A Bibliometric Analysis of Current Research and Emerging Trends in Community Landscapes

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Abstract

This study aims to systematically evaluate the research status and key topics related to community landscapes over the past decade (2014-2024) and identify emerging trends in this field. This paper employs bibliometric methods and uses CiteSpace to conduct a visual analysis of 498 articles on the topic of "community landscapes" from the Web of Science database. The results indicate that the number of publications increased from 2014 to 2020 but declined after 2021. Major research institutions include the University of California Santa Cruz and Cornell University. Keyword co-occurrence analysis revealed that terms such as "community garden," "urban agriculture," and "health" are highly frequent, indicating these as research hotspots in community landscapes. Additionally, keyword clustering analysis highlights the importance of community gardens in building community relationships, improving residents' quality of life, and promoting social equity and sustainable development. The study also finds that community landscapes significantly contribute to ecological conservation, biodiversity, and social capital. Keyword burst analysis reveals the research trajectory in the field of community landscapes from early ecological and environmental studies to mid-term urban design and regional studies, and finally to diversified and in-depth explorations in the later period. Future research directions will focus more on technological applications, sustainability, social functions, and cultural dimensions. In conclusion, this study provides a comprehensive overview of the current research status and trends in the field of community landscapes, offering important references and guidance for future research.
Keywords: Community Landscapes, Bibliometric Analysis, Research Trends

Introduce

In the field of urban planning and design, the concept of community landscapes plays a critical role in creating sustainable and livable urban environments. Spatial planning has become an essential tool for achieving sustainable land use patterns and guiding the development of physical infrastructure (Oliveira et al., 2018). The concept of community landscapes is

multifaceted, involving interactions between biodiversity, temporal changes, and community perceptions(Tscharntke et al., 2012). Additionally, the European Landscape Convention emphasizes the importance of understanding the relationships between landscapes, communities, and identities in contentious situations, as local acceptance of landscapes as public goods can be challenging (Giampino et al., 2023). Community landscapes provide a platform for diverse interactions and knowledge sharing, showcasing the rich knowledge base within communities (Duncan et al., 2020). The composition of landscapes, including natural elements such as lakes or terraced landscapes, can impact community well-being and development (Pomatto et al., 2022; Winkler et al., 2013) As discussed by García et al. (2020), community landscapes also play a crucial role in health and community organization. Therefore, studying community landscapes is essential for promoting community engagement, protecting valuable areas, understanding community dynamics, fostering social benefits, enhancing biodiversity, and ensuring environmental, social, and economic sustainability.

Bibliometrics is a commonly used research method for effectively analyzing and describing research trends. These analyses provide researchers with a general overview of research trends in the discipline, show areas for future studies, identify key issues, evaluate the quantitative level and influence of this field on others, and understand its historical pathways or methodologies. Currently, there is a shortage of bibliometric studies on community landscapes. This paper aims to systematically evaluate the research status and focus of studies related to community landscapes over the past decade and identify new trends in this field. So we use CiteSpace to conduct a visual analysis of 498 articles on the topic of "community landscapes" published in the Web of Science (WoS) from 2014 to April 2024. This analysis aims to uncover significant findings and provide insights for future research directions. The rest of the study is organized as follows: Section 2 introduces the research methods and data sources. Section 3 reports the results of the knowledge map analysis. Section 4 summarizes the main content of the knowledge map.

Methods and Date Sources
Method
In this study, a bibliometric approach was used for visualization analysis and CiteSpace was selected from a variety of visualization software programs. It integrates cluster analysis, social network analysis and other methods to identify landscapes, patterns and emerging trends in various fields of study (Azra et al., 2023) Numerous researchers have used CiteSpace for bibliometric analyses, such as visual analyses of corporate social media (Li et al., 2021) and visual analyses in the construction industry (Wang et al., 2020). The tool presents visualizations identifying key research directions, academic collaborations and the evolution of knowledge within different scientific fields(Juan, 2024; Li et al., 2021; Wang et al., 2020). By using the CiteSpace analysis tool, researchers can quantitatively analyze large amounts of literature data, perform visualizations of current research profiles in the field, and identify trends and future directions in each field (Wu et al., 2019).This paper therefore chose to analyze the community landscape using citespace's publication trends, co-occurrence analysis and data clustering methods. These analyses allow researchers to identify research frontiers and trends.

Data Sources
The term "community landscape" serves as the guiding principle for this entire study. The terms "TS=("community landscape" OR "neighborhood landscape" OR "residential landscape" OR "community garden" " were used to search for English publications in the WoS database from January 2014 to April 2024. The study limited the types of literature included to ensure higher quality and more reliable results. Only articles and review articles were selected, and duplicate studies were excluded. The literature that met the research criteria (including complete records and cited references) was exported in plain text format. The literature was then subjected to visual analysis using citespace.

Result
Annual Literature Volume and Growth

发文趋势图

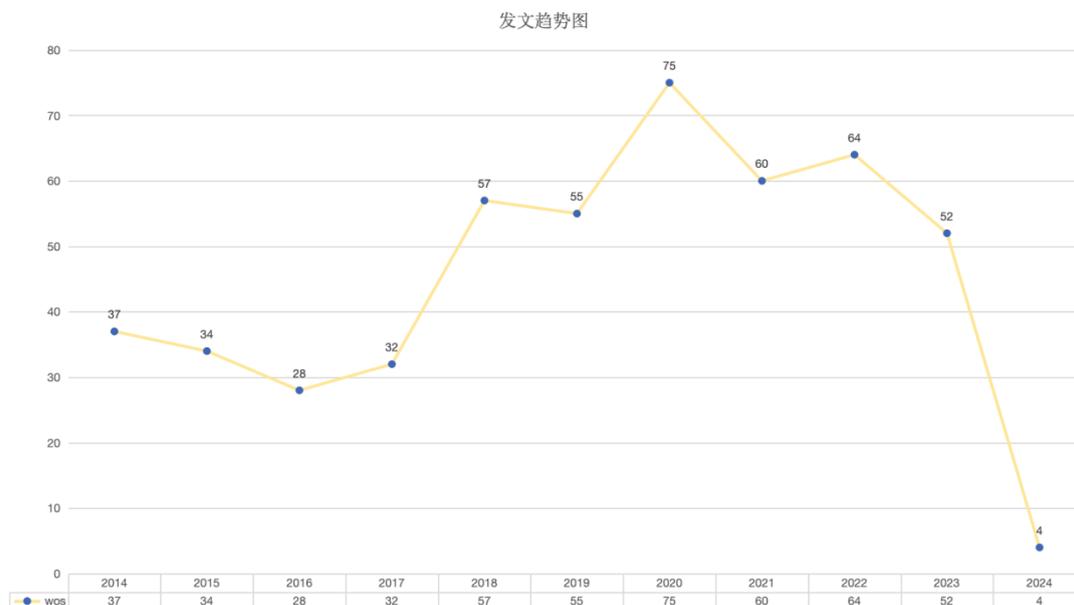|	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
WOS	37	34	28	32	57	55	75	60	64	52	4

Fig. Annual literature volume and growth

Figure 1 shows the changes in the number of publications on the topic of "community landscape" over the ten years from 2014 to 2024. As shown in the figure, the number of publications over these ten years exhibits a fluctuating pattern rather than a simple upward or downward trend. Specifically, starting from 2016, the number of publications shows a steady upward trend, with a notable increase from 32 to 57 between 2017 and 2018. During this period, research on "community landscape" gradually gained more attention, reaching a peak in 2020 with a continuous emergence of related studies. However, from 2021 to 2024, there was a noticeable decline in the number of publications. This may be related to a shift in academic focus, the field reaching a mature stage, or challenges faced in "community landscape" research that require new methodologies and interdisciplinary approaches.

Author Analysis

Fig. 1 Author co-occurrence

Table 1 The top20 Author analysis

Freq	Degree	Author	Year
5	5	Caputo, Silvio	2020
4	10	Mitchell, Rebecca G	2014
4	10	Splietherf, Henry M	2014
4	1	Warner, Laura A	2018
3	1	Egerer, Monika	2020
3	3	Philpott, Stacy M	2020
2	2	Blythe, Chris	2020
2	1	Bichier, Peter	2018
2	1	Bailey, Aisling	2019
2	15	Mardinoglu, Adil	2022
2	15	Ercan, Fatma Betul	2022
2	15	Arikan, Muzaffer	2022
2	15	Hanoglu, Lutfu	2022
2	15	Bayraktar, Abdulahad	2022
2	15	Koc, Fatma	2022
2	15	Gulpinar, Ezgi Aslan	2022
2	15	Gol, Mehmet Fatih	2022
2	15	Koseoglu, Emel	2022
2	15	Kadak, Kubra Sogukkanli	2022
2	15	Kocak, Mehmet	2022

Table 1 lists various authors and their related information, such as frequency, peak, peak start and end times, degree, centrality, PageRank value, and year. These metrics provide insights into the authors' research contributions and impact on the topic of "community landscape." Firstly, in terms of frequency (Freq), Caputo, Silviol has the highest frequency, reaching 5. Caputo's work frequently appeared in 2020, indicating significant influence in that year.

Mitchell, Rebecca G. and Spliethoff, Henry M both have a frequency of 4, tying for second place. Their work appeared multiple times in 2014, showing considerable contributions to the field that year. Warner, Laura A., and Egerer, Monika (with frequencies of 4 and 3, respectively): Their frequent appearances indicate significant impact in 2018 and 2020. Secondly, degree represents the number of collaborations an author has with other authors, while centrality measures an author's relative importance within the network. Together, these metrics reflect the authors' positions and influence within the "community landscape" research network. Mardinogly, Adil (2022), Ercan, Fatma Betul (2022), Arikan, Muzaffer (2022), Hanoglu, Lutfu (2022), Bayraktar, Abdulahad (2022), Koc, Fatma (2022), Gulpinar, Ezgi Aslan (2022), Gol, Mehmet Fatih (2022), Koseoglu, Emel (2022), Kadak, Kubra Sogukkanli (2022), Kocak, Mehmet (2022), Gundogdu, Aycan (2022) all have a degree of 15, indicating high standing in the research field. Finally, the authors' active years are primarily concentrated in 2014, 2018, 2019, 2020, and 2022. This indicates that research on the topic of community landscape was relatively active in these specific years. Overall, from 2014 to 2022, there have been continuous studies on this topic, showing sustained interest in the field.

Institutional Analysis

Fig. 2 Institutional co-occurrence

Table 2

The top 20 institutional analysis

Freq	Burst	BurstBegin	BurstEnd	Degree	Centrality	Sigma	Label	Author	Year
18	0			6	0.01	1	Univ Florida	Univ Florida	2017
12	0			13	0.02	1	Univ Calif Santa Cruz	Univ Calif Santa Cruz	2018
10	0			11	0.03	1	Arizona State Univ	Arizona State Univ	2014
10	3.05	2014	2016	11	0.02	1.06	Cornell Univ	Cornell Univ	2014
7	0			13	0.04	1	CUNY	CUNY	2015
6	0			3	0	1	Univ Washington	Univ Washington	2018
4	0			7	0	1	New York State Dept Hlth	New York State Dept Hlth	2014
4	0			1	0	1	Texas A&M Univ	Texas A&M Univ	2019
3	0			8	0.01	1	Adam Mickiewicz Univ	Adam Mickiewicz Univ	2020
3	0			8	0.02	1	Cary Inst Ecosyst Studies	Cary Inst Ecosyst Studies	2020
3	0			4	0	1	CUNY Brooklyn Coll	CUNY Brooklyn Coll	2015
3	0			2	0	1	Macquarie Univ	Macquarie Univ	2018
3	0			2	0	1	Comenius Univ	Comenius Univ	2020
3	0			1	0	1	Korea Univ	Korea Univ	2015
3	0			1	0	1	Chinese Acad Sci	Chinese Acad Sci	2014
3	0			1	0	1	Swinburne Univ Technol	Swinburne Univ Technol	2016
3	0			1	0	1	Calif State Polytech Univ Pomona	Calif State Polytech Univ Pomona	2014
3	0			1	0	1	Griffith Univ	Griffith Univ	2014
3	0			0	0	1	Chiba Univ	Chiba Univ	2018
3	0			0	0	1	Curtin Univ	Curtin Univ	2014

In the field of community landscape, a total of 266 institutions are involved, as shown in Table 2. The University of Florida had the highest publication frequency, with 18 occurrences in 2017, topping the list. Following are the University of California, Santa Cruz, and Arizona State University, which showed active participation with frequencies of 12 in 2018 and 10 in 2014, respectively. Among them, CUNY had the highest centrality at 0.04. The level of institutional cooperation reflects the extent of communication between influential institutions in the field. As shown in Figure 3, institutions with the same color in the co-authorship network indicate close collaboration in related fields. The metrics of degree and centrality reflect the position

and importance of institutions in the co-occurrence network. The University of California, Santa Cruz, and CUNY have high degree and centrality metrics, with the University of California, Santa Cruz having a degree of 13 and a centrality of 0.02, and CUNY also having a degree of 13 and a centrality of 0.04. These two institutions hold a central academic influence in the field of community landscape and have close ties with other institutions. Additionally, the table lists the names and years of the institutions, providing detailed information on their periods of activity. It can be seen that different institutions contributed to research on the community landscape theme in different years, particularly in 2014, 2018, and 2020, demonstrating the diversity and broad participation in this field.

Keywords Analysis

Fig. 3 Keyword co-occurrence

Table 3

The top 25 keyword analysis

keyword	Freq	Burst	BurstBegin	BurstEnd	Degree	Centrality	Sigma	Year
community garden	170	0			58	0.13	1	2014
urban agriculture	86	0			58	0.12	1	2014
health	78	0			69	0.15	1	2014
city	45	0			54	0.11	1	2015
new york	45	0			51	0.11	1	2014
space	35	0			41	0.06	1	2014
benefit	31	0			51	0.05	1	2014
fruit	29	2.59	2014	2017	57	0.11	1.3	2014
impact	28	0			41	0.1	1	2015
participation	27	0			60	0.11	1	2014
management	26	0			46	0.08	1	2016
ecosystem service	24	0			35	0.04	1	2019
biodiversity	21	0			42	0.07	1	2014
diversity	20	0			48	0.1	1	2014
urban	20	0			37	0.05	1	2014
food	20	0			32	0.03	1	2015
garden	19	0			35	0.04	1	2016
food security	19	0			31	0.04	1	2018
residential landscape	18	2.61	2016	2017	46	0.11	1.32	2014
behavior	18	0			41	0.06	1	2015
green space	18	3.26	2020	2022	30	0.03	1.09	2018
urban garden	16	0			24	0.03	1	2014
sustainability	15	0			29	0.02	1	2017
land use	14	0			35	0.03	1	2014
land	14	0			28	0.05	1	2016

The generated keyword co-occurrence map（Figure 5） and frequency table（Table 3）for the theme of "community landscape" allow for a detailed frequency analysis of keywords in the community garden field. According to Table 3, Freq indicates the frequency of a keyword's occurrence in the literature, with "community garden" having the highest frequency at 170 times. This indicates that "community garden" is a research hotspot in the community garden field, receiving widespread attention. Following this, "urban agriculture" and "health" have frequencies of 86 and 78, respectively. These two keywords are closely related to the sustainable development of community gardens and the health of residents, thus being key focal points for researchers. Additionally, keywords like "city" and "New York," each with a frequency of 45, though relatively lower, reflect the research status of community gardens in different cities and regions. These keywords represent specific research areas or case study subjects, helping to delve deeper into the practice and development of community gardens in various environments. Keywords like "ecosystem service" and "biodiversity" also appear in the table. Although their frequencies are not high, they demonstrate the contributions of community gardens to ecological protection and biodiversity, making them significant research directions in the community garden field. From the distribution by year, most

keyword co-occurrences are concentrated between 2014 and 2016, indicating a peak period of research in the community garden field. Burst indicates the burst activity intensity of a keyword within a specific time period. A non-zero value indicates a significant increase in the use of that keyword during that period. For instance, "Fruit" (2.59) had burst activity between 2014 and 2017, indicating a significant increase in research activity on this topic during that period. "Residential Landscape" (2.61) had burst activity between 2016 and 2017, showing increased attention to residential landscapes. "Green Space" (3.26) had burst activity between 2020 and 2022, indicating increased recent research interest in green spaces. Centrality is also a measure of the importance of nodes in a network, reflecting their position and influence within the network. From the table, we can see that "health" has a relatively high centrality value, indicating that it occupies a core position in the community landscape research network and serves as an important bridge connecting other keywords.

In summary, this keyword co-occurrence map reveals the research hotspots, keyword connections, frequency distributions, and temporal trends in the community landscape field. Through in-depth analysis of these keywords, the results show that research in the community garden field not only focuses on specific urban and regional practices but also covers a wide range of interdisciplinary topics, such as health, ecosystem services, and biodiversity. The intersections of these fields indicate a dynamically developing research area, with future studies likely to further explore the interactions and synergies among these topics, as well as how community gardens can achieve broader social and environmental goals.

Keywords Cluster

Fig. 4 keyword clustering

As shown in Figure 5, the keyword clustering map in the field of community landscape research displays multiple keyword clusters and their related information:
Cluster 0: Mainly focuses on community gardens and their associated social dimensions and horticultural benefits. Tags include community gardens, social dimensions, horticultural benefits, social capital, etc., highlighting the positive role of community gardens in building

community relationships and improving residents' quality of life. The average Silhouette value of this cluster is 0.742, indicating a high degree of keyword correlation within the cluster.

Cluster 1: Mainly discusses residential landscapes and their design, teaching, and other aspects. Keywords in this cluster cover residential landscapes, landscape architectural design, teaching methods, etc., showing their application in landscape design education and practice. It also involves species-area relationships, beta diversity, and food safety, reflecting the intersection of landscape design with ecology and human behavior.

Cluster 2: Focuses on community gardens and urban development in the context of urban agriculture. Tags include community gardens, urban governance, critical race theory, emphasizing the importance of community gardens in promoting urban sustainability and social equity. Additionally, this cluster addresses issues such as food security, the reuse of agricultural brownfields, and community development.

Cluster 3: Primarily focuses on water conservation and irrigation challenges in urban landscapes. Tags include water conservation, residential landscape irrigation, and planned behavior, highlighting the crucial role of water management in urban landscape maintenance. This cluster also investigates social marketing, residential landscape water conservation, and other social practices.

Cluster 4: Concentrates on the history, culture, and organic agricultural practices of community gardens. Tags include names of famous community gardens, main formation, and organic agriculture, reflecting the cultural heritage and environmental practices of community gardens. This cluster also explores topics such as residential buildings, sustainable materialism, and social capital, showcasing the diverse values of community gardens.

Cluster 5: Examines issues related to social ecosystems, food security, and urban green spaces. This cluster emphasizes the role of community gardens in enhancing the urban ecological environment and promoting social development. Tags such as spatial planning and cost-benefit analysis further illustrate its relevance in urban planning and management.

Cluster 6: Investigates the application of environmental psychology in urban agriculture and community gardens. This cluster delves into the practical significance of psychological concepts such as risk perception and planned behavior in horticultural participation and land use optimization. It also addresses social environmental issues like food deserts and green spaces, demonstrating the potential of environmental psychology in solving real-world problems.

Cluster 7: Primarily examines the impact of soil pollutants on urban agriculture and community gardens. Tags in this cluster include soil pollutants, environmental psychology, and planned behavior, indicating a focus on soil health and environmental quality. Additionally, this cluster explores issues related to horticultural participation and the experiences of long-term gardeners, emphasizing the close relationship between people and soil.

Cluster 8: Discusses polycyclic aromatic hydrocarbons and soil issues in community gardens. This cluster examines the impact of atmospheric deposition on soil quality in community gardens and the distribution of pollutants such as black carbon in the soil, highlighting the environmental health and safety challenges community gardens face.

Cluster 12: Examines the age-crime curve and neighborhood effects in community environments. Although these keywords may not be directly related to community landscapes, they provide important insights into the impact of community environments on social behavior.

The keyword clustering information table comprehensively showcases the various research hotspots and interdisciplinary fields within the community landscape domain. Through detailed analysis of each cluster, one can gain a deeper understanding of the connections between interdisciplinary research hotspots and main focus areas in this field.

Keywords Bursts

Top 25 Keywords with the Strongest Citation Bursts

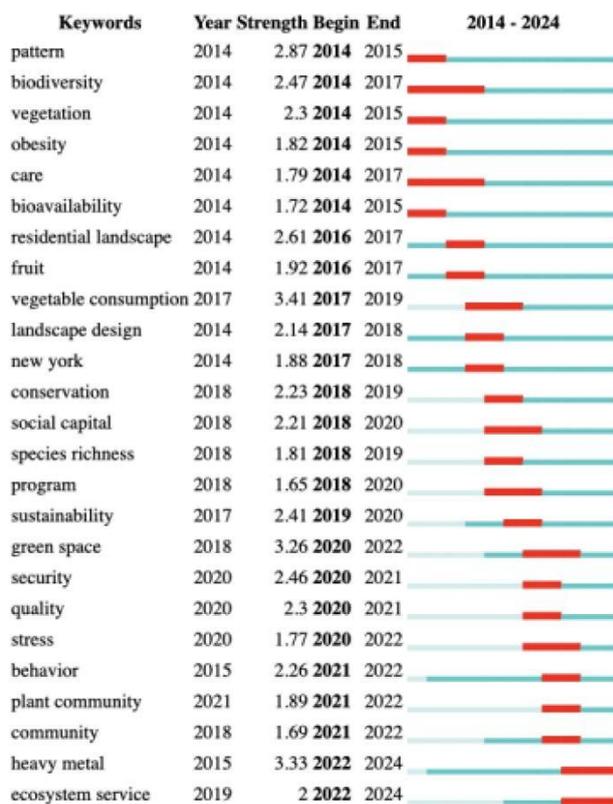| Keywords	Year	Strength	Begin	End	2014 - 2024
pattern	2014	2.87	2014	2015	
biodiversity	2014	2.47	2014	2017	
vegetation	2014	2.3	2014	2015	
obesity	2014	1.82	2014	2015	
care	2014	1.79	2014	2017	
bioavailability	2014	1.72	2014	2015	
residential landscape	2014	2.61	2016	2017	
fruit	2014	1.92	2016	2017	
vegetable consumption	2017	3.41	2017	2019	
landscape design	2014	2.14	2017	2018	
new york	2014	1.88	2017	2018	
conservation	2018	2.23	2018	2019	
social capital	2018	2.21	2018	2020	
species richness	2018	1.81	2018	2019	
program	2018	1.65	2018	2020	
sustainability	2017	2.41	2019	2020	
green space	2018	3.26	2020	2022	
security	2020	2.46	2020	2021	
quality	2020	2.3	2020	2021	
stress	2020	1.77	2020	2022	
behavior	2015	2.26	2021	2022	
plant community	2021	1.89	2021	2022	
community	2018	1.69	2021	2022	
heavy metal	2015	3.33	2022	2024	
ecosystem service	2019	2	2022	2024	

Fig. 5 Top 25 keywords with the Strongest Citation Bursts

As shown in Figure 6, the keyword burst map illustrates the top 25 keywords with the highest citation counts and burst intensity in the field of community landscapes from 2014 to 2024. These keywords reflect the research hotspots and trends in this field.

Early Burst Keywords (2014-2015): Initially, keywords like "pattern," "biodiversity," "vegetation," "obesity," and "care" demonstrated high burst intensity. These terms encapsulate the essential attributes and key focuses of community landscapes, such as ecological diversity, environmental benefits, vegetation patterns, resident health, and community care.

Mid-Period Burst Keywords (2016-2018): As time progressed, the pattern of keyword bursts evolved. In the mid-period, terms such as "residential landscape," "fruit," "vegetable consumption," "landscape design," and "New York" began to appear more frequently. These keywords indicate advancements in community landscapes related to enhancing residents' quality of life, urban design, and regional studies.

Late-Period Burst Keywords (2019-2024): In the later stages, the diversity and depth of keyword bursts increased. Keywords like "conservation," "social capital," "species richness," "program," "sustainability," "greenspace," "security," "quality," "stress," "behavior," "plant community," "community," "heavy metal," and "ecosystem service" emerged as major research topics. These keywords cover a broad spectrum of issues, including ecological conservation, social capital, biodiversity, sustainability, environmental quality, human behavior, and ecosystem services, reflecting the extensive and in-depth research in the community landscape field. Of particular note is the term "heavy metal," which displayed extremely high burst intensity in the late period, underscoring concerns about environmental pollution, especially heavy metal contamination. The keyword "ecosystem service," representing the intersection of community landscapes and ecosystem functions, also maintained steady research interest.

In conclusion, this keyword burst map comprehensively demonstrates the research development trajectory in the community landscape field. From early ecological and environmental foundational research to mid-period urban design and regional studies, and finally to late-period diversified and in-depth exploration, these keywords not only reflect the academic progress in this field but also indicate that future research will focus more on technological applications, sustainability, social functions, and cultural dimensions.

Summary

This study conducts a comprehensive bibliometric analysis of literature on community landscapes from the Web of Science (WoS) database, spanning from 2014 to April 2024. Using CiteSpace for visual analysis, the research systematically evaluates the current state and development trends in the field of community landscape research.

The innovation of this paper lies in its first systematic evaluation of the development in community landscape research over the past decade, identifying key research areas and emerging trends. Through CiteSpace, we gain an in-depth understanding of multiple themes within community landscape research, including community gardens, urban agriculture, water resource management, environmental psychology, and soil health. The study reveals that community landscapes serve as a diverse interaction platform, not only promoting knowledge sharing but also enhancing urban sustainability and social equity.

Key findings include the identification of significant research clusters:Cluster 0: Social dimensions and horticultural benefits of community gardens.Cluster 1: Residential landscape design and its intersection with ecology and human behavior.Cluster 2: Community gardens in urban agriculture and sustainability.Cluster 3: Water conservation and irrigation in urban landscapes.Cluster 4: History, culture, and organic agricultural practices of community gardens.Cluster 5: Social ecosystems, food security, and urban green spaces.Cluster 6: Application of environmental psychology in urban agriculture.Cluster 7: Impact of soil pollutants on urban agriculture.Cluster 8: Polycyclic aromatic hydrocarbons and soil issues in community gardens.Cluster 12: Age-crime curve and neighborhood effects in community environments.

The current state of research shows significant progress in community landscape studies over the past decade, with a notable increase in research output from 2016 to 2020. However,

since 2021, there has been a decline in the number of studies, possibly due to a shift in academic focus or the maturation of the research field.

Regarding research trends, community landscape studies are expanding from a singular focus on the ecological environment to include social, cultural, health，ecosystem servicesand psychological interdisciplinary fields. Future research may further explore the interactions among these themes and how community landscapes can achieve broader social and environmental goals.

Despite its innovation, this study has some limitations. The research data are solely from the WoS database, which may exclude relevant studies from other databases or non-English publications. Additionally, the analysis covers only the period from 2014 to April 2024, potentially missing emerging trends beyond this timeframe. Future research should consider incorporating more data sources and extending the temporal scope for a more comprehensive analysis.

In conclusion, this study provides a detailed knowledge map and guidance for future research directions in the community landscape field. The interdisciplinary results highlight the importance of community landscapes in addressing social, environmental, and urban sustainability issues, offering new perspectives and methodologies for future research.

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