



THE ROLE OF ACADEMIC LIBRARIES IN SUPPORTING CLIMATE ACTION: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Purpose: This study examines the role of academic libraries in supporting climate action, exploring how library resources, services, and institutional positioning contribute to climate literacy, sustainability education, and environmental advocacy within higher education.

Design/Methodology/Approach: The PRISMA guidelines were used to systematically review relevant literature. The researchers sourced relevant literature from five scholarly databases (ACM Digital Library, Web of Science, ScienceDirect, Library Information Science and Technology Abstracts (LISTA), and Scopus) from 2000 to 2024. A total of 129 articles were retrieved and reviewed for quality and relevance, but only ten (10) relevant records were included, satisfying the inclusion criteria.

Research Limitation: The results were limited to 10 studies on the role of academic libraries in supporting climate action. The study was further restricted to English-language publications.

Findings: The study identified categories such as curated climate-focused collections, green library initiatives, awareness programmes, climate and sustainability literacy, advocacy and policy engagement, green open educational resources, digital repositories, and research and data support to better understand the evolving role of academic libraries in supporting climate action.

Practical Implication: The practical implication is that academic libraries must curate inclusive and diverse climate change collections and enhance access to 'Green Open Educational Resources' (GOERs) and digital repositories to support sustainable research and climate action among users.

Social Implication: The paper proposes establishing a climate data laboratory in academic libraries, encouraging the development of green open educational resources for sustainability, and advancing sustainability initiatives across the curriculum.

Originality/Value: This study offers a systematic and comprehensive synthesis by consolidating relevant literature on how academic libraries support climate action and resilience through their resources, collections, and services.

Keywords: *Climate action. digital. green academic libraries. green open educational resources. sustainability*

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INTRODUCTION

In recent years, there has been increased concern about global warming and climate change and their impacts on the sustainability and survival of humans and the planet. Climate change is recognised as one of the greatest threats to global health and a challenge for this generation (Trotter & Komarnytska, 2023).

The harmful effects of climate change have called for collective efforts and sustainable practices, which require various stakeholders and decision-makers to participate in adapting to and mitigating this global challenge. This is essential due to its direct impact on human life (Lusiana, 2024).

Recent studies highlight the effects of climate change on society, regardless of age and gender (Trotter & Komarnytska, 2023; Martin et al, 2022; Hickman, 2020). This has led to the 2030 Agenda for Sustainable Development Goals, a framework that links climate change with economic, environmental, and social development (Aytac, 2022). The SDGS aim to inspire transformative action towards a sustainable future by individuals and various stakeholders.

The Canadian Medical Association and the Lancet Policy Brief 2020 for Canada advocate for “an urgent transition to an environmentally sustainable, just and healthy society ...” to address the severe consequences of climate change on health, rising sea levels, water scarcity, food crises, and irreversible damage to ecosystems (Kornfeind, 2022; Aytac, 2022; United Nations, 2021).

Addressing climate change and its harmful effects requires both global and local actions. Local action involves “access to knowledge and information resources about environmental sustainability and the roles communities can play” (Aytac, 2022; p 2). It involves individuals having knowledge and awareness of the environment, including observable behaviours (DemirtasDogan, 2023). Therefore, joint awareness and concrete action from various groups are necessary to combat climate change.

Climate action refers to the choices and behaviours of individuals, governments, institutions, organisations, communities, and societies in responding to climate change. For a healthy community, libraries play a vital role. As centres of information, libraries contribute to global efforts to tackle climate change and promote sustainable development by disseminating knowledge on climate change and environmental sustainability, supporting sustainability projects, practising sustainability within the library, and engaging in sustainable collection development.

However, the increasing demand for resources on climate change, such as green open educational resources and sustainable solutions in academic libraries, warrants this study. As societies continue to face problems related to climate change, there is a growing need for resources, services, and strategies to address it. Therefore, consolidating existing



knowledge to identify strategies and resources and propose improvements requires a systematic review.

Academic libraries' climate action aims to raise public awareness of climate change and its effects on society (Lusiana, 2024). These libraries connect the public with climate change resources, offering accurate, accessible, and current information on effective ways to incorporate climate change practices into daily life (Trotter & Komarnytska, 2023). Climate action in academic libraries enhances health, supports renewable energy, and mitigates the impacts of climate change. To combat climate change, the International Federation of Library Associations (IFLA) and other organisations have used the Sustainable Development Goals as a guiding framework. In view of this, conducting a systematic review of the role of academic libraries in supporting climate change is essential to identify appropriate resources and strategies that advance climate resilience.

The objective of the study is to systematically identify and critically examine the strategies and interventions academic libraries employ to address climate change, with particular attention to their scope, implementation approaches, and contextual variations. It further seeks to evaluate the mechanisms and practices through which academic libraries influence and mobilise their user communities toward climate action, including awareness-building initiatives, behavioural change efforts, and participatory engagement models. Additionally, the study intends to analyse the nature, accessibility, and effectiveness of the resources and services provided by academic libraries in supporting climate change mitigation and adaptation, with emphasis on their alignment with user needs and broader institutional sustainability goals.

Therefore, to ensure reproducibility and rigour in this study, an established systematic review methodology is followed. To identify relevant studies, a search string is developed, and searches are conducted in reputable scientific databases. A thorough screening and data extraction process is conducted on selected studies to ensure quality and relevance. Finally, the review can guide future advancements in green libraries and climate literacy.

LITERATURE REVIEW

An urgent global concern in the twenty-first century is Climate change, and academic libraries are increasingly required to contribute to combating the phenomenon by strengthening systems to withstand climate impacts and promoting climate literacy. As important actors, academic libraries are recognised for their roles beyond traditional activities, including sustainable climate action practices and community engagement (Hamad et al., 2024; Appleton & Woolley, 2023).

Libraries are known as knowledge hubs because they provide access to resources such as policy documents, research data, government publications and teaching and learning



materials that raise awareness of the impact of climate change and the need for mitigation strategies. More importantly, academic libraries are the go-to source because they facilitate evidence-based answers to climate change by consolidating access to reliable information and supporting scholarly communication (Appleton & Woolley, 2023). Naik (2024) supports the assertion that libraries contribute to environmental awareness by synthesising reliable resources into comprehensive repositories and making them accessible. In this respect, libraries function not only as information providers but also as knowledge brokers within the academic community.

Similarly, Hamad et al. (2024) suggest that academic libraries are the bedrock of information dissemination through information literacy instruction, curriculum support, and user education programmes. As a reliable source of climate information, it enables students and staff to identify, evaluate, and make evidence-informed decisions about sustainable climate actions, thereby reducing or eliminating misinformation and climate scepticism (Appleton & Woolley, 2023). Adetayo (2022) also demonstrates that information sources shape students' attitudes toward climate change, underscoring the importance of library guidance in selecting and using trustworthy materials.

The literature also showcases the increasing relevance of green libraries and sustainable organisational practices. Some libraries have adopted sustainability practices such as energy conservation, waste reduction, recycling and upcycling initiatives. Some studies suggest that academic libraries in Africa are gradually implementing green practices, although this is constrained by funding gaps (Adjei et al., 2025), reflecting the desire to adopt sustainable environmental best practices.

Academic libraries are often viewed as spaces for activism, collaboration, knowledge exchange, civic engagement around climate issues, and community resilience hubs that foster public education (Oshinaike & Saidu, 2024). This perspective is especially relevant to climate justice, as libraries can promote equitable access to climate information and learning opportunities. Hence, academic libraries aid both academic and civic functions in supporting climate awareness and action.

It is important to acknowledge that academic libraries are also susceptible to the adverse effects of climate change, which can have dire consequences for library stock and equipment, underscoring the need for sustainable disaster planning (Mohammed, 2024; Oshinaike & Saidu, 2024). Libraries, therefore, occupy a dual position as both contributors to climate solutions and institutions affected by climate-related disruptions.

While these contributions are significant, several constraints hinder academic libraries' active participation in climate action. The literature identifies limited funding, inadequate infrastructure, insufficient staff expertise, and weak policy integration as major challenges, particularly in developing-country contexts (Adjei et al., 2025; Hamad et al., 2024).



To conclude, it is significant to emphasise that the academic library plays a substantial role in the fight against climate change, as evidenced by its climate literacy campaigns, knowledge dissemination, sustainability practices, and community mobilisation efforts. These notwithstanding, a successful campaign hinges on robust organisational support and an embedded higher education sustainability agenda.

METHODOLOGY

This study conducted a systematic literature review to critically evaluate the published literature on how academic libraries address climate change, support the community's action on climate change, and provide resources for climate action. It adopted the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021a, 2021b; Shamseer et al., 2015). Page et al. (2021b) noted that PRISMA guidelines help authors produce comprehensive reports of their systematic reviews. PRISMA is an evidence-based, hierarchical flowchart of essential items that promotes transparency and enhances research reporting.

The PRISMA framework has four stages: identification, screening, eligibility, and final inclusion of studies or records (Ashiq et al., 2020). Recent studies, including those within librarianship, have applied the PRISMA guidelines to thoroughly review published research (Xie et al., 2023; Dwinggo Samala et al., 2023; Ashiq & Warraich, 2022). The study's title, objectives, methods, results, discussion, and other relevant details, such as inclusion and exclusion criteria and risk of bias, were developed in accordance with the PRISMA 2020 checklist proposed by Page et al. (2021b).

Search Strategy

To identify relevant literature, the authors developed a comprehensive search strategy. We initially created the search terms or keywords related to the role of academic libraries in climate change. After review by a Professor from the Department of Information Studies at the University of Ghana and a University Librarian at Kumasi Technical University, Kumasi, Ghana, a search string was finalised to obtain the necessary results. The first author searched the five databases below on September 3, 2024. The third author repeated the process on the same date to ensure the accuracy of the retrieved results. The search was performed across the following databases using the following keywords: Scopus, Web of Science, Library Information Science & Technology Abstracts (LISTA), ACM Digital Library, and ScienceDirect. Search terms used ("*academic libraries*") AND ("*climate change*" OR "*climate action*")

Search Process

We searched, filtered, and stored relevant articles from various databases. They entered search terms in Scopus, Web of Science, Library Information Science & Technology Abstracts (LISTA), ACM Digital Library, and ScienceDirect. We conducted backwards



and forward citation searches using filters such as publication years 2000–2024, full-text articles, and English-language documents. The titles of retrieved articles were screened for relevance. The searches produced the following results, as indicated in Table 1.

Table 1: Databases with articles retrieved

Database	No of Articles Retrieved
Scopus	9
Web of Science	6
LISTA	50
ACM	10
ScienceDirect	54
Total	129

All relevant articles from various databases were downloaded and imported into Mendeley Software to remove duplicates and verify data accuracy.

Inclusion and Exclusion Criteria

The inclusion criteria were:

All relevant peer-reviewed articles and empirical studies published between 2000 and 2024 concerning the role of academic libraries in supporting climate change were included, specifically those addressing at least one of the research objectives. The studies examined how academic libraries address climate change, encourage community action on it, and provide resources to support climate initiatives. Additionally, only studies published in English were considered.

The exclusion criteria were:

Studies that were not full-text peer-reviewed articles and articles published in languages other than English were excluded, as they were considered outside the scope of this review. By applying these criteria, we identified 10 papers focused on academic libraries' involvement in climate change, covering the period from 2000 to 2024.

Information Analysis

A comprehensive search strategy was established to retrieve relevant documents. In total, 129 records were identified (Figure 1). The bibliographic information of these records was imported into Mendeley Reference Software. Duplicate records (n=5) and excluded records (n=109) were removed following PRISMA guidelines, while fifteen (15) relevant records were included in the review after reading their titles and abstracts. These fifteen records (n=15) were chosen for in-depth analysis based on the study's inclusion criteria. The researchers performed a further check, resulting in the discarding of some records

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(n=5) because they did not pertain to academic libraries. Ultimately, 10 records were included—1 from LISTA, 2 from ScienceDirect, 4 from WoS, 1 from ACM, and 2 from Scopus. Figure 1 displays the PRISMA flowchart.

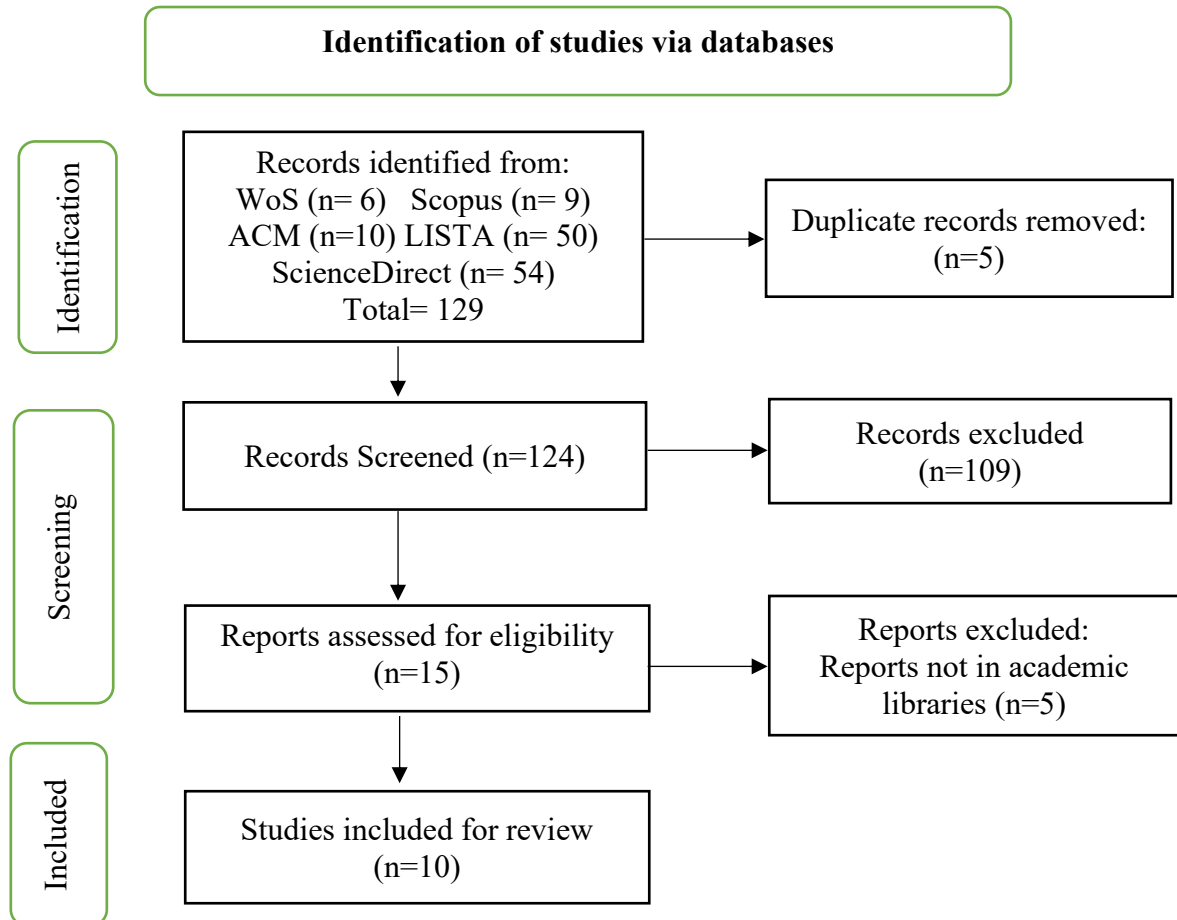


Figure 1: PRISMA flowchart 2020

Synthesis of Results/Findings/Themes

The researchers presented and synthesised the results using a thematic approach. The Atlas.ti software was used to analyse the records. To minimise coding errors, text units were established by employing codes as a criterion of reliability. For cross-checking, the researchers agreed on the definitions of the categories (Rose & Johnson, 2020). The codes were standardised and categorised to facilitate easier, more accurate analysis of the information. The analysis helped reduce the data to the components of the study topic (ZárateRueda et al., 2025). Similarly, it enabled the systematic generation of relevant and descriptive themes (Ashiq, 2022).



Risk of Researcher Bias

To ensure the validity and reliability of the search results and methodology, the search and download process was repeated to minimise bias and confirm the study's accuracy. The data were assessed using PRISMA guidelines (screening, eligibility, and selected studies), and the repeated procedure conducted by the authors ensured the data's accuracy and reliability.

Overview of the Selected Records

Table 2 provides an overview of the included studies. Most records were published in 2024 (n=4) and 2023 (n=4), with one article published in 2021 and another in 2022. The articles were published across various continents, mostly from Asia (n=4), followed by Africa (n=3), North America (n=2), and one from Europe. Of the seven journals in which the selected articles appeared, the majority (n=3) were published in “The Journal of Academic Librarianship” and “New Review of Academic Librarianship”. The case study approach was frequently utilised (n=5), followed by surveys (n=3). Participants included librarians, library staff, faculty, and students, with sample sizes ranging from a maximum of (n=203) to a minimum of (n=10). Regarding methodology, the most common design was quantitative (n=5), followed by mixed methods.

Table 2: Summary of the included studies

Sr No.	Study	Journal Name	Country	Methodology	Method	Population	Sample size
1	Lahyani et al., 2024	Procedia Computer Science	Morocco	Mixed or multi-method	Case study design and surveys	University professors, students, and the general public	--
2	Appleton & Woolley, 2023	New Review of Academic Librarianship	United Kingdom	---	Descriptive (opinion-based paper)	---	--
3	Goldman, 2024	Johns Hopkins University Press	United States	--	Case study	--	--
4	Bangani & Dube, 2024	Journal of Librarianship and Information Science	South Africa	Qualitative research study	Case study	Library staff	n=28



5	Rachman & Ratnasari, 2022	De Gruyter	Indonesia	Quantitative and descriptive approaches	Survey	Librarians	n=17
6	Hamad et al., 2024	New Review of Academic Librarianship	Jordan	Quantitative	Survey	Librarians	n=203
7	Krairiksh & Choksuchat, 2021	IEEE Xplore	Southern Thailand	Quantitative method	Case study	--	--
8	Mwanzu et al., 2023	The Journal of Academic Librarianship	Kenya	mixed method	Case study	Librarians	n=10
9	Bincy & Vasudevan, 2023	The Journal of Academic Librarianship	India	Quantitative method	Case study	Library Professionals	n=83
10	Tribelhorn, 2023	The Journal of Academic Librarianship	United States	Quantitative method	Survey	Managers, Faculty, Employees	n=15

FINDINGS OF THE SYSTEMATIC REVIEW

Academic libraries need a deeper understanding of climate change and should develop resources and best practices that promote climate action. Addressing climate change proactively can help enhance sustainability and global health. As academic libraries collaborate with students and other stakeholders, they can foster public awareness and engagement to lessen the impacts of climate change. Table 3 presents the relevant categories from the analysis.



Table 3: Relevant Categories from the Analysis

<i>Sr No.</i>	<i>Authors</i>	<i>Ways academic libraries address climate change</i>	<i>Ways academic libraries motivate their communities</i>	<i>Resources offered to support climate action</i>
1	Lahyani et al., 2024	<ul style="list-style-type: none"> ➤ Climate change awareness campaigns ➤ Provide leadership in climate change education 	<ul style="list-style-type: none"> ➤ Integrate sustainability into the curriculum ➤ Promote sustainability and climate literacy programs ➤ digital literacy training 	<ul style="list-style-type: none"> ➤ Provide digital databases on sustainability ➤ Provide Internet access to support climate change research ➤ digital resources
2	Appleton & Woolley, 2023	<ul style="list-style-type: none"> ➤ Empowering climate action and sustainability initiatives ➤ Contribute to reducing carbon emissions through the development of more sustainable physical spaces and operations 	<ul style="list-style-type: none"> ➤ Providing space for positive engagement with the climate emergency ➤ Advancing Open Science 	<ul style="list-style-type: none"> ➤ Multilingual and accessible content ➤ Sustainable collections and digital platforms
3	Goldman, 2024	<ul style="list-style-type: none"> ➤ Setting reduction goals and targets ➤ Creating formal climate action plans ➤ Implementing energy optimisation strategies 	<ul style="list-style-type: none"> ➤ Education, outreach, and advocacy programs ➤ Taking leadership roles as catalysts, conveners, and contributors ➤ Building internal awareness and engagement 	<ul style="list-style-type: none"> ➤ Institutional infrastructure and systems ➤ Open data and methodology sharing ➤ Conference and event models ➤ Data management and reporting tools



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|---|---------------------------|--|---|--|
| | | <ul style="list-style-type: none">➤ Connecting with sustainability stakeholders➤ Professional development and consciousness-raising | | |
| 4 | Bangani & Dube, 2024 | <ul style="list-style-type: none">➤ Recycling Initiatives➤ Tree Planting & Greening Activities➤ Reducing Carbon Footprint | <ul style="list-style-type: none">➤ Educational Campaigns➤ Community Engagement & Advocacy➤ Environmental Literacy & Awareness | <ul style="list-style-type: none">➤ Information & Research Support➤ Physical & Digital Exhibitions |
| 5 | Rachman & Ratnasari, 2022 | <ul style="list-style-type: none">➤ Sustainable energy use➤ Recycling & waste management | <ul style="list-style-type: none">➤ Educational campaigns,➤ Partnerships & Community engagement | <ul style="list-style-type: none">➤ Research support➤ Sustainable tools➤ Digital preservation |
| 6 | Hamad et al., 2024 | <ul style="list-style-type: none">➤ Curating specialized collections➤ Modelling sustainable practices➤ Collaborating across departments and NGOs➤ Inclusive and diverse collections➤ Climate change education➤ Promote climate change awareness | <ul style="list-style-type: none">➤ Climate literacy campaigns➤ Events (talks, panels, workshops)➤ Outreach tailored to user groups➤ Embedding sustainability in the curriculum➤ Advocating sustainability policies | <ul style="list-style-type: none">➤ Access to GIS & data visualization tools➤ Open access data for climate research➤ Provide climate-related resources |



- 7 Krairiksh & Choksuchat, 2021
- Promote sustainable practices
 - Collaborate with academic departments and NGOs
 - Environment collection for Green Library
- 8 Mwanzu et al., 2023
- Adopted greening initiatives such as architectural building designs
 - Incorporating green cleaning and recycling programs, water-wise landscaping, and green roofs to conserve resources and energy
 - Offered green services such as user training on environmental sustainability, green collection lending services, and digital library services
- Raised awareness through environmental usage graphs and visual tools
 - Modelling sustainable behaviour in the university and surrounding communities
 - Advocate for climate education policies
 - Creating awareness of environmental sustainability
- Visualisation data tools
 - Open public access to dashboards for broader engagement
 - Digital library services
 - Libraries provide access to green resources, including research on environmental sustainability, climate action, and renewable energy.
 - Open access to climate research



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|----|-------------------------|--|--|--|
| 9 | Bincy & Vasudevan, 2023 | <ul style="list-style-type: none">➤ Proper waste management, reduction of plastic usage, and maintaining indoor environmental quality are practiced➤ Green collections, including research on environmental sustainability and eco-friendly practices.➤ Green initiatives in libraries | <ul style="list-style-type: none">➤ Role models for society to make an eco-friendly environment➤ Impart green information literacy to the user community➤ Green building literacy | <ul style="list-style-type: none">➤ Use of solar panels and LED lights to reduce energy consumption |
| 10 | Tribelhorn, 2023 | <ul style="list-style-type: none">➤ Implemented energy conservation and waste reduction through active recycling programs➤ Implemented measures to enhance resource conservation and reduce energy consumption.➤ Recycling & composting➤ Green building initiatives | <ul style="list-style-type: none">➤ Provide education for sustainability➤ Offer community engagement programs➤ Provide information literacy➤ Workshops & staff engagement | <ul style="list-style-type: none">➤ Open Access resources,➤ Digital/e-book access➤ Hotspot and technology device lending |
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Ways Academic Libraries Address Climate Change

Table 3 shows the ways academic libraries address climate change. These fall into three categories: curating climate-focused collections, green library initiatives, and climate awareness programmes. Given the impacts of climate change on all members of society, reducing its effects requires both global and local actions. Academic libraries connect the general public with climate-focused and green collection lending services (Mwanzu, 2023; Krairiksh & Choksuchat, 2021). The extracted data shows the library's role in curating green collections, including research on environmental sustainability and eco-friendly practices (Bincy & Vasudevan, 2023). Hamad et al. (2024) and Tribelhorn (2023) advocate for sustainable collection development practices and the provision of resources focused on climate change, environmental issues, and sustainable resilience. Through specialised library guides and toolkits, academic libraries curate inclusive and diverse collections on climate change (Hamad et al., 2024). These curated collections help individuals understand and engage with climate-focused and sustainability-related topics (Hamad et al., 2024; Tribelhorn, 2023). Some of the resources curated by academic libraries may include research articles, policy documents, and practical guides that provide reliable information about climate issues to students, educators and community members. These guides curated to support education as well as empower users to become climate-literate individuals who can advocate for climate action (Appleton & Woolley, 2023). These resources serve communities to mitigate the detrimental impacts of climate change.

Another category that demonstrates academic libraries' contributions to climate action is the green library/building initiatives (Tribelhorn, 2023; Mwanzu et al., 2023; Bincy & Vasudevan, 2023), reflecting their commitment to environmental conservation and sustainability. Some academic libraries have adopted sustainable practices (Hamad et al., 2024; Krairiksh & Choksuchat, 2021), including initiatives focused on recycling and waste management (Bangani & Dube, 2024; Bincy & Vasudevan, 2023; Rachman & Ratnasari, 2022), tree planting and greening activities (Bangani & Dube, 2024), as well as incorporating green cleaning and recycling programmes, water-wise landscaping, and green roofs to conserve resources and energy (Goldman, 2024; Mwanzu et al., 2023; Tribelhorn, 2023). Academic libraries have also implemented measures to enhance resource conservation and reduce energy consumption (Tribelhorn, 2023). The extracted data further indicates the role of academic libraries in reducing carbon emissions by developing more sustainable physical spaces and operations (Bangani & Dube, 2024; Appleton & Woolley, 2023). The data also demonstrates the role of academic libraries in offering green services such as user training on environmental sustainability, green collection lending services, and digital library services (Mwanzu et al., 2023). This will support communities to develop critical skills and literacies to evaluate and understand climate change and sustainability issues.



Education and climate awareness programmes identified in the data are critical to addressing the climate crisis. Academic libraries act as knowledge hubs that help to advance climate change education and awareness campaigns (Lahyani et al., 2024; Hamad et al., 2024). These libraries promote climate change awareness among students, researchers, and faculty members by providing information, data, and research content on climate change (Hamad et al., 2024). By hosting educational and awareness programmes, and collaborating with academic departments and NGOs (Krairiksh & Choksuchat, 2021), academic libraries can advance a better understanding of climate change. The extracted data illustrate how academic libraries are crucial to empowering community members to take action on climate change and sustainability initiatives (Appleton & Woolley, 2023). The data highlights the need to create formal climate action plans and policies to mitigate climate change (Goldman, 2024).

Ways Academic Libraries Motivate their communities to act on Climate Change

The methods academic libraries employ to engage their communities have been documented in studies (see Table 3). These methods can be classified into two main categories: promoting climate change literacy and advocating and engaging in policy. Academic libraries play a vital role in educating users about the climate crisis and the strategies to mitigate it. Therefore, their primary focus is on promoting environmental and climate literacy programmes among students, academic staff, and their communities (Lahyani et al., 2024; Hamad et al., 2024; Bangani & Dube, 2024), organising digital literacy training (Lahyani et al., 2024), green building literacy (Bincy & Vasudevan, 2023), and imparting sustainable and green information literacy to the user community (Tribelhorn, 2023; Bincy & Vasudevan, 2023), and providing education on sustainability practices (Tribelhorn, 2023). These training programmes can enhance the knowledge (eco-friendliness and environmental sustainability) of the community to enable them to critically assess and engage in climate action.

Similarly, academic libraries are involved in advocacy and policy engagement on climate change issues. Some studies reported that they organise educational campaigns, community engagement and advocacy (Bangani & Dube, 2024; Rachman & Ratnasari, 2022), providing space for positive engagement with the climate emergency (Appleton & Woolley, 2023), building internal awareness and staff engagement on environmental sustainability (Goldman, 2024; Mwanzu, 2023; Tribelhorn, 2023). Others reported integrating sustainability into the curriculum (Lahyani et al., 2024; Hamad et al., 2024) and advocating for climate education and sustainability policies (Hamad et al., 2024; Krairiksh & Choksuchat, 2021). Hence, academic libraries can influence policy decisions and develop advocacy initiatives that advance climate solutions. These libraries advocate for evidence-based climate policies by engaging with policymakers at the local, national, and international levels.



Resources that Academic Libraries offer to support Climate Action

The resources that academic libraries offer to support climate action are shown in Table 3 and fall under two major categories, namely 1) ‘Green open educational resources (GOERs) and digital repositories’ and 2) ‘research support and data services.’ The first category describes high-quality educational resources on green topics such as energy, sustainability, the environment, and related topics.

Deploying green open educational resources to support sustainable research is a crucial strategy for academic libraries. Some major resources reported in the studies are the provision of digital databases on sustainability (Lahyani et al., 2024), open multilingual accessible content and digital resources (Hamad et al., 2024; Appleton & Woolley, 2023; Mwanzu et al., 2023; Tribelhorn, 2023; Krairiksh & Choksuchat, 2021), institutional infrastructure and systems (Goldman, 2024), physical and digital exhibitions (Bangani & Dube, 2024), and digital preservation (Rachman & Ratnasari, 2022). Increasing accessibility to green open access and digital resources allows academic libraries to connect with a wider audience on climate change and sustainability action.

Research support and data services emerged as another resource offered by academic libraries in supporting climate action. Some studies reported provision of internet access to support climate change research (Lahyani et al., 2024), open data and methodology sharing, data management and reporting tools (Goldman, 2024), access to GIS & data visualisation tools (Hamad et al., 2024; Krairiksh & Choksuchat, 2021), digital library services, and access to green resources, including research on environmental sustainability, climate action, and renewable energy (Mwanzu et al., 2023), hotspot and technology device lending (Tribelhorn, 2023). These digital tools and resources (research materials, climate data sets, GIS software) enable researchers to explore climate-related research. By providing digital sustainability resources, academic libraries facilitate interdisciplinary research and support collaborative projects.

Discussion

The study systematically reviewed the literature on how academic libraries address climate change, motivate their communities to engage in climate action, and provide resources to support it. The researchers selected ten (10) studies that met the inclusion criteria of the study. According to the literature reviewed, climate action and green library initiatives were more prevalent in developed countries than in developing countries. The ways identified in most studies on how academic libraries address climate change issues include curating climate-focused collections, implementing green library initiatives, and launching climate awareness programmes. Hamad et al. (2024) argued that academic libraries curate comprehensive collections to provide access and enhance users' understanding of global climate change. The authors contended that academic libraries facilitate access to inclusive, diverse collections on climate change and sustainability. Bincy and Vasudevan (2023) noted that academic libraries should incorporate green



movement activities and promote environmental sustainability practices and awareness among their constituents. Similarly, Mwanzu et al. (2023) indicated that academic libraries in Kenya offered green sustainability trainings, managed electronic waste, water harvesting, reduced carbon footprints, and created awareness-raising activities (Lahyani et al., 2024; Krairiksh & Choksuchat, 2021).

The study further identified two main ways academic libraries motivate their communities to engage in climate action: climate change literacy, advocacy, and policy engagement. Climate change literacy is a strategy used by most academic libraries in the study to educate their communities through activities such as exhibitions, seminars, lectures, and websites (Bangani & Dube, 2024; Lahyani et al., 2024). It refers to an individual's ability to find, understand, and ethically use information and services to make environmental decisions (Bincy & Vasudevan, 2023).

To ensure sustainability, academic libraries must implement climate literacy education (Tribelhorn, 2023). Therefore, integrating climate literacy into the curriculum provides essential tools for climate action, which are vital for creating a sustainable future (Hamad et al., 2024). Moreover, some academic libraries have introduced comprehensive knowledge domains on green building, covering building design, water conservation, water management, energy efficiency, and social equity (Bincy & Vasudevan, 2023). Similarly, students' knowledge, attitudes, and behaviours toward green construction were assessed to examine their literacy components (Bincy & Vasudevan, 2023).

More importantly, academic libraries have integrated sustainable principles into their activities to advance sustainability within their communities through advocacy and education (Goldman, 2024). Similarly, Hamad et al. (2024) emphasise the importance of developing a strategy, institutional policy, and infrastructure to guide and enhance academic libraries' sustainability advocacy efforts. This will transition academic libraries into active information centres for learning and advocacy on global issues, such as the climate crisis. Furthermore, community engagement has been one strategy used by academic libraries to contribute to the SDGs (climate action and sustainability). Bangani and Dube (2024) argued that exhibitions on climate issues are among the most common methods of climate engagement in academic libraries.

CONCLUSION

This study enhances a thorough understanding of how academic libraries tackle climate change, encourage their communities to engage in climate action, and the resources they provide to support this effort. Participants in the studies included librarians, faculty members, and students. The studies reviewed employed a qualitative approach (n=10), reflecting a comprehensive perspective. Academic libraries' responses to climate change primarily fell into three categories: curating climate-focused collections, implementing



green library sustainability initiatives and practices, and running awareness programmes. Climate literacy, advocacy, and policy engagement were identified as ways academic libraries motivate their communities to take climate action. The resources offered by academic libraries to support climate action included green open educational resources, digital repositories, and research and data support.

This study offers a systematic and comprehensive synthesis by consolidating relevant literature on how academic libraries support climate action and resilience through their resources, collections, and services. This gap has not been extensively explored.

Recommendations

This study recommends developing green, sustainable initiatives and policies to integrate sustainable practices (renewable energy, conservation, or climate justice) into the library's operations. This can inspire their communities to embrace eco-friendly practices. Academic libraries can engage local, national, and international policy-makers to advocate for evidence-based climate policies.

Academic libraries can invest in creating climate-focused collections, digital platforms, green open educational resources, and digital repositories to address climate change and promote sustainability.

More importantly, academic libraries should initiate climate literacy programmes to empower users to take action in their communities and contribute to climate resilience efforts.

Implications of the study

Implication for practice

This systematic review offers insights into the sustainable practices and climate action initiatives of academic libraries worldwide. It has been established that libraries, particularly academic ones, serve as catalysts for addressing climate change issues. Academic libraries should curate inclusive and diverse collections on climate change and improve access to 'Green Open Educational Resources' (GOERs) and digital repositories to support sustainable research and climate initiatives among users. None of this would be achievable without library staff being knowledgeable and skilled in climate-related matters and capable of teaching green information literacy, thereby preparing users for climate action.

Implication for policy

This systematic review provides insights for higher education institutions, policymakers, and university librarians in developing plans and policies that address climate change and promote sustainability within their libraries. Effective planning and execution of climate-



related policies are crucial for an academic library's capacity to undertake climate action. Climate change and awareness issues should be integrated into higher education curricula.

Limitations and future research directions

The data were extracted from five databases (Web of Science, ACM, LISTA, ScienceDirect, and Scopus). Some research studies may have been missed due to mismatches in keywords, despite a rigorous search strategy. This study aimed to obtain results from research articles, and as such, the researchers did not search for grey literature (theses, proceedings, reports, etc.). The results were limited to 10 studies on the role of academic libraries in supporting climate action. The study was further restricted to English-language publications. Although the research articles were quality-controlled, some vital information may have been overlooked.

REFERENCES

- Adetayo, A. J. (2022). News Sources and Climate Change Attitude among Students: Implications for Libraries. *The Serials Librarian*, 83(3–4), 215–227. <https://doi.org/10.1080/0361526X.2023.2191658>
- Adjei, S., Mensah, K., & Boateng, R. (2025). Green library practices and environmental awareness in African academic libraries. *Environmental Reports*, 7(2), 119–123. <https://doi.org/10.51470/ER.2025.7.2.119>
- Appleton, L. & Woolley, N. (2023). The Role of Academic Libraries in Climate Action, *New Review of Academic Librarianship*, 29:2, 117-122, <https://doi.org/10.1080/13614533.2023.2230652>
- Ashiq, M., & Warraich, N. F. (2022). A systematized review on data librarianship literature: Current services, challenges, skills, and motivational factors. *Journal of Librarianship and Information Science*, 55(2), 414- 433. <https://doi.org/10.1177/09610006221083675>
- Ashiq, M., Rehman, S. U., & Mujtaba, G. (2020). Future challenges and emerging role of academic libraries in Pakistan: A phenomenology approach. *Information Development*, 37(1), 158-173. <https://doi.org/10.1177/0266666919897410>
- Aytac, S. (2022). Libraries as Agents of Climate Change Literacy. 87th IFLA World Library and Information Congress (WLIC), Environment, Sustainability and Libraries (ENSULIB), 22–23. <https://repository.ifla.org/handle/123456789/2076>
- Bangani, S. & Dube, L. (2024). Academic libraries and the actualisation of Sustainable Development Goals two, three and thirteen. *Journal of Librarianship and Information Science*, Vol. 56(3) 773 –784. <https://doi.org/10.1177/09610006231174650>
- Bincy, O. K. & Vasudevan, T. M. (2023). Environmental sustainability: Awareness and practices among library professionals in University of Calicut. *The Journal of*



- Academic Librarianship*, 49(4), 1-6.
<https://doi.org/10.1016/j.acalib.2023.102748>
- Charney, M., & Hauke, P. (2020). Global action on the urgency of climate change: Academic and research libraries' contributions. *College & Research Libraries News*, 81(3), 114. <https://doi.org/10.5860/crln.81.3.114>
- Demirtas Dogan, H., & Gurpinar, B. (2023). Green Libraries and the User's Perspective: A Case Study in Turkey. *SAGE Open*, 13(4).
<https://doi.org/10.1177/21582440231211432>
- Dwningo Samala, A., Usmeldi, T. A., Bojić, L., Indarta, Y., Tsoy, D., Denden, M., ... & Parma Dewi, I. (2023). Metaverse technologies in education: A systematic literature review using PRISMA. *International Journal of Emerging Technologies in Learning (iJET)*, 18(5).
- Goldman, B. (2024). Understanding and Reducing Greenhouse Gas Emissions in Academic Libraries. *portal: Libraries and the Academy* 24(1), 7- 19.
<https://dx.doi.org/10.1353/pla.2024.a916987>.
- Hamad, F., Elfadel, M., Fakhouri, H. & Abu-Qaadon, A. (2024). Advancing Climate Change Literacy: Are Academic Libraries Part of the Solution?, *New Review of Academic Librarianship*, 30(4), 345-367
<https://doi.org/10.1080/13614533.2024.2369503>
- Hickman, C. (2020). We need to (find a way to) talk about ... Eco-anxiety. *Journal of Social Work Practice*, 34(4), 411–424.
<https://doi.org/10.1080/02650533.2020.1844166>
- Kornfeind, M. (2022). Advocacy and Action: How Libraries Across the Globe are Addressing Climate Change. *World Libraries*, 26(1). 1–14.
<https://worldlibraries.dom.edu/index.php/worldlib/article/view/594>
- Krairiksh, K. & Choksuchat, C. (2021). Awareness of Green Academic Library by KYL Dashboard towards Sustainable Digital University, *2nd SEA-STEM International Conference (SEA-STEM)*, pp. 108–111,
<https://doi.org/10.1109/SEA-STEM53614.2021.9668054>.
- Lahyani, K., Diabb, G, & Moukhliiss, G. (2024). Role of Academic Libraries in the Achievement of Sustainable Development Goals Case Study: The Mohamed Sekkat University Library. *Procedia Computer Science* 236, 566–573.
<https://doi.org/10.1016/j.procs.2024.05.067>
- Lusiana, E., Yanto, A., Nursari, T., Samson, C. M. S., & Suryadi, D. F. (2024). The contribution of community-based libraries in climate action to strengthen the face of climatechange supports the SDGs. *Journal of Law and Sustainable Development*, 12(1). 1-22. <https://doi.org/10.55908/sdgs.v12i1.2022>
- Martin, G., Reilly, K., Everitt, H., & Gilliland, J. A. (2022). Review: The impact of climatechange awareness on children's mental well-being and negative emotions - a scoping review. *Child and adolescent mental health*, 27(1), 59–72.
<https://doi.org/10.1111/camh.12525>



- Mohammed, L. (2024). Effect of Climate Change on Information Resources in Academic Libraries: A Case Study of Federal University Lokoja and Prince Abubakar Audu University in Kogi State Nigeria. *Lokoja Journal of Information Science Research*, 2(2), 133-147. <https://doi.org/10.5281/zenodo.14784303>
- Mwanzu, A., Bosire-Ogechi, E., & Odero, D. (2022). The Emergence of Green Libraries in Kenya: Insights from Academic Libraries. *Journal of Academic Librarianship*, 49(5), 1-8. <https://doi.org/10.1016/j.acalib.2022.102601>.
- Naik, G. (2024). Protecting knowledge, protecting nature: The role of academic libraries in promoting climate change awareness and environmental responsibility. *Journal of Environmental Nanotechnology*, 13(4), 202–207. <https://doi.org/10.13074/jent.2024.12.2441109>
- Oshinaike, A. B., & Saidu, D. (2024). The Role of Libraries in Climate Resilience: Building Sustainable Information Hubs. *International Journal of Library Science*, 10(3), 101–115.
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., McGuinness, L. A., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *British Medical Journal*, 372(71), <https://doi.org/10.1136/bmj.n71>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., & Moher, D. (2021). Updating guidance for reporting systematic reviews: development of the PRISMA 2020 statement. *Journal of Clinical Epidemiology*, 134, 103–112. <https://doi.org/10.1016/j.jclinepi.2021.02.003>
- Rachman, Y. & Ratnasari, W. (2022). Academic Libraries' Sustainable Preservation and Conservation Practices. *Preservation, Digital Technology & Culture*, 51(3), 121–129. <https://doi.org/10.1515/pdct-2022-0024>
- Rose, J., & Johnson, C. W. (2020). Contextualizing reliability and validity in qualitative research: toward more rigorous and trustworthy qualitative social science in leisure research. *Journal of Leisure Research*, 51(4), 432–451. <https://doi.org/10.1080/00222216.2020.1722042>
- Shamseer, L., Moher, D., Clarke, M., Gherzi, D., Liberati, A., Petticrew, M., ... & Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. *Bmj*, 349.
- Tribelhorn, S. K. (2023). Preliminary Investigation of Sustainability Awareness and Activities among Academic Librarians in the United States. *The Journal of Academic Librarianship*, 49(3), 1–11. <https://doi.org/10.1016/j.acalib.2022.102661>
- Trotter, M., & Komarnytska, O. (2023). Climate Change Considerations in Public Library Collection Development. *Pathfinder: A Canadian Journal for*



Information Science Students and Early Career Professionals, 4(1), 209–215.

<https://doi.org/10.29173/pathfinder72>

United Nations. (2021). Climate Action Fast Facts. Climate Action.

<https://www.un.org/en/climatechange/science/key-findings>

Xie, Z., Man, W., Liu, C., & Fu, X. (2023). A PRISMA-based systematic review of measurements for school bullying. *Adolescent research review*, 8(2), 219-259.

<https://doi.org/10.1007/s40894-022-00194-5>

Zárate Rueda, R., Lésmes Peralta, J. C. & Beltrán Villamizar, Y. I. (2025). Technological Tools and Inclusive Pedagogy for Students with Disabilities in Higher Education: A Systematic Review. *Revista de Investigación Educativa*, 43.

<https://doi.org/10.6018/rie.590831>