Going Green through Waste Management: Indian University Libraries Study

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Abstract

Sustainability and adaptability are two important aspects of the life for all species to survive in this world. Adaptability is the quality of being able to make changes in response to the environment. Survival of libraries is possible only through sustainability and adaptability. A system is sustainable when its operation does not break it down over time– in other words, when resources consumed in the system are replenished. As a public places libraries consume lot of energy and resources to provide services to their patrons. Hence, to understands social responsibility towards environment as a person and as library professional is important. This will show the path for greening the libraries. With this intention, the study on waste management in Indian university libraries was conducted. To cope up with the geographical area Morgan table was used to decide the sample size which turned out to be 254. Present paper reported the study which explored the facts about waste management in Indian University libraries. It also throws light on the status of audit regarding the waste management. The study followed descriptive research design and survey method. This exploratory study adopted qualitative and quantitative approach for the investigation of problem. Collected data were analyzed by using Microsoft Excel application. The concept of greening the libraries is in infancy stage in India. Awareness is gaining momentum slowly. It was found that these libraries are keener on waste management of paper, more than waste management of books, e-waste and other waste material as libraries are keen on holding all the collection as it can be required any time by the user, taking into account the research objective of university libraries.

Keywords: Waste Management; Greening Libraries; Library Sustainability; Green Libraries; University Libraries; E-Waste.

Introduction

The day to day activities of human being generate a lot of waste. For going towards greenness how do we manage the waste is very important. Libraries being part of the society also generate waste. Investigation of the waste management in libraries is thus important. There are many ways to go green.

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Going green has finally gone mainstream, countries are spending billions on implantation of clean or green technologies. Advantages of waste management are reflected on the quality of environment. Waste management policies can be drafted in such a manner that it will generate finance for libraries.

Sustainability is the quality of not being harmful to the environment or depleting natural resources, and there by supporting long term ecological balance.

Similarly adaptability is the quality of being able to adjust to new conditions. 'Sustainability' refers to the goal and 'sustainable development' is the path or framework to achieve it. To set the sustainability terms is our challenge today. Libraries as a system must think about sustainability for which greening the libraries is important. This study focused on greening the library through waste management.

Need of the Study

As a public place libraries consume lot of energy and resources to provide services to their patrons and clientele. We need to understand social responsibility towards environment as a person and as library professionals. For the survival of profession it is also necessary that libraries should change. Going towards greenness is inevitable for libraries in this context.

This triggers many questions like–

• Which are the different areas where libraries can be green?

• Is it possible for libraries and library professionals to go green with existing resources?

Knowing the status of libraries as part of ecological system is essential. This status and existing condition will guide the librarians to take decisions and implement the policies. In order to know the present status of university libraries regarding greenness it was necessary to analyze their pattern about energy efficiency, waste management, operation and maintenance of building etc. Thus, waste management is an important issue with reference to greening of libraries.

Objectives

The main objective of this study was to explore measures adopted by the Indian university libraries for waste management of books, paper, e-waste, and other waste. The study also explored how many Indian university libraries have waste management policies and types of audits related to eco-system and conducted by them.

The objectives formulated for this study were

To find out the measures adopted by Indian University libraries for waste management of books, paper, e-waste and other waste.

To find out whether Indian University libraries have waste management policies.

To investigate whether Indian University libraries conduct audit of eco-system.

Assumption

All university libraries in India are recognizing the importance of sustainability and natural resources because of their depleting nature. They are moving in the direction of turning into green libraries through waste management.

Scope and Limitation of Study

This study is limited to university libraries in India. Other types of libraries for example, college libraries, public libraries etc. are not considered. The study focused singly on waste management. Going green through initiatives, programs, activities, services, operations and maintenance etc. are out of the scope of this study. The study does not deal with stock taking practice in university libraries. Sewage arrangement for managing the other waste is out of the scope of this study.

Literature Review

Green practices are the major concern of the present era, all over the world. All environmentally sensitive persons think about how to go green and save the earth from further degradation. Discussions and debates are going on for adopting more sustainable practices to save the environment and earth.

Greening the libraries is also recognized and discussed by many researchers and environmental and information scientists internationally. However, not much research is done in India on greening the libraries. Libraries are recognized as lifelong learning centers for people of all ages. Hence, libraries can certainly play a major role to educate the society about environmental issues through their collections, sustainable and environment friendly facilities, and library programs. Libraries in 21st century era can implement greening and sustainability by adopting green practices. Waste management is one of those practices.

Henderson (2012) [2] guided for careers in sustainable architecture and pointed out that planetary limits necessitate to 'going green' and 'building green'. As a collective group, human beings can- and should- be the solution leaders for a sustainable environment. Green library buildings are one of such solution. Low, Gleeson, Green and Radovic (2005) [1] recommended that workplaces should be designed to reduce the drain on the environment and at the same time inform their users (workers, customers, clients) about the impact of it on the environment. Jankowska and Marcum (2010) [3] identified that there were variety of factors that threaten the sustainability of academic libraries: lowering libraries ecological footprints was one of them. Authors discussed four major categories as-

• Sustainability of scholarship and collections.

• Green library operations and practices.

- Green library buildings and

- Measuring and improving sustainability.

Sannwald (2009) [4] provided a checklist about how sustainability can be brought into the library design as well. For instance, Sharma (1970) [5] opined that library building should fulfill their functions as well as be graceful and peaceful. Some of the basic fundamentals of good library building are harmony, site, functionalism, and style, technical and economic factors. Further Kroller (1987) [6] opined that conversion or preservation of old building fabric for library was one of the solutions for greening the library.

Besides this, Antonelli (2008) [7] also opined that creation of green libraries was approaching a tipping point - generating a Green Library Movement, which was comprised of librarians, libraries, cities, towns, college and university campuses committed to greening libraries and reducing degradation of environment. Constructing a green library building using a performance standard such as LEED was one of the methods to go green and sustainable. Existing literature indicated that, innovations were taking place by building green library buildings, by greening existing facilities, providing green library services, and embracing environmentally supportive and sustainable practices within the library. While evaluating collection disposal Ambler (2012) [8] stated that library professionals are aware that collection disposal had an impact on the library. Developing the concept of collection sustainability required consideration of all aspects of collection management and the concerns of library and information workers which begins with consideration of collection disposal. Collection sustainability can be brought to the library through the use of deselection tool. However Jones and Wong (2016) [9] were of the view that only pursuing a green building cannot be the focus of a sustainability approach for many academic libraries.

Embracing a holistic approach to sustainability practices may be a way forward. Waste management in the library is one of the green strategies for sustainability under the head green operations while developing green strategies. Rowley (2006) [10] states that existing literature witnessed the debate and discussion about the contribution that libraries can, and might make to their environment and focused on the challenges for libraries in relation to the environment.

One of the considerations was the use and impact of digitization on environment. Even digital information environments generate a lot of redundant items which has built-in obsolescence and need an environmentally sensitive de-commissioning route. Proposed library greening guide by Salonga-Silverio (2011) [11] dwelled around following areas: Material conservation, Energy conservation, Library building including waste management practices, and Greener operation and services. Dempsey and Palilonis (2012) [12] put forward a thought that waste associated with printing can be reduced by implementing reuse, recycle and reduce methodology for a greener library with print management.

Barnes (2012) [13] recommended that public libraries can also use their green building as a teaching tool to teach their communities about sustainability and foster behavior change. Literature review indicated that waste management is one of the strategies to go green in the libraries. Inclusion of waste management practices in the regular library practices for going towards greenness and to save the earth is the need of the hour. Not much research has been done in this area with reference to academic libraries in India. This situation motivated the researchers to study the status of waste management practices in the Indian university libraries.

Materials and Method

The study adopted descriptive research design and survey method. This exploratory study adopted qualitative and quantitative approach for the investigation of problem. According to UGC website i.e. www.ugc.ac.in. [14] and universities handbook 2014 [15] total 719 universities were taken up as population for the present study. To cope up with the geographical area Morgan table was used to decide the sample size which turned to be 254. Simple random sampling technique by using lottery method was used to acquire the relevant sample. Questionnaire was used as research tool. In order to verify whether the waste management practices were continued, open ended questions asking reason for discontinuation were posed. Collected data was analyzed by using Microsoft Excel application. Percentages were derived at for close ended questions. Absolute frequency with relative frequency in form of percentage was presented. A relative frequency describes the number of times a particular value for a variable (data item) has been observed to occur in relation to the total number of values for that variable. The relative frequency is calculated by dividing the absolute frequency by the total number of values for the variable. This can be represented in percentage. Comparison is shown in the tables for relative

frequency in percentage and availability in libraries in percentage.

Results and Discussion

In order to explore measures adopted by the Indian university libraries for waste management it is necessary to understand measure adopted for waste
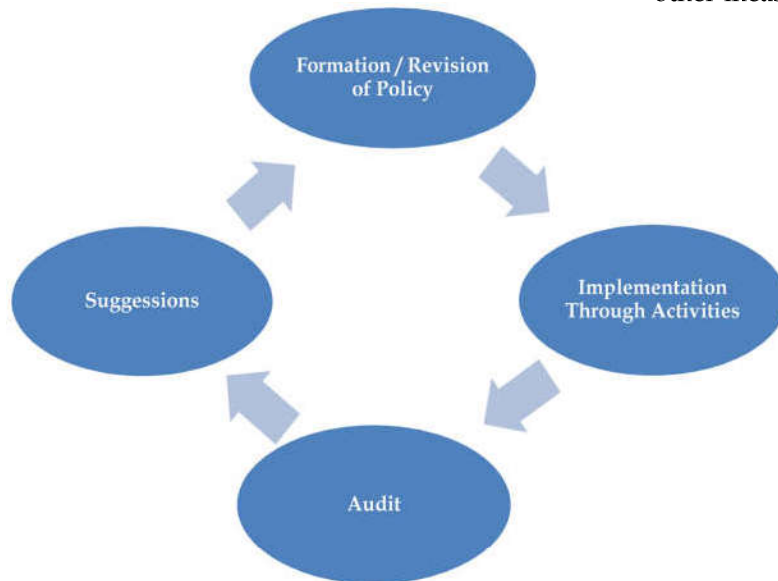

Fig. 1: Cyclic process of policy and audit

management of books, papers, e-waste, and other waste. There is cyclic process of policy and audit. Hence measures, policy and audits were studied quantitatively and qualitatively.

Waste Management

Waste management of libraries was divided into four parts.

- Waste management of books.
- Waste management of paper
- Waste management of e-waste and
- Waste management of other waste.

Measures for all the four were sought from the data received from respondents. This is presented next.

Waste Management of Books

Waste management of books is important as most of our Indian libraries are hybrid libraries at present. Waste management of books can be done through different modes. They are- by giving gift to friends of

library, relegate books to store area, sale to scrap person, giving them away to its users for no cost, send them to recycling organization, sell to its user for minimal charges, sale of books to store or other library. In this context the most preferred measure is gift the books to friends of library with 27%, followed by relegation books to store area 26%, 11% libraries choose sale of books to its user for minimal charges and 7% libraries opt for sale of books to store or other library respectively (Table 1). A few libraries adopted other measures than mentioned in the table. These responses provided unique local information. Five libraries do not urgently sense the need of waste management of books as libraries are established very recently, two libraries created binding section for books mending.

Waste Management of Paper

Managing waste of paper can be achieved through different measures like printing on both sides of paper, avoiding use of paper by going digital reuse, lessen the margins while printing, sending it to recycler, segregation of dry and wet waste, setting up recycling area etc. It was found that printing on both sides of paper is most preferred by libraries (72%) followed by avoid use of paper by preferring digital environment (50%). Segregation of dry and wet waste is followed by 17% libraries. 8% libraries have setup recycling area (Table 2). Libraries are keener on waste management of paper rather than waste management of books, waste management of e-waste and waste management of other waste as libraries like to hold all the collection as it can be required any time by the user. Besides the measures given in the options, other useful practices followed by respondents are-

- Circulars within the university are sent via e-mail.
- Newspaper clippings service is offered on blank side of used paper.

The measures discontinued by the respondents are-

- Using both side of paper while printing.
- Recycle bins are kept in university premises to throw the papers in recycle bins, which are further taken for recycling.
- Segregation of dry and wet waste.

This scenario of waste management of paper is quite positive as barely three institutes reported discontinuation of measure.

Waste Management of E-waste

E-waste is the most dangerous to human beings as it does not degrade on its own. Hence, its management is a prime concern of all environmentalists. Understanding position of libraries in this regard is significant. E-waste management can be achieved through measures like creation of specified junctions for collection of e-waste, handing over to the organization or recycler who knows proper disposal system, purchase of electronic products from companies which have service after sales for the disposal of product with take back policy, donation of computers to NGO to refurbish and give it to needy people and implementation of any recycling project or program.

The study showed that creation of specified junctions for collection of e-waste was feasible for 28% libraries. 26% libraries were able to handover to the organization or recycler who knows proper disposal systems. 8% libraries were able to implement any recycling project or program (Table 3). A few other practices expressed by respondents are-

• Project based competitions out of e-waste are organized for students.

• Hand it over to purchase section.

• Follow university decision.

With the advent of technology and its implementation in the libraries the situation of e-waste management is alarming. Comparing with other aspects of waste management, it was found that e-waste management was a neglected area, as 30% libraries do not follow even a single measure out of the measure mentioned in Table 3. This may be because introduction of technology in libraries is recent than printed books. Secondly, most of our libraries are hybrid libraries at present. People are not aware about the danger in absence of waste management of e-waste.

Looking at the situation, it can be suggested that more libraries should try for e-waste management. Companies' representatives or product sales persons must be aware of company's policies regarding e-waste management, if any at the time of providing the technology. Companies also should take the responsibility of safe e-waste disposal as their corporate social responsibility. They can promote different proposals for buy back policy. Libraries can also insist for different proposal for after sale service and disposal after use. Awareness is needed in the peers so that they can give valuable suggestions to each other while purchasing or implementing technology in the libraries.

The status of discontinued measures regarding e-waste was verified from the respondents. The number of projects discontinued are merely two. They are-

• Recycling project or programs were implemented previously.

• Purchase of electronic products from companies which have after sales service for the disposal of product with take back policy.

Libraries have not provided the reasons for discontinuation.

Waste Management of Other Waste

Libraries produce waste other than books, papers and e-waste. Problem of management of other waste can be tackled by the measures like installation of bins to collect garbage, sale to the recycler, outsourcing recycling of garbage to agency, use of coloured bins with code to collect garbage, in-house recycling of garbage, segregation of dry and wet waste, recreating it to new sustainable products etc. Measure of installation of bins to collect garbage is favored by 58% libraries. 24% libraries prefer sale to the recycler. 16% libraries segregate dry and wet waste. Recreation into new sustainable product is minimally practiced in 10% libraries (Table 4).

Libraries are not much concerned for the waste management of other waste that is other than books, paper and e-waste. One institute has reported discontinuation of measure about other type of waste. Use of coloured bins with code to collect garbage was implemented but the practice is discontinued. This reflects disappointing scenario in university libraries.

Table 1,2,3, and 4 also indicate that library professionals are not much aware about waste management. However, different measures followed by them for waste management are not result of deliberate and intentional decision.They may have adopted measure for getting more space or for other reason.

Policies and Audit

Waste Management Policy

Waste can be managed efficiently if waste management policy is drafted and the implementation is done. Exploration of existence of waste management policy was done. It is welcoming that 18% libraries have drafted waste management policy (Table 5). More libraries should have waste management policy. This can be drafted to generate finance for libraries and also protect the environment.

Insight gained from the respondents about policy is as follows. There are different themes around which waste management policies are drafted. For one university waste management policy has been drafted entirely for the purpose of pollution control board clearance. Use of EM technology for manufacturing of compost and using it for agriculture is the policy for one institute. Agriculture seems to be the concern for the university. Three waste water recycling plants function in one university campus and water is used for agriculture. (Meaning "EM Technology" - With the help of 'effective microorganisms' new alternative products are developed which are less harmful to nature.) Two universities have their own common policy on waste management which applies to all.

One university follows e-waste management and handling rules 2011. Water recycling and rain water harvesting are main concerns for one institute. One of the universities has formulated a committee for writing of items as per account code formed by the university. Segregation of waste before sending it to the recycler, use of coloured bins for segregation, and separate water waste policy are few other measures. ISO 14000 norm is followed by one university for policy formulation. The ISO 14000 family of standards provides practical tools for companies and organizations of all kind looking to manage their environmental responsibility. One more university has drafted the policy but the same is not available

Table 1: Waste Management: Books

Measures	(N=228)		Libraries (N=178)
	Absolute Frequency	Relative Frequency (%)	Availability in Libraries (%)
Gift the books to friends of library	48	21	27
Relegate books to store area	46	20	26
Sale of weeded books to scrap person	43	19	24
Give away the books to its users for no cost	31	14	17
Send books to recycling organization	29	13	16
Sale of books to its user for minimal charges	19	8	11
Sale of books to store or other library	12	5	7
Total	228	100	-

Table 2: Waste Management: Paper

Measures	(N=458)		Libraries (N=178)
	Absolute Frequency	Relative Frequency (%)	Availability in Libraries (%)
Printing on both sides of paper	129	28	72
Avoid use of paper by going digital	89	20	50
Reuse	84	18	47
Lessen the margins while printing	66	14	37
Sending it to recycler	44	10	25
Segregation of dry and wet waste	31	7	17
Setting up recycling area	15	3	8
Total	458	100	-

Table 3: Waste Management: E-waste

Measures	(N=168)		Libraries (N=178)
	Absolute Frequency	Relative Frequency (%)	Availability in Libraries (%)
Creation of specified junctions for collection of e-waste	49	29	28
Hand over to the organization or recycler who knows proper disposal system	47	28	26
Purchase of electronic products from company's which have after sales service for the disposal of product with take back policy	34	20	19
Donation of computers to NGO's to refurbish and give it to needy people	24	14	13
Implementation of any recycling project or program	14	9	8
Total	**168**	**100**	-

Table 4: Waste Management: Other Waste

Measures	(N=301)		Libraries (N=178)
	Absolute Frequency	Relative Frequency (%)	Availability in Libraries (%)
Installation of bins to collect garbage	104	34	58
Sale to the recycler	43	14	24
Outsourcing Recycling of garbage to agency	41	14	23
Use of coloured bins with code to collect garbage	35	12	20
In house Recycling of garbage	33	11	19
Segregation of dry and wet waste	28	9	16
Recreating in to new sustainable products	17	6	10
Total	301	100	-

Table 5: Waste Management Policy

Prevalence	Absolute Frequency (N=178)	Relative Frequency (%)
Yes	32	18
No	146	82
Total	178	100

Table 6: Number: Book Withdrawal Policy

Prevalence	Absolute Frequency (N=178)	Relative Frequency (%)
Yes	64	36
No	114	64
Total	178	100

Table 7: Audit

Prevalence	Absolute Frequency (N=178)	Relative Frequency (%)
Yes	28	16
No	150	84
Total	178	100

Table 8: Type: Audit

Type of Audit	(N=52)		Libraries (N=178)
	Absolute Frequency	Relative Frequency (%)	Availability in Libraries (%)
Energy audit (includes energy consumption, thermal comfort, visual comfort)	23	44	13
Water and waste audit (includes water quality, solid waste generation, solid waste disposal process)	16	31	9
Sound level audit (includes indoor noise level, outdoor noise level)	13	25	7
	52	100	-

with library. It is available with the estate officer of the university. For two libraries project is at planning stage. As per the local requirement policies are either drafted or third party certification is followed.

Book Withdrawal Policy

Books are the major resource for libraries to provide information. Most of our libraries are hybrid libraries at present except a few. It is obvious that more libraries have thought about formulations of withdrawal policy than waste management policy which normally is prepared at university level. Hence, the number of libraries with book withdrawal policy is almost double than the waste management policy. (Table 5 and 6.)

A few important examples of briefing from respondents about withdrawal policy for books are as follows. The number indicated in the bracket indicates the number of responses.

• As per central government rule 4 books per thousand circulated can be withdrawn subjected to the approval of library committee. Mostly these are the lost books as per stock taking report [5].

- Weeding out of older edition & damaged books after administrative follow up [4].

- A decision is taken by the library committee [3].

It should also be noted that the librarians have given responses not marking the difference between weeding and withdrawal. There is no uniform policy or format. The decisions about the implementation are taken at local level as per requirement. Further different libraries have included different factors regarding saving of environment in their policies. Maximum libraries give importance to recycling. Involvement of students in recycling is another notable factor. It is very important that next generation is involved in such constructive work. Once importance is outreached to next generation they will take utmost care of the environment. This will create habitable condition for each one of us. A few libraries insist on pulping or sale for optimum use.

This indicates that waste management policy and book withdrawal policy play very important role to march towards greenness. Implementation becomes easier once the policies are drafted. Individuals get clarity regarding their work and steps to be followed for achievement of final goal, once the policies are formulated and are in place.

Audit

Audit should be conducted for the judicious use of resources. Improvement in any activity or service can be achieved only if audit is done. Audit gives us clear and exact picture where improvement is needed. Audit helps us to save resources and improving services. Future planning is possible only through audit. Corrective measures can be implemented after the audit report. For the judgment of resources and environment different types of audit can be conducted by institutes. It can be energy audit, sound level audit or water and waste audit. Yet, so far merely 16% institution have conducted green audit (Table 7).

Energy audit is done by 13% libraries. Sound, water and waste audit is done in 7% and 9% libraries respectively (Table 8). 84% libraries have not conducted any type of audit (Table 7). 4% libraries conduct all three types of audit. This is very much alarming situation.

A few institutions conduct different types of audits in addition to those mentioned other than in Table 8. They are-

- University environmental policy.

- Pollution control board inspect for the compliance of e-waste rules.

- ISO 14000 certification.

Conducting audit is important as modifications and improvements can be implemented in the waste management policies to gain positive results. It can become a continuous process for the institute. Audit will identify the lacuna and to fill the gap, policies can be changed. Implementations of policies will result in betterment and transformation of institute. Audit can also be conducted to get further suggestions or to find out different procedures which will save resources. This process will take the institute ahead on the path of eco friendliness.

Thus, the assumption of the study with respect to Indian university libraries was affirmed as far as waste management is concerned. University libraries adopt many different measures for waste management to bring green quotient to the library. Even though percentage for implementation of policies and audits is on the lower side that is below forty percent, still initiatives are taken by university librarian to march towards greening of their libraries.

Suggestions

Following suggestions emerge from the study:

For Librarians

- Information regarding waste management and how it benefits users' health should be added in the library orientation of university libraries.

- Librarians should consider themselves as integral part of corporate social responsibility regarding waste management and become advocates to promote waste management for greening of libraries.

- Each and every library should possess waste management policy. This can be drafted skillfully to create finance for libraries and also protect the environment.

- Libraries and technology providing companies should join hands together to troubleshoot the problem of e-waste management.

Educational Institutes

Literature review revealed that efforts are taken by IIT Roorkee [16] for green initiatives. They are remarkable for an educational institute. As they have gone through all the procedures, other universities and institutes must take the advantage of their expertise and emulate them for creating green campus. University can acquire their advice for creating green campus. The existing policy with the institute can be

treated as a model policy and other institutes can frame their own policies with local variations required.

NAAC Accreditation

NAAC

The National Assessment and Accreditation Council (NAAC) is an autonomous body established by the University Grants Commission (UGC) of India to assess and accredit institutions of higher education in the country. More weightage to inclusion of waste management as environmental initiatives by committee can motivate institutes to take more initiatives for waste management to march towards greenness.

Conclusion

Libraries do follow waste management of books, paper, e-waste and other waste but they are keener on waste management of paper than books, e-waste and other material. Obsolesce rate of technology is at the peak because of the technological advancement. This situation regarding e-waste management is alarming. Companies and libraries must join hands together to troubleshoot the problem of e-waste management. Since greening of libraries is a recent phenomenon in India it is welcoming that eighteen percent libraries already have waste management policy. To target all the libraries it is very much necessary to create awareness amongst the libraries and librarians about waste management in every day activity for going towards greenness.

Greening of libraries is a recent phenomenon. Creation of clean and green spaces is not possible without waste management. Health of the user is at stake without waste management. This offers opportunities for one to improve the environment and well-being of the users. In an ecosystem, organisms are interdependent. Similarly users'health is dependent on environment in libraries. With the help of waste management libraries can maintain good health of the user. This necessitates all activities and timely actions towards waste management in university libraries.

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