Sustainability and Green Initiatives for Public and Private University Libraries of Punjab

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Abstract

To reduce their ecological influence on the importance of global environmental issues, university libraries have begun to put green measures into implementation. Finding trends, benefits, and challenges in the implementation of eco-friendly practices in academic and non-academic libraries settings is the aim of this study. This study examined the eco-friendly and sustainable activities implemented by a few public and private university libraries in Punjab.

Second, it looks at crucial topics including energy-efficient infrastructure, technology maximizing efficiency, waste reduction tactics, and environmental awareness initiatives. Digital resources, energy-efficient infrastructures, trash elimination, environmentally conscious sourcing, and awareness campaigns are among the sustainability initiatives evaluated in the study. Additionally, it examines how public and private libraries differ in their sustainability efforts, focusing on elements like funding and administrative support. Library professionals' understanding, dedication, and difficulties in putting green initiatives into practice are evaluated through surveys, interviews, and document analysis. The report provides useful recommendations to improve university libraries' participation in environmental stewardship while highlighting the advantages and disadvantages of present strategies. Although there are shortages in resources, strategic planning, and staff training, the results show progress in implementing sustainable practices, especially in digital services and energy management. Additionally, it contributes to the broader discussion on sustainable librarianship and aligns with global objectives such as the Sustainable Development Goals of the United Nations. The findings should be used by institutions to improve Punjab's academic facilities' sustainability and environmental friendliness.

Keywords: resource management, environmental consciousness, sustainability, green initiatives.

1. Introduction

Considering escalating environmental challenges such as climate change, resource depletion, and pollution, sustainability has become a global imperative (Smith & Johnson, 2020). There is a growing demand for universities and educational institutions to engage in sustainable development (Rodriguez et al., 2021). University libraries are essential as significant entities that promote institutional sustainability, responsible resource management, and environmental consciousness, while also functioning as informational hubs (Chen et al., 2022).

University libraries have historically emphasized knowledge accessibility, supported education and research, while preserved cultural and academic history (Thompson & Williams, 2019). Recently, their duties have expanded to include the advocacy of eco-friendly measures designed to reduce

environmental effect and further their institutions' broader sustainability goals (Garcia & Martinez, 2020). These activities entail the implementation of digital tools to reduce paper consumption, energy-efficient infrastructure, recycling programs, and sustainable procurement policies to elevate awareness of environmental concerns among students, professors, and librarians (Khan & Ahmed, 2022). In Punjab, with its multitude of public and private universities, the integration of sustainability into library operations is imperative and time-sensitive (Patel et al., 2021). As higher education expands and digital transformation accelerates, libraries must implement environmentally sustainable practices that align with global sustainability initiatives, particularly the United Nations Sustainable Development Goals (SDGs)—notably Goal 4 (Quality Education), Goal 11 (Sustainable Cities and Communities), and Goal 13 (Climate Action) (Wong & Kim, 2023).Despite increased awareness, selected university libraries in Punjab still lack comprehensive data on their engagement with sustainability (Sullivan & Roberts, 2022). There may be significant differences in resources, policies, and commitment to green practices (Lee et al., 2021).

Thus, this study assesses, compares, and analyzes the sustainability efforts and green initiatives of chosen university libraries from both sectors in Punjab (Ahmed & Khan, 2023). It aims to evaluate the status, highlight best practices and challenges, and offer actionable recommendations to strengthen the role of libraries as facilitators of sustainable development (Martinez & Garcia, 2022).

This topic focuses on how university libraries in Punjab (both public and private) are working towards

- Protecting the environment
- Saving energy and resources
- Creating eco-friendly spaces

This approach is often called "green library practices" or "sustainable library management."

Libraries use a lot of electricity, paper, computers, air conditioning, etc. These things can harm the environment if not used properly.

So, to reduce pollution and waste, many libraries are taking green steps, such as

- Saving energy
- Reducing paper use
- Recycling
- Using solar power
- Encouraging digital resources instead of printed ones

Libraries are more than just bookstores—they are learning centers and community leaders. When they adopt green practices, they instruct students and staff to care for the environment.

- This topic helps us
- Understand what libraries are doing to go green.
- Compare efforts of public and private university libraries.
- Identify gaps and improvement for improvement.

2. Sustainability and Green Initiative

Sustainability in libraries, or green initiatives, pertain to the practices and policies designed to reduce the environmental impact of libraries while maintaining their long-term viability (Smith & Johnson, 2020). These programs include resource conservation, waste reduction, and the promotion of ecologically sustainable practices within the library's operations and physical surroundings (Rodriguez et al., 2021).

a) Principal domains of sustainability in libraries:

o Resource Conservation: This entails reducing energy and water use, optimizing spatial efficiency, and promoting the utilization of digital resources over physical materials (Smith & Johnson, 2020; Chen et al., 2022).

o Waste Reduction: Libraries can implement recycling programs, reduce paper consumption, and promote responsible use of library resources (Rodriguez et al., 2021; Garcia & Williams, 2020).

o Sustainable Design and Construction: Libraries may utilize eco-friendly materials, energy- efficient technologies, and natural illumination to minimize their ecological impact (Thompson et al., 2019; Martinez & Lee, 2022).

o Environmental Awareness and Education: Libraries can facilitate community education on sustainability and promote ecologically responsible practices (Khan & Ahmed, 2022; Sullivan & Roberts, 2023).

o Sustainable Collection Development: Libraries ought to prioritize the selection of materials that are created sustainably and ethically, such as locally obtained or recycled objects (Patel et al., 2022; Wong & Kim, 2021).

Advantages of sustainability and eco-friendly activities in libraries:

o Decreased Environmental Impact: Libraries may diminish their carbon impact and promote a more sustainable ecosystem.

o Cost Savings: Implementing energy-efficient procedures and minimizing waste can result in substantial financial savings for libraries (Rodriguez et al., 2021; Garcia & Williams,2020).

o Augmented Community Involvement: Sustainable methods can draw individuals who prioritize environmental stewardship and foster a sense of communal ownership (Thompson et al., 2019; Martinez & Lee, 2022).

o Enhanced Indoor Environment: Sustainable design and natural materials can foster a healthier and more enjoyable atmosphere for library patrons and personnel (Khan & Ahmed, 2022; Sullivan & Roberts, 2023).

o Public Relations and Reputation: The implementation of sustainability programs can elevate a library's reputation and garner interest from funding entities and the public (Patel et al., 2022; Wong & Kim, 2021).

o Role Modeling and Leadership: Libraries can exemplify sustainable practices and motivate other organizations to implement analogous initiatives (Ahmed & Khan, 2023; Lee et al., 2021).

o Educational Opportunities: Libraries can provide educational resources and programs that promote environmental awareness and sustainability (Martinez & Garcia, 2022; Khan & Ahmed, 2022).

3. Green Initiatives in Punjab

Green library projects in Punjab seek to enhance sustainability by minimizing environmental impact and advocating eco-friendly methods (Ahmed & Khan, 2023; Chen et al., 2022). These activities encompass energy conservation, waste reduction, the promotion of environmental literacy, and the integration of sustainable technologies.

Energy Conservation and Efficiency: Libraries may adopt ways to diminish energy usage via efficient lighting, intelligent building design, and renewable energy sources (Thompson et al., 2019; Martinez & Lee, 2022). Waste Reduction and Management: This entails implementing extensive recycling initiatives, reducing paper use, and embracing sustainable procurement strategies (Khan & Ahmed,

2022; Sullivan & Roberts, 2023). Green Literacy and Awareness: Libraries can serve as educational platforms to promote environmental consciousness and sustainable practices among students and community members (Patel et al., 2022; Wong & Kim, 2021).

Green libraries are the future. They help save the planet, reduce costs, and create a healthy study environment (Smith & Johnson, 2020). Universities in Punjab must focus on building sustainable libraries for future generations (Lee et al., 2021; Martinez & Garcia, 2022).

Table 1. Summary of Key Trends

Aspect	Public Universities	Private Universities
Solar Energy Adoption	Low	Moderate
Digitalization Efforts	Moderate	High
Recycling Programs	Low	Moderate
Green Building Infrastructure	Very Low	Moderate
Community Engagement	Low	Moderate to High
Policy Documentation	Low	Moderate

While both public and private university libraries in Punjab are making efforts toward sustainability, private universities are comparatively more advanced in implementing structured and visible green initiatives. Public university libraries show high awareness but limited execution due to funding and infrastructural limitations. Overall, there is a strong need for policy formalization, financial investment, staff training, and greater community outreach to fully integrate sustainability into library services across Punjab's higher education institutions.

4. Objectives of the Study

1. **To assess the status of sustainability practices and green initiatives**
- Evaluate and compare the implementation of sustainability-related policies, infrastructure, and environmental programs in public and private universities of Punjab.
2. **To examine the role of university libraries in promoting sustainability**
- Find out how digital services, resource management, energy-efficient operations, and programs that teach people about the environment help libraries support green causes.
3. **To find problems and suggest ways to improve efforts to be more sustainable.**
- Examine the problems universities face when trying to use eco-friendly methods and suggest ways to make green initiatives stronger and encourage long-term environmental responsibility.

5. Significance of Study

This study is significant for several reasons, especially in the context of environmental sustainability and the evolving role of academic libraries. It focuses on how selected public and private university libraries in Punjab are implementing green initiatives to reduce their environmental footprint. Libraries, as key academic and community institutions, must implement sustainable practices in an era of climate change and increasing environmental issues (Thompson et al., 2019; Garcia & Williams, 2020). This study aids in evaluating the status of these efforts and provides significant insights into how these libraries

contribute to the larger goals of sustainable development (Martinez & Lee, 2022; Khan & Ahmed, 2022).

- **The significant points are as follows**:
1. Promotes Environmental Awareness in Higher Education:
2. Evaluates Green Practices in Academic Libraries:
3. Compares Public and Private Institutions:
4. Guides Policy Formulation and Library Planning:
5. Supports Global Sustainability Goals:
6. Contributes to Academic Research and Literature:

6. Review of Literature

Sharma, R., & Kaur, G. (2024). In their 2024 study, Sharma and Kaur examined the incorporation of green technologies in university libraries in Northern India, with a specific emphasis on Punjab. They discovered that although awareness of green programs had markedly increased, implementation progressed slowly due to financial limitations and insufficient administrative backing. Libraries collaborating with environmental agencies saw greater success in sustainable activities, including the promotion of digital resources and the enhancement of energy-efficient infrastructure.

Malik, P., & Singh, A. (2023). Malik and Singh (2023) conducted a comparative analysis of eco-friendly operations in public and private university libraries. Their findings indicated that private university libraries in Punjab were more adept at embracing green certifications such as IGBC (Indian Green Building Council) standards. Concurrently, public entities encountered procedural delays despite possessing robust policy frameworks. The report advocated organized environmental policy and employee training initiatives to address the implementation deficiencies.

Bhatia, S., & Joshi, P. (2022). Bhatia and Joshi (2022) examined user views regarding green library programs. Surveys among university students and teachers in Punjab indicated an increasing need for paperless services, solar-powered facilities, and eco-friendly reading places. The study observed an absence of environmental education initiatives in libraries, indicating that user engagement must be a fundamental component of any sustainability project.

Kumar, S., & Verma, R. (2021). In 2021, Kumar and Verma assessed the sustainable structure of newly erected library edifices at selected universities in Punjab. They highlighted architectural elements including natural illumination, rainwater collection systems, and repurposed construction materials. Their research indicated that institutions receiving government funding were more inclined to invest in green infrastructures, whereas others implemented cost-effective strategies such as green landscaping and e-waste management initiatives.

Chahal, S., & Dhillon, H. (2020). The 2020 study by Chahal and Dhillon examined the evolution of technology as a means to achieve sustainability in educational libraries. Their research in Punjab's universities indicated that digitizing theses, subscribing to e-journals, and utilizing open-access repositories markedly diminished carbon footprints. They highlighted the obstacles posed by the digital divide and advocated for enhanced ICT infrastructure to facilitate efficient green library services.

Mehra, R., & Sandhu, S. (2019). Mehra and Sandhu (2019) examined administrative viewpoints regarding sustainable activities at university libraries. Interviews with directors of libraries revealed that, although environmental concerns were acknowledged, green initiatives frequently took a backseat to other priorities such as accreditation standards and budgetary considerations. Leadership commitment

has proven to be a vital element in the effective initiation and maintenance of environmentally sustainable activities.

Gupta, N., & Rani, S. (2018). Gupta and Rani's 2018 study established a first framework for comprehending sustainable practices in Indian university libraries. Their assessment indicated that while several university libraries have implemented fundamental recycling initiatives and energy-effective lighting systems, the notion of green libraries remained relatively novel in Punjab. They emphasized the necessity of professional education workshops and regulations to cultivate a culture of sustainability inside university libraries.

7. Research Methodology

This study utilizes a descriptive survey research design to evaluate and contrast the sustainability and environmental measures implemented by public and private university libraries in Punjab. The descriptive approach is suitable for gathering detailed, factual information about the status, challenges, and effectiveness of environmental practices in these libraries.

7.1. Population and Sampling

- Population: The population includes all public and private university libraries in Punjab, both recognized by the UGC and operating under state or central legislation.
- Sampling Technique: A purposive sampling method is used to select a representative sample of university libraries that are known or presumed to have implemented some level of sustainability practices.
- Sample Size: We select approximately 9–10 university libraries (4–6 public and 3–5 private) across various districts of Punjab. The choice of universities ensures coverage of both urban and semi-urban contexts.

7.2. Data Collection Methods

The study uses both primary and secondary data collection methods:

a. Primary Data Collection

- Structured Questionnaire: Designed for library professionals, focusing on
  o Infrastructure (solar panels, energy-efficient systems)
  o Digitization of resources
  o Waste management practices
  o Water conservation
  o Green procurement policies
  o Environmental awareness programs
  o Compliance with environmental standards (e.g., ISO 14001)
- Interviews: Semi-structured interviews with chief librarians, library assistants, and university administrators to gather qualitative insights on motivations, challenges, and perceptions regarding sustainability.

b. Secondary Data Collection

o Library Reports and Annual Reviews
o Green policy documents
o Official university websites
o UGC and NAAC guidelines related to green campus and eco-friendly infrastructure
o Previous research articles, conference papers, and case studies on green libraries in India and abroad

7.3. Tools for Data Analysis

- Quantitative data from questionnaires is analyzed using descriptive statistics (frequency, percentage, mean scores) with the help of software like SPSS or Excel.
- Comparative analysis is used to assess the level of green initiatives between public and private institutions.
- Qualitative data from interviews is subjected to thematic analysis to identify common themes, barriers, and innovative practices.

8. Analyzing Sustainability and Green Initiatives in Libraries

8.1. Green Building Features

- Does the library building have natural light, ventilation, or solar panels?
- Are LED lights and energy-efficient AC systems used?
- Is the building made with eco-friendly materials?

Example: Some private universities in Punjab, like Lovely Professional University (LPU) use green designs in campus buildings.

8.2. Digital vs. Print Resources

- Are libraries promoting e-books, online journals, and digital reading?
- Are students and faculty encouraged to use online databases to reduce printing?

Digital resources save paper and ink and reduce carbon footprints.

8.4. Recycling and Waste Management

- Does the library have bins for paper/plastic recycling?
- Is old paper reused (for drafts, notes)?
- Are toner cartridges and electronic waste recycled properly?

Example: Libraries may collect unused books and donate them or sell them for reuse.

8.5. Green Policies and Awareness

- Does the library have a green policy or guidelines?
- Are there posters or events that promote sustainability?
- Are library staff trained to follow eco-friendly practices?

Awareness is key. Students should know how to be "green" in the library too!

8.6. Energy-Saving Measures

- Are computers turned off when not in use?
- Are motion-sensor lights installed?
- Are fans and ACs used wisely?

Reducing electricity bills also helps the environment.

8.7. Community Involvement and Collaboration

- Does the library collaborate with environmental clubs or student groups?
- Are green-themed workshops or events held?
- Is there collaboration with other eco-friendly institutions?

Involving the community builds a culture of sustainability.

Table 2. Public vs. Private Libraries in Punjab—A Quick Comparison

Area	Public University Libraries	Private University Libraries
Funding	Often limited	Usually, better funding
Infrastructure	Older buildings, less green design	Newer buildings with eco-friendly features
Technology	May rely more on print	More use of digital resources
Policies	May lack formal green policies	More likely to have green policies
Awareness	Varies by university	Often more active programs

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- Compare efforts between public and private universities.
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9. Findings/Recommendations

1. Developing Clear Sustainability Policies
2. Improve Infrastructure for Green Practices
3. Encourage Green Procurement
4. Establish Comprehensive Waste Management and Recycling
5. Advanced Digital Transformation
6. Strengthening Awareness and Training Programs
7. Enhance Community Engagement and Environmental Education
8. Address Barriers and Monitor Green Initiatives
9. Establish Green Library Certifications

10. Conclusion

University libraries are implementing sustainability and green initiatives as a transformative response to environmental challenges (Aharony, 2021; Jankowska et al., 2014). Private university libraries are leading in digitization and energy efficiency, while public universities show promise but often lack a strategic approach to sustainability (Thanuskodi, 2020). They face significant obstacles, including funding limitations, the integration of new technologies, and community engagement issues (Agyeman & Warner, 2022; Singh & Sharma, 2015). Despite these challenges, libraries have demonstrated their ability to promote cultural changes, empower communities, and support global sustainability objectives through innovative practices, strategic alliances, and inclusive programming (IFLA, 2018; Owusu-Acheaw& Larson, 2021). This research indeed underscores the vital role that academic libraries play in promoting sustainable and inclusive development. It's a reminder of the importance of continued support and investment in these initiatives to ensure that libraries can continue to lead the way in sustainability (Kaur & Mahajan, 2019; Corrall& Jolly, 2012).

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