

## THE BOOK

As Information Professionals, we live in the age of digital information. Recent studies have shown that there is a drastic change in user demands needed to support the teaching, learning, and research activities of the library profession. The desire for physical library collections is in decline. Even though there is high demand for internet access and allied resources, there are certain user categories like traditional resources and demand for the physical space in the library. In such conditions, libraries may reconsider their current spaces and future renovations to reflect these usage trends to meet the changing requirements of the user community.

In this book, library professionals from different regions of the world have contributed papers on how Next Generation Libraries (NGL) can be useful for the library users. This book will focus on the following themes such as:

- (a) New Trends & Technologies,
- (b) Collaboration & Community engagement, and
- (c) Future Librarianship, Library Spaces & Services.

In this age of rapidly changing technologies, it is essential for all library professionals to keep abreast of the latest developments, emerging trends & techniques in the era of Next Generation libraries (NGL). Certain issues and challenges faced in these areas need to be taken care of with proper solutions. It helps in understanding the various issues and challenges faced by the library professionals and attempt to provide the probable solutions to adopt in their workplaces.

Next Generation Libraries (NGL) will also showcase the challenges and solutions faced by the academic libraries which can be useful for the library policy makers to frame policies to provide value added services to its users.

## THE EDITORS



**Bhojaraju Gunjal (Ph.D.)** is currently working as Deputy Librarian at Biju Patnaik Central Library, National Institute of Technology Bhubaneswar with over 20 years of experience in deep understanding of social media, mobile and emerging technologies. He possesses Ph.D. in Library and Information Science from University of Mysore and also recipient of Endeavour Research Fellowship from Australian Government and other international fellowships. He has published and presented technical papers in the field of Knowledge Management, Library and Information Science in both national and international conferences, books, journals and also attended various professional training programs. His areas of interests are Digital Libraries, Library Management, Knowledge Management. For more details refer <http://bhojaraju.weebly.com>.



**Dibya Kishor Pradhan, Asst. Librarian, National Institute of Technology Bhubaneswar** has been in the profession since 2004. He holds Master Degree (MLIS) and M. Phil in Library and Information Science from P.U. Department of Library & Information Science, Sambalpur University. He is an UGC NET qualified in 2009, and presently pursuing his Ph.D. His basic interest and research areas are Electronic Resource Management, Open Access, Institutional Repository, Knowledge Management, Digital Libraries, Citation Analysis. He has published scholarly articles & reviews in both national and international publications.



**Vinod Kumar Mishra** is having rich practical experience in almost all domains of library and information science, worked in world leading institutes like IIT Kanpur and Roorki, DND and at present working in NIT Roorki. Have many publications in his credit, automated and digitized many libraries and have rich experience on open source solution for libraries. He has qualifications from BML, Varanasi and other details and contributions can be found at <http://vinodk.com/>.



**Puspita Mishra** is working in the capacity of Assistant Librarian and in-charge of Acquisition and technical sections at BPCL. She is responsible for Acquisition/Technical Processing related tasks, conducting Book Fair / Exhibitions. Also managed the collections related to Book Bank and NITR Publications.



**Kshirod Das** is currently working as a Senior Technical Assistant in the Biju Patnaik Central Library of National Institute of Technology Bhubaneswar. He has B. Com, MCLB, and DCA degrees. Also qualified UGC-NET (for lecturership) and recently registered for Ph. D. degree in Library & Information Science. He has over 15 years of professional experience. He has published over 05 publications in national and international conferences and one book chapter.

**Ess Ess Publications**

4831/24, Ansari Road, Darya Ganj, New Delhi-110 002

Phones : 41563444, 23260807 Fax 011-41563334

E-mail : [info@essesreference.com](mailto:info@essesreference.com)

[www.essesreference.com](http://www.essesreference.com)

ISBN: 978-93-87698-33-8



Rs. 1650/-



**NEXT GENERATION LIBRARIES**  
Emerging Technologies, Community  
Engagement & Future Librarianship

• B. Gunjal • P. Mishra  
• D.K. Pradhan • K. Das  
• V. Mishra

# NEXT GENERATION LIBRARIES

EMERGING TECHNOLOGIES, COMMUNITY ENGAGEMENT  
& FUTURE LIBRARIANSHIP



Bhojaraju Gunjal  
Dibya Kishor Pradhan  
Vinod Kumar Mishra  
Puspita Mishra  
Kshirod Das

# NEXT GENERATION LIBRARIES

**Emerging Technologies,  
Community Engagement  
& Future Librarianship**

*Editor(s)*

**Bhojaraju Gunjal  
Dibya Kishor Pradhan  
Vinod Kumar Mishra  
Puspita Mishra  
Kshirod Das**



**Ess Ess Publications**  
New Delhi

**NEXT GENERATION LIBRARIES**  
**Emerging Technologies, Community Engagement**  
**& Future Librarianship**

Copyright © by Editors

All rights reserved. No part of this book may be reproduced in any form or by any electronic or mechanical means including information storage and retrieval systems without permission in writing from the publisher, except by a reviewer, who may quote brief passages in a review.

While extensive effort has gone into ensuring the reliability of information appearing in this book, the publisher makes no warranty, express or implied on the accuracy or reliability of the information, and does not assume and hereby disclaims any liability to any person for any loss or damage caused by errors or omissions in this publication.

**ISBN : 978-93-87698-33-8**

**Price : Rs. 1650/-**

**First Published 2020**

Published by:

**Ess Ess Publications**

4831/24, Ansari Road,

Darya Ganj,

New Delhi-110 002.

INDIA

Phones: 23260807, 41563444

Fax: 41563334

E-mail: info@essessreference.com

www.essessreference.com

Cover Design by *Patch Creative Unit*

Printed and bound in India

## Contents

*Preface*

*Acknowledgements*

### **UNIT 1 : NEW TRENDS & TECHNOLOGIES**

- 1 Internet of Things: Application and Challenges in the Library 3  
*Kakiri, Inemotimi Flint*  
*Oyadonghan, Joyce Chinyere and*  
*Anthonia Ukamaka Echedom*
- 2 Artificial Intelligence and the Challenge of Technology Adoption in Libraries in Sub-Saharan Africa 15  
*Imoni, Gilbert Ikezahu*  
*Okuonghae, Omorodion CLN*
- 3 Transition and Transformation Libraries from Traditional to Digital : Nigeria Perspective 28  
*Saka, K.A.*  
*Ahmed, A. O.*  
*Akor, P. U.*
- 4 A Bibliometric Study of the 'IASLIC Bulletin' : 1976-1995 39  
*Tridib Chattopadhyay*  
*Moumita Ash*
- 5 Things to Understand in Internet of Things 52  
*Kavi Upreti*

(vi)	<i>Next Generation Libraries</i>	
6	Feed Green to Read Green: Green Library Movement for Sustainable Development <i>Niranjan Mohapatra</i>	67
7	Managing Bibliographic Relationships in Digital Information Retrieval : A Prototype <i>Anirban Dutta</i> <i>Parthasarathi Mukhopadhyay</i>	80
8	Koha Implementation in University Libraries of Sri Lanka : A Case Study <i>R.MNadeeka Rathnabahu</i>	90
9	Building a Library Website Using Open Source CMS Via Blogger : A Case Study on Don Bosco College, Arunachal Pradesh <i>Sur Chandra Singha</i> <i>Manoj Kumar Verma</i>	100
10	Innovative Technology Services in Mizoram University Library : A Study <i>J.Shivarama</i> <i>Lallaisangzuali</i> <i>Anand Dodamani</i>	118
11	Scientometrics : An Essential Service for R&D Organisation <i>Ganesh Surwase</i>	131
12	Research Visibility of DESIDOC Journal of Library and Information Technology: A Bibliometric Study <i>Jayanta Bhakta</i> <i>Trishma Bhui</i>	144
<b><u>UNIT 2 : COLLABORATION AND COMMUNITY ENGAGEMENT</u></b>		
13	Knowledge Management Capacity Building Initiatives for Librarians : Information Africa Organization's Experience <i>Nerisa Kamar</i> <i>Clive K. Tsuma</i>	155

Contents	(vii)	
14	Role of Digital Libraries in Higher Education to Promote Quality & Diversity : A special Reference to India <i>Bharat Kumar Vohra</i>	173
15	Role of Information Communication and Technology in Public Libraries <i>Babita Gaur</i>	186
16	Transforming Libraries : An Overview of a Pioneer Electronic Public Library in Akwalbom State, Nigeria <i>Kathryn J. Philip</i>	197
17	Gamification and Its Implications in Academic Libraries of Higher Educational Institutes <i>Sk Abdul Gaffar</i> <i>Bhojaraju Gunjal</i>	212
18	Information Seeking Behaviour of the Researchers of Nit Rourkela : A Study <i>Mrs. P. Mishra</i> <i>Ms. Srutilata Mondal</i>	225
<b><u>UNIT 3 : FUTURE LIBRARIANSHIP, LIBRARY SPACES &amp; SERVICES</u></b>		
19	Weaving the Historical Thread in Sharpeville : Memory Institutions as Citadel of Cultural Heritage <i>Joseph Ngoaketsi</i> <i>Collence T Chisita</i> <i>Koketso Makwatlo</i>	241
20	Engaging User Community Through Innovative Library Services <i>Dr. Bhojaraju Gunjal</i>	263
21	Awareness of Copyright Law : A Case Study of Library Professionals Working in Odisha <i>Dr. Mahendra Kumar Sahu</i>	273
22	Build New Workflows to Support Research : Academic Librarians as Teachers <i>Kamani Perera</i>	287

(viii)	<i>Next Generation Libraries</i>	
23	Learning Resources (LRs) Acquisition in University Libraries in Bangladesh : Status, Challenges and Reforms <i>Dr. Md. Zillur Rahman</i>	297
24	Awareness and Perceptions of Academic Plagiarism Among the Students of Netaji Subhas University: A Study <i>Prameeta Sharma</i> <i>Dr. D.K. Pandey</i>	321
25	Open Access in Latin American Science <i>Luis Eugenio Panza</i>	328
26	Exemplary Instances of Liaison Librarianship : A Case Study on University of Wyoming <i>Bharati Pati</i>	339
27	Journal Articles in Pre-print Archives : A Case Study of 'Astronomy and Astrophysics' Pre-prints in arXiv for Journal Collection Development Decisions <i>E.R. Prakash</i>	354
28	Information Sources and Services Utilizations in Degree Colleges-Medchal (Dist.) Telangana State : A Case Study <i>Doraswamy Naick B. R.</i> <i>Raja Suresh Kumar Pitla</i>	360
29	Online Library Searching Methods : A Case Study <i>Veena A. Prakash</i> <i>Priyanka V. Sane</i>	372
30	Role of Librarians in Capacity Building of Health Professionals in Public Health Sector <i>Suman Muddapur</i> <i>V. S. Malemath</i>	383
31	Personalized Service for Library Users Through Subject Guide: An Indian Scenario <i>Kshirod Das</i> <i>Bhojaraju Gunjal</i> <i>Sanat Kumar Behera</i>	393

Contents	(ix)	
32	Embedded Library Research Support Service : A Practice in Biju Patnaik Central Library, National Institute of Technology Rourkela <i>Srikanta Sahu</i> <i>Manoj Kumar Sa</i> <i>Pranoy Naik</i>	405
33	Waste Elimination and Management : A Mantra for Effective Space Management in Libraries with A Practical Approach of Central Library NIT, Silchar <i>Ms. Krishnamati Singha</i> <i>Dr. Kishor Chandra Satpathy</i>	414

## 6

# Feed Green to Read Green: Green Library Movement for Sustainable Development

---

---

Niranjan Mohapatra

*Librarian, Nabakrushna Choudhury Centre for  
Development Studies, Bhubaneswar*

### ABSTRACT

The word "GREEN" has a different power for sustainable development i.e. green vegetables for health, green fodder for cattle, and green environment for peace of mind. As green feeds are useful for better health, green environments are also helpful for peace of mind. A Green reading environment availed with natural air, natural light may be attracting the readers to **Read, Relax** and **Refresh**. Lack of green forest is cause of global warming and climate change etc, so everyone needs everything to be Green to save the earth. Day-to-day People's interests are growing for green movement in different fields. In the field of Library and Information Science, a new concept named Sustainable Library or Green Library having popularity among LIS Professionals. People need green food to feed as well as green Library to read. Green Library is not only a thought, but also a movement towards the sustainable development of libraries all over the world particularly in development countries. The green library movement involves librarians, library staff, library users, librarians that are dedicated to greening libraries and reducing the environmental degradation. "Feed Green to Read Green" is a sign of "as people take care their body for a better health, they should take care their library's health

(development). It calls for "Go Green" in daily foods as well as daily library activities.

**Keywords :** Sustainable Library, Green Building, LEED, GRIHA, USGBC

## 1. INTRODUCTION

In the universe, the earth is the beautiful creation of God. Earlier the earth was green forest everywhere. As the population of human being are increasing day-to-day, the greenery is decreasing. The beautiful nature of the earth is continuously corrupted by human beings and cause for the climate change and the global warming. A healthy natural environment is required to living a quality life. Now days everyone need everything to be green i.e. green vegetables, green tea, green environment, green garden. All greenery will be possible if people will aware to reduce the products/services which negative impact falls on the environment and think about the sustainable development. Even in a library, a lot of energy has been used for different services which are also contribution to the natural problems. To overcome these, a healthy natural environment is needed. So it is a challenge for library professionals to play major role for the sustainable development of environment and setup a Green Library or Sustainable Library. Although specific challenges are there to overall green building movement, libraries are coming forward for green environment movement.

## 2. GREEN LIBRARY

Green library also known as sustainable library is a part of the green building movement. A green building builds for a library to be considered as a "Green Library." In the early 1990s, a movement was started for Green Library and it became popularity in Library and Information Science (LIS) field. The LIS professionals are also trying to develop a library that is power consuming, energy efficient and eco-friendly. The Green Library is a framework designed, built, repaired, managed, or reused in an environmentally and resource-efficient manner. The world is making a concerted effort to create a green planet by reducing human warming. The Green Library helps maintain a natural environmental balance in the environment and conserves the

planet and its natural systems and resources. It also informs the community about responsible environmental practices along with improving the daily activities and practices of the library.

### 2.1. Definition

The Online Dictionary of Library and Information Science (ODLIS) define green/sustainable libraries as "A library designed to minimize negative impact on the natural environment and maximize indoor environmental quality by means of careful site selection, site selection, use of natural construction materials and biodegradable products, conservation of resources (water, energy, paper), and responsible waste disposal (recycling, etc.)". According the **Illustrated Oxford Dictionary (2006)** the term "green" is concerned with or supporting protection of the environment as a political principle" and the term "sustainable" refers to conserve an ecological balance by avoiding depletion of natural resources". The phrase "green library" idiomatically refers to an eco-friendly library building which being certified as a Green Building. Aulisio (2013) proposes that "we shift the trend and use term "green library" to refer to any library that promotes sustainability through education, operations, and outreach."

### 2.2. Concept of Green Building

Green building, also known as "sustainable building", refers to the design, construction, operation, maintenance, reorganization and demolition of a organization's environmentally responsible and effective processes throughout the building's life cycle. Green buildings are followed by Green architecture, or green design, which is an approach to building that minimizes the harmful effects of construction projects on human health and the environment.

## 3. GREEN LIBRARY MOVEMENT

The green library movement is a cooperation of persons that are dedicated to reducing the environmental degradation and try to greening libraries. This movement involves librarians, library staff, library users, libraries along with the students and teachers from

educational institutions i.e. schools, colleges, universities as well as interest people from villages, towns and cities. A Green reading environment availed with natural air, natural light may be attracting the readers to Read, Relax and Refresh.

### 3.1. Historical Evolution on Green Library Literature

In the 1990s, the earliest articles on green libraries were appeared. Antonelli (2008) described the overview of green library literature. According to her, in the February 1991 issue of the Wilson Library Bulletin had a special section on "Libraries and the Environment." Total Five environmental articles were published in that issue among them four articles were in the special section and one additional article in the viewpoint session respectively as follows:

- James and Suzanne LeRue (1991) "The Green Librarian"
- Tom Watson (1991) "Finding the Trees in the Forest: Environmental Information Sources"
- Linda Rome (1991) "Celebrating Earth Day all Year Long"
- Ann Eagan (1991) "Noise in the Library: Effects and Control"
- Steven Smith (1991) "The Library as an Environmental Alternative (Among Other Things)"

The articles stand for thenationwide regeneration of interest in a green environmental movement In 1991, a group of persons concerned with environment from the Berkeley Library, University of California and librarians from the University of Idaho, Moscow were decided to publish "The Green Library Journal: Environmental Topics in the Information World (GLJ)". The GLJ was first published on January 1992 under the editorial of Maria Anna Jankowska. This journal issue included practical library articles,

- Nancy N. Pope (1992) "The Greening of ALA Conferences"
- Terry Link (1992) "ALA's Task Force on Environment"
- Pat Murray (1992) "Special Libraries and Environmental Information"
- Monte L. Steiger (1992) "Oh, How Green is Your Library"

- Ted Kruse (1992) "Recycling Opportunity: Laser Printer Cartridges"
- Patricia Cruse (1992) "Environmental Impacts"

After One year, in the year 1993 an article was published on "Green Librarianship: A Revolt against Change" by C. Atton. After 10 years in 2003, Amy Cantú and Beth Andersen had an article on "It's Not Easy Being Green But it Sure is Fun: Sustainability Programming at the Ann Arbor District Library" appeared in the Public Libraries journal. The notable articles of the next 5 years are: Bill Brown (2003) "The New Green Standard", Louise Levy Schaper (2003) "Public Input Yields Greener Library Design", Jennifer Pinkowski (2007) "Keeping Track of Green Libraries", and Jane C. Neale (2008) "Go Green".

### 3.2. International Scenario

In United States of America, Leadership in Energy and Environmental Design (LEED) is one of the most popular green building certification programs used worldwide. LEED was developed by the U.S. Green Building Council (USGBC) in the year 2000. In United Kingdom, another certificate system British Building Research Establishment Environmental Assessment Method (BREEAM) was established in the year 2000 to confirm the sustainability of buildings. Currently, World Green Building Council (World GBC) is conducting research on the effects of green buildings on the health and productivity of their users and is working with World Bank to promote Green Buildings in Emerging Markets.

### 3.3. Indian Scenario

In India, Tata Energy Research Institute (TERI) New Delhi is in the forefront. In 2001, TERI has created the first USGBC rated Green Building in India named CII-Godrej Green Business Centre at Hyderabad. TERI also thought of the need for development of a home-grown tool for rating of green buildings in India. TERI has developed GRIHA (Green Rating for Integrated Habitat Assessment), which was adopted as the national rating system for green buildings



by the Government of India in 2007. In Kerala a non-profit organization established named COSTFORD (Centre of Science and Technology for Rural Development) works for housing development and has taken significant steps in providing alternative philosophy and technology to take the main responsibility of reforming the Green Library movement in India. The Indian Green Building Council (IGBC) was formed by the Confederation of Indian Industry (CII) in 2001 at the CII Green Business Centre, Hyderabad. IGBC is the India's premier body for green building certification and allied services.

#### 4. BUILD-UP GREEN LIBRARY

Green design is an integrated process. A green building has four main elements or components on which it is designed to make green building more sustainable. These are i.e. materials, energy, water and health. Brown (2013) has identified the some green design elements for build up a Green Library i.e. Community Collaboration, Green materials, Green roof, Raised floor system, Energy efficiency, Natural ventilation, Green and renewable power. The certifier agencies i.e. LEED, USGBC, IGBC mainly uses the following five different categories to Judge the sustainability of a Green Library which are very essential to build a Green Library.

**Site Location :** A library should be located in a heavily populated area, near to other service buildings i.e. bank, post office, hospital, university, college, government offices etc. and people should be able to reach via public transportation system.

**Water conservation :** Capture rainwater by rainwater harvesting system, to use low flow fixtures, and waterless urinals. Can reuse of waste water and rainwater for plantation and gardening, and for flushing in toilets.

**Energy conservation :** Sufficient number of windows, glass windows and skylights which allow natural light instead electric light during day time. Planting solar system on the roof top of library to conserved electricity for use during night time. To control the temperature and provide ventilation and lighting, take advantage of

the natural elements, i.e. wind and sun.

**Construction Materials :** When selecting materials for the library, the main responsibility is to waste as little as possible. Another responsibility is to choose materials that do not cause too much damage to the environment. To fulfil of primary responsibility, recycled materials are being used and used after use..

**Indoor air quality :** Today, fresh, healthy, and breathable air is a most important factor. Particularly, inside the library building there is the need of a quality air. Lack of proper ventilation will be expensive to cool the building, as well as discourage people spending their time in a library.

#### 5. FEATURES OF GREEN LIBRARY

Green library is characterized as environment friendly library or sustainable library. A Green library necessarily to possess certain essential features like -

- Proper location or most suitable site
- Use of natural, recycled and regionally available materials
- Use of reflective roof and ground
- Use of insulating windows
- Conservation of resources like water, energy, and paper
- Use of energy-efficient lighting minimizing consumption
- System for optimized cooling
- Suitable plantation both inside and outside of building
- Circulation of fresh and healthy air
- Use of environment friendly technology

#### 6. STANDARDS USED TO EVALUATE GREEN LIBRARY

A standard is a set of guidelines and criteria against which a product can be judged. There are lots of discussions, activities going on about 'Go Green' spearheaded by various councils operating from USA, UK and also in India.

**USGBC Standard :** The United States Green Building

Council (USGBC) is a United States (UK) based Non-Government Organisation (NGO) developed the LEED rating system in 2000. LEED is a green building certification program, it judges building's sustainability and certifies with a rating system i.e. certified (40-49), silver (50-59), Gold (60-79) or platinum (80+).

**Chicago Illinois Standards :** Chicago is one of the first cities to integrate environmentally friendly practices into public buildings and developed its own standard. This standard is highly influenced by LEED Green Building Rating System.

**Brown Green Standard :** Jerry Brown, The Governor of California discussed emerging trends in green libraries and stated that libraries are at the forefront of green design. New or renovated state buildings over 10,000 square feet must reach the US Green Building Council's LEED Silver certification or higher, as well as include clean energy generation.

**IGBC Indian Green Building Council Standard :** In 2001 Confederation of Indian Industry (CII) formed IGBC with a vision to enable a sustainable build environment for all. IGBC has licensed the LEED standard from the USGBC and in collaboration developed Gold rating system to promote green buildings in India.

**Green Rating for Integrated Habitat Assessment (GRIHA) :** The Energy and Resources Institute (TERI) think about the need for development of a home-grown tool for rating of green building in India which led to the foundation of GRIHA. Later this Rating system was adapted by the *Ministry of New and Renewable Energy (MNRE)*, Government of India. GRIHA has been developed as a suitable rating system for all types of buildings in different climatic zones of the country.

## 7. ROLE OF LIBRARIAN IN GREEN LIBRARY

The Librarian working in a Green library environment may be called as a Green Librarian. The Green Librarian must be aware himself/her-self as well as make awareness among the library users to be environment friendly and keep the green library ever green.

- Encouraging users to use e-books, e-journals, etc. which can work as space, paper saving tools
- Undertaking practices like making softcopies, microfilming of old and scarce books and by weeding-out of old and outdated books
- Using different electronic and online media tools for communications
- Working under eco-library system and identifying the people who wish to work
- Promoting tools, techniques of green library and encouraging others to use the same
- Encouraging other librarians towards green library by discussions, seminars, and conferences and workshops.
- Using wooden furniture and other biodegradable material
- Using recyclable paper insulation to make environment friendly building.
- Using more and more use of bamboo, fiber, etc. by replacing steel material
- Making rooftop planting which can be act as a good idea
- Taking necessary steps for conservation of energy, water, paper, etc.

## 8. GREEN LIBRARIES INITIATIVE IN INDIA

**Anna Centenary Library, Chennai :** The purpose of this library is to be a world famous city library, known for its great knowledge in education, innovative research and public participation, which contributes to economic reality, environmental sustainability and quality of life in the Chennai region and beyond.

**University of Delhi Library :** The library building is inherently quiet and pleasant with wide openings for natural light. To prevent excessive heat of the Delhi Summer desert Coolers being used that has pads with indigenous materials which prevents heat from coming inside.

**University of Calcutta Library :** Great heights, spacious open areas, thick walls, windows through the east wall are some of the green gestures built into this heritage structure as well as nurtured today by the current library leadership.

**University of Madras Library :** It is a symmetrical mixture of Indian and British architectural style. Wide corridor and large windows with sunshades outside enable to accelerate fresh air, preventing direct sunlight and allowing entry of adequate natural lights.

**Karnataka University Library :** No books, book shelves, chairs or tables but benches are set up under trees so that students can sit and read books taken from the university library.

**University of Mumbai Library :** University Library and the Rajabai Clock Tower located above it are located in a 280 feet high heritage building. The architecture itself is more environmentally friendly as it recently boasted low-height, low-width, non-thick walls. Calina campus library also provide wood as stack-material and/or providing sufficient space for the users.

**NIT, Silchar :** NIT, Silchar is probably the first of its kind in the entire North East Region of India for taken initiatives for Green library. The New Library Building is designed according to LEED certification system of U.S which can be the role model for developing green libraries in Barak Valley.

**Perna Karpo Library, Ladakh in Indian Himalayas :** Solar panels, surrounded by white lotus garden, innovative technologies.

**Bangalore University Library :** This green library is under construction. Recently on August 2019, the foundation stone was laid to open a Green library at the Jnanabharathi campus of Bangalore University on 10 acres area inside the campus where the library users can download books through the university's library app. There will be boards, pergolas, corners for deep studies and space for group discussion and free Wi-Fi to access the Library App.

## 9. WORLDWIDE MAJOR GREEN LIBRARIES

**Anythink Brighton, Brighton :** It is believed to be the first carbon positive library in the USA. In 2009 it was offsetting 176,620 pound of carbon dioxide. The building includes a 108 KW photo voltaic system which generates more than a third of the building's power and will save the library £30,000 a year in energy costs. Geothermal heating and cooling are used here.

**Blair Library, USA :** It is one of the first public libraries in the USA to register with the U.S Green Building Council (USGBC). The library opened in October 2004 and was completed in 2006. The 88,000-square-foot facility has a membrane roof, cork flooring, recycled material upholstery, water-free diuretics, low VOC finishes, fabrics and a pool to hold rainwater for irrigation etc.. It received LEED Silver NC certification.

**Spanish Peaks Library, Walsenburg, UK :** Geothermal system for heating and cooling, flooring made of recycled rubber. It is the recipient of Stephen H Richard award in 2010.

**The National Library, Singapore :** The Singapore National Library has been called the greenest building on the planet. Designed by Ken Yeang, it opened in July 2005. It is designed using light shelves that allow the light to filter into the library, without having any harsh effects. It is the first green library for kids.

**Fayetteville Public Library, Minneapolis :** Opened in 2004, it was the first building in Arkansas to register with the U.S Green Building Council and achieved the silver LEED designation in 2006. The library's green roof saves about £4,000 a year in energy savings. The building's reading spaces and circulation desks were situated to take advantage of the natural sunlight without overworking the building's air conditioners, reducing energy costs by 25% and the overall building's energy consumption by 30%. Sunlight streams through 75% of the building's public spaces.

**Seattle Central Library :** It was established in 2004 and located in dense public area to reduce cost of transportation 40,000 gallon (151600 lit.) tank from roof water harvesting irrigate

the landscape. Use of triple glazed glasses reduces heat saving energy.

**Minneapolis Public Library** : Established in 2006 has 18560 sq fit green roofs in the downtown city reducing rainwater runoff, heating and cooling load.

**University of California** : It has 1,80,000 sq. fit. glass and concrete building, established in 2005. It saves 42% water and 50% energy due to its green library initiatives

## 10. CONCLUSION

As per the Fifth Law of Library Science, Library is a growing organism; hence it is a long-term institution. A green library design is less expensive because, it reduced upfront costs energy and water conservation and increased efficiency. Green Library is not only saving money in terms of energy but also in terms of health, productivity and morale of employees. The library is the heart of an educational institution, so all have to think about the improvement of the heart (library) of their institution. In the sense of "Health is Wealth", the Library's health (development) is the wealth of an institution. To keep a body healthy as well as a library healthy, it is necessary to "Go Green" on daily foods and daily library activities. This is the concept of "Feed Green to Read Green"; as people take care their body for a better health, they should take care their library's health also. Remember sustainability is the best way to keep healthy either a human body or a library building.

## REFERENCES

- Thomas, R. (2017). Green Libraries: India vs International Scenario. *Scholarly Research Journal for Interdisciplinary Studies*, 4 (37), 8645-8654.
- Bangar, M. S. (2018). Green Libraries in India: An Overview. *Knowledge Librarian*, special issue, 222-230.
- Bhattacharya, A. (2017). Green Library and its Utilities in Modern Day Library Service: A study. *International Journal of Next Generation Library and Technologies*, (3)3, 1-11.
- Meher, P. (2017). Green Library: An Overview, Issues with Special Reference to Indian Libraries. *International Journal of Digital Library Services*, 7(2), 62-68.

- Nikam, S. S. (2017). Green Library: An Emerging Concept. *Knowledge Librarian*, 4(6), 190-198.
- Rabidas, S. (2016). Green Library Buildings: A Sustainable Process. *International Journal of Advance Research and Innovative Ideas in Education*, 2 (6), 342-346.
- Pangail, Ramya Krishnan (2015). Green Libraries: Meaning, Standards and Practices. *Episteme: an online interdisciplinary, multidisciplinary and multi-cultural journal*, 4(3), 1-9.
- Shah, L., at all. (2015). Green Libraries in Academic Institutions: Need of the Hour. *GRANTHAALAYAH: International Journal of Research*, 3 (9SE), 1-5.
- Malode, A. V. (2014). Green Library: An overview. *Research Journey*, 1 (4), 13-17.
- Aulisio, G. J. (2013). Green Libraries are more than just buildings. *Electronic Green Journal*, 1(35), 1-8.
- Neale, J. (2008). Go Green. *Library Journal*, 133, 46.
- Antonelli, M. (2008). The Green Library Movement: An Overview and Beyond. *Electronic Green Journal* 1(27), 1-12.
- Thompson, D., at all. (2006). *Illustrated Oxford Dictionary*. Dorling Kindersley.
- Reitz, J. M. (2019). *Online Dictionary for Library and Information Science*. Retrieved August 28, 2019 from [https://www.abc-clio.com/ODLIS/odlis\\_about.aspx](https://www.abc-clio.com/ODLIS/odlis_about.aspx)
- Wikipedia. (2019). Green Library. Retrieved August 28, 2019 from [https://en.wikipedia.org/wiki/Green\\_Library](https://en.wikipedia.org/wiki/Green_Library)
- Radhakrishnan, B. R. (2019). BU's green library aimed at getting students to read more. Retrieved August 27, 2019 from <https://www.thehindu.com/news/cities/bangalore/bus-green-library-aimed-at-getting-students-to-read-more/article29266770.ece>