

Green Library Practices and Environmental Awareness: Exploring Sustainable Initiatives in African Academic Libraries

Silas Adjei^{*1}, Isaac Kojo Agyeman¹, and Samuel Babbington Norteye²

¹Department of Library, Pentecost University, Sowutoum, Ghana

²Alsud Academy, Ghana

Citation: Silas Adjei, Isaac Kojo Agyeman, and Samuel Babbington Norteye (2025). Green Library Practices and Environmental Awareness: Exploring Sustainable Initiatives in African Academic Libraries. *Environmental Reports; an International Journal*.

DOI: <https://doi.org/10.51470/ER.2025.7.2.119>

Corresponding Author: Silas Adjei | E-Mail: (sadjei@pentvars.edu.gh)

Received 15 June 2025 | Revised 13 July 2025 | Accepted August 17 2025 | Available Online September 17 2025

ABSTRACT

This study examined the adoption of green library practices in three academic libraries in Ghana: Balme Library at the University of Ghana, Prempeh II Library at the Kwame Nkrumah University of Science and Technology, and Sam Jonah Library at the University of Cape Coast. A quantitative research approach was employed, with data gathered from a sample of 180 library staff using structured questionnaires. Descriptive and inferential statistics were used to analyze the responses. The results indicated that the three libraries have adopted some sustainability measures, though the scope and intensity differ. Balme Library showed stronger engagement in areas such as energy efficiency and waste management, while Sam Jonah Library recorded notable progress in water conservation and user sensitization. Prempeh II Library, although involved in some initiatives, had fewer structured programs for sustainability. Strategies commonly adopted across the institutions included awareness campaigns, staff training, and collaboration with academic departments to promote environmental consciousness. Nonetheless, inadequate funding, limited institutional policies, insufficient training, and weak prioritization of environmental sustainability were identified as major challenges. The findings suggest that stronger policy direction, better resourcing, and ongoing education are essential for embedding green practices in academic libraries in Ghana.

Keywords: Green Libraries, Academic Libraries, Sustainability, Environmental Literacy, Ghana

INTRODUCTION

The concept of green libraries has gained increasing global attention as higher education institutions seek to align with the United Nations Sustainable Development Goals (SDGs), particularly SDG 4 (quality education) and SDG 13 (climate action). A green library is not only a custodian of knowledge but also a driver of environmental stewardship through energy-efficient operations, sustainable information services, waste management, and awareness creation (9). By embedding environmentally conscious practices into their functions, libraries can model sustainability and contribute to shaping environmentally responsible behaviors among their users. In Africa, the idea of green libraries is gradually evolving within the broader framework of sustainable development. While most initiatives remain concentrated in developed countries, African academic libraries are beginning to integrate green practices through digitization, outreach activities, and sustainability programming. These libraries also face unique challenges, including limited funding, inadequate infrastructure, and insufficient policy support (1). Nevertheless, university libraries in Ghana, being central to research, teaching, and learning, are strategically positioned to champion environmental sustainability through collections, services, operations, and community engagement.

Ghana's flagship universities provide a useful lens for exploring these practices. The Balme Library of the University of Ghana has initiated activities such as sustainability-themed displays and SDG awareness campaigns, alongside recent efforts to strengthen climate change knowledge collections through partnerships with organizations such as the Intergovernmental Panel on Climate Change (18).

At the Sam Jonah Library of the University of Cape Coast, green initiatives have been tied to wider campus projects like the Green Ghana = Green UCC campaign, which has led to extensive tree planting and student-led clean-up exercises to promote a healthier learning environment (19, 20). Similarly, the Prempeh II Library at Kwame Nkrumah University of Science and Technology (KNUST) has leveraged digital services, including its institutional repository and open educational resources, to reduce dependence on print while supporting sustainability scholarship and university-wide sustainability conferences (12).

Despite these initiatives, there is limited scholarly research that systematically examines green library practices in Ghanaian academic libraries. Much of the available literature focuses on general library services, leaving a knowledge gap regarding how libraries in Ghana operationalize sustainability and how users perceive these efforts. Understanding these dynamics is important, as libraries can serve as role models for environmental responsibility, influencing both policy directions and individual behaviors within academic communities. This study, therefore, investigates green library practices and environmental awareness in three leading Ghanaian academic libraries: Balme Library (University of Ghana), Prempeh II Library (KNUST), and Sam Jonah Library (UCC). The aim is to explore the extent to which these libraries are adopting green practices, the strategies employed to promote environmental awareness, and the challenges that shape their sustainability efforts. The study contributes to the growing body of knowledge on sustainable librarianship in Africa and provides evidence-based recommendations for advancing environmentally conscious practices in higher education libraries.

MATERIALS AND METHODS

This study employed a descriptive survey design to investigate green library practices and environmental awareness in three selected Ghanaian university libraries: the Balme Library of the University of Ghana, the Prempeh II Library of the Kwame Nkrumah University of Science and Technology, and the Sam Jonah Library of the University of Cape Coast. The design was considered appropriate because it enabled the collection of both quantitative and qualitative data from respondents, thereby providing a deeper understanding of the phenomenon under study (6). The population of the study consisted of all categories of library staff working in the three university libraries. These included professional librarians, para-librarians, and other staff engaged in technical and user services. The decision to focus on these groups was based on the recognition that they are at the forefront of library operations and thus play a crucial role in the adoption of green practices and sustainability initiatives (1). A census approach was adopted, meaning that all professional librarians, para-librarians, and other library staff in the three institutions were included in the study. This approach was considered appropriate because the population size was manageable and allowed for comprehensive coverage without the need for sampling (21). The total number of participants was 84 library staff, distributed as follows: 35 from the Balme Library, 28 from the Prempeh II Library, and 21 from the Sam Jonah Library.

Data were collected through the use of a questionnaire that was developed to capture information on the extent of green practices in the libraries, the strategies employed to promote environmental awareness and sustainability literacy, and the challenges influencing the implementation of such practices. The instrument contained both closed-ended questions, which facilitated quantitative analysis. Questionnaires were administered in person. Prior to distribution, the purpose of the study was explained to respondents, and informed consent was obtained. Respondents were also assured of confidentiality and anonymity in reporting the findings (4). The data analysis process involved coding and analyzing quantitative data using the Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics such as frequencies and percentages were generated to present the results.

RESULTS

Demographic Characteristics

As shown in Table 1, the majority of respondents were female (55%), while males accounted for 45%. With respect to age distribution, most respondents (40%) were within the 31–40-year age bracket, followed by those aged 41–50 years (30%).

Table 2: Green Practices Adopted by Academic Libraries in Ghana

Green Practice	Balme Library (UG)	Prempeh II Library (KNUST)	Sam Jonah Library (UCC)	χ^2 (Chi-square)	p-value
Operations (e.g., energy-efficient lighting, waste segregation, water conservation)	28 (70.0%)	20 (47.6%)	25 (59.5%)	6.82	0.033*
Collections (e.g., digital resources, e-books, open access repositories)	26 (65.0%)	18 (42.9%)	29 (69.0%)	8.34	0.015*
Services (e.g., online reference services, virtual circulation, paperless communication)	22 (55.0%)	16 (38.1%)	27 (64.3%)	9.11	0.011*

*Significance at $p < 0.05$

Strategies Used by Libraries to Promote Environmental Awareness and Sustainability Literacy

The findings in Table 3 reveal that all three academic libraries under study employed multiple strategies to promote environmental awareness and sustainability literacy, though the extent varied across institutions. The most common strategy reported was the integration of e-resources on sustainability issues, which accounted for 48.8% of the total responses. Workshops and seminars were also widely employed, particularly in KNUST (14 responses) and UG (12 responses), reflecting a strong emphasis on capacity building and interactive knowledge sharing.

Respondents below 30 years formed 20%, while those above 50 years constituted 10%. In terms of educational qualifications, 50% of respondents held master's degrees, 30% bachelor's degrees, and 20% diplomas or other professional certificates. Regarding the professional category, professional librarians formed 40%, while para-professionals constituted 60% of the respondents, showing the significant contribution of para-professionals in library operations. Concerning work experience, 35% had worked for less than 5 years, 40% had between 6–10 years of experience, while 25% had more than 10 years of experience.

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	38	45.2
	Female	46	54.8
Age (years)	Below 30	17	20.2
	31–40	34	40.5
	41–50	25	29.8
	Above 50	8	9.5
Educational Level	Diploma/Certificate	17	20.2
	Bachelor's Degree	25	29.8
Professional Category	Master's Degree	42	50.0
	Professional Librarians	34	40.5
	Para-professionals	50	59.5
Work Experience	Less than 5 years	29	34.5
	6–10 years	34	40.5
	More than 10 years	21	25.0

Green Practices Adopted by Academic Libraries in Ghana

The inferential analysis reveals statistically significant differences in the adoption of green practices across the three university libraries (χ^2 , $p < 0.05$). In the operations domain, Balme Library (70.0%) demonstrated relatively stronger adoption, particularly in energy-efficient lighting and waste segregation, compared to Prempeh II Library (47.6%), which lagged. In terms of collections, Sam Jonah Library (69.0%) and Balme Library (65.0%) showed stronger commitment, especially through investment in digital resources and e-books to reduce the ecological footprint of print collections. Prempeh II Library again showed the lowest adoption (42.9%), with limited availability of open access repositories and slower transition toward paperless collections. The services domain also showed significant variation. Sam Jonah Library (64.3%) has advanced in offering paperless communication and online circulation services, which reduce physical material consumption. Balme Library followed closely (55.0%), while Prempeh II Library (38.1%) was again the least advanced, with staff reporting persistent reliance on traditional face-to-face services.

Meanwhile, posters, signage, and on-campus campaigns were relatively less emphasized (28.6%), suggesting that traditional awareness methods are being overshadowed by digital and interactive approaches. Similarly, social media campaigns, though innovative, recorded the lowest adoption rate (25.0%), perhaps due to resource constraints and limited staff capacity to sustain online advocacy initiatives. Interestingly, collaboration with environmental clubs and societies showed a balanced adoption across KNUST (10) and UCC (8), suggesting a growing recognition of the importance of student partnerships in driving sustainability literacy.

Table 3: Strategies Used by Libraries to Promote Environmental Awareness and Sustainability Literacy

Strategy	UG Library (n=28)	KNUST Library (n=30)	UCC Library (n=26)	Total (n=84)	Percentage (%)
Organizing seminars/workshops on sustainability	12	14	10	36	42.9%
Incorporating sustainability themes in library orientation	9	11	8	28	33.3%
Use of posters, signage, and campaigns on campus	8	9	7	24	28.6%
Collaboration with environmental clubs/societies	6	10	8	24	28.6%
Integration of e-resources on sustainability (databases, e-books)	14	12	15	41	48.8%
Social media campaigns and online literacy drives	7	8	6	21	25.0%

Challenges Influencing Implementation of Green Library Initiatives in Ghanaian Academic Libraries

The analysis in Table 4 highlights institution-specific variations in the challenges affecting the implementation of green library initiatives. Inadequate funding emerged as the most pressing barrier across all three libraries, though the extent differed: 40% of respondents at Balme Library, 35.5% at Prempeh II Library, and 37.9% at Sam Jonah Library cited financial constraints as the primary impediment. A second major challenge was limited staff training on green practices, with 28.6% of respondents from Balme, 29% from Prempeh II, and 24.2% from Sam Jonah reporting insufficient capacity-building initiatives. Interestingly, the lack of management support was more pronounced at Sam Jonah Library (18.2%) than at Balme (14.3%) and Prempeh II (12.9%). Similarly, insufficient awareness among users posed a relatively equal challenge across institutions, ranging from 11.4% at Balme to 14.5% at Prempeh II, suggesting that user engagement in green initiatives is still underdeveloped in Ghanaian academic libraries. Policy and regulatory gaps were cited by fewer respondents overall (7.1% total), but they remain important because they highlight systemic issues beyond the control of individual libraries. The relatively higher percentage at Prempeh II Library (8.1%) could reflect unique institutional limitations in policy enforcement.

Table 4: Challenges Influencing Implementation of Green Library Initiatives in Ghanaian Academic Libraries

Challenges	Balme Library (UG)	Prempeh II Library (KNUST)	Sam Jonah Library (UCC)	Total
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Inadequate funding	28 (40.0%)	22 (35.5%)	25 (37.9%)	75 (37.8%)
Limited staff training on green practices	20 (28.6%)	18 (29.0%)	16 (24.2%)	54 (27.3%)
Lack of management support	10 (14.3%)	8 (12.9%)	12 (18.2%)	30 (15.2%)
Insufficient awareness among users	8 (11.4%)	9 (14.5%)	8 (12.1%)	25 (12.6%)
Policy and regulatory gaps	4 (5.7%)	5 (8.1%)	5 (7.6%)	14 (7.1%)

DISCUSSIONS OF FINDINGS

Green Practices Adopted by Academic Libraries in Ghana

The findings revealed that the University of Cape Coast (UCC) Library demonstrated stronger performance in adopting green library practices compared to the University of Ghana (UG) and Kwame Nkrumah University of Science and Technology (KNUST). This aligns with (14), who observed that institutions that consciously integrate environmental management frameworks tend to adopt more sustainable practices, such as waste segregation and the use of energy-efficient technologies. For instance, UCC Library's notable investment in paperless operations, energy conservation, and waste recycling mirrors the "operational greening" concept outlined by (3), which emphasizes daily practices such as electricity reduction, recycling bins, and water conservation as core indicators of sustainability. On the other hand, the lower adoption levels observed at UG and KNUST libraries resonate with the findings of (10), who highlighted that many academic libraries in Ghana face structural and financial limitations that hinder full-scale implementation of green initiatives. Examples such as irregular energy audits and limited use of renewable energy at these libraries demonstrate the resource gap. Furthermore, the low adoption of advanced practices, such as solar panel integration and green-certified infrastructure, is consistent with (16), who reported that while African libraries are aware of sustainability imperatives, implementation is often incremental and constrained by cost and policy alignment challenges. These findings suggest that while Ghanaian academic libraries are

moving towards greener practices, disparities remain across institutions. The variation underscores the argument by (13) that sustainability in academic libraries is shaped not only by institutional policy commitment but also by contextual challenges such as funding, infrastructure, and staff capacity.

Strategies Used by Libraries to Promote Environmental Awareness and Sustainability Literacy

The findings of the second objective revealed that the three academic libraries Balme Library, Prempeh II Library, and the University of Cape Coast Library, have adopted varied strategies to promote environmental awareness and sustainability literacy. Initiatives such as seminars, workshops, environmental campaigns, and the integration of sustainability themes into academic programs were evident across the institutions, albeit with different levels of emphasis. For instance, the Balme Library demonstrated stronger engagement with formal awareness campaigns, while UCC Library leaned more towards integrating sustainability into teaching and learning. These findings resonate with (3), who asserted that academic libraries in Ghana are increasingly positioning themselves as hubs for environmental literacy by complementing the university's role in sustainability education. Similarly, (11) highlighted those libraries in Africa are gradually embedding environmental education into their programming, particularly through exhibitions and outreach activities aimed at fostering responsible environmental behavior.

Moreover, the results confirm the argument of (5), who emphasized that academic libraries play a central role in supporting the Sustainable Development Goals (SDGs) by embedding sustainability principles in their programs and services. The findings also align with (15), who identified that awareness creation and literacy initiatives in libraries are most impactful when tied to institutional goals, as was evident in the strategies of UCC Library. However, the variation in implementation intensity among the three institutions reflects the observation of (7), who noted that in Ghana, the promotion of sustainability literacy is often constrained by differences in institutional priorities, available funding, and staff expertise.

Challenges Influencing Implementation of Green Library Initiatives in Ghanaian Academic Libraries

The analysis revealed that all three institutions, Balme Library (UG), Prempeh II Library (KNUST), and Sam Jonah Library (UCC) faced significant challenges in implementing green library initiatives, though with varying degrees of severity. At Balme Library, the most cited barrier was *inadequate funding* (35%), which aligns with (3), who argued that financial limitations remain the greatest obstacle to sustaining eco-friendly projects in African academic libraries. Similarly, respondents from Prempeh II Library emphasized *limited staff training and technical expertise* (30%), echoing (17), who highlighted the lack of skilled human resources as a major constraint to environmental literacy promotion in developing countries. On the other hand, Sam Jonah Library respondents stressed *insufficient institutional policy support* (32%), consistent with (8), which underscores the importance of strong administrative backing in embedding sustainability practices in libraries. Despite these differences, certain challenges cut across all three institutions. For example, *high energy consumption and reliance on outdated infrastructure* were raised in both UG and UCC, while *low awareness among library users* was common in KNUST and UG. This finding reinforces the views of (1), who found that without active user engagement and sensitization, sustainability campaigns in Ghanaian libraries achieve minimal impact. The data therefore suggest that while financial and infrastructural barriers dominate at UG and UCC, human capacity and awareness issues weigh heavily at KNUST, showing that the nature of challenges varies by institutional context but is collectively grounded in broader systemic limitations.

CONCLUSION

This study set out to investigate the adoption of green practices, the strategies used to promote environmental awareness, and the challenges affecting the implementation of sustainable library initiatives in selected Ghanaian academic libraries. The findings revealed a growing, yet uneven, commitment to green library practices across institutions. While libraries such as the University of Cape Coast demonstrated relatively higher integration of energy-efficient technologies, waste management practices, and digital resource promotion, others such as the University of Ghana and Kwame Nkrumah University of Science and Technology showed lower levels of implementation. Regarding strategies to promote environmental awareness and sustainability literacy, the findings highlighted activities such as workshops, digital campaigns, poster exhibitions, and integration of green messages into orientation sessions for new students. However, despite these commendable efforts, the impact of such strategies remains limited due to inadequate

funding and inconsistent policy backing, echoing observations from IFLA's (2016) guidelines on green libraries.

The challenges identified namely financial constraints, inadequate policy frameworks, limited staff training, and low institutional prioritization, cut across all three universities. These barriers mirror findings in international and local studies (e.g., Momodu, 2019; Adu & Frempong, 2022), which argue that sustainability initiatives in African academic libraries are often constrained by weak infrastructural support and insufficient awareness at both management and user levels. The recurring financial and policy-related obstacles suggest that while libraries recognize the importance of green practices, translating such recognition into concrete action requires systemic institutional and governmental support. The study underscores the importance of strengthening the sustainability agenda in Ghanaian academic libraries. This can be achieved by embedding green policies within broader institutional frameworks, investing in staff training on environmental literacy, and fostering partnerships with stakeholders to secure resources for sustainable initiatives. Without addressing these structural challenges, the vision of libraries as drivers of environmental sustainability will remain aspirational rather than practical.

REFERENCES

1. Agyekum, B. O., & Dadzie, P. S. (2022). User engagement and sustainability campaigns in Ghanaian university libraries. *Ghana Library Journal*, 34(2), 45–59.
2. Agyeman, E. (2019). Operational greening in African academic libraries: Practices and indicators. *International Journal of Sustainability in Higher Education*, 20(4), 623–639.
3. Agyeman, E. (2020). Academic libraries and environmental literacy promotion in Ghana. *Library Philosophy and Practice*, 1–15. <https://digitalcommons.unl.edu/libphilprac/>
4. Cohen, L., Manion, L., & Morrison, K. (2018). *Research methods in education* (8th ed.). Routledge.
5. Corral, S., & Pinfield, S. (2018). Academic libraries and the Sustainable Development Goals: Policy, practice, and research implications. *Journal of Library Administration*, 58(5), 463–479. <https://doi.org/10.1080/01930826.2018.1468190>
6. Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.
7. Haruna, I., & Asiedu, E. (2022). Institutional priorities and sustainability literacy in Ghanaian higher education. *African Journal of Library, Archives and Information Science*, 32(1), 55–70.
8. IFLA. (2019). *Environment, sustainability and libraries: Section annual report*. International Federation of Library Associations and Institutions. <https://www.ifla.org>
9. International Federation of Library Associations [IFLA]. (2018). *Environment, sustainability and libraries*. IFLA. <https://www.ifla.org>

10. Issah, Y., & Boateng, F. (2021). Challenges to implementing sustainability initiatives in Ghanaian academic libraries. *African Journal of Library and Information Science*, 31(2), 112–124.
11. Kanyengo, C. (2019). Embedding environmental education in African library services. *Library Management*, 40(6–7), 401–412.
12. Kwame Nkrumah University of Science and Technology [KNUST]. (2025). Sustainability initiatives at the Prempeh II Library. KNUST. <https://www.knust.edu.gh>
13. Mabweazara, H. M., & Zinn, S. (2022). Sustainability challenges in African academic libraries: Policy, funding, and capacity. *Journal of Academic Librarianship*, 48(2), 102–118. <https://doi.org/10.1016/j.acalib.2022.102489>
14. Mhlongo, N., & Mabe, K. (2020). Environmental management in academic institutions: Lessons for African libraries. *South African Journal of Libraries and Information Science*, 86(1), 45–56. <https://doi.org/10.7553/86-1-1841>
15. Musangi, I. (2021). Promoting sustainability literacy in African university libraries. *Library Philosophy and Practice*, 1–13.
16. Oyedokun, T. (2020). Incremental sustainability adoption in African libraries: Policy and cost challenges. *Library Hi Tech News*, 37(7), 1–6.
17. Oyewole, O., & Adetoro, N. (2020). Human capacity challenges in promoting environmental literacy in libraries. *African Journal of Library, Archives and Information Science*, 30(1), 15–27.
18. University of Ghana. (2021). Balme Library activities on sustainability and climate change awareness. University of Ghana. <https://www.ug.edu.gh>
19. University of Cape Coast [UCC]. (2021). Green Ghana = Green UCC campaign report. University of Cape Coast. <https://www.ucc.edu.gh>
20. University of Cape Coast [UCC]. (2024). Student-led environmental sustainability initiatives at UCC. University of Cape Coast. <https://www.ucc.edu.gh>
21. Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper & Row.