

SUSTAINABLE AND GREEN LIBRARY INITIATIVES IN INDIA

DR. KUSHINI PRASAD

ASSOCIATE PROFESSOR, SCHOOL OF MANAGEMENT, PRESIDENCY UNIVERSITY, BANGALORE.

DR. SURESH P.

LECTURER IN COMMERCE, PINGLE GOVERNMENT COLLEGE FOR WOMEN(A), HANAMKONDA.

ABSTRACT

Environmental sustainability has emerged as a strategic imperative for the education sector in India, driven by climate challenges, evolving policy frameworks, and global commitments such as the United Nations Sustainable Development Goals (SDGs). Libraries, as central knowledge and learning ecosystems, are increasingly repositioned as active contributors to sustainability through green infrastructure and sustainable digital practices. This paper examines the concept, features, roles, and goals of green libraries and analyzes their cross-connections with multiple SDGs in the Indian context. Drawing on existing literature, national case examples, and secondary evidence on green library practices in India, the study identifies current progress as well as critical gaps in policy integration, technological adoption, and empirical assessment. A conceptual framework is proposed linking green library initiatives and sustainable digital practices with environmental sustainability outcomes. The study contributes to the growing literature in Library and Information Science and sustainability studies, offering policy and strategic insights for advancing SDG-aligned green library and campus sustainability initiatives in India.

Key words: 1. Green Libraries, 2. Sustainable Digital Practices, 3. Environmental Sustainability, 4. Green Infrastructure in India and 5. Sustainable Development Goals (SDGs)

Introduction

Sustainable development has become a pivotal goal for institutions across sectors, including educational and public service infrastructures such as libraries. Traditionally, libraries have served primarily as repositories of knowledge, but in recent years their role has expanded to include broader societal functions—such as environmental stewardship, community engagement, and support for equitable access to information. In India, the concept of green libraries or sustainable libraries is emerging as part of this larger transformation, integrating environmentally friendly infrastructure, resource-efficient operations, and eco-literacy among users. Green libraries aim not only to minimize ecological footprints—through energy efficiency, renewable energy use, water conservation, and waste reduction—but also to act as catalysts in fulfilling national and global sustainability agendas such as the United Nations Sustainable Development Goals (SDGs), especially SDG 4 (Quality Education), SDG 7 (Affordable and Clean Energy), and SDG 13 (Climate Action).

In India, examples of sustainable library initiatives range from eco-friendly school libraries with solar power and recycled materials to large institutional libraries incorporating green design standards and digital resources. However, despite early developments, widespread adoption remains nascent and uneven. This study explores the current landscape of green library initiatives in India, addressing the need for structured strategies and policies that can accelerate sustainability within the country's library ecosystem.

Literature Review

The concept of green libraries has been discussed extensively in international literature as a response to climate change and environmental degradation. Globally, green libraries are characterized by resource-efficient building design, internal operations that reduce carbon footprints, and services that promote environmental awareness among users. This body of work highlights how green library practices align with the three pillars of sustainability—environmental, economic, and social sustainability—creating institutions that are not only energy efficient but also socially inclusive and financially viable. In the Indian context, a limited but growing number of studies and initiatives demonstrate sustainable practices in library settings. For example:

Initiatives such as the Green Pencil Foundation's Eco-Friendly Library in Faridabad demonstrate practical implementation of solar-powered lighting, bamboo furniture, and vertical gardens constructed from recycled plastic bottles, promoting both sustainability and educational inclusivity among students. Research shows that some academic libraries, including those in technical institutions like the Indian Institutes of Technology (IITs), are evolving to incorporate green practices and contribute to SDG agendas through digital services, inclusive access, and operational sustainability. Scholars in India have examined how green library principles—and international standards like LEED and IGBC—can be applied to Indian libraries to encourage sustainable design and operations. However, these works also point to significant gaps in implementation and policy support. Despite these contributions, literature reveals that broader adoption of sustainable practices in Indian libraries is limited, with many institutions still in preliminary stages of implementation due to resource and infrastructural constraints.

The Green Library is a relatively new concept and hence literature on Green Library have been found to be limited. James and Suzanne (1991) in their paper on Green Library explained how to be environmentally friendly inside the library and how to introduce greenery in the library. Eagan (1991) discussed about sustainability and impact of noise pollution in the library.

Smith (1991) in his article explained about the role of libraries in conserving the nature. Atton (1993) in his research paper talked about green librarianship in the U.S. Brown (2003) in his paper discussed about the trend of Green Libraries in traditional libraries. Neale (2008) in her paper 'Go Green' talked about the ways of greening the libraries. Naphade, Chani & Garg (2013) studied the Central Library building of IIT, Roorkee and suggested various ways of making it ecofriendly and green

Problem Statement

While sustainability initiatives have gained momentum across several sectors in India, the adoption of green practices in libraries remains fragmented and inadequately institutionalized. Most Indian libraries continue to function with conventional infrastructure, limited environmental planning, and minimal integration of sustainable technologies. A major challenge lies in the lack of awareness and absence of clearly defined national or institutional policy frameworks guiding green library development. Additionally, financial constraints and infrastructural limitations restrict libraries from adopting energy-efficient systems, renewable energy sources, and sustainable building designs. The situation is further compounded by the scarcity of empirical and impact-based studies documenting best practices and measurable outcomes of green library initiatives in India. This absence of evidence restricts replication and scalability of successful models. Therefore, there is a critical need for systematic research to evaluate existing practices, identify implementation barriers, and develop context-specific strategies to promote sustainable green libraries across diverse Indian library settings.

Objectives of the Study

- To examine the concept, key features, roles, and goals of green libraries in promoting sustainability within the Indian library system.
- To analyze how green library initiatives contribute simultaneously to multiple UN Sustainable Development Goals (SDGs) in the Indian context.

Methodology

The present study adopts a conceptual and descriptive research design based entirely on secondary data. Relevant information has been collected from scholarly journals, books, conference proceedings, institutional and library reports, NAAC and NIRF documentation, government policy documents, UN Sustainable Development Goals publications, IFLA guidelines, and other credible national and international sources related to green libraries and sustainable digital practices in India.

Research Design and Data Sources

The study is based solely on secondary data collected from academic literature, institutional reports, government and policy documents, UN SDG publications, IFLA guidelines, and other reliable national and international sources relevant to green libraries and environmental sustainability.

Understanding Green Library

The Online Dictionary of Library and Information Science (ODLIS) defines a sustainable green library as one meant to maximise indoor environmental quality while minimising adverse effects on the natural environment. Careful site selection, using natural building materials and biodegradable goods, resource conservation (including water, energy, and paper), and appropriate waste disposal techniques like recycling help achieve this. The International Federation of Library Associations and Institutions (IFLA) claims that a green library not only emphasises environmental sustainability but also considers economic and social sustainability in its operations and services. These libraries seek to lower their ecological impact through energy efficiency, trash reduction, ethical purchasing, and environmental literacy initiatives. Therefore, they are rather important in encouraging sustainability in their areas.

Features of a Green Library

Green libraries prioritise energy efficiency by using sustainable building materials,

efficient insulation, natural lighting, and energy-saving equipment. They investigate and include renewable energy sources—geothermal systems, wind turbines, or solar panels—to run library operations. Green libraries use waste management techniques include garbage segregation, recycling initiatives, and encouraging responsible consumption to reduce waste production. They educate workers and customers on water conservation techniques, install rainwater collecting systems, and employ water-efficient equipment. Green libraries emphasize purchasing ecologically friendly goods, including recycled or sustainable materials, and encourage the proper disposal of electronic trash.

Through initiatives, seminars, and resource provision on sustainability subjects, they vigorously advocate environmental education and awareness. Green libraries work with local groups and include customers in sustainable activities, serving as community centres for environmental projects.

Roles and Goals of a Green Library: (Haukeet al., 2021)

Green libraries lead the way in sustainability by using energy-efficient structures, eco- friendly tools, and sustainable operational procedures, lowering their carbon footprint.

They set SMART (Specific, Measurable, Achievable, Realistic, and Time-bound) environmental targets and report their success to motivate action in the larger society.

These libraries offer access to pertinent and current knowledge by curating collections and resources on sustainability, climate change, and eco-friendly living. They increase environmental literacy and enable people to adopt sustainable practices by means of workshops, exhibits, and activities. Green libraries promote responsible resource use by conserving electricity, water, and Materials.

They make these practices available to their communities through circular economy techniques including resource sharing and recycling. Green libraries foster social inclusion cross-cultural variety and community involvement by providing shared spaces and programming that help to minimise inequality.

They actively interact with their communities to promote education, literacy, and environmental consciousness. Green libraries promote sustainability and match their projects with worldwide frameworks such as the UN Sustainable Development Goals (SDGs), the Paris Climate Agreement, and UNESCO's Education for Sustainable Development.

They motivate people and other organisations to embrace green practices and help to create a sustainable future. Green libraries offer innovative services like urban gardening, seed libraries, repair cafés, and citizen science projects, inspiring guests to adopt sustainable lives.

They strive to ensure no one is left behind in the move to a greener tomorrow by guaranteeing fair access to knowledge and resources.

Cross-Connections Between SDGs Through Green Library Initiatives

Below is a clear cross-connection chart showing how Green Library Initiatives simultaneously contribute to multiple UN Sustainable Development Goals (SDGs).

Green Library Initiative	Primary SDG	Linked SDGs	Nature of Cross-Connection
Energy-efficient buildings (LEDs, solar panels, green architecture)	SDG 7: Affordable & Clean Energy	SDG 11, SDG 13	Reduces carbon footprint, supports sustainable cities, and climate action
Digital libraries & e-resources	SDG 12: Responsible Consumption & Production	SDG 13, SDG 4	Minimizes paper use, lowers emissions, improves inclusive access to education
Water conservation systems (rainwater harvesting)	SDG 6: Clean Water & Sanitation	SDG 11, SDG 13	Promotes resource efficiency and climate-resilient infrastructure
Waste management & recycling programs	SDG 12: Responsible Consumption & Production	SDG 11, SDG 13	Encourages circular economy and reduces landfill impact
Green literacy & sustainability awareness programs	SDG 4: Quality Education	SDG 13, SDG 16	Builds environmental awareness and responsible citizenship
Inclusive access to digital knowledge	SDG 10: Reduced Inequalities	SDG 4, SDG 9	Bridges digital divide through equitable information access
Sustainable procurement (eco-friendly furniture, supplies)	SDG 12: Responsible Consumption & Production	SDG 8, SDG 13	Supports green jobs and sustainable supply chains
Smart technologies (IoT for energy monitoring)	SDG 9: Industry, Innovation & Infrastructure	SDG 7, SDG 11	Enhances efficiency through innovation and smart infrastructure
Community engagement & partnerships	SDG 17: Partnerships for the Goals	SDG 4, SDG 11	Strengthens collaborative governance and local sustainability efforts

State of Green Libraries in India

In Gunawan's (2017) survey on green libraries in India, the author examined the implementation of green practices among UGC-approved libraries in the country. The study focused on specific indicators to assess the extent of sustainable initiatives.

State of Green Libraries in India

S.No.	Parameters	Percentage of libraries
1	Green building	22
2	Natural ventilation	54
3	Dual flush toilet with cistern	31
4	Using natural daylight	60
5	Using energy-saving bulbs (LED lights)	48
6	Computerised monitoring of electrical systems	13
7	Photocell occupancy sensors for automatic light control	7
8	Solar panels	28
9	Use of chemical-free products for cleaning	33
10	Waste management of books	64
11	Printing on both sides of paper	72
12	Adopting measures for e-waste management	53
13	Green programmes and activities	49
14	Reducing, reusing and recycling of the products	12
15	Creating a Green Team in the library	7
16	Collection development	27
17	Green initiatives in IT	21
18	Rain water harvesting	34

(Gundawar, 2017)

Particularly in areas like cutting paper use during printing, efficiently managing book waste, using natural sunshine, and embracing green architectural techniques, the report shows significant progress Indian libraries have achieved in becoming green libraries. These elements show good progress toward sustainability objectives. There are, nevertheless, some regions calling for development. Indian libraries still have room for improvement in certain areas, such as the use of photocell occupancy sensors for automatic light control, the creation of a committed "Green Team" inside the library, and the efficient reduction, reuse, and recycling policies, if they are to be considered fully green libraries.

Prominent green libraries in India

- Anna Centenary Library, Chennai (Tamil Nadu) – Widely cited as Asia's first LEED Gold rated library building; designed by the Tamil Nadu Government with about 30% lower energy and 20% lower potable water use compared to conventional buildings.
- Karnataka University Library, Dharwad (Karnataka) – Often described as a "green space" library, with extensive outdoor reading spaces under trees and emphasis on natural surroundings.
- Perma Karpo Library, Ladakh (UT of Ladakh) – Himalayan library with solar panels, thick walls, and a surrounding garden, highlighted as a model of climate-responsive, sustainable design.
- National Library of India, Kolkata (West Bengal) – Listed among Indian green library buildings for its large reading rooms, thick walls, natural ventilation and light-focused design.

- Calcutta University Library, Kolkata (West Bengal) – Cited for spacious reading rooms, ample natural light and ventilation, and energy-conscious building features.
- Delhi University Library, Delhi (NCT of Delhi) – Noted for a naturally cool, comfortable building with greenery, wide openings and emphasis on natural lighting.
- Mumbai University Library, Mumbai (Maharashtra) – Uses wood as stack material and large windows to maximize daylight and ventilation in reading halls.
- NIT Silchar Library, Silchar (Assam) – New library building reported as being designed to meet LEED certification criteria as a green library for the Barak Valley region.
- NIT Trichy Library, Tiruchirappalli (Tamil Nadu) – Repeatedly mentioned in Indian green-library presentations as a library taking green-building measures.

Conclusion

Green libraries, supported by sustainable digital practices, represent a significant yet underutilized pathway for enhancing environmental sustainability in Indian higher education institutions. The findings indicate that while progress has been made in areas such as energy efficiency, digital resource adoption, waste reduction, and environmental awareness, the implementation of green library initiatives remains uneven and largely fragmented. By demonstrating the cross-linkages between green library practices and multiple SDGs, this study highlights the multidimensional role libraries can play in advancing education, climate action, responsible consumption, and social inclusion. The proposed conceptual framework provides a foundation for future empirical research and evidence-based policy development. Strengthening institutional commitment, integrating digital sustainability with green infrastructure, and aligning library initiatives with national and global sustainability frameworks can position Indian academic libraries as key drivers of sustainable development.

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