park use time and residents' satisfaction regarding the quality of facilities. The study shows that park renovation is an effective urban planning strategy, strengthening community support and public health.
2	Could there be negative sentiments toward urban parks? An analysis of internal and external factors	2025	To investigate negative sentiments associated with urban parks and to identify internal and external attributes that contribute to such perceptions.	Analysis of 83 urban parks in Nanjing using natural language processing techniques applied to Weibo posts, and multiple linear regression to analyze the relationship between park characteristics and negative sentiments.	Significant relationships were identified between physical attributes, visual landscape quality, accessibility, built environment density, park management, and negative public sentiments, providing insights for planning and management focused on emotional well-being.
3	Multisensory interactions in urban parks: Auditory-olfactory effects on psycho-physiological responses of hypertensive elderly adults	2025	To investigate how auditory–olfactory interactions in urban parks influence the psychophysiological responses of elderly individuals with hypertension, providing evidence for the design of urban spaces that promote health.	Three parks in Xi'an, China, were selected to create distinct auditory and olfactory environments. Subjective perceptions, physiological parameters, and electroencephalogram (EEG) signals of elderly individuals were evaluated, stratified into two groups: high pulse pressure (HPP) and normal pulse pressure (NPP).	Auditory–olfactory stimuli improved comfort and reduced blood pressure, with distinct effects between the HPP and NPP groups; EEG results showed greater sensitivity in the HPP group.

4	Identifying older adults' needs for park renewal in low-income neighbourhoods: A citizen science approach	2025	To investigate the needs and preferences of older adults regarding urban park use and to explore how participatory processes can support park redesign to promote healthy aging.	Participatory park design study with older adults from low-income neighborhoods in Belgium, using three stages: citizen science action groups, walk-along interviews, and focus group interviews.	Older adults prioritized higher benches with armrests, accessible and safe pathways, a variety of exercise equipment, shaded and sheltered areas, vegetation diversity, and the presence of water resources. The participatory process proved relevant for informing future urban planning projects and policies.
5	Green Gentrification and Urban Parks: Exploring the Complex Dynamics of Commercial Transformation	2025	To investigate the role of new urban parks in commercial gentrification in Shanghai, an aspect that has been little explored in the debate on the socioeconomic effects of green spaces.	Application of a difference-in-differences (DID) model to analyze 2019 data in an area of 6,340.5 km², examining the relationship between the implementation of new urban parks and the growth of businesses associated with gentrification (such as exotic restaurants and cafés).	New urban parks in Shanghai stimulated businesses linked to gentrification, especially restaurants and cafés, with stronger effects in central areas and major parks. The study warns of unintended impacts, highlighting the need for urban planning that promotes health and socioeconomic equity.
6	Assessment of Spatial Equality and Social Justice of Urban Park Distribution from Park Category Perspective: Evidence from Shanghai, China	2025	To develop a geospatial–quantitative framework that integrates spatial metrics and social justice to evaluate equitable access to urban parks in high-density areas.	Application of the framework in the Xuhui District, Shanghai, analyzing the spatial distribution of parks, differentiated social demands (older adults, youth, and low-income populations), and inequalities among park types.	Spatial inequality was identified, with large parks concentrated in peripheral areas and shortages in dense central areas. Priority groups faced greater deficits in social justice, and small parks showed the worst disparities. The study recommends prioritizing social demands and investing in small-scale community parks.

7	Examining the Relationship Between Urban Park Quality and Residents' Health in South Korean Cities Using Public Data	2025	To investigate the relationship between the quality of urban parks and health indicators among 85 cities in South Korea, using a localized version of the ParkScore index—a metric internationally created by the Trust for Public Land (TPL) that evaluates park systems considering area, accessibility, investment, amenities, and equity.	Application of a localized version of the ParkScore index, considering five dimensions (area, amenities, investment, accessibility, and equity). Rates of mental health disorders (anxiety, depression, insomnia, ADHD, and schizophrenia) and obesity were analyzed using Pearson correlation.	Parks with greater accessibility showed a significant negative correlation with mental health disorders, especially depression and anxiety. Although the study is cross-sectional and limits causal inferences, the findings confirm the importance of urban parks for mental well-being and highlight the need for equitable, data-driven management policies.
8	Assessing accessibility and environmental equity in the context of sustained aging: Pathways for age-friendly urban park planning	2025	To develop a method to optimize accessibility to urban parks, considering the specific needs of older adults and promoting health and well-being in contexts of rapid population aging.	Development of a weighted model of park attractiveness based on older adults' preferences, incorporating travel impedance (walking time and public transport). Accessibility was assessed through multidimensional quantitative analysis, and a dynamic population projection model was used to simulate future demands.	Disparities in attractiveness were identified among different parks, revealing failures in the equitable distribution of resources. The study proposes long-term planning strategies for age-friendly urban parks, reinforcing their importance for quality of life and environmental equity in high-density cities.
9	Park quality and chronic disease: A city-level analysis	2025	To investigate the relationship between the quality of urban parks (measured by the ParkScore index) and the prevalence of chronic diseases in major U.S. cities.	Analysis of 93 cities between 2017 and 2019 using mixed-effects regression models. ParkScore, which integrates dimensions of area, amenities, investment, accessibility, and equity, was associated with age-adjusted prevalence of eight chronic diseases.	Significant negative correlations were found between ParkScore and four chronic diseases (hypertension, cancer, coronary heart disease, and COPD). No associations were found with diabetes, obesity, chronic kidney disease, or stroke. Sociodemographic variables also strongly influenced disease prevalence. The study reinforces the role of high-quality parks as essential urban infrastructure for chronic disease prevention.

10	Does perceived biophilic design contribute to human well-being in urban green spaces? A study of perceived naturalness, biodiversity, perceived restorativeness, and subjective vitality	2025	To examine how perceived biophilic design (PBD)—an approach that integrates natural elements and biodiversity into urban environments to promote well-being—and perceived restorativeness in urban parks influence visitors' subjective vitality, focusing on the mediating roles of perceived naturalness and perceived biodiversity.	Application of 1,177 questionnaires (1,133 valid) across four types of urban parks in China (ecological parks, inclusive children's parks, sports parks, and open spaces). Correlation and path analyses were used to evaluate relationships among perceived biophilic design (PBD), perceived naturalness, perceived biodiversity, perceived restorativeness, and subjective vitality.	Ecological parks were rated higher in naturalness, while open spaces showed lower perceived biodiversity. These factors, together with perceived restorativeness, increased visitors' subjective vitality and reinforced the biophilic value of urban planning in promoting psychological health and well-being.
11	Analyzing the Mismatch Between Urban Park Supply and Community Needs in Busan: A Public Health Perspective	2025	To assess spatial disparities between the supply and demand of urban parks in Busan, South Korea, considering socioeconomic indicators and environmental justice.	Quantitative GIS-based approach, dividing the city into 100 m × 100 m grids. A modified Huff model—an accessibility-based spatial analysis tool—was used to estimate the probability of park use considering park attractiveness (size/quality) and distance decay (β) to calculate park supply in relation to the standard of 6 m² per person. These results were overlaid with a composite need index composed of six socioeconomic indicators.	Of the 205 communities in Busan, 100 lacked green areas; after integrating socioeconomic factors, 62 communities remained underserved. Ten communities were identified as priority areas, reinforcing policies focused on urban environmental justice. The study recommends replacing uniform expansion plans with strategies that prioritize vulnerable communities, integrating environmental justice into sustainable urban planning.

12	The role of city parks in creating 'wellbeing societies': A case study of Piłsudski Park in Łódź, Poland	2025	To investigate how urban green spaces and parks promote well-being in Polish cities, focusing on Marshal Józef Piłsudski Park in Łódź.	Application of a questionnaire to 238 park users, exploring usage patterns, motivations for visits, selected activities, and perceived benefits for well-being.	Physical activities such as walking were the main motivation for visits, while mental benefits such as relaxation and stress reduction were the most valued. Social interactions had lower overall relevance but were significant for youth, older adults, and marginalized groups (such as the unemployed). Proximity and visit frequency amplified benefits, although passive recreational activities remained predominant. The study advocates inclusive and participatory planning practices, highlighting the potential of parks to address social and health challenges in sustainable cities.
13	Preferring Local over Non-Local Parks? Green Space Visit Patterns by Urban Residents in Desert Cities, Arizona	2025	To investigate whether residents of urban neighborhoods use green spaces closer to their residences more frequently, focusing on Phoenix–Mesa, Arizona (USA).	Analysis of 2019 mobile phone tracking data to identify visitation patterns to local parks, assessing accessibility measures and the social composition of neighborhoods.	Approximately 40% of neighborhoods with available local parks did not prioritize their use. Visit frequency was associated with accessibility and neighborhood social characteristics, with particular emphasis on a nonlinear relationship between the proportion of Hispanic residents and local park use. The study highlights equity implications for urban green space planning.

14	Park Features, Neighborhood Environment, and Time Factors Affect Park Visitor Volume: A Meta-Analysis	2025	To identify, through a meta-analysis, the factors that influence visitor volume in urban parks, considering park attributes, neighborhood characteristics, and temporal aspects.	Meta-analysis of 30 studies, using a statistical technique that quantitatively combines results from multiple independent studies. Random-effects models were applied to estimate average associations between variables such as park size, facilities, population density, and temporal factors.	Park use was higher in areas with large, well-equipped, and well-maintained parks, as well as in neighborhoods with attractions as points of interest. Socioeconomically disadvantaged areas showed lower use, and factors such as water features, vegetation, and transportation exhibited mixed effects, varying by region.
15	Benefits of Various Urban Green Spaces for Public Health Based on Landscape Elements: A Study of Public Visual Perception	2025	To investigate how different landscape elements in urban green spaces influence public health and to propose optimization strategies for urban planning.	Five types of green spaces in Kunming were analyzed (forests, wetlands, urban parks, street green spaces, and residential areas) using semantic segmentation based on PSPNet to quantify landscape elements. Experiments with visual stimuli and analyses of physiological metrics and psychological questionnaires were conducted to assess effects on participants.	Urban forests and parks rich in natural elements (plants, soil, and mountains) had greater impacts on physiological and psychological restoration. Artificially designed spaces could produce similar benefits when they effectively mimicked natural elements. Specific elements—such as plants, soil, and mountains—were more determinant than aggregated indices. Excessive exposure to water negatively affected heart rate stabilization, whereas a higher presence of natural elements favored attention and well-being

16	Assessing Urban Park Equity in China Through Supply and Demand Balance: A Case Study of Wuhan City, China	2025	To investigate equity in access to urban parks in Wuhan, China, considering park quality and the heterogeneity of demand among different population groups, with particular emphasis on older adults.	Development of a comprehensive evaluation index system incorporating park quality and differentiated demand patterns. Big data from multiple sources and spatial analysis were used to examine the supply and demand of park services and to identify the causes of mismatches.	Central areas were found to have better park quality and supply, while peripheral regions experienced greater deficits, even though demand remained more stable. Older adults were identified as a vulnerable group, with 28.25% of communities lacking adequate service provision. The study recommends expanding the capacity of central parks and prioritizing the creation of new parks in underserved suburban areas to reduce inequalities.
17	How to lead the optimization of parks spatial patterns more comprehensively with the philosophy of green equity: A case of Chengdu	2025	To analyze green equity in the distribution of urban parks in Chengdu, aligned with the United Nations Sustainable Development Goals, and to propose spatial optimization strategies.	Introduction of the Green Equity Index based on the Theil index to measure inequalities, combined with a Support Vector Regression (SVR) model to identify spatial patterns and guide planning solutions.	Accessibility to parks has improved in recent years; however, inequalities in the distribution of green spaces persist. The proposed optimization solution showed potential to efficiently allocate available resources and reduce inequalities, offering practical guidance for sustainable urban planning.
18	Mapping the emotional landscapes of parks in post-industrial communities enduring environmental injustices: Potential implications for biophilic city planning	2025	To analyze the emotional landscapes of urban parks in post-industrial communities marked by environmental injustices, using Camden (New Jersey, USA) as a case study.	Questionnaires were administered to park users and combined with GIS data and a mixed-methods approach to map sentiment patterns and assess perceptions of park attributes.	The study showed that the legacy of environmental injustice influences emotional experiences in parks, that impacts vary across cases and are not uniformly positive, and that larger parks closer to water bodies receive greater investment and more positive evaluations. In addition, users' locations influenced their emotional responses more strongly than factors such as race, ethnicity, or income.

19	Understanding residents' motivation, psychological involvement, and psychological well-being in urban parks	2025	To investigate how motivations for using urban parks influence psychological involvement and the well-being of residents in Dongguan, China..	Questionnaires were administered to 331 residents, and the data were analyzed using Structural Equation Modeling (SEM) and Principal Component Analysis (PCA) to identify factors and test relationships among motivation, involvement, and well-being.	Motivations positively affected psychological involvement and psychological well-being, with involvement acting as a partial mediator. The study recommends expanding leisure resources, accessibility, family-oriented areas, sports, and cultural facilities to strengthen psychological health and community cohesion.
20	Urban Park Planning for Sustainability: Resident Insights from China's Major Cities	2025	To develop a framework to understand and predict residents' spatial perceptions of urban parks, aiming to support sustainable and personalized park management.	Questionnaires were administered to 701 residents in three major urban parks in China (Chaoyang, Century, and Yuexiu). The analysis combined semantic differential (SD)—quantifying subjective perceptions on bipolar scales (e.g., pleasant–unpleasant, safe–unsafe); importance–performance analysis (IPA)—crossing the importance attributed to park elements with perceived performance; and cognitive mapping—to reveal how residents mentally organize park attributes.	Perceptual differences were identified among the three parks, with greater perceived privacy in Chaoyang Park due to stronger natural characteristics, while Century and Yuexiu Parks were better evaluated for aligning design with local needs. Cognitive maps revealed differences in familiarity with natural, social, and artificial landscape functions, reinforcing the importance of integrating design elements adapted to diverse preferences to strengthen sense of place.

21	Assessing Urban Park Accessibility and Equity Using Open-Source Data in Jiujiang, China	2025	To assess accessibility and equity in access to urban parks in Jiujiang, China, considering different dimensions (spatial, opportunity-based, and group-based).	Accessibility was measured using walking route data (via an open API), considering a 1,500 m buffer radius and analyzed through GIS tools to map spatial differences, opportunity-based differences, and disparities among social groups.	Central parks showed better accessibility, but fewer service opportunities within the 1,500 m radius. Strong disparities were identified between neighborhoods, with greater benefits for wealthier communities. The study recommends opening secondary entrances, removing barriers, and creating shared green spaces.
22	How to define urban park relevance? Examining and integrating US National Park Service and partner views on the goal of “relevance to all Americans”	2025	To explore how different perspectives on park “relevance” can be reconciled between the U.S. National Park Service (NPS) and its urban partners, within the context of the Urban Agenda and the goal of “relevance to all Americans.”	Sixty-three interviews were conducted with NPS staff and partner organizations in Detroit, Tucson, and Boston. The analysis was based on a Collective Impact framework to examine convergence and divergence in views on park relevance.	Significant differences were identified between the perspectives of NPS staff and their partners, but also opportunities for strategic alignment. The institutional vision of the NPS can serve as a basis for setting shared goals and fostering collaborative planning at the urban scale.
23	How outdoor and indoor green spaces affect human health: a literature review	2025	To review studies on the effects of exposure to green spaces, both outdoor and indoor, on human health and the natural environment.	Literature review conducted in April 2024 using the PubMed, Web of Science, Scopus, Google Scholar, and Google Academic databases. Selected studies assessed the relationship between contact with vegetation and indicators of mental health, physical health, cognitive performance, environmental quality, and social cohesion.	Exposure to vegetation was associated with improvements in mental health (less stress, anxiety, and depression), physical health (blood pressure, heart rate, inflammation), cognition, social recovery, and social cohesion. It also contributed to environmental quality by mitigating heat and noise and strengthening sense of belonging and collective identity.

24	Quantifying physiological health efficiency and benefit threshold of greenspace exposure in typical urban landscapes	2024	To evaluate the physiological effects of exposure to different types of urban landscapes and to identify efficiency and benefit thresholds of greenspace exposure for health.	Social media comment data related to seven parks in Wuhan were analyzed, evaluating dimensions such as facilities, safety, maintenance, environment, and events. The analysis used big data and artificial intelligence techniques to provide real-time assessment.	Blue spaces showed faster efficiency (EEG: 4–5 min; HR: 1 min) but reached the benefit threshold in a shorter time (10 min). Open green spaces showed good initial efficiency (EEG: 5–6 min; HR: 1 min), while enclosed green spaces required more time to reach peak efficiency (EEG: 8–9 min; HR: 6–7 min). Overall, blue spaces were more effective for stress reduction, while open green spaces showed better physiological efficiency.
25	A new framework for assessment of park management in smart cities: a study based on social media data and deep learning	2024	To propose a framework based on machine learning to assess intelligent park management in smart cities, overcoming the limitations of traditional evaluation methods.	Foram analisados dados de comentários de redes sociais referentes a sete parques em Wuhan, avaliando dimensões como instalações, segurança, meio ambiente, atividades e serviços. A análise utilizou big data e inteligência artificial para fornecer uma avaliação em tempo real.	The framework identified management problems and showed that factors such as park type, season, and events (e.g., renovations) influence visitation and satisfaction. Compared with traditional methods, the approach proved more accurate and efficient, providing useful insights for intelligent park management and smart cities.
26	Assessment and optimization of spatial equity for urban parks: A case study in Nanjing, China	2024	To assess accessibility and equity in urban parks in Nanjing, China, integrating distance-based measures, park popularity, and residents' actual choices.	An improved version of the Two-Step Floating Catchment Area (2SFCA) method was applied, integrating real-time usage data to measure park popularity. The Huff model was used to analyze residents' park choices. Equity assessment employed the Gini index, Lorenz curves, and Bivariate Spatial Autocorrelation Analysis.	Central parks in Nanjing showed higher accessibility, while peripheral and disadvantaged communities experienced greater deficits. The study demonstrated pronounced inequities (10% of residents held 36% of accessibility), and only modest improvements were observed when equity was considered alongside park popularity.

27	Does supply match demand? Assessing the relationship between urban parks and residents from the perspective of equity and efficiency	2024	To analyze the relationship between the supply and demand of urban parks in Nanjing, identifying whether existing parks meet residents' needs in an equitable and efficient manner.	Mobile phone signaling data were used to estimate real park use patterns and their spatial overlap with residential areas. The analysis considered four indicators: Urban Park Supply Intensity (UPSI), Park Area Per Capita (PAC), Utilization Rate (UR), and Demand Satisfaction Rate (DSR). To explore factors influencing demand, a Spatial Lag Model (SLM) was applied.	Urban parks cover only about 30% of urban residences, and many areas show low per capita park supply. Most parks were found to efficiently meet local demand, with low demand satisfaction rates (DSR). The study concluded that mismatches between supply and demand are related to uneven spatial distribution, urban planning changes, and differing resident needs.
28	Evaluating the Accessibility of Seniors to Urban Park Green Spaces	2024	To assess accessibility and equity in access to urban green spaces (UPGS) for the elderly population in Ningbo, China, providing input for urban planning.	Urban blocks were used as the unit of analysis, applying the Two-Step Floating Catchment Area (2SFCA) method to measure accessibility based on walking distance. To assess equity, the study employed the Index of Accessibility Difference (IDA), hotspot analysis, and Pearson correlation coefficient.	Accessibility was found to be insufficient, especially in peripheral areas and neighborhoods with a higher concentration of older adults. Public transportation played a key role in improving equity, but spatial distribution remained uneven over time (15, 30, and 45 minutes). The study recommends increasing park supply and adjusting zoning regulations to improve equity and spatial distribution.
29	Spatial equity of urban parks from the perspective of recreational opportunities and recreational environment quality: A case study in Singapore	2024	To assess spatial equity of different categories of urban parks (regional, community, and composite) in Singapore, considering recreational opportunities and environmental quality.	A neighborhood-level evaluation system was developed using Lorenz curves, the Gini coefficient, and local spatial autocorrelation analysis to compare inequalities and distribution patterns.	Inequality in recreational opportunities was greater than inequality in environmental quality. Community parks showed higher inequity compared to regional parks. Both recreational opportunities and environmental quality were unevenly distributed, being concentrated in certain neighborhoods, creating privileged and underserved areas.

30	Towards a sustainable city: Deciphering the determinants of restorative park and spatial patterns	2024	To investigate how observable factors (vegetation, water, visual characteristics) and perceptual factors (landscape preference, place attachment) influence psychological restoration in urban parks and to identify their spatial patterns..	The study was conducted in an urban park in Wuhan, China. A total of 1,560 collaborative images were collected through a public participation geographic information system (PPGIS) and analyzed using deep learning methods to extract landscape visual qualities. Statistical models were applied, including Ordinary Least Squares (OLS), Quantile Regression (QR), and Multiscale Geographically Weighted Regression (MGWR), to assess restorative factors and spatial variations.	Landscape preference, place attachment, and the presence of vegetation and water were strongly associated with psychological restoration. However, restoration intensity varied according to park location and spatial context, revealing spatial heterogeneity. Different areas of the park showed distinct potentials for promoting psychological well-being.
31	The Restorative Effects of Urban Parks on Stress Control Ability and Community Attachment	2024	To investigate how perceived restorative effects of urban parks influence stress reduction and the strengthening of community attachment.	Questionnaires were administered to urban park users to assess perceptions of psychological restoration, stress management ability, and attachment to the community.	Time spent in parks significantly improved stress control capacity and increased place attachment. Participants who reported lower perceived restorative effects showed weaker stress management outcomes. The findings confirm the role of urban parks in mental health promotion and social connection.
32	How does multiscale greenspace exposure affect human health? Evidence from urban parks in the central city of Beijing	2024	To explore how exposure to green spaces at multiple spatial scales (local and subdistrict levels) is associated with residents' physical and self-rated mental health.	Questionnaires were applied to 1.017 residents in Beijing. Objective and subjective measures of greenspace exposure were analyzed using multiple regression models and pathway analyses to examine relationships with health outcomes.	Local-scale greenspace exposure had a stronger impact on mental health, mainly through aesthetic quality and opportunities for rest. Subdistrict-scale park density was more strongly associated with physical health and increased frequency of use. The study confirms that multiscale greenspace effects should be considered in urban planning to promote public health.

33	Study on the Spatial Arrangement of Urban Parkland under the Perspective of Equity—Taking Harbin Main City as an Example	2024	To evaluate spatial and social equity in access to urban parks in Harbin, with a focus on vulnerable populations such as older adults and children.	Points of interest (POI) and areas of interest data were combined with kernel density estimation and GIS-based spatial analysis to map park accessibility. The relationship between supply and demand was measured using the Two-Step Floating Catchment Area (2SFCA) method. Equity was assessed using the Lorenz Curve, Gini Coefficient, Participation Index, and Location Entropy Index.	Urban parks were concentrated in a limited number of areas and served only a portion of the population. The supply–demand relationship was insufficient, with pronounced inequality (Gini = 0.407). Older adults and children in low-income areas faced the lowest levels of access, confirming significant socio-spatial inequity.
34	How do urban parks, neighborhood open spaces, and private gardens relate to individuals' subjective well-being: Results of a structural equation model	2024	To investigate how different types of green infrastructure—urban parks, neighborhood open spaces, and private gardens—are associated with subjective well-being.	An online questionnaire was administered to 322 residents in the Netherlands. Data were analyzed using structural equation modeling (SEM) to assess direct and indirect effects of satisfaction with green spaces on subjective well-being.	Satisfaction with neighborhood greenery had a stronger positive impact on subjective well-being than satisfaction with urban parks. The size of private gardens indirectly influenced well-being by increasing satisfaction with neighborhood green spaces. Satisfaction with neighborhood greenery showed a consistent positive relationship with well-being, regardless of frequency of use.
35	Understanding the sociocultural valuation of ecosystem services in urban parks: a Colombian study case	2024	To investigate the sociocultural values attributed to ecosystem services in five urban parks in Tunja, Colombia.	Semi-structured interviews were conducted with three stakeholder groups (public managers, social leaders, and park users) to identify perceptions and preferences regarding ecosystem services.	Eighteen ecosystem services were identified, with cultural services being the most prominent. Sociocultural values were more strongly influenced by park characteristics than by size, with no significant influence of age, gender, or education. Discrepancies were identified between the perspectives of governmental and non-governmental managers, which may affect policy formulation.

36	An analysis of the effects of different urban park space environment construction on national health	2024	To analyze the multiple health benefits of urban green spaces, including physical and mental health, social interaction, and environmental sustainability, highlighting factors that promote successful implementation and existing challenges.	In-depth case studies were conducted in three parks in China (People's Park in Linyi, Youth Park in Lanshan, and Yumin Park in Yunnan), combined with international reference cases (the High Line in New York and Emscher Landscape Park in Germany) for comparative analysis..	Urban green spaces were shown to be essential for well-being and social cohesion; however, they still face barriers related to land availability and equitable resource distribution. The study highlights the importance of adopting justice-oriented spatial strategies, revising urban policies, and promoting inclusive governance. It also identifies gaps, such as the lack of longitudinal studies and limited understanding of socioeconomic inequalities in park use.
37	A user-based approach for assessing spatial equity of attractiveness and accessibility to alternative urban parks	2024	To propose a user-based method for assessing the attractiveness of urban parks in Tehran, considering inequalities in access and use.	Park attractiveness was modeled based on travel time, available leisure time, and user behavior. Indicators such as Duration of Use Inequality, Visit Frequency, and Choice Opportunity were applied, combined with traffic analysis zones and regional park data.	The method revealed significant inequalities among users, showing that some neighborhoods had substantially higher opportunities for park use than others. In comparison, traditional service-based indices tended to mask these differences and were effective only at a regional scale. The proposed model provides a more detailed understanding of local-scale inequalities in park accessibility and attractiveness.

38	Associations between the perception of ecosystem services and well-being in urban parks	2023	To analyze associations between users' perceptions of cultural ecosystem services and well-being in urban parks in Recife, Brazil.	A total of 481 questionnaires were applied in ten urban parks. Data on park perception, self-perceived health, and willingness to pay were analyzed using Stata 14, with four ordinal logistic regression models.	Users with better mental health and lower stress reported higher perceptions of ecosystem service benefits. Willingness to pay was also associated with positive park perceptions. The study reinforces the role of ecosystem services in promoting well-being and highlights the need to incorporate them into urban park planning.
39	The role of urban parks in affecting health outcomes and the differences between vulnerable groups: Evidence from the central city of Beijing	2023	To understand how urban parks influence public health and environmental justice outcomes in Beijing, with particular attention to older adults and low-income populations.	Different types of green spaces and their spatial distribution across subdistricts were analyzed. Multiple linear regression models were applied to assess the impact of factors such as quantity, density, distance, and park quality on residents' health.	Urban parks had a stronger impact on health than other types of green spaces. For older adults, park density and distance were decisive factors, while for urban residents overall, vegetation quality had a greater influence. The study concludes that accessible and free urban parks should be prioritized in urban planning to improve public health and reduce inequalities.
40	Does the Urban Park Provision Fit the Social Needs of the Community? Evidence for Semarang City, Indonesia	2023	To identify which categories of park services best meet community needs in Semarang, Indonesia.	Semi-structured questionnaires were applied to 100 users in five urban parks. Data were analyzed using a scoring method and compared with hypothetical reference categories.	Urban park services were generally classified as "medium," with strengths in facilities, quality, tree diversity, cleanliness, air quality, ventilation, and social use. However, some services did not fully meet community needs, indicating the necessity of targeted improvements to better adapt parks to local demands..

41	Green spaces for whom? A latent profile analysis of park-rich or -deprived neighborhoods in New York City	2023	To classify neighborhoods in New York City according to socioeconomic characteristics and green space provision, in order to understand patterns of park distribution.	Latent profile analysis was applied to group neighborhoods probabilistically based on combinations of socioeconomic characteristics and green space provision indicators.	Urban parks were not evenly designed or distributed; their presence varied according to the socioeconomic profiles of neighborhoods. The analysis identified differentiated patterns among social and local groups, reinforcing the need for context-sensitive policies to promote green equity and socio-spatial justice.
42	The Importance of Urban Green Spaces in Enhancing Holistic Health and Sustainable Well-Being for People with Disabilities: A Narrative Review	2023	To discuss how urban green spaces can improve health, well-being, and quality of life for people with disabilities, emphasizing inclusion in sustainable urban planning..	Conceptual and narrative review article addressing different levels of disability experience (global, population-level, individual) and different modes of interaction with green spaces (active, passive, direct, and indirect).	People with disabilities receive less attention in access to services and green spaces, despite having high potential to benefit from these environments. The study highlights that sustainable urban policies should prioritize inclusion, expanding environmental, social, and economic benefits and contributing to more equitable and sustainable cities.
43	The optimal spatial delineation method for the service level of urban park green space from the perspective of opportunity equity	2023	To investigate spatial equity in access to urban park green spaces (UPGS) in the district of Yingge, Taiwan, considering both quantity and quality to support fairer urban planning.	A modified micro-scale accessibility approach was applied, using buildings as demand points and service catchments as supply areas. Different service radii were compared, and UPGS quality was incorporated into the assessment.	Significant differences were identified when a uniform service radius was applied, revealing access inequalities. Including quality in the analysis highlighted areas with both high and low service levels. The delimitation method improved public resource allocation and supported better infrastructure planning, ensuring residents had adequate access to parks with satisfactory quality.

44	Policymaker and Practitioner Perceptions of Parks for Health and Wellbeing: Scoping a Holistic Approach	2023	To investigate how different qualities of urban parks—such as size, types of facilities, accessibility, community engagement, and green–blue infrastructure—influence health and well-being outcomes in cities, within the broader *Better Parks, Healthier for All* project.	An online focus group was conducted in May 2021, during the COVID-19 context, with 19 specialists from New South Wales, Australia, including park providers, policymakers, designers of green spaces, and public health researchers. Data were analyzed using thematic analysis.	The analysis revealed a holistic view of park quality, in which each space plays a complementary role within an integrated network of benefits. Co-design and community engagement were highlighted as essential to strengthen a sense of belonging and park use. The study concludes that well-connected and well-planned parks are fundamental infrastructures for health, well-being, and environmental sustainability.
45	Assessment of spatial equity of urban park distribution from the perspective of supply-demand interactions	2023	To assess equity in the spatial distribution of urban parks by overcoming traditional approaches that focus only on supply, incorporating residents' demand, usage preferences, and scale effects.	A composite index called **Supply–Demand Equity Index (SDEI)** was developed, combining accessibility to parks most frequently used and closest to residents (supply) with residents' perceptions obtained through surveys and population density. Data were analyzed at the neighborhood scale to capture supply–demand interactions more precisely.	Results showed that accessibility-based indicators better represented service provision than proximity alone, while demand-based approaches captured residents' perceptions but revealed hidden inequalities. The SDEI identified spatial mismatches between supply and demand, revealing inequitable patterns. The study concludes that combining indicators produces more robust assessments and has direct implications for urban park planning.
46	The Productive Role of Future Expectations in Participatory Spatial Planning. A Case Study on Urban Park Development in The Netherlands	2023	To examine the role of future expectations in spatial planning, a dimension still underexplored in the literature, using participatory planning processes in the development of **Seelig Park**, in Breda, the Netherlands.	A grounded theory approach was applied to analyze the participatory planning process, focusing on how expectations emerge, evolve, and influence decisions over time.	Expectations were found to be flexible, dynamic, and diverse, functioning as mechanisms of "recalibration" that shape the ongoing planning process. The study concludes that productive expectations help balance legitimacy and equity within the politically negotiated context of spatial planning.

47	Assessment and planning of green spaces in urban parks: A review	2023	To analyze how investments in green areas and sustainable development policies can enhance urban parks and contribute to population well-being, emphasizing the importance of spatial planning in large cities.	This is a review article that employed **Geographic Information System (GIS)** techniques to assess accessibility, guide spatial changes, and identify relationships between the proportion of green areas and the creation of green corridors.	The study showed that high proportions of green coverage favor the establishment of green corridors, which are essential for urban balance. The proposed methodology allows the adaptation of vegetation to lot design, supports urban requalification plans, reduces flood risks, and promotes biodiversity and heritage preservation through durable green spaces.
48	Impact of Urban Historical Parks on Physical Activity and Public Health in Beijing	2022	To explore the influence of urban historical parks on residents' physical activity and public health, based on a study of three emblematic parks in Beijing—Beihai Park, the Forbidden City, and the Temple of Heaven—and to propose recommendations for their management and revitalization.	Levels of residents' physical activity, park characteristics, and general public health were investigated. Statistical correlation methods were applied to analyze relationships between environmental, social, and health-related variables.	Physical activity in historical parks was associated with tranquility, attractiveness of the landscape, and available space. Physical activity correlated with companionship, while mental health was related to education level, frequency of visits, and scenic qualities. These parks play a central role in cultural preservation and social cohesion, in addition to providing health benefits.

49	Park equity: Why subjective measures matter	2022	To investigate how subjective perceptions of park quality and availability vary according to race/ethnicity, income, and metropolitan region in the United States, advancing beyond studies focused solely on objective access measures such as proximity.	Data from a survey conducted in six metropolitan areas were analyzed using mixed linear models to test interactions between race/ethnicity and region. Both subjective perceptions and objective metrics—such as **ParkScore**, which evaluates park access and quality—were considered.	Perceptions of park quality and availability varied across regions, being more critical in Baltimore and Los Angeles, less negative in Boston, and more positive in Phoenix and Minneapolis–St. Paul. Black and Hispanic residents reported more park-related problems, although Hispanic respondents also perceived improvements more frequently. Overall, income was not a determining factor, and subjective perceptions generally aligned with ParkScore objective metrics.
50	Assessing the social equity of urban parks: An improved index integrating multiple quality dimensions and service accessibility	2022	To propose an improved assessment of environmental equity in urban parks by integrating both accessibility and multidimensional quality, with a focus on socially vulnerable groups such as older adults, children, and unemployed populations.	An index was developed combining quality dimensions—including aesthetic features (AFs), facilities and recreational functions (FCS)—with accessibility measures, resulting in a total composite score (TS). The index was applied to urban parks in Xangai, considering different socioeconomic groups.	Convenience facilities were the most accessible services, followed by aesthetic and recreational aspects. Older adults and unemployed populations had greater access to higher-quality parks, while children experienced lower access. The proposed index proved effective for guiding planning and management, highlighting the importance of balancing supply and demand and improving park quality to enhance social equity.

51	Sustainable low-input urban park design based on some decision-making methods	2022	To develop methodologies that incorporate Life Cycle Costing (LCC) and rational resource use in order to optimize the design and maintenance of urban parks, making them more sustainable and cost-effective.	The study was conducted in Mashhad, Iran, comparing two park design scenarios: a conventional design based on general project standards and a low-investment design emphasizing sustainability. Methods from Value Engineering (VE), Multicriteria Decision Making (MCDM), and Risk Management (RM) were integrated to select indicators and analyze costs.	The low-investment plan reduced total costs by 62.7% compared to the conventional design, mainly due to reduced resource consumption and lower long-term maintenance costs, despite slightly higher initial expenses. The study concludes that VE is an effective tool for balancing costs, improving project quality, and supporting sustainable urban park management.
52	How urban parks nurture eudaimonic and hedonic wellbeing: An explorative large scale qualitative study in Québec, Canada	2022	To investigate urban park users' perceptions regarding their motivations for using these spaces, their impacts on well-being, and the park qualities that underpin these benefits.	Interviews were conducted with 449 adults across 20 urban parks in four cities in Québec, Canada. Thematic analysis was applied to identify patterns in users' motivations and perceived effects.	Three overarching themes explained park use: caring for oneself, caring for children, and caring for others. Users sought both **hedonic well-being**, related to leisure and pleasure, and **eudaimonic well-being**, associated with connection to oneself and to others. The study concludes that urban parks play a fundamental role in health promotion and should be prioritized in urban planning.
53	The role of the state in preserving urban green infrastructure - National Urban Parks in Finland and Sweden	2022	To analyze how different implementation models of National Urban Parks (NUPs) influence their effectiveness as instruments for preserving green infrastructure in cities.	A comparative analysis was conducted between two implementation approaches: a **top-down** model imposed by the state, as observed in Sweden, and a **bottom-up** model initiated by municipalities and civil society, as in Finland. The study examined the role of the state and local governments in the creation and management of NUPs.	In Sweden, the top-down model resulted in resistance from municipalities, limiting future development. In Finland, the bottom-up model led to broader acceptance of NUPs, as municipalities competed for their designation. The study concludes that although NUPs are effective tools for protecting green areas, their success depends strongly on the implementation model.

54	Associations between greenspace and mental health prescription rates in urban areas	2021	To expand understanding of the relationship between the availability of urban green spaces and mental health, analyzing how these spaces impact prescription rates for mental health disorders at a national scale in Scotland.	Linear mixed-effects models were applied to all Scottish settlements with more than 10,000 inhabitants. Greenspace availability was measured at two spatial scales—immediate neighborhood and up to a 30-minute walking distance—while controlling for sociodemographic variables, spatial autocorrelation, and health board effects.	In areas with a higher proportion of ethnic minorities and families experiencing multiple deprivation, greater availability of nearby green spaces was associated with lower prescription rates for mental health disorders. No significant association was found for green spaces within a 30-minute walking distance. The findings indicate that the mental health benefits of green spaces vary according to population profiles, providing important insights for urban planning and national-level policy.
55	Do persons with low socioeconomic status have less access to greenspace? Application of accessibility index to urban parks in Seoul, South Korea	2021	To examine socioeconomic inequalities in access to urban parks in Seoul, South Korea, framing park accessibility as an environmental justice issue.	Two parks provision metrics were analyzed: **total park area per capita (TPPC)** and an **accessibility index** that considers park size and proximity. Correlation and regression analyses were conducted at multiple administrative levels—**25 districts** and **424 neighborhoods**—relating these metrics to socioeconomic variables.	The accessibility index proved more sensitive to inequalities than TPPC. Areas with a higher proportion of elderly residents and low-income populations showed greater access to parks, while areas with higher divorce rates exhibited lower accessibility. The findings indicate that detailed measures incorporating proximity and park size better capture environmental inequalities than simple metrics, providing relevant guidance for urban planning.

56	Assessing the performance of urban open space for achieving sustainable and resilient cities: A pilot study of two urban parks in Dublin, Ireland	2021	To evaluate how urban open spaces contribute to urban resilience and sustainability in the context of climate change and urbanization, proposing a method to assess their socioecological performance.	A methodology was developed using **26 measurable indicators** related to ecosystem services and spatial configuration. The index was applied to two urban parks in **Dublin, Ireland**, as a pilot study to test its usefulness.	The index proved effective in assessing the contribution of urban parks to urban resilience, enabling the identification of strengths and weaknesses in park design. The proposed method serves as a practical tool for urban planners and managers, supporting both the evaluation of existing open spaces and the planning of new ones, reinforcing the integration of urban design and sustainability.
57	The neighborhood socioeconomic inequalities in urban parks in a High-density City: An environmental justice perspective	2021	To investigate how the quantity and quality of urban parks are related to socioeconomic deprivation and the presence of ethnic minorities at the neighborhood level, using Hong Kong as an example of a high-density city.	A total of **102 urban parks** distributed across **209 Tertiary Planning Units (TPUs)** were evaluated. Park quantity and quality were measured objectively between April and June 2018 using **Geographic Information Systems (GIS)** and a **Community Park Audit Tool**.	No direct association was found between the quantity of parks and amenities, safety, or aesthetics with socioeconomic deprivation or ethnic minorities. However, areas with greater socioeconomic deprivation showed higher park quantity but lower diversity of facilities. Neighborhoods with a higher presence of ethnic minorities had parks with fewer facilities and lower diversity, revealing distributive inequalities.

58	The planning and design of good quality urban parks in China: the perspectives of technical professionals	2021	To investigate the factors influencing the quality of urban parks during the planning, design, and investment phases, considering political, technical, and governance barriers.	Interviews were conducted with technical professionals working as consultants for local governments in urban planning and landscape projects across different regions of China.	The study identified three main factors influencing park quality: reliance on quantitative metrics in contemporary planning; the relationship between political will, leader prestige, and administrative engagement; and the importance of technical expertise and effective communication between managers and professionals. These elements directly shape the planning and design of high-quality urban parks.
59	Promoting goal-driven performance evaluation: a case study of an urban park in Florida, USA	2021	To highlight the importance of goal-oriented performance evaluation in landscape projects, demonstrating its application through a case study of an urban park in Florida, USA.	Depot Park was analyzed by assessing its level of achievement in relation to **four project objectives** defined at the outset. The research included a review of the planning process and an analysis of the results achieved.	The study showed that it is possible to verify whether a project is progressing toward its objectives; however, measuring the level of achievement remains challenging. The findings emphasize the need to establish clear goals, benchmarks, and comparative performance measures to improve future evaluations of landscape projects.
60	Urban green spaces for the social interaction, health and well-being of older people— An integrated view of urban ecosystem services and socio-environmental justice	2020	To analyze how older adults use urban green spaces in Berlin (Germany) and which social and health factors influence this use, relating the findings to dimensions of socio-environmental justice.	Comprehensive data were used on park visitation patterns, demographic characteristics, and social networks of older adults, allowing the identification of associations between social context, health, and frequency of park use.	Older adults with strong social ties (children, friends, close neighbors) visit parks more frequently, while socially isolated individuals use green spaces less. In addition, a positive perception of health increases visitation frequency. The study proposes integrating ecosystem services, social ties, and socio-environmental equity into urban planning.

61	Social and Structural Determinants of Self-Rated Health in Gentrifying Neighborhoods in Austin, Texas: A Cross-Sectional Quantitative Analysis	2022	To analyze how social and structural factors influence self-rated health in neighborhoods of Austin undergoing gentrification.	A cross-sectional quantitative study was conducted using multivariate statistical analysis based on population and neighborhood-level data.	C Housing conditions, racial composition, socioeconomic status, and gentrification directly affect perceived health, revealing social inequalities. The study recommends urban planning policies that integrate social justice and health equity.