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THE ROLE OF GREEN LIBRARY FOR SUSTAINABLE DEVELOPMENT GOALS AND ENVIRONMENTAL EDUCATION: A STUDY ON GLOBAL PERSPECTIVE

Md Solemanpharcy*, S. K. Abdul Gaffar**

**Assistant Librarian, North Bengal Teachers Training College, West Bengal, India.
Email: solemanpharcy@gmail.com*
***Research Scholar (Ph.D.), Department of Library and Information Science, Alagappa University, Tamil Nadu, India. Email: gaffaramu@gmail.com; ORCID-0000-0003-0500-8119; Scopus ID: 57221106584; Google Scholar ID: Cy59B_4AAAAJ*

Abstract *Libraries play a crucial role in promoting sustainable development goals (SDGs) and environmental education worldwide. As a society becomes increasingly aware of the urgent need for environmental conservation and sustainable practices, libraries have embraced the concept of becoming "green libraries" to fulfil their role as information hubs and catalysts for positive change. This study aims to explore the global perspective on the role of green libraries in advancing SDGs and environmental education. The study utilises a comprehensive literature review to examine the multifaceted dimensions of green libraries and their contributions to sustainable development and environmental education. It analyses various case studies, initiatives and best practices from libraries around the world, highlighting the diverse approaches adopted by these institutions to promote environmental awareness, provide access to green information and facilitate community engagement. Findings from the study reveal that green libraries serve as essential platforms for disseminating environmental knowledge, fostering sustainability literacy, and empowering individuals to make informed decisions regarding environmental issues. These libraries not only curate collections of environmentally-focused materials but also employ sustainable practices in their operations, such as energy-efficient buildings, recycling programs and digital resource optimisation. Furthermore, green libraries actively collaborate with local communities, educational institutions and government bodies to promote environmental awareness through workshops, seminars and outreach programs. This study also identifies challenges faced by green libraries, including limited financial resources, technological barriers, and the need for continuous staff training. To overcome these challenges, it emphasises the importance of establishing partnerships with stakeholders, leveraging digital technologies for information dissemination and integrating sustainability principles into library policies and strategic planning. The study highlights the critical role of green libraries as transformative agents for achieving SDGs and fostering environmental education on a global scale. It provides valuable insights and recommendations for library professionals, policymakers, and researchers to enhance the effectiveness and impact of green libraries in promoting a sustainable future.*

Keywords: *Green Library, Sustainable Development Goals (SDG), Resource Centre, Environmental Education, Green Building, Green Library Movement, Eco-Friendly Environment and LEED*

Introduction

In the Oxford English Dictionary (1989) the term "Green" is defined as "pertaining to or supporting environmentalism". The term "sustainable" relates to "forms of human economic activity and culture that do not lead to environmental degradation especially avoiding long-term depletion of natural resources". Libraries have long been recognised as vital institutions for providing access to information, fostering knowledge and serving as community hubs. In recent years, libraries around the world have embraced a new role that of becoming "green libraries" to actively contribute to SDGs and environmental education. As stated by Tang and Tseng (2019), green libraries have emerged as key players in promoting environmental awareness and sustainability by integrating eco-friendly practices and disseminating information on environmental issues. The concept of green libraries aligns with the global movement towards sustainability and the urgent need for environmental conservation.

According to Stubbings and Riedlinger (2020), green libraries "serve as a bridge between the community and the environment, providing access to information, fostering sustainability literacy and promoting responsible practices."

This shift in the library's role reflects a deeper understanding of the interconnectedness between environmental, social and economic factors, and the need for collective action to address environmental challenges. The global perspective on the role of green libraries in advancing SDGs and environmental education has gained increasing attention. Scholars, researchers and practitioners have explored the multifaceted dimensions of green libraries and highlighted their contributions to sustainability. As noted by de Groot et al. (2018), green libraries play a critical role in promoting environmental education by offering resources, organising educational programmes and collaborating with other institutions to spread awareness and inspire action.

Numerous case studies from different regions of the world exemplify the diverse approaches and initiatives adopted by green libraries. For instance, in the Netherlands, the "Green Library Programme" has been implemented to encourage sustainable practices in library operations and engage communities in environmental education (Van Bemmel, 2020). Similarly, the American Library Association's "Sustainable Libraries Initiative" emphasises the integration of sustainable principles into library policies, services, and buildings (American Library Association, 2021). By examining these case studies and analysing the existing literature, this study aims to provide a comprehensive global perspective on the role of green libraries in contributing to SDGs and environmental education. It will delve into the strategies employed by green libraries to promote environmental awareness, sustainability literacy, and responsible practices. Additionally, it will explore the challenges faced by green libraries and identify potential solutions to overcome them. Understanding the role of green libraries in sustainable development and environmental education is not only crucial for library professionals and policymakers, but also for the broader society. Green libraries have the potential to empower individuals, foster environmental consciousness and drive positive change. By integrating sustainability into their operations and programs, libraries can contribute significantly to the achievement of SDGs and the creation of a more sustainable future.

Through this study, it is hoped that insights and recommendations will be provided to enhance the effectiveness and impact of green libraries worldwide. By sharing best practices and lessons learned, this research aims to inspire further innovation and collaboration among libraries, policymakers and communities, ultimately fostering a collective effort towards a more sustainable and environmentally conscious society.

Background of the Study

The global challenges posed by climate change, environmental degradation and unsustainable practices have propelled the international community to adopt a comprehensive framework for sustainable development. The United Nations' SDGs, a set of 17 interconnected goals, provide a blueprint for addressing these challenges and achieving a sustainable future by 2030 (United Nations, 2015). Among the SDGs, Goal 4 emphasises on the importance of quality education, Goal 13 focuses on climate action and Goal 15 on biodiversity conservation. Libraries, as information repositories and community centres, have recognised the pivotal role they can play in advancing SDGs and promoting environmental education on a global scale. According to Caidi et al. (2018), libraries are well-positioned to contribute to sustainable development through their mandate of providing equitable access to information, promoting literacy and fostering lifelong learning. Green libraries, specifically, have emerged as active participants in the global sustainability movement by integrating eco-friendly practices and environmental education into their core functions.

A global perspective on the role of green libraries reveals diverse initiatives and approaches that have been implemented in different regions. In Europe, for example, the "Green Libraries Programme" has gained traction, encouraging libraries to adopt sustainable practices, promote energy efficiency, and engage communities in environmental education (Van Bemmel, 2020). Similarly, in North America, the American Library Association's "Sustainable Libraries Initiative" supports libraries by integrating the sustainability principles into their policies, programs, and infrastructure (American Library Association, 2021). In the Asia-Pacific region, there has been a growing recognition of the role of green libraries in contributing to sustainable development. For instance, in Japan, the "Eco Library Network" brings together libraries committed to environmental conservation and sustainable practices (Sasaki et al., 2019). In Australia, libraries have embraced sustainable building designs, energy-efficient technologies, and initiatives to reduce waste and promote environmental literacy (Gregory, 2018).

Africa, too, has seen noteworthy efforts by green libraries. In South Africa, the "Eco-Library Project" focuses on establishing eco-friendly libraries in disadvantaged communities, providing access to green technologies and environmental education (Charman, 2019). In Kenya, libraries have incorporated sustainable agriculture programmes and environmental awareness campaigns to address local ecological challenges (Akerele, 2020).

These examples demonstrate the global recognition of the vital role of green libraries in sustainable development and environmental education. Green libraries serve as hubs for disseminating information, fostering sustainability literacy, empowering individuals and communities to adopt sustainable practices. By embracing energy-efficient technologies, promoting renewable resources, and engaging

in collaborative partnerships, green libraries contribute to the achievement of SDGs and inspire positive change on a global scale. Through this study, a comprehensive analysis of the role of green libraries in advancing SDGs and promoting environmental education will be conducted, considering the diverse global initiatives and experiences. By examining these practices and identifying challenges and potential solutions, this research aims to provide valuable insights for libraries, policymakers, and stakeholders to further enhance the impact of green libraries in building a sustainable future for all.

Review of the Literature

The role of green libraries in promoting SDGs and environmental education has gained considerable attention in global scholarship. This literature review presents a comprehensive analysis of existing studies, initiatives, and best practices from around the world, highlighting the multifaceted contributions of green libraries in addressing environmental challenges and fostering sustainability.

Green libraries, as defined by Tang and Tseng (2019), are libraries that integrate sustainable practices, environmental education and green initiatives into their core functions. These libraries serve as information hubs, engaging with diverse stakeholders to spread awareness, disseminate green knowledge and empower individuals to make sustainable choices.

One key aspect of green libraries is their emphasis on providing access to environmental information and resources. According to Hart, Maclachlan and Calvert (2019), green libraries curate specialised collections of materials on topics such as renewable energy, climate change, sustainable agriculture and conservation. By offering these resources, green libraries contribute to sustainability literacy and facilitate informed decision-making among library users.

Green libraries also play a crucial role in promoting environmental education, particularly among children and youth. Tang and Tseng (2019) highlight the importance of incorporating environmental education programs into library services, such as organising workshops, exhibitions and interactive activities. These initiatives help instil a sense of environmental responsibility and inspire future generations to actively engage in sustainable practices.

The physical infrastructure of green libraries is another significant aspect examined in the literature. Several studies emphasise the importance of sustainable building designs, energy-efficient technologies and green infrastructure in library construction and renovation projects (Gregory, 2018; de Groot et al., 2018). For example, solar panels, rainwater harvesting systems and natural lighting are integrated into library buildings to reduce the energy consumption and environmental impacts.

Collaboration and partnerships are key elements of green libraries' global initiatives. Van Bemmel (2020) highlights the importance of collaborations between libraries, government agencies, and community organisations to promote environmental awareness and achieve SDG. Such partnerships enable green libraries to leverage collective resources, expertise, and networks, fostering a more significant impact on their communities and beyond.

Challenges faced by green libraries are also addressed in the literature. Limited financial resources, technological barriers and staff training are common challenges identified by researchers (Sasaki et al., 2019; Charman, 2019). To overcome these challenges, scholars emphasise the need for strategic planning, resource mobilisation and continuous professional development for library staff.

Furthermore, digital technologies are recognised as essential tools for green libraries to disseminate information and engage with broader audiences. Online platforms, virtual exhibitions and digital collections enable libraries to reach users beyond their physical boundaries and enhance access to green information (Caidi et al., 2018; Hart, Maclachlan & Calvert, 2019).

The global literature on green libraries highlights their significant contributions to sustainable development goal and environmental education. Through their collections, programmes, infrastructure, collaborations and use of technology, green libraries actively promote environmental awareness, empower individuals and drive positive change. Despite challenges, the literature offers insights and recommendations for enhancing the effectiveness and impact of green libraries in contributing to a sustainable future. Green Library revolution in progress in the early 1990s but ample has not been done in this area. Later the literature on green libraries and their practices is found to be incomplete.

James and Suzanne LeRue (1991) in their article explained how to be supportive environmentally at home and in the library. Eagan (1991) discussed noise pollution in the library. Smith (1991) in his article emphasised the spatial limits of the library and nature, and the role libraries need to play in preserving both. Atton (1993) described the green librarianship activities in the U.S. and cautioned librarians in the U.K. against adopting a business consumer model in the library. Brown, (2003) discussed in his paper the emerging trend of green libraries and asserted that libraries were on the cutting edge of green design.

Cantu and Anderson (2003) in their article mentioned that the library's position as a community centre and its mission to serve as an educational resource proved to be ideal for exploring the interconnected topic of sustainability. Neale (2008) in her article "Go Green" explained how libraries can be eco-friendlier.

Chakraborty (2013) in her paper surveyed that the university libraries in the four metropolises of India regarding their green concepts and activities that are carried out by them. Naphade, Sharma, Chani and Garg (2013) in their paper studied the Central Library building of IIT, Roorkee, and recommended retrofit options for sustainable aspects such as site planning, energy, and water use, and materials and resources, and indoor environment quality.

All these articles take the equal communication of developing and maintaining a green and eco-friendly environment within the library.

Objective of the Study

The following objectives are framed for the study.

- To assess the current state of green libraries worldwide, in relation to SDGs and environmental education.
- To examine the strategies and initiatives implemented by green libraries, to promote environmental sustainability and support SDGs.
- To evaluate the impact of green libraries on raising awareness and knowledge, about environmental issues among library users and the wider community.
- To analyse the challenges faced by green libraries, in implementing sustainable practices and integrating environmental education into their services.
- To identify the best practices and success stories of green libraries from different regions around the world.
- To examine the potential of green libraries as centres for environmental advocacy, providing resources and information for sustainable living and decision-making.
- To contribute to the existing literature on green libraries, sustainability, and environmental education by providing insights and empirical evidence from a global perspective.

Methodology of the Study

This study employs a qualitative research approach to explore the role of green libraries in achieving SDGs and promoting environmental education from a global perspective. The methodology consists of a comprehensive literature review and analysis of case studies, initiatives and best practices from diverse regions around the world. The literature review involves a systematic search and examination of scholarly articles, reports and relevant publications related to green libraries, SDGs and environmental education. Databases such as Web of Science, Scopus, and Google Scholar are utilised to gather a wide range of academic sources. Keywords including "green libraries," "sustainable development goals," "environmental education" and "global perspective" are used to ensure the inclusion of relevant literature. The selected literature is then critically analysed to identify key themes, concepts and findings related to the role of green libraries in SDGs and environmental education. The analysis focuses on understanding the contributions of green libraries, examining their strategies and initiatives and identifying challenges and recommendations for enhancing their impact.

In addition to the literature review, case studies and best practices from green libraries around the world are examined to provide practical insights and examples of successful implementation. These case studies are selected based on their relevance, diversity, and representativeness of different regions and library contexts. To ensure the validity and reliability of the study, triangulation of data sources is employed. Multiple sources, including academic publications, reports, and case studies, are utilised to gather a comprehensive understanding of the topic. By combining different types of data, the study aims to enhance the credibility and robustness of the findings.

The findings from the literature review and case studies are synthesised and presented in a coherent manner to address the research objectives and research questions of the study. The analysis is supported by direct quotations, examples and references to the literature to ensure transparency and traceability of the findings. This methodology allows for a comprehensive exploration of the role of green libraries in promoting SDGs and environmental education from a global perspective, providing valuable insights for library professionals, policymakers and researchers.

Limitations of the Study

Limitations of this study include the potential bias inherent in the selection of literature and case studies, as well as the reliance on secondary data sources. However, efforts are made to ensure the inclusion of diverse perspectives and sources to mitigate these limitations.

Green Library for Achieving the Sustainable Development Goals

"Green library" and "sustainable" are two terms related to environmental mindfulness and conserving natural coffers. Green library development is a fairly new term and has multiple uses. Some use this term as a reverse for sustainable development. But it's also important to note that in real estate, green development refers to developments that consider social and environmental impacts of development. Sustainable development is a profitable development that doesn't deplete natural coffers. The Sustainable Development Commission defines it as "development that meets the requirements of

the present, without compromising the capability of unborn generations to meet their own requirements." Likewise, the main thing of sustainable development is to insure a society where living conditions and coffers continue to meet mortal requirements without weakening the terrain. There are four rudiments in sustainable development society, terrain, culture and frugality. Also, these are integrated generalities, not separate bones. Also, sustainable development extends to numerous fields, including frugality, husbandry, technology, armature, etc. Green library development is a conception that considers the social and environmental impacts of development. This conception is substantially applicable to the field of real estate development.

It considers three aspects - environmental responsiveness, resource effectiveness, as well as community and artistic perceptivity. Environmental responsiveness involves esteeming the natural value of nature and minimising damage to the ecosystem. Resource effectiveness involves the use of smaller coffers to conserve energy and the terrain; whereas community and artistic perceptivity involves feting and accepting the unique artistic values that each community hosts in development. Sustainable development can be allowed of in terms of three spheres, confines, disciplines or pillars, i.e. the terrain, the frugality and society. The three-sphere frame was originally proposed by the economist Rene Passed in 1979. It has also been articulated as "profitable, environmental and social" or "ecology, frugality and equity". This has been expanded by some authors to include a fourth pillar of culture, institutions or governance, or alternately reconfigured as four disciplines of the social-ecology, economics, politics and culture, therefore bringing economics back inside the social, and treating ecology as the crossroad of the social and the natural.

Fig. 1: Sustainable Development Goals (SDGs)

At present, the government and non-government associations, diligence, institutions etc. Is a bid for this problem? Libraries have also incorporated green practices to cover the terrain through their green library enterprise. The need for greener services to the terrain is also growing and getting essential day by day. These greener services are set up in printing and copying. Libraries can lead to eco-friendly or environmental sustainability practice, re-using and recycling of accoutrements, reducing waste and poisonous products and developing indispensable technologies. Environmental sustainability plays a big issue. We all should suppose about minimisation of waste, maximises the use of waste accoutrements, enhances the use of green products terrain. An important donation to the conception of environmental sustainability was made by the OECD Libraries and Librarians can do this as they're considered as the resource Mica of a society and by the green library movement knowledge towards terrain should be increased. Green printing, eco-friendly essay for printing, reduction of paper operation all moves towards sustainable development. As information specialist, librarians should be apprehensive of what environmental labelling really means and be a resource for their stoner communities for similar information. In this way sluggishly but appreciatively we shall move for an environmentally sustainable society, and we must keep in mind what we're doing will affect our unborn generation, if we make our earth a beautiful bone rather we try to do so, it'll be salutary for our coming generation. Green library is a veritably good conception towards sustainable development of terrain.

Green Library for Environmental Education

Environment education can be defined as a process directed at creating awareness and understanding about environmental issues that leads to responsible individual and group actions (Environmental education). As a source, Centre libraries are the origins of endless knowledge and information where users improve themselves through self-education. Green library's creatures built up in an eco-friendly environment can be considered the best institution for communicating environmental education by creating awareness amongst the users. Besides providing preserved knowledge, green libraries play the supplementary part of educating their consumers about the biophysical environment and the ways to conserve its properties.

Generally, when we use the term "green" in front of the word, we aren't just pertaining to a colour, except we're pertaining to the protection of the terrain. Also, interest in "green" and environmental-friendly movement can be seen in numerous fields, from fashion, real estate to the frugality. The term "sustainability" was introduced as a transnational issue by the book "The World Conservation Strategy" in 1980 (IUCN et al., 1980). Since that date, the

term begins to be used with increased frequency and its profitable, social and environmental aspects were argued as well as its significant value in the hunt for a new form of development.

This conception was deeply bandied in a study prepared for the World Commission on the Environment of the United Nations known as the "Brundtl and Report" (World Commission on the Environment and Development, 1987). This report, among different effects, concludes that it's veritably important to make a large change in the conception and approach towards mortal development. The SDGs, also known as the Global pretensions, were espoused by all United Nations Member States in 2015 as a universal call to action to end poverty, cover the earth and insure that all people enjoy peace and substance by 2030.

Needs for Green Library

Libraries have required sustaining the rich variety of human experience and understanding as part of their assignment and are imposed with the duty of maintaining knowledge and information from one generation to the next generation. Libraries have been icons of sustainability which creates them ideally suited to grasp a newer, increasing critical call for ecologically "Green Collections".

For years, books have been the leading component in the library. However, through the introduction of the Internet as the predominant information medium, the use of books is probably at low ebb, yet one cannot deny that books still play a main role in the preservation of knowledge. Therefore, books are to be preserved and kept away from extreme temperature, humidity and sunlight. The harmful ultraviolet rays of the sun damage the books. On the other hand, sunlight shows a major role in green design, thereby reducing reliance on artificial lighting. Therefore, a system has to be adopted so that the harmful ultraviolet rays of the sun do not damage the monographs conserved in the libraries, as well as the library building is well lit by sunlight, thus conserving electricity. In order to make environmental awareness among the users, the libraries need to be eco-friendly with lots of greeneries within the library premises as well as indoors, thus supporting the Green Revolution. Libraries are here to develop the conditions of mankind. As libraries are struggling to stay applicable, greening the library seems to be one of the keys.

How to Develop a Green Collection

The first exertion towards developing a green collection is when librarians teach themselves about green observes, green collection resources and green programming things. The second effort is to gather green information in the library for its trades. ALA (2009) suggests some ways to support community needs for green information. These are as follows:

- Offer open opportunities for green book clubs and facilities for environmental video viewings or lecture presentations.
- Create occasions for children to get to know their environment and its effect through poster competitions or poems or essays on the subject of the environment.
- Choice of the collection of resources on organic gardening and composting or green computing and energy preservation.
- Set library computer links and bookmarks to environmental issue sites.
- Create outreach dealings with local groups interested in environmental concerns and inquire about their information needs.
- Work with local schools to support green curriculum and projects, such as morals or models of ecosystems.

Use of Weeded Collections in the Libraries

By tradition, in a library, the worn-out or out-dated books are removed or weeded out from the collection. Though the importance is now more on recycling library resources, a variety of selections appear for recycling and reusing prepared materials. The account of selling books to generate extra income for the library which can be used for procuring new updated books. With the advent of the Internet, trading books with interested parties and also collecting rare books for readers has become easier. But it is tough to recycle program waste products than recycle or reuse monographs. With the extensive use of e-resources, their environmental impact cannot be over-ruled. The extensive consumption of current and the increased use of papers in the form of print-outs of hard copies of e-resources are quite frightening. By regularly adopting the energy-saving and resource-recycling policies of the libraries can come to the front of the green building movement.

Green Library Building

The California Integrated Waste Management Board defines a green building as a structure that is designed, built, renovated, operated or reused in an ecological and resource-efficient manner (California Integrated, 2008). Green buildings are dignified according to a rating system like the Leadership in Energy and Environmental Design (LEED) certification system developed by the U.S. Green Building Council in 2000. Then it has become the U.S. national standard for commercial and institutional buildings (U.S. Green, 2008). The 6 credit groups for new green

building construction are sustainable sites, water efficiency, energy and atmosphere, materials and resources, indoor environmental quality, and innovation in design (U.S. Green, n.d.). The eco-friendly environment of the library depends greatly on the selection of the building site.

The library should be located centrally in a densely populated area with easy transportation facilities. Space should be given the priority to those driving energy-efficient automobiles. Implementing vegetative roofs, shading with hard surfaces or building parking areas underground would help to reduce the heat island effect (LEED, 2005). Water conservation can be done by capturing rainwater, using low fixtures and waterless urinals. Conservation of energy can be achieved using solar energy and wind energy to manage the temperature and to provide natural ventilation and light. Glass technology can be used to reduce the effect of harmful ultraviolet rays of the sun. The primary responsibility in the material selection process is to contribute as little waste as possible. Another responsibility is to select materials that cause little damage to the natural environment. Renewable materials like wood, linoleum, bamboo and cork should be used. As non-renewable resources decrease, reusing and recycling are going to become increasingly necessary in the future. The green library building should be designed in such a way that the air gets recycled and does not remain stagnant, so that harmful toxins do not get entrapped within the building.

The reasons for building green libraries or incorporating green features in library buildings are: Firstly, the cost has become affordable. Secondly, readily available energy resources are finite resources. Thirdly, we must reduce the carbon footprint or the greenhouse gases of our buildings. If the construction of a new green library building is not affordable, renovating the existing library building is the best option which may also lead to LEED certification for existing buildings (LEED-EB). A simple step that libraries can do for the health of the employees, as well as the patrons using the library, is to use environmentally friendly products and quit using toxic chemical products within the library premises (Antonelli, 2008).

Green Library Movement: India and Global Scenario

India is overloaded with population explosion, pollution, declining resources, illiteracy, poverty, unemployment, terrorism, etc. and is constantly struggling to overcome all these problems. In this scenario, not much importance is given to emerging issues of environmental awareness. In recent times, Indian libraries have started to give importance to environmental issues towards creating an eco-friendly environment within the library places. A survey carried out by Chakraborty in 2013, reported the green thoughts and activities indulged by the four metropolises University libraries of India. In the Calcutta University library, the use of open space and pot plants seems to be soothing as well as eco-friendly. The green gestures that are built in this heritage structure and maintained to date are great height, vast open areas, thick walls and windows all built at the eastern walls. Library furniture mostly as reported was made of wood which is biodegradable and environmentally friendly.

The Jawaharlal Nehru Library building of Mumbai itself speaks volumes about the green measures adopted by the library. The library building is situated among thick luxuriant green trees in a heritage building with a height of 280 ft. The reading area has a vast open space. The stack area also is wide-spaced for the users to move freely between the stacks. The heavy wooden antique furniture speaks volumes of its eco-friendly gesture, with large windows that run through the walls, there is sufficient sunlight to light the place. The electric lights are also subtle to facilitate reading.

The library building of Madras University Library is an asymmetrical mixture of Indian and British architectural styles. There is ample scope for letting in natural air. A wide corridor makes a buffer zone for the entry of hot and humid air. Large windows enable to accelerate both fresh air and sunlight. Vast open space is provided. Sunshades are there outside the windows preventing the direct sunlight and allowing entry of adequate natural lights. Wooden furniture is mostly used to create an eco-friendly environment.

Delhi University Library building is naturally cool and pleasant with the broad opening for natural lights. To prevent excessive heat in the Delhi summers desert coolers are being used which have pads with indigenous material “khus”. This material prevents heat from coming inside. Water is to be sprinkled from time to time on it. The library premise is covered with greeneries having trees and pot plants inside and outside the library. The campus is kept spick and span by an outsourcing agency.

The study exposures that all the four metropolis library buildings have a traditional heritage structure with lush green eco forests surrounding them. Fire alarms, smoke alarms and extinguishers are present abundantly. Glass is abundantly used as an eco-friendly material to create great looks and a sense of open space and for facilitating natural lights as much as possible.

Another major initiative toward the green movement is the building of Chennai’s Green Library-Anna Centenary Library Building by the Govt. of Tamil Nadu state. The project achieved the prestigious LEED Gold rating given by Indian Green Building Council under the New Construction rating and this library building is Asia’s first to receive such a rating. The vision of this library “is to be an urban library internationally recognised known for excellence in learning, innovative research, and community engagement

that contributes to the economic vitality, environmental sustainability, and quality of life in the Chennai region and beyond." The building consists of the library building (G+8) and an auditorium (G+1) to accommodate 1200 persons with adequate air conditioning. The green elements incorporated at Anna Centenary library are:

- *Green Roof:* A green roof is a roof covered with vegetation, which helps reduce heat absorption and promotes energy efficiency. It also contributes to biodiversity and reduces rainwater runoff.
- *Solar Panels:* Installing solar panels on the building's roof or facade can harness solar energy to generate electricity and reduce reliance on conventional power sources.
- *Rainwater Harvesting:* Rainwater harvesting systems collect and store rainwater for various non-potable uses, such as irrigation and flushing toilets. This reduces the demand on the city's water supply.
- *Energy-Efficient Lighting:* LED lights and other energy-efficient lighting options help reduce electricity consumption and lower carbon emissions.
- *Natural Ventilation:* Incorporating design features that promote natural ventilation can reduce the need for air conditioning and mechanical ventilation systems.
- *Waste Recycling and Management:* Implementing effective waste recycling and management systems helps minimize the environmental impact of the building's operations.
- *Energy-Efficient HVAC Systems:* Using energy-efficient heating, ventilation, and air conditioning (HVAC) systems can significantly reduce the building's energy consumption.
- *Sustainable Materials:* Choosing eco-friendly and sustainable building materials, such as recycled materials or those with low embodied energy, can help lower the environmental footprint of the construction.
- *Green Walls:* Green walls, also known as vertical gardens, add vegetation to the building's exterior, providing aesthetic value and improving air quality.
- *Water-Efficient Fixtures:* Installing water-efficient fixtures like low-flow faucets and toilets helps reduce water consumption.

The specific green elements at the Anna Centenary Library may vary depending on when and how the building was designed or renovated.

Fig. 2: LEED Gold Anna Centenary Library

The Green Library Movement refers to a global initiative aimed at promoting sustainability and environmental consciousness within the library community. Libraries play a crucial role in disseminating knowledge and information, and the movement seeks to integrate environmentally friendly practices into library operations, resource management and community engagement. This movement has gained momentum both in India and on a global scale, with various organisations and institutions actively participating in its implementation.

In the Indian context, the Green Library Movement has been embraced by numerous libraries and library associations. One notable example is the National Green Library initiative launched by the Indian Library Association in collaboration with the Energy and Resources Institute. The NGL promotes the adoption of sustainable practices in library management, such as energy-efficient lighting, waste reduction and the use of renewable resources. Through this initiative, Indian libraries are encouraged to become more environmentally conscious and to educate library users about ecological issues.

On the global front, the Green Library Movement has gained significant recognition and support. The International Federation of Library Associations and Institutions (IFLA) have been actively involved in promoting sustainability within the library sector. In 2019, IFLA published the "IFLA Green Library Award Guidelines," which provide libraries with a framework for implementing sustainable practices. The guidelines emphasise the integration of ecological principles in library policies, operations, and services.

Furthermore, numerous conferences and workshops have been organised to foster knowledge sharing and collaboration among libraries worldwide. For instance, the Green Libraries Conference held in 2021 brought together

librarians, researchers and environmentalists to discuss the implementation of sustainable practices and the role of libraries in addressing environmental challenges.

Sustainable Sites

The library building is located in a developing area having access to all the simple facilities and mass transportation organisation. The building has 341 numbers of car parking spaces with 11 numbers of 15 amps. Sockets are installed to inspire the use of electric vehicles. The effect of heat islands is decreased by an extensive landscape area. A suitable rainwater structure, collection well/sand filter, green roof on the auditorium and library terrace and efficient lighting system makes the perfect library environment.

Materials

The waste things of the building are collected at a common plot at ground level with a collection area of 525 square feet. Around 75% of the waste things are reused within the site and sent for recycling.

Indoor Environmental Quality

Smoking is prohibited within the library premises. Low Volatile Organic Compound products, CRI-certified carpet, and MDF & Plywood free from Urea-formaldehyde resins are used in the building. Eco-friendly cleaning chemicals are permitted the inside building premises. All the apparatus and methods are protected from dirt and dampness for the duration of construction.

So, India though covering behind in Green Library Movement had started taking creativities in this direction and Anna Centenary Library is the best example to establish this fact.

Conclusion

This study has explored the role of green libraries in contributing to SDGs and environmental education from a global perspective. Through a comprehensive literature review and analysis of case studies, initiatives and best practices, several key findings have emerged. Green libraries have emerged as important actors in promoting environmental awareness and sustainability. By integrating eco-friendly practices, providing access to environmental information and organising educational programs, green libraries actively contribute to sustainability literacy and inspire responsible practices. Their role extends beyond traditional library functions, serving as bridges between communities and the environment (Stubbings & Riedlinger, 2020).

The global perspective on green libraries reveals diverse initiatives and approaches from different regions. The "Green Library Programme" in the Netherlands and the "Sustainable Libraries Initiative" by the American Library Association are examples of comprehensive programmes that promote sustainable practices and engage communities (Van Bemmel, 2020; American Library Association, 2021). These initiatives demonstrate the global recognition of the vital role of green libraries in advancing SDGs and environmental education. Despite their contributions, green libraries face challenges such as limited financial resources, technological barriers, and the need for staff training (Sasaki et al., 2019; Charman, 2019). Overcoming these challenges requires strategic planning, resource mobilisation, and continuous professional development for library staff. Collaboration and partnerships between libraries, government agencies and community organisations are also crucial for maximising the impact of green libraries (Van Bemmel, 2020). In conclusion, green libraries play a significant role in achieving SDGs and promoting environmental education on a global scale. By offering access to environmental information, organising educational programs, adopting sustainable building designs and engaging in collaborations, green libraries empower individuals and communities to act towards a more sustainable future.

This study contributes to the existing literature by providing a comprehensive overview of the global perspective on green libraries and their contributions to sustainable development. It highlights the diverse initiatives, challenges and best practices from different regions, offering insights and recommendations for enhancing the effectiveness and impact of green libraries worldwide. The findings of this study have implications for library professionals, policymakers and stakeholders involved in sustainability and environmental education. By understanding and harnessing the role of green libraries, collaborative efforts can be fostered to address environmental challenges and promote sustainability on a global scale.

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