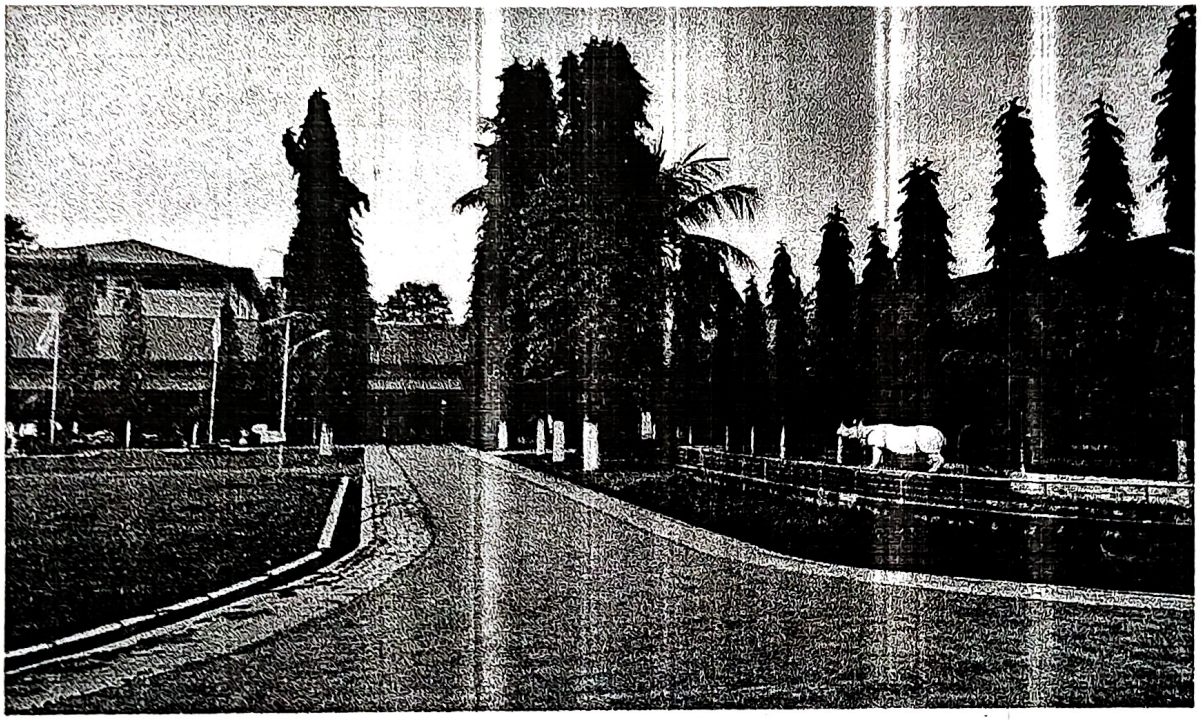
GREEN AND ENVIRONMENT AUDIT REPORT

KALIABOR COLLEGE



PERIOD-2021-22

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This is to that the Green and Environment Audit of Kaliabor College for the year 2021-22 was conducted under the supervision and support of Environment and Climate cell, Kaliabor College.

Coordinator

1. Introduction

1.1 Introduction to environmental audit

Environmental audit or **Green audit** is a general term that reflects various kinds of evaluations intended to identify environmental compliance and management system, implementation gaps, along with related corrective actions. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the ecofriendly ambience. Green audit is a useful tool to determine how and where the most energy or water resources are being used; and can then considerations be given on how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan.

It can create health consciousness and promote environmental awareness, values and ethics.
It imparts a better understanding of Green Impact on campus to staff and students.

1.2 Need for environmental audit

If self enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self enquiry is a natural and necessary outgrowth of a quality educational institution. Thus, it is imperative that evaluates its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background, it becomes imperative to adopt the system of the "**Green Campus**" for the Institutes which will lead to sustainable development and at the same time reduces a sizable amount of atmospheric carbon dioxide from the environment.The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

1.3 General and Specific Objectives of Green Auditing

Concerns about environmental degradation and realization of values of environment are logical consequences of scholarly research, teaching and learning process. In its pursuit for improving environmental quality and to maintain a pristine environment for the future generations , the students of Kallabor college have made a self-inquiry on environmental quality of the campus with the following objectives to achieve:

The general objectives are:

To prepare a baseline report on biodiversity and other resources, measures to mitigate resource wastage and improve resource quality and sustainable practices.

The specific objectives are:

- To prepare a checklist of floral diversity in and around the college campus.
- To suggest measures to improve biodiversity within the college campus.

- To monitor the energy consumption pattern of the college.
- To assess the quantity of water usage within the college campus.
- To suggest sustainable energy usage and water conservation practices.
- To find out various sources of organic and solid waste generation and mitigation possibilities.
- To inculcate values of sustainable development practices through green audit mechanism.
- Awareness generation among students concerning real issues of environment and its sustainability
- Promotion of environmental awareness through participatory auditing process; and
- To create a report that document baseline data of good practices and provide strategies and action plans towards improving environmental quality for future.

2. Environment policy of the college

2.1 Site inspection

Site inspection was done by Faculty and students. The process of green audit was an enriching environmental awareness programme for the students who participated in the green auditing. The experience of green auditing was a first time experience for most of the students. They shared their expectations about a green campus and gave suggestions for the audit recommendations.

2.2 Review of documents and records

Documents such as electricity bills and water charge remittance bills, laboratory equipment registers, purchase register, and stock registers were examined and data was collected. College calendars, previous phase NAAC self-assessment reports were also verified as part of data collection.

2.3 Review of policies

Discussions were made with the college governing council members and with the Principal regarding policies on environmental management. The college is very keen in bringing green practices in order to make an environment friendly centre for learning and research. The management is eager to understand the measures practiced in disposal of hazardous waste and better waste disposal or recycling methods possible. The management is keen in installation of renewable energy sources and hence brings down the excessive cost and wastage of financial resources.

3 Methodology

Environmental audit is based on the Survey by Questionnaire. The survey was done in the whole campus by dividing it into various sections. On the basis of data requirement, set of questionnaires about electricity consumption, water consumption, waste generation, solid waste collection and transport were prepared.

3.1 Survey by questionnaire

Questionnaire survey was conducted in the College Campus. The different questionnaire formats were restructured also with different combinations and modifications. The final sets of questionnaires were prepared based on solid waste, energy, fuel, water, hazardous wastes and e wastes. The framed questionnaires were distributed among students, and staff of the College to fetch the information pertaining to the Environmental audit.

The questionnaires contained the general information of the concerned section, including name of the section, total number of students and employees, number of buildings along with the area under build up. The maintaining of records for handling of solid and hazardous wastes holds much importance in green audit. It is quite possible that the loss of water and energy resources can occur due to improper maintenances and therefore their assessment holds importance as far as green audit is concerned.

3.2 Data evaluation

The information gathered during the surveys was compiled for the further analysis.

3.3 Analysis and reporting

The completed questionnaires were tabulated as per their modules in excel spreadsheets. This tabulated data was used for further analysis. Average and percentage values were determined to avoid complications. With the help of student volunteers, the major part of the data was compiled, which the committee analysed. The data regarding the plantation , Data on energy and water and data on solid waste generation were carried out by the Department of Botany.

4 Data Analysis

4.1 Land use Audit

Kaliabor college is using land for diverse purposes so that facilities are provided to all concerned for the smooth functioning and working. The College covers an area of 37 bighas (12.23 acres) After digital image processing of the area, the information about the area occupied by the various land uses from the map is gathered.

4.2 Energy audit

Energy audit is the key to systematic approach for decision making in the sphere of energy management. It attempts to balance the total energy inputs with its use, and serves to identify all the energy streams in a facility. It quantifies the energy usage according to its functions. The energy is utilized in the Campus for lighting, running of laboratory instruments, appliances, water heating, ground water pumping, cooking and transportation.

Table 1: The data regarding the energy consumption in the College campus is as following:

Building	Peak time load daytime	Peak time load daytime	Supply from renewable source	Supply from Non-renewable source (grid)	Intelligent Daylight use power saved

Old Academic Building	5KW	0.5KW	5KW		
Auditorium	6Kw	6Kw	6Kw		
Girls Hostel	1Kw	3Kw	1Kw		
Deptt. Of Chemistry	2.5Kw	0.5Kw	2.5Kw		
Deptt. Of Biology	5.5KW	0.2KW	5.5KW	Standby	
Deppt of Physics	5 Kw	0.1 Kw	5 Kw		
RUSA Building	1.5 Kw	0.5 Kw	1.5 Kw		
Library	3Kw	0.1Kw	3.Kw		
Indoor stadium	4Kw	4Kw	2Kw		1KW
Administrative Building	4 Kw	1.2 Kw	4 Kw		1Kw
Canteen	2K W	0.5K W	2K W		1KW
Boys Hostel	1K W	3K W	0.5K W	2Kw	
Campus	0	0.5KW	0.4KW	0.1Kw	
Total	**40.5Kw**	**18.1KW**	**25KW**	**2.1KW**	**3KW**

Most of the energy requirement of the College is met by hydropower generated electricity supplied by the State Government. Some amount of energy requirement is met out of the power generated by the Solar Power Plant in the College.

College staff members use personal vehicles and their approximate number goes to 65. Most of the students use public transport, indicating lesser carbon foot print of the student community.

4.3 Water audit

Water audit is conducted periodically to determine water supplied in the distribution system as well as water lost and/or used within a distribution system. It aims to establish the water consumption pattern in individual sections, so as to realise the consumption levels with respect to exploring various pollution prevention and waste water minimization opportunities. Water audit also helps to establish the existing water distribution system as well as waste water collection and recycling, if any. The water is supplied in the college by the ground water supply.

The storage capacity of water in the College is shown in Table 2.

Table 2 :Total water storage capacity in the college

S. No.	Storage Resources	Number	Storage Capacity (in litres)
1	Water Tanks	3	15000L
2	Underground water tanks	2	

There is a system donated by NRL under its CSR initiative which provides pure and safe drinking water for students.

Construction of water tanks has led to the collection of rain water and thus conserving the rainwater for watering plants.

4.4 Solid waste audit

The solid waste management is in order with the installation of incinerator, dust bins and their daily cleaning. The College has its own collection facility that collects the solid wastes daily from Residential complex, Hostels and Departments. This helps in maintaining the cleanliness by providing an efficient, safe and regulated management of solid wastes in the Campus.

The data showed that the total generation of solid waste in the Campus is 8 kg per day. Out of which non biodegradable is 3 kg per day while the biodegradable is 5 kg per day. It is noteworthy that College has adopted an environmentally sound practice of converting biodegradable waste into compost which is a useful resource. The compost produced is used in the nurseries and the gardens of the college.

The study showed that biodegradable waste constitutes a significant component of solid waste in the College. The non biodegradable component of solid waste is recyclable especially plastics. Work is going on under " Atmaram Research and Incubation Centre" for converting waste plastic into usable products.

4.5 Plantation audit

College maintains its own small gardens and extensive plantation drives the campus turned into a lush green spot with fair magnitude of biodiversity and have attracted a lot of faunal diversity including birds, reptiles and small mammals.

More than 50% area of the campus is green having different species broad leaved trees, shrubs, and perennial herbs.

College has established Orchid House and Herbal Garden with the financial support from different funding agencies of Govt. of India. The topography and altitudinal gradient of campus helps it support diverse vegetation of the tropical and temperate types. Orchid Garden is the conservatory of 32 species. Campus have many Angiosperms belonging to families Poaceae, Asteraceae, Fabaceae, Solanaceae, Lamiaceae, Malvaceae, Menispermaceae, Zingiberaceae, Liliaceae, etc. 3 species of Gymnosperms including *Juniparus prostata*, *Thuja orientalis*, *Cycas revoluta* are also grown. However, Shrubs includes *Citrus sp, Duranta sp, Cassia tora, Lawsonia inermis, Datura stramonium, Rouvolfia tetraphylla*, *Ricinus communis* etc. Climbers namely *Tinospora cordifolia, Asparagus racemosus*, *Piper longum, Piper nigrum* are also grown in the Garden of the Campus.

Table3 : Number of species of different types of vegetation

S. No	Growth form	Number of Species
1.	Trees	20
2.	Shrubs	13
3.	Climbers	4
4.	Herbs	26

5. Recommendations

The committee has made short term and long term suggestions to take environment protection to higher levels and it is hoped that this will receive due attention of College authorities.

1.Environmental auditing may be conducted by the College in every years.

2. Rainwater harvesting facilities may be established at both administrative and academic campuses, foreseeing future needs of water.

3. Specific waste management plans should be adopted to manage solid waste in the campus, with the assistance of State Swachhta Mission and use of plastic carry bags, thermocol cup, plate and flex boards should be banned inside the College campus.

4. Propose a system for collection and disposal of waste sorted out as organic and others on a daily basis, managed by the campus administration. The wastes generated can be used for promoting organic farming activities within the campus. There should be a system for the management of hazardous wastes.

5. Frame a holistic campus development plan to foresee the future developmental needs in tune with green charter adopted by the College.

6. All the blocks in the Campus should develop a garden in front of the building.

7. Green habitat concept should be adopted for all the building construction activities of the College campus in future, which may help a long way in reducing energy usage, increasing aesthetic appeal of the buildings and class rooms, besides reducing carbon foot print. Further, more green spaces should be established all around the campus around larger trees and shades for the benefit of the students.

8. Fire safety instruments should be installed in all the buildings.

9. Setting up of 10 more street lights in different places of the campus.

10. Install one more Solar power unit of 20 KW to meet the demand.