land

Review

Land Use Efficiency Assessment under Sustainable Development Goals: A Systematic Review

Yin Ma [1], Minrui Zheng [2,3,*], Xinqi Zheng [1,4,5], Yi Huang [1], Feng Xu [1], Xiaoli Wang [6], Jiantao Liu [7], Yongqiang Lv [7] and Wenchao Liu [8]

1 School of Information Engineering, China University of Geosciences (Beijing), Beijing 100083, China; mayin1994@cugb.edu.cn (Y.M.); zhengxq@cugb.edu.cn (X.Z.); cugbhy@email.cugb.edu.cn (Y.H.); 3004210010@cugb.edu.cn (F.X.)
2 School of Public Administration and Policy, Renmin University of China, Beijing 100872, China
3 Digital Government and National Governance Lab, Renmin University of China, Beijing 100872, China
4 Technology Innovation Center for Territory Spatial Big-Data, Ministry of Natural Resources of the People's Republic of China, Beijing 100036, China
5 Observation and Research Station of Beijing Fangshan Comprehensive Exploration, Ministry of Natural Resources, Beijing 100083, China
6 China Land Surveying and Planning Institute, Beijing 100035, China; wangxiaoli@mail.clspi.org.cn
7 School of Surveying and Geo-Informatics, Shandong Jianzhu University, Jinan 250101, China; liujiantao18@sdjzu.edu.cn (J.L.); lvyongqiang19@sdjzu.edu.cn (Y.L.)
8 Information Center of Ministry of Natural Resources of the People's Republic of China, Beijing 100034, China; wcliu@infomail.mnr.gov.cn
* Correspondence: minruizheng@ruc.edu.cn; Tel.: +86-010-8232-2116

Abstract: Improvements in and the assessment of land use efficiency are crucial pillars for achieving the Sustainable Development Goals (SDGs). This study reviews 208 representative papers, oral reports, and project reports to provide a systematic and comprehensive understanding of the current status and future trends of research on land use efficiency assessment. The findings reveal that (1) the number of papers on land use efficiency assessment is rapidly increasing, with research primarily focused on environmental science and ecology (n = 157, 75.48%). (2) Quantitative models are gaining popularity for land use efficiency assessment, with more than 46.63% of the studies adopting the data envelopment analysis (DEA) model. (3) The definition and analysis perspectives of land use efficiency are diverse, but research on relative land use efficiency and comprehensive analysis perspectives accounts for a significant proportion. (4) Constructing a large and complex model that incorporates geospatial effects, big data, and computer technology is a hot topic for future research methods. On the other hand, conducting land use efficiency research on a global scale is more conducive to achieving the SDGs. (5) The core to improving land use efficiency lies in the joint implementation of multi-pronged measures.

Keywords: land use efficiency; multi-perspective spatiotemporal analysis; sustainable development goals; quantitative models; systematic review; bibliometric analysis

Citation: Ma, Y.; Zheng, M.; Zheng, X.; Huang, Y.; Xu, F.; Wang, X.; Liu, J.; Lv, Y.; Liu, W. Land Use Efficiency Assessment under Sustainable Development Goals: A Systematic Review. *Land* **2023**, *12*, 894. https://doi.org/10.3390/land12040894

Academic Editor: Alexandru-Ionut Petrisor

Received: 13 March 2023
Revised: 26 March 2023
Accepted: 14 April 2023
Published: 16 April 2023

1. Introduction

Sustainable development is broadly defined as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs" [1]. Sustainability fully embodies a process or state that can be maintained over time from various perspectives, including natural, economic, social, and human. The definition emphasizes holistic, endogenous, and integrated perceptions [2]. The connotation of sustainable development theory is perceived through a long process, from survival to development and then from development to sustainable development [3]. It is perceived as a vector of behavior in a complex natural–social–economic system that leads to rational and harmonious development [4]. In summary, sustainable development is a high-level

overview of comprehensive and sustainable human development that takes into account multiple perspectives from both natural and social aspects. Therefore, its development is supported by multidisciplinary fundamental theories such as ecology, sociology, economics, geography, and medicine [1,4]. In 2015, the United Nations officially adopted 17 Sustainable Development Goals (SDGs), underpinned by these internal developments and theories. Land is the main element of the natural environmental substrate and is an important carrier of socio-economic development [5]. Furthermore, the rational use and management of land is a crucial way to resolve socio-economic conflicts and contribute to the harmonization of environment, society, and economy [6]. In addition, the SDGs will thoroughly address the development of the three dimensions of society, economy, and environment in an integrated manner between 2015 and 2030 [6,7]. It can be seen that the use, management, planning and conservation of land are closely related to the achievement of the SDGs.

With the continuous increase in population and urban expansion, the demand for land resources is rapidly increasing [8]. As we all know, the availability of land that can support human production and life is fixed and limited. To achieve SDGs in social, economic, and environmental domains while faced with this constraint, it is imperative to improve land use efficiency [9]. Improving land use efficiency is also a crucial strategy for promoting sustainable development globally. The relationship between humans and land has posed prominent contradictions, leading scholars to recognize the scarcity and importance of land resources. Consequently, the field of land research has attracted the attention of multidisciplinary experts [10]. The idea of optimizing the intensive use and efficiency of land resources has gained momentum and has become a popular topic of discussion [11,12].

As per the definition provided by the Food and Agriculture Organization (FAO) of the United Nations, land use refers to the various arrangements, activities and inputs undertaken by people to ensure the efficient production, transformation and maintenance of land. Land use is a dynamic process. Since ancient times, the degree of land utilization and the benefits and services obtained by using land are not nearly the same [13]. Currently, the key aspects of land use mainly encompass land resource surveys, land use structure analysis, land use planning, land development and land protection. Land use is not only a technical problem, but is also an economic problem. It involves many disciplines such as management, planning, geography, ecology and so on [14]. Consequently, land use is uniquely complex and systematic. With the cross-disciplinary fertilization and theoretical support, the changing dimensions of land use have gradually diversified since the 21st century [14,15]. The three main dimensions of change are spatial, temporal, and functional. The spatial dimension has become increasingly important with research including multiple scales such as local, regional, and global [16,17]. Land use has also exhibited various spatial development patterns, including cluster, axis, planar and three-dimensional development [17]. The time scale is also a crucial dimension, with studies investigating short-, medium- and long-term land use changes and their impacts. Predicting future land use changes is also a focus, providing data for land use planning [18]. Furthermore, different land use classes have their own functions, including mixed use, function overlay and spatial sharing [19]. Studies also focus on land use practices such as production agriculture, urban development, and natural resource conservation [20]. In summary, diverse perspectives and dimensions enrich research on land use change. However, the constantly changing dimensions reflect the increasing complexity of land use and the enhancement of land use activities. The intensification of land use activities has emerged as a critical factor that impacts sustainable global growth [15]. On the one hand, the overdevelopment and uncontrolled use of land resources in areas with high natural suitability have led to the disorderly expansion of built-up areas, destruction of green ecological land and occupation of agricultural land. These challenges pose significant threats to regional sustainability. On the other hand, abandoned farmland and unused land in marginal areas pose an even greater threat to food security and efficient land use. High-intensity land use has resulted in a range of problems, such as micro changes in the urban environment, increase in agricultural land pressure, soil pollution and a decrease in biodiversity. These problems create

many difficulties for the development, management, and sustainable utilization of land resources [21].

Land use efficiency is a multi-dimensional and comprehensive concept that involves the coordinated and sustainable development of production, living and ecological space. Therefore, it is supported by a variety of underlying theories. For example, location theory reveals the distribution pattern of land in geographic space and provides a basis for decision making in terms of improving land use efficiency [22]. The law of diminishing returns when associated with land guides the input and output of land to avoid unnecessary efficiency losses [23]. Ecological economics theory guides the optimization of land use efficiency by taking into account both economic and ecological dimensions [24,25]. Furthermore, the basic theories, such as the smart growth theory, input–output analysis theory, and the human–land relationship theory, also lay the foundation for the research of land use efficiency [26,27]. Land use efficiency can be defined as the benefit obtained from a given land area or as the ratio of input and output [28,29]. This involves investing natural, social and innovative technological resources into the land to obtain various materials and services. Land use efficiency can provide a comprehensive reflection of the relationship between human economic activities and natural subsystems. It is a powerful indicator for measuring the coordinated development of land, ecology, society, and economy. In addition, the implementation of SDGs aims to thoroughly solve the problem of social, economic, and environmental development coordination. Thus, land use efficiency assessment can be used to measure the achievements of the implementation of SDGs. In recent years, research on land use efficiency has gained significant attention and has been widely discussed by experts in various fields. Due to the diversity and complexity of land use efficiency, scholars have approached related research from different perspectives. The literature includes various land use efficiency assessment models and methods [30], multi-perspective assessment analyses based on different land use types [31], the analysis of influencing factors [32], as well as discussion on the spatial heterogeneity, convergence, and trends inland use efficiency [33,34]. In summary, the literature focuses on the assessment and spatiotemporal analysis of land use efficiency to clarify its current status. This provides researchers with the necessary foundation to give targeted solutions for improving land use efficiency. Moreover, improving the efficiency of production, living and ecological space based on land use is essential in order to achieve the national SDGs. In addition, the assessment of land use efficiency is the basis and prerequisite for land use efficiency improvement. However, few researchers have reviewed the research framework of land use efficiency assessment and have discussed future research directions against the background of SDGs. Therefore, this paper aims to provide a qualitative and quantitative review of the literature on land use efficiency assessment. Additionally, we provide a critical reflection on scholars' oral presentations and project results, covering a wide range of topics and in-depth discussions.

Nowadays, with the rapidly increasing number of papers and the complexity of interdisciplinary research, it is essential to use research methods and tools associated with analyzing the literature to accurately select and accurately grasp the literature. Researchers favor research methods that involve the literature, such as the systematic literature review method [35], bibliometric method [36], and content analysis method [37,38]. The systematic literature review method is a research method that solves specific problems using information technologies such as identification, screening, analysis and integration [39]. Bibliometric analysis uses mathematical and statistical methods to describe, evaluate and predict the current situation and development trends in science and technology by examining the various characteristics and quantities of the literature [36]. It focuses on analyzing the external characteristics of the literature's quantity, studying the distribution characteristics, variation laws, and quantitative relationships of the literature [40]. The content analysis method is a quantitative analysis based on qualitative research. It starts with the qualitative problem hypothesis and uses quantitative statistical analysis methods and tools to deal with the research object [41]. This review primarily focuses on the quantitative

analysis of papers, so the systematic literature review and bibliometric methods are selected. Furthermore, the rich knowledge relationships contained in the literature require bibliometric software to support the research. Scholars prefer using software such as co-occurrence clustering, CiteSpace, VOSviewer, R language and other measurement software to analyze these relationships. Different software has different analytical focus. This study mainly explores the information of knowledge mapping, clustering, and keywords in the literature, and takes into account the simplicity of operation and the aesthetics of drawing. Finally, VOSviewer is chosen to supplement the research.

In this review, we include the following questions:

- What are the quantitative characteristics and major research topics of land use efficiency assessment papers?
- What are the land use efficiency assessment measurement models? Which models are the most popular?
- What are the multi-perspective analysis of land use efficiency assessment results?
- What kind of assessment models and analytical perspectives would be more useful in the future to support an improvement in land use efficiency in the SDG framework?

This study presents a systematic review of land use efficiency based on papers, supplemented by oral reports from experts and project results. The second section outlines the research methods and material collection. The third section provides a comprehensive summary from multiple perspectives in order to address the issues raised in the study. The fourth section offers a critical and in-depth discussion of the research results, and suggests the future research direction. Finally, the fifth section is the summary and conclusion of this review.

2. Materials and Methods

2.1. Systematic Literature Review

Systematic literature review is a method used for gathering a significant amount of relevant data on a specific subject, research topic, profession, or aspect. This approach makes a comprehensive overview of a particular field by reading, analyzing, summarizing and sorting out the latest progress, academic opinions or suggestions. Moreover, it helps to assess the validity and effectiveness of each study to address a particular question by identifying all the relevant literature thoroughly [35]. Scholars have always regarded systematic literature review as an essential research method that fosters clear scientific communication and yields effective results [38]. In this study, we adhere to the principles of a systematic literature review and describe the methodology and procedures used to conduct it.

2.2. Bibliometric

This study utilized the bibliometric method to quantitatively analyze and visualize the literature. By applying mathematical and statistical concepts, the bibliometric method can reveal the characteristics of the literature, such as its attribute distributions, network relationships, research hotspots and development trends. The advantage of the bibliometric method is that it can display the research progress comprehensively and intuitively, which facilitates the excavation of information deep in the literature [40,42]. To further aid in this analysis, the VOSviewer was used to build and visualize bibliometric networks. It can generate network diagrams that display the relationships among the authors, articles and keywords of the literature. This review uses VOSviewer to quantitatively analyze the characteristics of land use efficiency assessment research.

2.3. Literature Search and Selection

This review surveys the publishers of papers related to land use efficiency assessment, and references review papers in related disciplines [38,43,44]. We chose Web of Science, Science Direct and Springer Link to collect the papers considering the breadth, authority, and comprehensiveness of the literature databases. The date range included the period

from the first coverage year of the database in 1982 until the end of 2022. After conducting a rigorous process of collation, comparison, and repeated examination, we found 422 papers that met the search requirements. We further screened these papers, including research papers, conference papers and review papers, and ultimately found 418 papers. In order to focus our review on methodology and on analytical perspectives of land use efficiency assessment, we carefully removed gray articles that provided less methodological detail and unclear perspectives. This study ultimately selected 208 papers that were published between 2005 and 2022. In addition, we collected oral reports and project results to assist in the discussion of bibliometric results.

2.4. Review Framework for Analysis

SDGs can be subdivided into three categories: social goals, economic goals, and environmental goals. Land is the carrier of the natural environment, economic development, and human society [17]. Land use efficiency measures the input–output ratio and the coordinated development status of land, the environment, society, the economy, and population [23]. Improving land use efficiency based on limited land resources contributes to the implementation of the three categories of SDGs. Conversely, the SDGs guide the direction of improving land use efficiency from the economic, social, and environmental perspectives. This review systematically summarizes the assessment of land use efficiency in the context of SDGs, as shown in Figure 1. The analysis is divided into three levels. At the first level, the study provides a quantitative and qualitative description of the papers, which mainly includes the major publications, research directions, keywords, etc. The second level involves extracting the definition, modeling method, indicator system, and the perspective of research analysis via a longitudinal and horizontal analysis of the literature. The third level is a critical discussion and a discussion of the future research directions.

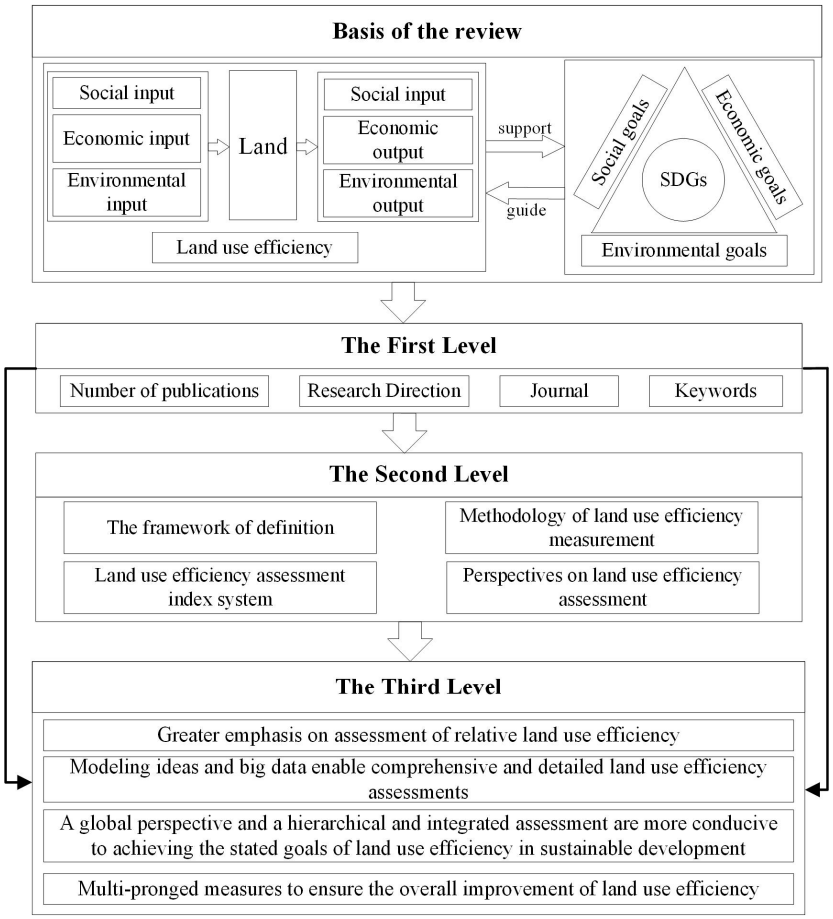

Figure 1. Analytical framework of the review.

3. Results

3.1. Description of the Literature Dataset

3.1.1. Land Use Efficiency Assessment Papers are Being Published Rapidly

The publication time distribution and growth trend of 208 papers are shown in Figure 2. The number of papers shows a continuous growth trend from 2005 to 2022. In 2010, there was a clear increase in the publication of research papers on land use efficiency. Chinese researchers accounted for a relatively large proportion of these papers. This is mainly due to the adoption of the National Land Planning Outline in China in 2010. The launch of these important documents triggered a surge in research on land use efficiency assessment. Notably, the number of papers has increased rapidly since 2019, with a total of 146 papers published in 2019–2022, constituting 70.19% of the overall output. An increase in the number of papers suggests that the field is gaining more attention.

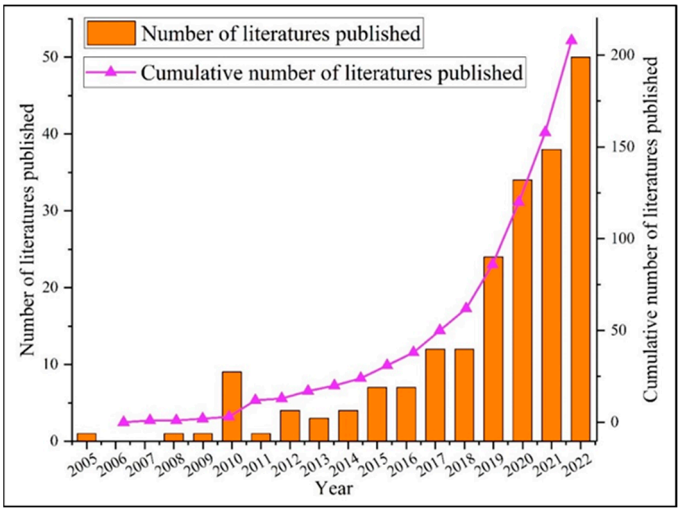

Figure 2. Annual publication and cumulative publication of documents (2005–2022).

3.1.2. Papers Published in High-Level Journals are Concentrated and Leading

As shown in Figure 3, this review compiles journals that have published more than three papers. We find that nearly 40% of the papers come from the top three journals, namely *Sustainability* (n = 29), *Land use policy* (n = 26), and *Land* (n = 25). While *Sustainability* and *Land* primarily focus on environmental science and ecology, *Land use policy* centers on law. Despite their distinct subject areas, all three journals center on land development, regional and urban planning, and environmental studies. Additionally, some economics, management science and geoscience journals have published a limited number of research papers on land use efficiency (*Habitat International*, *Journal of Geographical Sciences*, *Annals of Operations Research*, etc.). Given their high influence factors, extensive readership and citation rate, these journals offer widely recognized perspectives on the research topic.

3.1.3. Carry out Cross-Research around the Field of Ecological Environment

As shown in Figure 4, 75.48% (n = 157) of the papers belong to environmental science ecology, indicating a significant interest in research topics related to land use efficiency in this discipline. Additionally, 21.63% (n = 45) papers cover other science and technology-related topics. Furthermore, various research directions, such as in engineering (n = 22), public administration (n = 22), urban studies (n = 19), business economics (n = 15) and development studies (n = 15), also contribute to the field of land use efficiency. In addition to these, land use efficiency measurement and analysis involve computer science, operational preparedness, and management science. From a disciplinary perspective, the study of land use efficiency is broad, involving agriculture, urban development studies, and architecture and business economics. Thus, the research on land use efficiency is extensive and scattered, which is a complex multi-level research issue.

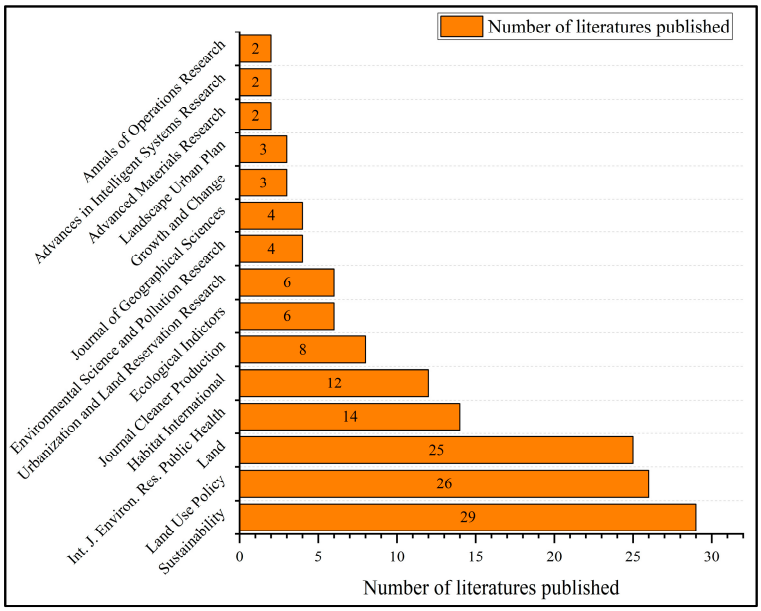

Figure 3. Main published journals and the number of publications in the literature (Abbreviation for a published journal: International Journal of Environmental Research and Public Health-Int. J. Environ. Res. Public Health).

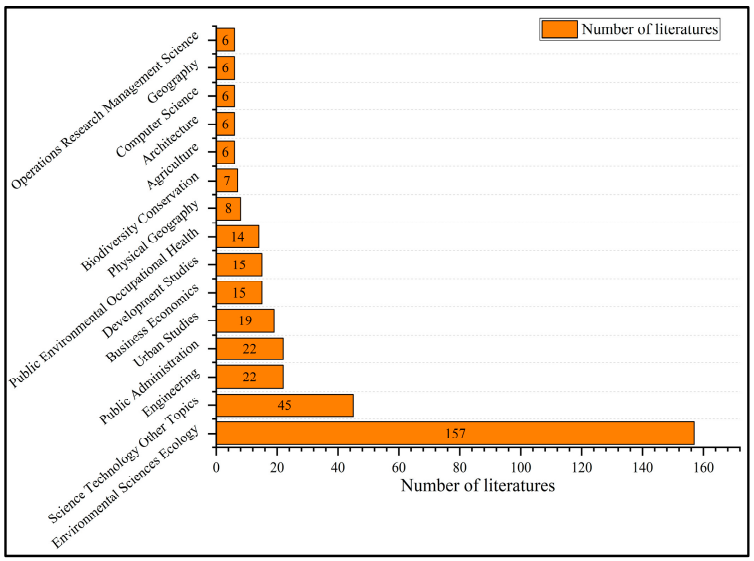

Figure 4. Research direction and the number of papers in the literature.

3.1.4. China is a High-Frequency Keyword

Keyword clustering is an active area or direction of research, where the size of a circle indicates the frequency of keywords. As shown in Figure 5, the red cluster is the largest of the three clusters, and its top three keywords are China, growth, and impact. Other relevant keywords in this cluster include CO^2 emissions, energy, productivity, technical efficiency, etc. The relevant research of the red cluster primarily focuses on China and tends to examine the subject from the perspective of influencing factors, economic development, and the environment [34,45–47]. Specifically, the red cluster focuses on the influencing factors of land use efficiency from different perspectives [48,49], the constraints of carbon emission on efficiency measurement [50], the calculation of the efficiency value of industrial land [32], and the research of technical efficiency [51]. The keywords in the green cluster include urbanization, land use efficiency, sustainability, model, and more [28,52–54]. The related research pays attention to urban land use efficiency and the sustainable development of

the city [26,31,55]. In the blue cluster, studies examine the research topic from a macro perspective, focusing on the influencing factors of land use efficiency and its related policy recommendations [48,56–58]. Additionally, the effects of land use expansion, its patterns and spread on efficiency are also discussed from multiple perspectives [11,59]. In summary, China is the only country that appears in the knowledge graph of keyword co-occurrence. However, further analysis of the papers reveals that countries such as Finland [60], Spain [61], Vietnam [62], Laos [63], and Ethiopia [31] are also continuing to focus on research on land use efficiency assessment.

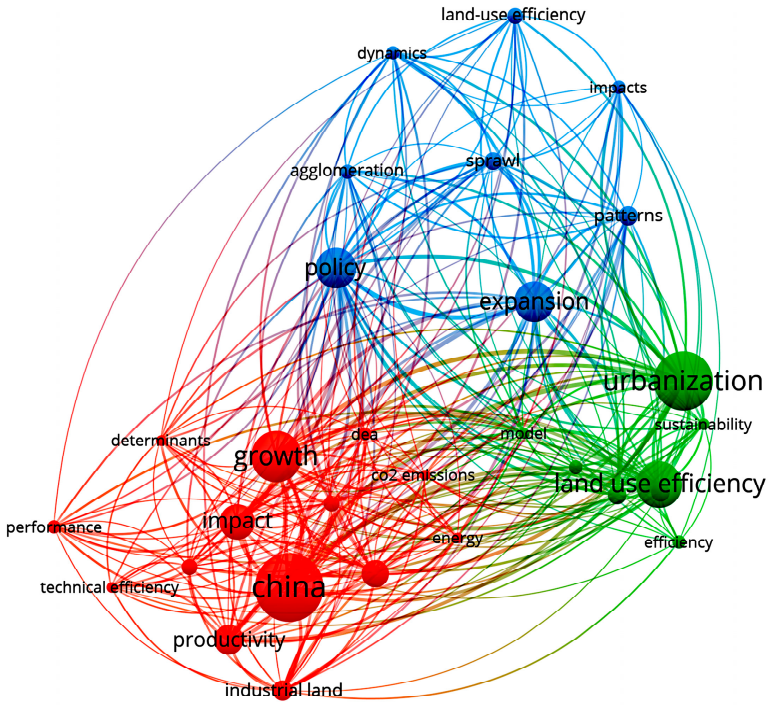

Figure 5. Knowledge graph of keyword co-occurrence in the literature (keywords that appear 10 times are clustered into 3 categories).

3.2. The Definition of Land Use Efficiency Presents a Variety of Understandings

After reviewing the literature, it appears that land use efficiency can be defined from four perspectives. First, the SDGs define land use efficiency as the ratio of the land consumption rate to the population growth rate over time, rather than efficiency at a single point in time [53,64]. Second, some studies define land use efficiency as economic output per unit of land [65,66]. Specifically, this definition includes the "ratio of the total output value of the secondary and tertiary industries to the area of the built area" [67,68]. Third, some scholars define land use efficiency in terms of the maximum benefit or the minimum cost of resources [50]. For example, Liu et al. defines land use efficiency as "the ratio of current land-use performance over potential maximum land—use performance" [69]. Hernandez explores the maximum benefits generated by solar installations per unit area in order to study land use efficiency [70]. Finally, some researchers define land use efficiency by considering material input, desirable and undesirable output [11], and the processes of production, living and ecological activities on land. This definition abstracts these processes into input–output processes and subdivides them into land use technology production efficiency and land use total factor production efficiency.

With the expansion of research perspectives and topics, the definition of land use efficiency has been refined under the framework of the four summarized definitions. Some scholars have conducted detailed studies on cultivated land use efficiency, industrial land use efficiency, land use economic efficiency and land use ecological efficiency [71–74]. Although the definitions of land use efficiency differ, they share two essential aspects.

Firstly, the definition considers either minimizing inputs while maintaining fixed outputs, or maximizing outputs while keeping input elements fixed. Secondly, the definition emphasizes that the optimal combination of various production factors can be achieved through the rational distribution of the proportion of these factors [75]. Moreover, the differing emphases in these definitions serve the SDGs of land, ecology, society, and economy from different perspectives.

3.3. Data Envelopment Analysis (DEA) and its Expansion Model are Obviously Favored by Scholars

The model of land use efficiency assessment is a core technical and scientific issue. The accurate measurement of land use efficiency is crucial for spatiotemporal heterogeneity analysis, the decomposition of influencing factors and optimization. Table 1 shows the summarization of the more popular models and methods used in the current research.

Table 1. Measurement model for land use efficiency.

Model	Advantage	Disadvantages	Amount
DEA series models	It is a non-parametric model. It does not need to build a production function to estimate parameters. It can deal with the problems of multiple inputs and outputs.	It calculates relative efficiency, not absolute efficiency. It ignores errors in efficiency measurements.	97
Mathematical ratio method	Its principle is easy to understand. It is easy to calculate and operate.	It is not favorable for the calculation of multiple indicators.	30
Stochastic frontier approach (SFA) model	It takes into account the effect of randomness on efficiency.	It cannot be used for multiple outputs.	17
Difference-in-difference (DID) model	Its principles and models are simple. It alleviates the omitted variable bias problem to some extent.	It suffers from self-selection problem, which will directly lead to non-consistency of estimation results.	10
Comprehensive analysis method	It is based on a simple principle. It can take multiple indicators into account in a comprehensive manner.	There are no clear criteria for determining weights.	7

3.3.1. DEA Series Models

The DEA series models have been utilized extensively, with 97 known applications to date. Over the past four decades, the DEA model has gradually developed into a method model system with multiple branches. DEA is a non-parametric technical efficiency analysis method that relies on relative comparison between evaluated objects. It was first proposed by Charnes, Cooper and Rhodes in 1978 [76]. The initial DEA model was divided into two categories, the Charnes, Cooper and Rhodes (CCR) model, which is based on the invariant return to scale, and the Banker, Charnes and Cooper (BCC) model, which is based on the variable return to scale. According to the difference in the distance function, the DEA model can be further divided into a radial DEA model and a non-radial DEA model. In 1993, Andersen and Petersen proposed the super efficiency model to solve the problem of multiple decision-making units being evaluated as effective during the efficiency measurement process. Subsequently, the DEA series models, Malmquist total factor productivity index and multi-stage DEA model experienced an increase in their applicability. The DEA model is a non-parametric model that requires the estimation of parameters based on the production function. However, the efficiency measured by the DEA model is relative efficiency rather than absolute efficiency, and measurement errors in the data are not accounted for [77,78].

3.3.2. Mathematical Ratio Method

Thirty papers have used the mathematical ratio method to measure land use efficiency, which is a methodology proposed in the SDGs. To apply this method, one must first select appropriate indicators based on the definition of land use efficiency, and then calculate

their ratio. The method's principle is straightforward, and its operation's simplicity makes it suitable for large-scale efficiency measurement. However, a limitation of this method is that it only considers a few indexes during the calculation process.

3.3.3. SFA Model

The SFA model is a widely used approach in scientific research on land use efficiency, having been employed in 17 papers. It is a parametric model, meaning that its parameters are established prior to measuring the land use efficiency. This can increase the difficulty and complexity of the calculation. However, this method takes into account the influence of random factors on efficiency [79–81].

3.3.4. DID Model

In recent years, the DID model has gained popularity among researchers for its simple principle and ease of use, and has been used in ten papers to measure land use efficiency. It is a robust methodology for evaluating policy effects that helps to circumvent endogeneity issues. It can also help alleviate the problem of biased missing variables to some extent. Furthermore, the DID model is easy to understand and operate. However, it may not be suitable for cross-section data and is better suited for processing panel data [82,83].

3.3.5. Comprehensive Analysis Method

The comprehensive analysis method is commonly used to measure land use efficiency. This approach involves calculating the value by adding the multiplication of the indicator and the weight of the indicator. It is suitable for assessing multiple indicators simultaneously. However, there is no fixed standard for determining weights, which may affect the accuracy of the land use efficiency measurements.

In addition, there are other methods, such as life cycle methods [84], ecosystem assessment health methods [29], and ecological footprint methods [85], that can be used to assess land use efficiency from a specific perspective.

3.4. The Indicator System Lacks Uniformity and Hierarchy

There are three main sources of data for measuring land use efficiency: (1) Statistical data are simple to obtain and constitute panel data [86]. They are suitable for large-scale and long-time-series land use efficiency studies. (2) Field survey data. Field survey data are obtained through field research or questionnaire surveys [87,88]. The cost of obtaining field survey data is high as they are difficult to obtain. However, the quality of field survey data is high, which can improve the accuracy of the measurement and truly reflect the characteristics of land use efficiency. (3) Remote sensing image data. Remote sensing image data are easy to acquire and have large coverage. Therefore, they are the preferred data for global and national large-scale land use efficiency research [89,90]. Additionally, basic geographic information data [91], such as topography and geomorphology, traffic, and road networks [92], and water and river networks, are commonly used to supplement land use efficiency measurements.

Due to the inconsistency in research purposes and perspectives, the selection of the indicators used for land use efficiency assessment also shows great variability. When land use efficiency is defined as a ratio relationship, the study is simple and clear in making indicator selection; most studies choose two indicators, population size and built-up land area. However, when the land use efficiency process is abstracted as an input–output system, the choice of indicators presents diversity. It is summarized into input indicators, desirable output indicators and undesirable output indicators [30]. These three categories of indicators are generally selected from multiple dimensions, such as land, the economy, population, and the environment, according to the research topic and research content [93]. The selection of the indicator system is the basis of land use efficiency assessment. In summary, the current index system has obvious individualized characteristics, with indicators selected based on specific research content, study area characteristics and researcher

knowledge. This facilitates detailed research and the multi-perspective analysis of land use efficiency assessment. However, this phenomenon also leads to highly subjective and poorly transferable indicator systems, making it difficult to conduct cross-sectional comparative studies of research results from different researchers and different regions. The lack of uniformity and hierarchy in the indicator system for land use efficiency assessment is not conducive to the development of standard documents for uniform assessment at a national or global level. Therefore, it is a favorable choice to construct an indicator system that takes into account both uniform and characteristic indicators.

3.5. The Assessment of Comprehensive Land Use Efficiency Accounts for a Large Proportion

This review divides the research topics of 208 papers into 7 categories, as presented in Table 2. Firstly, the total number of papers on efficiency assessment without land use classification accounted for the largest proportion, with 112 papers accounting for 53.85%. In this category, researchers conducted studies at various scales, such as global [53], urban agglomeration [48], river basin [94], megacity [51], provincial [95], municipal [91], and mountain town [96]. Of course, there were also explorations of land use efficiency in areas with unique characteristics, such as new districts [97], mining areas [98], and resource-based cities. Second, 15.87% (n = 33) of the papers focused on the measurement and identification of factors that influence industrial land use efficiency. As industry is a crucial driver of national economic development, it has been a focal point of research for scholars. Additionally, some studies assessed land use efficiency for electronic enterprise land [99], logistics land [100], and intelligent land [90], reflecting their industrial functions. Thirdly, 13.94% (n = 29) of the papers examined agricultural land use efficiency, including cultivated land and farm use efficiency [24,101]. Fourthly, with the increasing prominence of eco-environmental problems, research on land use efficiency from an ecological perspective has become a new research hotspot. In total, 7.21% (n = 15) of the papers studied this field from three perspectives: urban green land use efficiency [102], green land use efficiency [103] and land use ecological efficiency [104]. In addition, there were studies on residential land use efficiency, construction land efficiency, tourist land efficiency, etc. Although the land use efficiency research covers a wide range of perspectives, it is essential to clarify all the various kinds of production activities that occur on the surface; this is a prerequisite for the comprehensive calculation of land use efficiency based on land use type.

Table 2. Classification of research perspectives.

First-Level Research Perspective	Second-Level Research Perspective (Number of Literature)	Total Amount and Proportion of Literature
Comprehensive land use	Land use efficiency (n = 39) Urban land use efficiency (n = 61) Land use efficiency of urban agglomeration (n = 4) Land use efficiency of mega cities (n = 1) Global land use efficiency (n = 1) Land use efficiency of the new area (n = 1) Land use efficiency of villages and towns in mountainous areas (n = 1) Urban land use efficiency in western mining area (n = 1) Land use efficiency of resource-based cities (n = 1) Land use economic efficiency (n = 2)	112 (53.85%)
Industrial land	Industrial land use efficiency (n = 26) Urban industrial land use efficiency (n = 4) Land use efficiency of electronic enterprises (n = 1) Logistics land use efficiency (n = 1) Intelligent land use efficiency (n = 1)	33 (15.87%)
Agricultural land	Cultivated land use efficiency (n = 26) Farm utilization efficiency (n = 2) Urban agricultural land use efficiency (n = 1)	29 (13.94%)

Table 2. *Cont.*

First-Level Research Perspective	Second-Level Research Perspective (Number of Literature)	Total Amount and Proportion of Literature
Green Land use	Urban green land use efficiency (n = 7) Ecological land use efficiency (n = 6) Green land use efficiency (n = 2)	15 (7.21%)
Construction land	Construction land use efficiency (n = 4) Urban construction land use efficiency (n = 3)	7 (3.37%)
Residential land	Urban Residential land use efficiency (n = 3) Rural living space and use efficiency (n = 3) Global human settlements land use efficiency (n = 1)	7 (3.37%)
Other types	Tourism land land use efficiency (n = 2) Energy efficiency (n = 2) Land use efficiency from the perspective of solar energy (n = 1)	5 (2.40%)

4. Discussion

4.1. Greater Emphasis on Assessment of Relative Land Use Efficiency

There are different interpretations of the term "land use efficiency" in research. It can be divided into two categories: relative efficiency and absolute efficiency. Relative efficiency refers to calculating land use efficiency by comparing it with an excellent assessment unit [30], while absolute efficiency does not rely on any arbitrary assessment units. Both understandings of efficiency have been endorsed by researchers [53,94]. However, we find that the research on the relative efficiency of land use accounts for a larger proportion and is more popular. As shown in Table 1, the DEA series model has been used 97 times for relative efficiency calculation. This is sufficient evidence of scholars' interest in the relative efficiency of land use. In addition, the existence of excellent assessment units can serve as a benchmark for non-excellent assessment units in order to improve land use efficiency [105,106]. This also saves time and costs when proposing targeted measures to improve land use efficiency.

4.2. Modeling Ideas and Big Data Enable Comprehensive and Detailed Land Use Efficiency Assessments

Scholars across various disciplines agree that human activities on the earth's surface interact with the natural environment to create a complex human–land relationship regional system [107,108]. This relationship involves not only the interaction between humans and nature, but also the social relationships between humans and their dependency on nature [109,110]. To achieve sustainable development, it is important to achieve support for maximum progress with a minimum investment in resources and the least adverse impact on the environment [11]. This requires a focus on land use efficiency. The most effective way to grasp the current status of land use efficiency is through assessment and monitoring, which many researchers have agreed upon. For complex land use systems, it may be more helpful to adopt modeling to understand the relationship between people and land, systems, and inputs and outputs. Since the 19th century, scholars have developed land use models from multiple perspectives, scales, and temporalities. To sum up, the following developments and progress have mainly been achieved [111,112]. Firstly, there has been a shift from a single model to a coupled multi-model, which can consider more factors and make the results more suitable for reality. Secondly, there has been interaction between spatial models and non-spatial models. The land use model fully expresses the simulated spatial information with the help of remote sensing and GIS technology. Third, there is an increasing focus on feedback mechanisms, which is conducive to clarifying the relationship between people and land. The research of land use models has laid the foundation for the research of land use efficiency models.

At present, multidisciplinary models that involve operational research, mathematics, economics, and ecology support research on land use efficiency [27,34,113]. Many scholars have attempted to measure land use efficiency using various models, such as DEA, the mathematical ratio method, SFA, DID, and the comprehensive analysis method (Table 1). The land use efficiency model has also undergone gradual development and improvement. Firstly, the number of indicators considered in the model calculation have increased, and they have changed from simple to complex. The mathematical ratio method only considers two indicators, but the DEA model can consider dozens of indicators. Secondly, there has been a shift from the use of cross-sectional data models to panel data models. For example, there has been a progression from the DEA model to the Malmquist total factor productivity model. The analytical models used on land use efficiency results have also gradually diversified, and now involve mathematical ratio models, spatial clustering models, hotspot analysis models, coupled coordination models, and geographically weighted regression models. They have been used to realize the spatiotemporal evolution and influencing factors of land use efficiency [27,34,114]. However, existing land use efficiency assessment models have been constructed under the theoretical framework of economics and mathematics, ignoring the critical issue regarding the geographic attributes of the unit being assessed. The basic theory of geography is an important support for the study of the human–land relationship and land use efficiency [108,109]. According to the three laws of geography, spatial effects may be the key factor affecting the results of land use efficiency assessment. In the current research, the spatiotemporal analysis of efficiency values and the analysis of influencing factors have taken spatial effects into account, and some spatial models have been applied to explore the regularity [12]. However, fewer studies have considered spatial effects in the current research on efficiency measurement. Therefore, it is necessary to introduce spatial effects in the construction of land use efficiency assessment models in the future in order to obtain more realistic assessment results.

Furthermore, the comprehensiveness and internal system of the indicator system are essential prerequisites for accurately measuring land use efficiency [93,115]. Because of the complexity of the human–land relationship and of land use, an abundance of indicators must be considered and incorporated into the process of land use efficiency assessment. However, existing studies have limitations in terms of the number of indicators and they only focus on the efficiency of a particular perspective. The lack of agreement and hierarchy seriously undermine the effectiveness of such studies. Therefore, constructing a comprehensive land use efficiency index system is another research area that requires attention. In the future, it may be appropriate to look at the overall land use efficiency and develop a total sub-structure between the total efficiency and the sub-efficiency of each perspective. For instance, in the broader context of implementing the SDGs, we can construct sub-structures from three levels: environmental, social, and economic. A separate indicator system is selected for each structure, with specific indicators being considered from both qualitative and quantitative perspectives. There are broad indicators and focused indicators. Currently, the emergence of multi-source data, such as remote sensing big data, point of interest big data, statistical data, and field survey data, will also provide data support for the comprehensive assessment of the land use efficiency assessment index system [116–118]. However, due to the technical nature of the unified processing of data from multiple sources and the interwoven complexity of the indicator system, advanced computer technology is required to support the construction of the land use efficiency assessment model [116,117].

Based on the above discussion and analysis, the study of large and complex model construction considering geospatial effects, big data and computer technology is essential in order to promote developments in the field of land use efficiency. Analyzed from a geospatial perspective, there are complex interaction mechanisms between land patches that affect the land use pattern and inevitably impact land use efficiency. In future research, it will be necessary to focus on integrating this mechanism into the model of land use efficiency assessment. Furthermore, with the gradual sophistication of models and the rise

of big data, advanced computer technology may be the foundation of studying land use efficiency in depth.

4.3. A Global Perspective and a Hierarchical and Integrated Assessment are More Conducive to Achieving the Stated Goals of Land Use Efficiency in Sustainable Development

Research scale diversification has gradually emerged, with a focus on major cities [81], urban agglomerations [86], watersheds [119], and countries [33]. However, there is a lack of studies exploring the spatiotemporal variation characteristics of land use efficiency at the global scale [113]. As we all know, SDGs are goals set from a global perspective [120]. They consider and envision sustainability at a global scale [121]. Land is the foundation and carrier of a series of activities related to the realization of SDGs, such as society, the economy, the environment and so on [5]. Therefore, research related to land use efficiency is an important support for the realization of SDGs. Further, comprehensively understanding and planning the 17 sub-goals in the SDGs could help guide the evaluation index system, analysis perspective and improvement goals of land use efficiency. There is a close relationship between SDGs and land use efficiency, as shown in Figure 1. Experts and scholars have repeatedly mentioned land use efficiency research issues from a global perspective in the literature, oral reports, and project conclusions [64,122]. Therefore, we believe that in order to achieve the SDGs and to build a sustainable human community, land use efficiency research from a global perspective is topic that must be addressed in future research. We can develop a framework for land use efficiency research based on SDGs. The framework can be constructed at three levels: social goals, economic goals, and environmental goals. Specific objectives closely related to land use can also be selected to explore land use efficiency in detail. For instance, we can construct indicator systems from the perspectives of inclusion, security, risk, population, and sustainability. The constructed indicator system can be applied to realize land use efficiency research from the perspective of sustainable community goals. Constructing a framework for land use efficiency research that is guided by SDGs is a long-term challenging research task.

An analysis of the literature shows that the main perspectives of land use efficiency assessment and analysis are comprehensive land use efficiency analysis and a certain type of land use efficiency analysis (e.g., arable land, construction land, etc.). Comprehensive analysis only provides an overview of land use as a whole and selects common and public indicators for the assessment and analysis of land use efficiency [28,29]. The complexity, hierarchy and systemic nature of land use are ignored, so the analysis results are more general. On the other hand, analytical studies of land use efficiency of a particular type often ignore the correlation between complex systems, leading to an inadequate and incomplete description of land use efficiency. To address these limitations, land use space can be classified according to land use type or main function type. Based on different types of land use in differing spaces, the index system of each type can be constructed to evaluate the land use efficiency separately. Then, the comprehensive land use efficiency can be calculated by assigning weights. In other words, this method tries to study the assessment of land use efficiency through the concept of decomposition and classification. This research idea considers both the efficiency of a single land use type and the total efficiency of land use, facilitating a comprehensive and detailed assessment of land use efficiency.

4.4. Multi-Pronged Measures to Ensure the Overall Improvement of Land Use Efficiency

The fundamental objective of exploring and researching land use efficiency from multiple perspectives is to develop reasonable strategies to improve efficiency. The ultimate goal is to establish land that serves human development better and contributes to the achievement of the SDGs goals. This review provides an overview of the initiatives that aim to improve land use efficiency from five aspects.

(1) Policy

Strengthening policy guidance and linkage management, and exploring the multi-level co-construction mechanisms established by the government, are essential measures

to improve land use efficiency [123]. According to some researchers, to achieve this, the government needs to improve its assessment mechanism and fiscal system. It should also optimize the local fiscal expenditure structure, and implement various land finance policies that are suitable for local conditions [124]. For example, a market-oriented land concession system may be appropriate in some areas [56].

(2) Plan

Planning plays a crucial role in all aspects of land use and socio-economic development. It provides a clear direction, sets the scale, and visualizes the goals. Therefore, proper planning is a prerequisite to improving land use efficiency. To achieve this, we should use the factors intensive land use and carbon emissions as primary objectives and reference materials during planning. Moreover, we aim to improve land use efficiency from multiple perspectives by developing planned national spaces [29], industrial parks [125], farmland resources and ecological resources [126].

(3) The path of differentiated development

Improving land use efficiency should not be limited by the goal of achieving balanced development between regions [127]. Instead, development objectives should be defined based on the natural and social resources of each region [90]. Local government should formulate land development policies that consider the region's specific circumstances and promote the marketization of land [33]. To enhance land use efficiency, governments should focus on increasing technology, capital and labor investments, while considering factors such as geographical location, economic level and resource dependence.

(4) Integrating carbon emissions into efficiency studies

At present, the issue of "double carbon" has become a significant environmental concern on the global stage. Many countries have established targets for peaking their carbon emissions by 2030 and achieving carbon neutrality by 2060. As a result, there is a growing trend of including carbon emissions in the assessment of land use efficiency [115], which is an essential environmental constraint that must be considered in the study of land use. The first concern is the carbon emissions that are produced by industrial land, as fossil fuel combustion contributes the most significant proportion of carbon emissions in the process of social progress and development. Meanwhile, scholars have also focused on carbon emissions resulting from agricultural land efficiency, which can be caused by the inappropriate use of agricultural machinery, fertilizers and pesticides [115]. Under the constraints of carbon emissions, improvements in and the measurement of efficiency are more conducive to the achievement of the "double carbon" goal.

(5) Enhancement of technological innovation

Currently, technology and innovation are the driving factors that hinder improvements in land use efficiency [128–130]. To address this, the government should first increase investment in science and technology innovation to enhance the innovation capacity of research institutes, enterprises, and individuals [74,131]. Specifically, energy-saving technologies, production technologies, industrial upgrading and industrial restructuring should be used to achieve industrial structure diversification, optimize industrial layout, and reduce industrial chain costs. Moreover, innovative technologies should be invested in living spaces and ecological spaces in order to reduce inputs and promote outputs, and improve land use efficiency.

In addition, we need to pay attention to improving the transportation network [100], the problem of population loss [92], and the cultivation of human resources [32].

5. Conclusions

Improving land use efficiency is a necessary step towards achieving the SDGs. In order to clarify research trends, perspectives, and hotspots in the area, we conducted a systematic review and summary of 208 papers related to land use efficiency assessment,

while also paying attention to expert oral reports and project summaries. Our research yielded the following findings. (1) The number of papers related to land use efficiency has significantly increased since 2019. The research mainly focuses on two directions, environmental sciences ecology, and other topics related to science technology. (2) The definition perspectives of land use efficiency are diverse, and research on relative land use efficiency accounts for a larger proportion of papers and is more popular. (3) The DEA series models have been widely assessed and utilized by researchers in land use efficiency assessment research. The construction of a large complex model that considers geospatial effects, big data and computer technology is more conducive to the comprehensive and detailed assessment of land use efficiency. (4) The assessment index system of land use efficiency lacks uniformity and hierarchy. Additionally, the assessment and analysis of land use efficiency on a global scale is a hotspot for future research. (5) Studying the assessment of land use efficiency through the idea of disaggregation and classification is more conducive to clearly sorting out multi-level indicator systems and achieving the detailed and complex analysis of land use efficiency. (6) Multi-pronged measures, such as policies, planning, differentiated development paths and technological innovation, can help improve land use efficiency in order to achieve the SDGs.

To the best of our knowledge, little research has comprehensively reviewed and discussed the trends in the publication of research, definitions, research perspectives and model methods of land use efficiency. In this review, various aspects of land use efficiency assessment are discussed. We believe that our study is a novel work that fills a gap in previous research. We hope that researchers in land use efficiency will benefit from this review and rapidly gain an understanding of the research concepts and current status of the field.

Author Contributions: Conceptualization, Y.M. and M.Z.; methodology, X.Z.; software, Y.H.; validation, F.X., X.W. and W.L.; formal analysis, J.L. and Y.L.; writing—original draft preparation, Y.M.; writing—review and editing, M.Z.; visualization, F.X., X.W. and W.L.; supervision, X.Z.; funding acquisition, M.Z., X.Z., J.L. and Y.L. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the National Natural Science Foundation of China, grant number 42201471; Beijing Social Science Foundation, grant number 2022YJC264; the Key Program of National Natural Science Foundation of China, grant number 72033005; the Third Xinjiang Scientific Expedition of the Key Research and Development Program by Ministry of Science and Technology of the People's Republic of China, grant number 2022xjkk1104; the National Natural Science Foundation of China, grant number 42171113; the Natural Science Foundation of Shandong Province, grant number ZR2020QD021.

Data Availability Statement: The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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

References

1. Morton, S.; Pencheon, D.; Squires, N. Sustainable Development Goals (SDGs), and their implementation. *Br. Med. Bull.* **2017**, *124*, 81–90. [CrossRef]
2. Dalampira, E.S.; Nastis, S.A. Mapping Sustainable Development Goals: A network analysis framework. *Sustain. Dev.* **2020**, *28*, 46–55. [CrossRef]
3. Hickmann, T.; Biermann, F.; Spinazzola, M.; Ballard, C.; Bogers, M.; Forestier, O.; Kalfagianni, A.; Kim, R.E.; Montesano, F.S.; Peek, T.; et al. Success factors of global goal-setting for sustainable development: Learning from the millennium development goals. *Sustain. Dev.* **2022**. [CrossRef]
4. Haliscelik, E.; Soytas, M.A. Sustainable development from millennium 2015 to Sustainable Development Goals 2030. *Sustain. Dev.* **2019**, *27*, 545–572. [CrossRef]
5. Tirumala, R.D.; Tiwari, P. Importance of Land in SDG Policy Instruments: A Study of ASEAN Developing Countries. *Land* **2022**, *11*, 218. [CrossRef]

6. Cao, M.; Chang, L.J.; Ma, S.J.; Zhao, Z.J.; Wu, K.; Hu, X.; Gu, Q.S.; Lu, G.N.; Chen, M. Multi-Scenario Simulation of Land Use for Sustainable Development Goals. *IEEE J. Sel. Top. Appl. Earth Obs. Remote. Sens.* **2022**, *15*, 2119–2127. [CrossRef]
7. Bloomfield, G.; Bucht, K.; Martinez-Hernandez, J.C.; Ramirez-Soto, A.F.; Shesena-Hernandez, I.; Lucio-Palacio, C.R.; Inzunza, E.R. Capacity building to advance the United Nations sustainable development goals: An overview of tools and approaches related to sustainable land management. *J. Sustain. For.* **2018**, *37*, 157–177. [CrossRef]
8. Dadashpoor, H.; Ahani, S. Land tenure-related conflicts in peri-urban areas: A review. *Land Use Policy* **2019**, *85*, 218–229. [CrossRef]
9. Casali, Y.; Aydin, N.Y.; Comes, T. Machine learning for spatial analyses in urban areas: A scoping review. *Sustain. Cities Soc.* **2022**, *85*, 18. [CrossRef]
10. Zhou, Y.; Li, X.H.; Liu, Y.S. Rural land system reforms in China: History, issues, measures and prospects. *Land Use Policy* **2020**, *91*, 104330. [CrossRef]
11. Chen, Y.; Chen, Z.G.; Xu, G.L.; Tian, Z.Q. Built-up land efficiency in urban China: Insights from the General Land Use Plan (2006–2020). *Habitat Int.* **2016**, *51*, 31–38. [CrossRef]
12. Sun, Y.F.; Ma, A.B.; Su, H.R.; Su, S.L.; Chen, F.; Wang, W.; Weng, M. Does the establishment of development zones really improve industrial land use efficiency? Implications for China's high-quality development policy. *Land Use Policy* **2020**, *90*, 104265. [CrossRef]
13. Meyfroidt, P.; Lambin, E.F.; Erb, K.H.; Hertel, T.W. Globalization of land use: Distant drivers of land change and geographic displacement of land use. *Curr. Opin. Environ. Sustain.* **2013**, *5*, 438–444. [CrossRef]
14. Gilg, A. Perceptions about land use. *Land Use Policy* **2009**, *26*, S76–S82. [CrossRef]
15. Long, H.L.; Zhang, Y.N.; Ma, L.; Tu, S.S. Land Use Transitions: Progress, Challenges and Prospects. *Land* **2021**, *10*, 903. [CrossRef]
16. de Jong, L.; de Bruin, S.; Knoop, J.; van Vliet, J. Understanding land-use change conflict: A systematic review of case studies. *J. Land Use Sci.* **2021**, *16*, 223–239. [CrossRef]
17. Verburg, P.H.; Neumann, K.; Nol, L. Challenges in using land use and land cover data for global change studies. *Glob. Change Biol.* **2011**, *17*, 974–989. [CrossRef]
18. Lu, Y.T.; Wu, P.H.; Ma, X.S.; Li, X.H. Detection and prediction of land use/land cover change using spatiotemporal data fusion and the Cellular Automata-Markov model. *Environ. Monit. Assess.* **2019**, *191*, 68. [CrossRef]
19. Verburg, P.H.; van de Steeg, J.; Veldkamp, A.; Willemen, L. From land cover change to land function dynamics: A major challenge to improve land characterization. *J. Environ. Manag.* **2009**, *90*, 1327–1335. [CrossRef]
20. Allan, A.; Soltani, A.; Abdi, M.H.; Zarei, M. Driving Forces behind Land Use and Land Cover Change: A Systematic and Bibliometric Review. *Land* **2022**, *11*, 1222. [CrossRef]
21. Long, H.L. Land use policy in China: Introduction. *Land Use Policy* **2014**, *40*, 1–5. [CrossRef]
22. Xie, H.L.; Chen, Q.R.; Lu, F.C.; Wu, Q.; Wang, W. Spatial-temporal disparities, saving potential and influential factors of industrial land use efficiency: A case study in urban agglomeration in the middle reaches of the Yangtze River. *Land Use Policy* **2018**, *75*, 518–529. [CrossRef]
23. Wu, C.Y.; Wei, Y.H.D.; Huang, X.J.; Chen, B.W. Economic transition, spatial development and urban land use efficiency in the Yangtze River Delta, China. *Habitat Int.* **2017**, *63*, 67–78. [CrossRef]
24. Pascual, U. Land use intensification potential in slash-and-burn farming through improvements in technical efficiency. *Ecol. Econ.* **2005**, *52*, 497–511. [CrossRef]
25. Chen, Y.; Li, S.R.; Cheng, L. Evaluation of Cultivated Land Use Efficiency with Environmental Constraints in the Dongting Lake Eco-Economic Zone of Hunan Province, China. *Land* **2020**, *9*, 440. [CrossRef]
26. Schiavina, M.; Melchiorri, M.; Freire, S.; Florio, P.; Ehrlich, D.; Tommasi, P.; Pesaresi, M.; Kemper, T. Land use efficiency of functional urban areas: Global pattern and evolution of development trajectories. *Habitat Int.* **2022**, *123*, 102543. [CrossRef]
27. Zhang, X.; Jie, X.W.; Ning, S.N.; Wang, K.; Li, X.P. Coupling and coordinated development of urban land use economic efficiency and green manufacturing systems in the Chengdu-Chongqing Economic Circle. *Sustain. Cities Soc.* **2022**, *85*, 104012. [CrossRef]
28. Zhu, X.H.; Zhang, P.F.; Wei, Y.G.; Li, Y.; Zhao, H.R. Measuring the efficiency and driving factors of urban land use based on the DEA method and the PLS-SEM model-A case study of 35 large and medium-sized cities in China. *Sustain. Cities Soc.* **2019**, *50*, 101646. [CrossRef]
29. Xie, X.; Fang, B.; Xu, H.Z.Y.; He, S.S.; Li, X. Study on the coordinated relationship between Urban Land use efficiency and ecosystem health in China. *Land Use Policy* **2021**, *102*, 105235. [CrossRef]
30. Gao, J.X.; Song, J.B.; Wu, L.F. A new methodology to measure the urban construction land-use efficiency based on the two-stage DEA model. *Land Use Policy* **2022**, *112*, 105799. [CrossRef]
31. Koroso, N.H.; Zevenbergen, J.A.; Lengoiboni, M. Urban land use efficiency in Ethiopia: An assessment of urban land use sustainability in Addis Ababa. *Land Use Policy* **2020**, *99*, 105081. [CrossRef]
32. Xie, H.L.; Chen, Q.R.; Lu, F.C.; Wang, W.; Yao, G.R.; Yu, J.L. Spatial-temporal disparities and influencing factors of total-factor green use efficiency of industrial land in China. *J. Clean. Prod.* **2019**, *207*, 1047–1058. [CrossRef]
33. Liu, C.J.; Zhao, G.M. Convergence analysis of Chinese urban green land-use efficiency. *Environ. Sci. Pollut. Res.* **2022**, *29*, 89469–89484. [CrossRef] [PubMed]
34. Zhao, J.M.; Zhu, D.L.; Cheng, J.; Jiang, X.; Lun, F.; Zhang, Q. Does regional economic integration promote urban land use efficiency? Evidence from the Yangtze River Delta, China. *Habitat Int.* **2021**, *116*, 102404. [CrossRef]

35. Walker, J.J. Systematic reviews in the social sciences: A practical guide. *Sociol. Health Illn.* **2007**, *29*, 318–319. [CrossRef]
36. Zupic, I.; Cater, T. Bibliometric Methods in Management and Organization. *Organ. Res. Methods* **2015**, *18*, 429–472. [CrossRef]
37. Vaismoradi, M.; Turunen, H.; Bondas, T. Content analysis and thematic analysis: Implications for conducting a qualitative descriptive study. *Nurs Health Sci.* **2013**, *15*, 398–405. [CrossRef]
38. Busse, M.; Siebert, R. Acceptance studies in the field of land use—A critical and systematic review to advance the conceptualization of acceptance and acceptability. *Land Use Policy* **2018**, *76*, 235–245. [CrossRef]
39. Xiao, Y.; Watson, M. Guidance on Conducting a Systematic Literature Review. *J. Plan. Educ. Res.* **2017**, *39*, 93–112. [CrossRef]
40. Wang, H.; Zhao, Y.Z.; Gao, X.C.; Gao, B.Y. Collaborative decision-making for urban regeneration: A literature review and bibliometric analysis. *Land Use Policy* **2021**, *107*, 105479. [CrossRef]
41. Kondracki, N.L.; Wellman, N.S.; Amundson, D.R. Content analysis: Review of methods and their applications in nutrition education. *J. Nutr. Educ. Behav.* **2002**, *34*, 224–230. [CrossRef] [PubMed]
42. Wang, H.; Pan, Y.; Luo, X.C. Integration of BIM and GIS in sustainable built environment: A review and bibliometric analysis. *Autom. Constr.* **2019**, *103*, 41–52. [CrossRef]
43. Su, J.; Friess, D.A.; Gasparatos, A. A meta-analysis of the ecological and economic outcomes of mangrove restoration. *Nat. Commun.* **2021**, *12*, 5050. [CrossRef] [PubMed]
44. He, S.T.; Wang, D.J.; Zhao, P.; Li, Y.; Lan, H.J.; Chen, W.L.; Jamali, A.A. A review and prospects of debris flow waste-shoal land use in typical debris flow areas, China. *Land Use Policy* **2020**, *99*, 105064. [CrossRef]
45. Yin, Y.Q.; Hou, X.H.; Liu, J.M.; Zhou, X.; Zhang, D.J. Detection and attribution of changes in cultivated land use ecological efficiency: A case study on Yangtze River Economic Belt, China. *Ecol. Indic.* **2022**, *137*, 108753. [CrossRef]
46. Du, J.F.; Thill, J.C.; Peiser, R.B. Land pricing and its impact on land use efficiency in post-land-reform China: A case study of Beijing. *Cities* **2016**, *50*, 68–74. [CrossRef]
47. Lu, X.H.; Kuang, B.; Li, J. Regional difference decomposition and policy implications of China's urban land use efficiency under the environmental restriction. *Habitat Int.* **2018**, *77*, 32–39. [CrossRef]
48. Yu, J.Q.; Zhou, K.L.; Yang, S.L. Land use efficiency and influencing factors of urban agglomerations in China. *Land Use Policy* **2019**, *88*, 104143. [CrossRef]
49. Lu, X.H.; Shi, Z.X.; Li, J.; Dong, J.H.; Song, M.J.; Hou, J. Research on the Impact of Factor Flow on Urban Land Use Efficiency from the Perspective of Urbanization. *Land* **2022**, *11*, 389. [CrossRef]
50. Yang, B.; Chen, X.; Wang, Z.Q.; Li, W.D.; Zhang, C.R.; Yao, X.W. Analyzing land use structure efficiency with carbon emissions: A case study in the Middle Reaches of the Yangtze River, China. *J. Clean. Prod.* **2020**, *274*, 123076. [CrossRef]
51. Zhu, X.H.; Li, Y.; Zhang, P.F.; Wei, Y.G.; Zheng, X.Y.; Xie, L.L. Temporal-spatial characteristics of urban land use efficiency of China's 35mega cities based on DEA: Decomposing technology and scale efficiency. *Land Use Policy* **2019**, *88*, 104083. [CrossRef]
52. Qi, Y.J.; Yu, Y.; Dong, W. Coordination Analysis of Urbanization Level and Land Use Efficiency of Xinjiang Based on ESDA. *Environ. Eng. Manag. J.* **2013**, *12*, 1819–1823.
53. Estoque, R.C.; Ooba, M.; Togawa, T.; Hijioka, Y.; Murayama, Y. Monitoring global land-use efficiency in the context of the UN 2030 Agenda for Sustainable Development. *Habitat Int.* **2021**, *115*, 102403. [CrossRef]
54. Liu, S.C.; Ye, Y.M.; Li, L.L. Spatial-Temporal Analysis of Urban Land-Use Efficiency: An Analytical Framework in Terms of Economic Transition and Spatiality. *Sustainability* **2019**, *11*, 1839. [CrossRef]
55. Cai, G.Y.; Zhang, J.X.; Du, M.Y.; Li, C.P.; Peng, S. Identification of urban land use efficiency by indicator-SDG 11.3.1. *PLoS ONE* **2020**, *15*, e0244318. [CrossRef]
56. Jiang, X.; Lu, X.H.; Liu, Q.; Chang, C.; Qu, L.L. The effects of land transfer marketization on the urban land use efficiency: An empirical study based on 285 cities in China. *Ecol. Indic.* **2021**, *132*, 108296. [CrossRef]
57. Xue, D.; Yue, L.; Ahmad, F.; Draz, M.U.; Chandio, A.A.; Ahmad, M.; Amin, W. Empirical investigation of urban land use efficiency and influencing factors of the Yellow River basin Chinese cities. *Land Use Policy* **2022**, *117*, 106117. [CrossRef]
58. Liu, S.C.; Lin, Y.B.; Ye, Y.M.; Xiao, W. Spatial-temporal characteristics of industrial land use efficiency in provincial China based on a stochastic frontier production function approach. *J. Clean. Prod.* **2021**, *295*, 126432. [CrossRef]
59. Zhang, S.; Fang, C.L.; Kuang, W.H.; Sun, F.Y. Comparison of Changes in Urban Land Use/Cover and Efficiency of Megaregions in China from 1980 to 2015. *Remote. Sens.* **2019**, *11*, 1834. [CrossRef]
60. Saikku, L.; Mattila, T.J. Drivers of land use efficiency and trade embodied biomass use of Finland 2000–2010. *Ecol. Indic.* **2017**, *77*, 348–356. [CrossRef]
61. Onaindia, M.; Pena, L.; de Manuel, B.F.; Rodriguez-Loinaz, G.; Madariaga, I.; Palacios-Agundez, I.; Ametzaga-Arregi, I. Land use efficiency through analysis of agrological capacity and ecosystem services in an industrialized region (Biscay, Spain). *Land Use Policy* **2018**, *78*, 650–661. [CrossRef]
62. Jalilov, S.M.; Chen, Y.; Quang, N.H.; Nguyen, M.N.; Leighton, B.; Paget, M.; Lazarow, N. Estimation of Urban Land-Use Efficiency for Sustainable Development by Integrating over 30-Year Landsat Imagery with Population Data: A Case Study of Ha Long, Vietnam. *Sustainability* **2021**, *13*, 8848. [CrossRef]
63. Li, D.X.; Wang, X.P. Land-Use Change and Efficiency in Laos' Special Economic Zones. *Land* **2021**, *10*, 1012. [CrossRef]
64. Melchiorri, M.; Pesaresi, M.; Florczyk, A.J.; Corbane, C.; Kemper, T. Principles and Applications of the Global Human Settlement Layer as Baseline for the Land Use Efficiency Indicator-DSDG 11.3.1. *ISPRS Int. Geo-Inf.* **2019**, *8*, 96. [CrossRef]

65. Barath, L.; Ferto, I. Heterogeneous technology, scale of land use and technical efficiency: The case of Hungarian crop farms. *Land Use Policy* **2015**, *42*, 141–150. [CrossRef]
66. Herzig, A.; Nguyen, T.T.; Ausseil, A.G.E.; Maharjan, G.R.; Dymond, J.R.; Arnhold, S.; Koellner, T.; Rutledge, D.; Tenhunen, J. Assessing resource-use efficiency of land use. *Environ. Model. Softw.* **2018**, *107*, 34–49. [CrossRef]
67. Chen, W.; Shen, Y.; Wang, Y.A.; Wu, Q. The effect of industrial relocation on industrial land use efficiency in China: A spatial econometrics approach. *J. Clean. Prod.* **2018**, *205*, 525–535. [CrossRef]
68. Masini, E.; Tomao, A.; Barbati, A.; Corona, P.; Serra, P.; Salvati, L. Urban Growth, Land-use Efficiency and Local Socioeconomic Context: A Comparative Analysis of 417 Metropolitan Regions in Europe. *Environ. Manag.* **2019**, *63*, 322–337. [CrossRef]
69. Liu, J.; Jin, X.B.; Xu, W.Y.; Gu, Z.M.; Yang, X.H.; Ren, J.; Fan, Y.T.; Zhou, Y.K. A new framework of land use efficiency for the coordination among food, economy and ecology in regional development. *Sci. Total Environ.* **2020**, *710*, 135670. [CrossRef]
70. Hernandez, R.R.; Hoffacker, M.K.; Field, C.B. Land-Use Efficiency of Big Solar. *Environ. Sci. Technol.* **2014**, *48*, 1315–1323. [CrossRef]
71. Liu, J.; Jin, X.B.; Li, H.B.; Zhang, X.L.; Xu, W.Y.; Fan, Y.P.; Zhou, Y.K. Spatial-temporal changes and driving factors of the coordinated relationship among multiple land use efficiencies integrating stakeholders' vision in eastern China. *J. Clean Prod.* **2022**, *336*, 130406. [CrossRef]
72. Chen, W.; He, R.; Wu, Q. A Novel Efficiency Measure Model for Industrial Land Use Based on Subvector Data Envelope Analysis and Spatial Analysis Method. *Complexity* **2017**, *11*, 9516267. [CrossRef]
73. Zhang, C.M.; Feng, Z.W.; Ren, Q.L.; Hsu, W.L. Using Systems Thinking and Modelling: Ecological Land Utilisation Efficiency in the Yangtze Delta in China. *Systems* **2022**, *10*, 16. [CrossRef]
74. Yang, H.R.; Zheng, H.; Liu, H.G.; Wu, Q. NonLinear Effects of Environmental Regulation on Eco-Efficiency under the Constraint of Land Use Carbon Emissions: Evidence Based on a Bootstrapping Approach and Panel Threshold Model. *Int. J. Environ. Res. Public Health* **2019**, *16*, 1679. [CrossRef] [PubMed]
75. Bi, X.H.; Atlantis, P. Review and Prospect of Research on Urban Land Use Efficiency. In Proceedings of the 6th International Conference on Management, Education, Information and Control (MEICI), Shenyang, China, 24–26 September 2016.
76. Boyd, G.; Fare, R. Measuring the Efficiency of Decision-Making Units—A Comment. *Eur. J. Oper. Res.* **1984**, *15*, 331–332. [CrossRef]
77. Liu, J.S.; Lu, L.Y.Y.; Lu, W.M.; Lin, B.J.Y. Data envelopment analysis 1978-2010: A citation-based literature survey. *Omega-Int. J. Manag. Sci.* **2013**, *41*, 3–15. [CrossRef]
78. Cook, W.D.; Seiford, L.M. Data envelopment analysis (DEA)—Thirty years on. *Eur. J. Oper. Res.* **2009**, *192*, 1–17. [CrossRef]
79. Liu, S.C.; Xiao, W.; Li, L.L.; Ye, Y.M.; Song, X.L. Urban land use efficiency and improvement potential in China: A stochastic frontier analysis. *Land Use Policy* **2020**, *99*, 105046. [CrossRef]
80. Ferreira, M.D.P.; Feres, J.G. Farm size and Land use efficiency in the Brazilian Amazon. *Land Use Policy* **2020**, *99*, 104901. [CrossRef]
81. Yan, S.Q.; Peng, J.C.; Wu, Q. Exploring the non-linear effects of city size on urban industrial land use efficiency: A spatial econometric analysis of cities in eastern China. *Land Use Policy* **2020**, *99*, 104944. [CrossRef]
82. Lu, X.H.; Chen, D.L.; Kuang, B.; Zhang, C.Z.; Cheng, C. Is high-tech zone a policy trap or a growth drive? Insights from the perspective of urban land use efficiency. *Land Use Policy* **2020**, *95*, 104583. [CrossRef]
83. Ge, K.; Zou, S.; Ke, S.G.; Chen, D.L. Does Urban Agglomeration Promote Urban Land Green Use Efficiency? Take the Yangtze River Economic Zone of China as an Example. *Sustainability* **2021**, *13*, 10527. [CrossRef]
84. Beames, A.; Broekx, S.; Heijungs, R.; Lookman, R.; Boonen, K.; Van Geert, Y.; Dendoncker, K.; Seuntjens, P. Accounting for land-use efficiency and temporal variations between brownfield remediation alternatives in life-cycle assessment. *J. Clean. Prod.* **2015**, *101*, 109–117. [CrossRef]
85. Yang, H.R.; Wu, Q. Land Use Eco-Efficiency and Its Convergence Characteristics under the Constraint of Carbon Emissions in China. *Int. J. Environ. Res. Public Health* **2019**, *16*, 3172. [CrossRef] [PubMed]
86. Tan, S.K.; Hu, B.X.; Kuang, B.; Zhou, M. Regional differences and dynamic evolution of urban land green use efficiency within the Yangtze River Delta, China. *Land Use Policy* **2021**, *106*, 105449. [CrossRef]
87. Wang, H.; Wang, L.L.; Su, F.B.; Tao, R. Rural residential properties in China: Land use patterns, efficiency and prospects for reform. *Habitat Int.* **2012**, *36*, 201–209. [CrossRef]
88. Conradie, B.; Piesse, J.; Stephens, J. The changing environment: Efficiency, vulnerability and changes in land use in the South African Karoo, 2012–2014. *Environ. Dev.* **2019**, *32*, 12. [CrossRef]
89. Dong, Y.; Jin, G.; Deng, X.Z. Dynamic interactive effects of urban land-use efficiency, industrial transformation, and carbon emissions. *J. Clean Prod.* **2020**, *270*, 122547. [CrossRef]
90. Wang, L.J.; Zhang, L.; Chen, X.Q.; Gao, X.; Huang, Q.; Ieee. Evaluation on the Efficiency of Smart Land Use under Rational Urbanization. In Proceedings of the 5th International Conference on Agro-Geoinformatics (Agro-Geoinformatics), Inst Agr Resources & Regional Planning, Chinese Acad Agr Sci, Tianjin, China, 18–20 July 2016.
91. Li, J.; Zhu, Y.; Liu, J.Q.; Zhang, C.Y.; Sang, X.; Zhong, Q.Q. Parcel-level evaluation of urban land use efficiency based on multisource spatiotemporal data: A case study of Ningbo City, China. *Trans. Gis* **2021**, *25*, 2766–2790. [CrossRef]
92. Qiao, W.Y.; Huang, X.J. Change in Urban Land Use Efficiency in China: Does the High-Speed Rail Make a Difference? *Int. J. Environ. Res. Public Health* **2021**, *18*, 10043. [CrossRef]

93. Zhang, L.; Zhang, L.; Xu, Y.; Zhou, P.; Yeh, C.H. Evaluating urban land use efficiency with interacting criteria: An empirical study of cities in Jiangsu China. *Land Use Policy* **2020**, *90*, 104292. [CrossRef]
94. Wang, Y.C.; Li, B.Y.; Xu, L. Monitoring Land-Use Efficiency in China's Yangtze River Economic Belt from 2000 to 2018. *Land* **2022**, *11*, 1009. [CrossRef]
95. Pang, Y.Y.; Wang, X.J. Land-Use Efficiency in Shandong (China): Empirical Analysis Based on a Super-SBM Model. *Sustainability* **2020**, *12*, 10618. [CrossRef]
96. He, Y.; Huo, L.L. Research of land use efficiency in Mountainous Township based on the methods of DEA. In Proceedings of the International Conference on Civil, Architectural and Hydraulic Engineering (ICCAHE 2012), Zhangjiajie, China, 10–12 August 2012.
97. Zou, Z.G.; Sun, Y.; Yao, X.D. Study on Land Use Efficiency in Tianjin Binhai New Area. In Proceedings of the International Conference on Urbanization and Land Reservation Research, Tianjin, China, 15–17 September 2009.
98. Yuan, J.F.; Bian, Z.F.; Yan, Q.W.; Pan, Y.Q. Spatio-Temporal Distributions of the Land Use Efficiency Coupling Coordination Degree in Mining Cities of Western China. *Sustainability* **2019**, *11*, 19. [CrossRef]
99. Huang, Z.J.; He, C.F.; Zhu, S.J. Do China's economic development zones improve land use efficiency? The effects of selection, factor accumulation and agglomeration. *Landsc. Urban Plan.* **2017**, *162*, 145–156. [CrossRef]
100. Song, Y.; Yeung, G.; Zhu, D.L.; Zhang, L.X.; Xu, Y.; Zhang, L.Y. Efficiency of logistics land use: The case of Yangtze River Economic Belt in China, 2000-2017. *J. Transp. Geogr.* **2020**, *88*, 102851. [CrossRef]
101. Liu, Z.M.; Zhang, L.; Rommel, J.; Feng, S.Y. Do land markets improve land-use efficiency? evidence from Jiangsu, China. *Appl. Econ.* **2020**, *52*, 317–330. [CrossRef]
102. Zeng, L.G. The Driving Mechanism of Urban Land Green Use Efficiency in China Based on the EBM Model with Undesirable Outputs and the Spatial Dubin Model. *Int. J. Environ. Res. Public Health* **2022**, *19*, 10748. [CrossRef]
103. Yuan, T.; Zhang, J.; Xiang, Y.; Lu, L.Y. Exploring the Temporal and Spatial Evolution Laws of County Green Land-Use Efficiency: Evidence from 11 Counties in Sichuan Province. *Buildings* **2022**, *12*, 816. [CrossRef]
104. Fan, Z.G.; Deng, C.; Fan, Y.Q.; Zhang, P.W.; Lu, H. Spatial-Temporal Pattern and Evolution Trend of the Cultivated Land Use Eco-Efficiency in the National Pilot Zone for Ecological Conservation in China. *Int. J. Environ. Res. Public Health* **2022**, *19*, 111. [CrossRef]
105. Gao, X.; Zhang, A.L.; Sun, Z.L. How regional economic integration influence on urban land use efficiency? A case study of Wuhan metropolitan area, China. *Land Use Policy* **2020**, *90*, 104329. [CrossRef]
106. Fei, R.L.; Lin, Z.Y.; Chunga, J. How land transfer affects agricultural land use efficiency: Evidence from China's agricultural sector. *Land Use Policy* **2021**, *103*, 105300. [CrossRef]
107. Li, X.Y.; Yang, Y.; Liu, Y. Research progress in man-land relationship evolution and its resource-environment base in China. *J. Geogr Sci.* **2017**, *27*, 899–924. [CrossRef]
108. Bovet, J.; Reese, M.; Kock, W. Taming expansive land use dynamics—Sustainable land use regulation and urban sprawl in a comparative perspective. *Land Use Policy* **2018**, *77*, 837–845. [CrossRef]
109. Chen, X.; Yu, L.; Du, Z.R.; Liu, Z.; Qi, Y.; Liu, T.; Gong, P. Toward sustainable land use in China: A perspective on China's national land surveys. *Land Use Policy* **2022**, *123*, 106428. [CrossRef]
110. Xie, H.L.; Zhang, Y.W.; Zeng, X.J.; He, Y.F. Sustainable land use and management research: A scientometric review. *Landsc. Ecol* **2020**, *35*, 2381–2411. [CrossRef]
111. He, C.Y.; Shi, P.J.; Chen, J.; Li, X.B.; Pan, Y.Z.; Li, J.; Li, Y.C.; Li, J.G. Developing land use scenario dynamics model by the integration of system dynamics model and cellular automata model. *Sci. China Ser. D* **2005**, *48*, 1979–1989. [CrossRef]
112. Liu, D.Y.; Zheng, X.Q.; Wang, H.B. Land-use Simulation and Decision-Support system (LandSDS): Seamlessly integrating system dynamics, agent-based model, and cellular automata. *Ecol. Model.* **2020**, *417*, 108924. [CrossRef]
113. Chakraborty, S.; Maity, I.; Dadashpoor, H.; Novotny, J.; Banerji, S. Building in or out? Examining urban expansion patterns and land use efficiency across the global sample of 466 cities with million plus inhabitants. *Habitat Int.* **2022**, *120*, 102503. [CrossRef]
114. Pan, L.S.; Hu, H.G.; Jing, X.; Chen, Y.; Li, G.; Xu, Z.G.; Zhuo, Y.F.; Wang, X.Q. The Impacts of Regional Cooperation on Urban Land-Use Efficiency: Evidence from the Yangtze River Delta, China. *Land* **2022**, *11*, 915. [CrossRef]
115. Han, H.B.; Zhang, X.Y. Exploring environmental efficiency and total factor productivity of cultivated land use in China. *Sci. Total Environ.* **2020**, *726*, 138434. [CrossRef]
116. Qiao, L.; Huang, H.P.; Tian, Y.C. The Identification and Use Efficiency Evaluation of Urban Industrial Land Based on Multi-Source Data. *Sustainability* **2019**, *11*, 6149. [CrossRef]
117. Geng, B.; Fu, M.C.; Shan, J.J.; Sun, Y.B.; Wu, Z.Y. Evaluation of urban residential land use efficiency with a neural network from the perspective of service facility capacity. *J. Land Use Sci.* **2021**, *16*, 413–432. [CrossRef]
118. Zhou, Z.X.; Li, M.T. Spatial-temporal change in urban agricultural land use efficiency from the perspective of agricultural multi-functionality: A case study of the Xi'an metropolitan zone. *J. Geogr. Sci.* **2017**, *27*, 1499–1520. [CrossRef]
119. Wu, H.; Fang, S.M.; Zhang, C.; Hu, S.W.; Nan, D.; Yang, Y.Y. Exploring the impact of urban form on urban land use efficiency under low-carbon emission constraints: A case study in China's Yellow River Basin. *J. Environ. Manag.* **2022**, *311*, 114866. [CrossRef] [PubMed]
120. Zhao, W.; Yin, C.; Hua, T.; Meadows, M.E.; Li, Y.; Liu, Y.; Cherubini, F.; Pereira, P.; Fu, B. Achieving the Sustainable Development Goals in the post-pandemic era. *Humanit. Soc. Sci. Commun.* **2022**, *9*, 258. [CrossRef] [PubMed]

121. Wu, X.; Liu, J.; Fu, B.; Wang, S.; Wei, Y.; Li, Y. Bundling regions for promoting Sustainable Development Goals. *Environ. Res. Lett.* **2022**, *17*, 044021. [CrossRef]
122. Schiavina, M.; Melchiorri, M.; Corbane, C.; Florczyk, A.J.; Freire, S.; Pesaresi, M.; Kemper, T. Multi-Scale Estimation of Land Use Efficiency (SDG 11.3.1) across 25 Years Using Global Open and Free Data. *Sustainability* **2019**, *11*, 5674. [CrossRef]
123. Chen, W.; Su, Z.; Wang, Y.N.; Wang, Q.; Zhao, G.L. Do the rank difference of industrial development zones affect land use efficiency? A regional analysis in China. *Socio-Econ. Plan. Sci.* **2022**, *80*, 101168. [CrossRef]
124. Zhong, S.; Li, X.N.; Ma, J. Impacts of land finance on green land use efficiency in the Yangtze River Economic Belt: A spatial econometrics analysis. *Environ. Sci. Pollut. Res.* **2022**, *29*, 56004–56022. [CrossRef] [PubMed]
125. Zhang, X.; Li, M.; Li, Q.; Wang, Y.A.; Chen, W. Spatial Threshold Effect of Industrial Land Use Efficiency on Industrial Carbon Emissions: A Case Study in China. *Int. J. Environ. Res. Public Health* **2021**, *18*, 9368. [CrossRef] [PubMed]
126. Tang, X.L.; Sheng, L.; Zhou, Y.K. Exploring complex urban growth and land use efficiency in China's developed regions: Implications for territorial spatial planning. *Front. Earth Sci.* **2022**, *16*, 1040–1051. [CrossRef]
127. Liu, T.Y.; Liu, T.S. Study on Urban Agglomeration and Land Use Efficiency in China. In Proceedings of the 2nd International Conference on Humanities Science and Society Development (ICHSSD), Jimei Univ, Cheng Yi Coll, Xiamen, China, 18–19 November 2017; pp. 295–298.
128. Duan, B.; Ji, X.M. Can Carbon Finance Optimize Land Use Efficiency? The Example of China's Carbon Emissions Trading Policy. *Land* **2021**, *10*, 953. [CrossRef]
129. Zhang, Q. Evaluation on Rationality of Land Use from Structure Efficiency and Spatial Equilibrium Perspectives—A Case Study of Wujin County. In Proceedings of the 26th International Conference on Geo-informatics, Yunnan Normal Univ, Kunming, China, 28–30 June 2018.
130. Han, H.B.; Zhang, X.Y. Static and dynamic cultivated land use efficiency in China: A minimum distance to strong efficient frontier approach. *J. Clean Prod.* **2020**, *246*, 119002. [CrossRef]
131. Liu, J.M.; Hou, X.H.; Wang, Z.Q.; Shen, Y. Study the effect of industrial structure optimization on urban land-use efficiency in China. *Land Use Policy* **2021**, *105*, 105390. [CrossRef]