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GREEN AND ENERGY AUDIT REPORT 2023-2024

BAPUJEE COLLEGE, SARUKSHETRI

Bapuji Nager, Sarthebari, Assam 781307

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ACKNOWLEDGEMENT

Unprecedented changes in climate and related environmental disruptions have compelled us to adopt recent sustainable development policies throughout the globe. In this context, the University Grants Commission of India has launched "Green Campus Clean Campus" mission for all higher educational institutions of India. The National Assessment and Accreditation Council (NAAC) also made "Environmental Consciousness" as one of the mandatory criterion for grading educational institutes.

Bapujee College, Sarukshetri is therefore committed to create an ecologically sound campus by implementing some eco-friendly practices. The present report is the first ever Green Audit Report of the College which looked forward to identify the environment related issues in the college campus and to monitor the environmental management practices adopted by the college. A few suggestions were also made to take environmental protection to higher levels. It is hoped that the report will certainly receive due attention of the concerned authority and the College shall implement the green practices whatever suggested for better future of all stakeholders of the Bapujee College, Sarukshetri.

Dr. Ramesh Das, Principal, Bapujee College, Sarukshetri deserves the appreciation for his initiative in conducting the Green Audit for the college. The Audit team is thankful to all the students, officiating members of Offices and faculty members of the college for their support and co-operation to compile and complete this report on time. Special thanks are due to Mr. Pranab Kr. Sarma, Mr. Bhabananda Das and Mr. Chimoy Raj Saikia of Bapujee College, Sarukshetri for their whole hearted support during the audit process and for rendering help in taking a few photographs of the campus.

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ABOUT BAPUJEE COLLEGE, SARUKSHETRI

Bapujee College, Sarukshetri was established on 7th of April, 1970 as a part of a nationwide campaign for higher education and youth empowerment. It is the one of oldest college under Barpeta District of Assam and has been affiliated to Gauhati University w. e. f 1971. The college is situated at 26036/13// N and 91023/ 20// E at Bapujee Nagar of historic Sarthebari town which is located almost 85 kms from the Guwahati city of Assam. The site is covered by greenery in a semi urban locality.

After coming under the fold of Deficit Grants-in-Aid system of Govt. of Assam in the year 1985, the College has been showing the marks of progress in all respects to the satisfaction of the young students and guardians along with the elite education-enthusiasts of greater Sarukshetri Mouza (region) in last couple of decades. The serene beauty and eco-friendly campus of the College with beautiful garden and play ground is conducive to the pursuit of academic activities.

Photo 1 : The Bapujee College, Sarukshetri Campus

With the nine full-fledged departments under the faculty of Arts, Bapujee College, Sarukshetri continues to add new feathers in its cap so far as its academic excellence is concerned. The sustained endeavour and efforts of the College towards quality education and the focus on all round development of younger generation of the economically weaker section of the society is commendable. The college has therefore been accredited with 'B+' and 'B' grade by the National Assessment and Accreditation Council (NAAC) in the year 2004 and in 2016 respectively.

A total of 800 students enrolled in the UG courses (including HS programme) at Bapujee College, Sarukshetri in the session 2022-2023 against the 25 faculty members including one librarian. There are 14 supporting staffs at present in the college. The Principal is the chief executive of the college and the Vice Principal who has been nominated from the teachers is assisting him in academic activities.

GREEN AUDIT AT BAPUJEE COLLEGE, SARUKSHETRI

Participating in the "Green Campus, Clean Campus" mission launched by the University Grants Commission for all higher educational institution of India and in compliance with the 'Environmental Consciousness', a mandatory criterion of National Assessment and Accreditation Council (NAAC), the sustainability and sustainable development policies are kept on the agenda of Bapujee College, Sarukshetri. Green Audit is one of the steps which has therefore been taken up by the College in order to record, document, analyse and report of the environmental constituents of the college through an impartial and inclusive method. It is anticipated that Green Auditing has helped the institute in preserving the rich floral and faunal diversity in and around the campus; garnering interest and creating awareness among the stakeholders.

Bapujee College, Sarukshetri is committed to responsible stewardship of resources and to demonstrate leadership in sustainable academic practices for a better tomorrow with the policy goals of Green audit as follows:

- Identification and documentation of the eco-friendly practices for a sustainable college campus
- Increasing awareness among all stakeholders for sustainable use of available resources.
- Collection of baseline data on different components of environment before converting into threat to the college and the society.

To achieve the aforementioned goals, the present audit endeavours towards the following objectives:

- To identify current and emerging environmental issues.
- To monitor environmental management practices.
- To create awareness among the various stakeholders of the College.
- To prepare a status report on environmental compliances

AUDIT STAGE

Green auditing is the process of identifying and determining whether the College maintains eco-friendly and sustainable practices. As an effective ecological tool, it helps to create a culture of sustainability as an administrative policy throughout an organization and it needs to be implemented through regular identification, quantification, documenting, reporting and monitoring of environmentally important components.

Green auditing in Bapujee College, Sarukshetri began with the formation of the Green Audit team incorporating faculty members and researchers of Gauhati University and Bapujee College, Sarukshetri. The audit team visited the campus on regular basis and monitored different facilities from the audit perspectives and, simultaneously made the assessment of the status of the green cover of the Institution followed by waste management practices and energy conservation strategies, etc. Data collection was done by onsite visit through structured questionnaires in different sectors such as water, energy, waste, biodiversity status. The data were collated accordingly and analyzed to prepare this Green Audit report of Bapujee College, Sarukshetri. The Audit team was led by Prof. Partha Pratim Baruah, Department of Botany, Gauhati University and Chairperson, Gauhati University Green Audit Committee (2019-2022).

METHODOLOGY ADOPTED

The methodology adopted to conduct the Green Audit of Bapujee College, Sarukshetri had the following components

- On site field visits by the Green Audit Team at and when necessary.
- Data collections were done through distribution of structured questionnaires amongst different stakeholders and interviews with the executives, official staffs and general students.
- The water quality analysis was done at the Plant Ecology Laboratory of Gauhati University.
- The energy audit was also made based on the available information provided.
- Different standard taxonomic and ecological protocols were followed to document and estimate the floral and faunal account for biodiversity audit.

POST AUDIT STAGE
LAND USE AND LAND COVER

Located inside as the thinly populated township, the Bapujee College, Sarukshetri campus is flat piece of land without having any undulation in the topography. The present survey revealed that the college campus has been accommodated in a total area of 18.016 acres of land in two campuses managed with a master plan and having dedicated spaces for three smaller gardens including one Medicinal plant Garden and a playground. Regular plantations since the inception of the College make it lush green campus. The trees not only support as sound barriers, but also house a wide spectrum of epiphytic flora and fauna. Organized plantations in the campus are seen along the academic buildings. The topography of campus shows periodic inundation problems due to interference from the nearby residential areas, which the College is trying to mitigate by constructing a drain leading to nearby ponds one inside the campus and other just in the vicinity.

Observations

- Eco-friendly green campus is the commendable green initiatives of the College.
- Disturbance is less in dedicated green areas/gardens.
- Avenue trees including sound barriers lack attention.
- Drainage links were found to be missing.

Suggestions and Recommendations

- A task force is to be constituted for monitoring and maintaining the gardens.
- Timely pruning of avenue trees and sound braking trees is suggested to increase aesthetic beauty of the campus.
- Post plantation of saplings needs to be monitored.

Fig 1: The Map of Bapujee College, Sarukshetri campus

WATER AUDIT

Water is an essential natural resource. Hence it is essential to examine the quality and usage of water in the campus. Water auditing is a way to conduct a study on balance between demand and supply of potable and usable water including the quality of the available water. Water audit is therefore considered as an effective management tool for minimizing losses, optimizing various uses leading to conservation of water. Water audit improves the knowledge and documentation of the distribution system, identifies the problem of seepage and leakage leading to reduce water losses, generates ideas for possible recycling of water and the use of rain water. Above all, such auditing improves financial performance of an institute in long run.

Water Management

The source of water used in the Bapujee College, Sarukshetri is the ground water. A total of 2500 L of water is pumped out through water pumps every day (Table 1), of which, around 1500 L of water is used by the College per day including the office / canteen uses (amount could not be estimated) and lavatory uses.

Table 1: Source and usage

Sl no	Parameters	Response
1	Source of water	Ground water
2	No of Wells	NA
3	No of Hand pumps	2
4	No of Over head tanks	2
5	No of water pumps used	2
6	Horse power- water pumps	2.0 HP –one; 1.0 HP- Two
7	Depth of well (boring)	60 ft
8	Water level	Normal
9	Type of water tanks	Reservoir
10	Capacity of Tank/ reservoir (Total)	4000 L
11	Quantity of water pumped every day	2500 L per day
12	Indication of water wastage with reasons	No wastage of water was seen excluding little *overflow from water tanks/ taps*
13	Water usage for gardening	400 L per day
14	Use of waste water	No
15	Fate of wastewater from labs	Not attended
16	Any wastewater treatment for lab water	No
17	Whether any green chemistry method practiced in Labs	NA
18	Rain water harvest available?	Yes
19	No of units and amount of water harvested	One Capacity 1000 L
20	No of leaky taps	few
21	Amount of water lost per day	Around 200 L
21	water management plan used	Display card is missing
22	water saving techniques followed	Substantially less
23	Signage for reminding peoples to turn off tap	No
24	Cleaning of the reservoirs	Occasional

Fig 2 : Awareness among the stakeholders regarding water conservation

WATER QUALITY ASSESSMENT

Water samples were collected randomly from the sources and analyzed for various physico-chemical parameters (Table 2). All parameters were found under permissible limits as prescribed by different agencies.

Table 2: Water quality analysis report

Sl No	Parameters	Values
1	pH	6.7-6.9
2	Total Hardness (mg/l)	78-108
3	Alkalinity (mg/l)	72-140
4	Turbidity (N.T.U)	1-2
5	Calcium Hardness (mg/l)	64-76
6	Total Dissolved Solids (mg/l)	22-26
7	Sulphates (mg/l)	0
8	Chloride(mg/l)	22-40
9	Fluoride (mg/l)	Not traced
10	Residual Chlorine (mg/l)	Nil
11	Iron (mg/l)	0.24-0.26
12	Nitrate (mg/l)	Nil
13	Arsenic (mg/l)	Nil
14	Manganese (mg/l)	0.12-0.19
15	Magnesium (mg/l)	8-14
16	Bacteriological count	Nil

Observations

- The College is concerned with judicious use of water.
- Awareness for saving water is relatively high amongst the stakeholders.
- Little wastage of water was marked where attention is required
- Display signage for water conservation and regular monitoring were not seen for water conservation.
- The waste water from canteen and kitchens are not suitably controlled.

Suggestions and recommendations

- A proper water consumption monitoring system could be engaged to make zero water loss in future.
- Strengthening of rain water harvesting for each building could be done.
- Automated sensors can be installed in order to prevent the over flow of water from tanks.
- Awareness campaigns can be held in the campus for the fresh students to save water every year.
- Periodical maintenance of water taps/ water pipes/reservoirs should be done in order to prevent the leakage of water through taps.

AUDITING FOR WASTE MANAGEMENT

Any activities in an establishment create waste and the prime question is how efficiently it could be handled to avoid any kind of health problems out of it. Pollution from waste is aesthetically unpleasing and results in generation of large amounts of litters in our surroundings. A college can generate three types of wastes viz., solid waste, liquid waste and hazardous waste. Solid waste again can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Further attention must be taken against hazardous waste that is likely to be a threat to health of the environment. As unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water, and produce greenhouse gases contributing to global climate change respectively. The auditor diagnoses the prevailing waste disposal policies of the college and suggests the best way to combat the problems.

Status of Waste Generation

In the college, only paper and plastic wastes were recorded to be generated in the Administrative Blocks and in the Canteen whereas, organic waste was found to be more in the Canteen premises. Bio-medical waste and e-waste was almost nil during the survey. Waste in academic departments was negligible and whatever generated are systematically disposed off through the sweeping mechanism. The litters including regularly fallen twigs and leaves from the plants and trees were found to be dumped over and are kept unattended. A table is given here to show an estimated generation of different types of waste on monthly basis in the Bapujee College, Sarukshetri premises based on interview and data received through a structured questionnaire.

Table 3 : Waste generated on the campus (per monthly basis)

Sl.no.	Stakeholders	Types of solid waste	Average waste generated/month
1	Academic Department	Paper waste	0.45kg
		Plastic waste	0.1 kg
		Organic waste	1.2 kg
		E-waste	Nil
		Biomedical waste	Nil
2	Administrative Office	Paper waste	5 kg
		Plastic waste	0.5 kg
		Organic waste	2.5 kg
		E-waste	Nil
		Biomedical waste	Nil
3	Canteens	Paper waste	1.2kg
		Plastic waste	2.5 kg
		Organic waste	12 kg
		E-waste	Nil
		Biomedical waste	Nil

Waste Management

Though no segregation practice has been adopted to separate different wastes, the college is still committed to keep the campus clean. Installation of dustbins has been started in a phase manner. Signages are not seen to aware the stack holders to use different coloured dustbins for disposing any waste. This initiative needs to be taken by the College.

During a survey carried out among the stockholders of Bapujee College, Sarukshetri by the Green Audit Team, a majority of the respondents (92 %) were confident about their understanding of waste and their obligation in disposing of the same (**Fig. 3**).

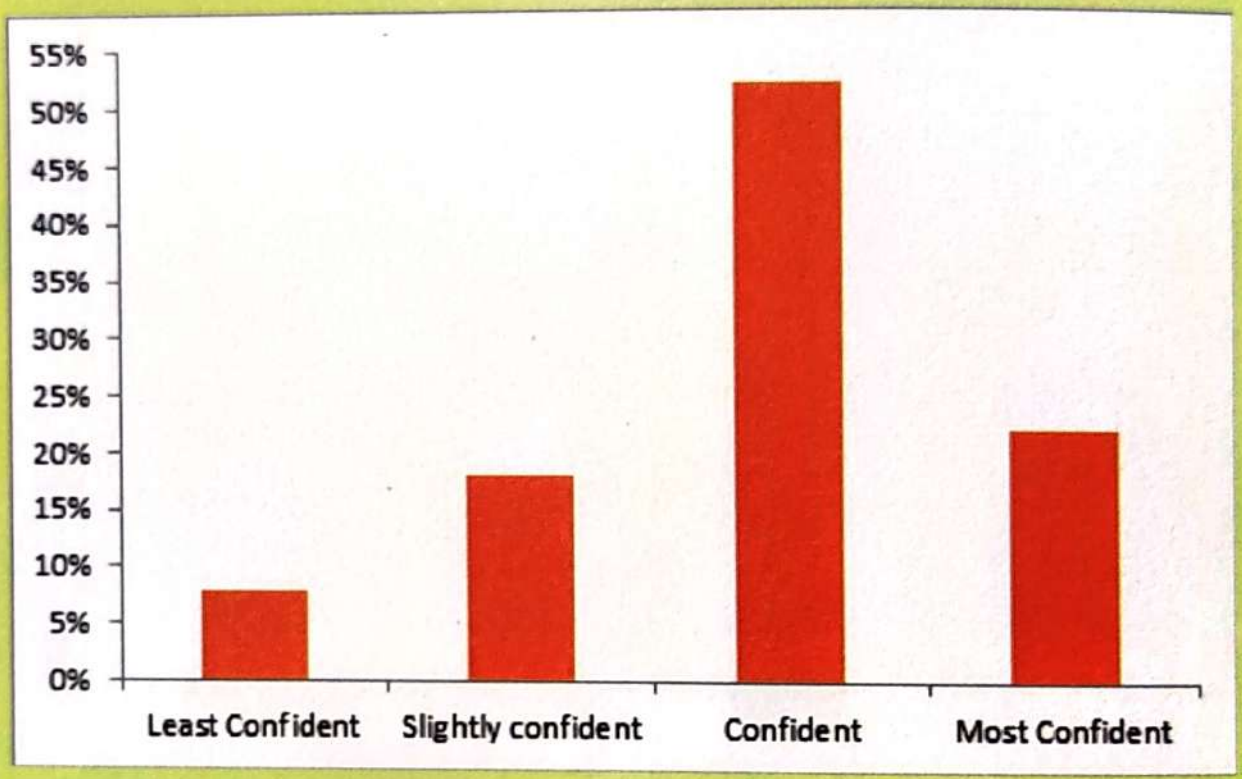


Fig 3: Opinion of stakeholders regarding waste disposal mechanism of Bapujee College, Sarukshetri

Table 4: waste management practices adopted

Sl No.	Practice/Strategies adopted	Response	Quantification if any
1	Organised collection of organic waste	Yes	NA
2	Leaf Litter disposal	Yes	On regular basis
3	Vermi composting Unit	Yet to be installed	NA
4	Use of Plastic/plastic wares	In use	Little
5	Segregation of waste as per Govt. directives	No	NA
6	Dustbins proper place	Yes	Not sufficient
7	Dustbin clearing	Yes	On daily basis
8	Solid waste recycling process	No	NA
9	Awareness programme organized	Yes	Regular

Photo 2: Garbage collection initiative

Photo 3: Litter gathering: need intervention

Observations

1. Academic Departments do not generate large quantities of waste.
2. Plastic materials are still in use though in smaller quantities.
3. Frequency for garbage and litter collection is sufficient.
4. Any educational institution is subject to budgetary and management constraints that limit the effectiveness of a waste handling system, that is also true in case Bapujee College, Sarukshetri as it is reflected in inadequate funds for waste management programs and staff.

Suggestions and Recommendations

- Bapujee College, Sarukshetri campus needs to be declared as a purely total plastic-free campus.
- The practice of using biodegradable materials should be encouraged.
- Vermi composting facilities should be operationalized soon to avoid dumping of organic litters here and there.
- More dustbins need to be placed.

HEALTH AUDIT

A healthy ecosystem directly means a healthy livelihood. Hence, to ascertain a healthy society inside the college campus and to create awareness among the individuals in taking actions against the growing strain on Earth's natural ecosystem, the Bapujee College, Sarukshetri fraternity took few initiatives through several events in past couple of years.

Table 5 : List of activities done by the College

Name of the Activity	Date	Number of participants	Academic Year
Awareness camp on cyber security	9/22/2022	60	2022-23
Awareness rally on the occasion of Independence Day	8/14/2022	200	2023-24
Celebration of College Foundation Day	4/7/2023	250	2023-24
International Yoga Day Celebration	6/21/2023	50	2022-23
Celebration of Golden Jubilee	11/18/2022	ALL	2022-23
Awareness cum counselling programme at Dakshin Pakka High School	12/24/2022	150	2022-23
International Women's Day	3/10/2023	200	2023-24
Guardian Meeting	3/18/2023	100	2023-24
Entrepreneurship Development Programme for SHG/ALF members	3/21/2023	70	2022-23
Celebration of chatra divas cum seminar talk on environmental issues	3/31/2023	180	2022-23
Extension service	5/20/2023	100	2022-23
A Lecture Programme on cultural pride of India on the occasion of Azadi ka amrit mahotsav	5/27/2023	80	2022-23
A lecture programme on Health and wellness	5/30/2023	120	2022-23
Bishnu Rabha Divas Celebration	6/20/2023	200	2022-23
National Sports Day	8/20/2023	150	2023-24
Celebration of Amrit Briksha Rupan	9/17/2023	100	2023-24
Orientation programme on 'Swayam'	5/28/2022	100	2021-22
World environment day: Seminar and Tea Plantation	6/5/2022	200	2021-22
Distinctive Programme by Bapujee College, Sarukshetri at Janapriya High School, Newlarvitha	6/6/2022	150	2021-22
One day orientation programme on competitive examination	7/31/2022	59	2022-23
Seminar on 'Awareness on HIV and AIDS' organised by Red Ribbon Club	9/9/2023	171	2022-23

Awareness Programme on "Mission Life for Sustainable Environment & Beyond" organised by pollution control board, Assam and Bapujee College, Sarukshetri	9/20/2023	200	2023-14
Awarenesss Programme on "Cleanliness and Personal Hygiene"	9/23/2023	100	2023-24
Ek Tareekh Ek Ghanta "Swaccha Bharat Abhiyan'	10/1/2023	80	2023-24
An interaction Programme on Careeer Counselling and Vocational Guidance	10/13/2023	143	2023-24
Poster making Compitition on the occasion of Rastriya Ekta Divas and national Unity Week	10/30/2023	21	2023-24
Rashtriya Ekta Divas and National Unity Week 2023	10/31/2023	113	2023-24
Lecture Programme of 400th Aniversary of Bir Lachit barphukan	11/17/2023	150	2023-24
Virtual Conference on Vikshit Bharat @2047	12/11/2023	50	2023-24
Self defense training under Beti Bachao, Beti Padhao Mission Sakti organised by District Hub for empowerment of women, Barpeta Department of women & child development, barpeta and NCC Bapujee College Sarukshetri	1/10/2024	38	2023-24
Counselling programme on career building at sarukshetri senior secondary school, Kapla organised by Bapujee College Sarukshetri	3/12/2024	65	2023-24

Photo 4: A "Free Health Checkup Camp" has been organised today by Bapujee College, Sarukshetri in Hilepra Village under Sarukshetri Block.

Photo 5: Workshop on impact of covid-19 pandemic on mental health of school students

Photo 6 : World Water Day celebration at Bapujee College, Sarukshetri.

Photo 7 : International Women's Day observation Date: 8th March 2021

Photo 8 : "EK TAREEKH EK GHANTA"- SWACHH BHARAT ABHIYAN on 1st October, 2023

Photo 9: Discussion of Human animal conflict: an initiative

Photo 10:"Meri Maati Mera Desh" and "Har Ghar Tiranga" Programme

Photo 11 : Plantation Program organised by the College

ENERGY AUDIT

As per Energy Conservation Act, 2001; the Energy Audit must include verification, monitoring, and analysis of the use of energy including submission of a technical report containing recommendations for improving energy efficiency with cost-benefit analysis and an action plan to reduce energy consumption. The scope of the energy audit hence includes the collection of all relevant data, documents, electricity bills, log books relating to electricity use & operations etc., inspection of the buildings & installations and then, to analyze the data to evaluate and assess energy use and also, to suggest measures in reducing energy use and improvement of performance. The present audit therefore aimed to cover the aggregate consumption of electrical and natural gas energy in Bapujee College, Sarukshetri covering all academic and administrative blocks. Energy use is clearly an important aspect of campus sustainability and thus, requires no explanation for its inclusion in the assessment.

Source and consumption of Energy

In Bapujee College, Sarukshetri, energy is mainly used to manage and run the 1) lighting's load, 2) office equipment, 3) air conditioners, 4) water cooler, 5) fan, 6) water pump and 7) Cleaning and construction gadgets.

The primary source of the energy for Bapujee College, Sarukshetri is the electricity received from Assam Power Distribution Company Limited supplied through a 19.0 KW connected load under the Consumer No. 061000000026 under the LT Category. The College has also 2 Diseal run generator sets of 2 KVA capacities which are mainly used during power failure during Examination seasons. LPG are utilised for cooking in Canteens and office only.

Table 6: Energy consumption in Bapujee College, Sarukshetri

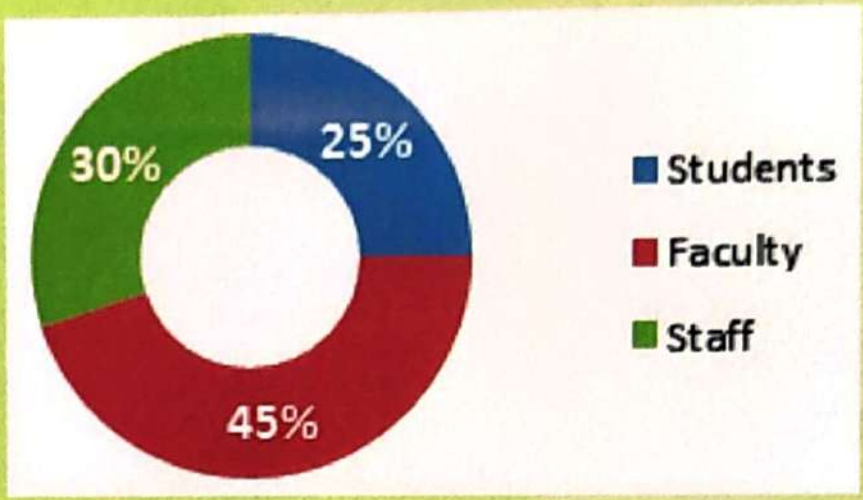
Annual Electrical Energy consumption in Bapujee College, Sarukshetri (2022-2023)	: INR 5460.00 per month (In terms of money)
LPG requirement per year	: 20 Nos
Fuel (Disesl)	: 100 L / year (Average 8.33 L./month)
Water Pump	:2 (2.0 HP/1.0 HP)
No of energy efficient AC	:2 Nos
Refrigerator	: 0 Nos
Xerox machine	: 4 Nos
Water Cooler	:3 Nos
Fan	: 65 Nos
Percentage replacement of Non- energy efficient machines in last 2 years:	: 0%
No of LED installation at present:	:Bulb-74 Tube-62
Percentage of increase of LED installation in last 2 years:	100%
Building energy performance index	: 2.22 kwh/m²/year

Energy efficiency assessment

The Energy efficiency assessment was conducted for the load connected to the mains supply of college buildings. The entire campus including common facilities is equipped with LED lamps and LED tube lights. All computers are set to automatic power saving mode when not in use.

A good habit of the stakeholders was observed that all the electrical appliances including the bulbs are usually shut down when not in use, more specifically during the vacations excluding a few essential points which are essential to illuminate the campus. Monitoring mechanism exists in put-on and put-off the electrical appliances is a laudable eco-friendly effort of the College

Fig 4: Stack holders' involvement in energy conservation



Suggestions and recommendations

Augmentation of solar power will make the college self sufficient in energy consumption and production.

- Old and non efficient electrical gadgets are to be replaced as far as practicable.
- 5 star rated ACs, Fans and other electrical appliances should be used in the campus to reduce further loss of energy.
- Cleaning of tube lights and bulbs to be done periodically to remove the dust over it.

BIODIVERSITY AUDIT

Biodiversity is the key to a healthy ecosystem. Morton & Hill (2014) in a biodiversity book published by the "Commonwealth Scientific and Industrial Research Organisation (CSIRO)" nicely mentioned 5 core values of biodiversity, viz. economic, ecological, recreation, cultural and scientific values. Biodiversity provides humans with raw materials for consumption and production. Ecologically biodiversity take part in functioning of ecosystems that supply oxygen, clean air and water, felicitating pollination in plants, control of pest, wastewater treatment and many ecosystem services. Scientific intervention may disclose a wealth of systematic ecological data that help us to understand the natural activities and necessities in the context of human behavior. Many recreational pursuits rely on the biodiversity of region, such as bird-watching, hiking, camping and fishing. The tourism industry also depends on biodiversity. Above all, our culture is closely connected to biodiversity through the expression of identity, through spirituality and through aesthetic appreciation. Any loss or deterioration in the condition of biodiversity can compromise all the values outlined above and affect human wellbeing particularly in North Eastern region which is located between two biodiversity hotspot, Himalaya and indo Burma.

As the Biodiversity plays a key role in providing numerous irreplaceable services to any community, biodiversity audit is one of the best practices for sustainability of an institute. The main objective of biodiversity audit is therefore to document different biodiversity components within the College campus, to observe ecosystem structures and functions along with regular monitoring to check the new addition and analysis of biotic interactions amongst different components of biotic resources. The outcome of such audit will certainly be helpful in designing different conservation measures that need to be taken for a better and self-sustaining ecosystem in the campus.

Though the Bapujee College, Sarukshetri campus is Spreading over in 18.016 acres of a plot (as per land record), it is the home to different varieties of fauna as well as flora. A few plants are introduced to enhance the aesthetic beauty of the campus.

FAUNAL DIVERSITY

The Bapujee College, Sarukshetri campus houses a good number of animals from each different phylum. Harbouring of rich faunal diversity indicates a good health of the campus. In the present study, 64 number of animals were reported in the college campus belonging to different phylum and classes including annelida, Arthropods and butterflies and Mollusca invertebrate. 17 birds were recorded during the audit period. Mammalian diversity is poor and is represented by only 5 species. It is very interesting to note that the college campus provides a sound nesting ground of Squirrel, dove, crow and common mynas and pigeon.

Table 7: Fauna of Bapujee College, Sarukshetri **Campus**

Sl No	Common Name	Scientific name
1	Leech	*Hirudinaria granulosa*
2	Earth worm (Pheretima)	*Pheretima posthuma*
3	Earthworm	*Eudriluseuginiae*
4	Bonda kechu	*Metaphirehouletti*
5	Milliped	*Trigoniuluscorallinus*
7	Centiped	*Rhysida nuda emarginata*
8	Centiped	*Scutigeracoleoptrata*
9	Spider	*Telamoniadimidiata*
10	Spider	*Hyllus semicupreus*
11	Signature spider	*Argiope pulchella*
12	Drosophila	*Drosophila melanogaster*
13	Dragon fly (common hooktail)	*Paragomphuslineatus*
14	Dragon fly (wandering glider)	*Pantalaflavescens*
15	House fly	*Musca domestica*
16	Cockroach	*Periplanta americana*
17	Ant	*Formica spp*
18	Weaver ant	*Oecophyllasmaragdina*
19	Ant	*Myrmicariabrunnea*
20	Termite	*Isoptera spp*
21	Hornet	*Vespa affinis*
22	Vespa	*Vespa orientalis*
23	Fire fly	*Photurislucicrescens*
24	Honey bee	*Apis indica*
25	Praying mantis	*Mantis religiosa*
26	House Cricket	*Acheta domestica*
27	Mole cricket	*Gryllotalpa brachyptera*
28	Grass hopper	*Ducetia japonica*
29	Grass hopper	*Trigonocorypha unicolor*

30	Common field grasshopper	*Chorthippusbrunneus*
31	Gundhi bug	*Macrocheraia grandis*
32	Gundhi bug	*Leptocorisavericornis*
33	Lemon Pansy	*Junonialemonias*
34	Grey Pansy	*J.atlites*
35	Pila	*Pila globusa*
36	Snail	*Cryptozonasspps*
37	Bamun Bhekuli	*Rana tigrina*
38	Chuk Bhekuli	*Bufo melanotictus*
39	Pat beng	*Hyla*
40	House Lizard	*Hemidactylus frenatus*
41	Oriental garden lizard	*Calotes versicolor*
42	Common Indian shink	*E. carinata*
43	Red vented bulbul	*Pycnonotuscafer*
44	Common Myna	*Acridotheres tristis*
45	Striated babbler	*Turdaidesearlei*
46	Spot belled owl	*Bubo nepalensis*
47	Crow	*Corvus splendens*
48	Spotted Dove	*Streptopeliachiinensis*
49	Asian pied starling	*Gracupica contra*
50	Rose ringed parakeet	*Psittaculakrameri*
51	White throated king fisher	*Halcyon smyrnensis*
52	Blue throated barbet	*Psilopogon asiaticus*
53	Grey headed wood pecker	*Picuscanus*
54	House sparrow	*Passer domesticus*
55	Great Egret	*Ardea alba*
56	Asian koel	*Eudynamysscolopaccus*
57	Black drongo	*Dicrurusmacrocercus*
58	Pigeon	*Columbia livia*
59	Oriental magpie robin	*Copsychussaularis*
60	Squirrel	*Scicurus carolinensis*
61	Rat	*Rattus norvegicus*
62	Bat	*Pipistrellus coromandra*
63	Mouse	*Mus musculus*
64	Mongoose	*Herpestededwadsii*

FLORAL DIVERSITY

The College campus is in true sense a very small but evergreen beautiful area with a variety of trees, bushes and grass. The aesthetic beauty of the campus has been enhanced by introducing a few ornamental and economically important plants. All the plants provide a good ecological service in maintaining a green College campus amidst a growing township. Altogether 104 species of plants belonging to herb, shrub and tree categories are recorded and enlisted below.

Table 8: Plants of Bapujee College Campus

Sl No	Scientific Name	Local Name
1	Averrhoa carambola L. (Averrhoaceae)	Kordoi
2	Boerhaavia diffusa L. (Nyctaginaceae)	Punarnava
3	Psidium guajava L. (Myrtaceae)	Modhuri Am
4	Poinsettia pulcherrhima R. Grah. (Euphorbiaceae)	Lalpat
5	Hibiscus rosa sinensis L. (Malvaceae)	Roktajoba
6	Mirabilis jalapa L. (Nyctaginaceae)	Godhuli Gopal
7	Nyctanthes arbortristis L. (Oleaceae)	Sewali
8	Murraya koenigii (L.) Spreng. (Rutaceae)	Narasingha
9	Carica papaya L. (Caricaceae)	Amita
10	Cinamomum tamala Nees & Eberm. (Lauraceae)	Tejpat
11	Costus speciosus (Koen.) Sm. (Zingiberaceae)	Jomlakhuti
12	Euphorbia nerifolia L. (Euphorbiaceae)	Siju
13	Houttuynia cordata Thumb. (Saururaceae)	Mosondari

14	Justicia adhatoda L. (Acanthaceae)	Boga bahok
15	Phlogacanthus thyrsiformis Mobb. (Acanthaceae)	Ronga bahok
16	Justicia gendarussa Burm. (Acanthaceae)	Kola bahok
17	Kalanchoe pinnata (Lamk.) Pers. (Crassulaceae)	Pategoja
18	Phyllanthus fraternus Webster (Euphorbiaceae)	Amlokhi
19	Micromelum minutum Wt & Arn. (Rutaceae)	Gonderi
20	Ricinus communis L. (Euphorbiaceae)	Era
21	Vitex negundo L. (Verbenaceae)	Posotia
22	Abroma augusta L. (Malvaceae)	Bon-Kopahi
23	Achyranthes aspera L. (Amaranthaceae)	Ubhoti –Soth
24	Acorus calamus L. (Araceae)	Boch
25	Ageratum conyzoides L. (Asteraceae)	Gondhoa Bon
26	Aloe barbadensis Willd (Liliaceae)	Chalkunwari
27	Alternathera sessilis R. Br. (Amaranthaceae)	Matikanduri
28	Canna orientalis Rosc. (Cannaceae)	Parijat
29	Amaranthus spinosus L. (Amaranthaceae)	Kata-Khutura
30	Amaranthus viridis L. (Amaranthaceae)	Hati-Khutura
31	Andrographis paniculata Nees. (Acanthaceae)	Kal-Megh
32	Argemone mexicana L. (Papaveraceae)	Sial-Kata
33	Blumea lacera DC. (Asteraceae)	Kukurshuta
34	Clitoria ternatea L. (Papilionaceae)	Aparajita Phul
35	Commelina benghalensis L. (Commelinaceae)	Kona Simolu
36	Oxalis corniculata L. (Oxalidaceae)	Tengesi tenga

37	Paederia foetida L. (Rubiaceae)	Bhedai lota
38	Curcuma longa L. (Zingiberaceae)	Halodhi
39	Eclipta prostata L. (Asteraceae)	Keheraj
40	Euphorbia hirta L. (Euphobiaceae)	Gakhiroti Bon
41	Heliotropium indicum L. (Boraginaceae)	Hatisuria
42	Centella asiatica Urban (Apiaceae)	Bor-manimuni
43	Ichnocarpus frutescens R. Br. (Apocynaceae)	Dugdha-lota
44	Kaempferia rotunda L. (Zingiberaceae)	Bhui-Champa
45	Leucas aspera Spreng. (Lamiaceae)	Doron
46	Pogostemon parviflora (L.) lamiaceae)	Sukloti
47	Solanum indicum L. (Solanaceae)	Tita-bhekuri
48	Artocarpus heterophyllus Lam (Moaaceae)	Kothal
49	Magnifera indica L. (Anacardiaceae)	Aam
50	Michelia champaca L. (Magnoliaceae)	Titachopa
51	Phyllanthus emblica L. (Euphorbiaceae)	Amlokhi
52	Zizyphus mauritiana Lamk. (Rhamnaceae)	Bogori
53	Litchi chinensis (Gaertn.) Sonn. (Sapindaceae)	Lichu
54	Phyllanthus acidus (L.) Skeels (Euphorbiaceae)	Poramlokhi
55	Mimusops elengi L. (Sapotaceae)	Bokul
56	Murraya paniculata L. (Rutaceae)	Kamini
57	Sizygium cumini (l.) Skeels (Myrtaceae)	Kolajamu
58	Bombax ceiba L. (Bombacaceae)	Simolu
59	Terminalia chebula Retz. (Combretaceae)	Silikha

60	Tectona grandis l. (Verbenaceae)	Segun
61	Poinciana regia Boj. (Caesalpiniaceae)	Krishnachura
62	Cassia renigera Roxb. (Caesalpiniaceae)	Golapi Radhachura
63	Caesalpinia pulcherrima swatz. (Caesalpiniaceae)	Radhachura
64	Solanum nigrum L. (Solanaceae)	Pichkoti
65	Typhonium trilobatum Schott. (Araceae)	Chama Kochu
66	Dracaena spicata Roxb. (Liliaceae)	Ram lakhuti
67	Catharanthus roseus G.Don. (Apocynaceae)	Nayan tora
68	Bacopa monnieri (L.) Pennell (Serophulariaceae)	Brahmi
69	Eryngium foetdum L. (Apiaceae)	Man dhonia
70	Alocasia odora (Roxb.) Koc. (Araceae)	Shyam Kochu
71	Xanthosoma atrovirens Schott (Araceae)	Nil Kochu
72	Zygocactus truncates (Ham.) K. Sch (Cactaceae)	Golpota
73	Ocimum sanctum L. (Lamiaceae)	Tulsi
74	Bauhinia acuminata L. (caesalpiniaceae)	Kanchan (Boga)
75	Erythrina indica Lamk. (Papilionaceae)	Modar
76	Thevetia peruviana Schum (Apocynaceae)	Korobi
77	Adenanthera pavonica L. (Mimosaceae)	Ronga Chandan
78	Alstonia scholaris R.Br. (Apocynaceae)	Chotiona
79	Azadirachta indica A. Juss. (Meliaceae)	Neem
80	Anthocephalus cadamba Miq. (Rubiaceae)	Kodom
81	Oroxylum indicum Vent. (Bignoniaceae)	Bhat-ghila

82	Cassia fistula L. (Caesalpiniaceae)	Sonaru
84	Gmelina arborea Roxb. (Verbenaceae)	Gomari
85	Lannea caromondelica Merr. (Anacardiaceae)	Jiya Goch
86	Melia azadirach L. (Meliaceae)	Ghora nim
88	Terminlia arjuna Bedd. (Combretaceae)	Arjun
89	Cocos nucifera L. (Arecaceae)	Narikol
90	Spondias pinnata Kuez (Anacardiaceae)	Amara
91	Areca catechu L. (Arecaceae)	Tamol
92	Moringa oleifera Lamk. (Moringaceae)	Sojina
93	Melastoma malabathricum L. (Melastomaceae)	Phutki
94	Calotropis gigantia (L.) R.Br. (Asclepiadaceae)	Aakon
95	Terminalia bellirica Roxb. (Combretaceae)	Bhomora
96	ardiospermum helicacabum L. (Sapindaceae)	Kopal-Phuta lota
97	Urena lolbata L. (Malvaceae)	Soka mara
98	Xanthium strumarium L. (Asteraceae)	Agara
99	Ludwigia octavalvis (Jacq.) Raven. (Onagraceae)	Bonoria long
100	Glycosmis pentaphylla Corr. (Rutaceae)	Chaul-dhowa
101	Polygonum hydropiper L. (Polygonaceae)	Bih- longoni
102	Sida acuta Burm. (Malvaceae)	Boriola
103	Spilanthes paniculata Merr. (Asteraceae)	Huhuni sak
104	Triumfetta rhomboidea Jacq (Tiliaceae)	Ogora

Photo 11: Plantation inside the college campus

Observations

- The College maintains a sound green environment. It is commendable.
- Beautiful and well-maintained gardens enhance the aesthetic beauty of the campus.
- The trees and bushes are providing nesting support to some wildlife. It is a specific sign of calm and quite eco- friendly environment of the campus particularly inside a city.
- Medicinal Plant Garden and lush green environment not only help in cleaning air and maintaining humidity, but also motivating students for organic cultivation and entrepreneurship.

Suggestions and Recommendations

- The existing campus of Bapujee College, Sarukshetri supports a good number of plants and animals of which a few are ecologically, aesthetically and culturally important. All these plant species should be conserved in a proper way to support and to achieve more biodiversity values in future.
- The dedicated garden areas need to be monitored regularly to enhance the aesthetic beauty of the campus.
- Boundary areas may be systematically planted in consultation with a horticulturist or botanist.
- Students may be encouraged to take care of the plants and the campus.

Photo 12: Inauguration of "Herbal Garden" at Bapujee College, Sarukshetri.

AUDIT SUMMARY

This report on "Green Audit" of Bapujee College, Sarukshetri for the year 2023-2024 was prepared with an objective to highlight and prepare a statement on the green practices followed by the College. The present Green Auditing began with the assessment of the status of the green cover of the college followed by water audit, waste management practices and energy conservation strategies etc. The audit team visited different facilities at the College campus, monitored different appliances/utilities and documented the relevant consumption patterns. The faculty members, staffs and learners were interviewed through structured questionnaires to get details of usage, frequency, or general characteristics of different appliances. Data collection was done by onsite visit also through questionnaires in all the sectors related to environmental quality. The data thus collated were analyzed to prepare this audit report of Bapujee College, Sarukshetri.

The college though is located in a small plot of land of 18.016 acres, the area is systematically arranged based on its master plan with dedicated spaces for including one Medicinal plant Garden and a playground. The garden in front of administrative building and avenue trees aligned with the buildings enlace the aesthetic beauty of the college campus. Little disturbances within the dedicated green areas/

gardens were observed that need monitoring and intervention. Boundaries of the college are not covered with plantation which needs to be to develop a sound barrier for the campus. Regular monitoring and trimming/pruning of plants is suggested at and when necessary.

The Bapujee College, Sarukshetri extract @ 1500 L ground water per day to fill up the 2 water reservoirs of the capacity 4000 L. It was noted that wastage of water is meager which was also reflected in the consciousness of the stakeholders. Till now the potable water quality was within the permissible limit as prescribed by different agencies. This is another good sign of healthy and green environment. Though the authority is proactive in conserving water, the awareness of Stakeholders on water conservation is little. Further, display signage for water conservation and regular monitoring was found to be missing which the college could implement as one of the best green practices for conservation of water. One rain water harvesting set up has recently installed which can be augmented in each building. Though no fault was found, it is suggested for periodical maintenance of water taps/ water pipes/reservoirs to prevent the loss of water.

In the college, more paper and plastic wastes were recorded to be generated in the Administrative Blocks and from the Canteen whereas, organic waste was found to be more in the canteen premises only. No report was found on generation of bio-medical and e-waste in the campus. The college has a centralized collection mechanism for any kind of waste excluding the litters and biomass generated due to shedding from trees and weeding in the campus. Installation of vermi-composting or otherwise conventional composting in a designated site may suggested with a structured monitoring mechanism. Further, in order to carry forward the commitment to keep the campus waste free, installation of dustbins has been started in phase manner. It is also noted that no visible segregation practice exists to separate different wastes which need active attention.

But, it is good to see that around 92 per cent of stakeholders were confident about their understanding of waste and their obligation in disposing of material. Academic Departments do not generate large quantities of waste. Plastic materials are still in use, of course, in small quantities. It is hence suggested that Bapujee College, Sarukshetri campus is to be declared as a 'Complete Plastic-Free Campus'.

In order to encourage students to respect the environment and think about conservation, the college in collaboration with NCC Cell regularly organise different awareness programme on Swachhata and maintenance of healthy environment, A couple of Cleanliness drive and plantation programmes during Republic Day,

Independence Day, World Environment Day etc. in and around the Bapujee College, Sarukshetri campus.

Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. Energy is mainly used in this college campus for 1) lighting's load, 2) office equipment, 3) air conditioners, 4) water cooler 5) fan, 6) water pump and 7) Cleaning and construction gadgets. The primary source of the energy for Bapujee College, Sarukshetri is the electricity received from Assam Power Distribution Company Limited supplied through a 19.0 KW connected load under the Consumer No. 061000000026 under the LT Category. The College has also 2 Diesel run generator sets of 2 KVA capacities which are mainly used during power failure during Examination seasons. LPG are utilised for cooking in Canteens and office only.

The Energy efficiency assessment was conducted for the load connected to the mains supply of college buildings including canteen. The entire campus including common facility centres are equipped with LED lamps and LED tube lights which can be considered as one of the best practices of energy saving. Though percentage replacement of non energy efficient machines/gadgets in last 2 years was almost nil, the percentage of increase LED installation in last 2 years was almost 100 per cent. A good practice was noted that all the computers are set to automatic power saving mode when not in use. Monitoring mechanism exists in put-on and put-off the electrical appliances is a laudable eco-friendly effort of the College.

As Biodiversity plays a key role in providing numerous irreplaceable services to any community, biodiversity audit is one of the best practices for sustainability of an institute. The Bapujee College, Sarukshetri campus houses around 64 numbers of animals under different phylum. The campus accommodates around 17 birds and 5 mammals. Harbouring of rich faunal diversity indicates a good health of the campus. Trees of the campus provide a sound nesting support to some urban wildlife like Squirrel, dove, crow, common myna and pigeon etc.

The campus is evergreen with 104 species of trees, shrubs and herbs including grasses. A few ornamental and economically important plants are introduced into the campus not only to beautify the campus but also to add values to it. Since plants provide a good ecological service in maintaining a green campus these should be conserved in a proper way to support and to achieve more biodiversity values in future. Establishment of Herbal Medicinal Garden is a commendable green and environment friendly initiative of the college to encourage budding citizens to nurture

nature. This garden not only help in cleaning air and maintaining humidity, but also motivating students for organic cultivation and entrepreneurship. In spite of having budgetary and management constraints that limits the effectiveness of green practices, Bapujee College, Sarukshetri has put every effort to streamline all those practices to make and convert into an eco-friendly and aesthetic campus within the Sarthebari town.

The report contains some specific suggestions and recommendations in each category to be implemented to improve the existing environment-related practices of Bapujee College, Sarukshetri.

Photo 13: Amrit Brikshya Andolan at Bapujee College, Sarukshetri

GREEN AND ENERGY AUDIT REPORT

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