

Mapping the Terrain of Accounting Research on Green Tax Incentives: A Bibliometric Analysis on African Perspectives and Global Trends

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Abstract

Green tax incentives have emerged as pivotal tools in global efforts to combat climate change and promote sustainable development. The study set out to examine the terrain of academic research on green tax incentives from 2015 to 2024, providing an understanding of publication trends, geographical distribution, and key research themes. A bibliometric review methodology grounded in a quantitative approach that systematically analyses scholarly publication data to map research trends, assess scientific impact, and visualize knowledge structures in the field of green tax incentives was employed to meet the study's objectives. The study highlights the growing global interest in green tax incentives, with China and the U.S. leading research efforts, while contributions from Europe, East Asia, and Oceania continue to expand. Africa's research output remains relatively low, yet the study underscores the continent's distinct challenges and opportunities in implementing such incentives. Keyword analysis identifies central themes like climate change, carbon tax, and environmental policy, reinforcing their role in shaping sustainable fiscal measures, while the emerging concept of the green paradox highlights the unintended consequences of environmental policies. Finally, the study notes Africa's vulnerability to climate change despite its minimal contribution to exacerbating the phenomenon. This calls for more research focus on environmental policy in the African region and an urgent need for green financing in response to the effects of climate change. The study expands the body of knowledge on green tax incentives, emphasizing their dual benefits of economic growth and environmental sustainability by bringing African perspectives to the forefront.

Key words: Green Tax Incentives, Climate Change, Environmental Policy, Sustainable Development, Africa.

Introduction

Green tax incentives have emerged as a pivotal tool in the global effort to combat climate change and promote sustainable development (Yan et al., 2023). Evidence of this assertion is seen in the worldwide attempt by Governments and organizational entities to reduce greenhouse gas emissions, stimulate green innovation, and transition towards low-carbon economies by leveraging fiscal policies to encourage environmentally friendly practices (Sakilu & Chen, 2024). Green tax incentives therefore encompass a range of fiscal measures, including tax breaks, exemptions, and subsidies designed to promote environmental sustainability. These incentives are grounded in the 'polluter pays' principle, which asserts that those responsible for pollution should bear the costs associated with it, rather than society at large (Yikun et al., 2021). The early 1990s saw Nordic countries pioneer carbon taxes, targeting a reduction in greenhouse gas emissions and fostering the development of clean technologies (Shafi et al., 2023). Such policies have been lauded for their cost-effectiveness and ability to integrate environmental objectives with economic goals. Research indicates that green tax incentives significantly promote green innovation (see Wang et al., 2022; Zheng et al., 2023). For instance, studies within China's manufacturing sector reveal that environmental taxes and tax incentives enhance green innovation synergistically (Wu et al., 2021). These incentives reduce the financial burden associated with green innovation, making sustainable practices more accessible for enterprises. Globally, developed countries are increasingly adopting fiscal measures to support investments in green technologies (Chuzhmarova & Chuzhmarov, 2023). Therefore, tax policies are often favored over direct regulation, as they allow consumers and firms to pursue their

fundamental objectives, such as utility and profit maximization while internalizing the environmental costs of their activities (Buchanan & Tullock, 2018). Moreover, well-designed green taxes could mitigate industrial opposition by recycling tax revenues back into the economy, potentially through lowering other taxes or investing in sustainable infrastructure (Daugbjerg & Svendsen, 2003).

While much of the existing research and policy implementation has focused on developed nations, there is a growing recognition of the unique challenges and opportunities presented by green tax incentives in Africa. Africa presents a distinct context for implementing green tax incentives (Mpofu, 2022). According to Nhemachena et al., (2020), the continent faces profound challenges from climate change, including adverse weather conditions, droughts, and rising sea levels, which threaten agriculture, water resources, and the livelihoods of millions. The authors further contend that despite contributing minimally to global greenhouse gas emissions, African countries are among the most vulnerable to the impacts of climate change. In recent years, there has been a growing movement within Africa to adopt green tax incentives as part of broader environmental and fiscal reforms (Mpofu, 2022). Countries like South Africa have introduced carbon taxes aimed at reducing emissions and promoting energy efficiency (Alton et al., 2014). Despite the promising potential of green tax incentives, their implementation in Africa is met with several significant challenges (Mpofu, 2022). Economically, many African countries rely heavily on natural resource extraction and energy-intensive industries (Nkemgha et al., 2022). Introducing taxes on these sectors could face substantial resistance from stakeholders who fear

short-term economic drawbacks and potential impacts on competitiveness. Hence, careful management is required to balance environmental objectives with economic realities, ensuring that such taxes do not hinder growth or disproportionately affect key industries. Moreover, the effective implementation of green tax policies necessitates robust regulatory frameworks and institutional capacities, which may be underdeveloped in some African nations (Occhiali, 2023). Weak institutional structures could lead to enforcement issues, reducing the overall effectiveness of environmental tax initiatives. Additionally, Muhammad et al., (2021) assert that limited public awareness about the benefits of green taxes could further hinder their acceptance. The authors added that without adequate education and stakeholder engagement, these policies may be misunderstood or met with skepticism, impeding their success. As such, building widespread support requires concerted efforts in communication and transparency to highlight how green taxes contribute to long-term economic and environmental well-being. It is also important to ensure that green tax incentives do not disproportionately burden low-income populations, exacerbating existing social inequalities (Semet, 2024). Policies must therefore be thoughtfully designed to protect vulnerable groups, possibly through exemptions or compensatory measures, while still achieving environmental objectives. Understanding the role and impact of green tax incentives in Africa is essential given the pressing environmental and economic challenges facing the continent.

This study is highly relevant as it contributes to the broader discourse on environmental taxation by bringing African perspectives to the forefront. The study

provides valuable insights on the study trends on green tax incentive, key authors and geographical distribution of publications globally, with a focus on Africa. The outcome, it is envisaged can drive effective policy formulation and implementation as well as arouse interest in further discourse on green tax incentive in African countries in particular.

Methodology and Data

This research employs a bibliometric review methodology, a well-established quantitative approach grounded in the systematic analysis of publication data to map the intellectual landscape of a research domain (Baker et al., 2020). Bibliometric analysis is inherently quantitative, using statistical and mathematical methods to measure publication outputs, citation patterns, and co-occurrence networks rather than interpreting the content of individual studies. This approach is particularly suited to review papers, as it enables a rigorous, data-driven examination of a large body of literature without requiring primary data collection or qualitative interpretation of individual texts. The application of bibliometric methods is therefore wholly consistent with the objectives of this study, which seek to assess publication trends, map geographical distributions, and identify key thematic clusters in the accounting literature on green tax incentives. The study applied performance analysis and science mapping techniques to assess the volume and impact of publications and to visualize the relationships between different research themes and concepts, respectively.

The SCOPUS database, renowned for its high-caliber peer-reviewed articles, was chosen as the study's data source. A thorough and methodical data collection process was implemented to gather relevant literature on accounting for green tax

incentive. The search utilized relevant keywords such as “green tax incentives,” “environmental tax incentives,” “environmental taxation,” “carbon pricing,” “eco taxation,” “carbon tax,” “green tax credits,” “sustainable tax incentives,” “sustainability tax incentives,” “carbon tax incentives,” “carbon policy,” “environmental policy tax incentives,” “biodiversity credits,” “eco-friendly tax benefits,” “environmental compliance,” “climate tax incentives,” “climate tax,” “climate policy,” “environmental policy,” “renewable energy tax credits.” BOOLEAN operators “AND” and “OR” were employed to refine search queries. The “AND” operator ensured results contained all specified terms, while “OR” broadened the search to include any of the listed keywords.

Data filtering techniques were applied to narrow the search results to the most relevant publications. The search queries yielded a total of 364,183 publications related to accounting for green tax incentives. Particularly, the study focused on literature from 2015 to 2024, a timeframe justified by the significant impact of the Paris Agreement adopted in 2015. This period captures the immediate and ongoing academic and corporate responses to the agreement, including policy changes, technological progress, and increased focus on corporate accountability. The period refinement returned 228,595 published articles. Further modification restricted the articles to the Business, Management, and Accounting, as well as Economics, Econometrics, and Finance subject areas, resulting in 41,042 articles. Likewise, limiting the language to English for consistency and accessibility produced a refined dataset of 30,956 articles. Last but not least, the authors limited the search field to only the article title and not the default search field. This ensured that the review zeroed in on the publications that

explicitly highlighted the research topic, as titles are the first point of communication and usually contain the core focus of the study (Wang et al., 2024). Moreover, this method filters out broader or less relevant results that mention the study’s keywords peripherally. As a result, the search refinement yielded a final dataset of 2,803 articles published between 2015 and 2024.

The data extraction phase involved exporting the 2,803 publications from SCOPUS using the CSV file format, facilitating easy management and analysis of the bibliometric data. The VOSviewer software was employed for all the performance analyses. VOSviewer is an effective tool for creating and visualizing bibliometric networks, making it well-suited for examining relationships between authors, journals, keywords, and other elements in the scholarly literature (Baker et al., 2020; Khan et al., 2020). The analysis process involved importing bibliometric data from a CSV file into VOSviewer, including information on publications, citation counts, authors, journals, and keywords related to green tax incentives. The analysis commenced with an evaluation of publication trends over time. The geographic distribution of publications was also assessed followed by network construction, including keyword co-occurrence analysis to identify key research themes and emerging trends. Additionally, citation analysis was conducted to map connections between frequently cited researchers and determine the most impactful authors. The study also performed bibliographic coupling analysis, which links documents by shared references, highlighting influential authors through the frequency and strength of these connections; revealing their impact in the scientific field, context-wise, green tax incentives. This method helps reveal leading researchers and emerging areas of

study in the field of green tax incentives based on their citation networks.

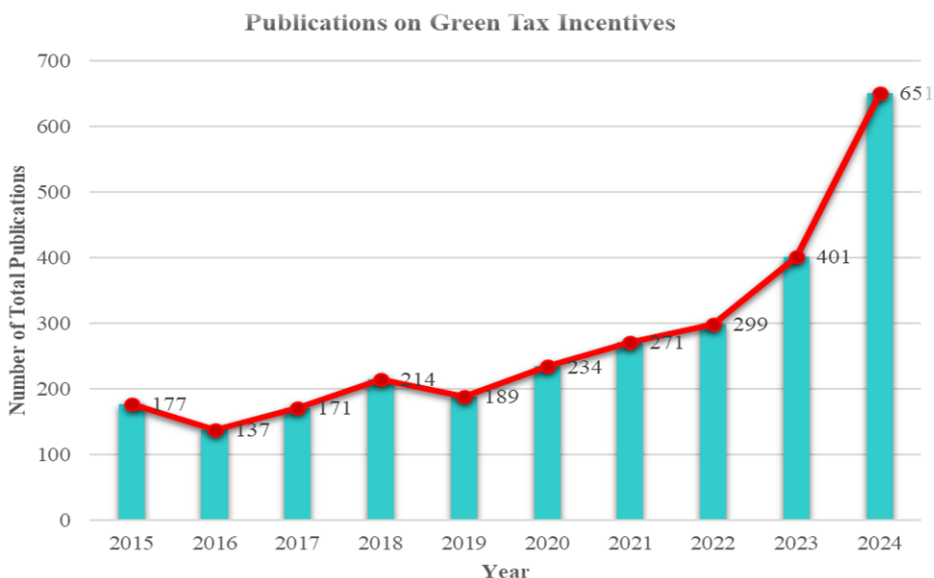
Presentation of Findings

Publication Trends

The publication trends on green tax incentives from 2015 to 2024 demonstrate how governments, policymakers, and researchers alike are recognizing the importance of environmental sustainability in economic policies. This trend reflects a growing awareness of climate change and the need for sustainable practices, leading to the adoption of tax incentives aimed at encouraging environmentally friendly behaviors among individuals and businesses. In 2015, there were 177 publications, serving as a baseline year before the Paris Climate Agreement in December 2015 at the UN Climate Change Conference (COP29). However, 2016 saw a decline to 137 publications, indicating a period of possible adjustment and

realignment of research focus in response to the Paris Climate Agreement. By 2017, publications picked up to 171, which further rose to 214 in 2018, reflecting possible renewed interest in exploring the implications of the Paris Climate Agreement and how that has redefined the discourse on green tax incentives. The year 2019 witnessed a slight dip in publications to 189. This, however, picked up in 2020 to 234 and maintained a steady incline until a notable peak in 2024, when publications rose to 651. This trend suggests a heightened focus on the role of green tax incentives in achieving global climate goals, indicating an intensified global effort to explore and implement green tax incentives. Generally, the trends highlight a progressive engagement with green tax incentives, reflecting their fundamental role in global climate policy and economic recovery efforts. Figure1 illustrates the publication trend of studies on green tax incentives.

Figure1: Publication Trend on Research Focusing on Green Tax Incentives



Source: Authors' own work (generated using the collected dataset)

Geographical Distribution

The geographical distribution of studies on green tax incentives reveals several interesting patterns across different regions and clusters. We present the results of the geographical distribution in clusters based on the color patterns presented in the network visualization in Figure 2. The clusters are formed when publications from different countries cite the same literature, implying that they are tackling comparable research questions since they use similar literature in their publications (Gao et al., 2021). China emerges as the most prominent node in cluster 1, recording 704 publications, 19,944 citations, and 164,348 total link strength, indicating it has the largest number of shared references with other countries in this cluster. Countries like Turkey and India appear in this cluster because they often cite the same sources. Cluster 2 brings together North America and Western Europe, reflecting a transatlantic link of research on green tax incentives. The United States and United Kingdom are key players here with 556 and 274 publications, 14,039 and 10,050 citations, and 127,761 and 95,888 total link

strength respectively. European countries also feature strongly in this cluster, with Germany, France, and the Netherlands showcasing significant contributions, indicating a regional emphasis on sustainable fiscal policies. Spain, South Korea, and Japan alongside other countries form a distinct cluster, signaling a substantial research community committed to environmental sustainability. Australia and Canada anchor cluster 4, joined by a few other countries that share similar references in the literature.

In all, seven African countries feature in the geographical distribution over the period, with four countries: Tunisia, Nigeria, South Africa and Algeria featuring in cluster 1, one: Egypt in cluster 2, and two: Ghana and Kenya in cluster 4. This suggests that some African countries are also contributing significant regional insights into the global discourse on green tax incentives by projecting issues on Africa, with growing research influence (Mpofu, 2022). The results of the geographical distribution analysis are presented in Table 1.

Table1: Geographic Distribution of Studies on Green Tax Incentives

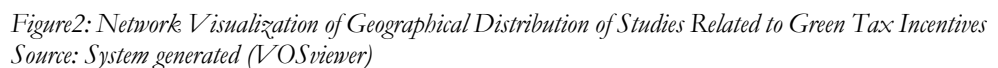
Rank	Country	Docs.	Cite.	Link	Rank	Country	Docs.	Cite.	Link
<i>Cluster 1: Red</i>					<i>Cluster 2: Green</i>				
1	China	704	19944	164348	1	United States	556	14039	127761
2	Turkey	65	1967	34062	2	United Kingdom	274	10050	95888
3	India	84	1675	22978	3	Germany	212	4881	70473
4	Pakistan	42	854	20497	4	France	173	4385	56915
5	Lebanon	35	798	18862	5	Italy	173	3617	54025
6	Malaysia	51	1008	18522	6	Netherlands	101	2433	36732
7	Vietnam	37	758	18300	7	Switzerland	75	2125	25772
8	Saudi Arabia	37	556	16657	8	Austria	56	1664	21620
9	Taiwan	54	1056	14911	9	Sweden	63	1637	21042
10	Russian Federation	54	674	14001	10	Greece	36	754	13721
11	United Arab Emirates	22	918	12050	11	Norway	55	1126	12410
12	Azerbaijan	14	28	9815	12	Denmark	42	900	10491
13	Romania	28	273	9097	13	Belgium	32	697	6661
14	Singapore	22	517	7463	14	Egypt	8	397	2225
15	Iran	34	637	7405	15	Israel	5	76	373
16	Kuwait	10	196	6856	<i>Cluster 3: Blue</i>				
17	Bangladesh	14	424	6585	1	Spain	133	3064	36296
18	Tunisia	20	169	5867	2	South Korea	67	1253	18835
19	Nigeria	18	288	5661	3	Japan	76	1237	17802
20	Indonesia	46	364	5415	4	Brazil	26	513	6812

Source: System generated (VOSviewer)

Table2: Geographic Distribution of Studies on Green Tax Incentives

Rank	Country	Docs.	Cite.	Link	Rank	Country	Docs.	Cite.	Link
21	South Africa	23	335	4726	5	Finland	32	546	6604
22	Algeria	7	120	3933	6	Ireland	16	332	6560
23	Croatia	5	74	2920	7	Thailand	20	176	5900
24	Macao	6	37	2575	8	Portugal	20	309	5810
25	Cyprus	6	27	1596	9	Czech Republic	15	172	5175
<i>Cluster 4: Yellow</i>					10	Chile	23	313	5172
1	Australia	121	3662	32326	11	Mexico	21	530	4442
2	Canada	120	3520	27637	12	Hungary	13	36	3777
3	New Zealand	31	694	9020	13	Luxembourg	7	48	2446
4	Colombia	19	281	3560	14	Argentina	8	68	1892
5	Ghana	15	207	3362	15	Peru	5	127	818
6	Kenya	5	63	311	<i>Cluster 5: Purple</i>				
<i>Cluster 6: Light Blue - Cyan</i>					1	Poland	41	596	11351
1	Hong Kong	31	846	8316	2	Ukraine	17	78	579

Source: System generated (VOSviewer)



The co-word analysis evaluates government policies and regulatory tools like carbon taxes, cap-and-trade systems, and environmental regulations aimed at reducing emissions and promoting sustainability. It highlights issues like carbon leakage and policy uncertainty as potential challenges that can undermine these efforts. The Environmental and Climate theme, highlighting keywords such as climate change and global warming

among others evaluates the impact of green tax incentives on combating climate change and reducing greenhouse gas emissions. Consistently, research evaluates the effectiveness of these policies in improving environmental quality, such as lowering carbon dioxide levels and preserving natural resources (Ozkan et al., 2024). Climate change mitigation is a dominant focus, with carbon pricing contributing to emissions reduction and achieving Paris Agreement targets (Digitemie & Ekemezie, 2024). The 'green paradox' highlights potential unintended effects, such as fossil fuel producers accelerating extraction in the short term, and increasing emissions. The theme grounds the discussion of green tax incentives in their ultimate purpose of improving environmental quality and addressing climate change (Sakilu & Chen, 2024). The third theme explores the economic and financial impact of green tax incentives on economic growth, development, and efficiency. It suggests a 'double dividend,' where green taxes improve environmental outcomes and benefit the economy by recycling revenues to reduce taxes or fund innovation (Goulder, 1994). The fiscal policy aspect highlights government budgetary measures, such as carbon tax recycling and environmental tax reforms shifting the tax burden towards pollution. Monetary policy is emerging, with interest in central banks and financial regulators responding to climate change. The finance and investment sub-theme focuses on the possible alignment of financial systems with climate goals, such as green bonds, sustainable investing criteria, and funding for clean energy projects. The Social and Governance theme emphasizes the social, equity, and governance aspects of green tax incentives. It acknowledges that environmental fiscal policies are influenced by society, businesses, and governments at all levels (Meng, 2024). The inclusion of

developing economies and Sustainable Development Goals (SDGs) signals attention to global development objectives. This comprehensive view is vital for crafting policies that are not only environmentally effective but also socially acceptable and aligned with broader sustainable development efforts. Finally, the Technological Innovation and Energy Transition theme focuses on the intersection of technological and energy-related drivers with green tax incentives. Green tax incentives aim to stimulate innovation in clean technologies, such as renewable energy, energy-efficient processes, and sustainability solutions (Guo et al., 2018). Research has shown that environmental taxes and tax incentives can significantly promote green innovation in enterprises (Wu et al., 2021). The theme focuses on the transition from fossil fuels to renewable energy sources, accelerating this transition through measures like feed-in tariffs, tax rebates, and carbon pricing. It also emphasizes improving energy efficiency and reducing energy intensity in economies. The circular economy is an emerging topic, with green tax policies being evaluated for supporting circular economy practices. Research questions include designing incentives that effectively foster clean innovation, how quickly these incentives can induce an energy transition, and potential unintended effects. The theme emphasizes that achieving the goals of green tax incentives relies on developing and deploying cleaner technologies and transforming our energy and production systems. Future studies may examine how tax incentives can be optimally structured to accelerate their adoption and ensure that innovation translates into tangible environmental benefits. Again, emerging topics include managing climate policy uncertainty and developing new instruments like carbon tariffs to address global competitive imbalances. Future

research could focus on optimal policy design, compliance strategies, and international cooperation. Furthermore, future research may focus on optimizing

incentives to support economic development, particularly in developing economies, while minimizing adverse economic impacts.

Table 3: Keyword Co-occurrences Analysis of Keywords Relative to the Concept of Green Tax Incentives

Key Themes	Specific Themes	Keywords
Policy and Regulatory Instruments	Climate Policies and Agreements	<i>Climate Policy, Climate Change Policy, Environmental Policies, Paris Agreement, Environmental Policy Stringency, Regulation, Environmental Regulation, Public Policy</i>
	Market-Based Mechanisms	<i>Carbon Taxes, Carbon Pricing, Carbon Tariff, Cap-and-Trade, Emissions Trading, Environmental Taxes (and Taxation), Emissions Tax, Revenue Recycling</i>
	Policy Challenges	<i>Climate Policy Uncertainty, Policy Uncertainty, Economic Policy Uncertainty, Carbon Leakage, Political Economy</i>
Environmental and Climate Focus	Climate Change and Emissions	<i>Climate Change, Global Warming, Climate, Greenhouse Gas (GHG) Emissions, Carbon Emissions (including Carbon Dioxide Emissions), Carbon Neutrality, Decarbonization</i>
	Mitigation and Adaptation	<i>Climate Change Mitigation, Climate Action, Adaptation</i>
	Pollution and Ecological Impact	<i>Environmental Pollution, Pollution, Air Pollution, Ecological Footprint, Environmental Quality</i>
	Environmental Sustainability	<i>Environmental Sustainability, Environmental Protection, Natural Resources, Environment</i>
	Performance and Management	<i>Environmental Performance, Environmental Management, Environmental Compliance</i>
	Notable Concept	<i>Green Paradox</i>
Economic and Financial Aspects	Growth and Efficiency	<i>Economic Growth, Economic Development, Green Growth, Green Economy, Endogenous Growth, Efficiency</i>

Source: System generated (VOSviewer)

Table4: Keyword Co-occurrences Analysis of Keywords Relative to the Concept of Green Tax Incentives

Key Themes	Specific Themes	Keywords
	Fiscal and Market Dynamics	<i>Fiscal Policy, Monetary Policy, Energy Prices, Fossil Fuels, Externalities, Social Cost of Carbon, Environmental Tax Reform, Revenue Recycling</i>
	Finance and Investment	<i>Financial Development, Green Finance, Climate Finance, Sustainable Finance, ESG (Environmental, Social, and Governance Investment)</i>
	Uncertainty and Risk	<i>Economic Policy Uncertainty, Climate Risk</i>
Social and Governance Dimensions	Stakeholder and Corporate Responsibility	<i>Stakeholder Engagement, Corporate Social Responsibility (CSR), Corporate Governance, ESG (Corporate Environmental, Social, and Governance criteria)</i>
	Equity and Welfare	<i>Social Welfare, Developing Economies, Inequality (implied by welfare and development context)</i>
	Sustainable Development Goals	<i>Sustainable Development, Sustainable Development Goals (SDGs)</i>
	Policy and Political Context	<i>Public Policy (broad societal policy context), Political Economy (influence of political and economic structures on policy outcomes)</i>
Technological Innovation and Energy Transition	Green Innovation	<i>Innovation, Green Innovation, Environmental Innovation, Green Technology Innovation</i>
	Clean Energy Transition	<i>Renewable Energy, Renewable Energy Consumption, Green Energy, Energy Transition, Energy Policy</i>
	Efficiency Improvements	<i>Energy Efficiency, Energy Intensity, Efficiency (resource and energy use efficiency)</i>
	Resource Use and Circularity	<i>Fossil Fuels, Circular Economy (systems innovation for reuse), Natural Resources (sustainable use of resources)</i>

Source: System generated (VOSviewer)

Many high-impact authors hail from countries that either pioneered environmental tax policies or have active climate tax debates, suggesting that national context drives scholarly focus and citations. For instance, Nicholas Rivers' influential work evaluating British Columbia's carbon tax (one of the earliest comprehensive carbon taxes) has drawn global interest, reflected in his 388 citations (see Rivers & Schaufele, 2015). Similarly, Valentina Bosetti's base in Italy (and the EU) aligns with Europe's robust climate policy framework, including EU Emissions Trading and various carbon tax experiments, which provides fertile ground for highly cited research on market-based climate incentives (see Colmer et al., 2024; Kanzig & Konradt, 2023). Countries like Sweden (with its long-running carbon tax since 1991) and the United States (which, while lacking a federal carbon tax, had vigorous academic exploration of green tax

theory) have produced top-cited scholars in this arena. A bibliometric review found that historically (1989-2014) the United States was the leading country in green tax research output, thanks to strong research funding and interest, even absent an actual national carbon tax (Bima & Alim, 2024). In recent years, China's emergence has been notable, with China now leading in the sheer volume of green tax research publications (704 documents) and total citations (19,944) (see Table1) reflecting how its 2018 Environmental Protection Tax and rapid industrialization have spurred new scholarship (Zhang et al., 2024). Inferring from the outcome of the citation analysis, the presence of strong environmental tax policies, generous research funding, and robust institutional support in an author's home country could potentially contribute to higher citation impact.

Table5: Top 20 Most Impactful Authors in the Field of Green Tax Incentives

Rank	Author	Country	Affiliation	Docs.	Cite.	Link
1	Jakob, Michael	Germany	Transition Economics	7	318	25
2	Steckel, Jan Christoph	Germany	Brandenburg University of Technology Mercator Research Institute on Global Commons and Climate Change, Technische Universitat Berlin	7	292	25
3	Edenhofer, Ottmar	Germany	Faculty of Economics and Social Sciences, University of Potsdam Department of Industrial Engineering, University of Concepcion	12	373	24
4	Kalkuhl, Matthias	Germany	University of Oxford	7	213	18
5	Mardones, Christian	Chile	University of Oxford	7	49	15
6	Van Der Ploeg, Frederick	UK	University of Oxford	12	241	13

Source: System generated (VOSviewer)

Rank	Author	Country	Affiliation	Docs.	Cite.	Link
7	Rezai, Armon	Austria	Vienna University of Economics and Business	9	123	10
8	Mattauch, Linus	Germany	Potsdam Institute for Climate Impact Research, Technical University Berlin	5	213	9
9	Rivers, Nicholas	Canada	School of Public and International Affairs, University of Ottawa	5	388	9
10	Savin, Ivan	Spain	Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona	7	136	8
11	Sterner, Thomas	Sweden	Department of Economics, University of Gothenburg	7	203	8
12	Yonezawa, Hidemichi	Norway	Department of Statistics, Division for Environmental, Resource and Innovation Economics	5	191	8
13	Van Den Bergh, Jeroen	Spain	Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona	5	83	7
14	Bosetti, Valentina	Italy	Bocconi University	5	366	6
15	Fried, Stephanie	United States	Department of Economics, Arizona State University	5	86	6
16	Hamdi-Cherif, Meriem	France	Avenue de la Belle Gabrielle	5	265	6
17	Lessmann, Kai	Germany	Mercator Research Institute on Global Commons and Climate Change, Institute for Climate Impact	5	59	6
18	Van Den Bergh, Jeroen C.J.M.	Spain	Institute of Environmental Science and Technology, Universitat Autònoma de Barcelona	5	91	5
19	Rausch, Sebastian	Germany	Department of Economics, Heidelberg University	6	152	4
20	Liang, Qiao-Mei	China	School of Management and Economics, Beijing Institute of Technology	6	172	2

Source: System generated (VOSviewer)

Bibliographic Coupling

The bibliographic coupling analysis reveals a highly interconnected network of researchers and publications in the green tax incentive field. The top 20 influential authors form a tight cluster, often co-citing foundational works on environmental taxation, leading to strong coupling links among their publications. Van der Ploeg stands out with the highest total link strength (1,359) among authors, indicating that his papers share an exceptionally large number of references with others in this field. In contrast, some equally influential authors like Ottmar Edenhofer have slightly lower coupling link strengths but higher citation counts, reflecting broad recognition of their work beyond the immediate network. On the journal side, the top 20 journals in green tax incentive research mirror these trends and serve as hubs connecting scholars. Notably, the *Journal of Cleaner Production*, an open-access, sustainability-focused journal, tops the list, boasting the highest number of publications and citations in this domain (244 and 10798 respectively). In green tax research specifically, analyses indicate that the *Journal of Cleaner Production* has hosted numerous influential articles, which in turn are heavily cited across the literature.

Other leading journals include *Energy Policy*, *Sustainability*, and *Environmental & Resource Economics*, all of which frequently publish green tax incentive studies. Many of these journals are interdisciplinary and globally read, meaning the references in their articles overlap considerably. Subsequently, geographic context and national policy focus are key factors explaining variations in bibliographic coupling strength among authors and the formation of sub-networks. Researchers from regions that pioneered environmental tax policies often show higher coupling with each other due to shared references to those policies and outcomes. For example, European authors have been at the forefront of carbon tax research ever since Nordic countries introduced carbon taxes in the early 1990s (Shafi et al., 2023). These scholars frequently cite the experiences of countries like Sweden, Denmark, and Germany, as well as common theoretical frameworks developed in Europe. This leads to a dense inter-citation network, with European researchers' papers tending to reference a similar body of literature. See results in Table 4.

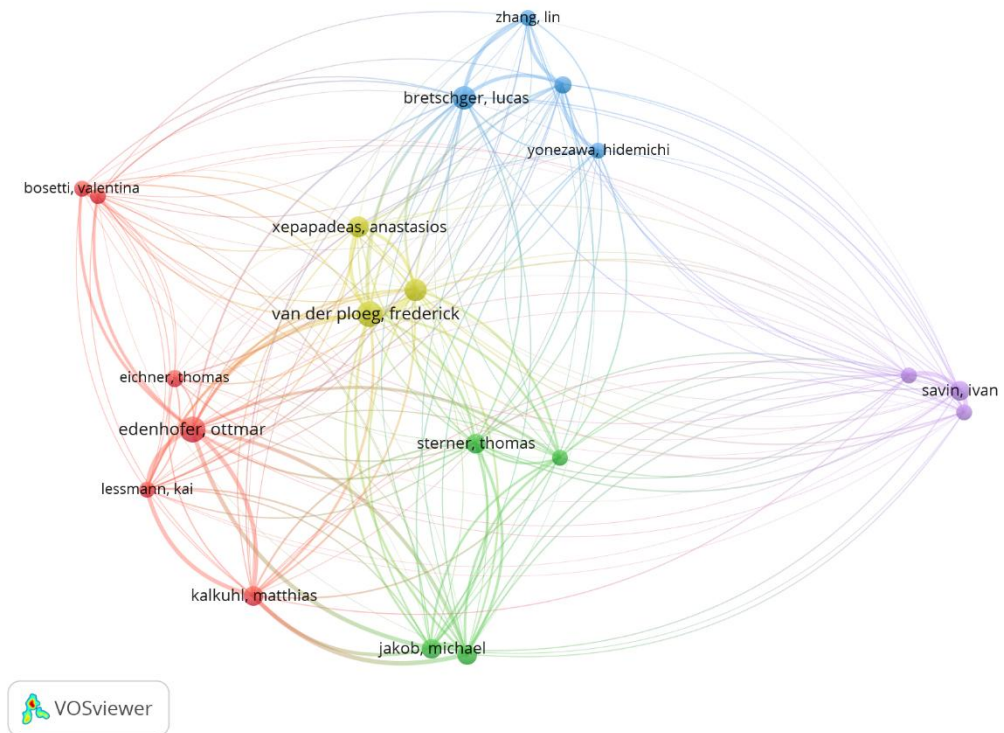
Table6: Top 20 Most Influential Authors in Accounting for Green Tax Incentive

Rank	Author	Docs.	Cite.	Link	Rank	Journal	Docs.	Cite.	Link
1	Van Der Ploeg, Frederick	12	241	1359	1	Energy Economics	140	3558	12417
2	Edenhofer, Ottmar	12	373	1269	2	Journal of Cleaner Production	244	10798	12032
3	Steckel, Jan Christoph	7	292	1104	3	Environmental & Resource Economics	93	1527	8447
4	Rezai, Armon	9	123	1043	4	Ecological Economics	101	3817	6716
5	Jakob, Michael	7	318	1006	5	Journal of Environmental Economics & Management	64	2551	6496
6	Kalkuhl, Matthias	7	213	981	6	Technological Forecasting & Social Change	45	2618	5019
7	Bretschger, Lucas	10	166	729	7	Environment, Development, & Sustainability	70	508	4970
8	Lessmann, Kai	5	59	662	8	Business Strategy & the Environment	56	3676	4175
9	Savin, Ivan	7	136	588	9	Resources Policy	57	971	3811
10	Rausch, Sebastian	6	152	583	10	Economic Analysis & Policy	34	646	3193
11	Sterner, Thomas	7	203	525	11	Finance Research Letters	55	1010	3024
12	Mattauch, Linus	5	213	517	12	Corporate Social Responsibility & Environmental Management	39	1469	2708

Source: System generated (VOSviewer)

Rank	Author	Docs.	Cite.	Link	Rank	Journal	Docs.	Cite.	Link
13	Xepapadeas, Anastasios	8	70	433	13	Economic Modeling	22	575	2617
14	Van Den Bergh, Jeroen	5	83	398	14	Resource & Energy Economics	26	480	2441
15	Zhang, Lin	5	137	397	15	European Economic Review	16	221	2396
16	Van Den Bergh, Jeroen	5	91	391	16	Review of Environmental Economics & Policy	25	871	2394
17	C.J.M. Hamdi-Cherif, Meriem	5	265	357	17	Environmental Economics & Policy Studies	27	346	2139
18	Bosetti, Valentina	5	366	344	18	Climate Change Economics	31	326	2127
19	Yonezawa, Hidemichi	5	191	277	19	International Review of Financial Analysis	19	588	1982
20	Eichner, Thomas	6	38	147	20	Journal of the Association of Environmental & Resource Economics	34	461	1950

Figure4: Network Visualization of Most Influential Authors in the Field of Green Tax Incentives



Source: System generated (VOSviewer)

Discussion of Results

The academic and policy discourse on green tax incentives has seen significant changes from 2015 to 2024. The surge in publications on green tax incentives since 2015 is closely tied to major climate agreements and policy shifts. In particular, the 2015 Paris Agreement spurred countries to strengthen climate policies, elevating interest in market-based solutions like green taxes. As nations pledged emission cuts under Paris, many began exploring carbon pricing, tax credits, and other fiscal incentives to meet those targets.

By 2022, 46 countries had implemented carbon taxes or emissions trading schemes, reflecting a post-Paris wave of carbon pricing adoption. This policy momentum has urged academic research to evaluate the design and impact of these tools. For example, Europe's commitment to cut emissions by at least 55% by 2030 under its post-Paris framework (the European Green Deal) explicitly involves overhauling energy and taxation policies to support decarbonization. Such high-level initiatives have directly fueled research into how

green tax incentives can help achieve climate goals. The literature growth from 2015-2024 in our results thus mirrors these policy developments, suggesting that as global and national climate strategies expanded to include green taxes, the academic discourse followed suit.

The United States has traditionally adopted a rule-based approach to green incentives, favoring targeted tax credits and specific regulations over broad carbon taxes. For instance, instead of a nationwide carbon tax or cap-and-trade, the U.S. relied on piecemeal incentives like renewable energy tax credits and fuel-efficiency standards (Rausch & Karplus, 2014). Until recently there was no federal carbon-pricing scheme unlike the EU or China. Nevertheless, the U.S. maintains a robust climate policy research community, with state-level initiatives. More recently, the U.S. rejoined the Paris Agreement in 2021 and passed the Inflation Reduction Act (IRA) of 2022, which represents the nation's largest-ever climate investment mainly via tax incentives. The IRA directs about \$369-400 billion into clean energy through expanded tax credits and rebates (Murray & Monast, 2023). This landmark legislation has further intensified research interest in green tax policy, as scholars examine its expected impact on emissions and how its myriad tax provisions can be optimized.

Europe's approach to environmental taxation is more principle-based, guided by the 'polluter pays' ethos (O'Connor, 1997). Many European countries implement economy-wide green taxes or cap-and-trade systems to internalize environmental costs (O'Connor, 1997). The EU Emissions Trading System (EU ETS) was pioneered in 2005, and numerous member states introduced carbon taxes decades ago. As of 2023, 20 European countries have carbon taxes in place, some exceeding €100 per

tonne CO₂. This fixed policy stance has driven a strong academic output examining the effectiveness of carbon taxes, energy taxes, and tax reform for sustainability. European research on green tax incentives often evaluates how to integrate environmental objectives with economic policy, reflecting Europe's commitment to sustainable development and climate mitigation (Huttmanova & Mikca, 2024). The European Green Deal, launched in 2019, set ambitious targets for climate neutrality by 2050 and 55% emissions cut by 2030. Europe has backed its climate aims with substantial research funding, including the EU's Horizon 2020 program, which allotted nearly €80 billion to R&D, with climate action as a priority area. Specific national initiatives, such as the UK's Climate Change Levy, Sweden's carbon tax, and France's energy tax reforms, have also contributed to green tax incentive research (see Gago et al., 2014; Richardson & Chanwai, 2003).

The results show China as the leading country in publications on green tax incentives, attributed to its government's prioritization of environmental sustainability and significant investments in research and development (Lin & Lin, 2023). As one of the world's top R&D spenders, China has enacted a series of green tax and climate policies, such as the Environmental Protection Tax Law in 2018 and the world's largest carbon market in 2021 (Zhang et al., 2024). These policies have driven corporate green innovation under certain conditions and have prompted the Chinese government to tighten environmental regulations to address public health crises and global criticism (Zheng et al., 2023). Chinese scholars, often supported by government grants, have devoted considerable effort to studying how fiscal instruments could mitigate the negative byproducts of China's

breakneck growth. China's size and centralized governance allow large-scale policy experiments, such as regional green finance pilot zones and renewable energy targets in Five-Year Plans, which yield rich datasets for analysis (Gao et al., 2024). These factors explain why China has emerged as a research leader in green tax incentives, as the country's proactive environmental leadership is evident not just in policy action but also in the scholarly output examining green tax incentives as tools for its low-carbon transition.

The findings noted Africa's comparatively low publication count on green tax incentives, which is symptomatic of broader challenges on the continent. African nations face pressing climate vulnerabilities and the need for green finance, but many are still in the early stages of adopting environmental tax policies (Belletti, 2020). The data showed only a handful of African countries among the top 64 in publication volume, with South Africa leading the region (23 publications). This emerging stage of research and policy development in Africa has been observed by others as well. Key barriers include limited research funding, fewer dedicated institutes focusing on environmental economics, and pressing development priorities that often sideline climate tax policy (Occhiali, 2023). For instance, outside of South Africa, very few African countries have implemented significant green taxes or carbon pricing, giving scholars less local policy material to analyze. Even where there is interest, capacity can be an issue, where universities may lack specialized programs on environmental taxation, and researchers often grapple with data scarcity on emissions and tax revenues among others in their countries. Additionally, policy adoption has been slow; South Africa is a noteworthy exception, having introduced a carbon tax

in 2019 (one of the first in Africa). Studies around that policy highlight both environmental benefits and economic considerations, for example, Alton et al., (2014) anticipated that South Africa's carbon tax would cut emissions and stimulate renewable energy without crippling the economy. Such findings are fundamental in building the case for green taxes in developing contexts. South Africa's relative output in our analysis reflects how a concrete policy initiative can spark academic work. Elsewhere on the continent, countries like Tunisia, Egypt, Ghana, Nigeria, and Kenya show a slow but growing interest, likely these are initial explorations of how green fiscal incentives could work in their contexts, often driven by collaborations with international organizations or as part of graduate research. African researchers have pointed out the opportunity for green taxes to both raise revenue and pursue sustainable development (see Mpofu 2022), but also the risks if such taxes exacerbate energy poverty or inequality. In recent years, we have seen emerging opportunities through regional cooperation. For example, the African Development Bank has advocated for 'green growth' and may support studies on fiscal tools to achieve it. Moreover, as African countries consider implementing small-scale green taxes (like levies on plastic, fuel taxes adjusted for carbon content), we can expect their academics to engage more in evaluating these measures. The challenge of balancing revenue needs, development, and environmental protection is acute in Africa, making research-based guidance on green tax incentives very valuable (Mpofu, 2022). As a result, Africa's low representation in the literature may not due to a lack of need or interest, but rather resource and capacity constraints, which are gradually being addressed through international partnerships and increasing awareness of

climate finance opportunities. As these constraints are overcome, Africa could see a stronger research presence, focusing on context-specific designs of green tax incentives that promote sustainable development.

Synthesis of Systematic Literature Review Findings Environmental Effectiveness and Innovation Stimulation

The systematic review consolidates robust evidence that green tax incentives (GTIs), particularly carbon pricing mechanisms, are effective tools for reducing emissions and stimulating green innovation. Meta-analyses and ex-post evaluations confirm that, on average, carbon taxes and emissions trading systems (ETS) lead to significant emission reductions, with the magnitude of effect contingent on design features such as the credibility of the rate escalation path, breadth of the tax base, and minimization of exemptions (Zheng et al., 2023). Firm-level evidence from the EU ETS demonstrates that carbon pricing not only reduces emissions but also spurs low-carbon investment, providing a valuable comparator for understanding firm responses to tax-based incentives (Colmer et al., 2025). National-level studies, such as of British Columbia's carbon tax, illustrate that price signals can effectively reduce fuel demand and CO₂ emissions, with the salience of the tax playing a key role in consumer and corporate behavioral responses (Rivers & Schaufele, 2015). Concurrently, GTIs are shown to shift the relative returns on investment, thereby stimulating clean innovation. Evidence indicates increases in low-carbon patenting and technology deployment in response to both carbon pricing and targeted tax credits (e.g., Investment Tax Credits for clean energy). However, a critical moderating factor is climate policy uncertainty (CPU), which multiple studies identify as a

significant drag on green patenting and investment, underscoring the importance of clear, credible, and stable policy trajectories to anchor expectations and avoid delaying the energy transition (Huang, 2023).

Distributional Equity, Competitiveness, and Political Economy

The review reveals that the distributional incidence of GTIs is not inherently fixed but is highly sensitive to policy design. Meta-analyses find ambiguous average effects, with outcomes ranging from regressive to progressive, strongly mediated by how revenues are recycled (Ohlendorf et al., 2021). The evidence converges on the conclusion that equity concerns, particularly salient in low- and middle-income countries (LMICs), can be effectively offset through targeted recycling mechanisms such as per-household carbon dividends, support for energy-poor households, or cuts in distortionary taxes. This design choice is intrinsically linked to political economy: public acceptance and the durability of GTIs rise markedly when revenues are used transparently, either through direct rebates to households or earmarking for visible public goods and climate projects (Carattini et al., 2019). Regarding competitiveness, literature acknowledges real risks of carbon leakage and harm to trade-exposed industries but finds these risks to be manageable. Empirical and modeling evidence suggests that well-designed policies utilizing output-based rebates for exposed sectors and border carbon adjustments, as exemplified by the EU's Carbon Border Adjustment Mechanism (CBAM), can effectively mitigate leakage risks while protecting domestic industries.

Policy Design, Implementation, and the African Context

The synthesis points to several key design levers that maximize the effectiveness of GTIs: comprehensive coverage of emissions, a credible and rising price path, minimal exemptions, and transparent revenue recycling. Policy mixes are also critical; evidence increasingly favors combining a robust carbon price with targeted subsidies for technologies with strong learning curves (e.g., renewables, EVs) to address multiple market failures without creating redundant incentives (Colmer et al., 2025). A notable theoretical concern is the “green paradox,” where the anticipation of future policy tightening could incentivize accelerated near-term fossil fuel extraction; however, empirical evidence for this remains limited and mixed, highlighting the need for credible and globally coordinated policy pathways (Sinn, 2015).

The findings align with your bibliometric analysis in identifying a significant evidence gap in African and LMIC contexts. The review confirms that administrative preconditions, specifically robust Measurement, Reporting, and Verification (MRV) systems and clear tax administration channels are pivotal for successful implementation. South Africa’s Carbon Tax Act of 2019 serves as a critical regional blueprint, demonstrating a phased design with extensive allowances and administration via the existing South African Revenue Service (SARS), offering practical lessons on MRV, industry engagement, and fiscal coordination for other LMICs. Key constraints to adoption in Africa include fiscal capacity limitations, data scarcity, high informality, and energy-poverty risks. Yet, the evolving global landscape, driven by the proliferation of carbon pricing instruments and the extraterritorial impact of mechanisms like the EU CBAM, is creating new imperatives

for African exporters to develop MRV-ready footprints. This presents an opportunity for targeted policy experiments combining GTIs with concessional climate finance to underwrite equitable revenue recycling and a just transition.

Research Agenda

In summary, the systematic review confirms that GTIs are effective instruments for reducing emissions and driving innovation, with their equity and competitiveness impacts being fundamentally shaped by policy design choices. The durability of these policies is inextricably linked to their perceived fairness and the visibility of their benefits. To address the identified gaps, particularly for Africa, a prioritized research agenda emerges:

1. Conduct ex-post, firm-level evaluations of South Africa’s carbon tax, especially as it tightens post-2026, to measure impacts on emissions, investment, and competitiveness.
2. Implement randomized or phased pilots in LMICs to test the impact of different recycling mechanisms (e.g., cash dividends, energy subsidies) on equity and public acceptance.
3. Analyze the exposure of African exports to border adjustments and develop policy packages to manage associated risks and opportunities.
4. Undertake comparative studies on MRV and tax collection mechanisms in low-capacity settings, using South Africa’s SARS model as a benchmark.
5. Explore feebates and other incentive structures for understudied sectors like waste, agriculture, and transport in African urban contexts.

By pursuing this agenda, future research can provide the context-specific, causal evidence needed to design and implement effective, equitable, and politically sustainable green tax incentives in Africa and other under-studied regions.

Conclusion

Summary of Key Findings

The analysis of publication trends from 2015 to 2025 revealed a significant development in the academic and policy discourse surrounding green tax incentives. The initial interest in 2015 set the stage for subsequent research, with a notable increase in publications reflecting the growing recognition of the critical role that green tax incentives play in achieving climate objectives. The geographical distribution of studies highlighted significant regional variations, with Asia, North America, and Europe leading the research efforts. The dominance of China and the United States in their respective clusters, alongside strong contributions from European countries, indicates a global commitment to integrating environmental objectives with economic policies. Africa, despite its lower research output, presents a unique and emerging context for the implementation and study of green tax incentives.

Implications

Theoretically, this study expands the body of knowledge on green tax incentives, emphasizing their dual benefits of economic growth and environmental sustainability. The findings underscore the importance of integrating green tax incentives into broader climate policies and regulatory frameworks. Additionally, the analysis highlights the need for stable and consistent policies to ensure the long-term success of these incentives. Moreover, the study underscores the relevance of economic mechanisms, such as carbon

pricing, in addressing environmental costs and promoting sustainable practices.

Practically, the findings offer valuable guidance for policymakers. The study provides understanding of best practices, potential challenges, and strategies for successful implementation of green tax incentives. Policymakers must design effective green tax policies that balance environmental objectives with economic realities. Also, the study also highlights the importance of strengthening institutional capacities and public awareness to improve the implementation and enforcement of green tax policies.

Limitations and Recommendations

While this bibliometric review has provided an in-depth analysis of the research landscape of green tax incentives, it is essential to acknowledge certain limitations that may have influenced the findings. First and foremost, the analysis relied on the SCOPUS database, as such publications not indexed in the SCOPUS database or written in languages other than English may be underrepresented leading to potential biases in the geographical distribution and keyword analysis. Also, citation counts and total link strength are used as proxies for the impact and relevance of publications. However, these metrics may not fully capture the qualitative aspects of research contributions or the practical implementation of green tax incentives. Finally, the study does not deeply dive into the unique socio-economic and political contexts of each region or country. Therefore, the generalizability of findings to specific local contexts may be limited.

Based on the findings and limitations of the review, the following recommendations are made to further knowledge of the concept of green tax incentives. First, the study highlights that green tax incentives are widely studied in developed regions, but there is limited research in developing

countries, particularly in Africa. Hence, future studies could explore the unique socio-economic and political contexts of different regions, especially developing countries, as understanding these contexts will help tailor green tax policies to local needs and ensure their effectiveness. Additionally, the review uncovered that there is a lack of longitudinal studies that assess the long-term impacts of green tax incentives on environmental and economic outcomes. As a result, conducting longitudinal studies will provide an understanding of the sustainability and effectiveness of green tax incentives over extended periods, helping policymakers design better long-term strategies. Again, the review indicates that green tax incentives are often studied in isolation, without considering their integration with other environmental regulations. Correspondingly, future research could explore how green tax incentives can be integrated with other regulatory measures to create cohesive and comprehensive strategies for sustainability. Furthermore, the study reveals limited research on the role of public awareness and stakeholder engagement in the acceptance and success of green tax incentives. Therefore, exploring the role of public awareness and engagement strategies will help policymakers design incentives that gain public support and are effectively implemented. Likewise, there is insufficient research on how green tax incentives drive technological innovation and the adoption of renewable energy technologies. Investigating this area will provide an in-depth understanding of the mechanisms through which green tax incentives stimulate innovation and reduce reliance on fossil fuels, contributing to sustainable development. In addition, the equity implications of green tax incentives are not

thoroughly examined, particularly their impact on low-income populations. As such, analysis of the equity aspects of green tax incentives is required to ensure that these policies do not disproportionately burden vulnerable groups and contribute to social equity. Despite being thorough, the review relies heavily on quantitative metrics, which may not fully capture the qualitative aspects of research contributions. Therefore, complementing quantitative analyses with qualitative assessments, such as case studies and expert interviews, might provide a more comprehensive understanding of the practical implications of green tax incentives. Moreover, there is a need for interdisciplinary research that integrates knowledge from economics, environmental science, political science, and sociology. This is because, interdisciplinary approaches might offer a holistic view of green tax incentives, addressing the complexities and multifaceted impacts of these policies. Finally, recent policy changes and new fiscal measures are not fully accounted for in the current study. There is therefore a need for future research to investigate the impact of newly introduced green tax policies to understand their short-term and long-term effects on environmental sustainability and economic growth.

By addressing these research gaps, future studies can make meaningful contributions to the literature on green tax incentives, providing a wealth of knowledge for policymakers and stakeholders. These efforts will help to advance the understanding and implementation of green tax policies, eventually contributing to global efforts in mitigating climate change and promoting sustainable development.

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