



# Green Libraries: A Review of Some Eco-friendly Initiatives and Sustainable Practices

Dr. Niti Mollah

*Librarian, Krishnath College, Berhampore, Murshidabad, West Bengal, India.*

*Email: n.mollah24@gmail.com*

**ABSTRACT:** *In the era of increasing environmental degradation and environmental pollution, any policy initiatives, programmes and action that encourages controlling this pollution and thereby degradation have greater bearing on sustainability. Constructing green structures and building a green library may serve to a great deal in the form of curtailing running and maintenance costs and thus serving to a great extent the SDG Goals in general and Goal 7 (Affordable and Clean Energy) and 11 (Sustainable cities and Communities) in particular. Libraries can play an important role not only through adoption of green equipment and technology but also can contribute substantially in operation and maintenance as well as imparting knowledge and information related to the advantages of adopting green libraries and green buildings to others. The present paper makes an effort to examine the different dimensions of green libraries and investigate the role that libraries can play to achieve SDG goals, particularly Goal 7 and Goal 11. While doing so the paper has also surveyed the initiatives taken by the reputed organizations and programmes such as IFLA, LEED and GRIHA in this direction.*

**KEYWORDS:** *Green Library, Clean Energy, Sustainable Development Goals (SDG), IFLA, LEED, GRIHA & IGBC, Environmental Impact.*

## INTRODUCTION

A library that considers social, economic, and environmental sustainability is considered green and sustainable. According to popular belief, green and sustainable libraries can be of any size, but they should fundamentally have a clear sustainability plan that includes green equipment and buildings [1]. (IFLA ENSULIB). Online Dictionary for Library and Information Science (ODLIS) considers the concept of Green Library to synonymous to the 'Sustainable Library' and defines as "A library designed to minimize negative impact on the natural environment and maximize indoor environmental quality by means of careful site selection, use of natural construction materials and biodegradable products, conservation of resources (water, energy, paper), and responsible waste disposal (recycling, etc.) [2][3]. In new construction and library renovation, sustainability is increasingly achieved through LEED (Leadership in Energy and Environmental Design) certification, a rating system developed and administered by the U.S. Green Building Council (USGBC)" [4].

Through a number of initiatives in terms of design of building to make it more energy efficient, sustainable to adverse climatic and geo-hazards, more cost effective and environment friendly may qualify a library to be a Green Library [5]. On the other hand, the activities within the library premises and rendering services may be planned and designed such a way that the library qualifies to be a 'Green Library'. But the qualification of a green library doesn't end

here. A 'Green Library' also has a greater role to play in the society to make it more environment friendly and build a sustainable society to a great extent [6]. Thus, the present review is devoted to discuss and assess different dimensions and aspects of 'Green Library'.

## **LITERATURE REVIEW**

Because green libraries are still a relatively new phenomenon, there aren't many research publications on the subject. A few of them that are connected to the Green Library, Sustainable Library, and Green Library Movements have been mentioned here. As a result, the amount of pertinent literature that has been located and examined is extremely little. The Green Library Movement was explained in detail by Hauke and Werner (2013), along with its early stages in the 1990s. Vijayalakshmi (2014) notes that Antonelli (2008) provides an explanation of the various webpages and websites pertaining to the Green Library Building. The facts regarding the Green Library or Sustainable Libraries program in India and around the world is covered in this article on "Greening the Library for Sustainable Development."

According to Achini (2018), the cost of creating a green library is 37% more during construction than a conventional building of a comparable nature, but in the end, the cost savings in terms of energy bills and other expenses are 21% more in a green building than in a conventional one. As a result, it has been said that although green libraries have upfront costs, they ultimately save money.

Adetoun (2018) has researched greening library tools because a great public space serves people as a critical community resource where functions always take precedence over form, and because great public spaces are not only defined by their physical qualities. This means that any green program will have a broad effect. On the other side, Bhattacharya (2017) discussed different green library standards, global green library initiatives, the role of librarians, and how to effectively raise awareness about green libraries, among other things. The University of California at Merced Library boasts an open, collaborative, and welcoming learning environment thanks to its environmentally friendly and sustainable design.

Haipeng (2017) investigated this environment and demonstrated how it supports both constructive and active learning. According to Chew et al. (2017), there isn't much research on how green buildings are maintained and operated [7]. These researchers have worked very carefully on procedures and techniques related to energy-efficient building maintenance and green building facilities management. The concept, elements, and qualities of a green library have been emphasized by Nikam (2017). Along with emphasizing the importance of contemporary librarians in the process, the author has included some practical advice for putting the green library into reality [8]. In their study, Sornasundari and Sara (2016) listed a number of advantages of green library structures [9]. They made recommendations that centered on resource conservation and achieving sustainability by offering users green library services and greening the library's current buildings.

In addition to defining the term "green" with great emphasis, Shah and Shah (2015) listed the several obstacles that librarians face when putting the "Green Library" initiative into practice [10]. They have also reiterated TERI's efforts in creating GRIHA and green library programs. The authors also recommended that buildings with solar energy systems, energy-saving measures, roof water harvesting, etc., be properly planned. Antonelli (2008) elucidated the advantages of green libraries for posterity, the notion of LEED, and many green library initiatives [11]. In addition, he gave information about green library associations and talked about a few green library courses.

## OBJECTIVE

### *Objectives*

The study is designed to fulfil the following objectives in the bigger framework of achieving the goal of green library as part of SDGs goals.

- (a) To identify the goals and objectives of the green library.
- (b) To identify the areas where the green library initiatives may be taken.
- (c) To identify and enlist the actual green library initiatives to be carried forward to fulfill the SDG goals.
- (d) To examine and prescribe the role of green librarians to achieve the green library initiatives.
- (e) To enlist the LEED aspects in green library initiatives.

## METHODOLOGY

### *Consideration of Indian Green Building Council for Green Library*

The primary consideration for Green Library is the following areas where the attention needed are:

- (a) Community or Locality
- (b) Area or geographical region
- (c) Constructional material
  - i. IGBC (Indian Green Building Council)
  - ii. LEED (Leadership in Energy and Environmental Design)
- (d) Light availability
- (e) Air flow and circulation
- (f) Electricity and energy
- (g) Water saving and conservation

Sustainability agenda of a green library:

As per the IFLA Environment, Sustainability and Libraries Section (ENSULIB) sustainability agenda for green libraries may be the following.

- (a) Green buildings and equipment: By efficiently reducing the carbon footprint of the building and equipment, the pollutant emissions are reduced.
- (b) Green office principles: Procedures and operating hours are designed to be sustainable and favourable to the environment.
- (c) Sustainable economy: Sustainable economy limits and minimizes consumption, promotes sharing and circular economies, and makes economic practices relevant and available to the community.
- (d) Sustainable library services: Users have easy access to current and pertinent information, shared spaces and technologies are utilized, environmental education is

provided, and operations are made more efficient. The library is made with a zero-carbon footprint in mind.

- (e) **Social sustainability:** Libraries support high-quality education, increase literacy, foster community involvement, encourage cultural variety that transcends national boundaries, ensure that members of all social groups are included, and take participation into account overall. The library actively works to reduce inequality.
- (f) **Environmental management:** The library strives to lessen its own negative environmental impact and has SMART (Specific, Measurable, Achievable, Realistic, and Time-bound) environmental goals [12]. A larger audience is informed about the environmental policy library, its implementation process, and the outcomes of environmental activity [13].
- (g) **Commitment to general environmental goals and programmes:** The UN Sustainable Development Goals (SDGs), the Paris Climate Agreement (IPCC), and pertinent environmental credentials and initiatives serve as the foundation for the library's commitment to environmental issues.

World's most reputed green building rating organization the Leadership in Energy and Environmental Design (LEED) has enlisted five areas for evaluating libraries from the perspective of its green quality and sustainability [14][15].

Followings are the five different LEED categories that are used to judge a building's sustainability:

1. Site or location
2. Water conservation
3. Materials used
4. Indoor air quality
5. A bonus category for innovation adaptation and design.

(1) Site or location Selection may consider the followings:

As per LEED framework site selection criteria may include the following aspects.

- (a) The first step towards constructing a green library building is choosing a site where the library is to be erected.
- (b) Reducing pollution from construction operations requires a thorough inspection of the work site.
- (c) Sensitive and restricted land types should not be present on the site.
- (d) To prevent soil erosion, waterway sedimentation, and the production of airborne dust, an erosion and sedimentation management plan should be developed during the project's design phase.
- (e) It is recommended to use methods such mulching, silt fence, construction earth dikes, sediment traps, and sediment basins in addition to temporary and permanent seeding.
- (f) When choosing urban locations, natural habitat should be preserved and no additional infrastructure should be needed for channel development.

## (2) Water Conservation

LEED prescribes the following actions to be considered for water conservation.

- (a) Reducing the amount of potable or drinking water used in building activities is the first duty when it comes to water conservation.
- (b) If there is landscape irrigation available close to the project site, it is best to avoid using natural surface water.
- (c) Recycled waste water and rainwater collected could be utilized in place of potable water.
- (d) Native or adaptable plants with low watering needs should be utilized to create less water-hungry vegetation.
- (e) Construct a building sewage system that employs non-potable or waste water. Rainwater, regenerated grey water, or treated water for sewage conveyance could all be stored in a water tank.
- (f) Plantation or plant irrigation with waste water.
- (g) To cut down on water waste, install an occupancy sensor in the tap water system.

## (3) Energy Conservation

As far as energy conservation is concerned LEED recommends the following actions to be initiated and adopted for energy conservation.

- (a) Create a building envelope design that is very energy-efficient and requires less power.
- (b) Buildings should be designed with appropriate ventilation systems to minimize the need for air conditioning and lighting.
- (c) Utilizing energy sources that are clean, renewable, and devoid of fossil fuels, such as biomass, geothermal, solar, wind, low-impact hydro, geothermal, and biogas techniques.
- (d) Renewable sources of energy should supply the majority of the energy used in buildings.
- (e) Reduce the amount of time you spend using HVAC (heating, ventilation, air conditioning, and refrigeration) equipment and related controls.
- (f) The usage of daylight and the lighting control system could be started.
- (g) Make use of HVAC systems that don't utilize CFC refrigerants, identify any that are currently in use, and offer a replacement timetable for them.
- (h) Make the most of the low-power instruments.

## (4) Building Material

If one considers the building materials to be used to make a library LEED recommends the followings to achieve the sustainability:

- (a) When designing green buildings, environmentally friendly materials must to be utilized. The local natural environment shouldn't be harmed by the materials used in building.

- (b) Techniques like recycling waste materials and producing with the least amount of waste ought to be put into practice.
- (c) Whenever feasible, it should be encouraged to use quickly renewable resources.
- (d) Generally speaking, natural materials are less harmful than those made artificially. They often don't produce a lot of toxic material during manufacturing, making them less damaging to the environment.
- (e) Using materials that are readily available locally can drastically cut down on transportation costs and pollution.
- (f) Natural materials are less toxic to building occupants and construction workers alike. Certain building materials, like adhesives, only produce harmful gasses for a relatively short time during and even after installation [16]. Other materials, however, may cause the building's air quality to deteriorate over time.
- (g) It's important to think about using recyclable materials to their fullest extent.

#### (5) Indoor Air Quality

Maintaining quality of indoor air to an expected level from the perspective of health and energy efficient LEED has recommendation of the followings:

- (a) For optimal air quality, a suitable ventilation system should be constructed.
- (b) Use natural methods to raise a building's indoor air quality (IAQ) for the benefit of its residents' comfort and health.
- (c) A variety of plants, such as spider plants, filter the internal atmosphere of the building by absorbing airborne pollutants [17][18]. Houseplants that are great in eliminating pollutants and biological substances from the air include English ivy, Boston fern, and aloe vera.
- (d) Some of the trappable air contaminants can also be captured by air filters.
- (e) An air quality monitoring system might be put in place to keep tabs on the ventilation system and get performance feedback.
- (f) Outlaw smoking inside such structures.

#### (6) Other Green Library Elements

In addition to the above mentioned five categories of initiatives that may be taken to make a library and achieve sustainability, a green library can further take the following measures to make a library eco-friendlier. Some of such measures are:

- (a) Community Collaboration
- (b) Green roofing
- (c) Daylight use
- (d) Installing solar panels
- (e) Green materials for building
- (f) Natural ventilation in use
- (g) Green power and renewable energy
- (h) Indoor environmental quality assurance

## DISCUSSION

### *Why is the Green Library important?*

Investigating the necessity of a green library is a crucial matter. Due to the pressing need for green libraries in the current poisonous and polluted environment, they have become extremely popular in recent years. The environment is at risk due to the emergence of new technologies and instruments, which intensifies the need to preserve the planet as soon as possible. In addition to aiding in the preservation of the environment, green libraries promote sustainability. It provides future users with the information they need while simultaneously creating a nice ambiance for present users.

Green libraries are frequently environmentally friendly establishments that can draw patrons from all walks of life. Regarding the lovely and relaxing atmosphere of a library, a green library has much to offer. It goes without saying that a green library promotes improved physical and mental health as well as a higher quality of life. It's also very beneficial to preserve the planet for next generations.

Green libraries contribute to the conservation of forests and trees by reducing the use of resources like power and paper. Apart from the aforementioned benefits, another crucial aspect of green libraries is their ability to assist in attaining standards. The greatest accomplishment of green libraries is the library, an ever-expanding organism. It makes it possible for libraries to expand easily and to make adjustments without facing obstacles when constructing new facilities.

### *Green Librarian Initiatives by the Librarians*

Librarians of a library, in order to make it a green library, may take the following initiatives. Some of the prime initiatives that can be taken by the librarian even individually. Following is some of the initiatives by a green librarian. Librarians are always expected to make efforts in the direction to promote green library initiatives through use of different online tools such as social media etc. A Green Librarian is one who is constantly prepared to function under the eco-library system and should recognize those people who are interested to work under such an environment to cooperate and network. One can always encourage use of green library equipments, techniques to inspire others to use similar equipment and tools.

A librarian may effectively encourage and convince other librarians to adopt green libraries through concerted debate, discussion, written communication, seminar, and conferences. There is no doubt that the green librarians' role is considered to be most dynamic and therefore he/she is also named an eco-librarian because of the fact that one has to take care of the budgets in order to support the organizations in its endeavour to attain sustainability. It will be much wiser to adopt wooden furniture and similar materials because these are biodegradable materials.

In order to save money and the environment, the library can replace burnt brick with wool brick instead and use solar tiles or panels that can be used for roofs to generate electricity. Paper insulation may also be a very good trick to make an environmentally friendly building. Newspaper and cardboard are usually used as these are recyclable. It also protects the wall from the threat of fire and insect infestation. Increasing use of bamboo and similar bio-products as reinforcement materials in place of steel to make libraries more environmentally sustainable. Rooftop planting in the form of both gardening and urban agriculture can be a good idea both for production and keeping roofs cooler.

### *Role and Responsibilities of Librarians in Green Libraries?*

Among the multifaceted roles that a librarian usually, he/she will have the following contributions:

- (a) Libraries have traditionally played a significant role in community learning initiatives, and it is right and desirable that they lead the way in the social movement toward sustainability.
- (b) By outlining the advantages of green libraries, librarians encourage patrons to take part in green library initiatives.
- (c) By using green library standards, librarians can create sustainable library architecture and promote the expansion of their institutions in an environmentally responsible way.
- (d) By implementing green library design, librarians improve the library's reputation and overall perception.
- (e) In order to assist the organization implementing the green library system, librarians are able to manage the money associated with the establishment and administration of the library.
- (f) Librarians can have a significant impact on achieving green library visions, which are essential to creating thriving, sustainable libraries by bringing the economy and ecological into balance.

Green library initiatives are efforts to make libraries more environmentally sustainable and socially responsible. Some of the common practices of green libraries are:

- (a) Using green design and interior, such as natural materials, renewable energy sources, and efficient lighting and ventilation systems.
- (b) Incorporating green practices in day-to-day operations of libraries, such as reducing paper and energy consumption, recycling and composting waste, and promoting green transportation and catering.
- (c) Developing green collections and literacy programs, such as providing information and education on environmental issues, supporting local and global sustainability projects, and collaborating with other green organizations and networks.
- (d) Adopting emerging innovative and smart technologies, such as using digital and cloud-based services, implementing artificial intelligence and automation, and enhancing user experience and engagement.

Green libraries aim to contribute to the United Nations 2030 Sustainable Development Goals (SDGs) and demonstrate the social role and leadership of libraries in environmental education. Some examples of green libraries around the world are:

- Rangsit University Library in Thailand, which won the IFLA Green Library Award 2020 for its green building, green practices, green services, and green community.
- Kenya National Library Service, which implemented a solar-powered mobile library to provide access to information and technology for rural communities.
- Humboldt University Library in Germany, which organized a Green Library Day to raise awareness and share best practices on sustainability among library staff and users.



There have been efforts by the Indian Green Building Council (IGBC) to implement the goals of Leadership in Energy and Environment Design (LEED). In the line of LEED, India Govt has established a scheme named Green Rating for Integrated Habitat Assessment (GRIHA). There are certain benefits of the GRIHA scheme on a larger scale that will be beneficial to the community to a great extent through improvement in the environment by curtailing GHG (greenhouse gas) emissions, limiting energy consumption and reducing the pressure on natural resources.

Following is the list of benefits of green design that may be common in case of green library too:

- (a) Minimized energy usage without compromising comfort levels
- (b) Preservation of natural regions, ecosystems, and wildlife Reduction of soil erosion and other related issues
- (c) Reducing pollution in the air and water (directly beneficial to health)
- (d) Reduction in water usage
- (e) Limiting the production of waste by implementing recycling and reuse practices
- (f) Low pollution levels
- (g) Increase in user productivity
- (h) Enhanced reputation and marketability

In order to assess the benefit and success of the GRIHA scheme there are a number of studies in India. Durairam (2016) has analyzed as many as 9 institutional libraries to find out the aspects of green library initiatives in them. The author found that (a) Anna Centenary Library (ACL), Chennai, (b) Perma Karpo School Library at the Indian Himalaya, (c) National Library, Kolkata, (d) Karnataka University Library, Dharwad, (e) Mumbai University Library, (f) Indian Institute Technology (IIT) Library, Roorkee, (g) Chaudhary Braham Prakash Ayurved Charak Sansthan (Institute) Library, New Delhi, (h) Indian Institute of Management (IIM), Silchar and (i) The Energy Research Institute (TERI) libraries have adopted a number of green library initiatives that they may be termed as Green Library as per the assessment of the Green Rating for Integrated Habitat Assessment (GRIHA).

## CONCLUSION

Green library is a movement which is a need of the hour from the point of view of lowering down not only the budget of the library by reducing energy bills and curtailing construction costs but also making the library an organ promotes eco-friendly building and provides environment friendly services to the users. It is possible to achieve greater goals of sustainability through the proactive role of green librarians. It has been noticed that SDGs can be achieved through a library truly becoming green starting from construction site/location selection, materials used and also in function. Making use of natural light to reduce energy bills, allowing well ventilation and good circulation of air to make it healthier as well as energy efficient and less use of water and recycling of wastewater make a library truly green. Beyond taking green library initiatives in its construction and functions, librarians can play a very significant role to make institutional premises green and making the users and others environmentally aware by which the objective of green library will be completely fulfilled.

## REFERENCES

- [1] R. Sunil, Green Library Buildings: A Sustainable Process. *International Journal of Advance Research and Innovative Ideas in Education*, 2(6), pp. 342–346, 2016.
- [2] M. S. Bangar, Green Libraries in India: An Overview. *Knowledge Librarian: An International Peer Reviewed Bilingual E-Journal of Library and Information Science*, special issue, pp. 223–230, 2018.
- [3] A. Bhattacharya, Green Library and its utilities in modern day library service: A study. *International Journal of Next Generation Library and Technologies*, 3(3), pp. 1-11, 2017.
- [4] U.S. Green Building Council (USGBC). [https://odlis.abc-clio.com/odlis\\_s.html#sustainablelib](https://odlis.abc-clio.com/odlis_s.html#sustainablelib).
- [5] R. Duraipandi, Green Library Initiatives in India: Reshaping the Future. 1st International Conference on Library and Information Management (ICLIM - 2016), 21st - 22nd October 2016, Department of Library and Information Science, Faculty of Social Sciences, University of Kelaniya, Sri Lanka. pp. 25, 2016.
- [6] LEED building standards, November 25, 2018. Retrieved from <https://www.usgbc.org/leed>.
- [7] M. Y. L. Chew, S. Conejos and A.S. Asmone, "Developing a research framework for the green maintainability of buildings", *Facilities*, Vol. 35 No. 1/2, pp. 39-63, 2017. <https://doi.org/10.1108/F-08-2015-0059>.
- [8] S. Nikam, Green Library: An Emerging Concept. *Knowledge Librarian: An International Peer Reviewed Bilingual E- journal of Library and Information Science*, 4(6), pp. 190- 198, 2017.
- [9] R. Sornasundari and C. Sara, Green Library: a study. *International Journal of Research Instinct*, 3(2), pp. 616-621, 2016.
- [10] L. Shah, S. Kumar and M. K. Shah, Green Libraries in Academic Institutions: need of the hour. *International Journal of Research- Granthaalayah*, 3(9), pp. 1-5, 2015. <https://doi.org/10.29121/granthaalayah.v3.i9SE.2015.3129>.
- [11] M. Antonelli, The Green Library Movement: An Overview and Beyond. *Electronic Green Journal*, 27, 2008. <http://dx.doi.org/10.5070/G312710757>.
- [12] S. Conejos, M. Y. L. Chew, and F. H. B. Azril, "Green maintainability assessment of high-rise vertical greenery systems", *Facilities*, Vol. 37 No. 13/14, pp. 1008-1047, 2019. <https://doi.org/10.1108/F-09-2018-0107>.
- [13] H. Li, "Built to succeed: sustainable learning environment at UC Merced Library", *Library Management*, Vol. 38 No. 2/3, pp. 175-180, 2017. <https://doi.org/10.1108/LM-01-2017-0003>.
- [14] P. Mehar and L. Parabhoi, Green Library: An Overview, Issue with Special Reference to Indian Libraries. *International Journal of Digital Library Services*, 7(2), pp. 62-69, 2017.
- [15] A. A. Oyelude, "Placemaking and technology as tools for greening libraries", *Library Hi Tech News*, Vol. 35 No. 10, pp. 9-11, 2018.
- [16] Gautam Soni, Green Library Concept: an overview. *ISST Journal of Advances in Librarianship*, 9(1), pp. 57-61, 2018. <https://doi.org/10.18231/j.jilsit.2022.007>.
- [17] R. Thomas, Green Libraries: India Vs International Scenario. *Scholarly Research Journal for Interdisciplinary Studies*, 4(37), pp. 9224 – 9232, 2017. <https://doi.org/10.21922/srjis.v4i37.10786>.
- [18] A. S. Weerasinghe and T. Ramachandra, "Economic sustainability of green buildings: a comparative analysis of green vs non-green", *Built Environment Project and Asset Management*, Vol. 8 No. 5, pp. 528-543, 2018. <https://doi.org/10.1108/BEPAM-10-2017-0105>.



This is an open access article distributed under the terms of the Creative Commons NC-SA 4.0 License Attribution—unrestricted use, sharing, adaptation, distribution and reproduction in any medium or format, for any purpose non-commercially. This allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms. For any query contact: [research@ciir.in](mailto:research@ciir.in)