GREEN AUDIT & ENERGY AUDIT

SIPAJHAR COLLEGE
2021-2022

Centre for the Environment
Indian Institute of Technology Guwahati
Guwahati-781039, Assam, India

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Under the consultation of
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EXECUTIVE SUMMARY

Educational institutions now a day are becoming more sensitive to environmental factors. A clean and healthy environment aids effective learning provide a conducive learning environment. There are many concepts, which are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc. The activities pursued by colleges can also create a variety of adverse environmental impacts. Environmental auditing is a process whereby an organisation's environmental performance is tested against its environmental policies and objectives. Green audit is defined as an official examination of the effects a college has on the environment. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario at the campus. Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider 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. Green auditing and the implementation of mitigation measures is a win-win situation for all the college, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Green auditing promotes financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. 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 the college evaluate 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.

In Sipajhar College, the audit process involved initial interviews with management to clarify policies, activities, records and the cooperation of staff and students in the implementation of mitigation measures. This was followed by staff and student interviews, collection of

data through the questionnaire, review of records, observation of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the green auditing process in the college. The baseline data prepared for the Sipajhar College will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development of the college. Existing data will allow the college to compare its programmes and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects. We expect that the management will be committed to implement the green audit recommendations.

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CHAPTER 1

INTRODUCTION

One of the leading institutions of higher education in Darrang district, Sipajhar College has come a long way since its inception in 1971. The need for an institution of higher education in Sipajhar was keenly felt by the intellectuals of the area as many talented youngsters of the area had to abandon their dreams of higher education due to financial constraints. Lack of availability of sufficient government land for setting up a college was a stumbling block which was overcome by the large-hearted and generous people of the area who came forward to donate their agricultural land for setting up the college. Situated at an easily accessible location along the National Highway 52, the College has been able to provide a sustainable momentum to the efforts to provide quality education to the student community of the area. From its humble beginnings in the Diamond Club premises and teachers with virtually no salary, Sipajhar College has come a long way. Starting out with just Pre-university classes in 1971, and Degree Classes in 1980, Sipajhar College, which celebrated its Silver Jubilee in 1997, has contributed significantly to the academic and cultural life of the region. With its alumni adorning responsible and respectable positions in society the college has been able to fulfil most of what it set out to do. Sipajhar College has also been rendering yeoman service in the sphere of women education, a field in which the area was lagging behind before its establishment. Permanently affiliated to the Gauhati University the college was brought under the Deficit Grant in Aid system of the Government of Assam in 1986 and is registered under 2(f) and 12B of the UGC since 1996.The college was "provincialised" by the Government of Assam in December 2005 by the Assam College Provincialisation Act.

1.1 VISION AND MISSION

Vision

The college which was established with the vision of making quality education accessible to the economically disadvantaged student community of the greater Sipajhar area aspires to nurture and promote the potential of its students to the fullest possible extent.

Mission

To enrich the society through academic advancement and instilling proper attitudes and values needed for the holistic development of each and every student.

1.2 TOTAL CAMPUS AREA & COLLEGE BUILDING SPREAD AREA

Campus area 32461.85 m^2

Built up area 4632.26 m^2

List of Places from Where Students Commute

Bachachuba
Badiasisa
Bajana Pathar
Balipara
Baman Pathar
Barathiabari
Barbari
Bhati Kuruah
Bhotardal
Bhuktabari
Bijulibari
Byas Para
Chamuapara
Cholardal
Chotoathiabari
Dakhin Chuburi
Dakhin Kuruah
Dakhin Kuruah No.1
Dakhin Kuruah No.2
Debananda Satra
Kachari Para
Kalitapara
Kamarchuba
Kanidal
Dhalpur No.1 (Dijolpur No.1)
Dhalpur No.2 (Dijolpur No.2)
Dhalpur No.3 (Dijolpur No.3)
Dheki Para
Dhoka Para
Dostany
Duari Para
Dumunichoki
Ganakbari
Gandhia Pathar
Gharoa Sonapur
Ghopa
Gopalpur
Haldha
Hatimuria (46 Hatimuria)
Hazarikapara
Hetemtola
Jhakuwapara
K. Kuruwa (Kuruwagaon)
Kabai Chuba
Khalihai Gaon
Khalihai Pathar
Khanapara Pt.1
Khanapara Pt.2

Khas Sonapur
Khatar Pathar
Khatikuchi
Kira Kara N.C.
Kowarijan
Kurua Chapari
Kuwari Gaon
Mahariadal
Maijali
Majar Chuba (Majar Chuba No.2)
Majar Chuba No.1
Malibaritari
Maroi
Maruwa Chuburi
Meta Para
N.C. Kurua Chapari
Naljhahi
Narikali
Nayak Para
Niz Salmara
Nizsipajhar
Pachim Chuba
Pachim Kuruah
Pakabangipara
Patgirichuba
Phuhuratali
Pithakhowa
Punia
Rajapukhuri
Ruparikash
Salmara
Sanowa
Sanowatari
Satgharia
Satkhali
Satmadar
Singmari
Solpam
Suktaguri No.1
Suktaguri No.2
Suktaguri Pathar
Sutiakata
Tekeliakur Grant
Upper Kuruwa
Veheni Chapari

1.3 PREVIOUS NAAC GRADING

NAAC accreditation First cycle: **C++** Grade, **67.35** % in **2005**

NAAC re-accreditation Second cycle: **B+** Grade, **2.52** (CGPA) in **2015**

1.4 CAMPUS INFRASTRUCTURE

Auditorium/ Community Hall

The college has an auditorium with a seating capacity of 500 converging point of academic and cultural activities.

Girls' Common Room

The college has one Girls' Common Room which can accommodate 50 girls, aimed at conducting small scale events like music, dance and drama club activities and meetings of various student support organizations.

Seminar Hall/Conference Room

The college has one seminar/ conference hall, equipped with audio-visual facilities for the smooth conduct of seminars, conferences and other activities.

IQAC Room

The IQAC room has the offices of the Coordinators of IQAC.

Library

The college library is fully computerized and digitalized with Machine Readable Catalogue facility and has a collection of over 18,000 books, 8 lakhs e-books and a subscription of about 22 hard copy of periodicals and 6000 e-journals. Internet browsing is also available.

Computer Labs

The college has two well-equipped computer labs.

Language Lab

A new Language Lab has been set up under the aegis of the Department of English with UGC assistance under Teaching-Aids Scheme of the XI Plan. The Language Lab has the latest facilities for imparting training in developing language skills. The Lab is equipped with 15 computers which are LAN networked and also provided with Internet connectivity. Six-month certificate courses in Functional English will be offered from the new academic session.

Canteen

The college canteen caters to the nutritional needs of the staff and students at subsidized rates. The canteen functions from 8.30 am to 4.30 pm.

Women's Hostel

A full-fledged Women's Hostel having all modern amenities which has been functioning for the last decade offers accommodation for girls. There are 52 number of seats, allotted on the basis merit. However, women coming from places with inadequate transport and communication facilities are given priority. A separate form for admission to the hostel, obtainable from the Warden on the day of college admission, is to be filled.

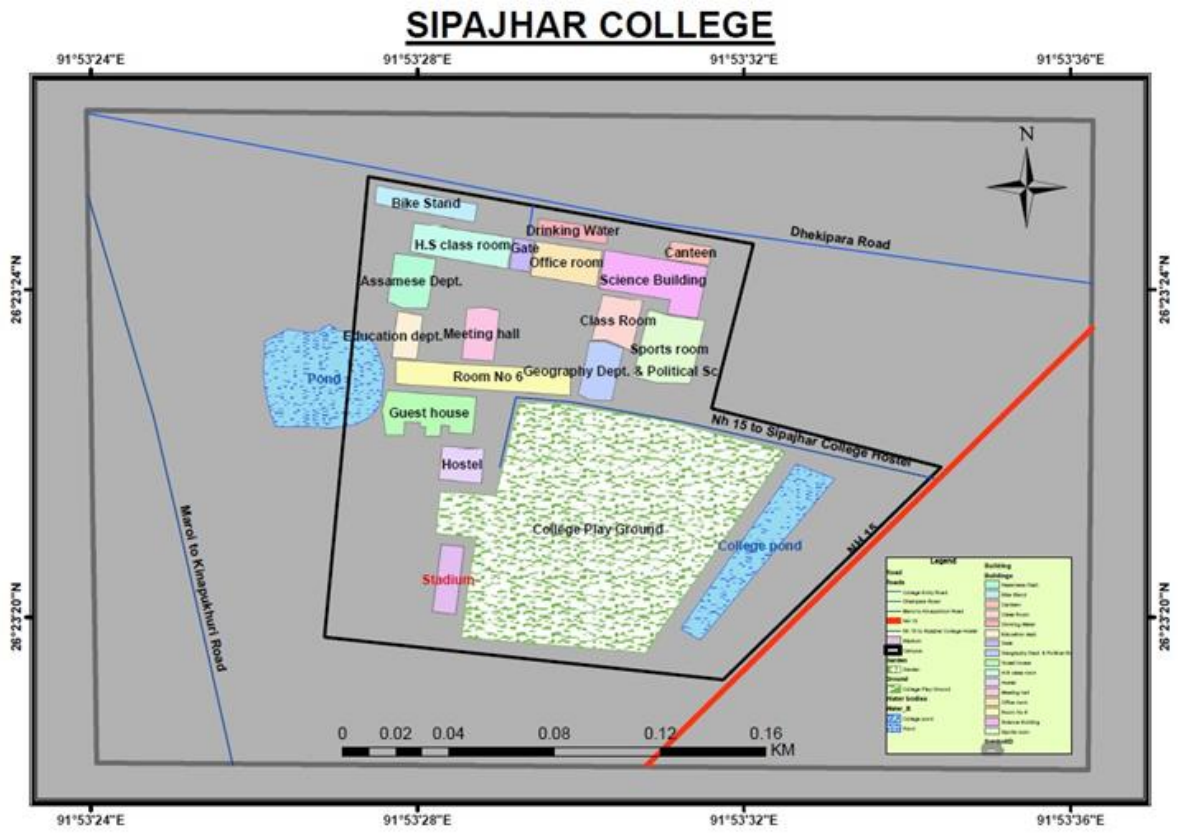
Sports and Games facilities

The College has a 400 meters Track & Field, Volley Ball Court, Shuttle Badminton Court, Football Field, Fitness Centre, Cricket Pitch etc. Built with UGC assistance under the XI Plan the college has an Indoor Sports Training Centre with state of the art equipment. It provides facilities for indoor sports and games. This centre was inaugurated by the Hon'ble Education Minister of Assam, Dr. Himanta Biswa Sarma.

Green House

The Green House has a collection of medicinal herbs and shrubs of Assam. The Botany department has collected these indigenous and rare herbs and medicinal plants used for ethno botanical purposes.

BUILDING LAYOUT



CHAPTER 2

PRE-AUDIT STAGE

A pre-audit meeting provided an opportunity to reinforce the scope and objectives of the audit and discussions were held on the practicalities associated with the audit. This meeting is an important prerequisite for the green audit because it is the first opportunity to meet the auditee and deal with any concerns. It was held at Sipajhar College on 29thApril, 2021. The meeting was an opportunity to gather information that the audit team can study before arriving on the site. The audit protocol and audit plan was handed over at this meeting and discussed in advance of the audit itself. In Sipajhar College pre-audit meeting was conducted successfully and necessary documents were collected directly from the college before the initiation of the audit processes. Actual planning of audit processes was discussed in the pre-audit meeting. Audit team was also selected in this meeting with the help of staff and the college management. The audit protocol and audit plan were handed over at this meeting and discussed in advance of the audit itself. The audit team worked together, under the leadership of the lead auditor, to ensure completion within the brief and scope of the audit.

2.1 COMMITMENT OF THE COLLEGE MANAGEMENT

The Management of the college has shown the commitment towards the green auditing during the pre-audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly such as awareness programs on the environment, campus farming, planting more trees on the campus etc., after the green auditing. The management of the college was willing to formulate policies based on green auditing report.

2.2 SCOPE AND GOALS OF GREEN AUDITING

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economical, financial, social, environmental factor. It is necessary to conduct green audit in college campus because students become aware of the

green audit, its advantages to save the planet and they become good citizen of our country. Thus, Green audit becomes necessary at the college level. A very simple indigenized system has been devised to monitor the environmental performance of Sipajhar College. It comes with a series of questions to be answered on a regular basis. This innovative scheme is user friendly and totally voluntary. The aim of this is to help the institution to set environmental examples for the community, and to educate the young learners.

2.3 BENEFITS OF THE GREEN AUDITING

- ✓ To provide basis for improved sustainability
- ✓ To create a green campus
- ✓ To enable waste management through reduction of waste generation, solid- waste and water recycling
- ✓ To create plastic free campus and evolve health consciousness among the stakeholders
- ✓ More efficient resource management
- ✓ Recognize the cost saving methods through waste minimizing and managing
- ✓ Point out the prevailing and forthcoming complications
- ✓ Authenticate conformity with the implemented laws
- ✓ Empower the organizations to frame a better environmental performance
- ✓ Enhance the alertness for environmental guidelines and duties
- ✓ Impart environmental education through systematic environmental management approach and Improving environmental standards
- ✓ Benchmarking for environmental protection initiatives
- ✓ Financial savings through a reduction in resource use
- ✓ Development of ownership, personal and social responsibility for the College and its environment
- ✓ Enhancement of college profile
- ✓ Developing an environmental ethic and value systems in youngsters.
- ✓ Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college.

2.4 TARGET AREAS OF GREEN AUDITING

Green audit forms part of a resource management process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined

intervals, and their results can illustrate improvement or changeover time. Eco-campus concept mainly focuses on the efficient use of energy and water; Minimize waste generation or pollution and also economic efficiency. All these indicators are assessed in process of "Green Auditing of educational institute". Eco-campus focuses on the reduction of contribution to emissions, procures a cost effective and secure supply of energy, encourages and enhances energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.

2.4.1 AUDITING FOR WATER MANAGEMENT

Water is a natural resource; all living matters depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. We need to use water wisely to ensure that drinkable water is available for all, now and in the future. A small drip from a leaky tap can waste more than 180 litters of water to a day; that is a lot of water to waste - enough to flush the toilet eight times! It is therefore essential that any environmentally responsible institution should examine its water use practices. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water. It is therefore essential that any environmentally responsible institution examine its water use practices.

2.4.2 AUDITING FOR ENERGY MANAGEMENT

Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent bulb uses approximately 60W to 100W while an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation.

It is therefore essential that any environmentally responsible institution examine its energy use practices.

2.4.3 AUDITING FOR WASTE MANAGEMENT

Pollution from waste is aesthetically unpleasing and results in large amounts o litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals. This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes schools and colleges such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channelled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices.

2.4.4 AUDITING FOR GREEN CAMPUS MANAGEMENT

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, overconsumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature’s delicate balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down, with detrimental consequences for all forms of life, including human beings. Newly planted and existing trees decrease the amount of carbon dioxide in the atmosphere. Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to approximately 21 Kg of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen that a singletree produces is enough to provide one day’s supply of oxygen for people. So while you are busy studying and working on earning those good

grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress.

2.4.5 AUDITING FOR CARBON FOOTPRINT MANAGEMENT

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as petrol). The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 412.5 ppm of the Earth's atmosphere in 2020 higher than at any point in at least the past 800,000 years. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions.

An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method travelled between home and college every day. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development. It is therefore essential that any environmentally responsible institution examine its carbon footprint.

2.5METHODOLOGY OF GREEN AUDITING

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the document, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three step process comprising of:

2.5.1DATA COLLECTION

In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements.

Following steps were taken for data collection:

- The team went to each department, centres, Library, canteen etc.
- Data about the general information was collected by observation and interview.
- The power consumption of appliances was recorded by taking an average value in some cases.

2.5.2DATA ANALYSIS

Detailed analysis of data collected include: calculation of energy consumption, analysis of latest electricity bill of the campus, understanding the tariff plan provided by the Assam Power Distribution Company Limited (APDCL). Data related to water usages were also analysed using appropriate methodology.

2.5.3 RECOMMENDATION

On the basis of results of data analysis and observations, some steps for reducing power and water consumption were recommended. Proper treatments for waste were also suggested. Use of fossil fuels has to be reduced for the sake of community health. The above target areas particular to the college was evaluated through questionnaire circulated among the students for data collection. Five categories of questionnaires were distributed. The formats of these are given below.

2.6 SURVEY FORMS

FORM I

Auditing for Water Management

1. List uses of water in your college.
2. What are the sources of water in your college?
3. How many Tube wells/ Bore well are there in your college?
4. No. of motors used for pumping water from each well?
5. What is the total horse power of each motor?
6. What is the depth of each Tube wells/ Bore well?
7. What is the present depth of water in each Tube wells/ Bore well?
8. How does your college store water?
9. Quantity of water stored in your overhead water tank? (in litres)
10. Quantity of water pumped every day? (in litres)
11. If there is water wastage, specify why.
12. How can the wastage be prevented / stopped?
13. Locate the point of entry of water and point of exit of waste water in your College.
14. Where does waste water come from?
15. Where does the waste water go?
16. What are the uses of waste water in your college?
17. What happens to the water used in your labs? Whether it gets mixed with ground water?
18. Is there any treatment for the lab water?
19. Whether green chemistry methods are practiced in your labs?
20. Write down four ways that could reduce the amount of water used in your college.
21. Record water use from the college water meter for twelve months.
22. Bimonthly water charges paid to water connections if any
23. No. of water coolers. Amount of water used per day? (in litres)
24. No. of water taps. Amount of water used per day?
25. No. of bath rooms in staff rooms, common, hostels amount of water used per day?
26. No. of toilet, urinals. Amount of water used per day?
27. No. of water taps in the canteen. Amount of water used per day?

28. Amount of water used per day for garden use.

29. No. of water taps in laboratories. Amount of water used per day in each lab?

30. Total use of water in each hostel?

31. At the end of the period, compile a table to show how many litres of water have been used in the college for each purpose.

32. Is there any water used for agricultural purposes?

33. Does your college harvest rain water?

34. If yes, how many rain water harvesting units are there? (Approx. amount)

35. How many of the taps are leaky? Amount of water lost per day?

36. Are there signs reminding people to turn off the water? Yes / No

37. Is there any waterless toilets? _____

38. How many water fountains are there? _____

39. How many water fountains are leaky? _____

40. Is drip irrigation used to water plants outside? YES/NO

41. How often is the garden watered?

42. Quantity of water used to watering the ground?

43. Quantity of water used for bus cleaning? (Litres per day)

44. Amount of water for other uses? (items not mentioned above)

45. Area of the college land without tree/building canopy.

46. Is there any water management plan in the college?

47. Are there any water saving techniques followed in your college? What are they?

48. Please share Some IDEA for how your college could save more water.

FORM II

Auditing for Energy Management

1. List ways that you use energy in your college. (Electricity, electric stove, kettle, microwave, LPG, firewood, Petrol, diesel and others).
2. Electricity bill amount for the last year (by month)
3. Amount paid for LPG cylinders for last one year (by month)
4. Weight of firewood used per month and amount of money spent?
Also mention the amount spent for petrol/diesel/ others for generators?
5. Are there any energy saving methods employed in your college? If yes, please specify. If no, suggest some.
6. How much money does your college spend on energy such as electricity, gas, firewood, etc. in a month. (Record monthly for the year 2020-21).
7. How many CFL bulbs has your college installed? Mention use (Hours used/day for how many days in a month)
8. Energy used by each bulb per month? (for example- 60-watt bulb x 4hours x number of bulbs = kwh).
9. How many LED bulbs are used in your college? Mention the use (Hours used/day for how many days in a month)
10. Energy used by each bulb per month? (kwh).
11. How many incandescent (tungsten) bulbs have your college installed? Mentions use (Hours used/day for how many days in a month)
12. Energy used by each bulb per month? (kwh).
13. How many fans are installed in your college? Mention use (Hours used/day for how many days in a month)
14. Energy used by each fan per month? (kwh)
15. How many air conditioners are installed in your college? Mention use (Hours used/day, for how many days in a month)
16. Energy used by each air conditioner per month? (kwh).
17. How many electrical equipment including weighing balance are installed your college? Mention the use (Hours used/day for how many days in a month)
18. Energy used by each electrical equipment per month? (kwh).

19. How many computers are there in your college? Mention the use (Hours used/day for how many days in a month)

20. Energy used by each computer per month? (kwh)

21. How many photocopiers are installed by your college? Mention use (Hours used/day for how many days in a month).

22. How many cooling apparatuses are in installed in your college? Mention use (Hours used/day for how many days in a month)

23. Energy used by each cooling apparatus per month? (kwh)

Mention use (Hours used/day for how many days in a month)

24. Energy used by each photocopier per month? (kwh) Mention the use (Hours used/day for how many days in a month) how many inverters your college installed? Mentions use (Hours used/day for how many days in a month)

25. Energy used by each inverter per month? (kwh)

26. How many electrical equipment are used in different labs of your college?

Mention the use (Hours used/day for how many days in a month)

27. Energy used by each equipment per month? (kwh)

28. How many heaters are used in the canteen of your college? Mention the use (Hours used/day for how many days in a month)

29. Energy used by each heater per month? (kwh)

30. No of street lights in your college?

31. Energy used by each street light per month? (kwh)

32. No of TV in your college and hostels?

33. Energy used by each TV per month? (kwh)

34. Any other item that uses energy (Please write the energy used per month) Mention the use (Hours used/day for how many days in a month)

35. Are any alternative energy sources/nonconventional energy sources employed / installed in your college? (photovoltaic cells for solar energy, windmill, energy efficient stoves, etc.,) Specify.

36. Do you run “switch off” drills at college?

37. Are your computers and other equipment put on power-saving mode?

38. Does your machinery (TV, AC, Computer, weighing balance, printers, etc.) run on standby mode most of the time? If yes, how many hours?

39. What are the energy conservation methods adapted by your college?

40. How many boards displayed for saving energy awareness?

41. How much ash is collected after burning fire wood per day in the canteen?

42. Write a note on the methods/practices/adaptations by which you can reduce the energy use in your college campus in future.

Calculation of energy for electrical appliances

Appliance	Powerused in(watt)	Usage perday(hours)	Number of appliances	AveragekWh perday (Watt Xhours XNumber X1000)	Average kWh per month (Watt X hours X Number X 1000 x 30)
Incandescent bulb					
CFL					
LED					
Other appliances					

FORM III

Auditing for Waste Management

1 What is the total strength of students, teachers and Non-teaching staff in your College?

	No. of Students	No. of Teachers No.	Non-teaching staff
Gents			
Ladies			
Total			

2 Which of the following are available in your College? Give area occupied and number

Garden area	Garbage dump (number)
Playground area	Laboratory
Kitchen	Canteen
Toilets (number)	Car/scooter shed area
Number of class rooms	Office rooms
Others (specify)	

3 Which of the following are found near your college?

Mark the level of disturbance it creates for the college in a scale of 1 to 9.

Municipal dump yard

Garbage heap

Public convenience

Sewer line

Stagnant water

Open drainage

Industry – (Mention the type)

Bus / Railway station

Market / Shopping complex / Public halls

WASTE

Does your college generate any waste?

If so, what are they? How much quantity? Number or weight

E-waste

Hazardous waste (toxic)

Solid waste

Dry leaves

Canteen waste

Liquid waste

Glass

Unused equipment

Medical waste if any

Napkins

Others (Specify)

Is there any waste treatment system in the college?

Is there any treatment for toilet/urinal/sanitary napkin waste?

1.What is the approximate quantity of waste generated per day? (in Kilograms)

Office

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.				
2- 10 kg				
> 10 kg.				

Laboratories

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.				
2 - 10 kg				
> 10 kg.				

Canteen/kitchen

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.				
2- 10 kg				
> 10 kg.				

2.Why waste is a problem?

3.Whether waste is polluting ground/surface water? How?

4.Whether waste is polluting the air of the college? How?

5.How is the waste generated in the college managed? Methods

i. Composting

ii. Recycling

iii. Reusing

iv. Others (specify)

6. How many separate boxes do you think you would need to put into a classroom to start a waste segregation and recycling campaign? What should be the use for each box? (Develop a colour code with reasons)

7.Do you use recycled paper in College?

8.Is there any waste wealth program practiced in the college?

9.How would you spread the message of recycling to others in the community? Have you taken any initiatives? If yes, please specify.

10.Can you achieve zero garbage in your college? (Reduce, Recycle, Reuse, Refuse) If yes, how?

FORM IV

Auditing for Green Campus Management

1. Is there a garden in your college? Area?
2. Do students spend time in the garden?
3. List the plants in the garden, with approx. numbers of each species.
4. Suggest plants for your campus. (Trees, vegetables, herbs, etc.)
5. List the species planted by the students, with numbers.
6. Whether you have displayed scientific names of the trees in the campus?
7. Is there any plantations in your campus? If yes specify area and type of plantation.
8. Is there any vegetable garden in your college? If yes, how much area?
9. Is there any medicinal garden in your college? If yes, how much area?
10. What are the vegetables cultivated in your vegetable garden? (Mention the quantity of harvest in each season)
11. How much water is used in the vegetable garden and other gardens? (Mention the source and quantity of water used).
12. Who is in charge of gardens in your college?
13. Are you using any type of recycled water in your garden?
14. List the name and quantity of pesticides and fertilizers used in your gardens?
15. Whether you are doing organic farming in your college? How?
16. Do you have any composting pit in your college? If yes, what are you doing with the compost generated?
17. What do you doing with the vegetables harvested? Do you have any student market?
18. Is there any botanical garden in your campus? If yes give the details of campus flora.
19. Give the number and names of the medicinal plants in your college campus.
20. Any threatened plant species planted/conserved?
21. Is there a nature club in your college? If yes, what are their activities?
22. Is there any arboretum in your college? If yes details of the trees planted.
23. Is there any fruit yielding plants in your college? If yes details of the trees planted.
24. Is there any groves in your college? If yes details of the trees planted.
25. Is there any irrigation system in your college?
26. What is the type of vegetation in the surrounding area of the college?
27. What are the nature awareness programmes conducted in the campus? (2020-21)

28. What is the involvement of students in the green cover maintenance?

29. What is the total area of the campus under tree cover? Or under tree canopy?

30. Share your IDEAS for further improvement of green cover.

FORM V

Auditing for Carbon Footprint

1. What is the total strength of students and teachers in your College?

	No. of Students	No. of Teachers	No. of Non-teaching staff
Gents			
Ladies			
Total			

2. Total Number of vehicles used by the stakeholders of the college. (per day)

3. No. of cycles used

4. No. of two wheelers used (average distance travelled and quantity of fuel and amount used per day)

5. No. of cars used (average distance travelled and quantity of fuel and amount used per day)

6. No. persons using common (public) transportation (average distance travelled and quantity of fuel and amount used per day)

7. No. of persons using college conveyance by the students, non-teaching staff and teachers (average distance travelled and quantity of fuel and amount used per day)

8. Number of parent-teacher meetings in a year? Parents turned up (approx.)

9. Number of visitors with vehicles per day?

10. Number of generators used per day (hours). Give the amount of fuel used per day.

11. Number of LPG cylinders used in the canteen (Give the amount of fuel used per day and amount spent).

12. Quantity of kerosene used in the canteen/labs (Give the amount of fuel used per day and amount spent).

13. Amount of taxi/auto charges paid and the amount of fuel used per month for the transportation of vegetables and other materials to canteen.

14. Amount of taxi/auto charges paid per month for the transportation of office goods to the college.

15. Average amount of taxi/auto charges paid per month by the stakeholders of the college.

16. Use of any other fossil fuels in the college (Give the amount of fuel used per day and amount spent).

17. Suggest the methods to reduce the quantity of use of fuel used by the stakeholders/ students/ teachers/ non-teaching staff of the college.

CHAPTER 3

AUDIT STAGE

In Sipajhar College green auditing was done with the help of Prof. Subhendu Sekhar Bag, (CChem, FRSC, FICS)Professor, Department of Chemistry &Centre for the Environment, IIT Guwahati and his team involving different student groups, teaching and non-teaching staff. The green audit began with the teams walking through all the different facilities at the college, determining the different types of appliances and utilities (lights, taps, toilets, fridges, etc.) as well as measuring the usage per item (Watts indicated on the appliance or measuring water from a tap) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were times to clarify the data received through survey and discussions. The whole process was completed within one months from 1stMay2021 to 31stMay 2021.

3.1 STUDENT AND STAFF INVOLVED IN GREEN AUDITING

General Co-ordinator: Dr. Pankaj Gogoi

1. Water Management

Faculty in Charge: Dr. Aswini Kalita

Non-Teaching Staff: Krishna Rai Baruah

Students

Sl. No.	Name	Department
1	Jintu Mani Nath	Chemistry
2	Kabyashee Hazarika	Zoology
3	Jogesh Saharia	Mathematics

2. Green Campus Management

Faculty in Charge: Jaltiram Hazarika

Non-Teaching Staff: Munin Bora

Students

Sl. No.	Name	Department

1	Khitish Kumar Nath	Chemistry
2	Dikhya Borua	Geography
3	Simanta Kalita	Geography

3. Carbon Footprint

Faculty in Charge: Mausumi Das

Non-Teaching Staff: Dilsha Ali

Students

Sl. No.	Name	Department
1.	Sashanka Kashyap	Chemistry
2.	Jinki Mani Deka	Mathematics
3.	Aparajita Saikia	Botany

4. Energy Management

Faculty in Charge: Dr. Tonuj Deka

Non-Teaching Staff: Munin Das

Students

Sl. No.	Name	Department
1	Aswini Sarma	Physics
2	Jyotish Kalita	Zoology
3	Chandamita Saikia	Chemistry

5. Waste Management

Faculty in Charge: Manasi Hazuwary

Non-Teaching Staff: Sachin Das

Students

Sl. No.	Name	Department
1.	Bandana Devi	Political Science
2.	Manas Jyoti Das	Political Science
3.	Binoy Das	Political Science

3.2 STUDENT CLUBS AND FORUMS

Eco Club

Faculty in Charge: Mr. Lakhminandan Goswami

Students

Sl. No.	Name	Department
1	Nirbarai Sankar	Physics
2	Madhurjya Nath	Botany
3	Aminur Rahman	Chemistry

Green Diary

Faculty in Charge: Dr. Prasanna Kumar Nath

Students

Sl. No.	Name	Department
1	Partha Pratim Chaliha	Assamese
2	Ankuma Deka	Education
3	Jayshree Deka	History
4	Arifa Begum	English

Women's Cell

Faculty in Charge: Gultaz Begum

Students

Sl. No.	Name	Department
1	Prianka Deka	Education
2	Archana Bonia	Economics
3	Kausar Zahan	Assamese
4	Kangkan Kalita	English

Career GuidanceCell

Faculty in Charge: Dr. Dibya Jyoti Saikia

Students

Sl. No.	Name	Department
1	Jannatun Nesha	Zoology
2	Rakesh Bordoloi	Chemistry
3	Pranjit Deka	Zoology
4	Nayan Jyoti Deka	Political Science

Mentoring Cell

Faculty in Charge: Gultaz Begum

Students

Sl. No.	Name	Department
1	Kausar Zahan	Assamese
2	Nabajit Nath	Assamese
3	Deepshikha Deka	English
4	Dhanmani Boruah	Philosophy

Chess Club

Faculty in Charge: Partha Pratim Saha

Students

Sl. No.	Name	Department
1	Nitish Kumar Sarma	Chemistry
2	Nirbarai Sankar	Physics
3	Jyoprakash Deka	Mathematics
4	Priyabrat Sarmah	Chemistry

Music Club

Faculty in Charge: Dr. Manash Jyoti Deka

Students

Sl. No.	Name	Department
1	Kabyashree Hazarika	Zoology
2	Madhurya Borua	Mathematics
3	Nitish Kumar Sarmah	Chemistry
4	Kangkana Sarma	Philosophy

Dance Club

Faculty in Charge: Dr. Karabi Devi

Students

Sl. No.	Name	Department
1.	Nikumani Deka	Education
2.	Nikita Bora	Zoology
3.	Momi Saharia	Botany
4.	Bhagyashree Hazarika	History

Drama Club

Faculty in Charge: Phanindra Kumar Nath

Students

Sl. No.	Name	Department
1	Rantu Saikia	History
2	Kangkan Kalita	History
3	Jubin Deka	History
4	Bhagyashree Hazarika	History

Flora and Fauna

Faculty in Charge: Mridusmita Mahanta

Students

Sl. No.	Name	Department
1.	Kabyashree Hazarika	Zoology
2.	Madhurya Nath	Botany
4.	Priyabrat Sarma	Chemistry
5.	Bhyalina Hazarika	Botany

Entrepreneur Club

Faculty in Charge: Sultana Rezia

Students

Sl. No.	Name	Department
1.	Mousumi Saharia	Education
2.	Rebina Yeasmin Choudhuri	Education
3	Minakshi Kalita	Education
4.	Jilmil Deka	Education

FineArts Club

Faculty in Charge: Himakshi Bardoloi

Students

Sl. No.	Name	Department
1	Jogesh Saharia	Mathematics
2	Diswani Sarmah	Assamese
3	Julli Jesmin Sultana	Assamese
4	Jesmin Begum	Assamese

Student Support Services

Faculty in Charge: Dr. Mantu Hazarika

Students

Sl. No.	Name	Department
1	Bhargav Jyoti Kalita	English
2	Nashila Sultana	English
3	Nayanjyoti Nath	English
4	Bijit Deka	English

Information cum Career Guidance and Counselling Cell (ICGC)

Faculty in Charge: Dr. Malini Nair

Students

Sl. No.	Name	Department

1	Bijit Deka	English
2	Abhinas Sarma	Botany
3	Aparajita Boruah	Zoology
4	Panki Mani Bordoloi	Chemistry

Language Lab

Faculty in Charge: Himashree Swargiary

Students

Sl. No.	Name	Department
1	Bhupali Das	English
2	Bidita Saharia	English
3	Junjun Deka	English
4	Saurabhjyoti Barua	English

National Service Scheme (NSS)

Faculty in Charge: Dr. Dulendra Nath

Students

Sl. No.	Name	Department
1	Prity Sarma	History
2	Banashree Saharia	History
3	Dhanmani Kalita	History
4	Jilmil Kalita	History

Bharat Scouts and Guides

Faculty in Charge: Dr. Mantu Hazarika

Students

Sl. No.	Name	Department
1	Manalisha Nath	English
2	Lipika Deka	English
3	Manasi Devi	English
4	Sanali Nath	English

Students' Aid Fund

Faculty in Charge: Dr. Nirmali Chakraborty

Students

Sl. No.	Name	Department

1	Bhokesh Rabha	Assamese
2	Dimlee Saikia	Mathematics
3	Sanakya Deka	Zoology
4	Himangshu Sarma	Physics

Library Book Club

Faculty in Charge: Dr. Nirmali Chakraborty

Students

Sl. No.	Name	Department
1	Sehzadi Sabnam Sultana	Assamese
2	Saurajyoti Kashyap	English
3	Mausom Goswami	Political science
4	Munmun Sarma	Chemistry

Red Ribbon Club (RRC)

Faculty in Charge: Dr. Dulendra Nath

Students

Sl. No.	Name	Department
1	Nikita Saharia	History
2	Rantu Saikia	History
3	Hiranmoyee Deka	History
4	Jubin Deka	History

Sahitya Chora

Faculty in Charge: Dr. Mukul Kumar Saharia

Students

Sl. No.	Name	Department
1	Sahjadi Sabnam Sulatan	Assamese
2	Sabiha Siddika	Assamese
3	Neha Saharia	Assamese
4	Dimpi Mani Nath	Assamese

English Forum

Faculty in Charge: Dr. Barnali Sharma

Students

Sl. No.	Name	Department

1	Dimpy Choudhury	English
2	Richa Saharia	English
3	Ananya Saikia	English
4	Abhigyanam Kashyap	English

Education Forum

Faculty in Charge: Dr. Kashmiri Nath

Students

Sl. No.	Name	Department
1	Mousumi Saharia	Education
2	Bhanita Nath	Education
3	Priyanka Deka	Education
4	Ankuma Deka	Education

Philosophical Society

Faculty in Charge: Tilak Deka

Students

Sl. No.	Name	Department
1	Nabajit Nath	Philosophy
2	Madhumita Bharadwaz	Philosophy
3	Jyotirupa Kalita	Philosophy
4	Abdul Zaki	Philosophy

Geographical Forum

Faculty in Charge: Abdus Samad

Students

Sl. No.	Name	Department
1	Haripriya Bhuyan	Geography
2	Juri Kumari	Geography
3	Niharika Deka	Geography
4	Pampee Kalita	Geography

Research Forum for History & Political Science

Faculty in Charge: Mr. Imran Hussain

Students

Sl. No.	Name	Department
1	Mrigen Kalita	Political science
2	Bhitali Saharia	Political Science
3	Rantu Saikia	History

4	Jubin Deka	History

Student's Union

Faculty in Charge: Dr. Prasanna Kumar Nath

Students

Sl. No.	Name	Designation	Department
1	Sikha Rani Deka	VP	Assamese
2	Kailash Sahria	GS	Political Science
3	Asif Iqbal	AGS	Pass course
4	Bhaskar Sarmah	Sports	Pass course
5	Bhagyashree Hazarika	Cultural	Philosophy
6	Jitu mani Bhuyan	Social Service	Political Science
7	Jyotirupa Kalita	Magazine	Philosophy
8	Mousumi Sahria	Debate	Pass course
9	Gitartha Sarma	Boys' common room	Pass course
10	Madhusmita Kalita	Girls' Common room	Botany

Science Forum

Teacher In-charge - Dr. Nayan Mani Das

Sl. No.	Name	Department
1	Vandita Sarmah	Zoology
2	Bhagyashree Kalita	Chemistry
3	Vedita Sarmah	Physics
4	Manash Deka	Mathematics

College Environment and Climate Cell

Teacher In-charge- Dr. Aswini Kalita

Sl. No.	Name	Department
1	Ritusmita Hazarika	Chemistry
2	Madhurya Nath	Botany
3	Jintu Mani Nath	Chemistry
4	Antara Kumar	Chemistry

3.3 COMMENTS ON SITE TOUR

Site inspection was done along with students and staff. Questionnaires were answered during the site tour. Students and staff took much interest in the data collection processes. It was quite interesting and fascinating. It was an environmental awareness program for the students who participated in the green auditing. The experience of green auditing was

totally a new experience for most of the students. They have shared their expectations about a green campus and gave suggestions for the audit recommendations.

3.4 REVIEW OF DOCUMENTS AND RECORDS

Documents such as admission registers, registers of electricity and water charge remittance, furniture register, laboratory equipment registers, purchase register, audited statements, and office registers were examined and data were collected. College calendars, college magazines, annual report of the college and NAAC self-assessment reports, UGC report etc. were also verified as part of data collection.

3.5 REVIEW OF POLICIES

Discussions were made with the college management regarding their policies on environmental management. Future plans of the college were also discussed. The management would formulate a revised environment /green policy for the college in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are to be in accordance with the Green Policy adopted by the institution.

3.6 INTERVIEWS

In order to collect information for green auditing different audit groups interviewed office staff, Principal, teaching and non-teaching staff, students, parents and other stakeholders of the college. Discussions were also made with the office bearers to clarify doubts regarding certain points.

3.7 SITE INSPECTION

College and its premises were visited and analysed by the audit-teams several times to gather information. Campus trees were counted and identified. Vegetable garden, play grounds, canteen, library, office rooms and parking grounds were also visited to collect data. Number and type of vehicles used by the stakeholders were counted and fuel consumption for each vehicle was verified with the user. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted.

CHAPTER 4

POST AUDIT STAGE

The base of any green audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner. Green audits form a part of a process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Although green audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. The essence of any green audit is to find out how well the environmental organisation, environmental management and environmental equipment are performing. Each of the three components is crucial in ensuring that the organisation's environmental performance meets the goals set in its green policy. The individual functioning and the success of integration will all play a role in the degree of success or failure of the organisation's environmental performance.

4.1 KEY FINDINGS AND OBSERVATIONS

4.1.1WATER

Main water uses in the campus

- ✓ Garden
- ✓ Laboratory
- ✓ Cleaning
- ✓ Canteen
- ✓ Drinking
- ✓ Toilets
- ✓ Bathrooms
- ✓ Hostel
- ✓ Washing
- ✓ Guest house
- ✓ Office uses

- The sources of water in the college are tube well, bore well, pond, tank and rain water.
- There are 3 tube wells and 6 bore wells in the college.
- 6 Numbers of motors used for pumping the water in the college.
- The total horse power of each motor is 1.0 H.P. (0.75 kW).
- The depth of each tube wells and bore well is 75 feet.
- The present depth of water in each tube wells and bore wells is 12 feet.
- The college store its water in reservoirs and tanks.
- Number of water tanks for water storage is 5.
- Quantity of water stored in overhead water tank is 8000 litres (including 1000 litres from rain water harvesting set up).
- 2000 litres of water pumped every day in the campus.
- There is no water wastage from the water supply process.
- To prevented / stopped wastage of water the college author has been taken proper monitoring and preventive measures.
- The management of the college is going to install wastewater treatment plant.
- The college laboratories practice green and sustainable methods in the labs.
- The college follows four basic ways that could reduce the amount of water usage in the campus, which are leakage monitoring, minimizing use of water in toilets and bathroom, used wastewater in garden and ground.
- Number of water tap in the campus is 170.
- Number of toilets and urinals in the campus are 18.
- Number of water taps in canteen are 2.
- 20 litres of water is used per day for gardening.
- A total 22 numbers of water taps are there in laboratories.
- Water used in hostel is 1000 litres.
- Sipajhar college has started rain water harvesting in the campus.
- There are one rain water harvesting unit in the campus with total capacity of 1000 litres. Another one is proposed.
- There is no leaky tap in the campus.
- There are signs in toilet and bathrooms, reminding people to turn off the water.
- 30 litres of water is used for watering the ground.
- There is a water treatment plant in college campus.

- Awareness among all the college fraternity, display on optimal usage of water, code of conduct if necessary, reuse and recycle of water are some of the initiatives taken by the management.
- Water charges paid – No water charges(No municipal water supply, using water from own bore wells, harvested water and from water body)

Overall utilization of water in the College

Sections	**Water Use/day**
Toilets and urinals	650 litres
Hostel and bathrooms	1000 litres
Canteen	100 litres
Garden and ground	50 litres
Laboratories	200 litres
Leakage	0 litres
Total	2000 litres

4.1.2ENERGY

- Electricity, LPG, diesel and solar are the sources of energy in the college.
- Electricity bill amount for the last month(Rs. 45000.00)
- Rs.3500.00 paid for LPG cylinders for the last month.
- 10 litres of diesel is used for generators per month and Rs 1000.00 is spent for the last month.
- Use of solar energy, rain water harvesting, no motor vehicle day, use of public vehicle and use of bi-cycle are some energy saving methods employed in the college.
- Rs 49500.00 is spend on energy such as electricity, gas, and diesel in a month. (Record monthly for the year 2020-21).
- There is no incandescent (tungsten) bulbs in the college.
- There is no cooling apparatus are in the college.
- There are no heaters in the college.
- Solar energy is the only alternative energy sources/nonconventional energy sources installed in the college.
- All the computers and other equipment are always put on power-saving mode.
- The machineries like TV, Computer, weighing balance, printers, etc. are run on standby mode.

- Solar energy, rain water harvesting, optimum use of water and reusability, sensor based device in water tank, proper monitoring of all electric appliances, awareness and sign of switch-off the device after use are energy conservation methods adapted by the college.
- Total number of CFL bulbs –9
- Number of LED lights –227
- Number of Fans –230
- Number of Tube Lights –100
- Total Electrical Equipment – 56
- Number of Computers – 57
- Number of Photocopiers – 5
- Number of Televisions – 3
- Number of AC – 7

Energy usage of CFL bulbs in the college

Department/ area	Number of CFL bulbs	Power Consumed (watts)	Power in (kW)	Working Time(hours per Day)	Energy Usage per month(kWh)
Library	7	15	0.015	6	13.86
KKHSOU	2	15	0.015	6	3.96
Total Energy usage per month (kWh)					17.82

Energy usage of LED bulbs in the college

Department	Number of LED bulbs	Power consumed (watts)	Power in(kW)	Working time(hours per Day)	Energy Usage Per month(kWh)
Principal Room	3	10	0.01	6	3.96
Vice Principal Room	3	10	0.01	6	3.96
Head Assistant	1	10	0.01	6	1.32
Examination Branch	4	10	0.01	6	5.28
Office	2	10	0.01	6	2.64
IQAC	2	10	0.01	6	2.64
Conference Hall	17	10	0.01	6	22.44
Computer	6	10	0.01	6	7.92

Room					
Digital Class Room	2	10	0.01	6	2.64
Smart Room	6	10	0.01	6	7.92
Research Cell	2	10	0.01	6	2.64
Health Care Centre	2	10	0.01	6	2.64
Library	3	10	0.01	6	3.96
KKHSOU	4	10	0.01	6	5.28
Assamese	2	10	0.01	6	2.64
Economics	2	10	0.01	6	2.64
Education	2	10	0.01	6	2.64
English	2	10	0.01	6	2.64
Geography	2	10	0.01	6	2.64
History	2	10	0.01	6	2.64
Philosophy	2	10	0.01	6	2.64
Political Science	2	10	0.01	6	2.64
Physics	10	10	0.01	6	13.2
Chemistry	4	10	0.01	6	5.28
Mathematics	6	10	0.01	6	7.92
Zoology	6	10	0.01	6	7.92
Botany	8	10	0.01	6	10.56
Canteen	2	10	0.01	6	2.64
Women's Hostel	86	10	0.01	6	113.52
Women's Hostel Warden Quarter	8	10	0.01	6	10.56
Guest House	8	10	0.01	6	10.56
Indoor Stadium	16	10	0.01	6	21.12
Total Energy usage per month (kWh)					299.64

Energy usage of Fans in the college

Department	**Number of Fans**	**Power consumed (watts)**	**Power in (kW)**	**Working time (hours per Day)**	**Energy Usage per month (kWh)**
Principal Room	3	40	0.04	6	15.84
Vice Principal Room	2	40	0.04	6	10.56
Head Assistant	2	40	0.04	6	10.56

Examination Branch	4	40	0.04	6	21.12
Office	7	40	0.04	6	36.96
IQAC	1	40	0.04	6	5.28
Conference Hall	6	40	0.04	6	31.68
Computer Room	6	40	0.04	6	31.68
Digital Class Room	2	40	0.04	6	10.56
Smart Room	5	40	0.04	6	26.40
Language Lab	2	40	0.04	6	10.56
Research Cell	3	40	0.04	6	15.84
Health Care Centre	2	40	0.04	6	10.56
Library	13	40	0.04	6	68.64
KKHSOU	2	40	0.04	6	10.56
Assamese	3	40	0.04	6	15.84
Economics	2	40	0.04	6	10.56
Education	2	40	0.04	6	10.56
English	2	40	0.04	6	10.56
Geography	4	40	0.04	6	21.12
History	6	40	0.04	6	31.68
Philosophy	1	40	0.04	6	5.28
Political Science	4	40	0.04	6	21.12
Physics	6	40	0.04	6	31.68
Chemistry	6	40	0.04	6	31.68
Mathematics	4	40	0.04	6	21.12
Zoology	6	40	0.04	6	31.68
Botany	6	40	0.04	6	31.68
Canteen	4	40	0.04	6	21.12
Women’s Hostel	37	40	0.04	6	195.36
Women’s Hostel Warden Quarter	6	40	0.04	6	31.68
Girls’ Common Room	2	40	0.04	6	10.56
Guest House	6	40	0.04	6	31.68
Indoor Stadium	16	80	0.08	2	56.32
Class Rooms	47	40	0.04	6	248.16
Total Energy usage per month (kWh)					1186.24

Energy usage of Tube Light in the college

Department	Number of Tube Light	Power consumed (watts)	Power in (kW)	Working time (hours per Day)	Energy Usage per month (kWh)
Principal Room	2	40	0.04	6	10.56
Head Assistant	2	40	0.04	6	10.56
Office	5	40	0.04	6	26.40
Digital Class Room	2	40	0.04	6	10.56
Language Lab	4	40	0.04	6	21.12
Research Cell	1	40	0.04	6	5.28
Library	3	40	0.04	6	15.84
KKHSOU	2	40	0.04	6	10.56
Assamese	2	40	0.04	6	10.56
Economics	2	40	0.04	6	10.56
Education	2	40	0.04	6	10.56
English	2	40	0.04	6	10.56
Geography	4	40	0.04	6	21.12
History	2	40	0.04	6	10.56
Political Science	4	40	0.04	6	21.12
Physics	2	40	0.04	6	10.56
Chemistry	5	40	0.04	6	26.40
Zoology	2	40	0.04	6	10.56
Girls' Common Room	2	40	0.04	6	10.56
Canteen	6	40	0.04	6	31.68
Indoor Stadium	12	40	0.04	6	63.36
Class Rooms	32	40	0.04	6	168.96
Total Energy usage per month (kWh)					528.00

Electrical Equipment and their energy consumption

Department	Name of the appliance/ equipment	Number of appliance/ equipment	Power consumed (watts)	Power in (kW)	Working time (hours per Day)	Energy Usage per month (kWh)
Chemistry	Hot Air Oven	1	2200	2.2	3	145.2
	Centrifuge	1	180	0.18	4	15.84
	Distillation	1	8000	8	3	528

	Apparatus					
	Electric Centrifuge	1	75	0.07	4	6.6
	Electrical Melting Point	1	500	0.5	4	44
	Exhaust Fan	4	50	0.05	4.5	19.80
	Fridge	1	200	0.2	6.5	28.6
	Heater	1	1060	1.06	4	93.28
	Heating Mantle	3	450	0.45	3	89.1
	Magnetic Stirrer	4	600	0.6	3	158.4
	Projector	1	240	0.24	3	15.84
	Shaker	1	120	0.12	4	10.56
	Sonicator	1	1000	1	3	66
	Spectrophotometer	1	30	0.03	3	1.98
	Vaccum Pumb	1	370	0.37	3	24.42
	Water Bath	1	1000	1	4	88
	Printer	1	25	0.025	2	1.1
	Electronic Weighing Machine	1	5	0.005	2	0.22
Botany	Hot Air Oven	1	2200	2.2	3	145.2
	Autoclave	1	2200	2.2	3	145.2
	Centrifuge	1	1500	1.5	0.5	16.50
	Incubator	1	180	0.18	0.5	1.98
	Laminar	1	200	0.2	0.5	2.20
	Spectro Photometer	1	250	0.25	0.5	2.75
	Fridge	1	30	0.03	3	1.98
	Electronic Weighing Machine	1	5	0.005	2	0.22
Zoology	Hot Air Oven	1	2200	2.2	3	145.2
	Autoclave	1	1500	1.5	0.5	16.50
	Centrifuge	1	180	0.18	0.5	1.98
	Incubator	1	200	0.2	0.5	2.20
	Laminar	1	250	0.25	0.5	2.75
	Spectrophotometer	1	30	0.03	3	1.98
	Fridge	1	200	0.2	24	105.6
	Electronic Weighing Machine	1	5	0.005	2	0.22
Office	Printer	1	25	0.025	1	0.55
Library	Printer	1	25	0.025	1	0.55
	Scanner	1	20	0.02	1	0.44
	Punching Machine	1	5	0.005	1	0.11
Physics	Battery Eliminator	3	4	0.004	2	0.528
	Electronic Weighing Machine	1	5	0.005	2	0.22
	Sodium Vapour Lamb	4	35	0.035	4	12.32

	CRO	2	33	0.033	6	8.712
Total Energy usage per month (kWh)						1952.83

Energy usage of Computers in the College

Department	Computers/ Laptops	Numbers	Power consumed (watts)	Power in (kW)	Working time (hours per Day)	Energy Usage per month (kWh)
Office	Computer	6	250	0.25	6	198.00
Computer Room	Computer	21	250	0.25	6	693.00
Library	Computer	8	250	0.25	6	264.00
KKHSOU	Computer	1	250	0.25	6	33.00
Language Lab	Computer	9	250	0.25	1	49.50
Economics	Computer	1	250	0.25	6	33.00
Geography	Computer	1	250	0.25	6	33.00
Mathematics	Computer	10	250	0.25	6	330.00
Total Energy usage per month (kWh)						1633.50

Energy usage of Photocopiers in the College

Department	Number of Photocopier	Power consumed (watts)	Power in (kW)	Working time (hours per Day)	Energy Usage per month (kWh)
Sipajhar College	5	1000	1	4	440.00
Total Energy usage per month (kWh)					440.00

Energy usage of inverters in the College

Department	Number of inverter	Power consumed (watts)	Power in (kW)	Working time (hours per Day)	Energy Usage per month (kWh)
Sipajhar College	7	3000	3	2	924.00
Total Energy usage per month (kWh)					924.00

Energy usage of Televisions in the College

Department	Number of appliance/	Power consumed (watts)	Power in (kW)	Working time (hours	Energy Usage per

	equipment			per Day)	month (kWh)
Sipajhar College	3	100	0.1	3	19.80
Total Energy usage per month (kWh)					19.80

Energy usage of Amplifiers and CCTV in the College

Name of the appliance/ equipment	Number of appliance/ equipment	Power consumed (watts)	Power in (kW)	Working time (hours per Day)	Energy Usage per month (kWh)
Amplifier	2	250	0.25	1	11.00
CCTV	24	35	0.035	24	443.52
Total Energy usage per month (kWh)					454.52

Energy usage of Air Conditioners in the College

Department	Number of AC	Power consumed (watts)	Power in (kW)	Working time (hours per Day)	Energy Usage per month (kWh)
Principal Room	1	1500	1.5	1	33.00
Conference Room	3	1500	1.5	1	99.00
Computer Room	2	1500	1.5	1	66.00
IQAC	1	1500	1.5	1	33.00
Total Energy usage per month (kWh)					231.00

4.1.3WASTE

The total strength of students, teachers and Non-teaching staff in the College

	No. of Students	No. of Teachers No.	Non-teaching staff
Gents	788	28	20
Ladies	1529	15	2
Total	2317	43	22

The following are the area where waste is generated in the College

Garden area	1 (Area 46.45 m^2)
Playground area	1 (Area 4200 m^2)
Laboratory	3
Kitchen	3
Canteen	1
Toilets	18
Car/scooter shed area	2

Number of class rooms	20
Office rooms	2

The following are the area found near the college

Mark the level of disturbance it creates for the college in a scale of 1 to 9.

Source	Scale
Municipal dump yard	1
Garbage heap	1
Public convenience	3
Sewer line	1
Stagnant water	1
Open drainage	4
Industry	1
Bus station	4
Shopping complex/public halls	4

The college generate waste of following type:

Type	Amount
Hazardous waste	0.01 kg during laboratory works only
Dry leaves	2.5 kg/day (Vermi-compost unit to be installed)
Canteen/ kitchen waste	10 kg/day
Napkin	Sanitary Napkin (Incineration unit to be installed)

The approximate quantity of waste generated per day (in Kilograms)

Office

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.	0.25 kg	Nil	Nil	Nil

Laboratories

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
< 1 kg.	Nil	0.05 kg	0.01 kg	Nil

Canteen/kitchen

Approx	Bio degradable	Non-Bio degradable	Hazardous	Others
2 - 10 kg	10 kg	Nil	Nil	Nil

The waste generated in the college managed will be managed following methods

- Composting
- Recycling
- Reusing

Four separate buckets will be put in front of a classroom to start a waste segregation and recycling campaign.

- **Blue bucket** for Paper and Glass waste
- **Green bucket** for Food waste
- **Yellow bucket** for Plastic waste
- **Red bucket** for Metal and E-waste

- Paper waste generated in the college is sold to paper waste collector of the area.
- The college management practiced waste wealth program in the college.
- The college management also have taken initiatives to spread the message of recycling to the nearby community.
- The college management is working very hard to achieve zero garbage in the campus college following 5R principle Reduce, Recycle, Reuse, Refuse and Rot.

4.1.4 GREEN CAMPUS

Total number of tree species identified – 16

Garden area and tree cover of the campus - 46.45 m^2

Free space in the campus – 4200 m^2

Campus Trees

Sl. No.	Name	Scientific Name	No. of Plants
1	Coconut tree	*Cocos nucifera*	1
2	Neem tree	*Azadirachta indica*	4
3	Mango tree	*Mangifera indica*	1
4	Indian gooseberry tree	*Emblica officinalis*	1
5	Indian Rose Chestnut tree	*Mesua ferrea*	30
6	Yellow jade orchid tree	*Magnolia champaca*	26
7	Pagoda tree	*Polyalthia longifolia*	30
8	Pine tree	*Pinus kesiya*	11
9	Black cutch tree	*Acacia catechu*	1
10	Myrobalan tree	*Terminalia chebula*	3
11	Bottle Palm tree	*Hyophorbe lagenicaulis*	1
12	Rubber tree	*Hevea brasiliensis*	2
13	Royal Poinciana tree	*Delonix regia*	5
14	Drumstick tree	*Moringa oleifera*	1

15	Curry leaf tree	*Murraya koenigii*	1
16	Queen's Crape Myrtle tree	*Lagerstroemia speciosa*	5
17	Tamol	*Areca catechu* L.	2
18	Amita	*Carica papaya* L.	3
19	Ahot gosh	*Ficus religiosa* L.	1
20	Joba	*Hibiscus rosa-sinensis* L.	5
21	Champa	*Magnolia champaca* (L.) Baill ex Pierre	2
22	Kol Gosh	*Musa* sp.	4
23	Rangagolap	*Rosa indica* L.	8
24	Bagagolap	*Rosa alba* L.	6
25	Latagolap	*Rosa multiflora* Thunb.	3

Fruit Trees in the Campus

Sl. No.	Name	Scientific Name	No. of Plants
1	Coconut tree	*Cocos nucifera*	1
2	Mango tree	*Mangifera indica*	1
3	Indian gooseberry tree	*Emblica officinalis*	1
4	Myrobalan tree	*Terminalia chebula*	3

List of plants proposed for "Tree Plantation Programme" in college campus

Sl. No.	Botanical name	Family	Local name
1	*Andrographis paniculata*	Acanthaceae	Sirata
2	*Anthocephalus cadamba*	Rubiaceae	Kadom
3	*Swietenia macrophylla*	Meliaceae	Mahgoni
4	*Psidium guajava*	Myrtaceae	Guava
5	*Citrus tangerina*	Rutaceae	Citrus
6	*Syzygium cumini*	Myrtaceae	Jam
7	*Plumeria pudica*	Apocynaceae	Nagchampa
8	*Averrhoa carambola*	Oxalidaceae	Kordoi Tenga
9	*Areca catechu*	Arecaceae	Tamul
10	*Azadirachta indica*	Meliaceae	Mahanim
11	*Butea monosperma*	Fabaceae	Palas
12	*Cassia fistula*	Caesalpiniaceae	Sunaru
13	*Catharanthus roseus*	Apocynaceae	Nayantara
14	*Clerodendrum colebrookianum*	Verbinaceae	Nephaphu
15	*Datura fastuosa*	Solanaceae	Dhatura
16	*Emblica officinalis*	Euphorbiaceae	Amlakhi
17	*Erythrina stricta*	Fabaceae	Madar
18	*Eugenia kurzii*	Myrtaceae	Bogijamuk
19	*Ficus bengalensis*	Moraceae	Bor goss
20	*Hedyotis scandens*	Rubiaceae	Bhedeli -lota
21	*Hibiscus rosa-sinensis*	Malvaceae	Joba
22	*Hymenodictyon excelsum*	Rubiaceae	Kodam
23	*Lagerstroemia speciosa*	Lythraceae	Azar

24	*Lawsonia inermis*	Lythraceae	Jetuka, mehendi
25	*Melia azedarach*	Meliaceae	Ghora-nim
26	*Michelia champaca*	Magnoliaceae	Titasopa
27	*Mimusops elengi*	Sapotaceae	Bokul, gokul
28	*Mirabilis jalapa*	Nyctaginaceae	Gadhuli -gopal
29	*Moringa oleifera*	Moringaceae	Sajina
30	*Morus alba*	Moraceae	Nuni goss
31	*Murraya koenigii*	Rutaceae	Narasingha
32	*Nerium indicum*	Apocynaceae	Karabi
33	*Nyctanthus arbor-tristis*	Oleaceae	Sewali phul
34	*Ocimum basilicum*	Lamiaceae	Tulasi
35	*Ocimum gratissimum*	Lamiaceae	Ram-tulasi
36	*Ocimum sanctum*	Lamiaceae	Kola-tulasi
37	*Terminalia chebula*	Combretaceae	Hilikha
38	*Vesica adhatoda*	Acanthaceae	Bahek
39	*Viburnum colebrookianum*	Caprifoliaceae	Mezenga
40	*Vitex negundo*	Verbenaceae	Posotia

Crops cultivated in the campus

Chilly, Cabbage, Tomato, Brinjal, Cauliflower,Ladies finger, Pea etc.

Campus farming

The college management has initiated a novel venture of organic farming of vegetable in the campus. The college management has been consistently undertaking vegetable cultivation of monsoon, winter and summer crops and conducting awareness of organic cultivation and sale the products among the college community.

Celebration of days of significance related to Environment and Climate

Awareness seminars and other activities are organized on various environmental problems. Distribution of fruit trees, poster exhibition etc. are some activities on these days.

4.1.5CARBON FOOTPRINT

Number of persons using cycles –980

Number of persons using cars – 12

Number of persons uses two wheelers – 40

Number of persons using other transportations – 850

Number of visitors per day – 10

Number of Students staying in the hostel – 47

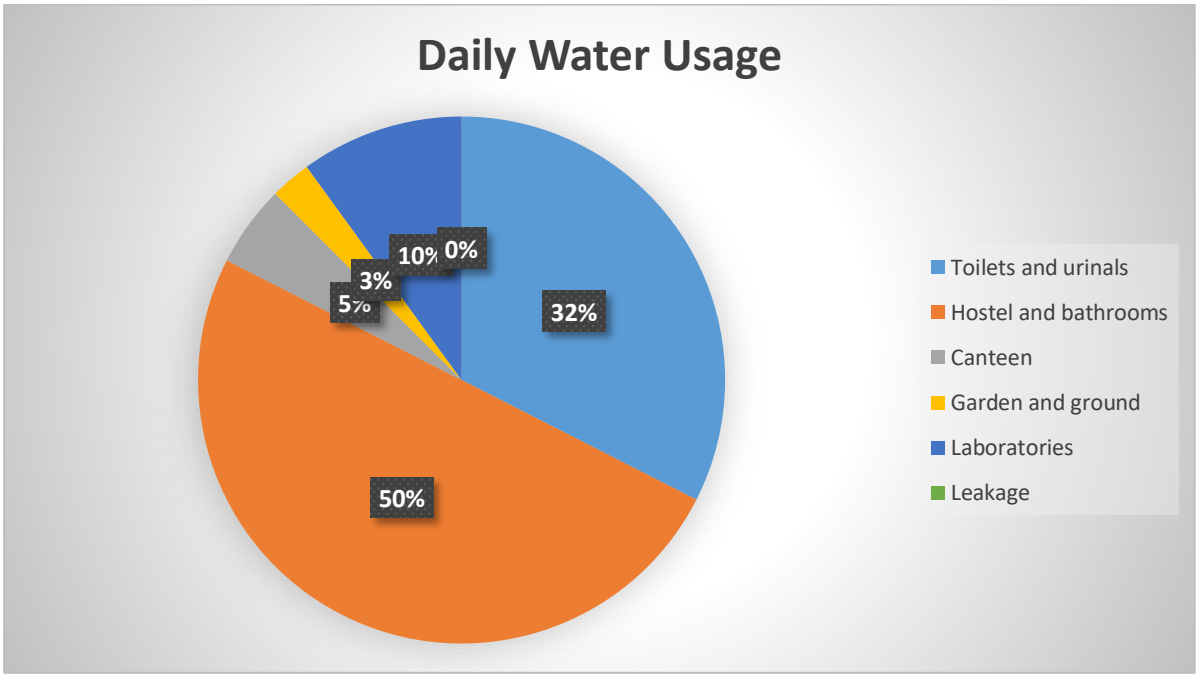
Number of Faculty and staff staying in the quarters – 2

Average distance travelled by stake holders – 20x2 km/day

Expenditure for transportation per person per day – Rs.20/-

4.2 EVALUATION OF AUDIT FINDINGS

4.2.1 WATER



2000 litres of water is used per day by the college for its different uses. The main source of water is ground water. Water from the public water supply is not utilized. **No** water is lost per day through the leaking of pipes and other misuses.

Wastage of water can be prevented. If water treatment system is installed at canteen and laboratories the amount of water lost through outlets can be recycled and utilized for gardening and toilet uses. Awareness programs for the management of sustainable water use will be highly beneficial in this college.

4.2.2 ENERGY

Energy Utilization

Appliances	Number ofappliance	Units of current per month kWh
CFL bulbs	9	17.82
LED lights	227	299.64
Fans	230	1186.24
Tube lights	100	528.00
Electrical Equipment	56	1952.83
Computers and laptops	57	1633.50

Photocopiers	5	440.00
Inverters	7	924.00
Televisions	3	19.80
Amplifier	2	11.00
CCTV	24	454.52
AC	7	231.00
Total Energy usage per month (kWh)		7698.35

Current saving methods adopted in the college

- ✓ Turn off electrical equipment when not in use
- ✓ Use energy efficient light-emitting diode (LED) bulbs instead of incandescent and CFL bulbs
- ✓ Maintain appliances and replace old appliances.
- ✓ Use computers and electronic equipment in power saving mode.

The total energy utilization of the college for different purposes is estimated approximately **7700 units/month**. By using energy saving methods, the college management cut down its energy utilization to approximately **4500 units/month.** Energy Saving is about **2200 units/month.** Increased production of solar energy a type of non-conventional category of energy will be a good energy management system for the college. Electricity charges per month are approximately **Rs. 45,000/month**. Energy saving through the replacement of CFL lamps and tube lights to LED light could be a good option. Energy efficient electrical equipment especially fans and pump sets can be replaced against old ones. Awareness programs for the stakeholders to save energy may also increase sustainability in the utilization of various energy source.

4.2.3 WASTE

❖Total Biodegradable waste = 12.5 kg/day

❖Non-biodegradable waste = 0.05 kg/day

❖Hazardous wastes = 0.01 grams/day when laboratories are fully functional

The composting facility of the college for the treatment of biodegradable waste generated from the canteen, office, vegetable garden, and from the college campus cleaning operations is not adequate. Different methods such as pit composting, vermi-composting, bacterial composting using bacterial consortium may be used to treat the biodegradable waste. Bottles, plastics, cans, broken glass wares, tins etc., may be sold out. A model solid

waste treatment system can be established in the college as a part of awareness program to the students.

4.2.4 GREEN CAMPUS

Total number of plant species identified – 16

Tree cover of the campus – 46.45 m^2

Total area for cultivation

The college has ample land surface for greening initiatives. The campus has **16** species of trees. A model arboretum will be ideal for the college. At least 50 different types of trees can be planted in the campus every year. Area demarcated for the establishment of a gardens of medicinal plants and vegetable garden, the extent of which may be increased.

4.2.5 CARBON FOOTPRINT

- Petrol used by two wheelers/day–**40** litre(Per person to and fro 40 kms =1litre)
- Fuel used by four wheelers (12 Persons) - **24** litre(Per person to and fro 40 kms = 2litre)
- Fuel for persons (total 850 persons) travelling by common transportation = **68** litre(4 litre x 50 persons)
- Total fossil fuel use is **132** litre/day.
- Total fuel cost per day for transportation **Rs. 13200/-**(132litre x Rs. 100)
- Cost of Gas cylinders used **Rs. 3500**/month (2 cylinders)
- Cost of generator fuel – **Rs. 2000**/month (1.0 litre per day)
- Amount spent for transportation (office) – **₹500**/month (Approx.)
- Amount spent for transportation (canteen) – **Rs. 500**/month (Approx.)
- Amount spent for transportation (visitors) – **Rs. 15000**/year (Approx.)
- Other expenditures for the energy – **Rs. 100**/day

Usage of fossil fuels is the main source and cause of carbon dioxide release in the atmosphere. Transportation to the college campus by students/ faculties/ others is the main source of carbon dioxide pollution. To avoid the current situation a dedicated College bus for transportation can be implemented. This initiative will reduce the total vehicle load coming into the campus. Additionally, it is advisable to plant more trees in the campus to maintain the ecological balance and reduce pollution.

4.3 LIST OF ECO-FRIENDLY ACTIVITIES GOING ON IN THE CAMPUS

- ✓ Planting and caring of trees in and around the campus.

- ✓ Segregation and timely disposal of wastes from the campus.
- ✓ Celebration of important days of significance such as World Environment Day, Earth Day, Ozone Day, etc. with great importance.
- ✓ Plastic and tobacco free practices.
- ✓ Distribution of medicinal plant saplings among students for plantation.

4.4CONSOLIDATION OF AUDIT FINDINGS

We hope that students will have developed a greater appreciation and understanding of the impact of their actions on the environment. They have successfully been able to determine the impacts on the environment through the various auditing exercises. Participating in this green auditing procedure they have gained knowledge about the need of sustainability of the college campus. It will create awareness on the use of the Earth's resources in their home, college, local community and beyond.

4.5 MAJOR AUDIT OBSERVATIONS

- ➢ The environmental awareness initiatives are good but need to be more intense.
- ➢ The installation of solar panels, training in vegetable cultivation and composting practices are inadequate.
- ➢ There is no Green policy/ environmental policy statement indicating the commitment of the college towards its environmental performance.
- ➢ Gardens inside the college premises are found well maintained.
- ➢ Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
- ➢ Programs on green initiatives should be increased. Campus is declared as plastic free (single use), stringent actions should be taken to maintain this.
- ➢ Rain water harvesting systems, solar power generation, environmental education programs have to be strengthened.

4.5.1 WATER AUDIT

- ➢ Recently, the college has adapted water consumption monitoring system in the college campus.
- ➢ The college does not have waste water treatment for waste water generated from laboratories, canteen, hostel kitchen, toilets, bathrooms and office rooms.

- The waste water from laboratories, canteen and kitchens are not suitably controlled and are not used for gardening.
- The college has to take actions to strengthen rain water harvesting. Rainwater harvesting for separate buildings are lacking. Measurement of quantity of water obtained from the rain water harvesting should be done.
- Water overflow alarm is installed on overhead tank filling.
- Per day use of water is very high and there is no control over wastage of water.
- Display boards against the misuse of water use are lacking.

4.5.2 ENERGY AUDIT

- The communication process for awareness in relation to energy conservation is found inadequate.
- Assessment of electrical load calculation is done recently by the college.
- Monthly use of electricity in the college is very low.
- There are fans of older generation and non-energy efficient which can be phase out by replacing with new energy efficient fans.
- Regular monitoring of equipment and immediate rectification of any problems.

4.5.3 WASTE AUDIT

- Solid waste management systems established are good.
- The college has proper communication with the local body and partner organization for regular collection of solid waste from the campus.
- Implementation of sustainable projects to attain set environmental goals is not in place.
- Waste bins in the class rooms; veranda, canteen and campus need to be increased.
- Proper composting systems are lacking.

4.5.4 GREEN CAMPUS AUDIT

- Tree cover of the college with respect to the stakeholder strength is not enough.
- Regular planting of trees in the campus should be done.
- Display boards to all plants identified were done recently.
- No arboretum is set up in the college campus.
- There are only very few fruit trees in the college to attract birds.
- Registry for flora and fauna on the campus is maintained.

4.5.5 CARBON FOOT PRINT AUDIT

- College has not yet taken any initiative for carbon accounting.
- Adequate common transportation facilities should be provided by the college.
- Encourage students to use cycles.
- **132** litres of fossil fuel is burned every day for communication and functioning of the college.

4.6 PREPARATION OF ACTION PLAN

Policies referring to college's management and approaches towards the use of resources need to be considered. The college should have a green policy/environmental policy for its sustainable development. The environmental policy formulated by the management of the college should be implemented meticulously. The college should have a policy on awareness raising or training programs (for ground staff or kitchen staff for example) and college also should have a procurement policy (the College's policy for purchasing materials).

4.7 FOLLOW UP ACTION AND PLANS

Green Audits are exercises which generate considerable quantities of valuable management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that action plans and implementation programs result from the findings.

Audit follow up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organisational priorities and the passing of time.

4.8 ENVIRONMENTAL EDUCATION

The following environmental education program may be implemented in the college before the next green auditing:

- Training programs in solid waste management, liquid waste management, setting up of medicinal plant nursery, water management, vegetable cultivation, tree planting, energy

management, landscape management, pollution monitoring methods, and rain water harvesting methods.

- Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.
- Activate the environmental clubs
- Set up model rainwater harvesting system, rainwater pits, vegetable garden, medicinal plant garden etc. for providing proper training to the students.
- Conduct exhibition of recyclable waste products
- Implement chemical treatment system for wastewater from the laboratories.
- Students and Staff members may be made totally aware of pollution caused by use of vehicles.
- The carbon consumption awareness programs on carbon emission at individual as well as social level will help to avoid air and noise pollution in the campus due to vehicles.

4.9 CONCLUSION AND FULL LIST OF RECOMMENDATIONS

The green audit assists in the process of testing performance in the environmental arena and is fast becoming an indispensable aid to decision making in a college. The green audit reports assist in the process of attaining an eco-friendly approach to the sustainable development of the college. Hope that the results presented in the green auditing report will serve as a guide for educating the college community on the existing environment related practices and resource sage at the college as well as spawn new activities and innovative practices. A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development. It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited organisation. An outside view, perspective and opinion often help staff who have been too close to problems or methods to see the value of alternative approaches. A green audit report is a very powerful and valuable communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

4.9.1 COMMON RECOMMENDATIONS

❖Adopt an environmental policy for the college

❖Establish a purchase policy for environmental friendly materials

❖Introduce UGC Environmental Science course to all students

❖Conduct more seminars and group discussions on environmental education

❖Students and staff can be permitted to solve local environmental problems

❖Renovation of cooking system in the canteen to save gas

❖Establish water, waste and energy management systems

4.9.2CRITERIA WISE RECOMMENDATIONS

4.9.2.1RECOMMENDATIONSFOR WATER

- ❖ Remove damaged taps and install sensitive taps.
- ❖ Drip irrigation for gardens and vegetable cultivation can be initiated.
- ❖ Establish rain water harvesting systems for each building.
- ❖ Establish water treatment systems.
- ❖ Awareness programs on water conservation to be conducted.
- ❖ Install display boards to control over exploitation of water.

4.9.2.2 RECOMMENDATIONSFOR ENERGY

- ❖ Employment of more solar panels and other renewable energy sources.
- ❖ Conduct more save energy awareness programs for students and staff.
- ❖ More energy efficient fans should be replaced.
- ❖ Observe a power saving day every year.
- ❖ Automatic power switch off systems may be introduced.

4.9.2.3 RECOMMENDATIONSFOR WASTE

- ❖ A model solid waste treatment system to be established.
- ❖ A model vermi-composting plant to be set up in the college campus.
- ❖ Avoid plastic plates and cups for in the college.

4.9.2.4RECOMMENDATIONSFOR GREEN CAMPUS

- ❖ All trees in the campus should be named scientifically.

- Create more space for planting.
- Grow potted plants at both corridor and class rooms.
- Create automatic drip irrigation system.
- Not just celebrating environment day but making it a daily habit.
- Providing funds to nature club for making campus more green

4.9.2.5RECOMMENDATIONSFOR CARBON FOOTPRINT

- Establish a system of car-pooling among the staff to reduce the number of four wheelers coming to the college.
- Introduce college bus services to the students and staff.
- Encourage students and staff to use cycles.
- Discourage the students using two wheelers for their commutation.
- More use of generators every day should be discouraged.

CHAPTER 5

EXIT MEETING

The exit meeting was conducted by Prof. Subhendu Sekhar Bag. It was a mechanism to provide the management and staff a broad feedback on the preliminary findings of the audit team before completing the audited report. The exit meeting was held in the college on 1st June, 2021. Clarification on certain information gathered was sought by the audit team from the management and staff of the college.

DRAFT AUDIT REPORT

The information gathered by the audit team was consolidated as a draft audit report. This draft report was then circulated to the audit team and those directly concerned with the audit to check the report for accuracy. The draft green audit report was also discussed in the exit meeting.

FINAL AUDIT REPORT

The final audit report is the corrected final document which contains the findings and recommendations of the audit. It will also form one of the bases of future audits because the information it contains informs some of the tests and analyses that need to be performed in the future. Final Audit Report was submitted on 14th June, 2021 to the Principal of the college.

FOLLOW UP AND ACTION PLANS

Green audits form a part of an on-going process. Innovative green initiatives have to be designed and implemented every year to make the college environmentally sustainable. Follow up programs of green auditing recommendations should be done meticulously before the next audit.

NEXT AUDIT

In order to promote continuous improvement, it is recommended to conduct the next green auditing during the year 2023.

TRANSPARENCY OF GREEN AUDIT REPORT

Green audit report is one of the useful means of demonstrating an organisation's commitment to openness and transparency. If an organisation believes it has nothing to

hide from its stakeholders, then it should feel confident enough to make its green audit reports freely available to those who request them. As a basic rule, green audit reports should be made available to all stakeholders.

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