Environmental and Climate Technologies
2026, vol. 30, no. 1, pp. 185–202
https://doi.org/10.2478/rtuect-2026-0013
https://content.sciendo.com

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A Bibliometric Analysis of the Role of Public Institutions in Climate Change Research

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Received 27.12.2025; accepted 17.01.2026

***Abstract* – The issue of climate change has become a global concern, prompting extensive research across various disciplines, including government science. This study presents a bibliometric analysis of role of public institutions in climate change research, examining trends in publication, influential authors, leading institutions, and critical themes within this field. *CiteSpace* and *Biblioshiny* were used to analyse 1436 publications published between 2005 and 2025 using the Scopus database. The results indicate an increasing trend in publications over the last decade, highlighting the growing interest in integrating climate change mitigation and adaptation strategies within public policy and governance frameworks. Key themes identified include environmental policy, adaptive management, and sustainable development, with the United States, China, and Australia emerging as the most active countries in this research area. This study provides a comprehensive overview of the current research landscape and identifies future research directions for strengthening the role of public institutions in addressing climate change challenges, especially for the local government.**

***Keywords* – Adaptive governance; bibliometric analysis; climate change mitigation; environmental policy; public institutions; sustainable development.**

1. INTRODUCTION

Climate change has emerged as one of the most pressing challenges of the 21st century, impacting natural ecosystems, socioeconomic systems, and human well-being [1]. As the effects of climate change become more pronounced, there is a growing demand for effective governance and policy responses at both the global and local levels. Public institutions play a critical role in formulating, implementing, and monitoring climate-related policies, making them central actors in climate change mitigation and adaptation strategies [2], [3]. Local governments have a significant role to play in addressing this challenge, as they are at the forefront of formulating and implementing policies related to climate change mitigation and adaptation [4]–[6].

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The relationship between public institutions and climate change has attracted significant scholarly attention in recent years, leading to a growing body of literature that explores various aspects of this intersection. Research has covered topics such as the role of government agencies in climate governance [7], inter-institutional collaboration [8], policy network dynamics [9], and the integration of climate considerations into public administration practices [10]. Despite this growing interest, there is a lack of comprehensive studies that map and analyse the research trends, key contributors, and emerging themes in this field. Such an analysis is essential to understand the current research landscape, identify gaps, and suggest directions for future research.

Bibliometric analysis offers a systematic approach to analyse the intellectual structure of a research field, providing insights into publication patterns, influential authors and institutions, collaboration networks, and thematic developments. This analysis can reveal collaborative networks between researchers and institutions, the most frequently discussed research topics, and research contributions to evidence-based policymaking [11], [12]. By utilizing bibliometric tools, this study aims to provide a comprehensive overview of research on public institutions and climate change. Furthermore, this analysis can help identify existing research gaps, such as geographical areas or specific subjects that have not been widely studied, so that researchers can use them as a reference to develop more comprehensive follow-up studies [13]. It addresses the following questions: (1) What are the main publication trends in this field? (2) Who are the most influential authors, institutions, and countries? (3) What are the key themes and emerging topics?

The findings of this study will contribute to a better understanding of how public institutions are being studied in the context of climate change and will provide valuable guidance for researchers and policymakers seeking to enhance the effectiveness of institutional responses to this global challenge.

2. METHODS

The study has three main stages: database selection, search strategy, and bibliometric analysis. Each stage is designed to ensure a systematic and comprehensive literature examination, covering publication trends, key contributors, and thematic developments in this field.

2.1. Selection Database

This study utilized the Scopus database, acknowledged as one of the largest and most complete abstract and citation repositories for academic research [14]. Scopus encompasses a broad spectrum of fields, including social sciences, environmental science, and public policy, rendering it appropriate for a bibliometric investigation concerning the nexus of public institutions and climate change. The choice of Scopus as the principal database is predicated on its comprehensive coverage of peer-reviewed journals, conference proceedings, and book chapters, with its sophisticated search capabilities that provide precise filtering of pertinent literature [15].

Scopus is an abstract and indexing database containing full-text links, developed by Elsevier. The name Scopus is derived from the Hammerkop (Scopus umbretta), a bird known for its exceptional navigational abilities [14]. The database, in development for two years, was created in collaboration with 21 academic institutions and over 300 researchers and librarians. The verbal and behavioural feedback from these librarians and researchers was examined and utilized to enhance the product. Scopus offers several features [14]: (1) Links

to both citing and cited documents, facilitating navigation both forwards and backwards in time, (2) Inclusion of open access titles in the index, (3) Indexing of web pages and patents, claiming over 167 million relevant web pages, (4) OpenURL compliance, functioning with any link resolver through image-based linking, and (5) Execution of an entitlement check before providing a full-text image if the article is accessible to the user.

Scopus is user-friendly, even for beginners. If the user is acquainted with search tools like drop-down menus and checkboxes, utilizing the easy search method will be straightforward. The capability to search both antecedently and subsequently from a specific citation would greatly assist the researcher. The transdisciplinary nature enables the researcher to readily explore beyond his field of study [16].

2.2. Search Strategy

This study follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework to ensure transparency and replicability in the identification and selection of relevant studies (Fig. 1). The primary search string applied was: ("public institution" OR "local government") AND ("climate change" OR "climate policy" OR "climate adaptation" OR "climate governance").

In the identification stage, a total of 41 357 records were initially retrieved from the Scopus database. Prior to screening, 1415 records were removed based on predefined exclusion criteria, namely publication years outside the 2014–2024 period and non-English language publications. This resulted in 39 942 records proceeding to the screening stage. During the screening stage, titles, abstracts, and keywords were reviewed, leading to the exclusion of 36 556 records that were not relevant to the study's scope. Subsequently, 3386 reports were sought for full-text retrieval. Of these, 1950 reports could not be retrieved due to access limitations, resulting in 1436 reports assessed for eligibility.

In the eligibility stage, all 1436 full-text articles met the inclusion criteria, and no additional records were excluded. Consequently, 1436 studies were included in the final review and bibliometric analysis. This systematic selection process ensured that the final dataset comprehensively represents scholarly research on public institutions and climate change.

2.3. Bibliometrics Analysis

The bibliometric analysis was conducted using *CiteSpace*. *CiteSpace* provides two concepts: research fronts and intellectual bases [17]. A research front is defined as an emergent and transient grouping of concepts and underlying research issues. The intellectual base of a research front is its citation and co-citation footprint in scientific literature—an evolving network of scientific publications cited by research-front concepts.

The analysis started with descriptive analysis examining publication trends over time, the distribution of documents by source, and the identification of prolific authors and institutions. Second, geographical and institutional distribution and cooperation show the distribution of inspiring countries and institutions on local governance and climate change research. Third, we used co-citation analysis, which was conducted to determine the most cited articles, authors, and journals in the field. This analysis provides insights into the most influential publications and research areas. Lastly, co-occurrence analysis was performed to identify the most frequently occurring keywords and the main research themes in the field. The co-occurrence network was visualized to show the thematic clusters and emerging research topics.

The findings from the bibliometric analysis are presented and discussed in the following sections, providing a comprehensive overview of the research landscape on public institutions and climate change.

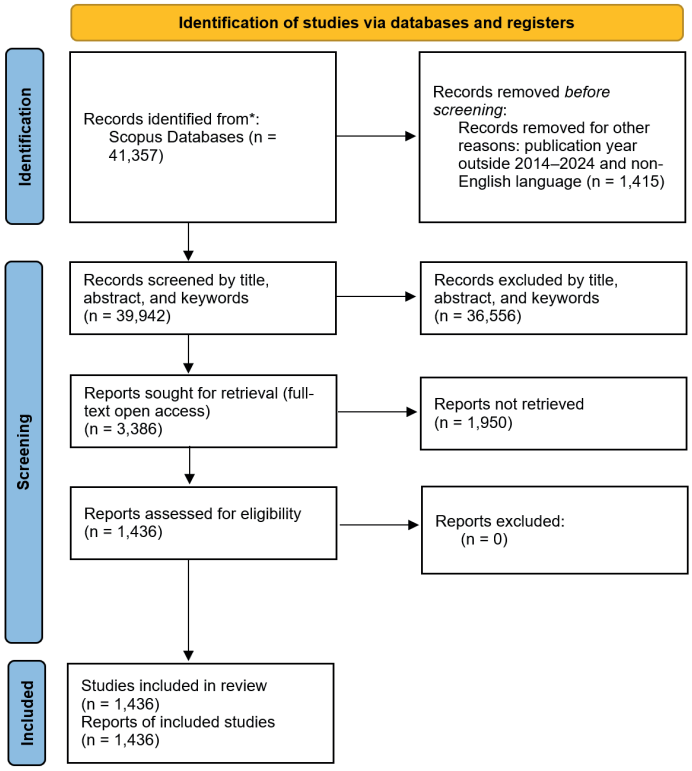


Fig. 1. PRISMA framework illustrating the methods process for research on public institutions and climate change.

3. Results and Discussion

3.1. Descriptive Analysis

3.1.1. Growth trend and publication output

Fig. 2 shows the growth trend and publication output over the years for research related to public institutions and climate change. It was divided into four phases:

- Initial emergence (2005–2009): Between 2005 and 2009, the number of publications was relatively low, increasing from 1 publication in 2005 to 8 publications in 2009, with annual outputs consistently below 10. This indicates that research interest in the intersection of public institutions and climate change was still in its early and exploratory stages;
- Gradual consolidation (2010–2014): Starting from 2010, there was a gradual increase in publication output, rising from 14 publications in 2010 to 23 publications in 2014. This growth suggests an emerging awareness and academic focus on the role of public institutions in addressing climate change issues;

- Accelerated growth (2015–2019): From 2015 onwards, there was a notable acceleration in publications, increasing from 45 in 2015 to 91 in 2019. This period marked an important phase where climate change became a critical public policy and governance agenda, leading to increased scholarly contributions on institutional and governance dimensions;
- Rapid expansion and intensification (2020–2025): The years from 2020 to 2025 show the most rapid growth, with publications rising from 99 in 2020 to 193 in 2023, followed by a slight decline in 2024 (179 publications) and a sharp increase to 239 publications in 2025. This significant jump in research output aligns with the global urgency and policy shifts towards climate action, sustainability, and institutional adaptation.

The growth trend indicates a rising research interest in the intersection of public institutions and climate change, especially in the past decade. The sharp increase since 2015 highlights the consolidation of this research field and the growing recognition of governance and institutional frameworks as critical components of effective climate action. The consistent increase in publication output reflects both the expansion of this research area and the greater involvement of scholars in exploring solutions to integrate climate policies within public institutions.

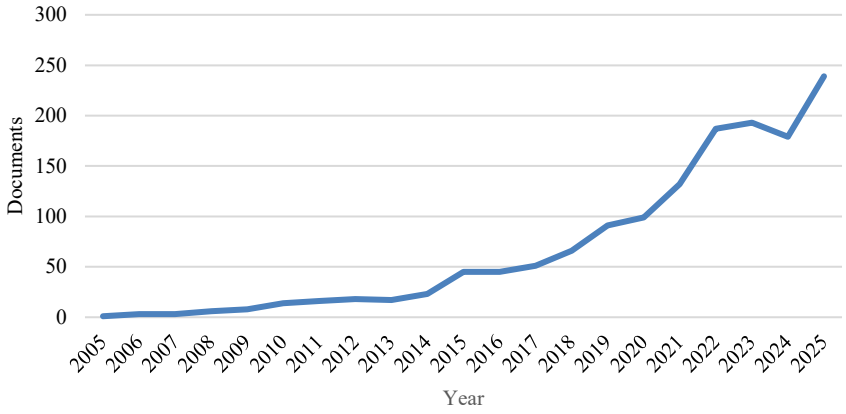


Fig. 2. Publication per year on public institutions and climate change (2005–2025).

Regarding authors and the number of publications (Fig. 3), there are three categories. First, Solecki W. D. is the leading contributor with 9 publications, followed by Rosenzweig C. E. with 8 publications, indicating strong and sustained research engagement on public institutions and climate change [26]–[30]. These authors emerge as influential figures shaping scholarly debates on climate governance and institutional adaptation.

Lawrence J. and Rosenzweig C. both have 9 publications each, further establishing them as influential voices in this field. This group of top authors is likely to be highly cited and influential, shaping the direction of research and policy discussions in the area of climate change governance.

Second, a group of active contributors has between 5 and 6 publications, demonstrating consistent involvement in this research domain. Notable authors include Bertoldi P., Clarke A. C., Hoppe T., Mees H. L. P., Bulkeley H. A., Byrne J. A., Castán Broto V., Driessen P. P. J. These authors form a core group that is actively publishing and likely engaged in

collaborative research networks and thematic specialization related to institutional responses to climate change.

Third, broader participation is reflected by the presence of many authors with fewer publications, indicating that the field attracts a diverse range of scholars from multiple disciplines. This pattern suggests that research on public institutions and climate change remains open and interdisciplinary, incorporating perspectives from public policy, environmental governance, urban studies, and sustainability science.

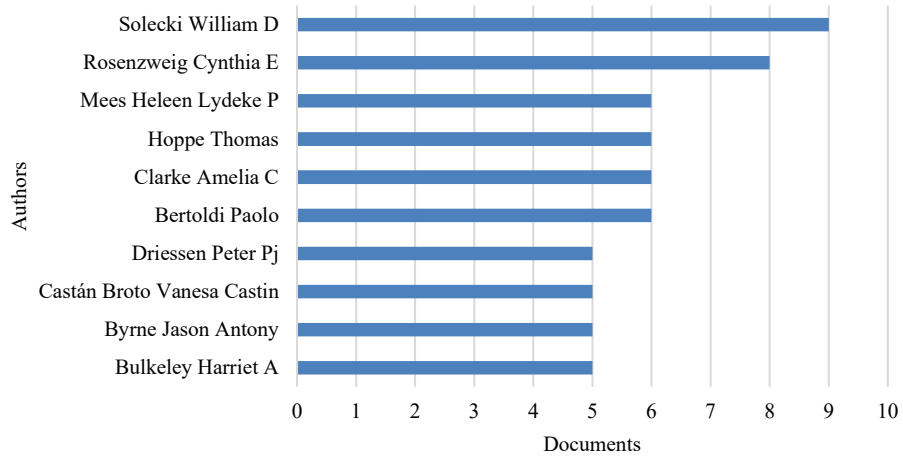


Fig. 3. Authors and publications output. Bar height indicates the number of publications per author, highlighting the most productive contributors on public institutions and climate change.

3.1.2. Type of document

The document type distribution reveals a robust research field with a strong preference for journal articles while maintaining a diverse range of publication formats to address various academic and practical needs (Fig. 4). Journal articles constitute the largest share of publications, accounting for 1192 (83 %) of the total output, indicating that articles are the dominant medium for disseminating research findings in this field. This dominance suggests that peer-reviewed journal articles are prioritized for presenting empirical analyses, theoretical frameworks, and comprehensive case studies. Given their rigorous review process, this pattern may also reflect a strong emphasis on research quality and scholarly credibility.

Conference papers represent 99 (7 %) of the publications, suggesting that while academic conferences remain a venue for sharing emerging ideas and preliminary findings, their role is more complementary than central. This proportion indicates an active but relatively focused academic community, where conference outputs may serve as precursors to journal publications rather than final dissemination channels. Reviews account for 79 (6 %) of the total documents, highlighting the importance of synthesizing existing knowledge to map research trends, methodological approaches, and gaps in the literature. Review articles play a crucial role in consolidating fragmented findings and are often valuable entry points for scholars and policymakers.

Book chapters make up 33 (2 %) of the publications, reflecting a more limited use of edited volumes and thematic books in this research area. While smaller in proportion, book chapters often allow for in-depth discussion of specific themes and may represent collaborative or

interdisciplinary contributions. Editorials and notes account for 1 %, contributing concise insights, reflections, or commentary that enrich academic discourse but do not constitute the main body of research output.

Other document types – such as data papers, books, errata, short surveys, and retracted documents – are represented under 1 % in percentage terms, indicating that the literature is highly concentrated in formal scholarly outputs, particularly journal articles. This concentration underscores a publication pattern that prioritizes peer-reviewed research articles as the primary vehicle for advancing knowledge on public institutions and climate change.

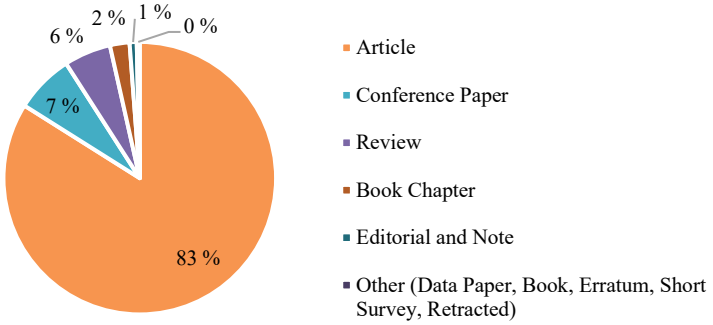


Fig. 4. Distribution of publication types. Segment size represents the percentage share of each publication type within the dataset.

3.1.3. Subject of publication

The diverse subject area representation illustrates a robust and evolving research field that draws upon various academic disciplines to holistically address the multifaceted challenges of climate change and public governance (Fig. 5).

Environmental Science leads with 870 publications, accounting for 29 % of the total output, representing the largest portion of the research output. This dominance is expected as the research theme revolves around climate change, which is inherently an environmental issue. It reflects the focus on studying ecological impacts, environmental policies, and sustainability practices.

Social Sciences emerge as the second most prominent subject area, with 642 publications (21 %), indicating that research in this field extends beyond biophysical concerns to include social, political, and institutional dimensions of climate change. This substantial proportion underscores a holistic approach to understanding how public institutions shape, and are shaped by, climate governance, policy responses, and societal adaptation processes.

Earth and Planetary Sciences contribute 283 publications (9 %), highlighting the importance of climate modelling, earth system analysis, and spatial approaches in understanding climate dynamics. Energy-related studies account for 250 publications (8 %), reflecting growing scholarly attention to renewable energy systems, energy transition policies, and sustainable energy governance as central components of climate mitigation strategies.

Agricultural and Biological Sciences represent 171 publications (6 %), emphasizing the relevance of food security, land-use change, and biodiversity conservation within climate change debates.

Computer Science and *Engineering* contribute comparable shares, with 145 (5 %) and 141 (5 %) publications respectively, indicating the increasing application of digital technologies,

data analytics, and technical innovations in climate governance research. *Computer Science* contributions are likely linked to modelling, simulations, and decision-support systems, while *Engineering research* often focuses on infrastructure resilience and technological adaptation solutions.

Medicine accounts for 118 publications (4 %), highlighting the growing recognition of climate change as a public health concern, including its impacts on disease patterns, health systems, and community resilience.

Biochemistry, *Genetics* and *Molecular Biology* contribute 64 publications (2 %), reflecting more specialized investigations into biological responses to environmental change. Economics, along with Arts and Humanities, collectively represent 57 publications (2 %), indicating engagement with economic implications, ethical considerations, cultural narratives, and societal values surrounding climate action.

Other subject areas together account for fewer than 2 % of the total publications, suggesting that while the field remains broadly interdisciplinary, research output is primarily concentrated within environmental, social, earth sciences, and energy-related disciplines. The distribution of subject areas underscores the interdisciplinary nature of scholarship on public institutions and climate change, with strong core contributions complemented by technical, health-related, and socio-cultural perspectives that enrich understanding and open avenues for further cross-disciplinary collaboration.

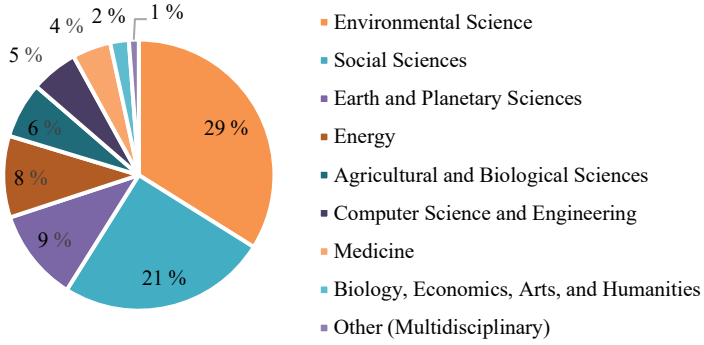


Fig. 5. Distribution of subject areas. Segment size indicates the percentage contribution of each subject area to the overall publications.

3.2. Geographical and Institutional Distribution and Cooperation

3.2.1. Countries

This co-authorship country network analysis reveals a highly structured pattern of international collaboration in research on public institutions and climate change. The analysis shows that research production and collaboration are highly concentrated in a small group of countries, with the United States (US), China, Australia, and the United Kingdom (UK) occupying dominant positions both in terms of publication output and international connectivity. The network's structure suggests a blend of regional and international partnerships, with some countries acting as crucial bridges connecting otherwise separate clusters (Fig. 6).

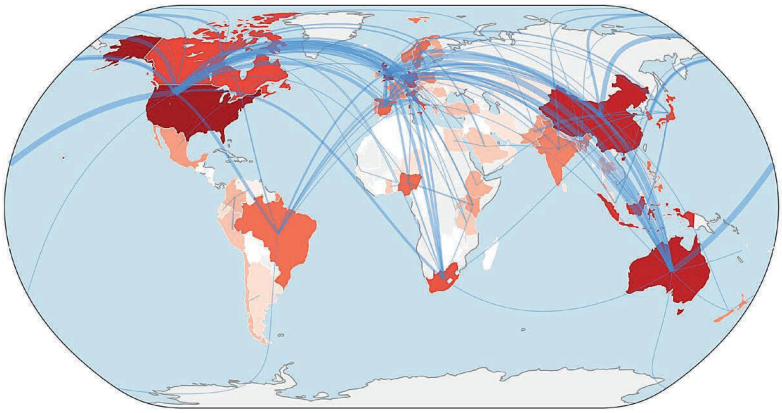


Fig. 6. Scientific production by country using a quantile-based method in public institutions and climate change research, where darker colours represent higher levels of scientific production. Source: Scopus database and processed by Authors.

In terms of scientific production as seen in Fig. 7, the United States clearly leads the field with 615 publications, followed by China (402) and Australia (390), while the United Kingdom ranks fourth with 255 publications. This distribution confirms that the US is not only an active collaborator but also one of the most productive countries in this research area, supporting its classification as a core actor in global climate change research involving public institutions. China, Australia, and UK have the largest nodes, indicating that these countries are the most prolific in terms of the number of publications in this field. The US shows strong connections (thick links) with both European and Asian countries, suggesting it plays a central role in facilitating international collaborations. This centrality is further reflected in the strongest bilateral collaboration observed between the United States and the United Kingdom (frequency = 20), followed by robust links between the United States and Canada (14), the Netherlands (14), Australia (13), and Germany (13).

China emerges as a key hub within the global collaboration network, rather than a peripheral or regionally confined actor. Strong collaboration ties between China and the United Kingdom (11) and between China and the United States (10) indicate China's deep integration into leading international research networks. These patterns demonstrate that China's high publication output is accompanied by intensive engagement with established research centres in Europe and North America.

Emerging and middle-income countries such as Indonesia, India, Brazil, and South Africa show moderate node sizes with an increasing research output and expanding international linkages. Indonesia, with 197 publications, ranks fifth globally in scientific production, indicating a substantial and growing contribution to this research field despite comparatively fewer high-frequency international collaboration links. This pattern suggests that while these countries are becoming more involved in international research networks, their integration remains less dense than that of core countries and possibly due to increasing funding or governmental emphasis on climate-related studies. The links between Brazil and other Latin American countries (e.g., Argentina, Chile) indicate regional cooperation, likely focusing on shared environmental challenges such as Amazon deforestation or climate adaptation strategies in the region.

European countries such as the Netherlands (124 publications) and Germany (118 publications) form a closely connected sub-network, reinforced by strong bilateral collaboration (Netherlands–Germany, $f = 9$; United Kingdom–Netherlands, $f = 9$). Some

countries, particularly in parts of Africa and the Middle East, continue to exhibit smaller node sizes and fewer collaborative ties, indicating lower research output and limited integration into global networks. The contrast between core countries (such as the US, China, and Australia) and peripheral regions highlights persistent inequalities in global research capacity and access to international collaboration opportunities. Addressing these disparities through targeted funding schemes and inclusive international partnerships could enhance the global diversity of climate change research on public institutions.

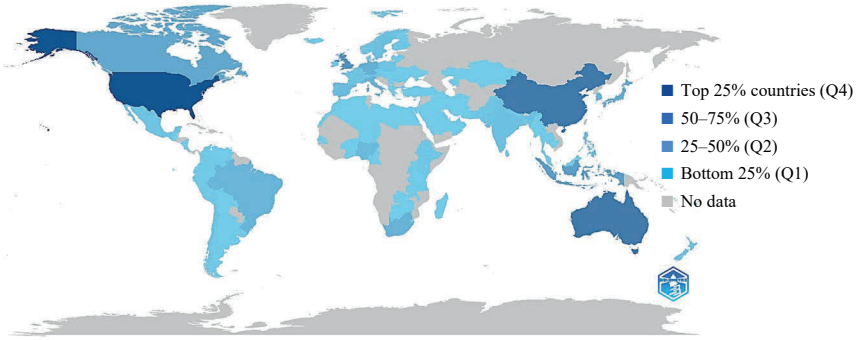


Fig. 7. Scientific production by country using a quantile-based method in public institutions and climate change research, where darker colours represent higher levels of scientific production. Source: Scopus database and processed by Authors.

3.2.2. Institutions

The network of co-authors' institution analysis provides a clear picture of how research on climate change adaptation is distributed across global institutions (Fig. 8). It identifies key players, highlights regional collaboration patterns, and pinpoints gaps in institutional partnerships. This information is valuable for researchers, funding agencies, and policymakers looking to promote collaboration and strengthen the global research network in this field.

The analysis indicates that Griffith University, RMIT University, and University of California are the top institutions with the highest node sizes in the network. This means these institutions have produced the most publications in collaboration with other institutions on climate change adaptation, making them central players in the research field. These institutions are highly influential and have a wide-reaching impact, often serving as hubs that connect other institutions in the network.

Institutions such as Macquarie University and University of Tasmania have high betweenness centrality scores, indicating that they serve as major bridging nodes within the network. These institutions connect different clusters, enabling knowledge transfer and research collaboration between institutions that may not otherwise collaborate directly. Their central position in the network allows them to play a pivotal role in shaping the direction of research and disseminating key findings.

The analysis reveals that institutions like National Technical University of Athens and Korea Environment Institute are emerging players in climate change adaptation research. While these institutions have moderate-sized nodes and are not yet at the level of Griffith or RMIT in terms of publication output, their increasing links with other leading institutions suggest a growing influence in the research field. Some regions, such as Sub-Saharan Africa and Southeast Asia, are underrepresented, with fewer institutions participating in

international research collaborations. This suggests a need for more support and initiatives to build research capacity in these regions.

The network map shows that some smaller institutions, particularly in developing countries, are isolated or have limited collaboration with leading global institutions. This represents a potential gap in research collaboration that could be addressed by promoting joint research projects, student exchanges, and capacity-building initiatives. Encouraging partnerships between established and emerging institutions can help foster a more inclusive and diverse research community, ultimately enhancing the quality and impact of research on climate change adaptation.

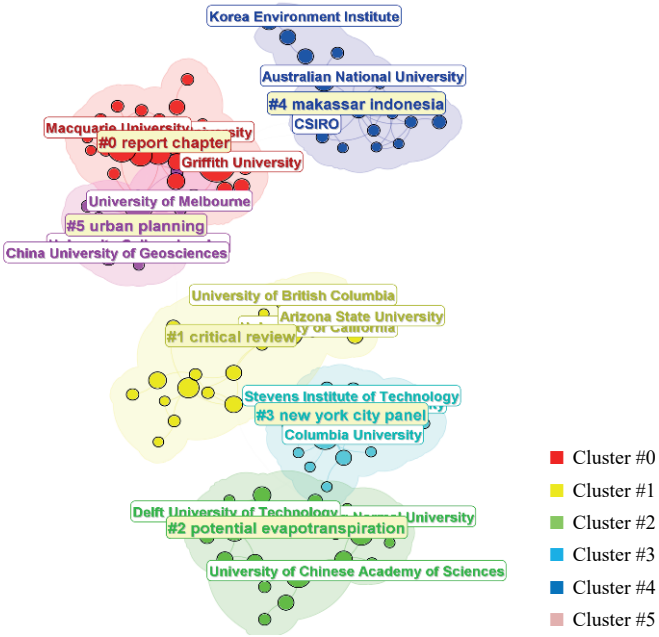


Fig. 8. Institutional co-authorship network. Node size indicates publication volume and colours represent thematic clusters; central and bridging institutions connect the network.

3.3. Co-citation Analysis

3.3.1. Author co-citation

The resulting network visualization reveals several large and interconnected nodes, representing the most frequently cited authors in the field. Nodes representing Bulkeley H, Adger WN, and Moser SC are the largest in the network, indicating that these authors are the most frequently cited in the literature (Fig. 9). This suggests that these specific researchers have a dominant influence on shaping research in local government and climate change. Their work may form the theoretical and empirical foundation of many other studies.

The Bulkeley H and Adger WN are heavily cited together, indicating their work is often referenced in discussions on the science-policy interface of local government and climate change. Adger and Moser SC: These two authors have strong co-citation links, likely because both focus on social vulnerability and adaptation strategies in the context of climate change. Their co-citation suggests that researchers often draw on their combined work to explore the human dimensions of climate impacts. The presence of these co-citation links indicates that

there are distinct research communities within the field that often cite a common set of core authors when discussing specific topics, such as climate policy, adaptation strategies, and social vulnerability.

Authors such as Bulkeley and Adger have high betweenness centrality scores. This indicates they serve as key connectors between various clusters. High centrality authors are pivotal in connecting different research themes. For example, Bulkeley's work might bridge the gap between climate science (Cluster #3) and vulnerability/resilience (Cluster #2), showing that his research has a broad interdisciplinary impact.

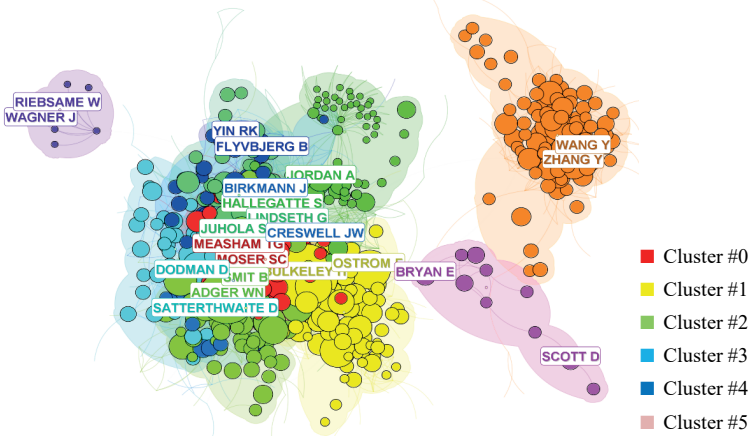


Fig. 9. Author co-citation network. Node size reflects co-citation frequency and links represent intellectual relationships among frequently cited authors.

3.3.2. Journal co-citation

When analysing a journal co-citation network in *CiteSpace*, the goal is to understand the interrelationships between journals and identify the core journals that shape the intellectual structure of a research field (Fig. 10). This type of analysis can help pinpoint which journals are most influential and reveal the thematic organization of research topics within a given field. The journal co-citation network is divided into clusters, each representing a group of journals that are frequently co-cited together. Each cluster corresponds to a thematic area or research stream within the broader research field. Cluster #1–Policy Response– contains journals such as *Global Environmental Change*, *Climatic Change*, *Local Environment*, *Climate Policy*, and *Environmental Politics*, with 372, 322, 210, 198, and 186 citations, respectively. This cluster includes journals that publish high-impact studies on climate policy, local environment, and environmental politics. The frequent co-citation of these journals indicates that they form the backbone of research focused on understanding the local government and climate change. Then, Cluster #2–European Union–Columbia Law School, *Ecology Law Quarterly*, and *Water Science & Technology*. This cluster is centred around journals that focus on the law dimensions of climate change, including environmental justice, the technology of wastewater. and stormwater management. These journals are often cited together when addressing governance and policy issues. Lastly, Cluster #3–Future Change– Nature, *Cincinnati Law Review*, and *Energy Research* and *Social Science*. Journals in this cluster concentrate on energy policies, renewable energy technologies, and sustainable development. They are co-cited when research involves intersections between climate change and energy sustainability.

Each cluster reflects a specific research theme or subfield within climate change research, indicating that different groups of journals serve as foundational literature for various thematic areas. Researchers can use this information to identify where to submit their research based on thematic alignment.

In terms of centrality, *Sustainability* has high betweenness centrality, indicating they are pivotal in connecting various clusters, such as between policy response (Cluster #1) and European union (Cluster #2). Journal with high centrality is considered interdisciplinary connectors. Their high betweenness centrality scores mean that research published in these journals is likely to have broader impact, influencing multiple subfields. For example, articles published in *Sustainability* might inform both the scientific understanding of climate impacts and policy responses [19].

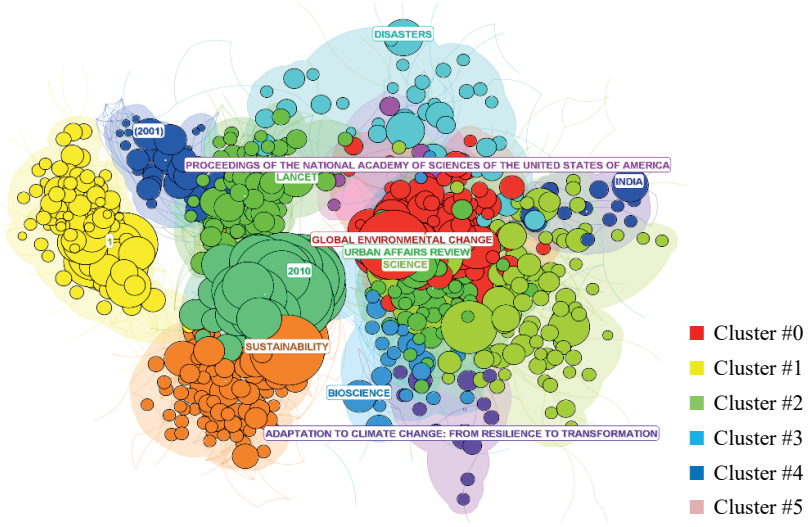


Fig. 10. Journal co-citation network. Node size indicates co-citation frequency, while links illustrate citation relationships among journals shaping the research field.

3.3.3. Document co-citation

The document co-citation network analysis in *CiteSpace* provides a way to explore the intellectual structure and research trends within a field by analysing the relationships between frequently co-cited documents (Fig. 11). This analysis highlights influential works, research clusters, and the development of knowledge over time.

Cluster #1–Sea-Level Rise–contains core documents, likes Bulkeley H. [31], Baker I. *et al.* [32], and Measham T. G. *et al.* [33]. This cluster focuses on the conceptual development of adaptive capacity, resilience theory, and social-ecological systems. The documents in this cluster are frequently cited together in studies that discuss the resilience of communities and ecosystems to external shocks and stresses.

Cluster #2–Society Relation–including Bulkeley H. [34], Reckien *et al*. [35], Chu *et al*. [36] as core documents. This cluster includes documents that discuss the vulnerability of urban areas to climate change and the strategies for enhancing urban adaptation. The cluster emphasizes the intersection of climate risk, governance, and social vulnerability in urban settings.

Cluster #3–Old Wine–contains Betsill & Bulkeley [6] and Bulkeley *et al*. [37]. This cluster is centred on resilience planning and governance frameworks. It explores the role of policy, planning, and institutional arrangements in fostering urban resilience.

Each cluster represents a distinct research stream within the broader field of urban resilience. The presence of these clusters suggests that the research community has converged on several key themes, such as social-ecological resilience, vulnerability and adaptation, and planning for resilience.

Furthermore, core documents within the network can be identified based on their citation counts and betweenness centrality. Documents with high betweenness centrality connect different clusters and thus play a critical role in knowledge diffusion. For instance, Archer D. *et al*. [38], titled "Moving towards inclusive urban adaptation: approaches to integrating community-based adaptation to climate change at city and national scale", has a high citation count and betweenness centrality. This document provides a strong case for integrating community-based adaptation (CBA) into urban adaptation frameworks, highlighting its ability to empower communities and align local adaptation strategies with broader urban and national policies. It calls for multilevel governance, better institutional coordination, and the involvement of diverse stakeholders to address the complex and context-specific nature of urban climate adaptation. The insights and lessons from the five case studies serve as valuable references for practitioners and policymakers working on urban resilience and climate adaptation in diverse settings.

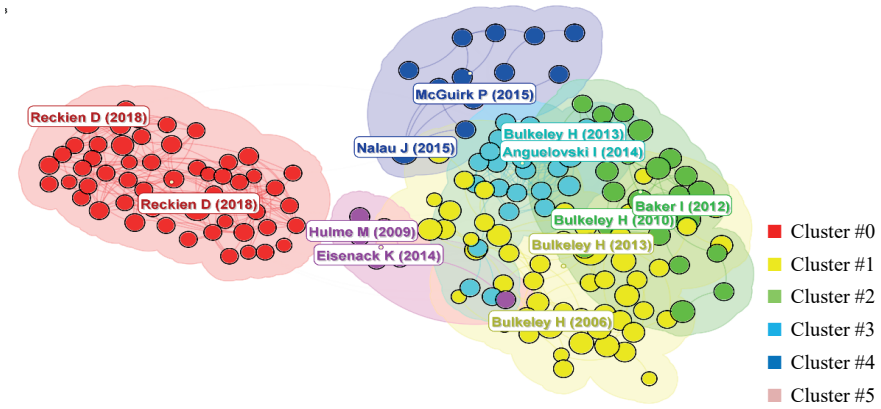


Fig. 11. Document co-citation network. Node size represents co-citation frequency and connections indicate foundational documents within the knowledge structure.

3.4. Co-occurrence Analysis of Keyword Detection

The keywords' co-occurrence analysis in *CiteSpace* reveals the thematic structure and research trends in local government and climate change. Frequently occurring keywords include "environmental policy", "adaptive management", "united states", "sustainable development", "human", "government", "governance approach", "decision making", "climate change adaptation", "risk assessment" (Table 1). The prominence of these keywords suggests that the research field is primarily focused on understanding the impact of climate change on urban areas and developing strategies to enhance urban resilience and adaptation.

The network is organized into clusters of co-occurring keywords representing different research themes. Clusters are labelled based on their keywords and the nature of the research they represent.

Cluster #1–Sea-Level Rise–contains the keywords occurring “adaptive management” (222), “climate change adaptation” (169), “risk assessment” (159), “urban planning” (119), and “vulnerability” (113). This cluster centres on assessing the vulnerability of urban areas to climate change. It includes studies on risk exposure, social vulnerability, and methods for evaluating the impact of climate-related hazards on urban populations.

Cluster #2–Renewable Energy–contains the keywords occurring "China" (158), "emission control" (117), "global warming" (91), "greenhouse gases" (86), and "greenhouse gas" (80). This cluster focuses on developing adaptation strategies and addressing climate-related hazard issues such as emissions and global warming. It highlights the role of policy, governance, and sustainable development in enhancing renewable energy.

Cluster #3–New York City Panel–contains the keywords occurring: “United States” (193), “human” (187), “government” (181), and “humans” (130). This cluster explores the governance mechanisms and institutional arrangements needed for effective climate change adaptation. It emphasizes the importance of stakeholder engagement, capacity building, and policy implementation. These clusters indicate that the research community has developed distinct thematic areas, focusing on vulnerability assessment, adaptation planning, and governance. The clustering suggests that studies in the field are multidimensional, involving both theoretical frameworks and applied research.

In terms of centrality, “human” has a high centrality score, indicating that it frequently connects research on climate and human. The centrality of “human” suggests that it is a pivotal concept in the field, bridging discussions on the role of human on climate and local government. Its central position in the network highlights its role as a unifying theme in climate change adaptation research.

Regarding burst effects, “greenhouse gas” has a citation burst from 2001 to 2013, indicating a growing interest in surface temperature. The burst of “greenhouse gas” suggests that researchers are increasingly focusing on using ecological and sustainable methods, such as green infrastructure, to address greenhouse gas impacts. This shift highlights a trend towards more holistic and sustainable adaptation strategies.

TABLE 1. TOP KEYWORDS ON PUBLIC INSTITUTION AND CLIMATE CHANGE RESEARCH

Top Keywords	Frequency	Centrality
Environmental Policy	229	0.04
Adaptive Management	222	0.07
United States	195	0.05
Sustainable Development	195	0.00
Human	191	0.12
Government	182	0.07
Governance Approach	181	0.02
Decision Making	180	0.03
Climate Change Adaptation	170	0.01
Risk Assessment	162	0.02

4. CONCLUSION AND FUTURE WORK

The study highlights the evolving research landscape on public institutions and climate change by using bibliometric analysis to examine publication trends, key contributors, and thematic developments. The results reveal a significant increase in publications over the last

decade, indicating a growing academic interest in understanding the role of public institutions in climate change governance and policy integration. Key themes identified include climate governance, policy networks, and sustainable development, with leading contributions from countries like the United States, Australia, and China. The findings emphasize the importance of aligning climate mitigation and adaptation strategies within public policy frameworks to effectively address global climate challenges.

The study underscores the interdisciplinary nature of this research field, which spans environmental science, social sciences, and policy studies, among others. Despite the growing body of literature, the research points to a need for deeper integration of climate considerations in public administration and governance practices, especially in emerging economies and regions with limited research output. Future research should focus on enhancing international collaboration, fostering cross-disciplinary approaches, and addressing gaps in policy implementation to strengthen the capacity of public institutions in climate adaptation and mitigation efforts. This comprehensive overview provides valuable insights for researchers and policymakers looking to bolster the role of public institutions in combating climate change.

ACKNOWLEDGMENT

The research was funded by the Institute for Research and Community Service (LPPM) Universitas Hasanuddin (Grant Numbers 02124/UN4.22/PT.01.03/2025). The authors thank the Faculty of Social and Political Sciences, Universitas Hasanuddin University for organizing a workshop. The event was held in collaboration with the Environmental Policy and Governance Research Group (EPG-RG). Through this event, the author gained knowledge about Bibliometric analysis and CiteSpace. Both are used in this study.

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