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Review

Exploring the Interplay between Landscape Planning and Human Well-Being: A Scientometric Review

Huixin Wang [1], Jing Xie [1], Shixian Luo [2], Duy Thong Ta [1], Qian Wang [1], Jiao Zhang [1], Daer Su [1] and Katsunori Furuya [1,*]

[1] Graduate School of Horticulture, Chiba University, Chiba 271-8510, Japan; cefa5056@chiba-u.jp (H.W.)
[2] School of Architecture, Southwest Jiaotong University, Chengdu 611756, China
* Correspondence: k.furuya@faculty.chiba-u.jp

Abstract: Numerous studies have indicated that proximity to nature positively affects human well-being. Landscape planning and related techniques have been widely implemented to achieve balance between natural environments and human society, thereby contributing to human well-being. This study examines peer-reviewed empirical research using scientometric analysis and systematic review to clarify how landscape planning enhances human well-being. On analysing 439 documents, we found a significant increase in publications by multidisciplinary teams in this research area from 2016 to date. There was an uneven global distribution of publications, with most institutions cooperating within the same continent. These findings suggest the potential for greater international collaboration in the future. We identified three main research topics in this field, traced their dynamic development, and highlighted intangible values requiring attention. Moreover, we proposed a loop of 'naturalness-landscape structures-landscape services-human well-being' which includes four intermediary steps to illustrate how landscape planning can improve human well-being. This loop clarifies the pathway between landscape planning approaches and human well-being, thus providing a foundation for future research. Overall, this research highlights the conceptual pathways of landscape planning in promoting human well-being and calls for further investigation to fully understand this complex relationship.

Keywords: landscape planning; human well-being; scientometric analysis; science mapping; sustainable development; interdisciplinary analysis

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1. Introduction

Humans have an inherent desire to live content lives, and human well-being, as a broad concept, has drawn interdisciplinary attention [1,2]. Many contemporary global policy documents highlight the significance of pursuing well-being from various perspectives. The promotion of well-being for people of all ages has been emphasised as a sustainable development goal (SDG) [3]. The United Nations (UN) has called for greater focus on well-being when considering improved social and economic outcomes [4]. The definition of 'human well-being' varies across disciplines. According to the World Health Organisation (WHO), well-being is a favourable state that people and societies experience [5]. From a psychological perspective, definitions of subjective well-being emphasise leading a socially valuable life, developing one's abilities, and realising one's potential [6]. The Millennium Ecosystem Assessment (MEA) used a broader definition of well-being that included financial security, individual liberties, positive social interactions, and physical health [7]. Although limited, there is a tendency to associate human well-being with the natural environment. The MEA framework considers the role of ecosystems, indicating that appropriately utilising natural resources can enhance human well-being [7].

The pursuit of human well-being is hampered by various global challenges such as urbanisation [8], climate change [9], the coronavirus disease 2019 (COVID-19) epidemic [10],

and ecosystem degradation [11]. The universal goal of achieving human well-being has attracted extensive interdisciplinary attention [1,2,12]. An illustration of a policy initiative that explicitly connects human well-being with economic well-being at the societal level comes from the Organisation for Economic Cooperation and Development (OECD) [13]. The WHO calls attention to the explication of well-being as a policy framework and states that a paradigm shift is required to broaden its measurement [14]. Moving beyond the straightforward components to assess well-being, such as capital or freedom from disease, leads to the consideration of degrees of spiritual fulfilment and other factors that render the pathways to well-being highly divergent. Exposure to the natural environment and interacting with nature have been widely demonstrated to enhance human well-being, implying that it is one of the potential pathways [15].

The interaction between natural processes and human actions produces the landscape, which, in turn, exerts a certain influence on human society [16]. Landscape planning is an approach that harnesses this influence. It is noteworthy that different contexts have differing understandings and interpretations of the term 'landscape'. Here, we employ the terms 'landscape' and 'landscape planning' based on the consensus views of the academic discipline 'landscape architecture'. In general, landscape planning can be considered a subdiscipline of landscape architecture [17]. According to Dame Sylvia Crowe (1969), landscape planning involves 'creative conservation' and is a continuous process that aims to maximise the use of the limited area on the Earth's surface while preserving its beauty and fertility [18]. Landscape planning also serves as a tool to inventory the resources of the natural environment and propose guidelines for their use [19]. The European Landscape Convention (ELC) defines landscape planning as a proactive measure aimed at improving, rejuvenating, and forming landscapes [20]. Its purpose is to balance conflicting land uses, while protecting the natural and cultural resources that underpin society.

Landscape planning is an effective way to maintain and improve human health and well-being, as demonstrated by numerous empirical studies [21,22]. There is a strong association between greenness in urban areas and human well-being [23]. In the context of rapid urbanisation, residential greenery has been positively linked to life satisfaction among older adults [24]. Urban parks have contributed to the health of city dwellers, particularly during the COVID-19 pandemic [25]. Studies have shown that natural environments provide ecosystem services that promote human well-being. These services can help urban areas address various challenges and become more sustainable [26]. By harnessing the regulatory functions of the ecosystem, cities can improve their resilience against climate change [27]. Additionally, cultural services such as recreational and spiritual benefits have become popular in recent years, alongside more commonly known provisioning, regulating, and supporting services [28].

Various studies indicate that naturalness has a beneficial effect on human well-being. While research in human habitat disciplines suggests promoting human well-being through naturalness, such as biophilic design in architecture [29] and the benefits of sustainable landscape patterns (SLP) in providing stable ecosystem services [30], there is a notable absence of a viewpoint from landscape planning. To effectively balance naturalness and human society, landscape planning and associated techniques must be carefully assessed to understand the connection between natural environments and human well-being. Thus, a comprehensive review that explicitly links landscape planning and related methods to human well-being, and identifies the pathways between them is necessary. Without these theoretical foundations, it would be challenging to apply landscape planning approaches or use related knowledge to develop well-being-oriented policies. Furthermore, it is crucial to distinguish the evolving patterns in landscape planning related to enhancing well-being. This can be achieved by reviewing and analysing previous studies to create a comprehensive and consistent knowledge map. Drawing on these insights, we can identify research gaps and pave the way for more stable and productive future research. To the best of our knowledge, there has not been a comprehensive review or knowledge mapping of 'landscape planning for human well-being' using scientometric analysis.

The ultimate goal of this study is to address the research gap in the theoretical foundation of landscape planning pertaining to human well-being. A thorough scientometric analysis of pertinent peer-reviewed literature was conducted to pinpoint the conceptual framework. The specific objectives behind the proposed aim are to:

1. Identify general patterns in the output of related materials, including basic information on publications, the distribution of related disciplines, and collaboration patterns;
2. Assess the key knowledge map, including the main structure and dynamic development of research topics;
3. Construct a conceptual framework that clarifies the pathways through which landscape planning can enhance human well-being based on the research results.

The remainder of this paper is organised as follows: Section 2 introduces scientometric analysis and the process followed for collecting and analysing data; Section 3 explicates basic information and the knowledge map regarding this topic; Section 4 discusses the proposed conceptual framework, potential directions for future research, and limitations of this study; and Section 5 lists the main conclusions.

2. Materials and Methods

2.1. Scientometric Analysis

Scientometric analysis is gaining popularity as a tool to help academics review substantial scientific material using bibliometric techniques [31]. In contrast to traditional structured literature reviews and meta-analysis, scientometric analysis is a quantitative approach that assesses how individual research combines to generate knowledge mapping of various disciplines and involves examining vast amounts of data. Moreover, researchers believe that this approach can improve rigour and limit subjective bias since the data are analysed using standardised frameworks and software programmes [32]. Scientometric analyses are increasingly favoured in landscape research because of their interdisciplinary nature and the prevalence of ambiguous terminology. These analyses serve as bibliometric tools to close knowledge gaps from a landscape research perspective [33,34].

To evaluate and reveal the structure and dynamics of various disciplines, most scientometric studies utilise several bibliometric methods to identify and measure connections among scientific material, including citation, co-citation, bibliographic coupling, co-author, and co-word, as summarised in Table 1. Citation can reveal the relative impact of publications; co-citation can provide information on connections and relative similarities among publications; and it may change over time, indicating that by interpreting co-citation, scholars can examine the dynamic development of disciplines [35]. Although bibliographic coupling can demonstrate connections between units, it does not change over time [36]. A co-author can be used to examine social networks in research fields. Co-word analysis can help researchers build scientific maps and theoretical frameworks.

Table 1. Common bibliometric methods.

Indicators of Bibliometric Methods	Units of Analysis	Description	Interpretation
Citation	Document	Calculates the impact of articles, authors, or journals using citation rates.	It can offer details on the relative influence of publications.
	Author		
	Journal		
Co-citation	Document	The frequency with which two units are cited together.	It can provide information regarding how the contents of individual units are related to each other. It may vary over time.
	Author		
	Journal		

Table 1. *Cont.*

Indicators of Bibliometric Methods	Units of Analysis	Description	Interpretation
Co-author	Author	Connects authors when they co-author papers.	It can be used to examine social networks in research fields.
	Country		
	Institution		
Co-word	Word	Connects keywords when they appear in the same title, abstract, or keyword list.	It can be used to establish the conceptual structure of research fields.
Bibliographic Coupling	Document	Relates documents, authors, or journals according to how many references they have in common.	It can illustrate the connection between units; the more the bibliographies of two articles overlap, the stronger their connection.
	Author		
	Journal		

2.2. Study Design

As shown in Figure 1, we proposed a workflow based on the recommended standard workflow for scientometric analysis [32], which involves five steps: study design, data compilation, data analysis, data visualisation, and interpretation.

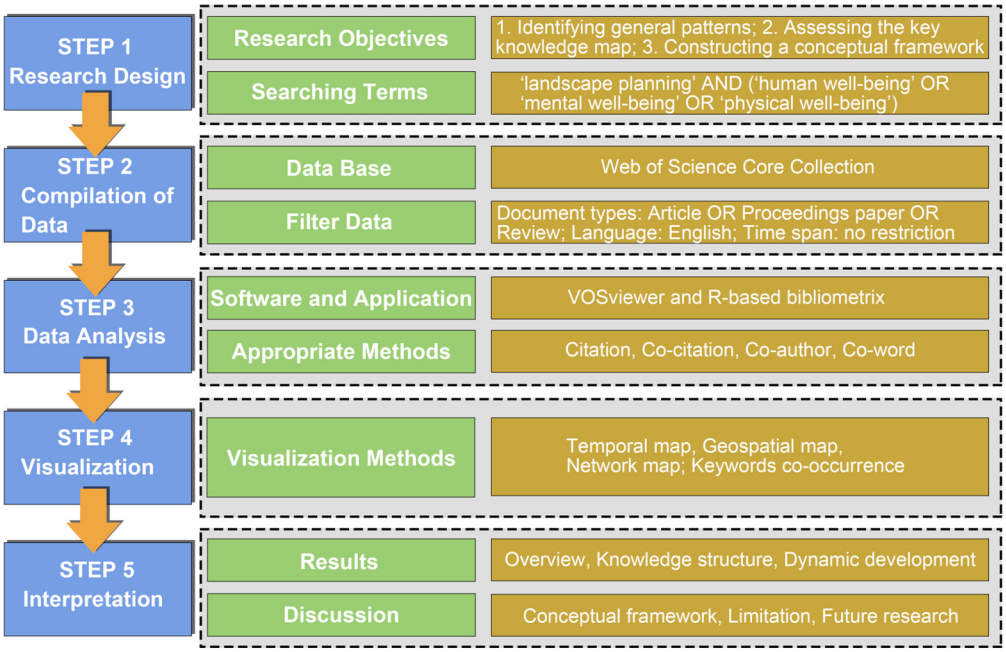


Figure 1. Workflow of this study. Drawn by the author.

2.3. Data Collection

To collect data, we used the Web of Science Core Collection (WoSCC), which is a database of scholarly literature and research that allows users to access and analyse data on scholarly publications, authors, and institutions. It encompasses a wide range of academic disciplines, including the sciences, social sciences, and humanities. The database contains over 33,000 journals and 190,000 conference proceedings from around the world, covering over 150 years of scholarly research [37].

In our literature search, we specifically looked for studies that met the criteria of being published in a peer-reviewed journal and available through WoSCC databases. We did not include books, grey literature, extended abstracts, or presentations. We employed a two-step process to collect and export data from WoSCC. First, on 20 January 2023,

we conducted a topic search in WoSCC using the keywords 'landscape planning' AND ('human well-being' OR 'mental well-being' OR 'physical well-being') without any time restrictions. Subsequently, we manually filtered the literature by excluding non-English material and retaining only articles and reviews. We also eliminated papers from unrelated fields such as medicine, media, food, law, economics, and archaeology after reviewing their titles and abstracts. Finally, 439 documents were obtained and exported to a local database.

2.4. Data Processing

The R-based package Bibliometrix (version 4.0.0) and the software VOSviewer (version 1.6.18) were used to conduct the scientometric analysis. Bibliometrix can perform a quantitative analysis of bibliographic networks [38]. The package provides various functions for data collection, preparation, and visualisation, and includes a number of metrics for evaluating the structure and importance of nodes in a network. VOSviewer is a Java-based software tool for creating and visualising bibliometric maps that features graphical knowledge maps in an easy-to-interpret way [39]. Both are open-source and easy to access. We used Bibliometrix to conduct a descriptive statistical analysis of our dataset and Bibliometrix and VOSviewer to analyse and visualise networks of scientific collections.

3. Results

3.1. Basic Information about the Research Topic

As shown in Table 2, we selected 439 documents that were published by 197 sources from 1992 to date. The annual growth rate of all the data was 4.57%, and the average age of each document was 4.95 years, indicating that most of the data were produced in recent years, even though the database ranged from 1992 to 2023. Regarding authors' information, only 39 studies were single-author documents. Co-authors per document were 4.4, showing that in this research topic, scholars intend to collaborate, highlighting its interdisciplinary nature. Moreover, the ratio of international co-authorship was 40.77%, indicating that the connections among researchers from different countries and regions were stable.

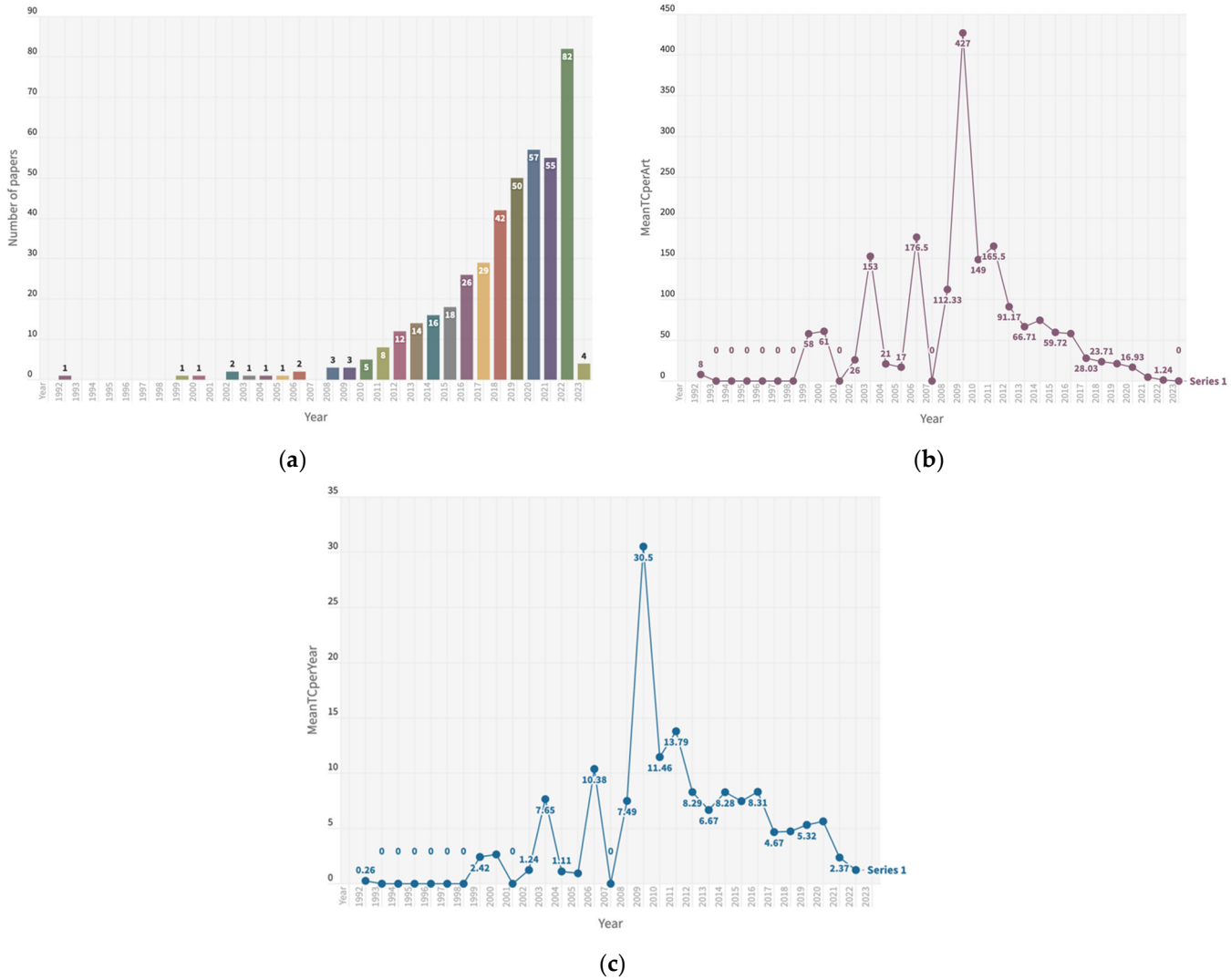
Table 2. Data from the bibliometric analysis.

Description	Results
DESCRIPTION OF DATA	
Timespan	1992–2023
Sources	197
Documents	439
Annual growth rate %	4.57
Average age of documents	4.95
Average citations per document	32.99
References	25,474
DOCUMENT CONTENTS	
Keywords plus (ID)	1147
Author's keywords (DE)	1581
AUTHORS	
Authors	1778
Solo authors	39
AUTHORS COLLABORATION	
Single-authored docs	39
Co-authors per document	4.4
International co-authorships %	40.77
DOCUMENT TYPES	
Article	405
Review	34

3.1.1. Annual Publications

The distribution of annual publications is shown in Figure 2. Figure 2a depicts the overall trend of publications on this topic, which we divided into three major periods:

period one, 1992–2009; period two, 2010–2015; and period three, 2016–present. Few studies discussed landscape planning and human well-being in period one, from 1992 to 2009. Period two (2010–2015) witnessed a consistently slow increase in the number of publications per year. Period three, from 2016 to the present, saw a significant increase in the total number of publications per year compared to previous periods. Although the number of papers in 2021 was lower than that in 2020, the trend in this period can still be considered growing. In addition to the number of studies, citation patterns are crucial because they represent impact and influence [40]. These patterns are shown in Figure 2b,c, namely, the mean total citations per article and per year, respectively. It is worth noting that there were only three publications in 2009, but the mean total citations per article was the highest because a document with a citation of 1170 was published in 2009 [41]. Overall, the citation patterns did not show a regular trend and were distributed unevenly across each of the studied periods.



(**a**) (**b**)

(**c**)

Figure 2. Information on annual publications from 1992 to 2023: (**a**) total publications; (**b**) mean total citations per article (MeanTCperArt); and (**c**) mean total citations per year (MeanTCperYear).

3.1.2. Distribution of Research Disciplines

We organised the top ten research fields in which all the works of literature were involved based on the Web of Science (WoS) categories (Table 3). Among the 439 documents, 172 were from environmental sciences, 170 from environmental studies, 104 from ecology, and 63 from urban studies. The distribution of research disciplines significantly illustrates

the multidisciplinary nature of landscape planning for human well-being, which can be divided into three broad research areas: environmental research, spatial planning, and geography. Hence, most related studies combined the natural sciences and social sciences.

Table 3. Distribution of research disciplines.

No.	Fields	Quantity	Proportion
1	Environmental Sciences	172	39.18
2	Environmental Studies	170	38.72
3	Ecology	104	23.69
4	Urban Studies	63	14.35
5	Green Sustainable Science Technology	49	11.16
6	Geography	44	10.02
7	Geography Physical	41	9.34
8	Forestry	40	9.11
9	Regional Urban Planning	39	8.88
10	Biodiversity Conservation	36	8.2

3.1.3. Distribution of Countries and Regions

Publications were from across 77 countries and regions. We determined the geographic distribution of all data based on the first author's affiliation. As shown in Figure 3b, China is the most productive country on this topic, with 200 papers published, followed by the United States with 188, Germany with 106, the United Kingdom with 72, and Australia with 60. The United States is the most influential country with regard to this topic, with 4532 total citations; Germany comes in second with 1576; the United Kingdom is third with 1115; China is fourth with 855; and Australia is fifth with 755 (Figure 3a). Figure 4 depicts the geographical distribution of papers on a world map; the darker the colour, the greater the number of papers. The majority of research on this topic has been conducted by countries in the global north, indicating that the Global South may have more unexplored potential to discuss landscape planning for human well-being.

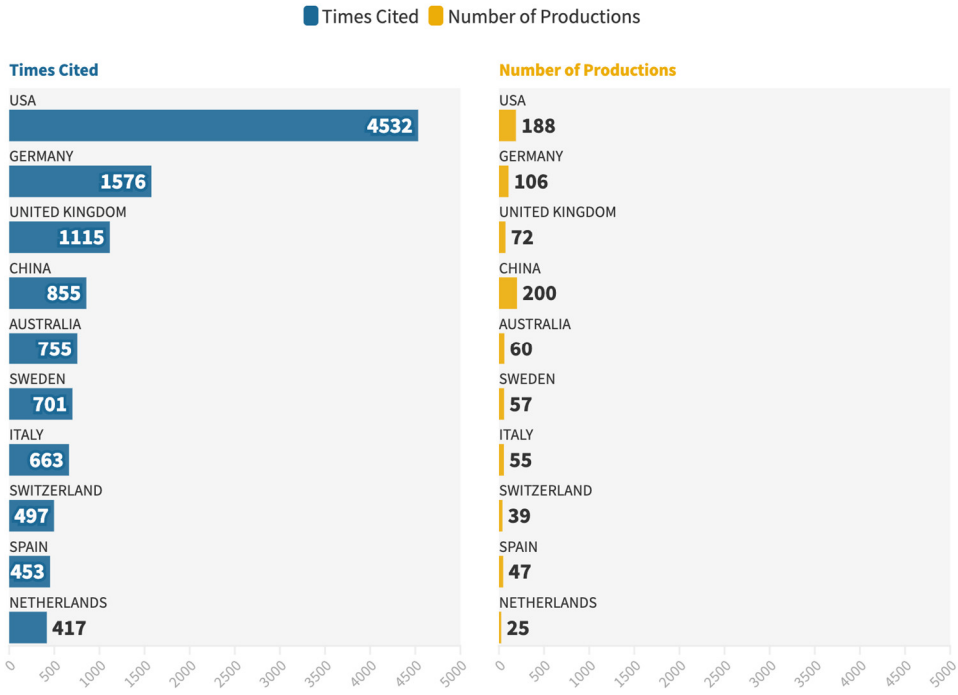


Figure 3. Country scientific production. (**left**) Times Cited. (**right**) Number of productions.

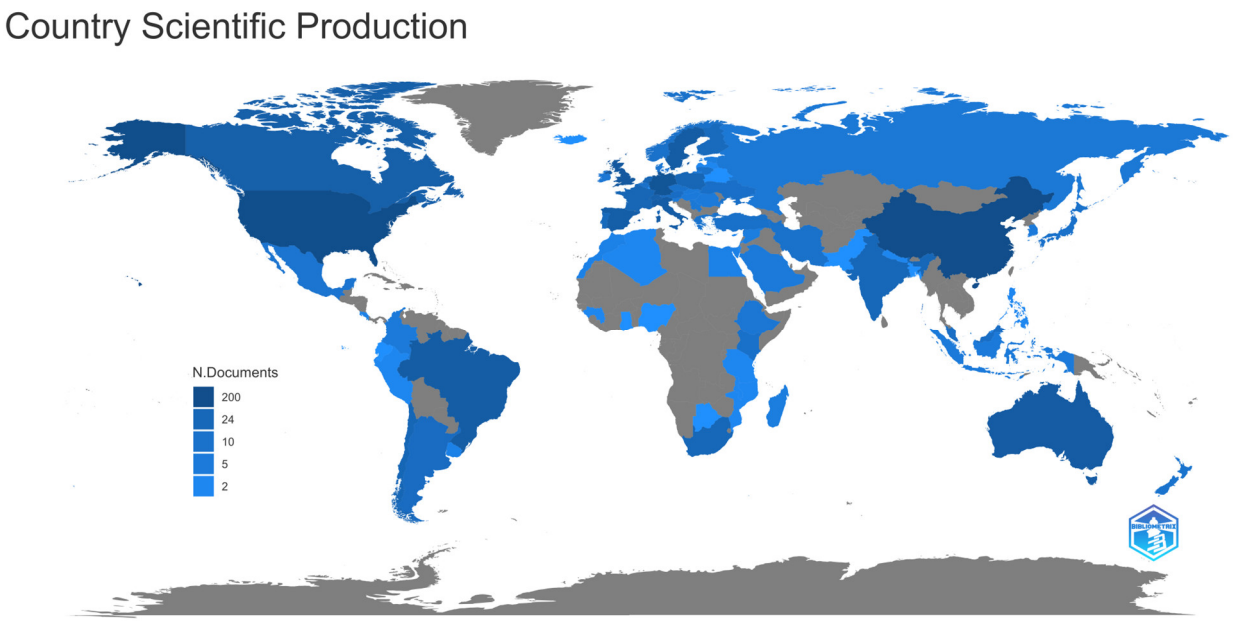


Figure 4. Geographical distribution of scientific productions.

3.1.4. Highly Influential Related Materials

Highly cited research articles serve as helpful markers in identifying 'world-class' research [42], reflecting the impact of these sources on certain research topics. We identified the top 10 most influential papers based on total citations, as shown in Table 4. Among them, only one is an empirical study; most are reviews, attempts at proposing theoretical frameworks, and compilations of research trends on how to promote human well-being through various methods involved in landscape planning. The most frequently cited paper presented a conceptual framework and outlined a strategic approach for delivering on the promise of ecosystem services, drawing on examples from Hawaii [41]. Following a systematic review, we identified four papers that attempted to improve human well-being from environmental and ecological standpoints, whereas six discussed optimising human well-being by combining interdisciplinary perspectives, with spatial planning playing a key role.

Table 4. The top 10 of the most cited papers from 1992 to 2023.

No.	Title	Author (Year)	Total Citations	TC per Year	Research Areas
1	Ecosystem services in decision-making: time to deliver [41].	Daily, G.C., 2009	1164	77.60	Environmental Sciences and Ecology
2	The health benefits of urban green spaces: a review of the evidence [43].	Lee, A.C.K., 2011	818	62.92	Public, Environmental, and Occupational Health
3	The impacts of nature experiences on human cognitive function and mental health [44].	Bratman, G.N., 2012	522	43.50	Biodiversity and Conservation
4	Urban ecology and sustainability: the state-of-the-science and future directions [45].	Wu, J.G., 2014	477	47.70	Environmental Sciences and Ecology
5	Motivations for conserving urban biodiversity [46].	Dearborn, D.C., 2010	369	26.36	Biodiversity and Conservation

Table 4. *Cont.*

No.	Title	Author (Year)	Total Citations	TC per Year	Research Areas
6	People needs in the urban landscape: analysis of landscape and urban planning contributions [47].	Matsuoka, R.H., 2008	308	19.25	Environmental Sciences and Ecology
7	The impact of blue space on human health and well-being salutogenetic health effects of inland surface waters: a review [48].	Volker, S., 2011	296	22.77	Public, Environmental, and Occupational Health
8	Vitamin G: effects of green space on health, well-being, and social safety [49].	Groenewegen, P.P., 2006	259	14.39	Public, Environmental, and Occupational Health
9	Benefits of nature contact for children [50].	Chawla, L., 2015	237	26.33	Public Administration
10	Riparian ecosystems in the 21st century: hotspots for climate change adaptation? [51].	Capon, S.J., 2013	217	19.73	Environmental Sciences and Ecology

Note: TC per year is the total number of citations for each paper in every year, and research areas were categorised using the Web of Science (WoS).

Our database contained 439 papers published by 197 sources. Based on the H-index, calculated as a journal that has at least H papers cited more than H times, we extracted the 10 most influential academic journals on this research topic (Table 5). As illustrated in Table 5, the most influential journal is *Landscape and Urban Planning* (1488 citations), followed by *Ecosystem Services* (915 citations), *Urban Forestry and Urban Greening* (546 citations), *Sustainability* (265 citations), *Land Use Policy* (238 citations), *Landscape Ecology* (340 citations), *Ecological Indicators* (366 citations), *International Journal of Environmental Research and Public Health* (390 citations), *Journal of Environmental Management* (416 citations), and *Science of the Total Environment* (258 citations). We argue that all the sources can be covered by three primary research areas: environmental research, spatial planning, and geography.

Table 5. The top 10 sources based on H-index from 1992 to 2023.

No.	Sources	TC	TP	H-Index	Web of Science Categories
1	*Landscape and Urban Planning*	1488	27	18	Ecology; Environmental Studies; Geography; Geography, Physical; Regional and Urban Planning; and Urban Studies
2	*Ecosystem Services*	915	17	14	Ecology; Environmental Sciences; and Environmental Studies
3	*Urban Forestry and Urban Greening*	546	19	10	Plant Sciences; Environmental Studies; Forestry; and Urban Studies
4	*Sustainability*	265	31	9	Green and Sustainable Science and Technology; Environmental Sciences; and Environmental Studies
5	*Land Use Policy*	238	16	8	Environmental Studies
6	*Landscape Ecology*	340	10	8	Ecology; Geography, Physical; Geosciences, and Multidisciplinary
7	*Ecological Indicators*	366	12	7	Biodiversity Conservation and Environmental Sciences

Table 5. *Cont.*

No.	Sources	TC	TP	H-Index	Web of Science Categories
8	*International Journal of Environmental Research and Public Health*	390	12	7	Environmental Sciences Public, and Environmental and Occupational Health
9	*Journal of Environmental Management*	416	13	7	Environmental Sciences
10	*Science of the Total Environment*	258	9	7	Environmental Sciences

Note: TP is total papers; TC is global total citations; and an H-index is defined as a journal that has at least H papers cited more than H times.

3.1.5. Collaboration Patterns

Collaboration patterns can reflect the network of academic societies and the structure of a research topic [52]. We clarified the cooperative relationships among authors, institutions, and countries to present the collaboration patterns on this topic (Figure 5). Figure 5a shows that several co-authorships have been constructed, indicating a strong research network. For instance, several profound works emerged from such collaborations, including an empirical study that identified six potential Green Infrastructure (GI) hubs providing multiple ecosystem services for human well-being in Sweden [53]. According to Figure 5b, as the most productive institution on this topic, Beijing Normal University (17 articles published) has established a network with Peking University, China University Geosciences, and Arizona State University. Several collaboration networks have been built among different institutions. However, most affiliations tend to cooperate with units from the same continent, reflecting the great potential for conducting global research projects to promote knowledge development. Figure 5c shows that the most productive country, China, with 200 published papers, and the most impactful country, the US, with 4532 citations, have established academic connections with each other, and both have stable networks with other countries. Similarly, connections between countries occur on the same continent, indicating that global cooperation is possible in the future.

3.2. Knowledge Map of the Research Topic

There are two main procedures in scientometric analysis: performance analysis and science mapping [54]. In this section, we introduce the science mapping of this research area, combining visualisation views and systematic analysis.

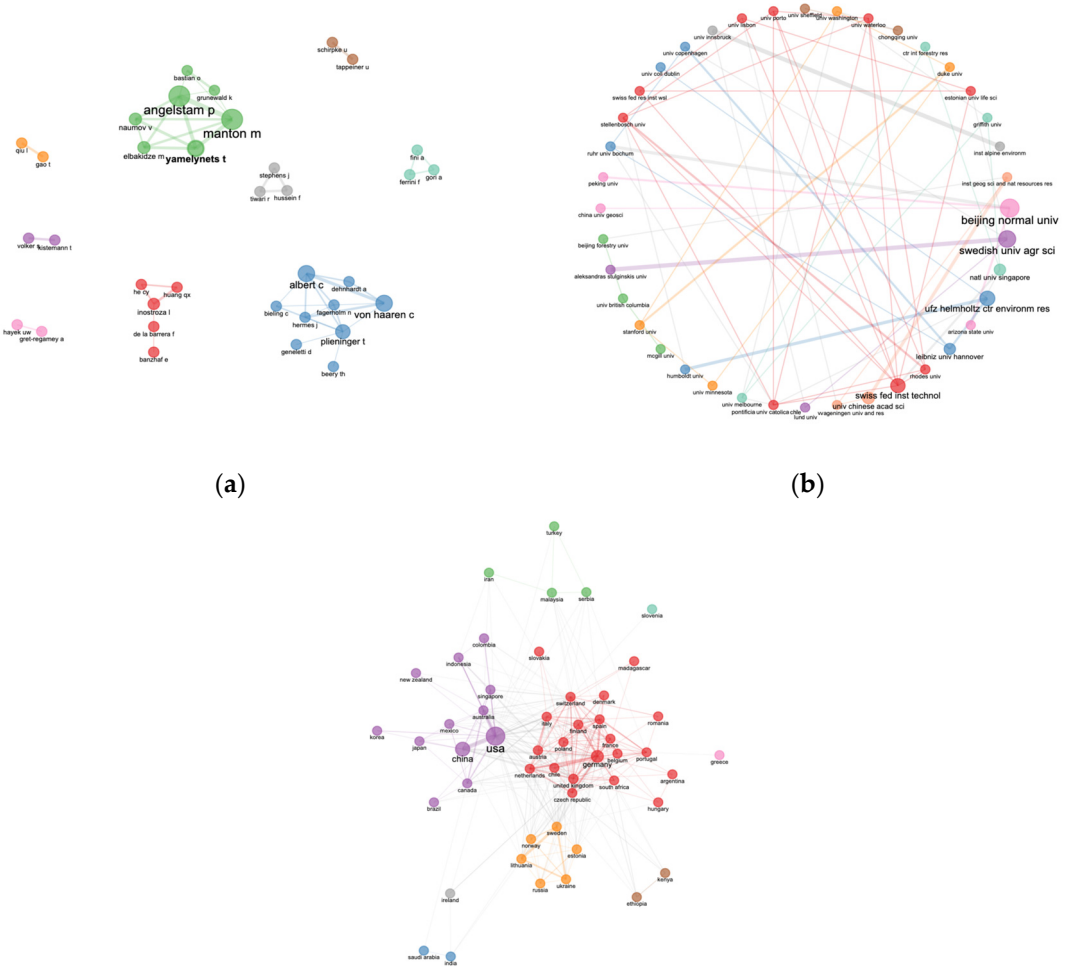
3.2.1. Main Research Keywords

We can obtain an overview of the essential subjects covered in landscape planning for human well-being by analysing the most frequently appearing keywords from a large number of papers. The WoSCC states that there are two different types of keywords: 'Author Keywords', which are terms that authors have included in published articles on their own, and 'Keywords Plus', which gives users a list of related, more specialised terms that can help them broaden or narrow their searches [55]. The WOS database generates Keywords Plus, which offers a mechanism for identifying pertinent phrases and concepts related to a study topic, making it simpler to find articles and material.

The top 15 Keywords Plus were obtained using the R package Bibliometrix and were based on frequency (Table 6). To enhance the accuracy of the results, the terms 'landscapes' and 'landscape' were merged into one term, 'landscape', prior to conducting the analysis.

We divided the keywords into three main categories: ecology (ecosystem services, biodiversity, conservation, and climate change); spatial planning (health, land-use, impacts, cities, areas, and urbanisation); and governance (management, framework, indicators, and challenges). Since 'landscape' is the primary focus of this research area, we argued that it belongs to all three categories. This result aligns with the assertion that landscape

planning must bridge scientific knowledge on ecosystems and socio-spatial systems with changing land-use processes and other factors affecting decision-making in landscape governance [56].



(**a**) (**b**)

(**c**)

Figure 5. Collaboration patterns, (**a**) authors, (**b**) institutions, and (**c**) countries. The same colour of the bubbles shows the same cluster, which has a collaborative connection. The thickness of the line reflects the closeness of the partnership, while the bubble size indicates the number of articles.

Table 6. The top 15 keywords ranked by frequency.

No.	Keywords	Frequency
1	landscape	103
2	ecosystem services	79
3	biodiversity	68
4	management	64
5	conservation	55
6	health	51
7	framework	47
8	land-use	41
9	impacts	33

Table 6. *Cont.*

No.	Keywords	Frequency
10	city	29
11	indicators	29
12	climate-change	28
13	areas	27
14	challenges	27
15	urbanisation	27

3.2.2. The Main Structure of Research Topics

By analysing keyword co-occurrence, we can identify the main structure of research topics and, thus, establish the conceptual structure of the research field. We used VOSviewer to conduct a keyword co-occurrence analysis by analysing Keywords Plus from our database. It is noteworthy that we made modifications to improve the precision of the results by merging synonyms. Specifically, 'environments' was consolidated into 'environment', 'green spaces' became 'green space', 'perceptions' became 'perception', 'well-being' was incorporated into 'human well-being', 'climate-change' was changed to 'climate change', 'landscapes' was replaced by 'landscape', and 'preferences' was merged into 'preference'. The minimum number of keyword occurrences was ten, and 56 met the threshold out of the 1143 keywords. As shown in Figure 6, the three main research topics are based on three clusters. Table 7 outlines the specific keywords for each cluster and their corresponding main topics and references.

Cluster 1: Manage natural capital using landscape planning methods to promote human well-being.

With the advent of the Anthropocene, human beings are facing serious issues such as the degradation of ecosystem services [57]. The MEA defined ecosystem services and highlighted their connection to human well-being, generating a growing interest in the identification and management of natural capital [7]. The landscape scale, which combines human behaviours and natural resources such as multiple ecosystems, has the potential to conduct complementary research on sustainability [58]. As shown in Figure 6, ecosystem services are a crucial concept that must be studied comprehensively. They serve as links between human behaviour and natural capital, making it difficult to achieve human well-being without identifying, assessing, managing, and implementing it. Researchers have proposed an assessment framework and tool to identify how natural sources contribute to human well-being [41]. Other methods, such as non-market assessment, are also very effective when considering the utilisation of ecosystem services [59]. Through a systematic review, scholars found that regulatory and cultural services, which are two categories of ecosystem services, are vital for promoting human health [60]. There is a growing trend to expand the scope of ecosystem services studies to include cultural and value aspects, incorporating these findings into land-use and policy decisions [27,61].

Cluster 2: Identify health benefits from landscape sources to enhance human well-being from a socio-spatial planning perspective.

Multiple studies have demonstrated that various landscape sources can provide health benefits for human well-being [44]. Scholars have made considerable efforts to uncover the mechanisms that determine the natural resources and health benefits that humans can access and how they operate. We summarise these studies in three dimensions. First, two main types of landscape sources are usually discussed: green spaces [43] and blue spaces [48]. Many studies have used empirical cases to demonstrate the connection between different types of green spaces and human well-being [62]. According to research conducted on-site in Germany, water is a powerful predictor of preference and pleasant sensory

experiences in urban landscapes, suggesting that urban blue space may be therapeutic [63]. Second, researchers have focused on different groups of people who benefit from landscape environments [24,50,64]. Based on these findings, it is apparent that individuals from different socioeconomic backgrounds may experience varying benefits. Therefore, it is crucial for researchers to focus on populations of low economic status to promote equity. We also suggest that future research should be directed towards the Global South since, as Section 3.1.3 highlights, there is limited available evidence from these regions. Third, scholars are concerned about the various outcomes from which people can abstain. These were classified as mental health [65], physical health [66,67], and mixed outcomes [68,69].

Cluster 3: Create a sustainable living environment against global ecological challenges caused by urbanisation.

Urbanisation is an irresistible process, and the UN predicts that 68% of the world's population will reside in cities by 2015 [70]. We should carefully consider how urbanisation affects human well-being, especially from an ecological standpoint, as a large body of research has proven that it has a detrimental impact on ecosystems [45]. There are many landscape planning-based solutions to create a more resilient urban area and thus improve human well-being. Green infrastructure is one such promising and advanced strategy [71]. The European Commission issued a policy document, titled 'Green Infrastructure Enhancing Europe's Natural Capital', to draw attention to this powerful tool for connecting ecosystem functions and human well-being [72]. Mosler and Hobson proposed a conceptual principle and used an empirical case to illustrate how to combat urban ecological issues by applying urban green infrastructure [73]. Tzoulas et al. argued that green infrastructure could be beneficial to both ecosystems and human well-being in urban areas [74]. Specifically, various urban green spaces, such as historical green spaces [75], public parks [76], and urban forests [77], have been shown to positively impact sustainable urban environments and human well-being. The urban environment is a critical aspect of life for the majority of the population; to achieve one of the UN's SDGs, namely 'Make cities and human settlements inclusive, safe, resilient, and sustainable', it is crucial to utilise all available methods of landscape planning to maximise the benefits of the surrounding natural environment [78].

These three clusters are interconnected and interdependent, rather than having clear-cut boundaries and existing in isolation. They interact and influence each other to create a comprehensive knowledge map of 'landscape planning for human well-being'.

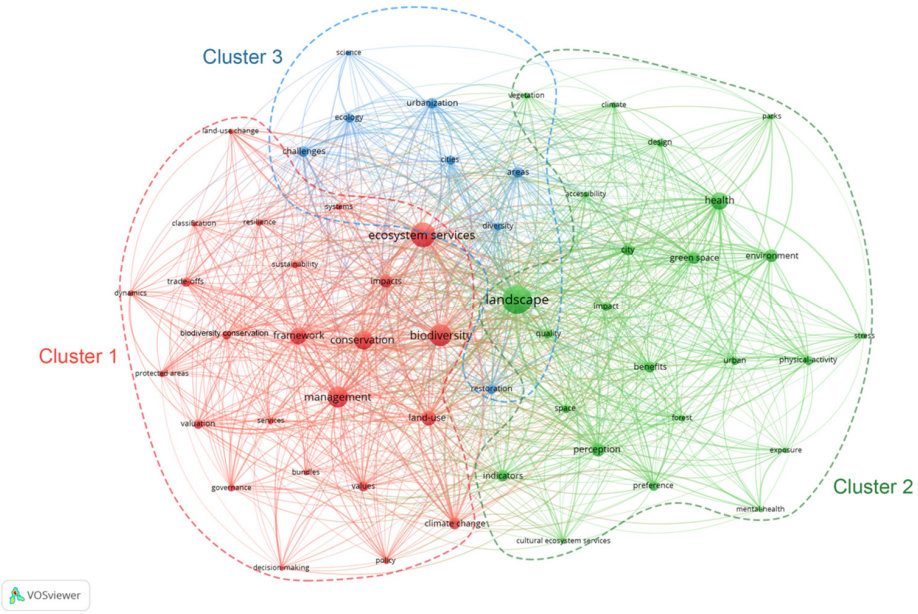


Figure 6. The main structure of research topics based on keyword co-occurrence.

Table 7. Three major research topics and main references.

No.	Keywords Co-Occurrence	Main Topic	Main References
Cluster 1	ecosystem services, biodiversity, conservation, framework, management, land-use, services, valuation, bundles, governance, values, climate change, policy, decision-making, protected areas, impacts, sustainability, trade-offs, dynamics, classification, resilience, system	Manage natural capital using landscape planning methods to promote human well-being.	MEA, (2005) [7]; Daily et al., (2009) [41]; Wu, (2013) [58]; Hausmann et al., (2016) [59]; Jackson et al., (2013) [60]; Schaich et al., (2010) [61]; and Bachi et al., (2021) [27]
Cluster 2	landscape, health, green space, health, environment, perception, indicators, preference, mental-health, exposure, cultural ecosystem services, forest, space, benefits, urban, physical-activity, impact, city, design, parks, accessibility, climate, vegetation	Identify health benefits from landscape sources to enhance human well-being from a socio-spatial planning perspective.	Bratman et al., (2012) [44]; Lee and Maheswaran, (2010) [43]; Völker and Kistemann, (2011) [48]; Hadavi, S., (2017) [62]; Völker and Kistemann, (2013) [63]; Ode Sang et al., (2016) [64]; Liu et al., (2022) [24]; Chawla, (2015) [50]; Gerstenberg and Hofman, (2016) [65]; Villeneuve et al., (2012) [66]; Demoury et al., (2017) [67]; Gao et al., (2019) [68]; and Huang et al., (2020) [69]
Cluster 3	urbanization, cities, areas, diversity, restoration, challenges, ecology, science	Create a sustainable living environment against global ecological challenges caused by urbanization.	UN, (2018) [45]; Coutts and Hahn, (2015) [71]; EEA [72]; Mosler and Hobson, (2021) [73]; Tzoulas et al., (2007) [74]; Rostami et al., (2015) [75]; Syrbe et al., (2021) [76]; and Cavender and Donnelly, (2019) [77]

3.2.3. Dynamic Development of Research Topics

Topic evaluation can aid in understanding how knowledge is transferred across research domains and encourages researchers to identify trends for future studies [79]. We determined the dynamic development of research topics using Bibliometrix and VOSviewer to analyse and visualise the results, respectively. Based on the annual publishing distributions, we separated the period into three: subperiod one, 1992–2009; subperiod two, 2010–2015; and subperiod three, 2016–present, to help elucidate the trend. The subtle thematic development of these three subperiods is shown in the Sankey diagram (Figure 7). By combining systematic analysis and data visualisation, we found that early research on landscape planning and human well-being mainly focused on large-scale assets such as national parks [80,81] and protected areas [82]. Publications in this field rose in subperiod two along with the release of significant policy documents, such as the ELC, and a few global environmental concerns, such as urbanisation and environmental degradation. As subperiod three ended, ecosystem services began to receive more attention, which led to their emergence as crucial content when considering landscape planning, as discussed in Section 3.2.2.

Figure 8 shows the evolution of keyword co-occurrence. The colour of each keyword in the overlay visualisation view corresponds to the keyword's average publication year as determined by the VOSviewer algorithm. Studies on ecosystem services have underlined the significance of cultural aspects and dug deeply into their non-material qualities, which represent a substantial conversion. Without concern for cultural ecosystem services, landscape planning may lead to the loss of cultural landscapes and hinder well-being [83]. This transition emphasised the interdisciplinary features of landscape planning, which combines the natural and social sciences to accomplish sustainable development and, therefore, enhance human well-being. Recent studies have also highlighted the issue of trade-offs, noting that failure to account for the perspectives of various stakeholders can result in misaligned policy implementation [84].

In analysing the evolution of these research topics, it is evident that increasingly explicit and nuanced aspects are being explored, and future research should continue this trend towards a more detailed understanding of knowledge mapping in landscape planning for human well-being.

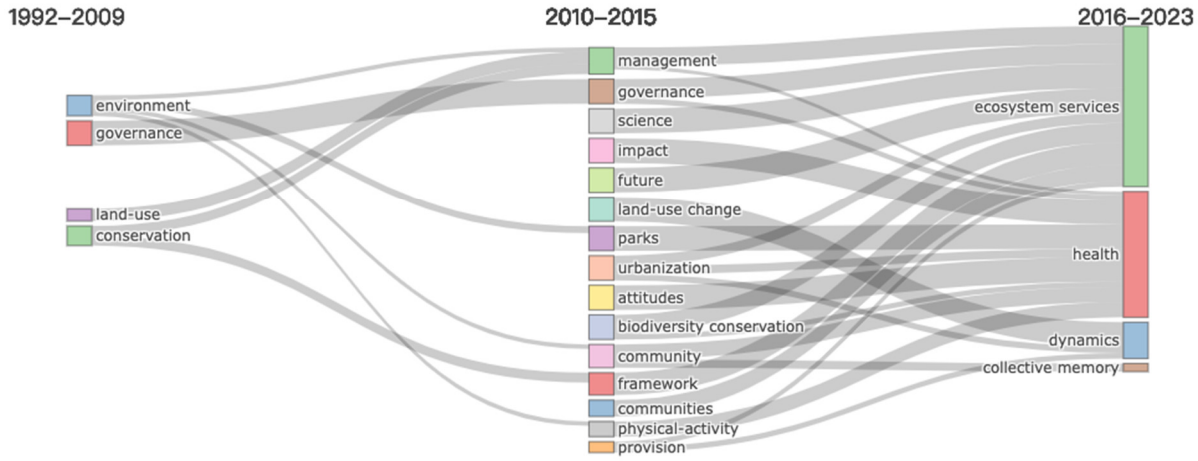


Figure 7. Sankey diagram based on the thematic evolution of Keywords Plus.

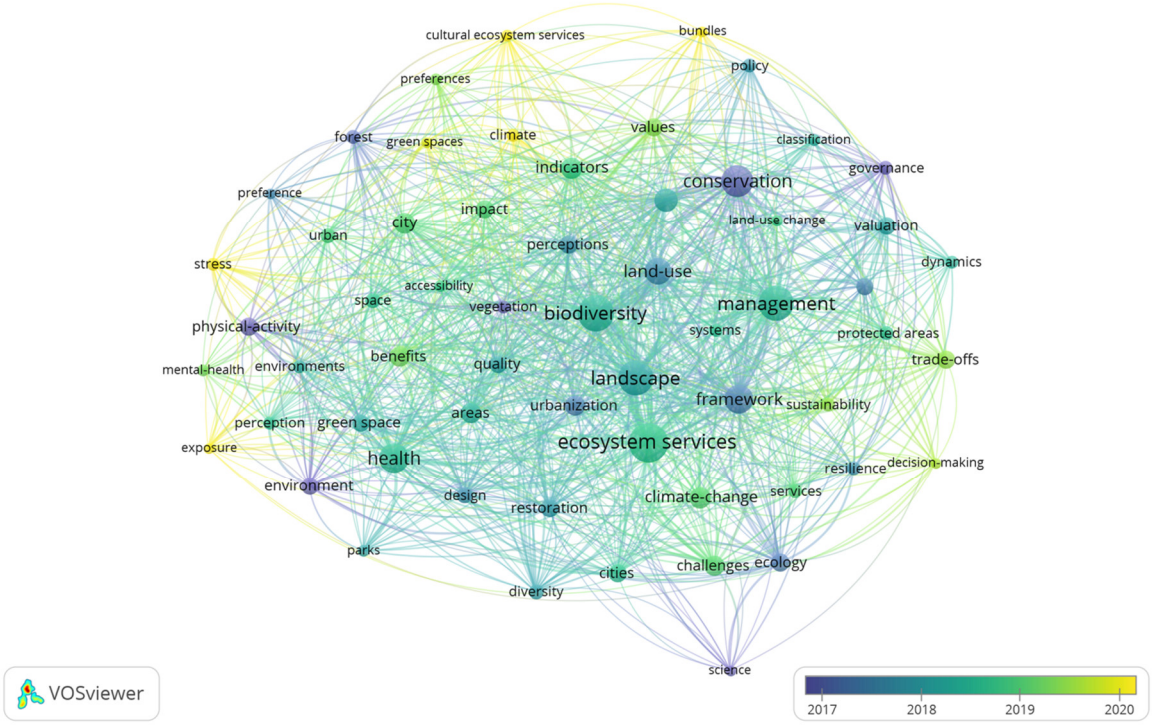


Figure 8. Dynamic development of keyword co-occurrence.

4. Discussion

4.1. How Can Landscape Planning Promote Human Well-Being?

Based on our bibliometric and systematic analyses, we propose a conceptual framework (Figure 9) to demonstrate how landscape planning can be employed to enhance human well-being. This model follows a 'naturalness-landscape structures-landscape services-human well-being' loop, wherein different landscape planning-based methods and theories function as crucial intermediary steps that connect natural capital and human well-being Table 8 outlines the various representative methods and tools that can be employed in this loop.

Table 8. Outlines of crucial intermediary steps and corresponding approaches.

Crucial Intermediary Steps	Approaches and Tools Utilising Landscape Planning in Response	References
Utilise	Functional analysis and valuation before decision-making.	de Groot, (2006) [19]; Fürst et al., (2014) [85]; and Requena-Mullor et al., (2018) [86]
	Assigning monetary values to natural environment to enhance land use policy.	Chan et al., (2011) [87]; Albert et al., (2017) [88]; and Sannigrahi et al., (2020) [89]
	Optimising benefits from nature involves integrating conflicting interests and overlaps among stakeholders.	Skubel et al., (2019) [90] and Paing et al., (2022) [91]
Identify	Exploring how various landscape structures impact different groups of people positively.	Ode Sang et al., (2016) [64]; Liu et al., (2022) [24]; and Dan et al., (2021) [92]
	Mapping the benefits people obtain from landscape structures.	Elbakidze et al., (2017) [53]; Arnaiz-Schmitz et al., (2021) [93]; and Bachi et al., (2021) [27]
	Evaluating the quality of landscape structures.	Roy et al., (2022) [94]; Pukowiec-Kurda, (2022) [95]; and Atasoy, (2018) [96]
Manage	Developing guidelines for the design of landscape structures based on the needs of people.	Hu et al., (2022) [97]; Jaszczak et al., (2021) [98]; and Beery et al., (2017) [99]
	Providing conceptual models to support spatial planning.	Mycoo, (2018) [100]; Lafortezza et al., (2013) [101]; and Coutts and Hahn, (2019) [71]
	Gaining insight into people's perspectives to improve design and planning processes.	Hadavi et al., (2018) [102]; Wan et al., (2021) [103]; and Altamirano et al., (2020) [104]
Protect	Proposing conservation approaches on a landscape-scale.	Murry, (2019) [105]
	Identifying factors that encourage pro-environmental behaviour.	Dearborn and Kark, (2010) [46] and Diaz et al., (2020) [106]
	Investigate individuals' willingness to pay for various types of land to improve reserve management.	Castillo-Eguskitza et al., (2019) [107]

The first step in the cycle involves the use of landscape planning-based methods to translate naturalness into different landscape structures. Notably, we use 'landscape structures' here to refer to various types of natural environments shaped by human activity to distinguish these mixed lands from the purely natural. Evidently, ecosystem structure and function imply that the natural environment provides the foundation of Earth's life support system, and this consensus has been extensively discussed in the literature [108]. When considering the transformation of natural environments into landscape structures, such as green spaces in urban areas, and semi-natural areas, such as national parks and protected lands that are accessible and directly beneficial to humans, it is crucial to engage in effective landscape planning that connects these two parts while preserving the inherent natural order. As many scholars have highlighted, inconsiderate utilisation and conversions may lead to an unsustainable way of life and the destruction of natural environments [19]. Therefore, appropriate landscape planning methods, such as functional analysis and valuation before decision-making [85,86], assigning monetary values to the natural environment [87–89], and conducting spatial planning and design based on stakeholder integration, are essential [90,91].

The second stage involved identifying landscape services in landscape structures using landscape planning tools. Despite the fact that they sometimes overlap, we do not intend to replace ecosystem services with landscape services; rather, we utilise landscape services to

emphasise the significance of landscape features to human well-being [16]. Termorshuizen and Opdam (2009) emphasised the concept of 'landscape services' to promote sustainable development from a landscape ecological perspective and encouraged disciplinary cooperation [109]. Willemen et al. (2012) defined landscape services as 'the flow of ecosystem services to society . . . provided within a landscape' [110]. Bastian et al. (2014) found that landscape services focus more on anthropogenic effects than ecosystem services do [16]. Based on the parameters and definitions established in earlier studies, we claim that people can benefit from various landscape structures in ecological and sociocultural contexts. As illustrated in Table 8, various techniques and instruments can be employed to 'identify' the advantages of using landscape structures to provide landscape services. First, there are numerous approaches to examining the beneficial effects on different groups of people utilising different landscape structures, including multidisciplinary methods combined with environmental psychology and landscape planning [24,64,92]. Second, mapping technologies are often used to reveal information derived from landscape structures [27,53,93]. Finally, evaluating the quality of landscape structures and services is a strong strategy for bridging the two [94–96].

Consequently, human well-being can be achieved by a well-managed landscape and related elements through the benefits generated by landscape services. To simplify the model, we categorised human well-being into two dimensions: spiritual and basic material, based on the MEA [7]. The 'basic material aspect' comprises 'basic material for a good life', 'safety and security', and 'physical health', while the 'spiritual aspect' encompasses 'good social relations', 'freedom of choice and action', and 'psychological health'. 'Manage' is a crucial step to help people directly reap the ecological and sociocultural advantages of landscape elements. As shown in Table 8, creating a set of guidelines to improve the design of various landscape structures in accordance with people's needs is one of the most useful managerial tools, allowing people to access nature and improve their well-being more readily, particularly in the spiritual realm [97–99]. Researchers on this subject can also offer conceptual models that activate spatial design to accomplish human well-being at multiple levels [100]. For example, using green infrastructure can deliver resources from a basic level to a spiritual level, as per human desires [71,101]. Moreover, it is imperative to incorporate people's preferences and perceptions in the design and planning process to create a better landscape environment [102–104].

The final step in this cycle involves the use of landscape planning-oriented tools to facilitate the safeguarding of the natural environment by humans, thereby completing the loop that links human well-being and naturalness. By providing fundamental living materials and using tools to improve the world around us, we may attain the 'basic material element', which includes 'basic material for a good life', 'safety and security', and 'physical health', of human well-being in this loop. However, the ultimate goal of well-being cannot be increased unless the 'spiritual aspect' is achieved. As previously concluded, various natural environments, including but not limited to urban parks, neighbourhood-level green spaces, and blue spaces, have a positive impact on human health at multiple levels, which can be understood as landscape services meeting human spiritual needs. After addressing lower-level needs, higher-level needs contributing to well-being draw attention to the protection of natural capital. Thus, at this stage, landscape planning-based approaches can act as catalysts in improving people's pro-environmental behaviours, such as combining interdisciplinary methods to build conservation frameworks on a landscape scale [105], understanding factors that encourage pro-environmental behaviour [46,106], and researching individuals' willingness to pay for different types of land to improve reserve management [111]. Greater and more sustainable naturalness can be derived from the final stage of this loop, promoting human well-being sustainably.

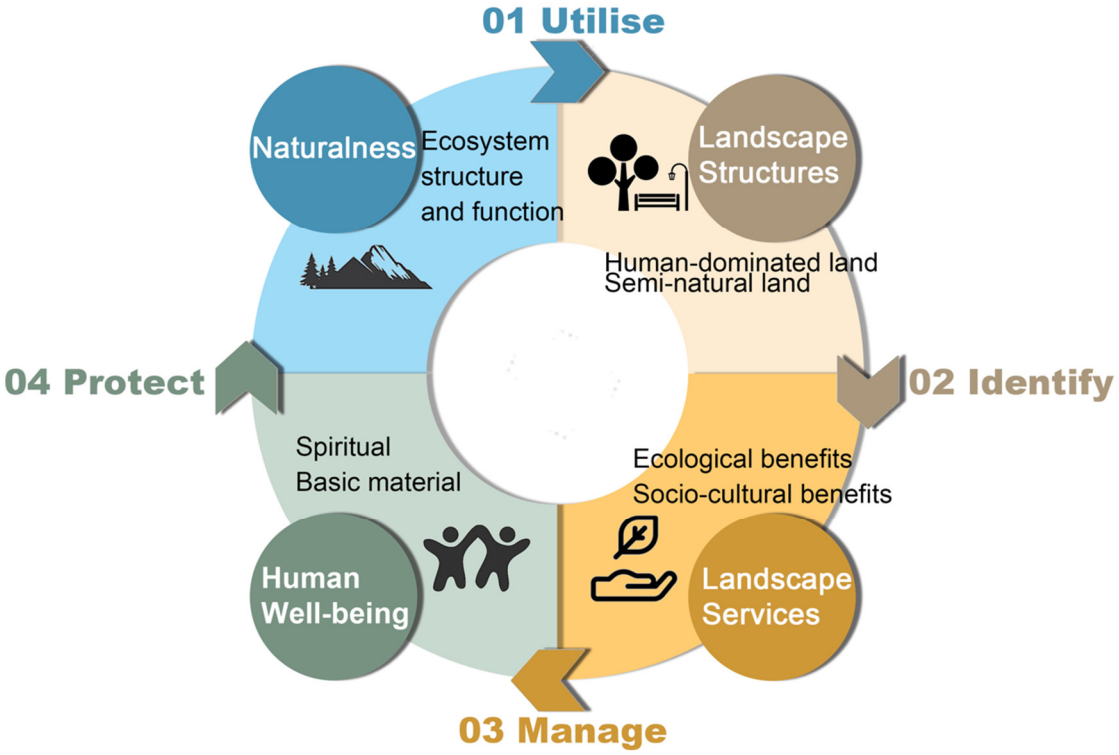


Figure 9. Conceptual framework showing how landscape planning can be employed to enhance human well-being. Drawn by the author.

4.2. Vacuum in This Research Field and Trends in Future Research

Upon investigation of the primary research inquiries, which entailed examining broad patterns in the literature, constructing a key knowledge map, and developing a conceptual framework, we identified four inadequately explored research gaps in this field. Our goal is to anticipate future research trends, enhance related knowledge, and reinforce pathways linking landscape planning to human well-being:

1. Utility of research results for decision-making

Although there are numerous empirical studies and review papers in our local database that pertain to the utilisation of landscape planning tools or methods to enhance human well-being, the impact of their findings on management processes and decision-making has scarcely been described. In the absence of practical incorporation of theoretical conclusions into management and decision-making processes, reaping the rewards of natural capital and landscape planning-based methods becomes challenging [111]. Hence, we posit that researchers embarking on these projects should consider the implementation of theoretical results in practical and public decision-making;

2. More concerns about intangible values

Upon analysing the progressive evolution of this topic, we observed a discernible tendency towards placing greater emphasis on the intangible values associated with natural ecosystems, such as cultural ecosystem services. Recognising the importance of resources such as natural capital can be a challenge for traditional economic perspectives [107]. To fully comprehend the economic and non-monetary values of natural ecosystems, it is imperative to develop advanced techniques to measure and quantify these intangible values. This will allow us to emphasise the potential benefits that humans can derive from these resources. One way to identify intangible values is to use interdisciplinary methods that combine objective ecological indices, measured using remote sensing [112], with subjective assessments from stakeholders [113]. These approaches have great potential for providing the necessary means of recognition;

3. More concerns about minorities

Although several studies have investigated how diverse demographic groups, including older adults, can benefit from various landscape environments, we urge researchers to pay more attention to various minority populations, such as individuals with mobility impairments and the economically marginalised. Scholars have acknowledged that virtual reality (VR) has the potential to be used as an alternative approach to simulating and providing natural environments for restoration and enhancement of well-being [114]. Future research should prioritise the development of landscape planning technologies that are more inclusive and effective in promoting the well-being of marginalised communities. For instance, efforts can be made to improve the accessibility of natural environments for individuals with disabilities;

4. More evidence from the Global South

Finally, from Section 3.1.3 and Figure 4, it is evident that empirical studies and reviews from the Global South are limited. As urbanisation and population growth continue to accelerate in Africa, it is imperative to consider sustainable development. However, a review of studies related to urban green infrastructure and ecosystem services in Sub-Saharan Africa revealed that these areas are critically understudied [115]. This also holds true for other countries and regions in the Global South that are undergoing rapid urbanisation. To establish better land-use policies and frameworks in the future, it is essential to implement sustainable planning strategies. To improve well-being across regions, we require more knowledge and understanding of how landscape planning methods can be implemented. Thus, we call for cross-continental collaboration in the Global South to gather further evidence for future initiatives.

4.3. Limitations

Scientometric analysis can be useful for writing scientific literature reviews because it can help to quickly identify patterns, trends, and knowledge gaps in research fields from a quantitative perspective. It can also identify key players and influential work in a particular research area and provide a stable foundation for future research. However, it is important to note that scientometric analysis is just one tool among many in compiling a review, and it should be used in conjunction with other methods such as qualitative analysis, critical thinking, and expert knowledge to provide a comprehensive and balanced review of the literature. Without representing and establishing a theoretical conclusion, this research field cannot be developed. Thus, scientometric analysis should be combined with systematic frameworks to provide insightful comments on the research topics examined. Although this study provides valuable insights into the literature on landscape planning and human well-being, its limitations should be considered when interpreting the results.

This study has several limitations, which are outlined below:

1. Database source: Our study relied solely on the WoS database, which, although covering a vast range of journals, did not include other significant sources such as grey literature and policy documents. This may have resulted in the exclusion of some relevant studies from our analysis;
2. Language bias: We included only papers written in English, which may have resulted in a language bias. Non-English literature, particularly local surveys and case studies, may have provided valuable indigenous knowledge and insights;
3. Search strategy: Our search strategy relied on the specific terms 'landscape planning' AND ('human well-being' OR 'mental well-being' OR 'physical well-being'). However, other researchers may have conducted studies related to landscape planning that did not use these terms, resulting in the omission of relevant studies.

5. Conclusions

This scholarly investigation utilised scientometric analysis and mixed methods to explore the correlation between landscape planning and human well-being through a

comprehensive review of the relevant literature. The main objective was to identify the prevalent output patterns in this research domain and construct a conceptual framework to elucidate how landscape planning can positively contribute to human well-being. The scope of the literature review was not restricted to a specific timeframe; however, based on annual publication patterns, three primary periods were distinguishable, and a substantial surge in publications in this field was observed between 2016 and the present day. The distribution of research disciplines and the analysis of impact materials underscore a robust interdisciplinary collaboration that mainly covers three research areas: environmental research, spatial planning, and geography. There was an uneven global distribution of publications, with most institutions cooperating within the same continent. These findings suggest the potential for greater international collaboration in the future.

Based on this analysis, three primary research topics were identified. The first is managing natural capital using landscape planning methods to promote human well-being. The second is identifying health benefits from landscape sources to enhance human well-being from a socio-spatial planning perspective. Finally, the third research topic is creating a sustainable living environment to combat global ecological challenges caused by urbanisation. Furthermore, although currently restricted, this research field is placing more emphasis on intangible advantages, such as cultural ecosystem services.

In addition, this study presented a 'naturalness-landscape structures-landscape services-human well-being' loop that includes crucial approaches and tools utilising landscape planning as four main intermediary steps to illustrate how landscape planning can be applied to enhance human well-being. This framework establishes a clear understanding of how landscape planning approaches are connected to human well-being, laying the groundwork for future research.

This study had some limitations, including data sources, language, and search strategy bias. Despite these, the study provides a stable and clear understanding of the current state of research on landscape planning and human well-being. The findings of this review can serve as a foundation for future research to address the limitations of this study and further advance our knowledge on this important topic. Ultimately, this study highlights the potential for landscape planning to promote human well-being and provides an impetus for further research in this area.

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