land

MDPI

Systematic Review

A Bibliometric Analysis on Designing Urban Green and Blue Spaces Related to Environmental and Public Health Benefits

Catarina de Sousa Silva [1], Simon Bell [2,3], Lenka Lackóová [4] and Thomas Panagopoulos [1,*]

[1] Research Center for Tourism, Sustainability and Well-Being, University of Algarve, Campus de Gambelas, 8005-139 Faro, Portugal; cssilva@ualg.pt
[2] Landscape Architecture, Institute of Agricultural and Environmental Sciences, Estonian University of Life Sciences, 51006 Tartu, Estonia; simon.bell@emu.ee
[3] School of Architecture and Landscape Architecture, Edinburgh College of Art, University of Edinburgh, Edinburgh EH8 9YL, UK
[4] Faculty of Horticulture and Landscape Engineering, Slovak University of Agriculture in Nitra, 94976 Nitra, Slovakia; lenka.lackoova@uniag.sk
* Correspondence: tpanago@ualg.pt

Abstract: Humans and nature have always been connected. Meanwhile, with the industrial revolution, landscapes have become more artificial, reducing the human–nature relationship. Urban design should follow biophilic principles to reconnect people with nature, mitigate climate change, improve air quality, restore biodiversity loss, and solve social problems. Poor air quality affects people's health, and vegetation plays a crucial role in purifying the air. Similarly, contact with nature benefits physical and mental health and well-being. However, there is no consensus on how urban design can be beneficial for improving air quality and human health. This review paper aims to provide a comprehensive evaluation of evidence linking nature-based solutions (NBSs), air quality, carbon neutrality, and human health and well-being. Five hundred articles published between 2000 and 2024 were analysed. A number of publications studied the benefits of green infrastructure in improving air quality, carbon sequestration, or the influence of green spaces on human health. The topic of NBSs has recently emerged related to air quality, health, and promoting physical activity, as has accessibility to green spaces and mental health, also associated with blue spaces and residential gardens. The results revealed the gaps in the literature on how to design green and blue spaces to tackle environmental and public health crises simultaneously.

Keywords: green infrastructure; nature-based solutions; biophilia; urban planning; urban green and blue spaces

check for updates

Academic Editor: Xiangzheng Deng

Received: 15 April 2025
Revised: 28 May 2025
Accepted: 3 June 2025
Published: 6 June 2025

Citation: de Sousa Silva, C.; Bell, S.; Lackóová, L.; Panagopoulos, T. A Bibliometric Analysis on Designing Urban Green and Blue Spaces Related to Environmental and Public Health Benefits. *Land* **2025**, *14*, 1230. https://doi.org/10.3390/land14061230

1. Introduction

There is a consensus that the human species has an innate connection with nature. Ten thousand years ago, nature was the habitat and source of vital supplies for the survival of human beings. Nowadays, it is commonly accepted that contact with nature brings us positive experiences and feelings. The Biophilia hypothesis, described as "the urge to affiliate with other forms of life" [1], reflects this. The industrial revolution transformed the paradigm, kick-starting urbanisation, and since then, landscapes have become increasingly artificial and the human–nature relationship has started to be devalued. The exponential growth of cities, the uncontrolled occupation of vast tracts of deforested land, and economic and industrial development based on the exploitation of fossil fuels as well as major lifestyle changes mean that today we must deal with combined environmental and public health crises.

Overcoming these crises is undoubtedly a complex process, but it also involves re-thinking the public space. Landscape architects believe that biophilic design is one of the solutions to mitigate climate change, improve air quality, restore biodiversity loss, and solve social problems such as poverty, inequality, and minority segregation while reconnecting people with nature.

More specifically, new public urban green and blue spaces (UGBSs), attractive, safe, and accessible to all, should be implemented in the urban network—so-called Urban Green-Blue Infrastructure (UGBI) [2]. To maintain awareness of this, soft mobility and transport based on renewable energies should be prioritised, reducing greenhouse gas (GHG) and air pollution and avoiding urban heat islands [3].

Nature-based solutions (NBSs)—finding solutions based in nature to social problems—represent a more recent practical and integrative approach [4,5]. NBSs are applied to solve contemporary crises using collaborative design [6,7] involving citizens, stakeholders, and urban planners and landscape architects. In this context, spatial planning and the performance dimension must operate simultaneously. This means that all UGBSs, including urban parks, gardens, street trees, private gardens, urban forests, urban rivers, wetlands, lakes, and the sea, must provide a wide range of ecosystem services, including air purification, carbon neutrality, social interaction, and stress reduction.

It is well known that poor air quality affects people's health [8,9]. At the same time, many studies show how vegetation plays a crucial role in purifying the air [10–12]. The various benefits that contact with nature has for human physical [13–15] and mental health [16,17] and well-being [18,19] are also well known. However, the benefits and mechanisms of UGBSs for improving air quality and human health still remain understudied, and there is little evidence as to which types of green or blue space perform best in this respect.

In this context, the main objective of this paper consists of reviewing the published research concerning the design and planning of UGBSs for environmental and public health benefits and identifying gaps in the literature for future research on this topic. Therefore, we aim to answer the following questions: (1) What has been the historical evolution of the literature on UGBI? (2) Which documents have mainly influenced the intellectual structure of the research topic? (3) Which journals present more publications on this research topic?

The results will provide academics and practitioners with an overview of the current situation and trends in the field of UGBI and its relationship with environmental and public health benefits. The results of this study are especially relevant considering the integration of society and institutions in the planning of UGBSs for a simultaneous improvement in air pollution, achieving carbon-neutral cities, and improving human health and well-being. This study may support future research on how UGBI should be designed to tackle environmental and public health crises simultaneously.

2. Theoretical Framework

2.1. Air Pollution: A Problem for Health and the Environment

There are two main concerns about pollutant gases: human health and climate change. Human health is being severely affected by air pollution. According to the World Health Organisation (WHO), about 99% of the global population breathes air with pollutant concentrations exceeding the advisable limits. Exposure to air pollution is reflected in the premature death of about 9 million people in 2015, mainly from heart disease, stroke, lung cancer, chronic obstructive pulmonary disease, and acute respiratory infections [20].

This scenario is more worrying in low- and middle-income countries where exposure to pollutants is higher than in developed countries [21,22].

The air pollutants of most concern causing adverse health outcomes include particulate matter $\leq$ 10 µm (PM_{10}) and fine particulate matter $\leq$ 2.5 µm ($PM_{2.5}$) and gases such as sulphur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), and ozone (O_3). Carbon dioxide, the main greenhouse gas, is not considered an atmospheric pollutant since it has a smaller effect on human health [23] and is in any case exhaled by people. Fine particulate matter, PM2·5, is the most studied form of air pollution and is responsible for a wide range of impacts on biological systems, especially pulmonary and cardiovascular diseases [24,25]. At the same time, air pollution is intimately linked to the global climate change crisis [20,26]. For example, particulate matter [27] and ozone [28] have a substantial impact on the Earth's radiation balance and, consequently, on climate.

Policies offering a "win–win" strategy for both climate and health are increasing, especially in Europe [29]. These adaptation strategies aim to contribute to short and long-term climate change mitigation by changing urban design practices while achieving public health benefits [23,29,30].

2.2. The Carbon-Neutral Cities Challenge

The European Union's mission for climate-neutral and smart cities is to reach 100 European climate-neutral cities by 2030 and, according to the European Green Deal Strategy, to make Europe as a whole climate-neutral by 2050. The Climate Action Planning Framework defines a carbon-neutral city as being based on the annual emissions completely cancelled out through carbon offsetting, or removed through carbon dioxide removal or emission removal measures [31]. There are two mechanisms capable of achieving carbon-neutral cities: (1) sequestration and (2) avoidance. The sequestration process involves the removal or capture of GHG emissions from the atmosphere through physical or biological absorption or long-term storage in carbon sinks, including forests, soils, and oceans [32]. Conversely, avoidance includes reducing, preventing, or abolishing GHG emissions released into the atmosphere associated with a baseline; for example, reducing fossil fuel energy consumption [33]. Some European cities, for example Copenhagen and Sønderborg, have already implemented strategies that support carbon-neutral challenges [34].

2.3. Nature as a Solution in Air Phytoremediation

Vegetation plays a crucial role in decreasing atmospheric gases, including carbon dioxide (CO_2) and methane (CH_4), through processes like photosynthesis and microbial activity. Urban trees, in particular, are significant carbon sinks, absorbing substantial amounts of CO_2. Urban vegetation can decrease the concentration of air pollutants in two ways: absorption of gases or deposition of particulate matters. The mechanism by which vegetation removes the pollutant depends on the nature and property of the pollutant, the nature and property of leaves, and the weather [35]. For example, rainfall intensity over 16 mm/h positively influences the removal of PM through the wash-off process in urban trees and living wall evergreen species [36,37]. In contrast to the $PM_{2.5}$ deposition efficiency, broad-leaved trees might have a higher efficiency to transport $PM_{2.5}$ from leaves to the soil when compared with conifers [37] during the wash-off process. Also, wind speed increases the PM resuspension of particles from the leaf surfaces [38], which reduces the removal rate by trees [39]. PM can also drop to the ground during the leaf fall season [39].

The amount of tree cover positively influences the vegetation efficiency of removing air pollutants, and it depends on plant strata (tree, shrub, or herbaceous), species, type (evergreen, deciduous, or conifer), and vegetation configuration [40,41]. However, high Biogenic Volatile Organic Compounds (BVOCs) emitted by urban trees, especially in

Mediterranean environments, is conducive to the formation of O_3 [42], negatively affecting human and plant health. For this reason, the choice of the right species to plant in urban areas becomes even more important.

2.4. Effectiveness of NBSs in Improving Health and Well-Being

Human beings have always regarded the landscape as beneficial to their well-being [43]. Over a hundred years ago, Frederick Law Olmsted proposed that contemplation of "rural scenery" would have the opposite effects to those caused by urban life, responsible for "excessive nervous tension, over-anxiety, hateful disposition, impatience, irritability" [44]. Exposure to natural environments prevents certain diseases [45] and contributes to salutogenesis [46].

Nowadays, there is a growing interest in studying the benefits of UGBSs for general health [47,48]. Some authors have studied the associations between green and blue spaces and non-communicable diseases [14,15], well-being [18,19], and mental health [49,50].

The WHO contends that UGBSs can effectively deliver positive health and social outcomes [48]. In this context, NBSs are responsible for providing cultural ecosystem services, including the increase in happiness, physical activity, and social cohesion and the reduction in stress, overweight, and health inequalities. For example, attractive and accessible green spaces can improve community identity and sense of place [51], improve aesthetics, and provide a place for gathering and social reunion [2]. Proximity to amenities and safety from crime increases residents' happiness [52] and subjective well-being [53]. Conversely, Thompson [54] found that social isolation is associated with stress and poor well-being. Recently, Pouso et al. [17] found that nature-relatedness attenuated the negative effect of the COVID-19 lockdown on mental health and enhanced positive emotions. NBSs are also responsible for regulating ecosystem services, including improved air quality, water management, and heat and noise reduction as well as health outcomes, including mental health, autoimmune diseases, respiratory diseases, cancer, and perceived general health, among others [55].

Nevertheless, it is urgent to raise population awareness of this evidence and find co-design strategies to implement NBSs in contemporary cities.

3. Data and Methodology

We conducted a review to provide as complete and comprehensive a review of research related to NBSs, air quality, and human health and well-being as possible. The study was developed in three stages. In the first stage, for data collection, we followed the guidelines on the Preferred Reporting Items for Systematic Reviews (PRISMA) [56]. In stage two, we present the results of the bibliometric analysis and visualisations. In the final stage, we present the main findings, research patterns, contributions, and limitations of the study.

The papers used in this review were retrieved from the core collection of the Web of Science (WoS) database from Clarivate Analytics, on 19 January 2022, via a virtual private network (VPN) connection from the University of Algarve. Two surveys were performed, combining keywords related to NBS + air quality and NBS + health and well-being. Both combinations were searched in the title, abstract, and keywords plus. We recognise that from that date to the time of publication, further research has emerged, but we feel that the trends are likely to be the same.

Initially, the two research stages obtained 2455 and 15,091 documents, respectively, related to the topic. Then, the search was refined to include only English articles, and we found 1932 and 11,775 results, respectively. Articles published in the top 25 most relevant sources on this topic were automatically selected. This resulted in 912 and 3381 articles, respectively, on the subject.

Bibliographic information, such as citation, the article's title, the list of authors, the publication year, abstract, and the journal's name, was exported to Zotero 7.0.15 software. The results of the two searches were then combined: 387 duplicates were removed, 15 entries did not include any information, and 1 publication was retracted. This resulted in a final total of 3890 articles for the next stage of the evaluation (Figure S1).

The refinement process was then carried out by examining the title, keywords, and abstract of each article, and occasionally the main text of an article. Following this, we reduced the total to 620 articles. Finally, after reading the full-text article, a further 130 publications were excluded. The reasons for exclusion were as follows: (1) the focus was on air pollution measurement, (2) the focus was on indoor air quality, and (3) the focus was on other ecosystem services, e.g., reduction in the urban heat island or noise reduction or flooding mitigation, (4) the focus was on plant health rather than human health, and (5) the focus was on rural environment instead urban environment.

In the end, 500 scientific articles were considered relevant for this review and included in the bibliometric analysis. The total publications consist of 133 articles from the first survey, 261 articles from the second survey, and 96 articles from both surveys (Figure S1).

The open-source statistical R software 4.5.0 was used for the bibliometric analysis and the Bibliometrix R-tool package 3.0.1 in the Biblioshiny version [57]. Also, to analyse and visualise the relationships among the authors, countries, journals, co-citations, and terms, the bibliometric analysis software VOSviewer was applied [58].

4. Results

4.1. General Characteristics of the Body of Research

This research analysed a database comprising 500 documents, covering 2057 authors, 25 journals, and 64 countries. Over the years, scientific production on this topic has increased exponentially, with an annual growth rate of 7.81% (Figure S2).

In the selected publications, 64 countries, based on author origin and institutional affiliation, were identified. China is the country with the highest number of publications with a total of 99 (20.20%), followed by the USA with 69 articles (14.08%), and the United Kingdom with 44 publications (8.98%) on the topic (Figure S3).

Of the 25 scientific journals we identified, the *International Journal of Environmental Research and Public Health* is the most common with 77 publications, followed by *Urban Forestry & Urban Greening* (74 articles), and then *Landscape and Urban Planning* (51 articles) (Figure S4). *Landscape and Urban Planning* has the highest h-index (28) and g-index (50) value and the highest number of total citations (4708 citations).

A total of 2057 authors were identified, with an average of articles per author of 0.238 and 4.2 authors per article. The average number of co-authors per article was 5.04. Only 13 articles (2.65%) were of single authorship. We identified 477 multi-authored documents (97.35%) with 2044 authors, representing a collaboration index of 4.29.

According to Lotka's Law [59], 1793 authors (87.2%) produced just a single article. Only 13 authors (0.50%) produced five or more articles. Nowak, D. is the core author who stands out due to the number of publications (11 publications), the longevity of scientific production of about 19 years, and highest number of citations (1858). Other authors stand out in terms of the total citation number: Grahn, P. (640 total citations since 2010), Hirabayashi, S. (633 total citations since 2011), and Stigsdotter, U. (522 total citations since 2010).

4.2. Citation Analysis

The publication that has been most cited as a reference in other publications is "Carbon storage and sequestration by urban trees in the USA" (Table S1). Since its publication, in

2002, the article has been cited 668 times. The paper with the highest average citations per year, cited 44.50 times per year, is "Spatial planning for multifunctional green infrastructure: Growing resilience in Detroit". Only four scientific journals published the top 10 most cited papers. *Environmental Pollution* and *Landscape and Urban Planning* are the best represented, with four publications each (Table S1).

In the 500 publications, 20,360 references were included, appearing in 8286 sources. The sources that stand out in terms of co-citation are *Urban Forestry & Urban Greening*, *Landscape and Urban Planning*, *Atmospheric Environment*, and *Environmental Pollution* (Figure S5).

4.3. Keywords

The authors indexed the 500 publications with 1540 keywords and with 1244 keywords plus by WoS. A total keywords network that combines authors' keywords and keywords plus was analysed using VOSviewer. A thesaurus file was used to merge similar terms, or the same terms written differently. Only keywords that occurred at least ten times were considered. Sixty-seven terms met this threshold. Two clusters were generated: one includes keywords related to health and green spaces and the other incorporates terms connected to air pollution and green infrastructure (Figure S6). "Health" appears as a central term and is the keyword with the most significant number of occurrences (130 times). Air pollution has 121 occurrences, followed by "Physical activity" that appears 108 times. Keywords related to "green" appear in the two topics studied. In one cluster, keywords related to "green" are associated with a social component; this means that "green" is connected to an activity or associated with direct benefits to people. In the other cluster, "green" words are related to direct benefits to the environment and indirect benefits to people. Landscape architecture occupies the most central position and is connected to the most prominent keywords of this topic, demonstrating the transversality of this discipline and the need to study the benefits of UGBSs for health, air pollution, and carbon sequestration (Figure 1). The keywords "city" and "neighbourhood" appear in different clusters, which can suggest differences in scale when studying the interaction between health and UGBSs (neighbourhood scale) or when studying the impacts of UGBI on air quality (city scale). Also, due to the larger scale, the interactions that the term "neighbourhood" presents are primarily associated with a social component, e.g., "preferences", "inequality", "children", and "adults".

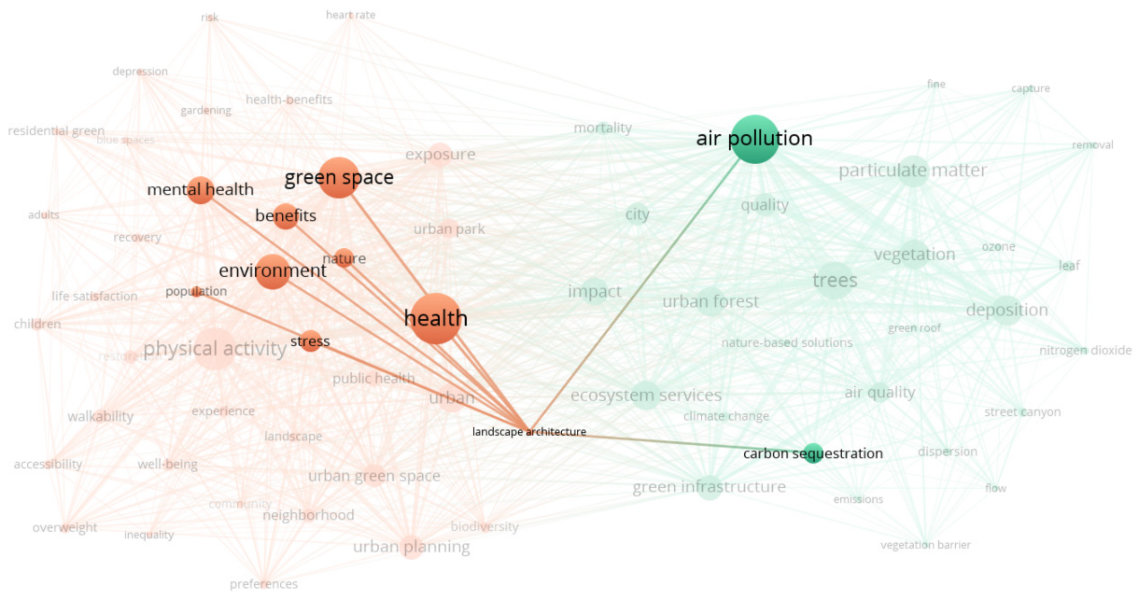


Figure 1. Interactions of "Landscape architecture" term | software: VOSviewer 1.6.20.

Most of the research around the year 2017 focused on studying the impact of urban forests on carbon sequestration. Around 2020, most research was conducted in the content area of NBSs and the impact of green spaces on mental health (Figure 2).

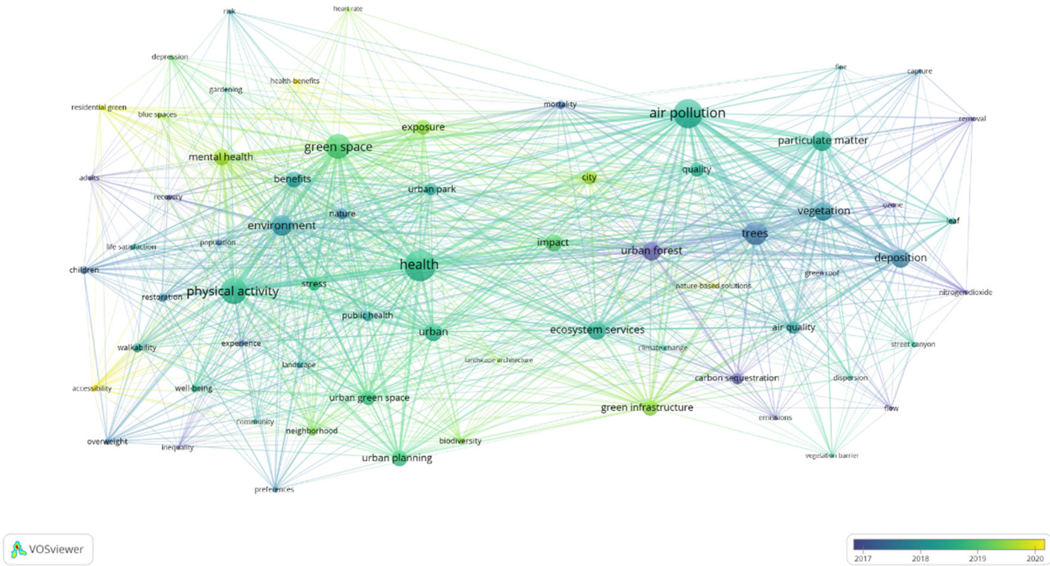
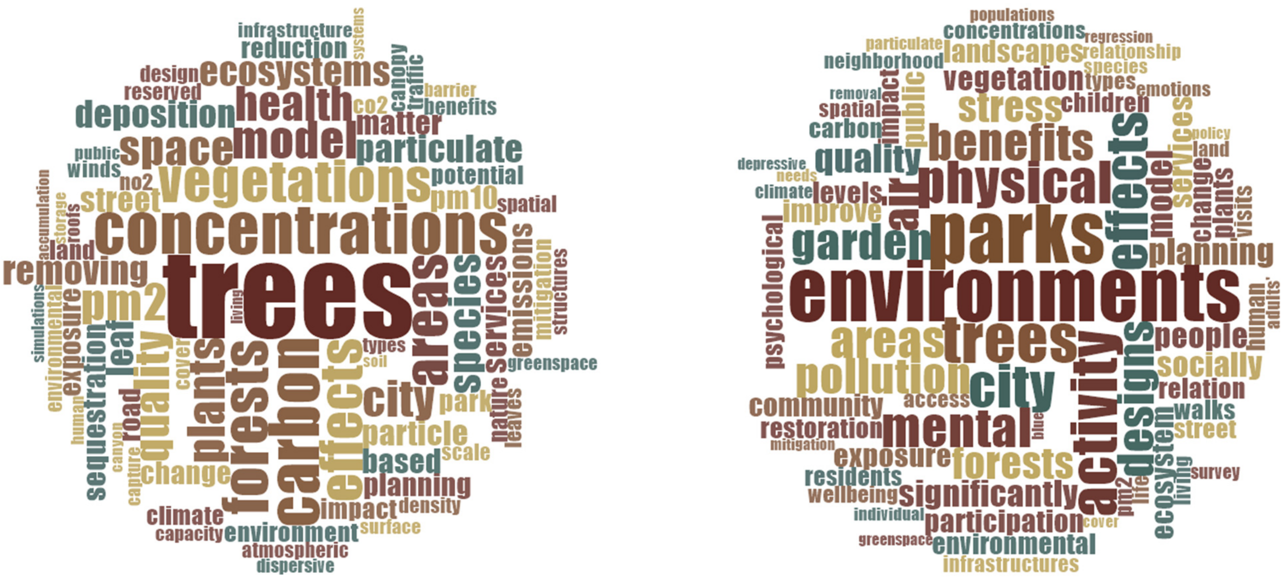


Figure 2. Keywords analysis with time information | software: VOSviewer 1.6.20.

4.4. The Focus of the Articles

The 500 articles were separated into two general areas according to their primary objective (Table 1). The words that best define the first research area are "concentrations", "carbon", "forest", and "vegetation", while the words "environment", "parks", "physical activity", and "mental" are the words that stand out in the second area of research; however, there are also words in common between the two clouds. The most notable are "trees", "city", and "effects" (Figure 3).



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

Figure 3. Word cloud arranged by area: (**a**) impact of UGBI on air quality and carbon neutrality and (**b**) impact of UGBI on health and well-being | software: NVIVO 12.

Table 1. General areas of study.

Topic	Sub-Topic	Aim
(a) Impact of UGBI on air quality and carbon neutrality	Types of UGBSs that positively influence air quality	Analyse different types of green space and their benefits in terms of air purification (green corridors, urban parks, urban forest, etc.)
	Climate zones	Focus on studying the benefits of UGBSs for air quality in specific climate zones
	Carbon sequestration by UGBSs and mobility and lifestyle	Analyse the impact of vegetation and soil on carbon sequestration and mobility and lifestyle modes that influence carbon neutrality in cities
	Urban planning solutions to mitigate air pollution	Focus on urban planning solutions to mitigate air pollution
(b) Impact of UGBI on health and well-being	Designing for health	Focus on urban planning and targeted design solutions to enhance the health of certain social groups (e.g., elderly people, children)
	Non-communicable diseases	Focus on the benefits of UGBSs for non-communicable diseases (cancer, cardiovascular diseases, dementia, obesity, and respiratory disease)
	Child development	Focus on the benefits of interaction with UGBSs for child development (birthweight, cognitive and motor development)
	Well-being indicators	Reviews the indicators of well-being (health status, self-rated health, self-rated well-being, happiness and mood, personal security, social connectedness, and social cohesion)
	Mental health conditions	Focus on the benefits of interaction with UGBSs for pathologies associated with mental health (depression, anxiety, and stress)
	Typologies of UGBSs that positively influence mental health and well-being	Analyse different types of green space and their benefits for health and well-being (green corridors, urban parks, urban forest, etc.)
	Environment comparison	Focus on comparison between indoor and outdoor environment and urban versus natural environment

4.4.1. Impact of UGBSs on Air Quality and Carbon Neutrality

Regarding the types of UGBSs that positively influence air quality, most of the authors studied the benefits provided by urban forests [60,61] and green corridors, including green barriers along the roadside [62,63]. It is worth mentioning that the term "urban forest" can mean, depending on the context, all the trees in a city or just areas of continuous canopy woodland, and this is not easily differentiated between among the keywords. Other authors studied the relationship between street trees [11,64] and urban parks [65] in air pollutants' reduction (Table S2).

Urban planning solutions, at the city scale, to mitigate air pollution are mentioned in several article [66,67]. Only a few articles focus on specifying the best vegetation configuration to improve the mechanisms for air purification [67–70].

Several articles focus on the impacts of vegetation [71,72] and soil [73] on carbon sequester (Table S3). Additionally, 14 articles studied the impact of mobility and lifestyle on carbon neutrality (Table S3).

4.4.2. Impact of UGBSs on Health and Well-Being

Several publications reported urban design solutions to enhance human health (Table S4). Most authors focus on urban planning solutions [74] or generic biophilic design solutions [75]. In comparison, others focus on more specific solutions to implement in urban green and blue spaces [76] for minorities, including unhealthy people, through healing gardens [77], children [78], and older adults [79].

The benefits of UGBSs for non-communicable diseases were the focus of 19 articles. Some studies related overweight to the practice of physical activities in green areas [80]. Others focus on the decrease in the effects of cardiovascular diseases [81] or on the decrease in the effects of respiratory diseases [82] when in contact with green spaces. In the same context, only a few articles studied how UGBSs can reduce cancer incidence [83] and minimise dementia [14].

Similarly, different indicators have been used to study mental health and well-being. Happiness is the most used indicator to measure mental health and well-being [84–86]. Social connectedness was used in 23 articles (e.g., [54,84] and self-rated health in 19 articles (e.g., [87])). Only a few authors used personal security as an indicator of well-being [88].

Access to green space, frequency of visits, nature-relatedness, or quantity of green spaces were found to improve mental health and well-being in 38 publications (Table S5).

A considerable group of articles report the influence of a specific type of UGBS on mental health and well-being (Table S6). Plunz et al. [89] found that Twitter users express more positive opinions in an urban park that in other contexts. They suggest that urban green parks can promote a more relaxed state which influences their mood, emotions, and feelings. Young et al. [90] studied how the self-reported restoration of gardeners is related to garden type and the number of plant species. Their study indicates that allotment gardens, compared to domestic gardens, are associated with higher levels of restoration and that the number of plant species positively influences the restoration of gardeners. According to [91], the most important benefits of visiting blue spaces are psychological and social interaction. The presence of nature is significant to the visit, especially for older adults.

While several studies examined the relationship between the amount of green space and health or alternatively focused on the benefits of specific types of green space, a few recent studies compare different types of 'green' and their health outcomes (Table S7).

Only five publications focused on comparing the benefits of indoor and outdoor environments (8). The most recent studied the benefits of the outdoor natural environment after the COVID-19 lockdown [92]. Lehberger et al. [93] showed that private garden owners had substantially better life satisfaction and mental well-being, associated with freedom and joy, than residents living in apartments during the pandemic. These studies reveal that long periods spent indoors are associated with risks of depressive symptoms. In contrast, visits to outdoor green spaces improved psychological and physiological health.

In a similar context, 14 publications compared the outcomes of spending time in urban environments versus natural environments (Table S8). These authors state that urban environments are associated with anxiety, stress, and depression scenarios, while natural environments are associated with stress reduction and better overall mental health and well-being.

Only a few articles studied the effects of green spaces on solving air quality and human health problems (Table 2).

Table 2. Publications simultaneously relating green spaces with air quality and health.

Authors	Aim	Geographic Location	Findings	Limitations
Alcock et al. [94]	To study the association between emergency hospitalisations for asthma in urban residential areas and the presence of green spaces at different levels of air pollutant exposure.	England, Europe	Green spaces and gardens are associated with reductions in asthma hospitalisation when pollutant exposures are lower. Tree density is associated with reduced asthma hospitalisation when pollutant exposures are higher.	It is not possible to interpret the results at a different spatial scale. Do not consider exposer to pollutants from indoor sources. Do not allow to see any seasonal or secular trends in how asthma emergencies relate to interaction effects between the natural environment and air pollutant exposures.
Engemann et al. [95]	To study the associations between growing up surrounded by different environments and psychiatric disorders.	Denmark, Europe	Growing up surrounded by a range of natural environments may lower rates of psychiatric disorders.	It was not possible to infer causality. Certain socioeconomic factors, social disadvantages in deprived neighbourhoods or crime rates, were not considered. Estimating land cover and vegetation density from satellite images contains no information about how people use or perceive their local environment.
Sanchez et al. [82]	To evaluate the pathways and effects of green spaces on air pollution and the mortality of respiratory diseases.	Tehran, Asia	Green spaces have a significant mitigating effect on air pollution and the mortality of respiratory diseases. Air pollution has an increasing effect on mortality due to respiratory diseases.	Temperature was not included in the model as an influential factor in air pollution.
Lai & Kontokosta [96]	To study the impact of street trees on air quality and the prevalence of acute respiratory illness.	NYC, North America	A greater concentration of trees contributes to better local air quality. Some species, including *Quercus palustis, Quercus rubra, Quercus bicolor, and Fraxinus pennsylvanica*, with severe allergenicity can increase local asthma hospitalisation rates.	The available data were not widely available at the intended scale. Limited analysis due to a lack of individual tree data within urban parks.

Table 2. *Cont.*

Authors	Aim	Geographic Location	Findings	Limitations
Nowak et al. [39]	To estimate the amount of PM2.5 removal and resuspension by trees and its effect on PM2.5 concentrations, including the associated values and impact on human health.	NYC, North America	Trees improve general air quality by intercepting PM2.5. PM2.5 resuspension can lead to short-term increases in pollutant concentrations. Urban trees area was responsible for substantial health improvements and values.	The premise is that all particles are removed from leaves by precipitation events that cover the complete leaf area. Do not consider the interaction with water on leaves after precipitation events. Do not consider precipitation events in the form of snow. It uses the average for the particle distribution in the atmosphere and the average wind speed in the city. Do not consider tree volatile organic compound emissions and their potential contribution to PM2.5 concentrations. Vd is assumed to be equal for all leaves within a tree canopy. Rainfall intensity is not considered. Use of 24 h average concentration data to estimate the hourly concentrations during the day.
Sun et al. [97]	To study whether residential neighbourhood greenness modifies the short-term association between air pollution and respiratory mortality among the elderly.	Hong Kong, Asia	Elders living in higher greenness areas are less susceptible to pneumonia mortality associated with air pollution.	Some measurement errors may exist due to the use of the average pollution over the whole territory and residential greenness to represent the participants' exposure. The sample only includes Chinese older adults, so the results cannot be generalised. It measured only greenness quantity instead of the quality of greenness space.
Wang et al. [98]	To examine the biopsychosocial pathways linking residential green space quantity and quality to mental health.	Guangzhou, Asia	Green space quantity influences mental health mainly by reducing harm. Greenspace quality influences mental health mainly by restoring capacities and building capacities.	The several mediators used were based on self-reported questions. The actual use or visual exposure to green spaces respondents' information was impossible to consider. The street view data and survey data were from different periods of time. Imprecision in the exposure assessment for some environmental variables. Do not consider exposure to indoor greenspace or window views.

Table 2. *Cont.*

Authors	Aim	Geographic Location	Findings	Limitations
Zock et al. [99]	To assess a range of potentially relevant physical and social environmental characteristics to study their mutual correlations and explore associations with residents' morbidity.	Netherlands, Europe	Social cohesion and collective efficacy tended to be higher in less urbanised municipalities. The degree of urbanisation was associated with higher morbidity in all disease groupings. A higher social cohesion coincided with a lower prevalence of depression and migraine/severe headache.	The aggregation of the social capital variables to the neighbourhood level had limited reliability. It analyses only a few potential confounders at individual levels. Do not consider data on social cohesion and collective efficacy for surrounding neighbourhoods. Do not apply strict statistical criteria to identify significant associations.

5. Discussion

This review aimed to provide information about the research published concerning UGBS design and planning for environmental and public health benefits. To achieve this, three specific objectives were defined: to identify the topics in the academic literature related to urban green infrastructure and its environmental and public health benefits; to uncover the main areas of research in this field; and to find gaps in the literature and propose directions for future research.

The results indicate that most of the selected publications are concentrated around two central themes: the impact of UGBSs on air quality and carbon sequestration and the benefits of UGBSs for physical and mental health. These findings reflect a growing interest in the importance of nature within urban environments and align with biophilic design and NBSs, highlighting the positive psychological and social impacts of natural spaces.

Analysing keywords and publication trends over time reveals an evolution in the research focus. Earlier studies, particularly before 2016, primarily investigated the role of urban forests in carbon sequestration and air purification. From 2017 onward, research shifted toward mental health, social cohesion, and general well-being, especially in response to growing public health concerns. This transition reinforces the increasing recognition of UGBI as an environmental asset and a public health tool, in line with the biophilic hypothesis and with the perspectives outlined in Section 2 of the theoretical framework.

This review shows that relatively few studies simultaneously address the impact of UGBSs on air quality, carbon sequestration, and human health (as summarised in Table 2). Most of those that do exist highlight a positive association between UGBSs and reducing air pollution and lower risks of mortality and respiratory diseases, such as asthma. However, some authors note that specific tree species may aggravate respiratory conditions during the pollination season, although this does not invalidate their role in air purification. This evidence highlights the importance of further research into the characteristics and potential health risks of different plant species used in urban settings, aiming to optimise their benefits while minimising possible negative impacts on public health.

Although many studies examine the connection between UGBSs and mental health, the evidence remains mixed, especially when establishing a clear link between air pollution and psychological well-being. However, an analysis of the literature indicates that the consensus in existing studies is that areas with lower levels of urbanisation and generally better air quality tend to show higher levels of social cohesion and a lower prevalence of depression.

Several studies have also suggested that blue spaces and residential gardens offer greater psychological recovery than traditional green spaces. Although urban forests are most frequently associated with air purification, and both urban parks and forests with general health improvement, there is no consensus on which typology of UGBSs delivers the most effective results. Therefore, each solution must be designed based on contextual variables such as local climate, urban morphology, vegetation type, and cultural preferences.

As an example, Mediterranean cities often have compact urban centres far from extensive urban forests, and with low numbers of street trees, and the limited availability of open public space makes it challenging to create new green spaces. In such cases, pocket parks or green roof gardens could be viable alternatives to expand green areas while promoting environmental and health benefits. Consequently, future research should explore the comparative effectiveness of different UGBS types in diverse geographical contexts.

Finally, it is important to integrate environmental and health metrics into unified assessment frameworks and to encourage participatory planning strategies involving communities, stakeholders, and urban planners. Future studies should also expand the geographical scope of analysis and adopt mixed methods that combine bibliometric, spatial, and qualitative approaches. These directions are critical for advancing the knowledge and practice of urban planning through nature-based solutions, helping cities simultaneously tackle environmental and public health crises.

6. Conclusions

In this review, two research areas were analysed: the impact of urban green spaces on air quality and the impact on health and well-being. A total of 500 documents were reviewed to understand how UGBSs can simultaneously address environmental and public health crises. The research reveals that green spaces are positively associated with better air quality, better health and mental health, and less mortality risk. Earlier studies, especially before 2016, focused on the role of urban forests in carbon sequestration and air purification. These studies highlighted the importance of vegetation in mitigating air pollution and achieving carbon neutrality.

Since 2017, publications focusing on the benefits of green spaces for mental health and well-being gained more prominence. Mental health benefits from exposure to green spaces gained further importance after 2019, as a result of the COVID-19 pandemic. Studies have increasingly explored the links between accessibility to green spaces, increased physical exercise, improved mental health, and the prevention of non-communicable diseases such as obesity. Some studies indicated that blue spaces and home gardens may be more effective for psychological recovery than urban green spaces. However, it is not yet a consensus, which indicates that further studies should be carried out.

Emerging themes include the role of blue spaces and residential gardens for health, and the growing importance of ensuring equitable access to UGBSs. The diversity of the results suggests that the effectiveness of UGBSs varies by context, including geographic location, urban form, and cultural factors. This study is significant for future research relating biophilic design to improve air quality, mitigate climate change, and enhance health and well-being, but it has some limitations. The search was limited to the WoS database in the English language, although relevant articles exist in other databases. However, most bibliometric tools do not support extended datasets, which can lead to analysis restrictions and data processing errors. Additionally, only first-quartile journals were considered, which excluded several potentially relevant studies. Another limitation was the date at which the search was completed—early 2022. We know that there are more publications which could be included, but of course, literature reviewing is a constant process in research. Future studies should focus on the benefits of different types of UGBSs, understanding the value of each, and identifying the most effective designs to achieve carbon neutrality, mitigate air pollution, and enhance health and well-being in diverse geographical contexts.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/land14061230/s1, Figure S1. Preferred Reporting Items for Systematic Reviews (PRISMA 2020) expression of the systematic literature review; Figure S2. Annual Scientific productions about NBS for air quality and human health (software: biblioshiny); Figure S3. Corresponding Author's Country | software: biblioshiny; Figure S4. Top 10 most relevant sources | software: biblioshiny; Figure S5. Journal co-citation network | software: VOSviewer; Figure S6. Keywords analysis | software: VOSviewer; Table S1. Most cited articles; Table S2. Publications studying the typologies of UGBS that positively influence air quality; Table S3. Impact of urban green space on carbon sequestration and active mobility; Table S4. Publications on design solutions to enhance health; Table S5. Publications studying variables that affect mental-health and wellbeing; Table S6. Publications on the influence of a specific type of green and blue spaces for mental health & well-being; Table S7. Most relevant publications comparing different typologies of UGBS; Table S8. Publications comparing the influence of opposite environments on mental health and wellbeing.

Author Contributions: Conceptualization, C.d.S.S. and T.P.; methodology, C.d.S.S.; validation, S.B. and L.L.; formal analysis, C.d.S.S., data curation, C.d.S.S.; writing—original draft preparation, C.d.S.S.; writing—review and editing, supervision, S.B., L.L. and T.P.; funding acquisition, T.P. All authors have read and agreed to the published version of the manuscript.

Funding: This study was supported by a PhD grant from the Foundation for Science and Technology–Portugal (2021.06357.BD).

Informed Consent Statement: Informed consent was obtained from all subjects involved in this study.

Data Availability Statement: Data are available on demand.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

The following abbreviations are used in this manuscript:

NBSs	Nature-Based Solutions
UGBSs	Urban Green and Blue Spaces
UGBI	Urban Green and Blue Infrastructure
PM10	Particulate Matter with Diameter $\leq$ 10 µm
PM2.5	Particulate Matter with Diameter $\leq$ 2.5 µm
SO_2	Sulphur Dioxide
NO_2	Nitrogen Dioxide
CO	Carbon Monoxide
O_3	Ozone
CO_2	Carbon Dioxide
WoS	Web of Science

References

1. Kellert, S.R.; Wilson, E.O. *The Biophilia Hypothesis*; Island Press: Washington, DC, USA, 1995; ISBN 978-1-55963-147-1.
2. Wolch, J.; Byrneb, J.; Newell, J.P. Urban Green Space, Public Health, and Environmental Justice:The Challenge of Making Cities 'Just Green Enough'. *Landsc. Urban Plan.* **2014**, *125*, 234–244. [CrossRef]
3. Nieuwenhuijsen, M.J.; Khreis, H. Car Free Cities: Pathway to Healthy Urban Living. *Environ. Int.* **2016**, *94*, 251–262. [CrossRef]
4. Seddon, N.; Smith, A.; Smith, P.; Key, I.; Chausson, A.; Girardin, C.; House, J.; Srivastava, S.; Turner, B. Getting the Message Right On Nature-Based Solutions To Climate Change. *Glob. Change Biol.* **2021**, *27*, 1518–1546. [CrossRef]

5. Dumitru, A.; Wendling, L. (Eds.) *Evaluating the Impact of Nature-Based Solutions: A Handbook for Practitioners*; Publications Office of the European Union: Brussels, Belgium, 2021; ISBN 978-92-76-22821-9.
6. Semeraro, T.; Radicchio, B.; Medagli, P.; Arzeni, S.; Turco, A.; Geneletti, D. Integration of Ecosystem Services in Strategic Environmental Assessment of a Peri-Urban Development Plan. *Sustainability* **2021**, *13*, 122. [CrossRef]
7. Lupp, G.; Zingraff-Hamed, A.; Huang, J.J.; Oen, A.; Pauleit, S. Living Labs-A Concept for Co-Designing Nature-Based Solutions. *Sustainability* **2021**, *13*, 188. [CrossRef]
8. Pope, C.A.; Dockery, D.W. Health Effects of Fine Particulate Air Pollution: Lines That Connect. *J. Air Waste Manag. Assoc.* **2006**, *56*, 709–742. [CrossRef]
9. Kampa, M.; Castanas, E. Human Health Effects of Air Pollution. *Environ. Pollut.* **2008**, *151*, 362–367. [CrossRef]
10. Yin, S.; Shen, Z.; Zhou, P.; Zou, X.; Che, S.; Wang, W. Quantifying Air Pollution Attenuation within Urban Parks: An Experimental Approach in Shanghai, China. *Environ. Pollut.* **2011**, *159*, 2155–2163. [CrossRef]
11. Selmi, W.; Weber, C.; Riviere, E.; Blond, N.; Mehdi, L.; Nowak, D. Air Pollution Removal by Trees in Public Green Spaces in Strasbourg City, France. *Urban For. Urban Green.* **2016**, *17*, 192–201. [CrossRef]
12. Nowak, D.J.; Hirabayashi, S.; Doyle, M.; McGovern, M.; Pasher, J. Air Pollution Removal By Urban Forests in Canada and Its Effect on Air Quality and Human Health. *Urban For. Urban Green.* **2018**, *29*, 40–48. [CrossRef]
13. Lu, T.; Lane, M.; Van der Horst, D.; Liang, X.; Wu, J. Exploring the Impacts of Living in a "Green" City on Individual BMI: A Study of Lingang New Town in Shanghai, China. *Int. J. Environ. Res. Public Health* **2020**, *17*, 7105. [CrossRef]
14. Paul, L.; Hystad, P.; Burnett, R.; Kwong, J.; Crouse, D.; van Donkelaar, A.; Tu, K.; Lavigne, E.; Copes, R.; Martin, R.; et al. Urban Green Space and the Risks of Dementia and Stroke. *Environ. Res.* **2020**, *186*, 109520. [CrossRef]
15. Kabisch, N.; Pueffel, C.; Masztalerz, O.; Hemmerling, J.; Kraemer, R. Physiological and Psychological Effects of Visits to Different Urban Green and Street Environments in Older People: A Field Experiment in a Dense Inner-City Area. *Landsc. Urban Plan.* **2021**, *207*, 103998. [CrossRef]
16. Oh, R.; Fielding, K.; Chang, C.; Nghiem, L.; Tan, C.; Quazi, S.; Shanahan, D.; Gaston, K.; Carrasco, R.; Fuller, R. Health and Wellbeing Benefits from Nature Experiences in Tropical Settings Depend on Strength of Connection to Nature. *Int. J. Environ. Res. Public Health* **2021**, *18*, 10149. [CrossRef]
17. Pouso, S.; Borja, A.; Fleming, L.E.; Gomez-Baggethun, E.; White, M.P.; Uyarra, M.C. Contact with Blue-Green Spaces during the COVID-19 Pandemic Lockdown Beneficial for Mental Health. *Sci. Total Environ.* **2021**, *756*, 143984. [CrossRef]
18. Qin, B.; Zhu, W.; Wang, J.; Peng, Y. Understanding the Relationship between Neighbourhood Green Space and Mental Wellbeing: A Case Study of Beijing, China. *Cities* **2021**, *109*, 103039. [CrossRef]
19. Souter-Brown, G.; Hinckson, E.; Duncan, S. Effects of a Sensory Garden on Workplace Wellbeing: A Randomised Control Trial. *Landsc. Urban Plan.* **2021**, *207*, 103997. [CrossRef]
20. Landrigan, P.J.; Fuller, R.; Acosta, N.J.R.; Adeyi, O.; Arnold, R.; Basu, N.; Baldé, A.B.; Bertollini, R.; Bose-O'Reilly, S.; Boufford, J.I.; et al. The Lancet Commission on Pollution and Health. *Lancet* **2018**, *391*, 462–512. [CrossRef]
21. Forouzanfar, M.H.; Afshin, A.; Alexander, L.T.; Anderson, H.R.; Bhutta, Z.A.; Biryukov, S.; Brauer, M.; Burnett, R.; Cercy, K.; Charlson, F.J.; et al. Global, Regional, and National Comparative Risk Assessment of 79 Behavioural, Environmental and Occupational, and Metabolic Risks or Clusters of Risks, 1990–2015: A Systematic Analysis for the Global Burden of Disease Study 2015. *Lancet* **2016**, *388*, 1659–1724. [CrossRef]
22. Wang, H.; Naghavi, M.; Allen, C.; Barber, R.M.; Bhutta, Z.A.; Carter, A.; Casey, D.C.; Charlson, F.J.; Chen, A.Z.; Coates, M.M.; et al. Global, Regional, and National Life Expectancy, All-Cause Mortality, and Cause-Specific Mortality for 249 Causes of Death, 1980–2015: A Systematic Analysis for the Global Burden of Disease Study 2015. *Lancet* **2016**, *388*, 1459–1544. [CrossRef]
23. Maione, M.; Fowler, D.; Monks, P.S.; Reis, S.; Rudich, Y.; Williams, M.L.; Fuzzi, S. Air Quality and Climate Change: Designing New Win-Win Policies for Europe. *Environ. Sci. Policy* **2016**, *65*, 48–57. [CrossRef]
24. Cohen, A.J.; Brauer, M.; Burnett, R.; Anderson, H.R.; Frostad, J.; Estep, K.; Balakrishnan, K.; Brunekreef, B.; Dandona, L.; Dandona, R.; et al. Estimates and 25-Year Trends of the Global Burden of Disease Attributable to Ambient Air Pollution: An Analysis of Data from the Global Burden of Diseases Study 2015. *Lancet* **2017**, *389*, 1907–1918. [CrossRef]
25. Thurston, G.D.; Kipen, H.; Annesi-Maesano, I.; Balmes, J.; Brook, R.D.; Cromar, K.; Matteis, S.D.; Forastiere, F.; Forsberg, B.; Frampton, M.W.; et al. A Joint ERS/ATS Policy Statement: What Constitutes an Adverse Health Effect of Air Pollution? An Analytical Framework. *Eur. Respir. J.* **2017**, *49*, 1600419. [CrossRef]
26. Perera, F.P. Multiple Threats to Child Health from Fossil Fuel Combustion: Impacts of Air Pollution and Climate Change. *Environ. Health Perspect.* **2017**, *125*, 141–148. [CrossRef]
27. Fuzzi, S.; Baltensperger, U.; Carslaw, K.; Decesari, S.; Denier van der Gon, H.; Facchini, M.C.; Fowler, D.; Koren, I.; Langford, B.; Lohmann, U.; et al. Particulate Matter, Air Quality and Climate: Lessons Learned and Future Needs. *Atmos. Chem. Phys.* **2015**, *15*, 8217–8299. [CrossRef]

28. Monks, P.S.; Archibald, A.T.; Colette, A.; Cooper, O.; Coyle, M.; Derwent, R.; Fowler, D.; Granier, C.; Law, K.S.; Mills, G.E.; et al. Tropospheric Ozone and Its Precursors from the Urban to the Global Scale from Air Quality to Short-Lived Climate Forcer. *Atmos. Chem. Phys.* **2015**, *15*, 8889–8973. [CrossRef]
29. WHO. *Health in the Green Economy: Health Co-Benefits of Climate Change Mitigation—Transport Sector*; World Health Organization: Geneva, Switzerland, 2012.
30. Cheng, J.J.; Berry, P. Health Co-Benefits and Risks of Public Health Adaptation Strategies to Climate Change: A Review of Current Literature. *Int. J. Public Health* **2013**, *58*, 305–311. [CrossRef]
31. C40 Cities. *Defining Carbon Neutrality for Cities & Managing Residual Emissions—Cities' Prespective & Guidance*; C40 Cities: New York, NY, USA, 2019.
32. Griscom, B.W.; Adams, J.; Ellis, P.W.; Houghton, R.A.; Lomax, G.; Miteva, D.A.; Schlesinger, W.H.; Shoch, D.; Siikamaki, J.V.; Smith, P.; et al. Natural Climate Solutions. *Proc. Natl. Acad. Sci. USA* **2017**, *114*, 11645–11650. [CrossRef]
33. Rogelj, J.; Popp, A.; Calvin, K.V.; Luderer, G.; Emmerling, J.; Gernaat, D.; Fujimori, S.; Strefler, J.; Hasegawa, T.; Marangoni, G.; et al. Scenarios towards Limiting Global Mean Temperature Increase below 1.5 Degrees C. *Nat. Clim. Change* **2018**, *8*, 325–332. [CrossRef]
34. Madsen, S.H.J.; Hansen, T. Cities and Climate Change—Examining Advantages and Challenges of Urban Climate Change Experiments. *Eur. Plan. Stud.* **2019**, *27*, 282–299. [CrossRef]
35. Roupsard, P.; Amielh, M.; Maro, D.; Coppalle, A.; Branger, H.; Connan, O.; Laguionie, P.; Hébert, D.; Talbaut, M. Measurement in a Wind Tunnel of Dry Deposition Velocities of Submicron Aerosol with Associated Turbulence onto Rough and Smooth Urban Surfaces. *J. Aerosol Sci.* **2013**, *55*, 12–24. [CrossRef]
36. Weerakkody, U.; Dover, J.; Mitchell, P.; Reiling, K. The Impact of Rainfall in Remobilising Particulate Matter Accumulated on Leaves of Four Evergreen Species Grown on a Green Screen and a Living Wall. *Urban For. Urban Green.* **2018**, *35*, 21–31. [CrossRef]
37. Xie, C.; Yan, L.; Liang, A.; Che, S. Understanding the Washoff Processes of PM2.5 from Leaf Surfaces during Rainfall Events. *Atmos. Environ.* **2019**, *214*, 116844. [CrossRef]
38. Kumar, P.; Fennell, P.; Britter, R. Effect of Wind Direction and Speed on the Dispersion of Nucleation and Accumulation Mode Particles in an Urban Street Canyon. *Sci. Total Environ.* **2008**, *402*, 82–94. [CrossRef]
39. Nowak, D.; Hirabayashi, S.; Bodine, A.; Hoehn, R. Modeled PM2.5 Removal by Trees in Ten US Cities and Associated Health Effects. *Environ. Pollut.* **2013**, *178*, 395–402. [CrossRef]
40. Pearce, H.; Levine, J.; Cai, X.; MacKenzie, A. Introducing the Green Infrastructure for Roadside Air Quality (GI4RAQ) Platform: Estimating Site-Specific Changes in the Dispersion of Vehicular Pollution Close to Source. *Forests* **2021**, *12*, 769. [CrossRef]
41. Wania, A.; Bruse, M.; Blond, N.; Weber, C. Analysing the Influence of Different Street Vegetation on Traffic-Induced Particle Dispersion Using Microscale Simulations. *J. Environ. Manag.* **2012**, *94*, 91–101. [CrossRef]
42. Calfapietra, C.; Fares, S.; Manes, F.; Morani, A.; Sgrigna, G.; Loreto, F. Role of Biogenic Volatile Organic Compounds (BVOC) Emitted by Urban Trees on Ozone Concentration in Cities: A Review. *Environ. Pollut.* **2013**, *183*, 71–80. [CrossRef]
43. Ward Thompson, C. Linking Landscape and Health: The Recurring Theme. *Landsc. Urban Plan.* **2011**, *99*, 187–195. [CrossRef]
44. Olmsted, F.L. *Notes on the Plan of Franklin Park and Related Matters*; Boston: Printed as a supplement to the City of Boston Eleventh Annual Report of the Board of Commissioners of the Department of Parks for the Year 1885; City of Boston Park Department: Boston, MA, USA, 1886.
45. Jimenez, M.P.; DeVille, N.V.; Elliott, E.G.; Schiff, J.E.; Wilt, G.E.; Hart, J.E.; James, P. Associations between Nature Exposure and Health: A Review of the Evidence. *Int. J. Environ. Res. Public Health* **2021**, *18*, 4790. [CrossRef]
46. Antonovsky, A. *Health, Stress, and Coping*; Jossey-Bass: San Francisco, CA, USA, 1979; ISBN 978-0-87589-412-6.
47. Gascon, M.; Zijlema, W.; Vert, C.; White, M.P.; Nieuwenhuijsen, M.J. Outdoor Blue Spaces, Human Health and Well-Being: A Systematic Review of Quantitative Studies. *Int. J. Hyg. Environ. Health* **2017**, *220*, 1207–1221. [CrossRef] [PubMed]
48. WHO. *Urban Green Space Interventions and Health: A Review of Impacts and Effectiveness*; World Health Organization: Geneva, Switzerland, 2017.
49. Bratman, G.N.; Anderson, C.B.; Berman, M.G.; Cochran, B.; de Vries, S.; Flanders, J.; Folke, C.; Frumkin, H.; Gross, J.J.; Hartig, T.; et al. Nature and Mental Health: An Ecosystem Service Perspective. *Sci. Adv.* **2019**, *5*, eaax0903. [CrossRef] [PubMed]
50. White, M.P.; Elliott, L.R.; Grellier, J.; Economou, T.; Bell, S.; Bratman, G.N.; Cirach, M.; Gascon, M.; Lima, M.L.; Lõhmus, M.; et al. Associations between Green/Blue Spaces and Mental Health across 18 Countries. *Sci. Rep.* **2021**, *11*, 8903. [CrossRef] [PubMed]
51. Santini, Z.I.; Koyanagi, A.; Tyrovolas, S.; Mason, C.; Haro, J.M. The Association between Social Relationships and Depression: A Systematic Review. *J. Affect. Disord.* **2015**, *175*, 53–65. [CrossRef]
52. Park, S.J.; Lee, H.C. Spatial Design of Childcare Facilities Based on Biophilic Design Patterns. *Sustainability* **2019**, *11*, 2851. [CrossRef]
53. Mouratidis, K. Compact City, Urban Sprawl, and Subjective Well-Being. *Cities* **2019**, *92*, 261–272. [CrossRef]

54. Thompson, C.W.; Aspinall, P.; Roe, J.; Robertson, L.; Miller, D. Mitigating Stress and Supporting Health in Deprived Urban Communities: The Importance of Green Space and the Social Environment. *Int. J. Environ. Res. Public Health* **2016**, *13*, 440. [CrossRef]
55. van den Bosch, M.; Ode Sang, Å. Urban Natural Environments as Nature-Based Solutions for Improved Public Health—A Systematic Review Of Reviews. *Environ. Res.* **2017**, *158*, 373–384. [CrossRef]
56. Page, M.J.; McKenzie, J.E.; Bossuyt, P.M.; Boutron, I.; Hoffmann, T.C.; Mulrow, C.D.; Shamseer, L.; Tetzlaff, J.M.; Akl, E.A.; Brennan, S.E.; et al. The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews. *BMJ* **2021**, *372*, n71. [CrossRef]
57. Aria, M.; Cuccurullo, C. Bibliometrix: An R-Tool for Comprehensive Science Mapping Analysis. *J. Informetr.* **2017**, *11*, 959–975. [CrossRef]
58. van Eck, N.J.; Waltman, L. Software Survey: VOSviewer, a Computer Program for Bibliometric Mapping. *Scientometrics* **2010**, *84*, 523–538. [CrossRef] [PubMed]
59. Lotka, A.J. The Frequency Distribution of Scientific Productivity. *J. Wash. Acad. Sci.* **1926**, *16*, 317–323.
60. Nowak, D.J.; Hoehn, R.E.; Bodine, A.R.; Greenfield, E.J.; O'Neil-Dunne, J. Urban Forest Structure, Ecosystem Services and Change in Syracuse, NY. *Urban Ecosyst.* **2016**, *19*, 1455–1477. [CrossRef]
61. Viippola, V.; Yli-Pelkonen, V.; Jarvi, L.; Kulmala, M.; Setala, H. Effects of Forests on Particle Number Concentrations in Near-Road Environments across Three Geographic Regions. *Environ. Pollut.* **2020**, *266*, 115294. [CrossRef]
62. Sheng, Q.; Zhang, Y.; Zhu, Z.; Li, W.; Xu, J.; Tan, R. An Experimental Study to Quantify Road Greenbelts and Their Association with PM2.5 Concentration along City Main Roads in Nanjing, China. *Sci. Total Environ.* **2019**, *667*, 710–717. [CrossRef]
63. Zheng, T.; Jia, Y.; Zhang, S.; Li, X.; Wu, Y.; Wu, C.; He, H.; Peng, Z. Impacts of Vegetation on Particle Concentrations in Roadside Environments. *Environ. Pollut.* **2021**, *282*, 117067. [CrossRef]
64. Riondato, E.; Pilla, F.; Basu, A.; Basu, B. Investigating the Effect of Trees on Urban Quality in Dublin by Combining Air Monitoring with I-Tree Eco Model. *Sustain. Cities Soc.* **2020**, *61*, 102356. [CrossRef]
65. Vieira, J.; Matos, P.; Mexia, T.; Silva, P.; Lopes, N.; Freitas, C.; Correia, O.; Santos-Reis, M.; Branquinho, C.; Pinho, P. Green Spaces Are Not All the Same for the Provision of Air Purification and Climate Regulation Services: The Case of Urban Parks. *Environ. Res.* **2018**, *160*, 306–313. [CrossRef]
66. Liu, O.; Russo, A. Assessing the Contribution of Urban Green Spaces in Green Infrastructure Strategy Planning for Urban Ecosystem Conditions and Services. *Sustain. Cities Soc.* **2021**, *68*, 102772. [CrossRef]
67. Bodnaruk, E.; Kroll, C.; Yang, Y.; Hirabayashi, S.; Nowak, D.; Endreny, T. Where to Plant Urban Trees? A Spatially Explicit Methodology to Explore Ecosystem Service Tradeoffs. *Landsc. Urban Plan.* **2017**, *157*, 457–467. [CrossRef]
68. Wang, C.; Li, Q.; Wang, Z.-H. Quantifying the Impact of Urban Trees on Passive Pollutant Dispersion Using a Coupled Large-Eddy Simulation-Lagrangian Stochastic Model. *Build. Environ.* **2018**, *145*, 33–49. [CrossRef]
69. Lei, Y.; Davies, G.M.; Jin, H.; Tian, G.; Kim, G. Scale-Dependent Effects of Urban Greenspace on Particulate Matter Air Pollution. *Urban For. Urban Green.* **2021**, *61*, 127089. [CrossRef]
70. Zhang, L.; Zhang, Z.; Feng, C.; Tian, M.; Gao, Y. Impact of Various Vegetation Configurations on Traffic Fine Particle Pollutants in a Street Canyon for Different Wind Regimes. *Sci. Total Environ.* **2021**, *789*, 147960. [CrossRef] [PubMed]
71. Nowak, D.; Crane, D. Carbon Storage and Sequestration by Urban Trees in the USA. *Environ. Pollut.* **2002**, *116*, 381–389. [CrossRef]
72. Wang, Y.; Chang, Q.; Li, X. Promoting Sustainable Carbon Sequestration of Plants in Urban Greenspace by Planting Design: A Case Study in Parks of Beijing. *Urban For. Urban Green.* **2021**, *64*, 127291. [CrossRef]
73. Downey, A.; Groffman, P.; Mejia, G.; Cook, E.; Sritrairat, S.; Karty, R.; Palmer, M.; McPhearson, T. Soil Carbon Sequestration in Urban Afforestation Sites in New York City. *Urban For. Urban Green.* **2021**, *65*, 127342. [CrossRef]
74. Pozoukidou, G.; Chatziyiannaki, Z. 15-Minute City: Decomposing the New Urban Planning Eutopia. *Sustainability* **2021**, *13*, 928. [CrossRef]
75. Andreucci, M.; Loder, A.; Brown, M.; Brajkovic, J. Exploring Challenges and Opportunities of Biophilic Urban Design: Evidence from Research and Experimentation. *Sustainability* **2021**, *13*, 4323. [CrossRef]
76. van den Bogerd, N.; Elliott, L.R.; White, M.P.; Mishra, H.S.; Bell, S.; Porter, M.; Sydenham, Z.; Garrett, J.K.; Fleming, L.E. Urban Blue Space Renovation and Local Resident and Visitor Well-Being: A Case Study from Plymouth, UK. *Landsc. Urban Plan.* **2021**, *215*, 104232. [CrossRef]
77. Marques, B.; Freeman, C.; Carter, L.; Pedersen Zari, M. Conceptualising Therapeutic Environments through Culture, Indigenous Knowledge and Landscape for Health and Well-Being. *Sustainability* **2021**, *13*, 9125. [CrossRef]
78. Ghaziani, R.; Lemon, M.; Atmodiwirjo, P. Biophilic Design Patterns for Primary Schools. *Sustainability* **2021**, *13*, 12207. [CrossRef]
79. Perry, M.; Cotes, L.; Horton, B.; Kunac, R.; Snell, I.; Taylor, B.; Wright, A.; Devan, H. "Enticing" but Not Necessarily a "Space Designed for Me": Experiences of Urban Park Use by Older Adults with Disability. *Int. J. Environ. Res. Public Health* **2021**, *18*, 552. [CrossRef] [PubMed]

80. Bozkurt, M. Metropolitan Children's Physical Fitness: The Relationship between Overweight and Obesity Prevalence, Socioeconomic Status, Urban Green Space Access, and Physical Activity. *Urban For. Urban Green.* **2021**, *64*, 127272. [CrossRef]
81. Seo, S.; Choi, S.; Kim, K.; Kim, S.; Park, S. Association between Urban Green Space and the Risk of Cardiovascular Disease: A Longitudinal Study in Seven Korean Metropolitan Areas. *Environ. Int.* **2019**, *125*, 51–57. [CrossRef]
82. Jaafari, S.; Shabani, A.; Moeinaddini, M.; Danehkar, A.; Sakieh, Y. Applying Landscape Metrics and Structural Equation Modeling to Predict the Effect of Urban Green Space on Air Pollution and Respiratory Mortality in Tehran. *Environ. Monit. Assess.* **2020**, *192*, 412. [CrossRef]
83. Sanchez, C.; Segu-Tell, J.; Gomez-Barroso, D.; Pardo Romaguera, E.; Ortega-Garcia, J.A.; Ramis, R. Urban Green Spaces and Childhood Leukemia Incidence: A Population-Based Case-Control Study in Madrid. *Environ. Res.* **2021**, *202*, 111723. [CrossRef]
84. Roe, J.; Aspinall, P. The Restorative Outcomes of Forest School and Conventional School in Young People with Good and Poor Behaviour. *Urban For. Urban Green.* **2011**, *10*, 205–212. [CrossRef]
85. Tilley, S.; Neale, C.; Patuano, A.; Cinderby, S. Older People's Experiences of Mobility and Mood in an Urban Environment: A Mixed Methods Approach Using Electroencephalography (EEG) and Interviews. *Int. J. Environ. Res. Public Health* **2017**, *14*, 151. [CrossRef]
86. de Bell, S.; Graham, H.; Jarvis, S.; White, P. The Importance of Nature in Mediating Social and Psychological Benefits Associated with Visits to Freshwater Blue Space. *Landsc. Urban Plan.* **2017**, *167*, 118–127. [CrossRef]
87. Chen, Y.; Stephens, M.; Jones, C.A. Does Residents' Satisfaction with the Neighbourhood Environment Relate to Residents' Self-Rated Health? Evidence from Beijing. *Int. J. Environ. Res. Public Health* **2019**, *16*, 5051. [CrossRef]
88. Muro, R.S.-T.; Granados, C.S.d.T.; Romero, E.J.R. Green Infrastructures in the Peri-Urban Landscape: Exploring Local Perception of Well-Being through 'Go-Alongs' and 'Semi-Structured Interviews'. *Sustainability* **2020**, *12*, 6836. [CrossRef]
89. Plunz, R.A.; Zhou, Y.; Vintimilla, M.I.C.; Mckeown, K.; Yu, T.; Uguccioni, L.; Sutto, M.P. Twitter Sentiment in New York City Parks as Measure of Well-Being. *Landsc. Urban Plan.* **2019**, *189*, 235–246. [CrossRef]
90. Young, C.; Hofmann, M.; Frey, D.; Moretti, M.; Bauer, N. Psychological Restoration in Urban Gardens Related to Garden Type, Biodiversity and Garden-Related Stress. *Landsc. Urban Plan.* **2020**, *198*, 103777. [CrossRef]
91. Hashemi Sigari, R.; Panagopoulos, T. A Multicriteria Decision-Making Approach for Urban Water Features: Ecological Landscape Architecture Evaluation. *Land* **2024**, *13*, 1799. [CrossRef]
92. Amerio, A.; Brambilla, A.; Morganti, A.; Aguglia, A.; Bianchi, D.; Santi, F.; Costantini, L.; Odone, A.; Costanza, A.; Signorelli, C.; et al. COVID-19 Lockdown: Housing Built Environment's Effects on Mental Health. *Int. J. Environ. Res. Public Health* **2020**, *17*, 5973. [CrossRef]
93. Lehberger, M.; Kleih, A.-K.; Sparke, K. Self-Reported Well-Being and the Importance of Green Spaces-A Comparison of Garden Owners and Non-Garden Owners in Times of COVID-19. *Landsc. Urban Plan.* **2021**, *212*, 104108. [CrossRef]
94. Alcock, I.; White, M.; Cherrie, M.; Wheeler, B.; Taylor, J.; McInnes, R.; Kampe, E.O.I.; Vardoulakis, S.; Sarran, C.; Soyiri, I.; et al. Land Cover and Air Pollution Are Associated with Asthma Hospitalisations: A Cross-Sectional Study. *Environ. Int.* **2017**, *109*, 29–41. [CrossRef]
95. Engemann, K.; Svenning, J.-C.; Arge, L.; Brandt, J.; Erikstrup, C.; Geels, C.; Hertel, O.; Mortensen, P.B.; Plana-Ripoll, O.; Tsirogiannis, C.; et al. Associations between Growing up in Natural Environments and Subsequent Psychiatric Disorders in Denmark. *Environ. Res.* **2020**, *188*, 109788. [CrossRef]
96. Lai, Y.; Kontokosta, C. The Impact of Urban Street Tree Species on Air Quality and Respiratory Illness: A Spatial Analysis of Large-Scale, High-Resolution Urban Data. *Health Place* **2019**, *56*, 80–87. [CrossRef]
97. Sun, S.; Sarkar, C.; Kumari, S.; James, P.; Cao, W.; Lee, R.; Tian, L.; Webster, C. Air Pollution Associated Respiratory Mortality Risk Alleviated by Residential Greenness in the Chinese Elderly Health Service Cohort. *Environ. Res.* **2020**, *183*, 109139. [CrossRef]
98. Wang, R.; Feng, Z.; Pearce, J.; Liu, Y.; Dong, G. Are Greenspace Quantity and Quality Associated with Mental Health through Different Mechanisms in Guangzhou, China: A Comparison Study Using Street View Data. *Environ. Pollut.* **2021**, *290*, 117976. [CrossRef] [PubMed]
99. Zock, J.-P.; Verheij, R.; Helbich, M.; Volker, B.; Spreeuwenberg, P.; Strak, M.; Janssen, N.A.H.; Dijst, M.; Groenewegen, P. The Impact of Social Capital, Land Use, Air Pollution and Noise on Individual Morbidity in Dutch Neighbourhoods. *Environ. Int.* **2018**, *121*, 453–460. [CrossRef] [PubMed]