

Review

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Review

Insights on Who Funds Climate Change Adaptation Research in South Africa

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Abstract: (1) Background: This article examines the funding landscape of climate change adaptation research in South Africa to understand the origin, distribution, and thematic prioritization of funding for climate-change research in South Africa. (2) Methods: The article used specific search terms to query peer reviewed publications in the Web of Science and Scopus databases (1985 to 2023). (3) Results: Environmental Science emerged as the most dominant research area during this period, while agriculture appeared in the top four position among research areas in climate change adaptation research in South Africa in both databases. The largest number of publications on climate change adaptation research in South Africa is generated through domestic funding, followed by the United States of America, the United Kingdom, and Germany. The National Research Foundation (NRF) had the highest number of publications. The analysis revealed a strong paucity of funding relationship between South Africa and other African countries in the field of climate change adaptation research. (4) Conclusions: Knowledge of these trends can inform policy decisions on funding of climate change adaptation in South Africa and strategic partnerships between South Africa and the rest of the world.

Keywords: bibliometric review, climate change adaptation, south africa, research funding; research themes

1. Introduction

Climate change adaptation has become a critical focus in the global response to climate change [1,2]. The Paris Agreement significantly raised the profile of climate change adaptation [3,4], and over the past two decades, there has been a marked increase in peer-reviewed publications on the topic [5]. However, as scientific literature on climate adaptation proliferates, there is a growing challenge in analysing the extensive information available. As a result, gaps persist in understanding the progress of climate change adaptation at the national level [6,7]. In South Africa, there has been little effort to assess the maturity of climate adaptation research, particularly regarding funding sources and research themes.

Significance of the Study for South Africa

This article is particularly important for South Africa due to the country's unique circumstances, including unequal opportunities for society to contribute to and access scientific research [37], reductions in research funding [38], a shortage of skills [39], high vulnerability to extreme weather events [40,41], and the need to strengthen the country's capacity to respond to climate change impacts [42,43]. Despite these challenges, South African scientists are actively involved in global assessments of climate science, such as the Intergovernmental Panel on Climate Change (IPCC) [44] and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) [45]. Understanding the

funding landscape for climate adaptation research can better equip national experts to contribute to these global assessments.

Challenges in Climate Change Adaptation Research

The complexity of climate change adaptation science includes both basic and applied research [8], with some dimensions focused on understanding adaptation processes and others on generating practical knowledge [9]. Nalau & Verrall [10] highlighted several characteristics of climate adaptation science, such as an evolving epistemological base and challenges in capturing marginalized communities' lived experiences in academic literature. A key difficulty remains in generalizing what makes adaptation effective and in which contexts.

Bibliometric Analysis of Climate Change Adaptation Research

Bibliometric analysis has been widely used to examine climate adaptation research trends globally [11–15], with regional studies offering similar insights. For example, Vakulchuk et al. [16] studied Central Asia's engagement with climate research from 1991 to 2021. However, there has been limited research into climate adaptation publications in South Africa and Southern Africa. Kapuka et al. [17] reviewed climate change research in Southern Africa, while Pouris [18] focused on Europe-Africa research co-publications. More research is needed to examine funding trends and research themes in South Africa.

Funding and Research Priorities in Climate Change Adaptation

Funding is a critical component in shaping research priorities and climate responses, yet it remains understudied in climate adaptation research [21,22]. No peer-reviewed analysis has explored how climate adaptation research in South Africa is funded or how this funding influences research themes. Insights into the sources of funding for adaptation research can help policymakers and researchers align resources with national and international climate goals. Additionally, understanding the distribution of financial resources across scientific disciplines is essential for effective decision-making and prioritization.

Gaps in Climate Finance for Adaptation Research

Despite long-standing calls for financial support for adaptation research in developing countries [23–27], global climate negotiations like those under the United Nations Framework Convention on Climate Change (UNFCCC) have often overlooked this area. Most climate finance is directed toward mitigation [29–33], leaving limited funds for adaptation. Examining how the available adaptation funds are allocated in South Africa is crucial for assessing the effectiveness and efficiency of resource use in addressing climate challenges.

Literature Contributions

This study contributes to various branches of literature, including research on the power of developing country researchers to set research agendas [47,48], and the allocation of climate research funding based on vulnerability, exposure, or risk [49,50]. By investigating funding trends and research themes, this study provides a comprehensive view of the national climate adaptation research landscape, which can guide policy and improve the effectiveness of climate adaptation responses.

Aim and Objectives

The purpose of this study is to explore the funding landscape for climate change adaptation research in South Africa and to analyse key research themes through a bibliometric analysis of peer-reviewed publications indexed in the Web of Science and Scopus databases from 1985 to 2023. By doing so, the research aims to inform future funding strategies, assess national research performance,

and provide insights into South-South and North-South collaborations in climate research [46]. Understanding the sources and distribution of funding will help profile key institutions that play a role in supporting scientific research in South Africa.

This article has two objectives: (1) to analyse the sources of funding for climate change adaptation research in South Africa using bibliometric analysis, and (2) to outline the themes of research outputs from South African publications. By examining these aspects, this study offers insights into research priorities and national intentions, which can inform South Africa's climate justice and development agenda.

Climate change adaptation has become a critical focus in the global response to climate change [1,2]. The Paris Agreement significantly raised the profile of climate change adaptation [3,4], and over the past two decades, there has been a marked increase in peer-reviewed publications on the topic [5]. However, as scientific literature on climate adaptation proliferates, there is a growing challenge in analysing the extensive information available. As a result, gaps persist in understanding the progress of climate change adaptation at the national level [6,7]. In South Africa, there has been little effort to assess the maturity of climate adaptation research, particularly regarding funding sources and research themes.

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[42,43]. Despite these challenges, South African scientists are actively involved in global assessments of climate science, such as the Intergovernmental Panel on Climate Change (IPCC) [44] and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) [45]. Understanding the funding landscape for climate adaptation research can better equip national experts to contribute to these global assessments.

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2. Materials and Methods

Data Sources

The data for this study were sourced from two bibliographic databases: Web of Science (WOS) and Scopus. These databases are well-established for their comprehensive indexing of peer-reviewed publications across various disciplines, making them ideal for bibliometric analysis. Scopus, in particular, is noted for providing broader coverage, with approximately 20% more content for citation analysis compared to Web of Science, as demonstrated in previous studies [51]. For this reason, both databases were utilized to ensure a comprehensive assessment of the research landscape. Google Scholar was excluded from this study due to previously reported inconsistencies and inaccuracies in its indexing and citation metrics, which could affect the reliability of the analysis [52].

The search strategy targeted articles focused on climate change adaptation, using specific keywords such as "climate change adaptation," "adaptation strategies," and "resilience" to capture relevant literature published between 1985 and 2023. Only peer-reviewed journal articles were considered in this study..

The bibliographic data extracted from both databases included several key metadata fields: Funding information, which was downloaded as a subset of the results, provided details on the financial support associated with each publication. Country affiliation data were extracted to assess the geographic distribution of climate change adaptation research, focusing mainly on South Africa. Institutional affiliation data highlighted the organizations and universities that played a role in climate change adaptation research within the country.

In Web of Science, the "Funding Agency" field was used to collect funding-related data, while the "Country" and "Organization" fields provided information about the national and institutional contributions. Similarly, in Scopus, the "Funding Sponsor" field, along with author affiliations, was used to map out the sources of research funding and the key institutional contributors in South Africa.

Search Strategy

In June 2023, a literature search was conducted using SCOPUS and Web of Science (WOS) to identify relevant scholarly articles on climate change adaptation in South Africa. For inclusion criteria, specific key terms, "climate," "change," "adaptation," "South," and "Africa" (Figure 1); were employed in the search queries, which were combined using Boolean operator "AND" and quotation marks "" to enhance focus and precision. The individual search terms proved sufficient for capturing relevant literature without the need for additional free text terms, yielding over 1500 results in each database. For exclusion criteria, the search was restricted to articles published in English between 1985 and 2023, ensuring a comprehensive view of the evolving discourse on the subject. The search results included 1,916 items from SCOPUS and 2,077 from Web of Science, which were downloaded in RIS (Research Information Systems) and CSV (Comma-Separated Values) formats for further analysis. To supplement the database searches, a manual review of the reference lists of identified

articles was conducted, resulting in the inclusion of several additional relevant studies. The full search strategy, including specific search strings and detailed steps, is documented in the appendix of this article, promoting transparency and reproducibility of the methodology. Prior to conducting any analyses, the datasets underwent a thorough cleaning process. This included checking for and addressing any inconsistencies, missing values, or duplicate entries. Fields were standardized to ensure uniformity, and any irrelevant or extraneous data was removed to focus solely on the key variables necessary for bibliometric analysis. All relevant articles were systematically organized for analysis, facilitating a comprehensive synthesis of the literature on climate change adaptation in South Africa as show in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram in Figure 1.

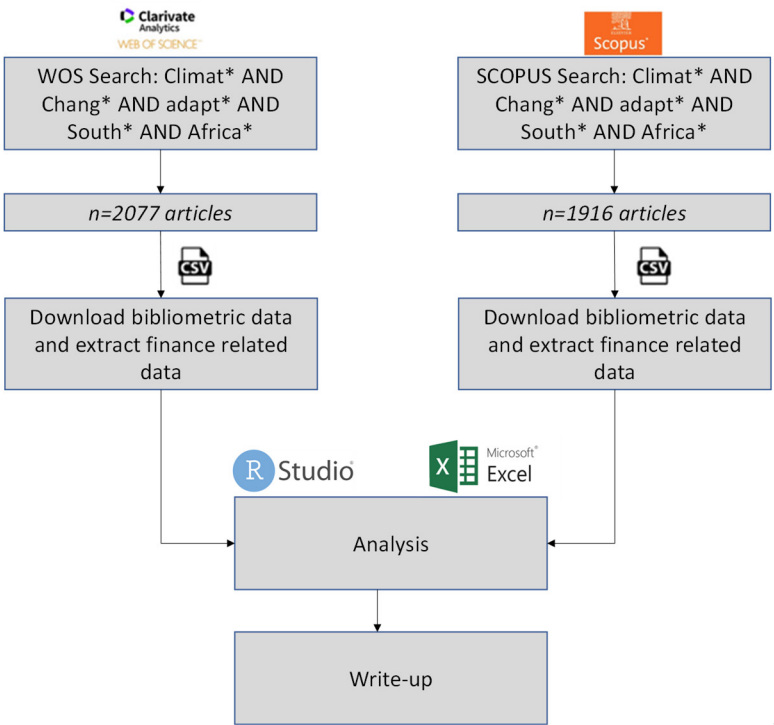


Figure 1. Flow diagram showing the methodological flow of the research. Methodological flow diagram showing sequential steps used in the research process.

Data Processing and Data Analysis

In this study, we conducted a comprehensive analysis using four pairs of distinct data sets obtained from SCOPUS and Web of Science. The data was processed and analysed with Microsoft Excel 365 and R software (v4.4.1). Our analysis focused on three primary areas: publication patterns, funding sources, and the global distribution of climate change adaptation research, specifically in South Africa. Various visualization techniques, including bar graphs, thematic maps, and Sankey diagrams, were employed to effectively convey our findings.

Patterns of Publication by Research Domains

We began by examining the number of publications across various research domains, concentrating on the top 10 research domains identified from both SCOPUS and Web of Science. Colour coded (orange = SCOPUS & purple = WOS) vertical bar graphs were used to compare the volume of publications in each research domains, aiming to determine if the ranking of research areas, from the highest to the lowest number of publications, was consistent across the two databases. Our hypothesis was that the top 10 research areas would align in both databases, reflecting similar research trends. We investigated how publication rates varied across different research domains specific to climate change adaptation in South Africa. We utilized research domain classifications from the built-in analysis page of SCOPUS and WOS to analyse publication rates across different

research domains. This approach provided a comprehensive view of publication trends and domain-specific research domains.

Funding Source Organisation and Country

We examined the funding organizations mentioned in the publications by extracting information on funding sources and mapping them, with Sankey diagram, to their respective countries. The analysis focused on the top eight countries based on the number of identified funding organizations. Thematic maps were created to show the number of organizations, and the volume of publications funded by these organizations. The maps used a colour gradient to represent the volume of publications, with darker shades indicating higher numbers of funded publications.

Additionally, we investigated the top ten countries contributing to climate change adaptation research in South Africa. A world map with a colour gradient was used to visualize the data, highlighting the leading funding agencies and their contributions to research in South Africa.

Global Distribution of CCA Research Investment

To assess the global distribution of climate change adaptation research, we analysed publication data by country. We extracted data from SCOPUS and Web of Science, focusing on the number of publications from each country. Paired vertical bar graphs were generated using R's ggplot2 package to illustrate the volume of research output by country, providing a clear picture of where the most significant contributions originated between the databases.

We also examined the global distribution of research funding using Sankey diagrams to visualize the flow of funding from organizations to countries. These diagrams illustrated the proportion of publications funded by organizations from different countries, highlighting the global distribution of inferred research funding as driver of publication output.

This structured approach provided a comprehensive understanding of publication trends, funding patterns, and the global reach of climate change adaptation research, using various data visualization methods to present and interpret the findings effectively.

3. Results

CCA Research Domains

From the analysis of research domains (see Figure 2), *Environmental Science* stands out as the most prominent field in climate change adaptation research, with significant contributions from both the WOS (3,600 publications) and SCOPUS (3,497 publications) databases (Figure 2B). *Environmental Science* was originally linked to the *Earth and Planetary Sciences* branch.

In the phylogenetic display of the cluster dendrogram (Figure 2A), *Agricultural and Biological Sciences* and *Social Sciences* were identified as two distinct sub-branches stemming from both *Environmental Science* and *Earth and Planetary Sciences*. This classification highlights their close association with these primary research domains in climate change adaptation.

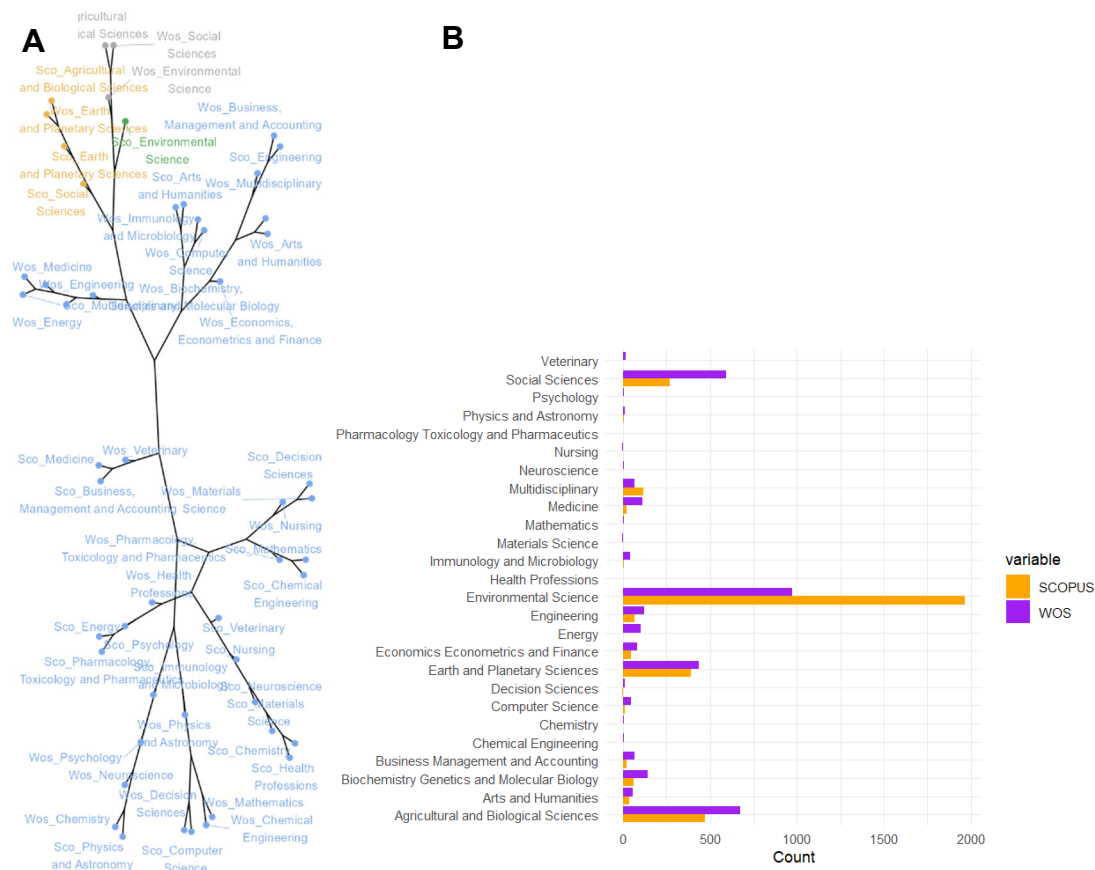


Figure 2. This figure shows the dominance of environmental science as a top subject area in South African climate change adaptation research in both the SCOPUS and WOS datasets.

Global Distribution of Top 10 Countries and Institutions Funding CCA Research in SA

There were large similarities between the two databases in terms of country representation in the database using country location of the funding source institution (Table 1 and Figure 3). For both databases, the top four countries providing funding for CCA research in South Africa were South Africa, United States, United Kingdom, and Germany. In the Web of Science database, the United Kingdom, followed by Germany, had the highest number of institutions that published on climate change adaptation in South Africa. While for the Scopus database, the United Kingdom, Germany, South Africa and United States of America, each had two institutions that fund the largest number of publications on climate change adaptation.

It is important to highlight the results of the analysis for South African based research funding institutions. The results from the Sankey analysis presented in Figure 3 showed that the National Research Foundation (NRF), with a total of 262 publications, emerged as the largest contributing research funding agency in terms of the number of articles funded in both the Scopus and Web of Science databases. By contrast to the NRF, our analysis showed that South Africa’s Water Research Commission (WRC) was in position six in the Scopus database and was absent in the Web of Science among the top ten executing agencies funding climate change adaptation research in South Africa.

Furthermore, it is worth noting that in the Scopus database, the National Research Foundation was recorded as two different institutions. As a result, the count of papers attributed to the National Research Foundation was different from the results of the National Research Foundation South Africa. Moreover, our analysis revealed variations between the two databases regarding the representation of country and funding organizations as some countries and funding organizations were found only in the Web of Science or only in Scopus, while others were common to both databases. For example, the Water Research Commission featured only in the Scopus database.

Figure 3 shows only peer-reviewed publications. It is possible that the results of this analysis would be different if grey literature were included.

The top ten institutions that fund peer-reviewed climate change adaptation research that is about South Africa and is published in Scopus database are based in six countries; while those are published in the Web of Science database are based in seven countries (Table 1 and Figure 4). In the Scopus database, South Africa (144), followed by United Kingdom (101) and then United States of America were the top three countries that published climate change research on South Africa. While, in the Web of Science the United Kingdom (236), South Africa (149) and United States of America (91) were the top three countries that published climate change research on South Africa. The bar chart underscores the varying levels among countries regarding research outputs on climate change adaptation in South Africa. The research outputs can be a proxy of financial inputs to climate change adaptation research in South Africa. What is certain is that the chart serves as a valuable tool for understanding the global distribution of scientific research interest on South Africa.

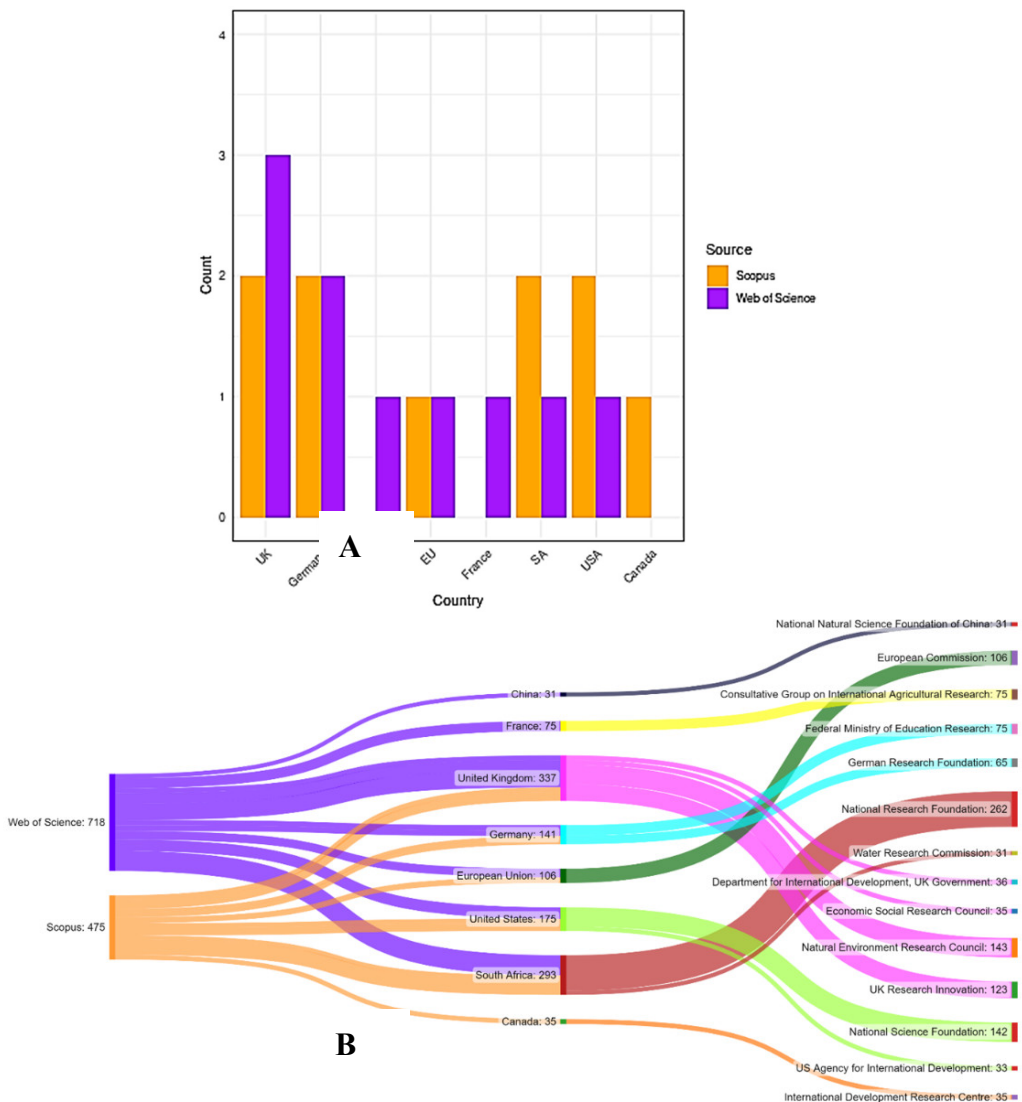


Figure 3. Distribution of Funding Organizations by Country in Web of Science and Scopus (A), Sankey diagram (B) of South African climate change adaptation research publications as an indicator of funding sources executing agency and countries, comparing Web of Science and Scopus databases.

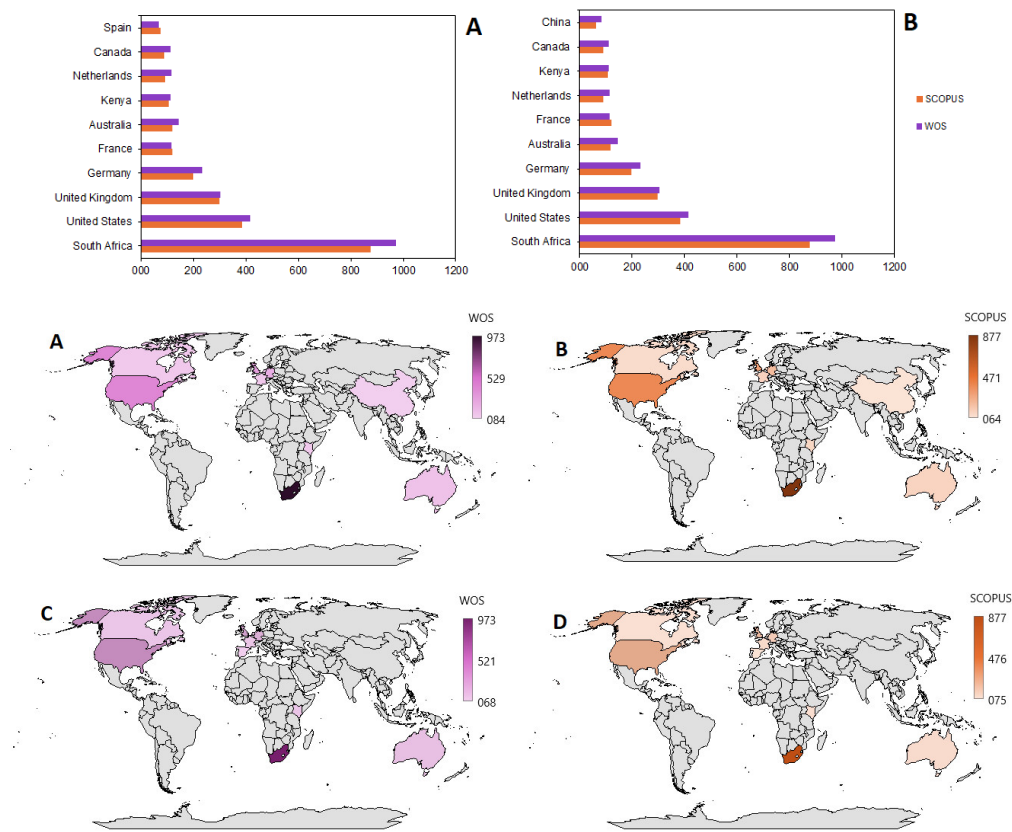


Figure 4: The bar chart illustrates a comparative analysis of count data from entries of articles on climate change adaptation in South Africa, arranged in descending order of Scopus (A), and Web of Science (B) across various countries and regions. The maps represent the top 10 countries in Web of Science (A) compared with Scopus (B), and the top 10 countries Scopus (D) compared with Web of Science (C).

Table 1. Top ten research organisations that have published adaptation research on South Africa in Scopus and on Web of Science.

Database	Country	Funding Institution	<i>n</i> Articles	%
WOS	China	National Natural Science Foundation of China	031	01.50
	European Union	European Commission	063	03.00
	France	Consultative Groupon International Agricultural Research	075	03.60
	Germany	Federal Ministry of Education Research	042	02.00
	Germany	German Research Foundation	038	01.80
	South Africa	National Research Foundation	149	04.90
	United Kingdom	UK Research innovation	123	05.90
	United Kingdom	Natural Environment Research Council	078	03.80
	United Kingdom	Economic Social Research Council	035	01.70
	United States	National Science Foundation	084	04.00
SCOPUS	Canada	International Development Research Centre	035	03.40
	European Union	European Commission	043	04.20
	Germany	Bundesministerium für Bildung und Forschung	033	03.20
	Germany	Deutsche Forschungsgemeinschaft	027	02.70
	South Africa	National Research Foundation	113	11.10
	South Africa	Water Research Commission	031	03.00
	United Kingdom	Natural Environment Research Council	065	06.40
	United Kingdom	Department for International Development	036	03.50

United States	National Science Foundation	058	05.70
United States	United States Agency for International Development	033	03.20

* Country = Country where the funding institution’s head office is based

Discussion

Top 10 Subject/Research Areas Benefiting from South African Climate Change Adaptation Finance.

The dominance of environmental sciences in climate change adaptation research in South Africa aligns well with previous studies on trends in climate change adaptation literature [53]. This result suggests that climate change adaptation is largely seen by researchers through the environmental lens. Impacts of climate change on the natural environment are unevenly distributed geographically. South Africa is ranked sixth out of the world's seventeen megadiverse countries and is rated among the top 10 for plant species diversity. Therefore, it would be expected that considerable effort is invested to understand the impacts of, and responses to, climate change on the environment. However, other authors have contested the dominance of environmental science research as a reflection of both narrow perspectives of framing the analysis of climate change [54] and a weakness of inadequate conceptualisation of the political mechanisms of social change that serve to reproduce vulnerability to the impacts of climate change over time and space [55].

The presence of agriculture in top ten areas in both Scopus and Web of Science is understandable as it suggests a growing scholarly interest in the application of climate science to support livelihoods [56,57], through understanding impacts on, and options to enhance, productive landscapes of South Africa.

Global Distribution of Top 10 Countries and Institutions Funding Climate Change Adaptation Research in SA

Our analysis focused on examining the global distribution of publications on South Africa’s climate change adaptation using the Scopus and Web of Science databases, as a proxy for funding of adaptation research in South Africa.

The finding that a South African institution is responsible for highest number of publications in climate change adaptation in South Africa is meaningful, and from it we can draw the following six observations. Firstly, climate change adaptation research that is funded by South African institutions is likely to encourage and catalyse context relevant development and implementation of nationally appropriate climate actions and climate resilient development pathways. Secondly, this result suggests that there is considerable funding for climate change adaptation research in South Africa from a South African institution. This observation contradicts findings from similar studies that showed that almost all funding for climate research on Africa originates outside the continent [22,58], or climate change research has been neglected by local researchers [16]. Thirdly, this result reflects an understanding by South African decision makers that South Africa faces disproportionate risks from climate change and is ultimately responsible for addressing these risks. Importantly, this result suggest ownership by South African decision makers of the national climate change adaptation research agenda. Such ownership may lead to, or contribute to, the development and advancement of Africa-led initiatives that aim to create solutions for climate finance flows to Africa [59]. Fourthly, this domination of scientific publications on climate change adaptation in South Africa by a South African institution challenges the expected domination of science relevant to climate change policy and practice by researchers from industrialized in the countries of the Global South [60]. Fifthly, this result confirms a well-established observation that research institutions that are based in Europe and North America receive considerable funding for climate research on Africa [22]. Sixthly, this result suggests that South African climate adaptation researchers are likely to experience minimum detrimental impacts of persistent ‘parachute science’ partnerships. Miller et al., [61] define parachute science partnerships as ‘inequity in research relationships between researchers from the Global North and those from the Global South’.

Analyzing the worldwide distribution of climate change adaptation publications on South Africa from the top 10 funding organizations revealed the crucial role of dataset selection in shaping bibliometric research outcomes. The appearance of the Water Research Commission (WRC) only in the Scopus database highlights the differences between the two databases. This discrepancy highlights the importance of understanding the limitations of using only one literature database in literature reviews. In addition, our analysis showed that it is essential to account for the indexing criteria employed by the database collections when examining country representation. These criteria influence the composition of the dataset and can lead to variations in the representation of countries within the sample. Numerous indicators are used to assess and compare institutional or national scientific performance [62,63]. In this study the focus was on two informative yet straightforward indicators: affiliation of the first author and the proportion of publications conducted by the international teams involving African authors [64].

Our results also showed that contributions to climate change adaptation research in South Africa by the United Kingdom (UK) originated from several research institutions. It is important to remember that South Africa is a former British colony. It is possible that the research interest in South Africa by the UK based institutions stems from historical colonial ties between these two countries. Indeed, Overland et al., [22], reported that global funding for climate change research in Africa supported research on former British colonies more than in other African countries. Our results are consistent with previous studies which reported a tendency of climate change research to follow the geographies of colonial legacy [22,65].

Results of this study also indicate that the largest number of publications on climate change adaptation in South Africa were from countries that have formal bilateral relationships with South Africa. This observation suggests that formal bilateral ties may be contributing positively to climate change adaptation research in South Africa. This result is important on two fronts. Firstly, it points to the need for South Africa decision makers to be deliberate in fostering funding of climate change adaptation through the country's bilateral relations, to augment the local grant-based funding sources. Secondly, this result highlights the opportunity for South African climate change researchers to align their research collaborations with researchers from institutions of those countries that have bilateral relations with South Africa.

Limitations of the Study

Our analysis did not allow us to know the scale of funding. Rather, the analysis could identify the sources of funding. Owing to being the two world-leading citation databases of English language journals, the Web of Science and Scopus databases have been used extensively in bibliometric analysis across several research domains [66]. However, the use of these two databases does come with inherent biases. For example, Mongeon and Paul-Hus [67], showed that both databases are biased towards Natural Sciences and Engineering as well as Biomedical Research to the detriment of Social Sciences and Arts and Humanities, and that both databases disadvantage journals that are not in the English language. Furthermore, the use of Web of Science and Scopus databases has certain limitations. These include restricted access due to subscription requirements, difficulties in distinguishing authors, and insufficient coverage of books, proceedings and grey literature [68]. However, despite the acknowledged limitations and biases of these databases (see Wilder & Walters, [68]), these limitations did not impact the results of this study for the following reasons:

Firstly, our study focused exclusively on scientific papers, disregarding books and grey literature. Therefore, the limitations related to these types of sources are irrelevant to the analysis conducted in this study. Secondly, the primary data used in this study is metadata, which provides valuable information about the publications themselves. Metadata can often be accessed without a subscription and is more accessible compared to the detailed content of scientific papers. Thirdly, the mechanisms for distinguishing authors, which may be inadequate in the databases, did not affect the analysis in this study because the study is not based on author-centric factors.

Conclusions

In this article, we set out to examine the sources of funding for climate change adaptation in South Africa and to describe climate change adaptation research themes from publications on South Africa for the period 1985 to 2023 using Scopus and the Web of Science databases. This study provided us with an opportunity to understand the extent to which the academic community engaged with climate change adaptation in South Africa between 1985 and 2023. The study confirmed that South Africa has experienced remarkable progress in climate change research during the past four decades.

The study yielded three main results. Firstly, the study showed Environmental Science as the most dominant research area, while Agriculture appeared in the top four position among research areas in climate change adaptation research in South Africa in both the Web of Science and Scopus databases. Secondly, between 1985 and 2023, South Africa, United States of America, United Kingdom, and Germany contributed the largest number of publications on climate change adaptation research in South Africa. Thirdly, the National Research Foundation (NRF) emerged as the largest contributor to climate change adaptation research in South Africa.

This finding that the largest number of publications on climate change adaptation research in South Africa is generated through domestic funding is commendable given urgency and criticality to prevent loss of development gains to the impacts of climate change. However, this result points to the persistent lack of just and equitable flows of climate flows for climate adaptation research. South Africa has had negligible contribution to historical accumulation of greenhouse gas (GHG) emissions in the atmosphere. Industrialized countries, who have historically contributed the most to GHG emissions, should provide adequate funding for climate adaptation research by, and research infrastructure for, researchers based in South African institutions to ensure informed national response to climate change that is free of colonial mindsets, prejudices and perspectives.

Another important observation emanating from this study is the absence of research institutions that are based in Africa among the top ten institutions that have scholarly publications on South Africa's climate change adaptation. This paucity of collaboration or scholarly interest on climate change adaptation possibly reflects two main issues. Firstly, the coverage of the tools of analysis used in this study, that is, a focus on peer-reviewed literature. Secondly, the lack of funding for cross-border research that prevails in many African countries. Regardless of any possible reason for this result, this observation highlights a missed opportunity for African nations to learn from one another, share valuable information, pool resources, and collaborate on climate adaptation research initiatives. Climate change is a multi-country phenomenon. Collaboration among African countries is crucial for collectively addressing climate change challenges that transcend national borders and have shared regional impacts. It would be expected that South Africa has functioning research collaborations in the African region that, among other outputs, produce peer-reviewed articles in the field of climate change adaptation.

There are three main limitations of this study. Firstly, this study analyzed mainly the flows of funding for adaptation research. It did not analyze the split of research funding between the South African researchers and researchers from these countries that have the largest number of publications on CCA research in South Africa. Secondly, it did not examine the trends in scale of funding for climate change adaptation research in South Africa. Nevertheless, this study showed that the use of bibliometrics is a useful tool for examining trends in climate change adaptation research. Thirdly, it did not examine co-authorship between South African authors and international authors to understand partnerships that enhance African scholarship.

Our findings indicate an increasing ability of South African climate change adaptation scientists to contribute to the global discussions. They also highlight the need to strengthen South Africa – Africa research collaboration to inform regional climate change adaptation policy and practice. This study contributes to the understanding the progress of climate change adaptation research in South Africa; while also representing a valuable and fundamental reference for both researchers and practitioners in the field of climate change adaptation in South Africa.

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