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An Empirical Study of The Environmental Sustainability of Green Libraries Initiatives in Federal Universities in Nigeria

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Abstract: *In this contemporary global ecosystem, librarians as custodians of knowledge and libraries especially university libraries who not only serve as knowledge gateway but also research hub are looked upon for not only promoting the idea of green initiative and sustainability but are also to set the pace by implementation knowing full well that the whole world look up to them to begin the change. This study is therefore an empirical assessment of the environmental sustainability of green libraries initiatives in federal universities in Nigeria. It adopted a descriptive survey research design with a sampled population of 120 librarians selected through random sampling technique from 12 University libraries in Nigeria covering the six geo-political zones of Nigeria with each zone producing 20 respondents. The primary instrument used for data collection in this study is a self prepared Likert modified type of four point scale rating structured questionnaire with section-1 lifted from the IFLA set agenda for green library and section-2 guided by IFLA checklists for green structures and information services for libraries while observation was also used to ascertain the level of compliance of the green library initiative. On this scale, the average mean benchmark is 2.50, in which case, an item is accepted if it is 2.50 and above and rejected if it is below 2.50 hence the decision rule. The questionnaires were administered through email and returned 100% with the help of research assistants. Data collected were statistically analyzed using frequencies, percentile and mean (X) and presented in tables. The result shows among others that apart from green buildings and equipment, sustainable library services and sustainable economy the librarians expressed high level of awareness of, other agenda that form part of the green library initiative, the librarians are not fully aware of them and the university libraries buildings were found not to be green initiative compliance as none of the university libraries ccould boast of an entire library structure made with natural biodegradable resources. It was also discovered that the university libraries provide some green information services such as providing non-print information services and sources, encouraging the use of search engines and the Internet, having websites that can be easily perused by users and adoption of e-library concepts but lag in some areas. Based on the findings, the study recommended inter-alia that federal university libraries should be reconstructed in line with the characteristics set outside by IFLA for the construction of green library in its entirety which streamlined all that is needed in making a library a green one and that librarians*

should be trained and re-trained on green information and communication technology (Green IT) as well as on green office principles and environmental management.

Keywords: green library, sustainability, environment, environmental sustainability university library, librarian, climate change

INTRODUCTION

Man from creation, was placed in a green environment by God, to enjoy nature at its best and have things in their natural state knowing the importance of such environment to their wellbeing but as result of what is christened civilization and technological advancement as a result of scientific breakthrough, man has become an endangered species to the same environment he is suppose to harness for his good health. Man instead if adapting to the environment is now working against the environment forcing the environment to adapt to his way of life resulting to environmental degradation and climate change as the land is no longer green. Librarians as custodians and managers of knowledge and information are aware of the danger human activities have posed on the environment that have brought the much talked about climate change. The degradation of the environment as known to man has led to environmental pollution, soil degradation, erosion and depletion of the ozone layer that has resulted to global warming.

In realization of the need for environmental sustainability, there is the need to take the bull by the horn and libraries and librarians are no longer sitting on the fence. In this regard, libraries are increasingly adopting sustainable practices with the aim of bringing to the barest minimum their ecological footprint (Beutelspacher & Meschede, 2020). As revealed by Whang & Kim, (2015), environmental sustainability as a concept which is tailored towards integrating environmental, social as well as economic dimension ranks first among the steps known for addressing the challenges of climate, conserving biodiversity and ensuring ecosystem well-being for generation unborn and it is also seen as a balanced approach (Morelli, 2011) towards solving the problem of climate change. As the custodians of the people's knowledge, environmental sustainability should occupy the front burner in the scale of issues that are of paramount important to libraries especially university libraries that are the society hub of research and learning. To this end, state Beutelspacher & Meschede (2020) libraries contribute to environmental sustainability through the acquisitions of ecological friendly collections, tools and events that have social economic and environmental dimension impact.

It is asserted that Libraries, as educational hubs, promote green literacy and sustainable knowledge, making them essential in advocating for eco-friendly practices (Zobundžija & Dolaček-Alduk, 2021) and by all standards and assessment, it is believed that the role of libraries in general is in tandem with the UN 2030 Agenda for Sustainable Development, positioning them as agents of transformation in tackling global sustainability challenges (Zobundžija & Dolaček-Alduk, 2021).

The underlying factor is that libraries can no longer assume that. As explained by Laybats (2024) a green library focuses on the environment, sustainable development and environments that are subject to dangers from climate change or social inequalities, while to International Federation of Library Associations and Institutions (IFLA) (2022) a green and sustainable library is a library which takes into account environmental, economic and social sustainability in that green and sustainable libraries may be of any size, but should have a clear sustainability agenda. The view is that libraries should go full green under wise called green library as awareness creation of climate change and its attributed danger is not enough steps towards fighting the menace we are in. It is in this vein declared Laybats (2024) that there is a lot more to green library than creating awareness and educating the communities, it is very much about practicing what you preach.

The implication is that Libraries as custodian of knowledge and the channel through which this knowledge/information is disseminated must be part of the campaign that supports climate mitigation by way of attuning their structural units and activities that can promote and uphold environmental sustainability as their contribution to having a better and healthier environment. There are basically three principle responsibilities that have been placed on the shoulder of libraries and these according to Sahavirta (2018) and Choudhury (2019) are; green buildings, green services and green practices and accomplishing these task in the opinion of Antonelli, (2008) can be seen as libraries contribution to climate action.

Going by available data, the implementation of green library and environmental sustainability has been on the high gear in most developed nations of the world such as the Netherland, United Kingdom and the Singapore (Vasanthi, 2019) as well as developing nation like India (Ingole & Kumari, 2021) and Kenya (Mwanzu, 2022) but same cannot be said of in Nigeria more so in federal university libraries as there is little or no information on the compliance and implementations of this great initiative. This development forms the reason behind this research and it is anchored on three purposes which are aimed at closing the existing gap and creating further awareness of the initiative to university librarians and by extension all librarians in this part of the globe.

Objectives of the Study

The study has the aim of achieving the following objectives:

I. To ascertain the level of awareness of Librarians in federal universities of IFLA set agenda for green library initiatives,
II. To determine how university library buildings and infrastructure in Nigeria are green initiative compliance and
III. To ascertain the green information services provided by librarians in federal universities in Nigeria.

Research Questions

The study was further guided by the following research questions:

I. What is the level of awareness of librarians in federal universities in Nigeria of IFLA set agenda for green library initiatives?
II. To what extent are federal universities library buildings and infrastructure in Nigeria green initiative compliance?
III. What are the green information services provided by librarians in federal university libraries in Nigeria?

LITERATURE REVIEW

Conceptual Framework

Sustainability

The definition of sustainability could be likened to the analogy of the seven blind men and the elephant in which each one described the elephant based on the area touched and the feeling had of the animal. In this context, sustainability means different thing to different profession and field. It is in this view posit Heather, et al (2020) that sustainability is defined in the literature in several ways but in the area of focus in this study which is the ecosystems, the most commonly used definition is that formulated by UN World Commission on Environment and Development (WCED) in 1987 known as the Brundtland Commission. According to the Commission, sustainability is all about meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. The implication of this definition is that the present global population is at liberty to utilize what natural resources that is on mother earth but at the same time being mindful of the generation unborn. In other words, they should leave enough of the resources for the future generation and no action of today should endanger their existence tomorrow. As revealed by Hasna (2017) the ecosystem sustainability hinges on three pillars which are environmental, economic and social policy. These ensure a balance between economic growth, environmental quality and social equity and require an integrated policy and a cross-sectoral institutional framework rather than isolated policies.

As averred by Kendiukhov (2017) and Armeanu; Vintila, .and Gherghina 2018), despite the advantages of the Brundtland Commission report, it shortcoming is that it did not declare that the potential for growth depends on the carrying capacity of the environment considering the fact Politicians often use the term ‘sustainable economic growth’, even though it is not possible to grow infinitely in a finite world they added. All the same, in its enhanced version, sustainable development was defined as improving the quality of human life while remaining within the carrying capacity of supporting ecosystems (World Resources Institute, 1993). In recent time however in line with the trends of events, sustainability is assessed based on the economy point of view and this has led to circular economy being the most widely accepted term which in a sense noted Corvellec, Stowell, and Johansson (2022) goes beyond the need for sustainability as it is a return to the order of nature, as in nature almost all materials are involved in cycles and there is no waste: the end product of each process is the starting material for another process. Sustainability

has also been defined by Online Dictionary of Library and Information Science (ODLIS) as the capacity to meet current demand without jeopardizing future generation's ability to meet up their own requirements and this affects society, economy and environment

Green Library

The formation of the 'green library movement' in the 1990s buttressed Ingole and Kumari (2021) marked the beginning of the concept and the move to implementation of green library as a result of the noticed climate change and the associated global warming that resulted to excruciating weather conditions. The whole idea is to protect the earth and everything therein from negative impact of the climate change on the environment. With the growing concerns on the negative impact of climate change, buildings and managerial practices across the globe are expected to address this challenge by drifting toward 'greenness' (Qutab, Ali and Ullah, 2016). This implies that the whole idea of green library was understandable and straight forward and that the meaning is as the name denotes. So when green library is talked about, it refers to the entirety of the library structures and activities. To this end, green library can be simply seen as an environmentally friendly or eco friendly library. In this regard, Chalukya and Pagore (2022) defined green or sustainable libraries as libraries whose structures are designed, built, re-built, operated or re-purposed in a way that is environmentally and resource sufficient. It has also been defined as a library designed to minimize negative impact on the natural environment and to maximize household environmental quality by means of careful site selection, use of natural structure materials and biodegradable products, maintenance of resources such as water, energy, and paper as well as the use of responsible waste disposable recycling system (Online Dictionary of Library and Information Science). While New World Encyclopedia sees it as a library created with environmental issues in mind.

According to Daimari (2018), a green library is a library where spaces within the library are carefully designed to contribute to environmental sustainability, while its technology, services and management are climate friendly with the aim of minimizing the negative impact of climate change on the environment. The green library which is often referred to as eco-library, 'environmentally responsible' and/or climate neutral library where all activities, collections, actions, and programs are green-conscious (Stoss, 2010; Aulisio, 2021). In all, IFLA (2022) gave a clear cut working definition of a green or sustainable library as a library which takes into account environmental, economic and social sustainability and regardless of size has green buildings and equipment, green office principles, sustainable economy, sustainable library services, social sustainability, environmental management and commitment to general environmental goals and programmes. Sustainable library therefore is a one that fulfils its task and fulfils it job while being environmentally conscious (Thomas, 2017). Suffice to say, that a green library is a library that is designed in line with nature and everything therein with a view to preserving our natural ecosystem and promoting the health and wellbeing of users.

Theoretical and Empirical Framework

Regardless of the fact that the concept green library seems to be in its embryonic stage in a country like Nigeria and her likes despite its emergence since more than three decades ago, the story is different in some other parts world as it has remained a widespread in libraries of developed nations and some developing nations like India. As noted by Kulkarni, (2018) as well as Pagore and Chalukya (2022) green library as a widespread, emerging and evolving concept is essential to the health of library users and the global ecosystem and making a library 'green' is another way of marketing or publicizing the library to potential patrons (Sangita, 2014).

In the nature of green which symbolizes fertility, a green library apart from being environmentally friendly and sustainable must possess certain characteristics which differentiate it from conventional library. To this posits Vijayalaxmi (2010), green library must have particular characteristics such as use of natural and recyclable and locally available materials, reflecting roof and ground, insulating windows, water, energy, and paper maintenance, energy-efficient lightning to reduce energy consumption, system for optimizing cooling, appropriate plantation both inside and outside the library, circulation of fresh and healthy air and use of environmentally friendly technology. In the same vein IFLA (2022), apart from giving a working definition of green library or sustainability library noted that regardless of the size of the library, a green library should also set out agenda that should act as guides. These agenda as listed includes: Green buildings and equipment which will allow the emissions, or carbon footprint, of the building and equipment to be actively decreased; Green office principles that facilitate operational routines and processes to be environmentally sustainable, Sustainable economy that will restrain Consumption, and promote circular and sharing economy practices that are made accessible to the community, Sustainable library services which will see to the acquisition of relevant and up-to-date information that is easily accessed by users, shared spaces, devices, and environmental education is offered, and operations are efficient. Social sustainability that paves way for good education, literacy community engagement, cross cultural diversity, social inclusion, and overall participation are considered. (In this context, the library works actively to reduce inequality) as well as setting SMART environmental management goals (By SMART environmental goals it means, the goals must be Specific, Measurable, Achievable, Realistic and Time-bound), and the library works to decrease its own negative impact on environment. The library's environmental policy, its implementation and the results of environmental work are communicated to a broader audience and Commitment to general environmental goals and Programmes which is guided by the UN Sustainable Development Goals, the Paris Climate Agreement and related environmental certificates and programmes.

Komiyama and Takeuchi (2006), noted that in recent time, sustainability is growing into a science in its own right in that Sustainability science provides a critical framework for sustainability. It focuses on the interactions between human, environmental and man-made systems, with the aim of understanding the complex challenges to the future of humanity and the integrity of the planet's

life-support systems. As expressed by Okpidi-Urhibo (2023), the industrial (technological) revolution which accompanied climatic vicissitudes have prompted the need for building constructions and social interactions to be eco-friendly and sustainable. Libraries as information centers and service providers should not be left out. Compliance to environmental practices must start from the knowledge hubs (-the libraries) cascading down generations and strata of learning from faculty to student users. Invariably, librarians are the custodians of this knowledge as well as its transmission process. Libraries must be part of the campaign that supports climate mitigation by way of attuning their structural units and activities that can promote and uphold environmental sustainability. This should be their contribution to having a better and healthier environment. The assertion is that it is the duty of libraries to not only promote environmental sustainability but to implement it starting with the library structure and management process (Pagore & Chalukya, 2022).

Greening our society demands social innovation as much as technical and libraries are crucial centres for inspiring communities with ideas for change. They support the understanding that history is not pre-written but made by the actions of people. We are all agents in the future we choose to build (Bennett, 2024). As revealed by Laybats (2024), it has been found that with increasing awareness of climate change more and more businesses are choosing more sustainable practices. It is more than just fulfilling social responsibility obligations; sustainable and eco-friendly practices are offering cost savings and efficiencies to businesses as well as building them a good reputation in their market places

There have also been some other relevant articles in recent years on green and sustainable libraries though not all inclusive. Smith (1991) in the earliest period of green library movement, in his write-up, was emphatic on libraries and nature's space constraints as well as the role libraries must play in conserving both. While Bill (2003) noted the growing trend of green libraries and inferred that they are in the forefront of the green design. Lamis (2003) on his part provided an outline of sustainable model building design and planning. There was also discussion on various web pages and websites linked to green library construction by Antonelli (2008). In the same vein, Neale (2008) in came up with ways libraries can be more environmentally friendly whereas, Tseng (2008) work dealt on green library designs and evolution. Above all, to buttress the importance attached to greening in the US, leadership in Energy and Environmental Design (LEED) was established by the United States Green Building Council (USGBC, 2008). Furtherance Aulisio (2013) provided guidelines and insight on how to go about building green library and Hanke and Werner (2013) traced the history of green library from the early 1990s detailing all the specifics. Purohit (2013) treated the green library as a new type of library while Hacettepe and Boustany (2014) explained the transition from green libraries to green information literacy.

Other related works include Leena et al (2015) who threw more light on the need for green libraries in academic institutions. Meher and Parabhoi (2017) gave an insight of the view of a green library

with special focus on Indian libraries whereas, Nikam (2017) in an article talked also about the view of a green library and Sawant and Sawant (2018), work was on the concept, attributes and importance of a green library. ALA (2019) in her contribution, concentrated on green library as a concept with emphasis on the link between sustainability and libraries.

Okpidi-Urhibo (2023) carried a study on the levels of adoption of the green library concept in Nigeria as well as librarians perception and discovered that librarians have the right perception about the concept, and have implemented or currently translating their policies, practices, and services in compliance with environmental sustainability objectives but noted that much needs to be done as the libraries also have not sufficiently engaged in climate change sensitization activities with patrons or their immediate community. Morris (2024) her article, introduces the Green Libraries Partnership, which was rebranded as the Green Libraries Campaign in 2023. The work talks through its history and achievements over the past few years and what its aims and objectives are for the future. It highlights the importance of the role of libraries in promoting climate awareness and action, the connection with global initiatives and the focus financial sustainability whilst being dedicated to the creation of an inclusive network of libraries dedicated to environmental stewardship.

The emphasis is that green or sustainable library is one that is environmentally friendly and built based on special specifications putting into consideration the health and the wellbeing and health of the library users. In this context, the protection and sustainability of the natural ecosystem in such a way that the future of the unborn generation is not hampered or endangered. Librarians as custodians and driving access to knowledge and libraries being home of knowledge should not be involved solely in awareness creation of the danger of climate change and the need for green revolutions, they should also do the talk by being in the forefront of green revolution by ensuring green library structures and services. In the case of old libraries, just as stated by Parmar and Kamdar (2021), greening an existing library is definitely perfect way of joining the green library movement if it's not a new building.

METHODOLOGY

The study applied descriptive survey research design. The sampled population for this study was 120 librarians selected through random sampling technique from 12 University libraries in Nigeria covering the six geo-political zones of Nigeria with each zone producing 20 respondents. The breakdown shows that Ahmadu Bello University , Zaria -10, Bayero University, Kano -10, Modibbo Adama University of Technology, Yola -10, University of Maiduguri -10, Federal University, Lafia -10, University of Agriculture, Makurdi -10, Federal University of Technology, Owerri -10, Alex Ekwueme Federal University, Ikwo -10, University of Port-Harcourt -10, University of Uyo -10, Federal University of Technology, Akure -10 and Federal University, Oye-Ekiti -10. The primary instrument used for data collection in this study is a self prepared Likert

modified type of four point scale rating structured questionnaire with section-1 lifted from the IFLA set agenda for green library and section-2 guided by IFLA checklists for green structures and information services for libraries while observation was also used to ascertain the level of compliance of the green library initiative. On this scale, the average mean cut off is 2.50, in which case, an item is accepted if it is 2.50 and above and rejected if it is below 2.50 hence the decision rule. The questionnaires were administered through email and returned 100%. Data collected were statistically analyzed using frequencies, percentile and mean (X) and presented in tables and charts.

Presentation and Analysis of Data

Table 1: Librarians level of awareness of green library agenda

Items	HA		A		NA		HNA		Mean (X)
	F	%	F	%	F	%	F	**%**	
Green buildings and equipment	60	50	20	16.67	29	24.17	11	9.66	3.08
Green office principles	10	8.33	30	25	45	37.5	35	29.17	2.13
Sustainable economy	40	33.33	10	8.33	65	54.17	5	4.17	2.71
Sustainable library services	45	37.5	28	23.33	23	19.17	24	20	2.78
Social sustainability	30	25	5	4.17	51	42.5	34	28.33	2.26
Environmental management	10	8.33	8	6.67	54	45	46	38.33	1.82
Commitment to general environmental goals and programmes	12	10	16	13.33	38	31.67	54	45	1.88

As shown in table 1 above, librarians' level of awareness of the green library agenda as set by IFLA varies. From the data collected and analyzed, 66.67% or 70 out of the 120 respondents indicate that they are highly aware or aware of green buildings and equipment as one of the agenda set by IFLA for green library with Mean (X)=3.08, 68 of the respondents representing 60.83% indicate that they are highly aware or aware of the sustainable library services with Mean (X)=2.78 and 50 respondents or 41.66% with Mean (X)=2.71 are highly aware or aware of sustainable economy as an agendum of green library. On the other hand, over 60% of the respondents are either not aware or highly not aware of commitment to general environmental goals and programme, environmental management, green office principles and social sustainability as agenda of green library as all fall below the Mean (X) benchmark of 2.50.

Table 2: Building and infrastructure compliance to the green initiative

Items	SA		A		DA		SDA		Mean (X)
	F	%	F	%	F	%	F	%	
The library uses wooden shelves and furniture	15	12.5	35	29.17	30	25	50	41.67	2.29
The library has adequate Production and circulation of fresh air inside the library	25	20.83	15	12.5	47	39.17	33	27.5	2.27
The library uses energy saver bulbs and lighting points	120	100	***	***	***	***	***	***	4.00
solar panels are used as source of power supply within the library building	15	12.5	25	20.83	34	28.33	46	38.33	2.08
The library has community gardens	***	***	***	***	***	***	120	100	1.00
The library Uses insulating windows and structural protections from heat waves of the sun	***	***	***	***	21	17.5	99	82.5	1.17
There are water conservation facilities within the library	20	16.67	***	***	40	33.33	60	50	1.83
The library structure has Some environment friendly elements around.	15	12.5	5	4.16	20	16.67	80	66.67	1.62
The entire library structure is made with natural biodegradable resources	***	***	***	***	***	***	120	100	1.00
The library has Replaced all steel materials with bamboos and fibre in the cause of building maintenance and redesigning	***	***	***	***	***	***	120	100	1.00
The library has provision for the Use of day/sun-light for illumination	20	16.67	***	***	30	25	70	58.33	1.75

The data as displayed in table 2 did reveal areas the university libraries buildings and infrastructure are green initiative compliance. As shown the 120 respondents or 100% strongly agree that the libraries make use of energy saver bulbs and lighting points with Mean (X) =4.00, while other items in the table fall below the Mean (X) benchmark of 2.50 which indicates that most of the respondents strongly agree or agree that almost all the library buildings and infrastructure are not green initiative compliance as they indicated in the negative with Mean (X) ranging from 1.00 to 2.29

Table 3: Green information services provided by the university libraries

Items	SA		A		DA		SDA		Mean (X)
	F	%	F	%	F	%	F	%	
The library provides non-print information services and resources	85	70.83	35	29.17	***	***	***	***	3.71
The library print information services and sources have been digitalized	10	8.33	10	8.33	46	38.33	54	45	1.80
The library encourages the use of search engines and the Internet	70	58.33	50	41.67	***	***	***	***	3.58
Adoption of e-library concepts	70	58.33	50	41.67	***	***	***	***	3.58
Promoting and providing e-books to library users	20	16.67	***	***	45	37.5	55	45.83	2.38
The library Automated important library services	35	29.17	45	37.5	10	8.33	30	25	2.71
The library is environmentally-friendly as its services are technologically driven	10	8.33	30	25	35	29.17	45	37.5	2.04
The library has Developed green collections on climate change and environmental sustainability	12	10	8	6.67	40	33.33	60	50	1.77
The library website is created for users to easily peruse	84	70	36	30	***	***	***	***	3.70
The library uses customized library app	***	***	***	***	19	15.83	101	84.17	1.16

Table 3 harbours data on Green information services provided by the university libraries. As indicated by the data, the 120 respondents or 100% strongly agree or agree that their library provide non-print information services and resources and websites are created in such a way that they allow for easy utilization by users with statistical Mean (X) of 3.71 and 3.70 respectively, the same 100% also strongly agree or agree that their library adopted e-library concept as well as that they provide information services that promote the use of search engines and the Internet with Mean (X) of 3.58 respectively. Available data also showed that most of the libraries studied do not provide other green inclined services as 100% of the respondents either strongly disagree or disagree that they use customized library app and with over 80% or 100 respondents affirming that their library has not developed green collections on climate change and environmental sustainability and their library is not environmentally-friendly as its services are not entirely technologically driven among others. As seen from the table, of the 10 items, 5 fall below the benchmark of 2.50 as their mean ranges from 1.16 to 2.38.

DISCUSSION OF FINDINGS

The outcome of this study did show as can be seen in table 1 that apart from green buildings and equipment, sustainable library services and sustainable economy the librarians expressed high level of awareness of, other agenda that form part of the green library initiative such as environmental management, commitment to general environmental goals and programmes, green office principles and social sustainability are not well known to good number of the librarians. This result definitely is contrary to the assertion that librarians as custodians of knowledge and Libraries, as educational hubs, promote green literacy and sustainable knowledge, making them essential in advocating for eco-friendly practices (Zobundžija & Dolaček-Alduk, 2021) and by all standards and assessment, it is believed that the role of libraries in general is in tandem with the UN 2030 Agenda for Sustainable Development, positioning them as agents of transformation in tackling global sustainability challenges (Zobundžija & Dolaček-Alduk, 2021). The argument is that if the librarians who are suppose to be embodiment of green knowledge are not aware of the reality on ground, how can the library succeed in her mandate in contributing to sustainable development.

The study also discovered that almost all the libraries studied were missing in the green library initiative as it concerns buildings and infrastructure. Apart from making use energy saver bulbs and lighting points, the university libraries buildings were found not to be green initiative compliance as none of the university library can boast of an entire library structure made with natural biodegradable resources, Replacement of all steel materials with bamboos and fibre in the cause of building maintenance and redesigning and community gardens not to talk of using insulating windows and structural protections from heat waves of the sun, provision for the use of day/sun-light for illumination and water conservation facilities within the library while only few could boast of using solar panels as source of power supply within the library buildings (see table 2). This was further substantiated through the observations of the researcher who noticed that most university libraries never considered green initiative in the construction of their buildings neither are there moves to reconstruct them in line with green initiative as you hardly see trees and natural terrains rather you notice balkanized environment with interlocks, no natural ventilation and lighting among others.

This outcome, is not in tandem with the views of Okpidi-Urhibo (2023), that the industrial (technological) revolution which accompanied climatic vicissitudes have prompted the need for building constructions and social interactions to be eco-friendly and sustainable. The implication being that libraries as information centers and service providers should not be left out. To this end, compliance to environmental practices must start from the knowledge hubs (-the libraries) cascading down generations and strata of learning from faculty to student users. Invariably, librarians are the custodians of this knowledge as well as its transmission process. Libraries must

be part of the campaign that supports climate mitigation by way of attuning their structural units and activities that can promote and uphold environmental sustainability. This should be their contribution to having a better and healthier environment. The assertion is that it is the duty of libraries to not only promote environmental sustainability but to implement it starting with the library structure and management process (Pagore & Chalukya, 2022). It is also contrary to Vijayalaxmi (2010) assertion that green library must have particular characteristics such as use of natural and recyclable and locally available materials, reflecting roof and ground, insulating windows, water, energy, and paper maintenance, energy-efficient lightning to reduce energy consumption, system for optimizing cooling, appropriate plantation both inside and outside the library, circulation of fresh and healthy air and use of environmentally friendly technology.

The study further found through the available data and observations that the university libraries provide some green information services such as providing non-print information services and sources, encouraging the use of search engines and the Internet, having websites that can be easily perused by users and adoption of e-library concepts among others. This development supports the idea that provision of green information services and resources are essential to the health of library users and the global ecosystem and making a library 'green' is another way of marketing or publicizing the library to potential patrons (Sangita, 2014). On the other hand, there are other green information services such as use of customized library app services, being fully technologically driven, development of green collections on climate change and environmental sustainability as well as digitalization of print information services and sources among others that need to be implemented. The absence of these, ultimately is a disservice to the library if one considers Laybats (2024) revelation that the provision of green information services in the context of the library, is more than just fulfilling social responsibility obligations as sustainable and eco-friendly practices are offering cost savings and efficiencies to businesses as well as building them a good reputation in their market places.

CONCLUSION AND RECOMMENDATIONS

Going by the findings of this study, federal university libraries in Nigeria are far from the reality on ground as it concerns greening, environmental management and principles and worse still librarians' level of awareness of the green library agenda as set by IFLA is quite below expectations. Coming to the extent of green information services and resources provided by federal university libraries in Nigeria to their users one is left grasping as much is also left to be desired as out of the ten (10) items listed in the table, only three (3) crossed the statistical Mean (X) benchmark of 2.50 (see table 3). The implication is that both the federal government of Nigeria and various federal university managements are only paying lip services and support to the green library initiative without any serious financial support and political will not minding being signatory to most climate protection treaties and the librarians themselves are not living up to the bidding as many of them, are so skeptical about global transformation and have refused to acquire

the desired skills to remain relevant in an ecosystem that is berated by climate change masterminded by human activities and man and his environment are now the worse for it as they are at the receiving end since their health is now endangered.

In this contemporary global ecosystem, librarians as custodians of knowledge and libraries especially university libraries who not only serve as knowledge gateway but also research hub are looked upon for not only promoting the idea of green initiative and sustainability but are also to set the pace by implementation knowing full well that the whole world look up to them to begin the change. It is in view of these therefore that the study put forward the following recommendations believing that if they are tenaciously applied will make federal university libraries in Nigeria green library compliance which will also help promote the health of the library users and the same time, market the services of the libraries.

1. In the first instance, federal university libraries should be reconstructed in line with the characteristics set outside by IFLA (2013) for the construction of green library in its entirety which streamlined all that is needed in making a library a green one.

2. Federal university libraries should create community gardens by planting well structured trees and flowers around the library building as to creating conducive environment for reading while in the case of a new library structure, careful selection of building sites should be made and the Nigerian factor of uprooting all trees in site discouraged as only trees directly on the spot of the anticipated structure should be uprooted while others should be left to enhance the green environment.

3. Librarians should be trained and re-trained on green information and communication technology (Green IT) as well as on green office principles and environmental management. This skill can be acquired through conferences, workshops, seminars or even through online courses as to remain relevant in the scheme of events and be well equipped for disseminating information about environmental sustainability.

4. Federal university libraries should be roofed or re-roofed with green transparent roofing sheet to allow natural illumination and at the same time, use insulating windows and structural protections from heat waves of the sun as this will help to provide a green reading environment with natural ventilation and light.

5. Furthermore, federal government and university management should see it as a necessity as to ensuring that all newly constructed library structures are entirely made with natural biodegradable resources as well as enforcing that existing ones are reconstructed same.

6. On the area of green information sources, there is need for the federal university libraries to developed holistic green collections on climate change and environmental sustainability and where necessary exchange ideas and resources under information sharing.

7. It is obvious that one of the most impressing challenges facing Nigeria is power supply, in the context of green library; there is no need for hydro power supply, as the initiative calls for installation and use of solar energy as a better source of power.

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