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ENVIRONMENTAL TAX POLICY AND CARBON MITIGATION: MAPPING GLOBAL RESEARCH TRENDS THROUGH A BIBLIOMETRIC ANALYSIS (2015–2025)

Ekološka poreska politika i smanjenje emisije ugljenika: mapiranje globalnih trendova istraživanja kroz bibliometrijsku analizu (2015–2025)

Abstract:

Environmental tax policy has become an increasingly important component of global climate governance, stimulating a growing body of research on its role in supporting carbon mitigation. Despite this expanding literature, a comprehensive understanding of its intellectual development remains limited. This study maps the evolution and intellectual structure of research on environmental tax policy and carbon mitigation during the period 2015–2025. Using a dataset of 678 peer-reviewed articles retrieved from the Scopus database, a bibliometric analysis was performed through Biblioshiny (R) and VOSviewer to evaluate scientific performance, thematic evolution, and knowledge structures. The findings reveal a clear transition from general discussions of environmental fiscal instruments toward more policy-oriented and mechanism-based research, with carbon tax emerging as the dominant conceptual node connecting climate policy, renewable energy, and sustainable development. The results also indicate increasing integration between computable general equilibrium (CGE) modelling and environmental policy analysis, while highlighting a strong geographical concentration of research activity in a limited number of countries. By synthesizing the evolution of this research domain, the study contributes to a better understanding of how environmental taxation has developed within the broader climate policy literature and identifies promising directions for future research and policy development.

Keywords: *environmental tax policy, carbon mitigation, bibliometric analysis, carbon tax, climate governance*

Sažetak

Ekološka poreska politika postaje sve značajnija komponenta globalnog upravljanja klimatskim promenama, podstičući sve veći broj istraživanja o njenoj ulozi u smanjenju emisija ugljenika. Uprkos širenju ove literature, celovito razumevanje njenog intelektualnog razvoja i dalje je ograničeno. Ovaj rad prikazuje razvoj i intelektualnu strukturu istraživanja o ekološkoj poreskoj politici i smanjenju emisija ugljenika u periodu 2015–2025. Na osnovu uzorka od 678 recenziranih naučnih članaka indeksiranih u bazi Scopus, sprovedena je bibliometrijska analiza korišćenjem alata Biblioshiny u programskom okruženju R i VOSviewer-a, sa ciljem procene naučnog učinka, tematskog razvoja i strukture znanja. Rezultati ukazuju na jasan prelazak sa opštih razmatranja fiskalnih instrumenata u oblasti zaštite životne sredine ka istraživanjima usmerenim na konkretne politike i mehanizme. Pri tome se porez na ugljenik pojavljuje kao centralni koncept koji povezuje klimatsku politiku, obnovljivu energiju i održivi razvoj. Rezultati takođe ukazuju na sve veću povezanost modeliranja opšte ravnoteže (CGE) i analize politika zaštite životne sredine, uz izraženu geografsku koncentraciju istraživačke aktivnosti u ograničenom broju zemalja. Sintezom razvoja ove istraživačke oblasti, rad doprinosi boljem razumevanju razvoja ekološkog oporezivanja u široj literaturi o klimatskim politikama i ukazuje na perspektivne pravce budućih istraživanja i kreiranja javnih politika.

Ključne reči: *ekološka poreska politika, smanjenje emisije ugljenika, bibliometrijska analiza, porez na ugljenik, klimatsko upravljanje*

Introduction

Climate change mitigation has become one of the defining policy challenges facing governments and organizations worldwide. In response to the commitments established under the Paris Agreement, environmental taxation has increasingly been incorporated into national fiscal frameworks as an economic instrument for reducing greenhouse gas emissions and supporting the transition toward low-carbon development [7]. Carbon taxes, energy taxes, and other environmental fiscal instruments are now implemented not only to internalize environmental externalities but also to guide long-term policy decisions balancing environmental protection, economic competitiveness, and energy security.

Consequently, environmental taxation has evolved from a conventional fiscal instrument into an important component of contemporary policy design. Increasing attention has therefore been devoted to evaluating whether environmental tax policies can simultaneously promote carbon mitigation, technological innovation, and sustainable economic development. Recent evidence suggests that well-designed carbon pricing mechanisms encourage energy efficiency improvements, stimulate cleaner production technologies, and contribute to the achievement of decarbonization objectives [5, 9, 14]. Likewise, environmental taxation is recognized as an integral element of green growth strategies because fiscal revenues generated through environmental taxes may finance investments that reinforce sustainable development [17, 20]. Nevertheless, considerable debate remains regarding the design of environmental tax systems, particularly with respect to their effectiveness, economic competitiveness, and distributional consequences.

At the same time, environmental taxation is increasingly implemented within broader policy frameworks that combine fiscal instruments with complementary measures to support the green transition and sustainable development [6]. Rather than functioning as isolated policy tools, environmental taxes have become part of integrated climate policy portfolios whose effectiveness depends on institutional capacity, regulatory quality, and sectoral characteristics [3]. Furthermore, public acceptance, policy credibility, and transparent revenue recycling have emerged as critical factors influencing the long-term success and political feasibility of environmental fiscal reforms [13].

Parallel to these policy developments, the rapid expansion of sustainability research has stimulated the widespread application of bibliometric methods for examining the evolution of scientific knowledge. Bibliometric analysis has become an established approach for identifying influential contributors, conceptual structures, collaboration networks, and emerging research themes across sustainability-related disciplines [8]. Recent studies have successfully applied science mapping techniques to rapidly growing research domains such as Environmental, Social, and Governance (ESG), demonstrating their value in revealing the intellectual development and future directions of interdisciplinary research fields [12]. Despite these methodological advances, limited attention has been devoted to systematically examining how research on environmental tax policy has evolved in relation to carbon mitigation over the last decade.

Although the literature on environmental taxation has expanded considerably, existing studies primarily focus on evaluating policy effectiveness or specific empirical contexts rather than providing a comprehensive overview of the field's intellectual development. Consequently, there remains limited understanding of how research themes, influential contributors, collaboration patterns, and conceptual structures have evolved since the adoption of the Paris Agreement. Addressing this gap is important for identifying emerging research priorities and supporting evidence-based policy development.

Therefore, this study conducts a comprehensive bibliometric analysis of global research on environmental tax policy and carbon mitigation covering the period 2015–2025. Using bibliographic data retrieved from the Scopus database and analyzed through Biblioshiny (R) and VOSviewer, the study examines scientific productivity, influential authors, countries, journals, and thematic evolution while mapping the intellectual structure of the field. By providing a systematic synthesis of the existing literature, this research contributes to a better understanding of how environmental taxation research

has evolved and identifies promising directions for future research and policy development.

Literature Review and Theoretical Background

Research on environmental tax policy and carbon mitigation is grounded in several theoretical perspectives that explain the economic justification for environmental taxation and its role in promoting sustainable development. These theories also clarify how environmental regulations influence firms' strategic behavior, innovation activities, and long-term competitiveness.

One of the most influential perspectives is the Porter Hypothesis, which argues that well-designed environmental regulations can stimulate innovation, enabling firms to offset compliance costs through technological progress and productivity gains [15, 16]. From this perspective, environmental taxation is not merely a regulatory instrument but also a potential driver of innovation and competitive advantage.

Another important theoretical foundation is the Polluter Pays Principle, which states that economic agents responsible for environmental damage should bear the associated environmental costs. Environmental taxes, particularly carbon taxes, operationalize this principle by internalizing environmental externalities and creating financial incentives for cleaner production and consumption [21, 24].

The Green Growth Theory further suggests that properly designed environmental fiscal policies can reconcile environmental protection with economic development. When environmental tax revenues are efficiently recycled and supported by appropriate institutional arrangements, they can contribute simultaneously to economic growth and sustainability objectives [4].

From a strategic management perspective, environmental taxation represents an external institutional factor that shapes firms' strategic decisions rather than merely imposing compliance obligations. According to the contingent resource-based view, organizations adopting proactive environmental strategies are better positioned to develop valuable capabilities, strengthen competitive advantage, and respond effectively to changing regulatory environments [1]. Consequently, environmental tax policy can be interpreted as an important driver of organizational adaptation and long-term competitiveness.

The empirical literature generally follows three main research streams. The first evaluates the effectiveness of environmental taxes and carbon pricing mechanisms in reducing greenhouse gas emissions and encouraging cleaner technologies [9, 22]. The second examines the interaction between environmental taxation and complementary policy instruments, particularly emissions trading systems, renewable energy policies, and broader environmental governance frameworks [3, 19]. The third focuses on the institutional and social dimensions of environmental fiscal policy, highlighting public acceptance, political feasibility, and revenue recycling as key determinants of policy effectiveness [11].

Despite the rapid expansion of this literature, two important research gaps remain. First, empirical evidence is concentrated in a relatively small number of countries, particularly China, limiting the generalizability of existing findings across different institutional contexts. Second, most studies focus on specific environmental tax instruments or individual policy outcomes, whereas relatively limited attention has been paid to the intellectual structure, thematic evolution, and knowledge development of this research field. Addressing these gaps requires a comprehensive bibliometric analysis capable of identifying major research themes, influential contributions, and emerging directions for future research.

Data and Methodology

This study employs a bibliometric approach to examine the intellectual development and thematic evolution of research on environmental tax policy and carbon mitigation. Bibliometric analysis has become an established method for synthesizing scientific knowledge, identifying influential research contributions, and mapping conceptual structures across expanding research domains [8, 23]. To obtain complementary analytical perspectives, the study combines Biblioshiny, an R-based interface for the bibliometrix package [2], with VOSviewer for network visualization and science mapping [18].

The bibliographic dataset was retrieved from the Scopus database, which was selected because of its broad coverage of peer-reviewed journals and its consistent citation indexing across the fields of environmental science, economics, and social sciences [10, 22]. Its comprehensive coverage makes it particularly appropriate for large-scale bibliometric investigations.

Data collection followed a two-stage screening procedure. In the first stage, the Scopus database was searched using the following query:
(«environmental tax» OR «carbon tax» OR «green tax») AND («carbon mitigation» OR «carbon emission reduction» OR «decarbonization» OR «climate change mitigation»)

This search initially identified 1,325 publications. In the second stage, the records were filtered according to predefined inclusion criteria, including the publication period (2015–2025), document type (peer-reviewed journal articles), publication language (English), and subject areas related to environmental sciences, economics, and the social sciences.

The analysis begins in 2015, corresponding to the adoption of the Paris Agreement, which marked a major turning point in international climate policy and stimulated growing academic interest in environmental taxation as an instrument for carbon mitigation. After applying all screening criteria, the final dataset consisted of 678 peer-reviewed articles.

The selected records were exported in BibTeX format for analysis in Biblioshiny and in CSV format for network visualization using VOSviewer. Descriptive indicators were additionally processed in Microsoft Excel to support the presentation of publication trends and performance statistics. The overall data collection and screening procedure is summarized in the PRISMA flow diagram presented in Figure 1.

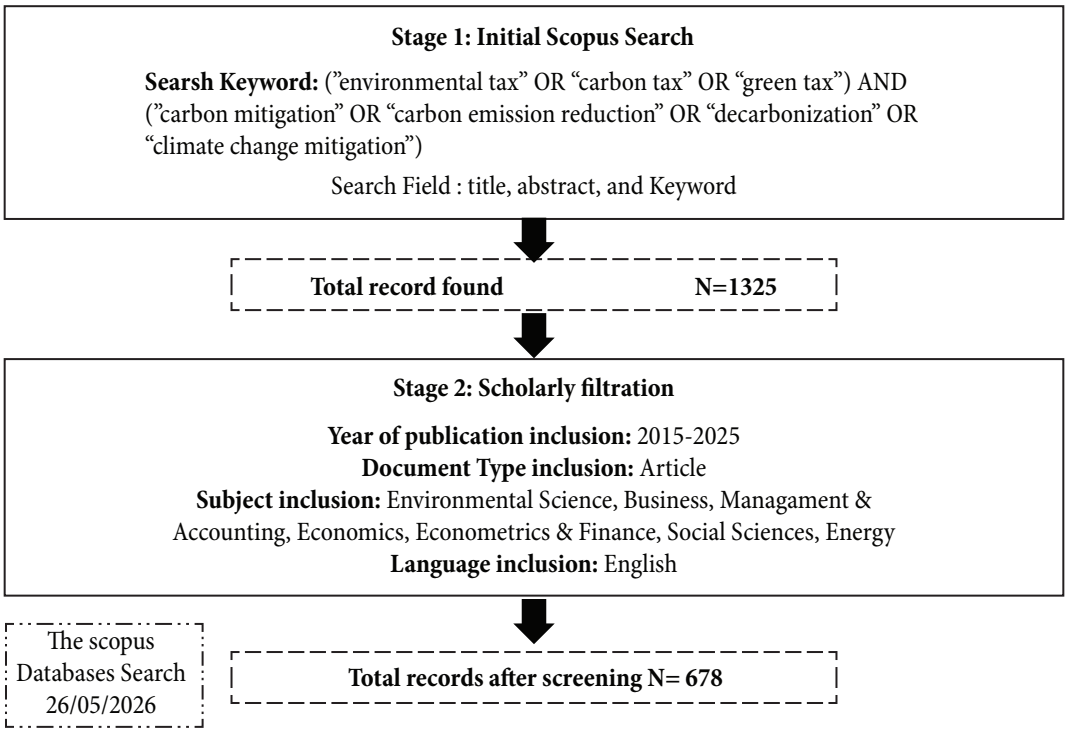
Results and Discussion

Key Information

The bibliometric indicators reported in Table 1 provide an overview of the development of research on environmental tax policy and carbon mitigation between 2015 and 2025. The dataset includes 678 Scopus-indexed articles, indicating that this research area has developed into a well-defined field of scientific inquiry during the last decade.

The annual growth rate of 26.39% reflects a sustained expansion of the literature, suggesting that environmental

Figure 1. PRISMA flow diagram of the literature selection process



Source: The author

taxation has become an increasingly important component of research on climate governance and sustainable development. From a strategic perspective, this growth also indicates that environmental fiscal instruments are no longer examined solely as regulatory mechanisms but are increasingly considered within broader discussions of long-term policy planning, organizational adaptation, and sustainability transitions.

Collaboration patterns further illustrate the multidisciplinary character of the field. With an average of 3.58 co-authors per document, research is commonly conducted through collaboration among scholars from economics, environmental sciences, public policy, and related disciplines. Such collaboration facilitates the integration of different analytical perspectives, contributing to a more comprehensive understanding of environmental taxation and its implications for climate policy.

The average citation rate of 26.19 citations per document demonstrates the considerable academic visibility of this body of research. The relatively high citation performance suggests that publications in this field have generated substantial scientific influence and have contributed to the development of an increasingly interconnected knowledge base. Collectively, these indicators reveal a research domain characterized by continuous growth, expanding scientific collaboration, and increasing intellectual maturity, reinforcing its strategic relevance for both academic research and environmental policymaking

Evolution of Annual Publications on Environmental Tax Policy and Carbon Mitigation

Figure 2 illustrates the annual scientific production on environmental tax policy and carbon mitigation during the period 2015–2025. The publication trend demonstrates a sustained expansion of scholarly interest and suggests that environmental taxation has progressively evolved from a relatively specialized research topic into a well-established component of climate policy and sustainability research.

Between 2015 and 2019, scientific production increased gradually, reflecting the formative stage of the field. During this period, research primarily focused on establishing the economic rationale for environmental taxation and evaluating its potential contribution to carbon emission reduction within the broader context of post-Paris Agreement climate policies. The moderate growth observed in these years indicates the consolidation of theoretical and empirical foundations rather than rapid knowledge expansion.

A more pronounced increase in publication output becomes evident from 2020 onward. This acceleration coincides with the growing international emphasis on carbon neutrality, net-zero transition strategies, and green economic recovery, all of which reinforced the relevance of environmental fiscal instruments within policy and academic debates. Rather than representing a temporary increase in publication activity, this pattern reflects the institutionalization of environmental tax research as an integral component of climate governance and sustainable development scholarship.

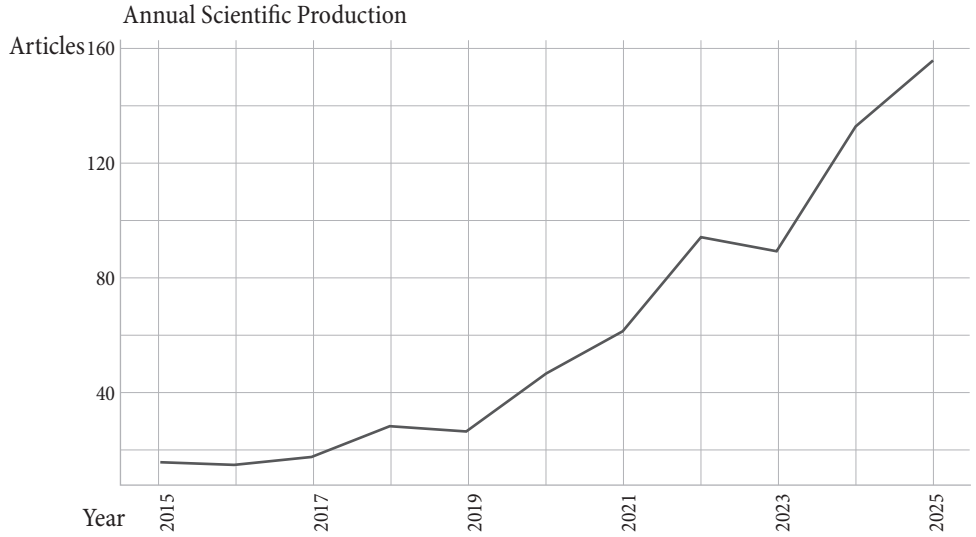
From a strategic management perspective, the evolution of publication output also illustrates the increasing strategic relevance of environmental taxation. As governments and organizations respond to more demanding environmental regulations and sustainability objectives, environmental tax policy is increasingly examined not only as an economic instrument but also as a strategic mechanism influencing organizational adaptation, innovation, and long-term competitiveness. Consequently, the observed publication trend reflects both the maturation of the academic field and the growing strategic importance of environmental fiscal policy within contemporary sustainability research.

Table 1. Main Bibliometric Indicators of the Dataset (2015–2025)

Timespan	2015:2025	Average citations per document	26.19
Sources	267	Authors	1852
Documents	678	Authors of single-authored docs	73
Annual Growth Rate %	26.39%	Co-Authors per Doc	3.58
Document Average Age	4.53	International co-authorships %	30.73%

Source: the author's research based on Scopus data

Figure 2 : Evolution of Annual Scientific Production on Environmental Taxation and Carbon Mitigation



Source: the author's research based on Scopus data

Analysis of the Most Productive Authors

The distribution of authorship productivity provides important insights into the intellectual leadership and knowledge development of research on environmental tax policy and carbon mitigation. As reported in Table 2, scientific production is concentrated among a relatively small group of highly productive scholars, indicating that the field has developed around a recognizable core of leading contributors.

Among these authors, Zhang Y. ranks first with 21 publications and 784 citations, demonstrating both sustained research productivity and strong scholarly influence. Other prominent contributors, including Wang X. (414 citations), Li J. (332 citations), and Liu J. (342 citations), also exhibit considerable citation impact, suggesting that their work has played a significant role in shaping contemporary debates on environmental taxation and carbon mitigation. The alignment between publication output and citation performance indicates that scientific influence within the field is closely associated with continuous research activity rather than isolated highly cited contributions.

An additional characteristic of the authorship structure is the emergence of new influential researchers. For example, Zhang J., whose publications began in 2022, has already accumulated 171 citations, illustrating the capacity of recently established scholars to gain rapid academic recognition in a research area experiencing strong international expansion. This pattern reflects the dynamic nature of the field, where growing policy relevance creates opportunities for new contributors to become visible within a relatively short period.

From a strategic knowledge perspective, the observed distribution resembles a core–periphery structure, in which a limited group of highly productive researchers acts as the principal source of scientific development, while a broader community contributes complementary knowledge across diverse topics and methodological approaches. Such a structure is commonly observed in expanding interdisciplinary research fields, where intellectual leadership facilitates cumulative knowledge creation while simultaneously encouraging the diffusion of new research perspectives.

Overall, the authorship pattern indicates that environmental tax policy and carbon mitigation research has reached a level of intellectual maturity characterized

Table 2. Most Productive Authors

N°	Author	TP	TC	PY – Start
1	ZHANG Y	21	784	2020
2	WANG Y	18	187	2017
3	LI Y	15	346	2017
4	WANG X	15	414	2018
5	LI J	14	332	2017
6	LIU J	14	342	2017
7	ZHANG X	11	309	2020
8	LI Z	8	247	2019
9	WANG J	8	91	2019
10	ZHANG J	8	171	2022

TP: Total Publications / TC: Total Citations / PY – Start: Publication year start
Source: the author's research based on Scopus data

by identifiable research leaders, expanding scholarly participation, and increasing opportunities for international collaboration and future knowledge diversification.

Analysis of the Most Productive Countries

Figure 3 illustrates the geographical distribution of scientific production on environmental tax policy and carbon mitigation. The results reveal a highly concentrated pattern of research activity, with a relatively small number of countries accounting for most publications and citation impact.

China occupies a dominant position in the field, producing 269 publications that have accumulated 8,079 citations. This leadership reflects not only a high level of scientific productivity but also the substantial influence of Chinese research on the international development of environmental taxation studies. The country's extensive policy experimentation with carbon pricing and environmental fiscal reforms appears to have provided a fertile context for sustained academic output.

The United States ranks second, with 64 publications and 1,526 citations. Although its publication volume is considerably lower than China's, the citation performance confirms its continued contribution to the advancement of research on environmental taxation, particularly through theoretical and policy-oriented studies.

European countries, including Germany and the United Kingdom, together with Canada, also demonstrate consistent scientific activity. Rather than competing through publication volume alone, these countries contribute to the diversification of the literature by examining environmental taxation within different institutional and regulatory settings. Their participation reflects the importance of mature governance systems in supporting research on climate-related fiscal policies.

An interesting pattern emerges in the case of Australia. Despite producing only 11 publications, Australian studies have received 887 citations, indicating that a relatively limited body of research has achieved considerable international visibility. This suggests that scientific influence depends not only on research output but also on the originality, methodological quality, and policy relevance of published work.

From a strategic knowledge perspective, the geographical distribution indicates that the evolution of this research field is driven by a limited group of countries possessing strong research capacity, well-developed climate policy frameworks, and active scientific collaboration. At the same time, the relatively modest contribution of many developing economies points to opportunities for future comparative studies capable of broadening the empirical foundations of environmental tax research and improving its international applicability.

Analysis of the Most Productive Journals

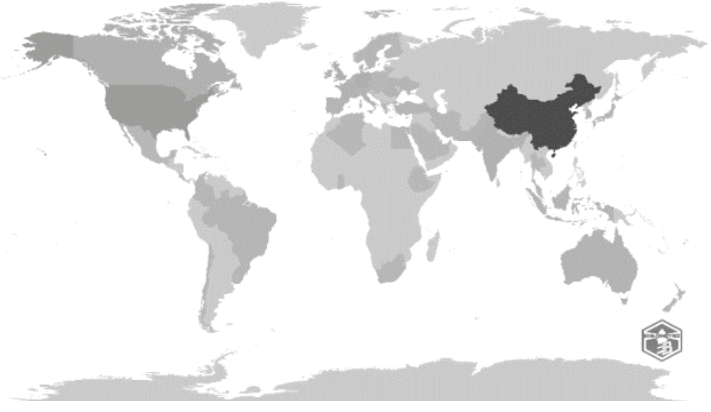
The distribution of publications across journals provides insight into the principal channels through which knowledge

Figure 3. Geographical Distribution and Scientific Productivity of Countries in Environmental Taxation and Carbon Mitigation Research

N°	Country	TP	TC
1	CHINA	269	8079
2	USA	64	1526
3	GERMANY	23	709
4	CANADA	22	654
5	UK	22	654
6	ITALY	13	229
7	JAPAN	13	313
8	INDIA	12	375
9	INDONESIA	12	203
10	AUSTRALIA	11	887

TP: Total Publications
TC: Total Citations

Country Scientific Production



Source: the author's research based on Scopus data

on environmental tax policy and carbon mitigation is generated and disseminated. As illustrated in Figure 4, the Journal of Cleaner Production occupies the leading position, publishing 51 articles that have accumulated 3,264 citations. Its prominence indicates that research on environmental taxation is strongly embedded within broader discussions of sustainability, resource efficiency, and environmental policy.

Sustainability (Switzerland) ranks second with 40 publications, while Energy Policy follows with 35 publications and 1,434 citations. Although publishing fewer articles than the leading journal, Energy Policy demonstrates substantial citation impact, reflecting its influence in advancing research on the economic and policy dimensions of environmental taxation and carbon mitigation.

The distribution of publications indicates that scientific output is concentrated within a relatively small group of specialized journals. Rather than being dispersed across a wide range of publication outlets, research on environmental taxation is primarily communicated through journals focusing on environmental management, sustainability, energy economics, and climate policy. This concentration facilitates cumulative knowledge development by fostering continuous scholarly exchange within closely connected research communities.

From a strategic knowledge perspective, the concentration of publications in a small number of influential journals illustrates the existence of well-established dissemination platforms that shape the evolution of the field. These journals not only serve as primary channels for communicating research findings but also influence emerging research priorities by encouraging interdisciplinary dialogue among environmental scientists, economists, and policy scholars. Consequently, the journal distribution reflects both the intellectual maturity of the field and the increasing integration of environmental taxation research into broader sustainability and climate governance debates.

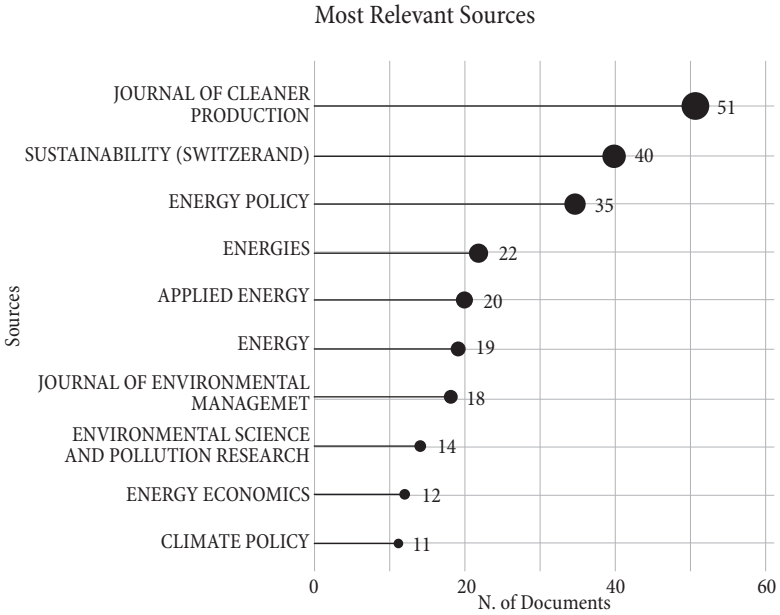
Research Trends Analysis

To examine the intellectual configuration of research on environmental tax policy and carbon mitigation, a keyword co-occurrence analysis was performed using VOSviewer. As illustrated in Figure 5, the network reveals a well-defined thematic structure organized around a dominant conceptual core. The keyword «carbon tax» exhibits the highest occurrence, centrality, and network connectivity, confirming its role as the principal concept linking the major research streams in the field. This finding suggests that carbon taxation has evolved beyond

Figure 4. Most Productive and Influential Journals in Environmental Taxation and Carbon Mitigation Research

N°	Source	TP	TC
1	JOURNAL OF CLEANER PRODUCTION	51	3264
2	SUSTAINABILITY (SWITZERAND)	40	678
3	ENERGY POLICY	35	1434
4	ENERGIES	22	270
5	APPLIED ENERGY	20	961
6	ENERGY	19	568
7	JOURNAL OF ENVIRONMENTAL MANAGEMET	18	490
8	ENVIRONMENTAL SCIENCE AND POLLUTION RESEARCH	14	375
9	ENERGY ECONOMICS	12	214
10	CLIMATE POLICY	11	249

TP: Total Publications
TC: Total Citations



Source: the author's research based on Scopus data

a specific fiscal instrument to become the primary analytical framework through which environmental tax policies are examined.

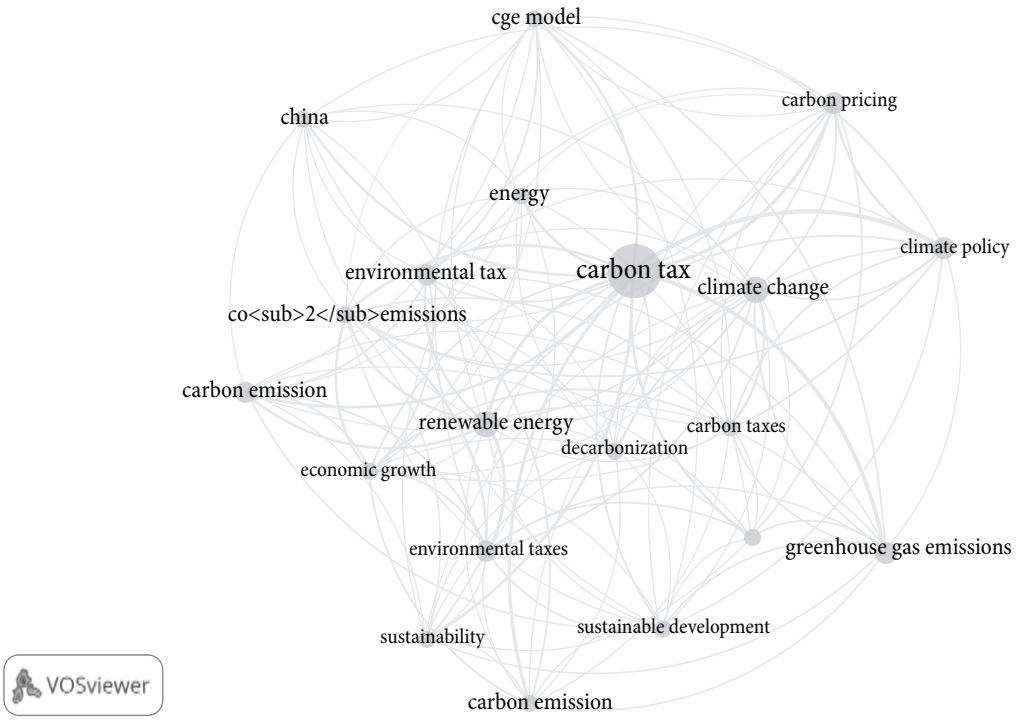
The visualization identifies three closely connected thematic clusters. The first cluster, labelled Economic and Policy Perspective, links carbon tax with economic growth, sustainable development, and China. This configuration reflects the increasing attention devoted to balancing environmental objectives with economic performance. The prominence of China within this cluster also illustrates the importance of large emerging economies as empirical settings for evaluating environmental fiscal reforms and low-carbon development policies.

The second cluster, Policy Evaluation and Analytical Approaches, connects carbon tax with climate policy, carbon pricing, and computable general equilibrium (CGE) models. The close association among these keywords indicates that quantitative policy evaluation has become one of the dominant methodological approaches in the literature. Rather than examining environmental taxation in isolation, researchers increasingly assess its effectiveness within broader climate policy frameworks and through integrated economic modelling techniques capable of capturing economy-wide impacts.

The third cluster, Environmental Outcomes and Sustainability Transition, groups concepts such as greenhouse gas emissions, decarbonization, and sustainability. This thematic configuration demonstrates that the literature has progressively shifted from discussing environmental taxation as a fiscal mechanism toward evaluating its contribution to long-term environmental performance and low-carbon transitions. The dense connections among the keywords suggest that environmental effectiveness has become an essential criterion for assessing fiscal policy instruments.

From a strategic management perspective, the overall network structure indicates that environmental tax research is increasingly characterized by the integration of economic policy, regulatory design, and sustainability objectives rather than by isolated disciplinary perspectives. The central position of carbon tax reflects its role as a coordinating concept through which researchers examine how fiscal instruments influence organizational adaptation, policy implementation, and broader decarbonization strategies. This growing thematic integration suggests that future research is likely to adopt more comprehensive analytical frameworks combining environmental governance, strategic decision-making, and economic performance.

Figure 5. Co-occurrence Network of Keywords in Environmental Taxation and Carbon Mitigation Research



Source: the author's research based on Scopus data

The keyword network illustrates the evolution of a mature and increasingly interconnected research domain. While carbon taxation remains the dominant organizing concept, the literature has progressively expanded toward multidisciplinary approaches that integrate fiscal policy, environmental governance, strategic management, and sustainability transitions, reflecting the field's continuing evolution toward more holistic analyses of climate policy.

Table 3 complements the network visualization by identifying the most influential author keywords according to their occurrence frequency and total link strength (TLS). While keyword frequency reflects the prominence of a concept within the literature, TLS indicates the extent to which that concept is connected to other research themes, providing additional insight into the intellectual cohesion of the field.

The results show that carbon tax overwhelmingly dominates the research landscape, recording 886 occurrences and the highest total link strength (TLS = 410). Its leading position in both indicators confirms that carbon taxation functions not only as the most frequently investigated topic but also as the principal concept connecting diverse strands of research on climate policy, environmental economics, and sustainability. This finding reinforces the network analysis presented in Figure 5, where carbon tax occupies the central position within the knowledge structure.

Several supporting keywords—including climate change, renewable energy, environmental tax, climate policy, and carbon pricing—also display high frequencies and strong network connections. Their prominence suggests that research has progressively evolved from examining environmental taxation as an isolated fiscal instrument toward investigating its interactions with broader environmental governance, energy transition, and decarbonization policies. The coexistence of these concepts reflects an increasingly integrated research agenda addressing both economic and environmental dimensions of climate action.

In contrast, keywords such as economic growth, CGE model, and China appear less frequently but maintain meaningful levels of connectivity. Their presence indicates that a substantial segment of the literature is devoted to evaluating environmental tax policies through quantitative economic modelling and country-specific policy experiences. Rather than representing peripheral topics, these concepts provide important analytical contexts for assessing the effectiveness and strategic implementation of environmental fiscal reforms.

The keyword profile highlights the increasing maturity of this research domain. The combination of highly interconnected core concepts and complementary analytical themes indicates that environmental tax policy research has evolved into an increasingly multidisciplinary field, integrating fiscal policy, environmental governance, economic modelling, and sustainability objectives within a coherent body of knowledge. This intellectual development provides a stronger foundation for future research on the strategic design and implementation of environmental policy instruments.

Discussion

The findings of this bibliometric analysis demonstrate that research on environmental tax policy and carbon mitigation

Table 3. Top 20 Most Frequent Keywords and Total Link Strength (TLS)

Rank	Keywords for Authors	Occurrences	TLS	Rank	Keywords for Authors	Occurrences	TLS
1	carbon tax	886	410	11	economic growth	69	68
2	climate change	181	174	12	cge model	63	55
3	renewable energy	140	130	13	environmental policy	75	50
4	carbon pricing	115	85	14	carbon emission	97	49
5	co2 emissions	99	85	15	carbon taxes	63	45
6	climate policy	128	84	16	china	61	42
7	carbon emissions	117	73	17	sustainable development	50	41
8	environmental tax	135	72	18	sustainability	59	39
9	greenhouse gas emissions	76	71	19	decarbonization	54	32
10	environmental taxes	129	69	20	energy	36	30

TLS: Total Link Strength
Source: the author's research based on Scopus data

has evolved into a more coherent and interconnected field of inquiry over the period 2015–2025. Rather than remaining confined to traditional environmental economics, the literature increasingly integrates fiscal policy with broader questions of climate governance, organizational adaptation, and sustainable development. The central position of carbon tax within the keyword network illustrates that carbon pricing has become the principal conceptual reference through which environmental fiscal policies are examined.

The observed thematic configuration suggests that environmental taxation is progressively understood as part of a wider policy ecosystem. The close relationships among carbon taxation, renewable energy, climate policy, and CGE modelling indicate that researchers increasingly evaluate fiscal instruments alongside complementary regulatory mechanisms instead of treating them as isolated interventions. This evolution reflects a broader analytical shift toward integrated policy assessment, where environmental effectiveness, economic performance, and institutional conditions are examined simultaneously.

Another important finding concerns the geographical concentration of scientific production. China clearly dominates both publication output and citation impact, indicating that its extensive policy experimentation has significantly influenced the international research agenda. While this concentration has generated a substantial body of empirical evidence, it also raises questions regarding the transferability of existing findings to countries operating under different institutional, economic, and regulatory environments. Consequently, comparative research across diverse national contexts remains essential for improving the external validity of environmental fiscal policy research.

From a management perspective, the growing integration of environmental taxation into broader climate policy debates suggests that fiscal instruments increasingly influence organizational decision-making rather than functioning solely as regulatory mechanisms. Firms operating under environmental tax regimes must continuously adjust investment priorities, technological innovation, and sustainability practices in response to evolving policy environments. This observation is consistent with strategic environmental management literature, which argues that changing regulatory conditions shape organizational capabilities and long-term competitiveness.

Taken together, these findings suggest that the field has reached a relatively mature stage of intellectual development, characterized by strong conceptual convergence and expanding interdisciplinary collaboration. Nevertheless, important opportunities remain for future research to broaden methodological approaches, strengthen comparative cross-country evidence, and further investigate how environmental tax policies operate across diverse institutional and governance contexts.

Conclusion

This study presented a comprehensive bibliometric assessment of global research on environmental tax policy and carbon mitigation based on 678 Scopus-indexed publications published between 2015 and 2025. Using Biblioshiny and VOSviewer, the analysis identified the principal contributors, publication trends, intellectual structures, and thematic relationships that have shaped the development of this research field during the past decade.

The findings demonstrate that carbon taxation has become the dominant concept linking fiscal policy with climate governance, environmental sustainability, and economic modelling. The bibliometric evidence further indicates that research has progressively evolved toward integrated analytical frameworks that combine environmental regulation, renewable energy transition, and policy evaluation within a common intellectual structure.

The study also highlights the increasing interdisciplinarity of environmental taxation research while revealing a pronounced geographical concentration of scientific production, particularly in China. Although this concentration has substantially advanced knowledge in the field, broader empirical evidence from different institutional contexts is needed to strengthen the generalizability of current conclusions.

From both policy and management perspectives, the results suggest that environmental taxation is increasingly viewed as a governance instrument capable of influencing organizational adaptation, technological innovation, and

long-term sustainability objectives. Consequently, future research should extend beyond single-country analyses by adopting comparative designs, diversified methodological approaches, and stronger consideration of institutional differences that shape the implementation and effectiveness of environmental fiscal policies.

By mapping the intellectual evolution of environmental tax research, this study provides a structured reference for researchers, policymakers, and practitioners interested in understanding how fiscal instruments contribute to carbon mitigation and sustainable economic transformation.

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