

**SUSTAINABLE STRATEGIES TOWARDS GREEN  
LIBRARIES : A STUDY OF NATIONAL INSTITUTION OF  
TECHNOLOGY IN INDIA**

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# ABSTRACT

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## INTRODUCTION

As concerns about environmental sustainability continue to grow, various sectors are seeking innovative ways to reduce their ecological footprint. Libraries, as vital community institutions, have recognized the importance of adopting environmentally friendly practices to contribute to a greener future. This abstract explores the concept of the "Green Library" and highlights sustainable practices implemented within library settings to promote environmental conservation.

The Green Library concept encompasses a range of initiatives aimed at reducing energy consumption, minimizing waste generation, and promoting eco-consciousness among library users and staff. This abstract focuses on key aspects of green libraries, including energy efficiency, waste management, sustainable design, and community engagement.

To achieve energy efficiency, libraries have implemented measures such as energy-efficient lighting systems, smart HVAC (Heating, Ventilation, and Air Conditioning) controls, and renewable energy sources like solar panels. These initiatives not only reduce the environmental impact but also lead to substantial cost savings, enabling libraries to allocate more resources to their core services. Efficient waste management practices are another essential aspect of green libraries. Libraries are adopting recycling programs, promoting paperless operations, and encouraging users to borrow electronic resources instead of printing materials. Additionally, libraries are investing in proper waste segregation and composting, diverting a significant portion of their waste from landfills.

Sustainable design plays a crucial role in the construction or renovation of libraries. Incorporating environmentally friendly materials, optimizing natural lighting and ventilation, and designing spaces to maximize energy efficiency are key considerations. Green roofs and rainwater harvesting systems are also becoming popular features, helping libraries conserve water and mitigate stormwater runoff.

Community engagement is a fundamental component of the Green Library concept. Libraries organize educational programs, workshops, and exhibitions to raise

awareness about environmental issues, sustainable living practices, and the importance of preserving natural resources. They collaborate with local organizations, schools, and businesses to promote eco-friendly initiatives and provide resources for environmental research and advocacy.

By adopting these sustainable practices, libraries become important catalysts for change, inspiring visitors and stakeholders to adopt greener lifestyles. Green libraries serve as community hubs that promote environmental stewardship, knowledge sharing, and sustainable development.

This abstract highlights the significance of the Green Library concept and emphasizes the transformative role that libraries can play in fostering environmental conservation. As libraries continue to evolve, embracing green initiatives not only aligns them with global sustainability goals but also ensures their long-term relevance as dynamic and socially responsible institutions.

## **STATEMENT OF PROBLEM**

The problem of the study entitled as “**SUSTAINABLE STRATEGIES TOWARDS GREEN LIBRARIES : A STUDY OF NATIONAL INSTITUTION OF TECHNOLOGY IN INDIA**”, this is specific study on NIT Libraries in India. It aims to find out the current status of Green Libraries in NIT libraries. Study focus on the impact and sustainable strategies of Green Libraries.

## **OBJECTIVES OF THE STUDY**

The main objectives of the study are-

1. To study about overall sustainability in the context of library in NITs.
2. To check the awareness about green library among the library professionals.
3. To identify the initiatives taken by the NIT libraries towards making them eco-friendly.
4. NITs are implementing adequate infrastructure for Green Library.
5. To examine the facilities provided for the Green Library as per IFLA guidelines
6. To investigate impediments for transforming into sustainable library.

## **HYPOTHESES OF THE STUDY**

Hypotheses are usually considered as tentative statement or declaration about two or more variables, which can be observed empirically. The following hypotheses were tested in the study:

- H<sub>1</sub> The LIS Professionals of NITs are well aware about Green Library.
- H<sub>2</sub> NITs are making efforts in transforming into Green Library.
- H<sub>3</sub> NIT libraries are facing impediments while designing Green infrastructure.
- H<sub>4</sub> NITs are not giving Priority to Green Library.

## **SCOPE AND LIMITATION OF THE STUDY**

The research examined NITs libraries in India for exploring library professionals' knowledge on environmental sustainability practices and about library building architecture. It attempted to understand the librarian's views on maintaining, planning, and converting existing libraries into sustainable green libraries.

This study is confined to the librarians of National Institute of Technology in India.

1. National Institute of Technology, Durgapur
2. National Institute of Technology, Jamshedpur
3. National Institute of Technology, Patna
4. National Institute of Technology, Rourkela
5. MNIT, Rajasthan
6. Visvesvaraya National Institute of Technology (VNIT), Nagpur
7. Sardar Vallabhbhai National Institute of Technology, Surat
8. National Institute of Technology, Goa
9. Motilal Nehru National Institute of Technology Allahabad,
10. National Institute of Technology, Hamirpur
11. Dr B R Ambedkar National Institute of Technology, Jalandhar
12. National Institute of Technology, Kurukshetra
13. National Institute of Technology, Uttarakhand
14. National Institute of Technology, Srinagar
15. National Institute of Technology, Delhi
16. National Institute of Technology, Calicut
17. National Institute of Technology, Suratkal

18. National Institute of Technology, Tiruchirappalli
19. National Institute of Technology, Andhra Pradesh
20. National Institute of Technology, Warangal
21. National Institute of Technology, Puducherry
22. NIT Agartala
23. National Institute of Technology, Silchar
24. National Institute of Technology, Sikkim
25. National Institute of Technology, Meghalaya
26. National Institute of Technology, Nagaland
27. National Institute of Technology, Arunachal Pradesh
28. Maulana Azad National Institute of Technology, Bhopal
29. National Institute of Technology, Raipur

## **RESEARCH METHODOLOGY**

A survey method was used to conduct this study. Questionnaires and observation have been used as tools for data collection. In the process of collecting data, interviews are also taken personally to cover the gaps in the questionnaire and to clear the respondents doubts. In this study, the researcher has made observations and tried to interact with the library professionals of the institutions. As we all were suffering and badly impacted by COVID-19 since the year 2019, it hinders many opportunities. Therefore, the help of Google has been taken for the distribution of the online questionnaire as a Google Form to get responses for the successful conduct of the study.

## **ORGANIZATION OF THE STUDY**

The present study has been organized into the five chapters. A brief description of the chapters is given as:

### **CHAPTER 1: INTRODUCTION**

Presents the background of the study, a statement of the problem, the objectives of the study, the hypotheses of the study, and the scope of the study. The research methodology has been described. The whole aspect of green libraries has also been elaborated on in this chapter.

## **CHAPTER 2: REVIEW OF LITERATURE**

The second chapter presents the literature review related to the study. For the fulfilling the research purpose, the researchers also consulted and read various pieces of literature from various information sources such as books, journals, e-databases, newspaper clippings, reports, blogs, theses and so on. Also, green library guidelines have been studied by the researcher. For references and in- text citation, Publication Manual of the American Psychological Association (APA) 7th edition has been utilized.

## **CHAPTER 3: BRIEF PROFILE OF NATIONAL INSTITUTION OF TECHNOLOGY, INDIA**

This chapter provides a brief history of national institutes of technology in India. These institutes are all functioning under the ownership of the Ministry of Education, govt. of India.

## **CHAPTER 4: DATA ANALYSIS AND INTERPRETATION**

In this chapter, data analysis and interpretation has been completed. For the study, data collected through a questionnaire and personal observation. Microsoft Excel was used to feed and tabulate the data to find the results. Data is analyzed and interpreted on the basis of objectives.

## **CHAPTER 5: FINDINGS, CONCLUSION AND SUGGESTIONS**

This chapter presents the major findings and conclusion of the study. It deals with recommendations of the study and suggestion for further future research. On the basis of the analysis, the researcher concludes and makes suggestions for the promotion of green library and also about the role that libraries may play to support it for the sake of social benefit. Also, the areas for further research have been stated in the chapter.

## **MAJOR FINDINGS**

### **Gender wise response**

In the present study, it was found from the data that 22 (76%) librarians or library in-charges were male and 7 (24%) librarians or library in-charges were female; the

majority of librarians or library in-charges were male, and they were managing and handling their libraries.

### **Designation of Respondents**

In all National Institutes of Technology, 8 (28% of respondents) are librarians and library in-charge (L), 5 (17%) are deputy librarians (DL), 12 (41% of respondents) are assistant librarians (AL), and 4 (14% of respondents) are technicians, senior library information assistants, and superintendents.

### **Age wise Respondents**

In the NITs, 8 (28%) respondents are more than 50 years old, 6 (21%) are more than 41 years old, 8 (27%) respondents are more than 36 years old, and 5 (17%) respondents are less than 35 years old.

### **Educational qualification wise respondents**

It was depicted from the analysis that in all NIT libraries there was some difference in the qualification of the library or library in-charge, which means 18 (62%) staff have a postgraduate degree and the remaining 11 (38%) have a doctorate in library and information science.

### **Library Building**

The result illustrates that only 5 (17%) NITs have used bricks out of 29 (100%) libraries, and the rest of 24 (83%) NITs have used concrete for building construction. No one is using wood for library buildings.

### **Use of Plastic in Library**

The result depicts that 10 (34%) NITs allowed plastic in libraries, while 19 (66%) did not.

### **Level of computerization in Library section/service**

The results of the study show that most of the NIT libraries have computerized their services and sections, including 24 (83%) acquisition sections, 28 (97%) technical sections, 29 (100%) circulation sections, 26 (90%) periodical sections, and 23 (80%) correspondence sections. With the help of computerized services, libraries save time for their users and also reduce the use of paper in libraries, so it can be taken as a beginning to making a green library.

## **Awareness Regarding Sustainability**

Most of the LIS professions were aware of sustainability and their specifications, which are written requirements that detail the properties of the construction materials and processes used in the project. On the basis of the data, 27 (93%) NIT library professionals are aware of it. Study results showed that most LIS professionals were aware of sustainable development; 27 (93%) believed that sustainable development is essential in libraries; 23 (79%) respondents were aware of SDG goals given by the United Nations; 25 (86%) had ideas about how libraries achieve this; 27 (93%) said it was important and appropriate for libraries; and 27 (93%) agreed that sustainable library or green library work can secure the future of academic libraries. After the end of the analysis, it was found that most LIS professionals are aware of sustainability.

## **Adoption of Green Initiative in Library works**

Based on the collected data, the result shows that 38% National Institutes of Technology libraries have started adopting green initiatives in their work.

## **Elements used in library building**

**Sunlight:** The data concluded that the majority of libraries 19(65%) used sunlight in library buildings.

**Natural Ventilation:** Most of the NIT libraries 20 (69%) used windows, doors, solar chimneys, and pulsating ventilators) for natural ventilation in library buildings.

**Natural Temperature Control:** in the context of natural temperature control, the data result shows that in 19 (66%) libraries, painting the building or its roof, to reduce the heat is said to be a better way of controlling temperature.

**Acoustic control:** In the case of acoustic control, the researcher found the majority of libraries used 18 (62%) acoustic control devices (absorbers, soundproof interior doors, windows, ceiling baffles, etc.) and 11 (38%) used the least.

## **Electric source used in library**

The result shows that 29 (100%) National Institutes of Technology libraries used government electricity, while 18 (62%) libraries were using diesel generators, and 9 (31%) were using solar panels; no one was using a biogas plant in the libraries.

## **Electric lighting source for power saving**

In the context of power savings, the study depicts that the majority of libraries, 28 (97%), were using LED lights, while 13 (45%) libraries were using compact fluorescent tube (CFT) lights in library buildings.

## **Level of Electrical efficiency in libraries**

The result depicted electrical energy efficiency. It was found that the use of star rated and energy saving equipment's in libraries ranked first with 20 (69%), adopting effective electronic technology was ranked second with 19 (66%) in libraries, while 59% of NIT libraries using innovative cooling and ventilation techniques, and plug multiple computers into the same printer found fourth place with 16 (55%) in the libraries.

## **Promotional steps for green library**

On the basis of data the libraries that adopted promotional steps for green library practices and initiatives based on certain indicators and researcher found that NIT libraries are taking various promotional steps to promote green libraries, which included 83% of NIT libraries promoting green libraries through digital services, 86% through double-sided printing, 52% of the libraries by workshops and training programs, 52% through blogs and websites, 76% by institutional repositories, 86% libraries provide digital content/materials for users, 38% operating 3R services in libraries, 97% of libraries giving information to users through OPAC and MARC service, and 41% providing online short-term courses for their users.

## **Cleaning Material for Cleaning Maintenance**

On the basis of data, researcher found the 18 (62%) NITs use natural house cleaning materials and 11 (38%) are not used while 16 (55%) NIT libraries use chemical cleaners while 13 (45%) are not.

## **Challenges for green libraries**

Green buildings and green libraries are no exception. The new concept gives rise to challenges, and these challenges are being faced by the librarians or library administrators to convert the library into a green library. Adequate budgeting is the first challenge, and we found that 16 library professionals did not face this problem while 13 did. Irresponsible behavior of readers was the second main problem, with 38% of library professionals showing concerns. Negligence of library staff was the next concern. The researcher found that 8 (28%) agreed and 15 (51%) disagreed about it. The next challenge was related to the shortage of trained staff in NIT libraries, and we found that 12 (41%) agreed with this statement, which clearly shows that for resource sharing, libraries should be trained and updated with the use of new technologies. Guidelines on environmental awareness are another challenge for libraries, and we found that 13 (45%) agreed about this problem. This analysis shows that the maintenance of green libraries will raise specific human challenges for which libraries must prepare after the implementation of green libraries. Respondents reported that a shortage of trained staff and guidelines on environmental awareness were the biggest challenges facing NIT libraries. Another big aspect is that the design of the library building also matters while maintaining the library, and training in every aspect must be given to staff members for maintenance.

## **CONCLUSION**

It's only recently that libraries have started to go green. Developing and converting present libraries into green ones offer opportunities for librarians to improve the environment and wellbeing of the users. In an ecosystem, organisms are interdependent. Library activities generate an ecological effect on the environment. Similarly, environment-related factors have effect on library activities Users' health is

dependent on the environment in libraries with the help of overall eco-friendly management, institutes and libraries can maintain good health of users. NIT Libraries have much to achieve and practice in this area.

In India, we have followed the oral tradition of passing knowledge on to the next generation. Because of this oral tradition, whatever one has learned from previous generations is subconsciously applied in everyday life. All the efforts mentioned here are not the result of awareness. There is still a lot to be done in this area, which calls for futuristic leadership. It also requires awareness and implementation by the NIT as a whole. Only then will librarians move forward in an eco-friendly environment. On the other hand, the grass is always greener, and the saying holds true in letter and spirit in the case of green libraries in India. It is greener in other developed countries like America, Canada, and Singapore, where the legal base is well established in this area. Let all of us who are concerned with the higher education system and environment come together to make our library landscape greener.

## **SUGGESTIONS**

It is a massive challenge for the National Institutes of Technology in India, to outstretch the success pillar of the green library movement. There are so many obstacles in relation to environmental sustainability and sustainable development issues. The library professionals of those NIT libraries will individually and cordially accept such challenges and elucidate those hurdles by way of consciousness, initiatives, and policy making on the basis of suggestion given by the librarians. These are major suggestions that may be recommended:

1. It should be important to switch fluorescent energy saving lamps and recycling bulbs for energy consumption to maintain environmental sustainability and sustainable development in libraries.
2. Recycling is a necessary step to reduce waste materials. Reducing waste materials could reduce soil pollution in the environment. So, users of all NIT Libraries should be encouraged use recycle batteries, electrical devices, containers, packaging materials, waste papers and so on.
3. All NIT libraries should practice ecological activities on a regular basis in their libraries, i.e., tree plantations and environmental awareness programs.

4. Library Science professionals should be trained and educated, by incorporating green library concepts as part of their curriculum.
5. Innovative ideas such as introducing a green library award, rewards, and monetary grants by the government and head of the institution should be adopted, as these help motivate libraries to go green.
6. Effective strategies and proper financial aid by the government and concerned authorities to support and promote the concept of green libraries should be ensured.

### **AREA FOR FURTHER RESEARCH**

1. Contribution of Central University libraries in India towards green library: A Study
2. Use of Green Information Technology by central library of National Institutes of Technology in India: A study
3. Awareness and Perception regarding Green Libraries among LIS professionals of IIM Libraries in India: A Study
4. Conducting survey of green public libraries in India.
5. Impact and implementation of greening the Libraries: A study of IISER in India