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Systematic Review

How Is the Forest Sector's Contribution to the Sustainable Development Goals (SDGs) Being Addressed? A Systematic Review of the Methods

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Abstract: The Sustainable Development Goals, developed in 2015 by the United Nations, are a set of 17 internationally agreed-upon goals to be reached by 2030. The forest sector stands out as an important player in tackling climate change and strengthening sustainable initiatives. However, in addition to investigating the synergies and trade-offs between the forest sector and the SDGs, it is important to comprehend how this relationship has been measured. We conducted a systematic review to understand which methods have been used to understand the contributions of the forest sector to the SDGs. Following the PRISMA protocol, we screened 1064 articles from the Scopus and Web of Science databases, written in English and published between 2015 and November 2022. With the assistance of CADIMA 2.2.4 and Atlas.Ti 22, 83 articles were selected for further investigation. As a result, we categorized the studies into eight methods: content analysis, personal perceptions, interpretative analysis, frameworks, models, impact analysis, time series data, and SDG index. The approaches used include nature-based solutions, literature reviews, the Delphi method, case studies, the iSDG model, SDG 15 indicators, Earth observations, and remote sensing. In conclusion, although the SDGs are widely referenced, studies that measure and explore the relationship between the forest sector and SDGs in a more holistic way are still lacking. This systematic review aimed to offer an overview of the methods being used to address this topic and stimulate future research.

Keywords: forest sector; Sustainable Development Goals (SDGs); systematic review; methods

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1. Introduction

Climate change and constant concern regarding the world's future and stability are common issues that society has been debating for years, and they still remain uncertain. Many agreements, frameworks, and tools have been developed to assist in tackling environmental issues and all of the economic and social challenges we are facing. On 25 September 2015, the United Nations General Assembly adopted the Agenda 2030 for Sustainable Development and launched the Sustainable Development Goals (SDGs)—a plan of action for people, the planet, and prosperity. The SDGs are set of 17 internationally agreed-upon global goals, addressing 169 targets and 232 indicators, that set sustainable development targets to be reached by 2030 [1].

The term "sustainable development" was defined by the Brundtland Commission in their report published in 1987. Since then, the term has gained international recognition and dominated environmental discussions. The Brundtland Report set the environment for the Rio de Janeiro Earth Summit that was to take place five years later. The Rio Summit, which took place in June 1992, was the largest environmental conference ever held. Another United Nations initiative emerged in 2000 with the creation of the Millennium Development Goals (MDGs), the first global attempt and strategy to end extreme poverty.

Their main goal was to meet the basic needs of developing countries, such as reducing hunger and providing basic access to education and to water and sanitation to alleviate extreme poverty [2]. While the MDGs expired in 2015, they had a strong social approach, where the main focus was to end extreme poverty in all its dimensions. However, they had a simplified definition of development, which did not consider environmental and economic issues [3]. The decision to move beyond the MDGs to a new universal set of goals that fully integrates economic, social, and environmental challenges was made at the 2012 UN Rio+20 Conference on Sustainable Development [4]. The new goals were expected to broaden the narrow scope of the MDGs to include a wider variety of issues within a long-term sustainability agenda that is applicable to all nations.

Much has been discussed about the importance of the Sustainable Development Goals, especially in combating climate change and assisting in environmental issues, as the SDGs are a call to action. Thus, a number of studies that examined contributions to the SDGs have been carried out across different sectors, including systematic reviews [5–10]. The forest sector has the potential to contribute to sustainability, as well as to become a key player in tackling climate change and strengthening sustainable initiatives. The forest-based sector can contribute to reducing emissions, enhancing carbon sinks, and providing a continuous stream of ecosystem services, including energy, wood products, and biodiversity conservation. However, detrimental impacts occur, for example, along with forest extraction and illegal timber exploitation [11] and income differentiation in communities that depend exclusively on forest products [12]. Given the considerable social and environmental impacts of the sector, research on sustainable practices is crucial.

A few studies analyzing the forest sector and the SDGs have been published over the last years. Baumgartner (2019), Hazarika et al. (2019), and Ma (2022) investigated the Austrian forestry sector and SDGs nexus, the SDGs and the forest sector's complex relationship, and the forest and forestry support to the SDGs, respectively [13–15]. However, in addition to analyzing the synergies and trade-offs between the forest sector and the SDGs, it is also important to understand exactly how this relationship has been measured and explored and which methods and methodologies have been applied.

To the best of the authors' knowledge, no previous systematic review of the methods used to assess the forest sector's contribution to the SDGs has been performed to date. Given the lack of systematic reviews on this topic, the proposed study will provide researchers in the field with an accessible overview of the existing research, which can be used to determine how different methods are being applied and how they complement each other, which might also point to areas in need of further research.

The main objective of this study was to investigate which methods are being used to analyze the forest sector's contributions to the SDGs and to assess the challenges and opportunities. According to Allen et al. (2018), there is a need for methods, models, and tools that can capture and address the inherent complexities of the SDGs, including interactions, synergies, and trade-offs or options for their integration [16].

This systematic review aimed to answer the following research questions (RQs):

- RQ1. How the contributions of the forest sector to the SDGs have been addressed and studied over the last several years?
- RQ2. Which methods have been used to investigate this relationship?

This work will aid researchers, practitioners, consultants, and decision makers by providing guidance and support on better methods for investigation.

2. Methodology

2.1. Research Protocol

This research followed the updated Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. The protocol was developed to facilitate the transparent and complete reporting of systematic reviews [17]. For this study, the authors developed a research protocol and defined each criterion for the inclusion and exclusion of studies (see Section 2.7 below). This protocol allows researchers and decision makers

to assess and replicate the findings of reviews through a clear and trustful process. In addition to PRISMA, the development of this systematic review is also an adaptation of the Collaboration for Environmental Evidence (CEE) systematic review guidelines, version 5.2.

2.2. Search Strategy

According to the CEE, a search strategy is the whole search methodology, including search terms, search strings, bibliographic sources searched, and enough information to ensure the reproducibility of the search. Search terms encompass individual or compound words used to find relevant articles. A search string is a combination of search terms using Boolean operators [18]. The inclusion criteria defined that only peer-reviewed articles written in English between 2015 and November 2022 with full-text availability would be selected. The Scopus and Web of Science databases were exclusively used to search for articles. In the preliminary database searches, search terms and search strings were used either for titles, abstracts, or both. The initial search trials were based on previous studies in the literature that were conducted at the beginning of 2022 to check the current status of the research topic and the authors' expert knowledge. Terms such as "Forest" AND "Sector* OR Industr* OR Compan* OR Product" AND "SDG" were used. Nonetheless, few studies related to the forest sector and SDGs were found in the initial trials, as known articles that must be included in the research results were missing. As mentioned before, studies by Baumgartner (2019) and Hazarika et al. (2019) led studies regarding the contribution of the forest sector to the SDGs; for this reason, their articles were considered starting points for this study [13,14]. Next, the search string was updated and the general terms, such as "industry" and "company", were replaced with more specific keywords. After testing more suitable search strings and conducting pilot searches, the following search strings were finally used in both databases (Table 1).

Table 1. Summary of the search strings used in the databases for articles on the forest sector and SDGs.

Databases	Search Strings	Access Dates
Scopus and Web of Science	(Forest* OR Tree* OR Wood* OR "Pulp and Paper*" OR Furniture* OR Timber*) AND ("Sustainable Development Goal*" OR SDG* OR "Agenda 2030" OR "2030 Agenda")	5 July 2022 and 10 November 2022

For the purposes of this research paper, the search strategy was based on an adaptation of the PICO/PECO elements, which are commonly used in CEE evidence synthesis (Table 2). PICO, or PECO, is term that is frequently used in evidence synthesis to define crucial parts. It stands for population, intervention (or exposure), comparator, and outcomes. Other similar question forms have been proposed and may apply to some questions better. The PICO/PECO key elements can help address the structure and components of the data coding and extraction forms [18].

In this systematic review, the PO (population and outcome) questions' structural framework, for the paper's selection criteria, used the following definitions:

- Population: The study's population must be related to forest, forestry, wood, pulp, paper, furniture, and timber sector. The study's population can be related to forest management, forest operations, forest certification, sustainability, sustainable development, bioeconomy, and circular economy;
- Outcome: The study's outcome must be an assessment of the Sustainable Development Goals (SDGs). The study's outcome should be clearly related to addressing, analyzing, measuring, and/or contextualizing all SDGs, some SDGs, or specific SDGs. The study's outcome can be related to self-assessments, third-party assessments, case studies, and/or the application of frameworks that explicitly address the SDGs.

Table 2. PICO/PECO question structural framework.

Question Element	Definition
Population	Statistical samples or populations of subjects (ecosystem, species, etc.) to which the intervention is applied or exposed to describe conditions.
Intervention/Exposure	Policy, action, or environmental variables impacting the populations or to which the subject populations are exposed.
Comparator	What the exposure or intervention is compared to. Either a control with no intervention/exposure, alternative intervention, or counterfactual scenario.
Outcome	Consequences of the intervention or exposure. All relevant variables that can be reliably measured.

2.3. Forest Sector Definition

In this study, we defined the forest sector as a concept that includes different components along the whole forest supply chain. Our study was inspired by Gane (2007), who described the forest sector as follows:

> *"The forest sector concept is all embracing. Globally, it covers all types of forest and wood vegetation, from rain forest in the tropics to boreal coniferous ecosystems, and includes all manner of human activities based on forest resources. Sector activities range from large scale forest industries, which manufacture timber, panels, paper and other mass-produced goods to meet the needs of consumers in home and foreign markets, to the small-scale collection and processing of forest products for domestic and local use. Service activities which aim to satisfy social, cultural and environmental needs are also included. Outputs from the sector are very diverse and comprise intangible benefits, such as scenery and biodiversity, in addition to the wide range of goods derived from forests and trees. From a human point of view the sector is a collection of groups, organizations and institutions, with interests ranging from the conservation and exploitation of the forests to the processing and distribution of the goods and services obtained from them. The sector's contribution to social and economic welfare is heterogeneous".* [19]

According to the authors' knowledge and understanding of the forest topics relevant to this review, the topics addressed in this systematic review ranged from forests, trees, wood, pulp and paper, furniture, timber, forest management, forest operations, forest certification, ecosystem services, forest fires, forest data in remote sensing to biodiversity. Topics that were not addressed in this study included agroforestry, cooking/charcoal, desertification, drylands, forestry education, fungus, green urban areas, land cover, degradation and use, mangrove, national parks, palm oil, work conditions/slavery, tourism, urban vegetation, and wetlands. The nonincluded topics were not considered as they are too broad, overlap with other sectors, and are beyond the scope of this search strategy.

2.4. CADIMA

CADIMA is online software that is used to develop systematic reviews and maps related to agricultural and environmental questions, and it was established by the Julius Kühn Institute. This online tool supports the following steps: (1) development of the review protocol; (2) management of the search results (including the identification of duplicates); (3) management and performance of the study selection process (including the performance of a consistency check); (4) management and conducting of on- and off-line data extraction; and (5) management and performance of the critical appraisal process [20]. The CADIMA test version was first used to check the online tool's configurations and its applicability to the research. The tool presented good features that could assist the research's development, so it was chosen as the main tool for the selection of articles. After defining the research protocol and search strings, the initial set of articles was added to CADIMA. The systematic review was conducted using a combination of the steps, as presented next.

2.5. Study Selection

We added 3527 records in total to CADIMA (both from Scopus and Web of Science). This total number corresponds to the first round (July 2022) of 1642 records added. In addition, we added 1885 more records to the database in the second round (November 2022). After a duplicate check, we removed 2463 articles. Next, a consistency check was executed to measure the team's agreement on the criteria. The screening for the inclusion of the articles was conducted by two reviewers, who were responsible for their own set of literature. To test the consistency and objectivity of the reviewers' inclusion decisions, a kappa analysis was conducted until an acceptable score was achieved [21]. We found a kappa value of 1. The research team then started the selection of articles based on the population and outcome criteria. From 1064 articles screened at the title and abstract levels, 852 were excluded, and 212 full-text articles were assessed for eligibility, and 123 were excluded. When disagreements within the research team regarding the inclusion or exclusion of an article occurred, the main researcher decided whether the article should be selected based on the selection criteria, already presented in Section 2.2, and their expert opinion. The research team consisted of forest engineers with an extensive background in forestry and diverse regional representation. PhD candidates and university professors were among the authors. Finally, eighty-nine full-text articles were included in the data extraction phase.

2.6. Data Extraction

Predefined rules regarding data extraction were created and followed during the process, and they were also continuously revised and extended [22]. The data extraction was performed using a combination of CADIMA 2.2.4 and ATLAS.ti 22 software. ATLAS.ti is a qualitative research software used for coding and analyzing large bodies of textual, graphical, audio, and video data. It offers tools for any systematic approach to unstructured data, enabling the creation of codes, memos, networks, and word clouds [23]. Version 22.2.4.0 was used in this systematic review.

The data extraction process followed two main stages. First, bibliometric data were collected, including the title, name of author(s), periodical name, and publication year. Second, information regarding the content of each study was accessed. Our classification focused on methods. In this case, the data extraction aimed to identify methods being used to address the SDGs in the forest sector. Three main data extraction categories were created:

- Direct methods/tools: extract methods that directly measure, address, and assess the SDGs;
- Indirect methods/tools: extract methods that indirectly measure, address, and assess the SDGs;
- Results related to addressing the SDGs: a study did not mention any direct or indirect method to address the SDGs but presented results or discussions considering the topic.

The full texts of the selected articles were scanned and coded in Atlas.ti.

2.7. Critical Appraisal

During critical appraisal, the appraisal criteria are used to assess the validity of included studies. The critical appraisal judgment system defined three criteria to analyze whether the data extracted from the articles were relevant for the study. The studies had to comply with at least two out of the three criteria.

CRITERIA 1. *Does the publication clearly address the contributions of the forest sector to the Sustainable Development Goals?*

This criterion aimed to assess whether the selected study was conducted directly in the forest sector (in its entire range, as described in Section 2.3) and not in any other sector, as well as whether the study specifically addressed, investigated, and/or mentioned the SDGs.

CRITERIA 2*. Does the publication provide a clear approach (method or tool) to investigate, support, and/or measure the SDGs in the forest sector?*

This criterion aimed to assess whether a clear methodology, method, tool, or approach was presented in the study or if it only mentioned the SDGs in a conceptual way or only briefly mentioned it in parts of the study.

CRITERIA 3. *Does the publication describe or list opportunities, recent developments, and/or innovative measures to address the SDGs in the forest sector?*

This criterion aimed to assess, in cases where no methodology, method, tool, or approach was provided, if the publication offered insights related to future developments of the SDGs in the forest sector. Six articles were excluded in this final step because they did not meet at least two out of the three criteria. A flow diagram of the identification of studies via the databases and registers, with all selection processes, can be seen in Figure 1.

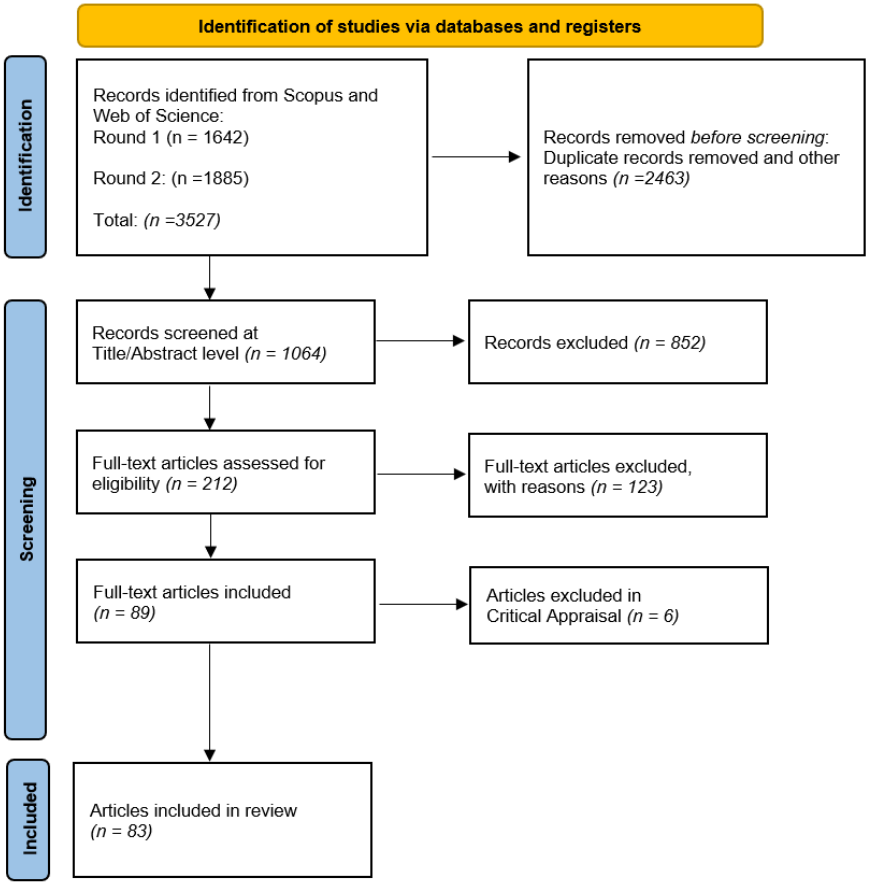

Figure 1. Flow diagram of the article selection process based on the PRISMA guidelines [17].

2.8. Analysis and Synthesis

Eighty-three articles were identified as eligible for the study (Supplementary Materials File S1). After a detailed analysis, the selected articles were categorized according to the similarity of their methods by coding in Microsoft Excel. The categorization followed common definitions in the literature and the authors' understanding of the topic, and a thematic analysis was specially used at this stage. A thematic analysis is used to identify the themes and subthemes based on efforts related to clustering, counting, and noting the similarities and relationships that exist within the abstracted data. It also seeks to identify and gather the main, recurrent, or most important issues or patterns arising from a body of literature. The themes identified are shaped by the specific review questions [24,25]. Altogether, this process resulted in the creation of eight categories of methods. The characteristics of the reviewed articles and extracted analytical themes are presented in Section 3.2 and discussed in Section 4.

3. Results

3.1. Characteristics of the Reviewed Articles

The bibliometric analysis presented here encompasses the distribution of publications by year, geographical distribution, periodical name and publisher, and keyword co-occurrence. In total, 83 articles were selected, of which 48 came from the Web of Science and 35 from the Scopus databases. The distribution of the publications over the years peaked in 2021, when 22 articles were published. This was followed by 2022 with 16 articles and 2020 and 2018 with 15 articles each, as seen in Figure 2. The years 2015 and 2016 did not present any publications for this dataset. The SDGs were launched in 2015, and the implementation of the 2030 Agenda framework started in 2016. This can help explain the low interest in this topic in the initial years. Apart from a decline in 2019, more studies began to be published in this field. The rise in the number of publications could be related to the awareness and discussions that began to intensify over the last few years.

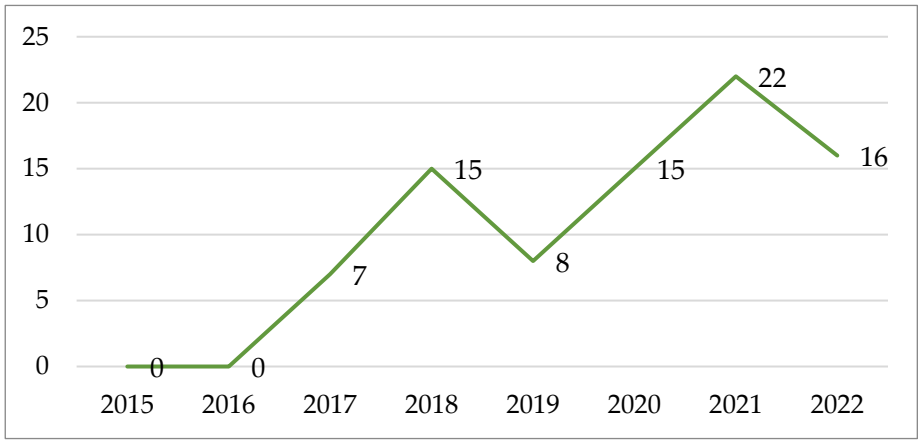

Figure 2. Annual scientific production of the selected articles from 2015 to 2022.

The geographical distribution of the selected articles shows the United States of America as the number one country for publications related to the forest sector and SDGs (Figure 3). The top five countries were the USA with 11 articles (13%), followed by China with 9 articles (10%), England with 6 articles (7%), Indonesia with 5 articles (6%), and Austria, Germany, and Italy with 4 articles each (4%). In total, 36 countries were represented, with most of them, represented by the institutions that conducted the studies, publishing one or two articles on this topic.

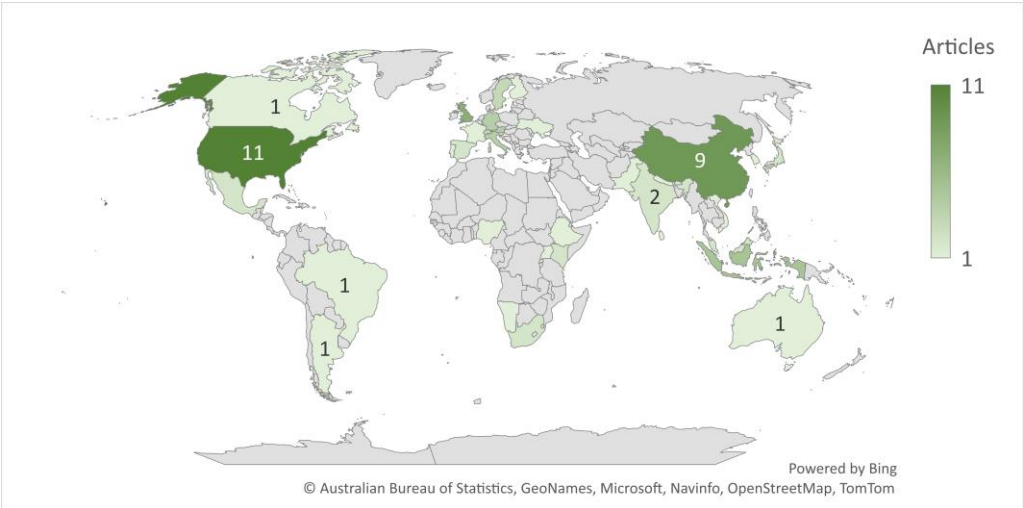

Figure 3. Geographical distribution of the selected articles.

Table 3 presents the top 10 scientific journals of the 83 reviewed articles. *Sustainability* stands out among the main sources, followed by *Forests*, both published by MDPI. They are followed by *Forest Policy and Economics* (Elsevier), *Mountain Research and Development* (BioOne), and *Remote Sensing* (MDPI).

Table 3. Distribution of the periodicals and publishers of the selected articles.

Periodical Name	Publisher	Number of Articles
Sustainability	MDPI	11
Forests	MDPI	8
Forest Policy and Economics	Elsevier	3
Mountain Research and Development	BioOne	3
Remote Sensing	MDPI	3
Current Opinion in Environmental Sustainability	Elsevier	2
Ecological Indicators	Elsevier	2
Int. Journal of Environmental Research and Public Health	MDPI	2
ISPRS International Journal of Geo-Information	MDPI	2
Journal of Cleaner Production	Elsevier	2

The keywords co-occurrence map was generated using VOS viewer 1.6.18 software [26]. In the software, the setting options were set to the following: co-occurrence analysis of full texts, full counting method, minimum occurrence threshold equal to four, and 42 keywords visualization selection. The network mapping, as depicted in Figure 4, shows the keywords clustered in three main groups, with colored lines indicating co-occurrence links between terms.

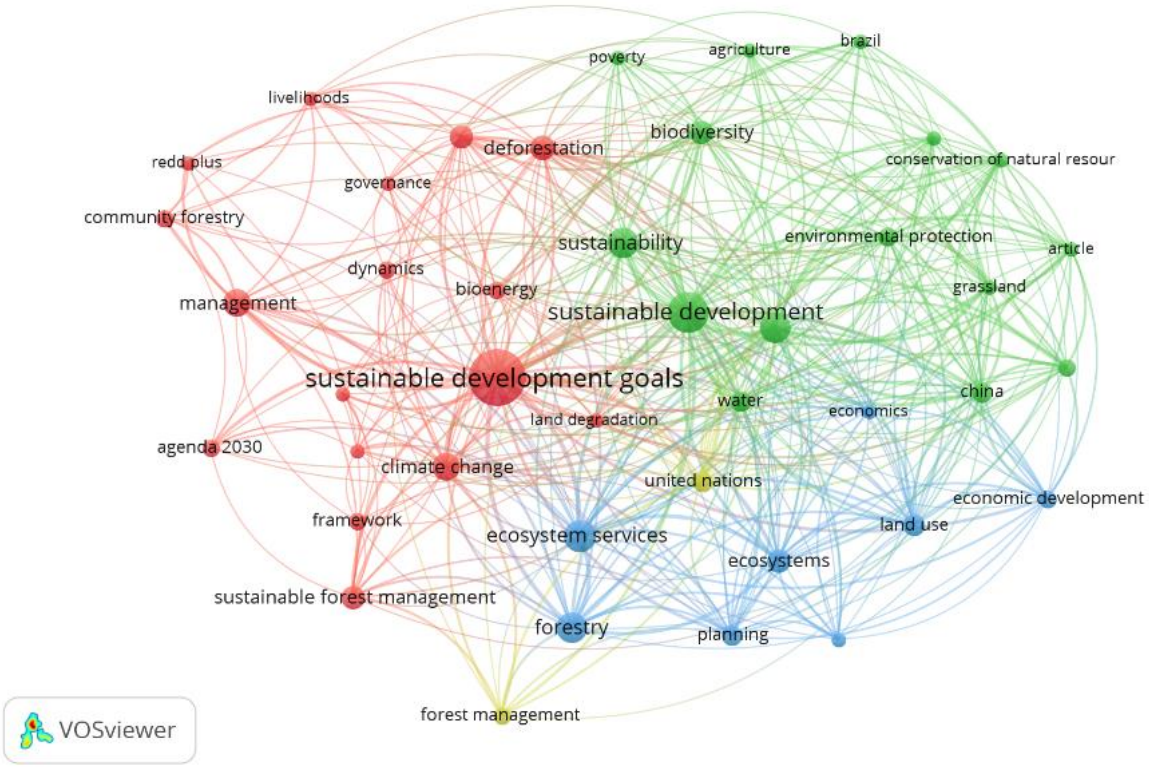

Figure 4. Keyword co-occurrences of the selected articles.

The three groups were very heterogeneous, but for better understanding and classification, they were labeled according to the three pillars of sustainability [27]:

- Social-related cluster (red): keywords such as "community forests", "livelihoods", and "governance";
- Economic-related cluster (blue): keywords such as "economic development", "economics", and "planning";
- Environmental-related cluster (green): keywords such as "biodiversity", "environmental protection", and "conservation of natural resources". In this cluster, the keyword "Brazil" appeared. This may be related to the country's importance and role in environment-related issues.

Although classified into different clusters, most keywords fit and represent all three sustainability pillars. They are directly related to the SDGs and the forest sector. For example, keywords such as "sustainability", "climate change", "ecosystem services", and "sustainable forest management" are common terms in relation to the SDGs and targets.

3.2. Thematic Analysis and Methods Categorization

The different methods found among the selected articles were very heterogeneous, so a thematic and descriptive analysis to categorize them according to their similarities was performed. The categorization assisted in describing their methodological directions and facilitated in their analysis. First, there was a separation of the direct and indirect methods used. Next, these methods were, altogether, grouped into eight categories: (a) content analysis, (b) personal perceptions, (c) interpretative analysis, (d) frameworks, (e) models and flows, (f) impact assessments, (g) time series, and (h) SDG indicators and index, as illustrated in Figure 5.

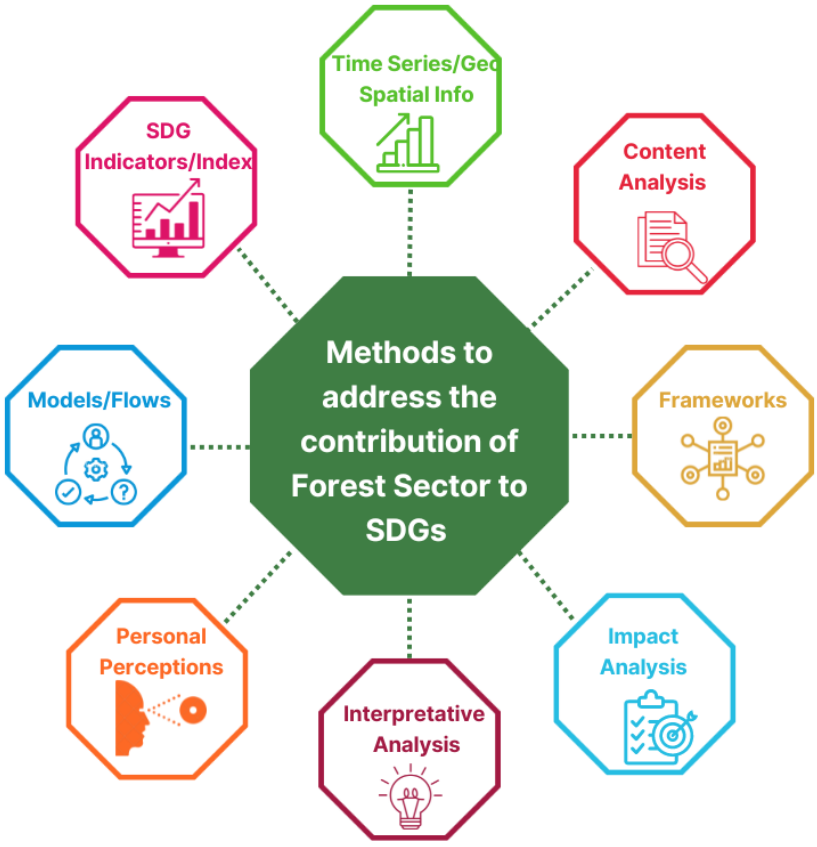

Figure 5. Categories of methods used to address the contribution of the forest sector to the SDGs. Source: the authors (2023).

The categories of methods created in this study were not intended to follow pre-established and well-conceptualized methods commonly used in scientific research. Instead,

the aim here was to classify all methods used in the studies in such a way as to understand and analyze them according to the research questions. Some articles presented more than one method to address the SDGs, combining different categories in the study.

Table 4 shows the distribution of the methods among the selected articles. Accordingly, the most popular category was content analysis (31 articles), followed by personal perceptions (23 articles), interpretative analysis (21 articles), frameworks (20 articles), models and flows (15 articles), and impact analysis, time series data, and SDG indicators with 14 articles each. Out of the 83 articles included, 43 articles presented more than one method category in the study.

Table 4. Distribution of the method categories among the selected articles.

Category of Method	Article References	Number of Articles	%
Content Analysis	[13,14,28–50]	31	20.39%
Personal Perceptions	[14,29,35,37,41,42,51–65]	23	15.13%
Interpretative Analysis	[13,30,43,51,53,58,60–62,66–75]	21	13.82%
Framework	[29,37,47,52,57,62,65,76–87]	20	13.16%
Model/Flows	[28,35,51,58,70,78,84,88–93]	15	9.87%
Impact Analysis	[28,30,40,54,55,69,73,79,91,94–98]	14	9.21%
Time Series Data	[42,80,81,87,93,99–104]	14	9.21%
SDG Indicators	[34,35,56,63,80,85,90,91,97,98,101,105–107]	14	9.21%

3.2.1. Content Analysis

This category refers to the analysis of different types of content—from reports and articles to policies and economic analyses—based on punctual data. Content analysis is a flexible research method that can be applied to many research problems, either as a method by itself or in conjunction with other methods. It was the most popular category; thirty-one of the selected articles (20.39%) used content analysis as a direct or indirect method. One of the most popular methods used was literature review. Articles used this method to study environmental governance to achieve SDG 16 in Asia and Africa [29] and also to assess community forestry frameworks in sub-Saharan Africa and the impact on sustainable development [94]; other studies used a literature review and industrial data to analyze the effects of woody pellet production on the SDGs in the USA [31]; and data analysis and review methods were adopted to track the global-level impacts of national sustainability initiatives [35].

The systematic review method was also applied in order to perform more complex and deeper analyses. Ishtiaque et al. (2020) reviewed remote-sensing-based research to monitor the progress towards SDG 15 in Bangladesh [38]. Carr et al. used a systematic review to anticipate the impacts of achieving SDG targets on forests [40]. Makwinja et al. studied how to manage ecosystem service demand under a changing catchment [42]. Costa et al. (2022) conducted a systematic and bibliometric literature review to measure the degree of the contribution of digital transformation technology on company sustainability areas [34]. Science-based understanding was used as a method by van Noordwijk to measure the SDG synergy between agriculture and forestry at the food, energy, water, and income nexus [45]. Interesting research regarding the institutional interactions and synergies of REDD+ projects, economic contributions of NTFPs, and plant conservation to the SDGs also used variations of the literature review [39,47–49].

A common practice among the studies in this category was policy analysis. Methods such as institutional interaction analysis [37], policy cluster analysis [46], international policy instruments [41], and theory and policy analysis [44] could be found among the selected studies. Another frequent method was strategies and discourse analysis to address challenges and opportunities for alignment between supply chains and the SDGs. Delabre et al. proposed strategies for tropical forest protection and sustainable supply chains [36], whereas Thorlakson et al. (2018) analyzed corporate sustainability reports, company reports, and websites to understand their contribution to sustainability through global supply

chains [108]. Other methods in this category included thematic analysis [50], bioeconomy strategy analysis [32,33], state forest report analysis [43], and economic analysis [28].

Finally, two important articles that analyzed the relationship between the forest sector and SDGs require special attention. The first implemented a content analysis to understand the nexus between the Austrian forestry sector and SDGs by reviewing its interlinkages [14], and the second explored the complex relationship between the SDGs and the forest sector [13].

3.2.2. Personal Perception

The personal perception category was created as a group that covers methods based on third-party personal perceptions, such as interviews, case studies, and surveys. This category was the second-most popular. Twenty-three articles (15.13%) used some kind of personal perception method. The case study, as a direct and indirect method, was the most frequent method in this category. It was used for a cross-case comparison and case-oriented process to evaluate how the SDGs align with top–down and bottom–up approaches, as well as the basis for supply chain decisions in the construction sector [54], to understand how small- and medium-sized enterprises can incorporate the SDGs through cluster management organization [56], and to analyze the contribution of biomass supply chains for bioenergy to the SDGs [57]. Bloomfield et al. (2018) used workshop and capacity-building themes to obtain an overview of the tools and approaches related to sustainable land management for capacity building to advance the SDGs [64]. In addition to content analysis methods, case studies were also used by Amaruzaman et al. (2022) and Downing et al. (2021) [29,35].

Structured and semi-structured interviews were popular methods as well. Articles used structured interviews with leaders and symbolic interactionism [14] and semi-structured interviews and focus groups [42]. Huong et al. (2021) conducted semi-structured interviews to assess the co-benefits of climate change response in Vietnam [63]. Expert elicitation methods also appeared in different studies related to the relationship between community forestry and the SDGs [37,60]. Other well-known methods were further implemented in this category: an online survey to evaluate linkages between SDG targets and 16 specific ecosystems services [59], the Delphi method and guiding interview questions to draw a decision-making approach for the assignment of ecosystem services to forest management units in Turkey [62], snowball sampling theory to analyze soil infiltration management from the perspective of the SDGs [58], workshops to research priorities for the conservation and sustainable governance of Andean forest landscapes [65], and desk study to access international perspectives regarding the forest–water nexus [41].

Still, not so well-known methods were also implemented, such as science-management partnerships [55], actor-centered perspective and participatory analysis [51], and multi-stakeholder platforms [52]. In some studies, the use of more than one personal perception method was applied. Tegegne et al. (2019) conducted expert multilingual online surveys, semi-structured interviews, and stakeholder consultations in selected countries to understand the potentials, challenges, and ways forward for forest concessions and the SDGs [53]. However, Nath et al. (2020) used observation, semi-structured household interviews, and group discussions to understand how to achieve the SDGs through participatory forest management in southeastern Bangladesh [61].

3.2.3. Interpretative Analysis

Interpretative analysis refers to methods where the authors interpret data based on their opinions and previous knowledge and evaluations, mostly using qualitative and quantitative analyses. Twenty-one articles (13.82%) used variations of the interpretative analysis. The most common methodological approach used in this category was qualitative methods. According to Yanow and Schwartz-Shea (2015), qualitative methods are considered particularly suitable for accessing structures of meaning and interpretation [109].

A qualitative rapid assessment was used to foresee the future of tropical forests under the SDGs [72], and a qualitative content analysis and mixed methods were applied directly and indirectly to analyze how to achieve the SDGs through participatory forest management in southeastern Bangladesh [61]. A qualitative approach was also combined with nature-based solutions (NbS). Kim et al. (2021) implemented a qualitative approach to understand how nature-based solutions can improve environmental and socioeconomic resilience to achieve the SDGs by analyzing cases of reforestation and afforestation in the Republic of Korea [30]. Anderson et al. (2022) performed qualitative evidence synthesis and NbS aligned with the SDGs to study a typology of nature-based solutions for sustainable development [75]. Other acknowledged methods, such as phenomenology and an observational method, were tested in combination with qualitative research by Susanto et al. [58].

Critical analysis [66], theoretical analysis [65], semi-quantitative analysis [71], and deconstruction, interpretation, and reconstruction [73] are established methods that were used in the selected studies. Some studies required the authors' interpretation of external data in order to organize their research and draw conclusions. Mostly interpreting data related to the SDGs, Dobriyal et al. (2022) developed indicators based on the SDGs to analyze the nexus between forest, market, and human well-being in the Western Himalayas of India [74]. Bryan et al. (2018) reviewed program impacts across multiple sustainability indicators to analyze China's response to a national land-system sustainability emergency [69]. Humpenöder et al. (2018) explored sustainability indicators derived from the MAgPIE model and mapped them to the SDGs to resolve sustainability trade-offs in large-scale bioenergy production [70]. Finally, Dandabathula et al. (2021) analyzed the connection between the global forestry sector and the SDGs to understand the nexus between Indian forestry and the SDGs [43].

3.2.4. Frameworks

This category refers to the use of established and recently developed frameworks—conceptual structures intended to serve as support or guides—to access information of interest. Twenty articles (13.16%) used frameworks as a method to integrate concepts regarding the SDGs. Frameworks have been extensively used in research on the SDGs. One of the most successful endeavors has been the Global Reporting Initiative (GRI), whose framework has become the main benchmark for sustainability reporting [110]. Frameworks based on a determined number of steps were common. Bennich et al. (2021) followed a five-step analytical framework that consisted of cross-impact analysis, network diagramming, identification of key variables, conceptual modeling, and simulation-based analysis aimed at the regional-scale assessment of sustainability goal interactions [76]. Tengberg et al. (2016), among other methods, used a five-step process: initiation, mapping of key issues and actors, dialogue preparation, realization, and follow-up. The main goal was to analyze experiences from multistakeholder dialogues on water, food, forests, and landscapes [52]. A more complex framework with further steps, a seven-point scoring framework, was used by Blair et al. (2021) to examine the positive and negative relationships between biomass supply chains and the SDGs [57].

Frameworks were usually used as analytical tools, and they were often referred to as analytical frameworks. For example, Milbank et al. (2018) executed an evaluative and analytical framework to assess the progress of REDD+ projects towards the SDGs [47]. A well-known framework regularly used in different research fields is the SWOT analysis. Bruzzese et al. (2020) tested what they called a TOWS analysis, which focuses on the external environment, whereas SWOT emphasizes the internal environment, to develop strategies for the valorization of chestnut resources in mountainous areas of Italy from a sustainable development perspective [77].

The framework method is very flexible, and it can be adapted and molded to different areas. Unique and specific frameworks were used among the selected articles. For example, an interoperability framework was used to create a workflow for the assessment of SDG

indicators based on high-resolution satellite data [78]. Jarosch et al. (2020) implemented RESPONSA—a context-specific social life cycle framework—to design a regional socioeconomic life cycle assessment for a bioeconomy value chain [79]. The TRENDS.EARTH framework was adopted by Xoxo et al. (2022) to explore the biome context as an appropriate degradation monitoring dimension for SDG 15.3 [87]. Another concept used in this category was the sustainable development as process approach (SDAP framework), aimed at analyzing forest sector contributions to the UN 2030 Agenda, such as by Gregersen et al. [83].

Interesting studies also used tailored frameworks in their research, such as a reporting framework, described as a multiscale analysis of forest degradation for SDG 15 [81]; a value-based framework to access innovations in locally controlled forest business models [82]; and a framework for measuring regional progress in incorporating ecosystem services to assess progress towards the SDGs [84]. In addition, more complex frameworks, such as the data–information–knowledge–wisdom paradigm framework, were proposed to evaluate the potential impacts of land use changes on ecosystem service values under multiple scenarios in support of SDG reporting [85]; and, finally, an integrated land use planning framework intended to study the coordinated intensification towards reconciling the "zero hunger" and "life on land" Sustainable Development Goals [86].

3.2.5. Model/Flows

Fifteen articles (9.87%) used a model or flow as their direct or indirect method. Similar to frameworks, the model and flow category reflects tools and methods used in studies that were very particular to a specific topic. With the 2030 Agenda, the use of models is important for the exploration of key intersecting systems and their interdependencies; to achieve sustainable development, a good understanding of the interlinkages (synergies and trade-offs) among the goals is required, and modeling can effectively contribute to this necessity [111]. In this category, modeling that used geospatial information was excluded.

Mutta et al. (2021) used the conceptual sustainable business model (SBM model) and the Canvas business model to study sustainable business models for informal charcoal producers in Kenya [51]. Allen et al. (2022) applied a macroeconomic modeling framework, iSDG-Australia, as both a direct and indirect method to model ambitious climate mitigation pathways for Australia's built environment [92]. Han et al. (2022) used the PLUS model to create a multiscenario landscape ecological risk simulation for the Sustainable Development Goals [91].

Multiple linear regression analysis was conducted to investigate a case study of improved cookstoves and clean fuel use by selected Nigerian households [88]. Martinez-Hernadez et al. (2022) employed process modeling to analyze the process and sustainability performance of forestry-based bioenergy systems [28]. By contrast, Pfaff et al. (2018) exploited the modeling of road impacts as an indirect method to determine correlations among roads and the SDGs, its trade-offs, and synergies by learning how to distinguish frontiers of Brazil's Amazon forest [89]. Other methods utilized include multimodel inferences to evaluate the spatiotemporal contribution of non-native trees to cultural ecosystem services [93]; flow diagrams of investments, trade, and causal loops [35]; the green economy model [58]; and the land-use optimization model MAgPIE [70].

3.2.6. Impact Analysis

Impact analysis includes impact assessments and strategies, and it encompassed fourteen articles (9.21%) in this systematic review. This method consists of multiple-step processes for determining the potential positive and negative consequences of determined decisions. A common impact analysis method, the life cycle assessment (LCA), was applied by Zeug et al. (2022) to study the application of holistic and integrated life cycle sustainability assessments (LCSAs) to the production of laminated veneer lumber in Central Germany [97]. Combined with other methods, for example, LCAs and social assessments, it was used to analyze the process and sustainability performance of forestry-based bioen-

ergy systems [28]. An adapted version, the social life cycle assessment (S-LCA), was used, together with a framework method, to design a regional socioeconomic life cycle assessment [79].

Impact analysis was likewise used in the selected studies as a method. Marini Govigli et al. (2022) used the environment impact tripartite method to understand the green side of social innovation by using the SDGs to classify the environmental impacts of rural grassroots initiatives [98]. Other previously mentioned studies also used impact analysis [94], program impacts [69], and impact scores [40] as methods in their research regarding the contribution of the forest sector to the SDGs. Forest- and climate change-related approaches were also used as the basis of impact analyses. Russell et al. (2018) implemented forest stewardship council (FSC) approaches to evaluate whether the SDGs can be used as a basis for supply chain decisions in the construction sector [54]. Halofsky et al. (2017) tested climate change and vulnerability assessments to understand and manage the effects of climate change on ecosystem services [55]. Landscape ecological risk assessments and resilience assessments were also applied to create multiscenario landscape ecological risk simulations and to improve environmental and socioeconomic resilience towards the achievement of the SDGs [30,91]. Risk assessments have a long history; however, new and more sophisticated analysis methods have been developed and are now being used in different sectors [112].

Specific utilizations and assessments were conducted using impact analysis methods. Spanos et al. (2022) used the i-Tree assessment tool to provide a statistical estimate of carbon sequencing potential to study how the FIFA World Cup 2022™ could meet carbon neutral commitments and the United Nations 2030 Agenda [95]. Nasr et al. (2021) studied the composition and impact of black liquor to determine whether industry outputs interlinked with bioenergy generation, pollution minimization, biochar as a soil amendment, nanoparticles, and paper manufacturing industrialization can meet the environmental, economic, and social aspects of the SDGs [96]. Finally, Liu et al. (2020) conducted an integrated spatially explicit assessment of land use and coverage changes and their impacts on ecosystem services to understand the implications for the SDGs [73].

3.2.7. Time Series Data and Geospatial Information

This category refers to the use of time series data and geospatial information in a combination of different methods. Fourteen articles (9.21%) are represented in this category. Performing analyses over time is important for measuring progress towards the SDGs. Remote sensing data, among other types of data, are often collected at regular intervals, meaning time series of remote sensing data are available [113]. There are many approaches to analyzing time series data, and a broad range of them were used in the selected articles. MODIS vegetation index time series data and the land productivity index were used to measure the ecological effect of ecological engineering projects on low-temperature forest cover [101]. In addition to using MODIS, Landsat, and Sentinel data, Mondal et al. (2020) used coarse-scale vegetation and climate data, finer-scale satellite data, the random forest classifier, and a nonforest mask to elaborate a reporting framework for SDG 15 [81]. Liu et al. (2019) applied a calculation method for future county-scale evaluations of SDG 15 using geospatial information, and Honeck et al. (2018) used a geographic information system (GIS) and Python 3.6 to design a forest trend monitoring method for three decades of Earth observations across Switzerland [80,103]. In addition, in Switzerland, Poussin et al. (2021) utilized vegetation water content time series and Landsat program data to study drying conditions in support of the SDGs [99].

Other methods and tools included satellite image preprocessing, land use classification, and geospatial techniques to improve knowledge concerning the management of ecosystem services [42]; the collection and processing of georeferenced datasets and spatiotemporal analysis to evaluate the spatiotemporal contribution of non-native trees to cultural ecosystem services [93]; the use of Q-GIS software to explore the use of the biome context as an appropriate degradation monitoring dimension for SDG 15.3. [87]; and, lastly,

the use of mixed methods, such as field data, tree species characteristics dataset mapped predictor data, remotely sensed imagery, mapping with forest inventory data, cubist, and a PGNN used together to determine the spatial patterns of tropical forest biomass, functional groups, and species counts linked to stand age, geoclimate, and sustainability goals [104].

Among the selected articles, times series data were used as both direct and indirect methods in two studies to (1) evaluate Earth observation solutions for Namibia's SDG monitoring system. In order to do so, internationally standardized methodologies and tools to identify land degradation, forest coverage, and surface water were utilized and adapted, as well as Earth observations (EOs), the rural access index (RAI), multiple open datasets and applications, and the QGIS plugin and the new Google Earth Engine (GEE) app [100]; (2) characterize historical transformation trajectories of the forest landscape in Rome's metropolitan area for the effective planning of sustainability goals by reconstructing the forest cover index (FCI) dynamics given SDG target 15.1.1 [102]. In this study, Solano et al. (2021) implemented the following steps: (a) data acquisition and forest maps derivation; (b) altitudinal classification of the study area; (c) forest cover change detection analysis; (d) forest canopy density reference mapping; (e) landscape metrics and forest fragmentation analysis; and (f) landscape dynamics and sustainable development.

3.2.8. SDG Indicators and Indexes

The last category refers to the use of SDG indicators, targets, and indexes as the primary method to address the SDGs, and all of them were considered direct methods in this study. Fourteen articles (9.21%) represent this category.

A common approach of the selected articles in this category was to use SDG indicators as the primary method. Since this systematic review is related to the forest sector and the SDGs, the most applied SDG goal was SDG 15. Wang et al. (2021) used the computed SDG 15.3.1 indicator to measure the ecological effect of ecological engineering projects on low-temperature forest cover in China [101]. Honeck et al. (2018) tested an SDG 15.1.1 indicator formula to design a forest trend monitoring system using three decades of Earth observations across Switzerland [80]. Qiu et al. (2021) used the SDG15.1.1, SDG15.1.2, and SDG15.1.4 indexes to measure the impacts of land use change on ecosystem service values based on SDG reports [106]. Peng et al. (2021) applied an SDG 15 indicator formula to evaluate the potential impacts of land use changes on ecosystem service values under multiple scenarios in support of SDG reporting [85]. Bertelsmann Stiftung and the Sustainable Development Solutions Network (SDSN) devised the SDG Index, in 2015, as a composite system to benchmark the performance of countries across the SDGs. Regarding data availability, some indicators were selected to represent each SDG on a scale of 0–100. All indicators were grouped into three tiers according to the availability of data and the statistical methodology used [114]. In addition, Hu et al. (2022) developed the ES-SDG index to integrate ecosystem services into assessments of the sustainable development goals [90].

In addition to the indicators, the entire SDG framework and assessments were used as the main method in some studies. For example, Costa et al. (2022) used an analysis of the SDGs and their relationship with the definition of Industry 4.0. to measure the degree of the contribution of digital transformation technology to company sustainability initiatives [34]. Both Downing et al. (2021) and Marini Govigli (2022) implemented the SDG framework to track the global-level impacts of national sustainability initiatives and to understand the green side of social innovation by using SDGs to classify the environmental effects of rural grassroots initiatives, respectively [35,98]. In addition, Zeug et al. (2022) used the SDGs and their targets as impact categories in an open LCA [97].

Finally, particular assessments, such as the assessment, evaluation, and ranking of the SDGs to evaluate the global state of ecosystems and natural resources [105]; SDG-oriented multiscenario settings to create a multiscenario landscape ecological risk simulation for the Sustainable Development Goals [91]; SDG-related benchmarking multilevel analysis and Lehi-ODS (online sustainability management tool) to understand how small- and medium-

sized enterprises can incorporate the Sustainable Development Goals through cluster management organization [56]; and a review of Vietnam's SDGs to assess the co-benefits of climate change response in Vietnam [63], were used among the selected articles.

4. Discussion

For all practitioners who believe the forest sector is central to the ongoing transition to a low-carbon and natural-resource-based economy, assessment and implementation studies and actions taken towards the accomplishment of the SDGs mean, among other things, promoting sustainable forest services, innovative solutions for low-income forest markets, expansion of renewable energy options, and developing a deeper understanding of sustainable business models. With the 2030 Agenda's deadline, communities involved in advancing the agenda need to make efforts towards improving and increasing contributions and participation towards the SDGs as one way of achieving them. According to Gregersen et al. (2017) [83], sustainable development is focused on designing and implementing over time an evolving set of processes that move humankind towards broad, agreed-upon societal aims, as represented by the SDGs, which underpin the UN 2030 Agenda. The authors affirm that it is time to design and implement more dynamic, integrated, and inclusive approaches to sustainable forest development as a set of complementary and dynamic processes [83]. The main findings of this systematic review are presented in this discussion section (Section 4) as the answer to the previously mentioned research questions.

4.1. How Have the Contributions of the Forest Sector to the SDGs Been Addressed and Studied over the Last Several Years?

Discussions regarding sustainability and sustainable development are attracting more practitioners than ever before. Important economic sectors, such as agriculture, construction, mining, chemistry, pharmacy, and technology, among others, are effective in spreading sustainable initiatives, which is reflected in the increase in publications on the SDGs in the last few years. For example, Viana et al. (2022) discussed the importance of agricultural land systems for supporting food security and the SDGs [6]. Lukin et al. (2022) performed a comparative analysis of the leading companies in the automotive industry in terms of sustainability strategies and achievement of the SDGs [10]. However, as attested before in Section 1, little attention is being given to how forests and trees are included in the 2030 Agenda and how efforts undertaken in the forest sector to advance the 17 SDGs are being accomplished. The results from this systematic review show that from more than one thousand publications scanned, only 83 met the inclusion criteria of forest sector studies addressing the SDGs. According to Katila (2013), the positive impacts of forests, forest ecosystem services, and forest-related livelihoods are still lacking in information [115].

The contributions of the forest sector to the SDGs addressed in this paper have brought benefits to all three sustainability pillars since their conception. Before the introduction of the SDGs, Gane (2007) stated that sustainability, in relation to the forest sector, is concerned with the continuity of present and future supply across generations. This takes place in a dynamic setting and depends on the way that sector activities are managed. A recipe for sector sustainability involves safeguarding the resource base, maintaining its activities, and preserving output choices [19]. This idea of maintaining resources for future generations reaffirms that forests are an important mechanism of supporting sustainability and sustainable development. Barbier and Burgess (2019) affirm that an increasing number of studies have attempted to develop an analytical framework to formally analyze the possible trade-offs and complementarities in attaining the different SDGs in order to support decision making [116]. Ekins et al., in 2008, listed frequently used methods and techniques for evaluating contributions to sustainable development. At that time, the methods commonly used included concept or issue mapping, cost–benefit analysis (CBA), use of secondary source data, multicriteria analysis (MCA), and strategic environmental assessment (SEA) [117].

Ecosystem services (ES) were a recurrent concept used in close relationship with the SDGs. The ES are often valued in terms of the immediate benefits to human well-being and the economy while preserving and making sustainable use of natural resources. Ma et al. (2022) similarly argued that since SDGs benefit from ecosystem protection, restoration, and sustainable use, the supply level of forest ecosystem services is the key to supporting the SDGs [15].

Another interesting finding from this review is the contribution of different countries, such as Indonesia's leading studies in this area. Indonesia has established an SDG Transition Secretariat in the Ministry of National Development Planning and categorized the goals, targets, and indicators of the SDGs into social, economic, environmental, and law and governance pillars [49].

4.2. Which Methods Have Been Used to Investigate This Relationship?

In this study, the reviewed articles were grouped into eight main categories. In the content analysis category, methods such as literature reviews, analysis of bioeconomy strategies, and SDG-related content analysis were used. Content analysis and its methods are a systematic coding and categorizing approach used for the exploration of large amounts of textual information to determine trends and patterns in the words used, their frequency, their relationships, and the structures and discourses of communication [118].

The personal perceptions category presented methods such as case studies, interviews, symbolic interactionism, and the Delphi method. Stebbins (2001) advocates that exploratory research involves interacting with stakeholders to gain initial insight into the subject matter. This is a preliminary step in gaining a new perspective and often involves putting oneself deliberately in the field to obtain initial insights [119]. In this research, the case study method was applied to assess progress and performance and to develop optimal solutions to achieve the SDGs [120–122]. Using 15 countries along the "Belt and Road" as a case study, Huan et al. (2021) conducted empirical research using a quantitative method designed to assess regional progress in achieving the SDGs [123].

The interpretative analysis category presented mostly qualitative approach methods. There is a considerable overlap among available qualitative approaches in terms of methods, procedures, and techniques. A known concept that has increasingly been used and discussed to access sustainable development is the nature-based solutions (NbS). This concept promotes nature as a means for providing solutions to climate mitigation and adaptation challenges, which are cost-effective; simultaneously provide environmental, social, and economic benefits; and help build resilience [124]. According to Nesshöver et al. (2016), NbS bring together established ecosystem-based approaches, such as "ecosystem services", "green–blue infrastructure", "ecological engineering", "ecosystem-based management", and "natural capital" [125]. Life cycle analysis and risk assessment methods are regularly used as impact analysis methods. The aim of these approaches is to evaluate the environmental impact of the production, use, and disposal of a product. Originally developed for industrial processes, the use of the LCA to evaluate the environmental impact of different sectors is now a common practice [126].

Frameworks were often employed among the selected articles. In recent years, many initiatives started developing guidelines and frameworks to support and assist in the SDGs' implementation. Organizations such as the Global Reporting Initiative (GRI) and United Nations (UN)-related institutions are some of the leaders in the research and development of these tools and frameworks. A number of tools and frameworks have been developed by scholarly and practitioner communities to support organizations in engaging with and acting upon the SDGs. For instance, Grainger-Brown and Malekpour (2019) mention the "SDG compass" and the "SDG industry matrix", both offered by the Global Reporting Initiative, an organization that specializes in sustainable reporting standards [127].

Models and flows were also used as primary methods to address the SDGs. As corroborated in other studies, an integrated dynamic system modeling approach is required to properly assess sustainability and sustainable development. Costanza et al. (2016) proposed

the development of an underlying systems dynamics model to assess interactions and synergies over time and space, including both stocks and flows and causes and effects [128]. In the time series category, the use of remote sensing and geographic information systems methods have been increasing due to the incorporation of socio-spatial information in strategic green space planning and SDG index calculations, especially for forest cover and land use. Ma et al., in 2022, already noticed that remote sensing has been widely used as a method in forestry and SDG research to monitor and evaluate forest ecosystem services and, thus, track progress on sustainable development targets, such as land use changes, land degradation, and biodiversity conservation [15].

Finally, the SDGs and their targets are firmly embedded in a policy framework, and their operationalization has mostly been conducted using indicators. The regional, national, and global adaptations of the goals, targets, and related indicators create complementary datasets and indicators for the assessment of the SDGs [129]. One interesting point observed during this systematic review was the use of the SDGs at a superficial level only. Many articles (those that were not selected for this study) mostly mentioned SDGs only in their titles or briefly in their introduction and/or conclusion, not explaining related concepts or how they are connected to their studies. In some cases, there were no proper assessments or applied methods to address the SDGs or to analyze them. In some forestry studies, for example, it was only mentioned that forests and ecosystem services meet determined SDGs, but no empirical research was presented. Although using empirical research to assess sector contributions to the SDGs was not an inclusion criterion of this study, we noted that in several forestry studies, for example, it was only mentioned that forests and ecosystem services meet determined SDGs, but no empirical research was presented to support such claims.

4.3. Challenges and Future Opportunities Regarding the Forest Sector and SDGs

This last section aims to present general aspects observed throughout the study. The forest sector and the SDGs have many synergies and trade-offs. Positive and negative impacts derive from this relationship, and it is essential for forest sector studies to use effective methods and methodologies to address them. Fu et al. (2019) argued that addressing the SDGs in a consistent way will facilitate the optimization of their implementation, and it is essential for achieving synergy among the 17 goals. According to the author, although there are overlaps, trade-offs, and synergies among the 17 SDGs, the negative externalities of each goal can be effectively excluded if they are considered holistically [130].

Considering the challenges for future research, a critical point in the application of methods is the definition of system boundaries, as the methods reviewed in this study are suitable for assessing direct impacts along the whole forest supply chain. Possibilities for combinations of several methods, tools, and other forms of support for sustainable development have been analyzed with regard to their ability to be helpful in a strategic way. There is still a need for the development and combination of supplementary methods, tools, and other forms of support, making possible an increase in their utility for strategic sustainable development [131] and also for policy and decision making, as well as academic research.

A challenge related to this particular study is the broad range of measurements available to track the SDGs. A nonstandardized method can be either negative or positive. On the one hand, the nonstandardization of methods can open the field for different methods and methodologies to be applied by academia, consultants, and practitioners, enlarging scientific contributions to the topic. On the other hand, a large variety of methods applied also leads to difficulties in comparing, analyzing, and tracking them. The United Nations Economic Commission for Europe (UNECE) recommends the creation and use of SDG dissemination and communication platforms, as well as the application of standardized methods for data and metadata exchange that adhere to internationally recognized standards [132]. In addition, Owers et al. (2021) argues that a major obstacle to advancing the SDGs has been identified as the lack of timely, accurate, standardized, and freely accessible information [133].

Future opportunities will demand more holistic approaches that should be used in order to understand all aspects involved in this complex context. Singh et al. (2008) already advocated that an integral systematic approach to the definition and measurement of indicators is needed for sustainability assessments. This facilitates the reproduction of well-structured methodologies and will ensure that all important aspects are included in measurements [134]. Malagó et al. (2021) [135] proposed an analytical framework to assess SDG targets and listed a more holistic nexus approach as one of the main recommendations of the study. In addition, the UN Environment Program affirms that the financial institutions sector, for example, is already doing plenty to measure and manage progress towards the SDGs, but there is too little that is holistic and that can reach across all sectors of the economy.

Considering this need for more dynamic and integrated perspectives, methods and methodologies that have a broader overview and incorporate different contextual perspectives are a better alternative to address the contribution of the forest sector to the SDGs. So-called soft operational research (Soft-OR) methods, or problem structuring methods (PSM), are alternatives. One of the strengths of Soft-OR methods applied to natural resources management is the capability they offer in structuring and providing a better understanding of complex problems in situations of poor data. In this case, capturing and representing local knowledge is sometimes the best possible way to obtain information and structure a decision problem [136]. Future studies that can approach the SDGs using a more integrated panorama and that can conciliate different perspectives of the key actors involved are preferred and should be promoted.

5. Conclusions

In this study, we conducted a systematic review that aimed to offer an overview of the methods being used to address the contribution of the forest sector to the SDGs and to encourage future research. Eighty-three articles were selected, from which eight categories of methods were defined: content analysis, personal perceptions, interpretative analysis, frameworks, models, impact analysis, time series data, and SDG indicators. We found, for this set of studies, that the popular methods and approaches applied in this field included literature reviews and systematic reviews, policy analyses, case studies, interviews, the Delphi method, qualitative approaches, nature-based solutions, analytical frameworks, SWOT analyses, business models, life cycle assessments (LCAs), remote sensing data, the land productivity index, SDG 15 indicators, and the SDG framework. A range of references has been provided to demonstrate the relevance of the methods described and their practical applications. Although not intended to be exhaustive, these eight categories enabled us to cover a wide range of frequently used methods. The findings need to be considered in the context of the study's limitations. The SDGs and the pursuit of sustainable development in different sectors is a fast-growing field, and new tools, methods, and methodologies emerge on a frequent basis.

The SDGs are a popular topic, and the findings of this study reiterate this information. Even though a high number of publications address the SDGs—in this case, more than one thousand articles were preselected—only a few met the inclusion criteria of addressing the forest sector and the SDGs. This reinforces the research gap mentioned before that the forest sector needs to expend more efforts to measure and address its contribution to Agenda 2030. Some articles only mentioned the SDGs in the title, introduction, or conclusion, without exploring the relationships among the SDGs and the topic of the study and without justifying which methods and methodologies were used. As a result, some studies contribute very superficially to the development of the SDGs. It is necessary to keep in mind that the forest sector's contributions to the SDGs depend on the specific context, and sustainable forest management techniques are critical to maximizing the positive contributions while minimizing adverse effects, such as the climate crisis, deforestation, forest degradation, and biodiversity loss.

As a limitation of this research, the inclusion criteria may have led to a narrowed set of articles. To some extent, these criteria defined and delimited which types of methods and approaches the authors found. In addition, with the aim of showing the positive contributions of the forest sector to the SDGs, some studies focusing on negative impacts or unsustainable practices may have been excluded from the review. In this sense, the authors suggest that future studies apply broader inclusion criteria that include the forest sector as a whole. This way, the results can be more conclusive.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/su15118988/s1, File S1: All selected articles in the evidence base.

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