GREEN AND ENVIRONMENT AUDIT REPORT
(2021-2022)

BRAHMAPUTRA DEGREE COLLEGE
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1. INTRODUCTION

Green and environment audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. Green and Environment 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. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. 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. 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 essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric carbon-di-oxide 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 and Environment 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.

Green and environment audit of the Brahmaputra Degree College primarily concern with the appraisal of all available natural resources, those have been endowed by birth and at present context what extent of these resources have been exploited so far and also to have a scientific future plan of remaining resources by keeping environmental sustainability in mind. To conduct an audit on such a vital issue, we have to review first about the all available resources of our environment concern and secondly their existing managerial practices and

lastly their future plan of exploitation keeping the RRR (Reduce, Reuse and Recycle) principle in mind.

2. OBJECTIVES

In recent time, the green and environment audit of an institution has been becoming a paramount important for self assessment of the institution which reflects the role of the institution in mitigating the present environmental problems. The college has been putting efforts to keep our environment clean since its inception. But the auditing of this non-scholastic effort of the college has not been documented. Therefore, the purpose of the present green and environment audit is to identify, quantify, describe and prioritize framework of environment sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out the green and environment audit for the Brahmaputra Degree College are as follows:

i. To describe the general land use pattern of the college
ii. To document the floral and faunal diversity of the college
iii. To review the status of ambient environmental conditions of the college
iv. To document the waste generation and review the waste disposal system of the college
v. To document the energy uses and conservation in the college
vi. To analyze the awareness level within the college premise for environmental policy.

3. METHODOLOGY

The purpose of the green and environment audit of Brahmaputra Degree College is to ensure that the practices followed in the campus are in accordance with the green policy adopted by the institution. The methodology adopted in order to perform the green audit for the college included different approaches and tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis. Further, suggestion and recommendations were formulated based on the collated data and based on standard rules, regulations and literature. The study covered the following areas to describe the present environmental conditions of the campus and its management thereof:

- Land resource and pattern of utilization
- Campus Biodiversity

- Water Quality, Use and Management
- Energy Usage and Conservation
- Waste Generation and Waste management
- Campus Cleanliness

4. OBSERVATIONS

4.1. ABOUT THE COLLEGE

The Brahmaputra Degree College was established in the year 1993 by the educational zeal of the visionaries and by the dedicated efforts of the local community of greater Kherkata area belonging to the Dhakuakhana sub division, in the Lakhimpur district of Assam, with Bakulguri as its centre of location. The college was envisioned and established as a source and centre for the dissemination of the value of higher education so that its benefits could be reaped by the students from the remote rural community and its adjacent areas. The college is affiliated to the Dibrugarh University and received UGC recognition under Section 2F and 12B of the UGC Act 1956.The college has introduced CBCS courses in its curriculum in the year 2019 and at present the college offer courses only in the arts stream. The college trains the students to be morally sound, socially conscious and intellectually capable so that they are an example and an asset for the society. The college has adapted to the latest educational methods in order to provide best system of education required in the world today.

4.2 VISION AND MISSION OF COLLEGE

VISION

To make accessible for all, affordable and excellent centers of higher education in order to create an environment of acquiring academic knowledge and skill development with high social values.

MISSION

To provide affordable but value based and quality education by identifying hidden talents in their respective chosen streams and provide opportunities to realize their full potential in order to shape them into accomplished and capable persons of the country.

4.3 GREEN AND ENVIRONMENT AUDITING

The college has adopted the 'Green Campus' system for environmental conservation and sustainability. There are main three pillars i.e. zero environmental foot print, positive impact on occupant health and performance and 100% graduates demonstrating environmental literacy. The goal is to reduce CO_2 emission, energy and water use, while creating atmosphere where students can learn and be healthy.

Table 1: Population of the College

1	Total number of students	UG	332
2	Number of teaching staff	Permanent	17
3	Number of teaching staff	Others	12
4	Number of non-teaching staff	Permanent	10
5	Number of non-teaching staff	Others	1

4.4 GENERAL ENVIRONMENTAL SETTING

Lakhimpur district of Assam is located between $26^0 48' 00''$ and $27^0 53' 00''$ (N) and $93^0 42' 00''$ and $94^0 20' 00''$ (E). The district is bounded by the Siang and Papum Pare district of Arunachal Pradesh on the north, by Dhemaji district and Subansiri River on the east, Majuli Sub Division on the south and Gohpur sub division on the west. Climatologically, the district is characterised as subtropical with high humidity and high rainfall. The average annual rainfall is 3268 mm with as relative humidity of 74%. Lakhimpur district receives the monsoon rainfall from the month of April and continues up to September/October. Northern part of the district which is geographically located at the foothills of Arunachal Himalayas, receives the maximum rainfall within the district. The maximum temperature in the district 6 reaches up to 35°C during June / July and the minimum temperature falls to around 8°C in the months of December and January. Based on geology and hydrogeological characteristics, the district has two distinct hydrogeological units - semi-consolidated and unconsolidated formations. The semi-consolidated formation is composed of Neogene Siwalik Group of rocks bordering the northern boundary of the district.

5. LAND RESOURCE AND PATTERN OF UTILIZATION

Brahmaputra Degree College has a total land holding of 45 bighas 6,48,000 square feets (including 20385 sq. ft which is covered by pond) of which approximately 3,60,400 square feets of the total area can be classified as under green cover (Table 2). The presence of four gardens and forest area inside the campus (5,308 sq.ft. and 1,72,515 sq.ft.) augments the aesthetic value of the college.

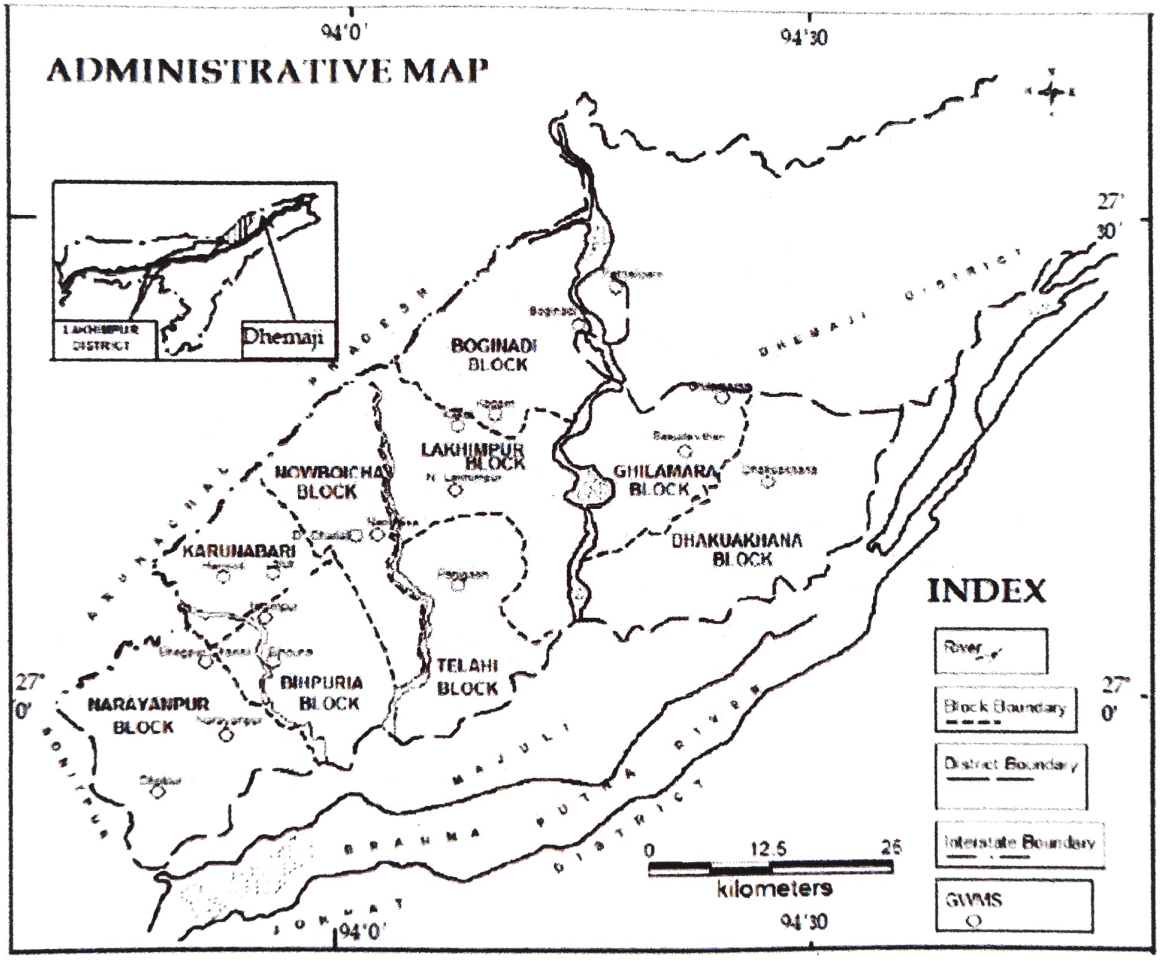


Figure 1: Administrative map of Brahmaputra Degree College

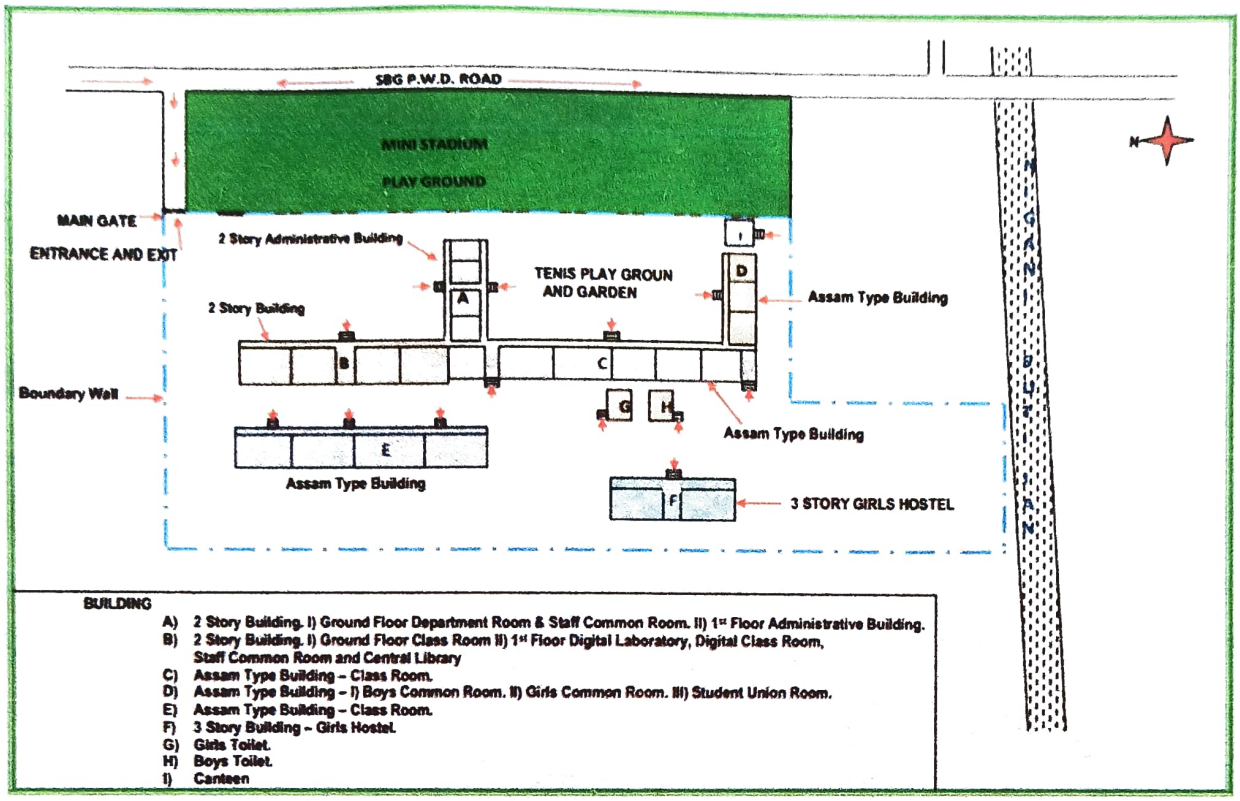


Figure 2: Map of Brahmaputra Degree College

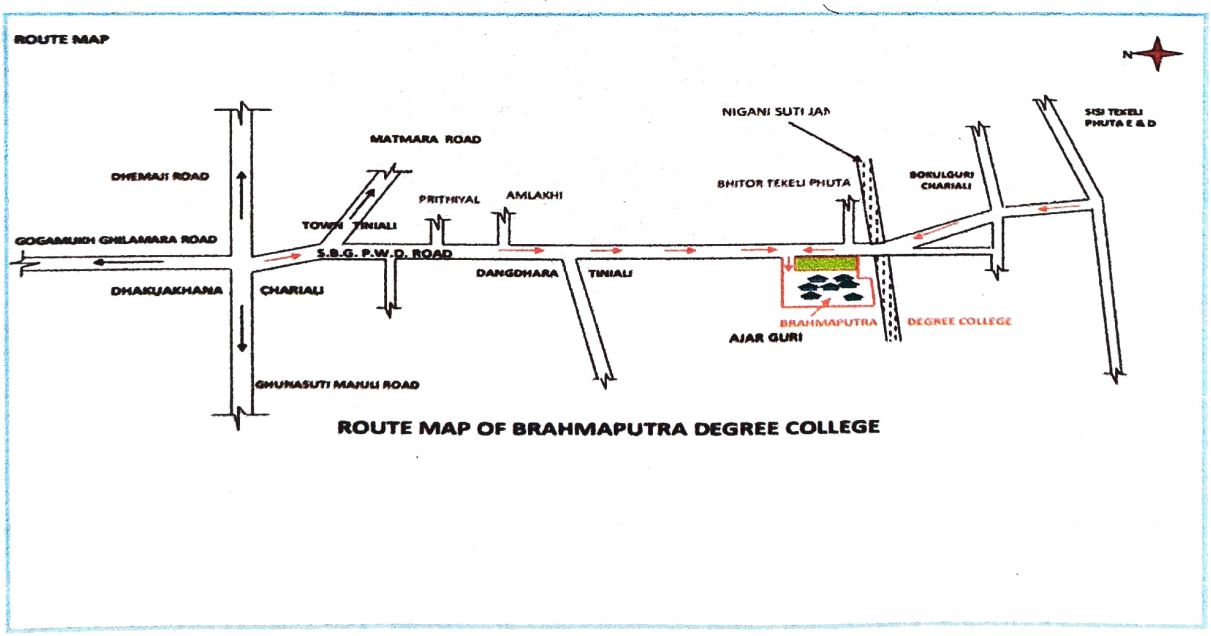


Figure 3: Route Map of Brahmaputra Degree College

The total land holding of the college is declared to be around 6,48,000 square feets. Considering the gardens, forest, waterbodies etc. present inside the college campus, it can be

said that the around 30-40% of total area provides a good ecological habitat for a wide variety of flora and fauna which are listed in the following pages.

Table 2: Land resource and pattern of utilization

Total Land	**Pattern of use**							
6,48,000 sq. ft.	Used for construction (sq ft.)				Open area (sq ft.)			
	Building	Roads			Play Ground			
	RCC and Assam type	Concrete /Black topped	Pavement tiles	Cacha	Synthetic	Natural Grassland	Garden	Forest
	47,405 sq. ft	4,440 sq. ft	Nil	3,200 sq. ft.	Nil	3,60,400 sq. ft.	5,308 sq.ft.	1,72,515 sq.ft.

Figure 4: Play Ground of Brahmaputra Degree College

Figure 5: Garden Area of Brahmaputra Degree College

Table 3: List of fishes found in the ponds of the college

Local name	Scientific name
Goroi	Channa punctata
Sengeli	Channa gachua
Hol	Channa striata
Kawoi	Anabas testudineus
Rou	Labeo rohita
Bahu	Catla catla
Puthi	Puntius sarana
Hingi	Heteropneutes fossilis
Kholihona	Trichogaster fasciata

Table 4: List Herpeto fauna observed in the campus

Common name	Scientific name
Asian tree frog	Chirixalus simus
Jerdon`s bullfrog	Hoplobatrachus crassus
Asian bullfrog	Hoplobatrachus tigerinus
Garden skink lizard	Eutropis carinata
Common house gecko	Hemidactylus frenatus
Indian rat snack	Ptyas mucosa
Indian Cobra	Naja naja
Printed bronze back	Dendrelaphis pictus

Table 5: List of Avifauna

Common name	Scientific name
Asian koel	Eudynamys scolopaceus
Indian pied Maina	Gracupica contra
Common Maina	Acridotheres tristis
Jungle Maina	Acridotheres fuscus
Black Drongo	Dicrurus macrocercus
Common tailor bird	Orthotomus sutorius
Black hooded Oriole	Oriolus xanthornus

House Crow	Corvus splendens
House Sparrow	Passer domesticus
Crimson sunbird	Aethopyga siparaja
Red vented Bulbul	Pycnonotus cafer
White throated kingfisher	Halcyon smyrnensis
Common kingfisher	Alcedo atthis
White breated water hen	Amaurornis phoenicurus
Coppersmith Barbet	Megalaima haemacephala
Indian pond Heron	Ardeola grayii
Domestic Duck/wild duck	Anas platyrhynchos
Barn Owl	Tyto alba
Domestic pigeon/ rock dove	Columba livia domestica
Spotted Dove	Stigmatopelia chinensis

Table 6: List of Trees found in the college campus

Local name	Scientific name
Krishna chura	Delonix regia
Moha-neem	Azadirachta indica
Amlokhi	Emblica officinalis Geartn
Ajar	Lagerstroemia flos-reginae Retz
Aam	Mangifera indica, linn
Ghora neem	Melia azedarach linn
Nahor	Mesus ferrea linn
Debadaru	Polyathia longifolia sonn. Var. pendula
Modhuri-Aam	Psidium guajava L.
Kola jamu	Syzygium cumini(L) Skeels
Bogi jamu	Syzygium jambos(L) Alston
Silikha	Terminalia chebula Retz
Bogori	Zizyphus mauritiana. Lam
Jati Bah	Bambusa tulda
Rain Tree	Samanea Saman
Joba Ful	Hibiscus rosa sinensis L.
O`tenga	Dillenia Indica
Ahot	Ficus religiosa

Table 7: List of herbs found in the college campus

Local name	Scientific name
Bor manimoni	Centilla asiatica
Duboribon	Cynodon dactylon
Lai jabori	Drymaria cordata
Man dhania	Eryngium foetidum
Saru manimoni	Hydrocotyl rotundifolia
Kolmow	Impomoea aquatic
Boga doron	Leucus linifolia
Keturi halodhi	Martanta arudinaceae
Poduna	Menthe arvensis
Lajuki bon	Mimosa pudica
Kolia tulosi	Ocimum sanctum
Bor tengashi	Oxalis corniculata
Soru tengashi	Oxalis corniculata
Bihlongoni	Polygonum hydropiper
Bon jolokia	Scoparia dulsis
Seujia kachu	Alocasia fornicate
Man kochu	Alocasia indica
Mati Kaduri	Alternanthera sessilis
Khutura sak	Amaranthus virdis

Table 8: Water resource, exploitation and conservation.

Water resource Enjoyed/Year			Water Resource Consumed (Reservoir Capacity) liters/Month					
Total precipitation/ Annual	Surface water	Ground water	Canteen	Hostels	Office 1000L	Laboratories	Student Toilets 1000L	Class room
2828 mm			1000 L	2000 L	1000 L	Nil	1000L	500L

Table 9: Celebration of World Environment Day in different years

Sl.No	Date & Year	Organized by	Number of students participated	Location
1	05-06-2017 (World Environment Day)	NSS Unit & IQAC	60	College Premise
2	05-06-2018 (World Environment Day) Sapling plantation	NSS Unit & IQAC	62	College Premise
3	05-06-2019 (World Environment Day) Sapling plantation	NSS Unit & IQAC	21	College Premise
4	05-06-2021 (World Environment Day)	NSS Unit	21	College Premise
5	05-06-2022 (World Environment Day)	NSS Unit	20	College Premise

Figure 6: A few snapshots of plantation programme

Table 10: Special Environmental activities in the year 2017 -2022

Name of the activity	Organising unit/ Agency/ Collaborating Agency	Name of the Scheme	Year of the activity	Number of students participated
Cleanliness programme, shramdan programme, health awerness and health check up	NSS Unit, Brahmaputra Degree College	Clean India Programme	23rd February, 2018	81
Erosion Protection camp	NSS Unit, Brahmaputra Degree	Embankment protection programme	12th August, 2018	30

	College			
Embankment Erosion Protection programme	Brahmaputra Degree College	Tekeliphuta dike, Brahmaputr River	16th February, 2019	51
Plastic Free Challenge	NSS Unit, Brahmaputra Degree College	Clean India programme	25th to 30th Sep, 2019	56
Embankment Erosion protection programme	Brahmaputra Degree College	Moderguri dyke, Brahmaputra River	3rd March, 2021	41
Plastic and Waste Collection Drive	NSS Unit, Brahmaputra Degree College	Clean India programme	24th to 30th Oct. 2021	46
Cleanliness Drive	NSS Unit, Brahmaputra Degree College	Clean India programme	8th to 24rt March, 2022	81

6. DRINKING WATER QUALITY

Drinking water in the college campus is mainly extracted from the groundwater aquifer through deep boring wells and using submersible pumps. The water extracted is used for drinking is collected by individuals from the electrical filters. (Fig.7). Drinking water quality data is currently not available and hence the present audit team referred to earlier published data from the locality. The audit team referred to the Central Groundwater Board data booklet for Lakhimpur district. According to that report, the major chemical parameters were within the permissible limits as specified by BIS (2003), except for high concentration of iron which ranged from 0.16 to 3.76 mg/l in most of the area of the district. Similarly, another study reported that Iron content generally varied from 0.13 to 6.98 mg/l. Thus, it is observed that iron content is generally high in the district and generally associated with permanently water-logged areas. Therefore, treatment of groundwater for Iron shall be a general necessity for locations across the district including the Brahmaputra Degree College. Staining due to high iron concentration in groundwater is a major aesthetic problem. Apart from that, another study on groundwater quality of Lakhimpur district reported that of the total samples tested in

the research, 5% had Arsenic content above the ISI limit of 0.05mg/L. Thus, based on data available from secondary sources, it is suggested that the college should test its own groundwater quality through an agency like PCBA, IASST, IIT etc. for ascertaining the concentrations of health-wise significant parameters like Fluoride, Arsenic, Heavy metals etc.

Figure 7: Source and supply of drinking water in the college campus

The college has to cater to water needs of a population of more than 370 persons per day. Although the groundwater potential of Lakhimpur district is depicted to be very high as per CWGB reports, yet, the extraction is not recommended for various reasons. Particularly, to avoid geogenic contamination of drinking water due to Arsenic, Fluoride, heavy metals etc., the use of groundwater should be avoided. Electricity consumption can also be reduced if, the number of times the water is being pumped is reduced. This can be achieved by using surface

water supply sources like ponds and also through using rain water. The college has started an initiate of two rain water harvesting units which is capable of storing 1000 Litres. But this facility should be augmented by making arrangement for each and every building and also make provisions for groundwater recharge using the rain water. Such steps will play an important role, if not large, in maintaining the overall water balance in the long run.

Figure 8: Rainwater harvesting unit

7. WASTE MANAGEMENT

Any educational institution can generate different kinds of wastes depending upon the population, the type of curriculum, facilities etc. of the institute. The college has a total population of more than 360 persons during working hours. The college offers only arts courses which are capable of generating solid wastes and e-wastes. The college authority has installed more than 20 nos. of waste collection bins across the entire college campus. The college has also installed an incinerator for disposal of sanitary napkins. Although the college has taken up a good initiative for waste management, but such activities are not adequate. Further, there is a necessity to review existing working policies of the college with regards to compliance of environmental rules and regulations, e.g., there is the necessity of installing colour coded bins in biological for waste segregation as per Indian rules. Additionally, e-

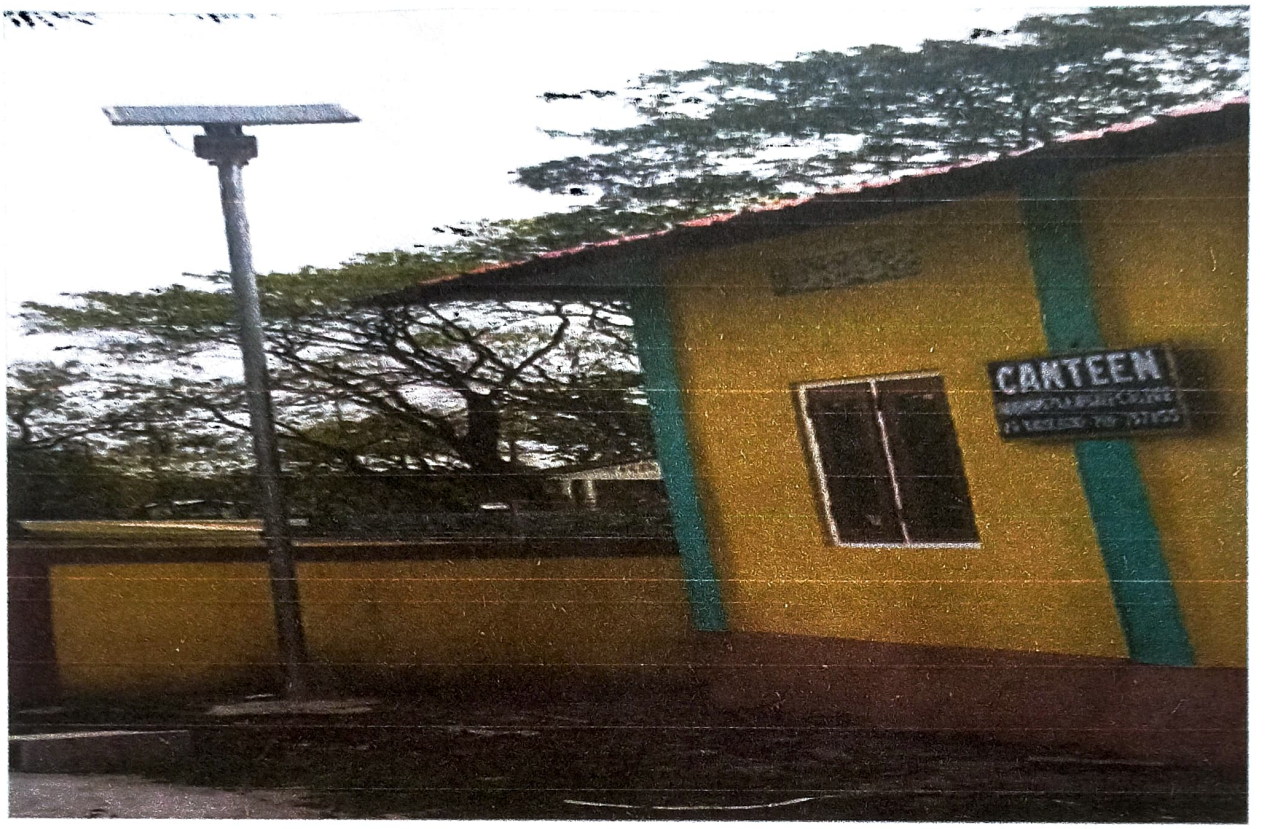
wastes should be managed as per standard guidelines issued by PCBA and CPCB wherein recognised e-waste dealers needs to be assigned for dealing with e-wastes.

8. CAMPUS CLEANLINESS

In matters of cleanliness in educational institutes and also in our personal lives we may seek motivation in the words of Benjamin Disraeli – "Cleanliness and order are not matters of instinct; they are matters of education, and like most great things, you must cultivate a taste form them". It is worth mentioning that the Lakhimpur Girls' College is doing all that needs to be done in pursuing a clean campus and have also strived hard to inculcate the virtue of cleanliness among the students through various activities. The college has conducted many cleaning programmes in tandem with the national flagship programme of Swachh Bharat Abhiyan. The college authority has also constructed permanent, concrete dustbins within the campus apart from the portable plastic dustbin located across the whole campus.

9. ENERGY USE AND CONSERVATION

Energy crisis is one of the most important environmental issues in the age of Anthropocene. Every individual and organization must strive for conservation of energy and reduce dependence on conventional energy sources. Educational institutes have the moral responsibility towards preaching and practicing the concept of energy conservation. Brahmaputra Degree College used 2 nos. of water motors, 132 nos. of fan and 144 nos. of CFL bulbs. The college has installed 2 nos. of solar street lamps, yet it is hugely dependent upon the conventional electricity being supplied by APDCL. The college is spending a large sum of money for electricity bills, which totals to a tune of around Rs. 42,000 per year (based on last financial year data). However, considering the open space available in the campus, the college can adopt a comprehensive plan for setting up solar power grid which will help in saving conventional energy as well as finances. The government of Assam has specific solar power programmes. Usage of rainwater harvesting systems and use of treated water from ponds and wetlands will reduce the necessity of extracting groundwater using electrical water pumps. This will minimize further consumption of electricity and decrease the financial load of the college.



10. BEST ENVIRONMENTAL PRACTICES

Nowadays every educational institution takes up some kind of regular activities that are thought to promote environmental sustainability. However, only few of such activities are taken up on longer term basis or are set up permanently to serve for many years to come. Such activities are capable of inculcating positive mindset among the staff and students of the institute. These activities are generally termed as best environmental practices which in the long run are capable of bringing about behavioural change and also contribute to sustainability in truest sense. Brahmaputra Degree College has also tried to establish such best practices. Five such practices observed by the audit team are:

ii. The college authority has installed an incinerator in the campus for disposal of sanitary napkins. Incineration is considered to be the best kind of disposal in respect of disposable sanitary napkins. However, the college should take up necessary steps for complying with the rules with regards to emission standards for bi-medical waste incinerators.

ii. The college has installed 4 numbers of solar street lamps. This is a small but a sustainable initiative towards energy conservation. Given the size of the campus, the no. of solar powered lighting and appliances can be increased substantially

iii. The college has installed 2 units of rain water harvesting in the administrative building. The rainwater from the rooftop is collected via PVC ducts and stored in a1000Ltr reservoir. This can be considered to be a small experimental initiative, which the audit team recommends to be augmented and replicated for other official and residential units.

iv. The audit team recognises the NSS unit of the college as one the most active and important component with respect to development of environmental management plan of the college. The extra-curricular environmental activities performed by the NSS unit are —

- Plantation Programmes
- Environment Awareness Programmes
- Celebration of environmentally important days like- World Environment day, World water day, Earth day, etc.
- Supplying bags to hostel boarders for shopping (to reduce polythene in the campus).

These activities are capable of building environmentally sensitive character of the students who can transform themselves as environmental stewards.

11. AUDIT RECOMMMENDATIONS

In view of the facts and figures found by the Environment Audit committee and the experts the following suggestions are offered to the college:

I. More plantations is needed to increase the green coverage of the campus'

II. The college needs to devise more effective measures for disposing solid wastes and e-wastes.

III. The college should generate more power from the non-conventional energy sources reducing its dependence on the electricity provided by the Assam Power Distribution Corporation Limited.

IV. Effective measures should be taken for scientific management of water resources particularly rain water and ground water.

V. The college authority should try to develop programs to engage more students across all dwpartments in various environmental activities apart from those who are NSS members. The activities taken up by these units should continue and carried out regularly.

VI. The college authority should set up an empowered cell/committee or entrust the IQAC for establishing rules and norms within the campus so as to comply with various rules implemented under the Environmental Protection Act,1986 and its subsequent amendments.

VII. Inculcate discipline and sense of participation in the energy conservation movement, any

unnecessary lighting during day period should be avoided through awareness programmes.

VIII. Intensive monitoring/inspection in order to ensure the minimum use of artificial light.

IX. It is recommended that all luminaries should be converted to energy efficient LED as an energy conservation measures.

X. Installation of master switch outside in each room which will help to switch off all electrical appliances during non-working hour.

XI. Tubular daylight devices to maximize the use of daylight which will reduce the energy consumption

12. CONCLUSION

Green and environment audit is one of the most efficient ways to identify the strength and weakness in strategies and approaches of making an organization environmentally sustainable. Green audits can 'add value' to the managing environmental risks (known and unknown). Green and environment audit is one of the most important activities that comes under the NAAC assessment. It is a mandatory activity which can go a long way in making an educational institution truly sustainable. Based upon the data provided by the college authority, it can be apprehended that there is scope for further improvement,particulararly in relation to management of water and energy resources as well as that of waste. The recommendations in this report highlight many ways in which the college can work to improve its actions and become a more sustainable institution.

13. ACKNOWLEDGEMENT

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