

GREEN AUDIT REPORT 2021-2022



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Manabendra Sarma Girls' College
Rangia, Kamrup, Assam

GREEN AUDIT REPORT

2021-2022

MANABENDRA SARMA GIRLS' COLLEGE



Green Audit Report -2021-22 : Manabendra Sarma Girls' College | 1

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ACKNOWLEDGEMENT

In the context of climate change and its related environmental disruptions, maintenance of an ecologically sound ecosystem is the need of the hour. Accordingly sustainable development policies have been adopted throughout the globe. To follow up the process, University Grants Commission of India has launched “Green Campus Clean Campus” mission for all HEIs of the country in the line of National Assessment and Accreditation Council (NAAC) which made “Environmental Consciousness” as one of the important criterion for grading an educational institution.

Manabendra Sarma Girls’ College is therefore committed to create an ecologically sound campus by adopting a few ecofriendly practices in and around the college premises. The present report is the first ever Green Audit Report of Manabendra Sarma Girls’ College which aimed to identify the environment related issues in the college campus and to monitor the environmental management practices adopted by the college. 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 Manabendra Sarma Girls’ College.

Mrs. Kanika Goswami, Principal i/c, Manabendra Sarma Girls’ College deserves the appreciation for her initiative in conducting the Green Audit for the college. The Audit team is thankful to all the field staff, laboratory staff, students, officiating members and faculty members of the college for their support and co-operation to compile and complete this report on time. Special thanks is due to Dr. Aparajita Sharma of the College for her whole hearted support in the entire audit process.

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ABOUT MANABENDRA SARMA GIRLS' COLLEGE

Manabendra Sarma Girls' College is one of the pioneer academic institutions of Rangia town of Kamrup district (Assam). The college was established on 25th August, 1984 to empower the socially and economically backward women of the entire North Kamrup area. The college was later affiliated to Gauhati University.

After coming under the fold of The Assam Venture Educational Institutions (Provincialisation of Services) Act, 2011 w.e.f. 1st January, 2013, the College has been showing the marks of progress in all respects to the satisfaction of the students and guardians along with the elite education-enthusiasts of greater North Kamrup area of Assam in last three decades. The eco-friendly campus of the College with green surroundings make it suitable for academic activities.



Plate 1 : The Manabendra Sarma Girls' College Campus

With nine Departments under the Arts stream Manabendra Sarma Girls' College continues to add new feathers in its cap so far as its academic excellence is concerned. The College is therefore planning for NAAC accreditation in the coming year.

A total of 1097 students enrolled in the UG courses at Manabendra Sarma Girls' College in the session 2020-2021 against the 24 faculty members. There are 13 supporting staffs at present in the college. The Principal is the chief executive of the College.

GREEN AUDIT AT MANABENDRA SARMA GIRLS' COLLEGE

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 (Criterion VII) of National Assessment and Accreditation Council (NAAC), the sustainability and sustainable development policies are kept on the agenda of Manabendra Sarma Girls' College. Green Audit is one of the step 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.

Manabendra Sarma Girls' College 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 ecofriendly friendly practices for a sustainable college campus
- Increasing awareness amongs the all stakeholders for sustainable use of available resources.
- Collection of baseline data on different components of environment before pose 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 Manabendra Sarma Girls' College began with the formation of the Green Audit team incorporating faculty members and researchers of Gauhati University and Manabendra Sarma Girls' College. The audit team visited the campus on a 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 on-site 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 Manabendra Sarma Girls' College. 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 Manabendra Sarma Girls' College had the following components

- On-site field visits by the Green Audit Team at and when necessary.
- Data collection was 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.
- GIS tools were used to prepare the map of the campus for LULC survey
- 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 with the Rangia town, the Manabendra Sarma Girls' College campus is flat but partially low lying. The College campus is surrounded by residential area. The college campus houses a wide spectrum of flora and fauna.

The present survey revealed that the college had a total area of 1.97 acres of land with a few dedicated spaces for one green space, one parking lot and one play ground. There are three segments of smaller gardens to beautify the campus. Organized plantations in the campus are seen along the approach road. One huge pond is on the north of the campus which enhance the beauty of the College. The topography of campus shows periodic inundation problems with the interferences of the nearby residential areas which the College is trying to mitigate by constructing a drain leading to nearby river with the help of district administration.

Observations

- Disturbance seen in dedicated green areas/gardens that need management intervention.
- Roadside avenue trees 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.
- Post plantation of saplings need to be monitored.
- Pruning of avenue trees should be carried out in a planned manner.

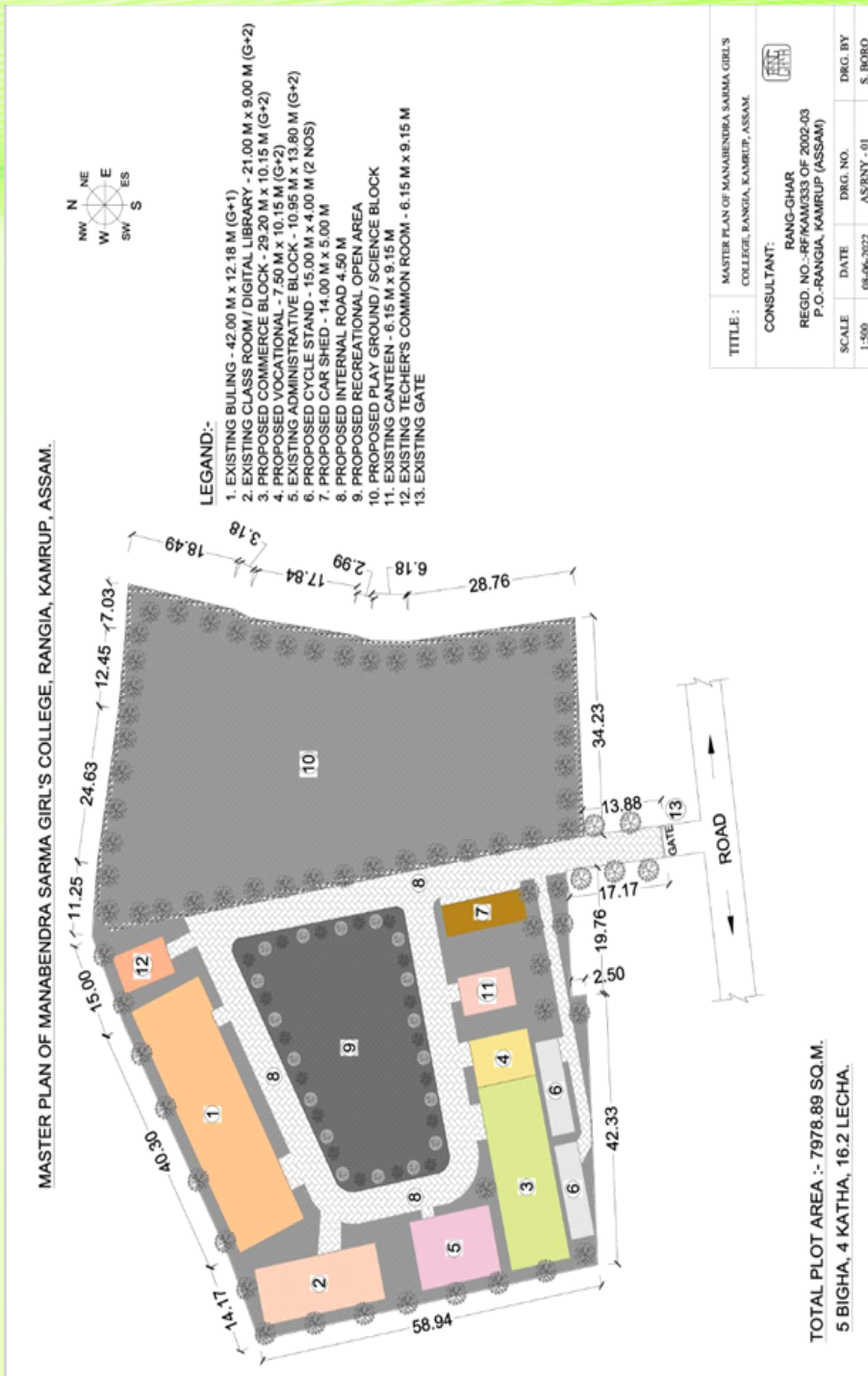


Fig 1: The Map of Manabendra Sarma Girls' College campus

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 Manabendra Sarma Girls' College is the ground water. A total of 4000 L of water is pumped out through water pumps every day (Table 1) of which, around 3000 L of water is used by the College per day excluding the water extracted through the two hand pump (amount could not be estimated) .

Table 1: Source and usage of potable water

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	4
5	No of water pumps used	2
6	Horse power- water pumps	1.5 HP -2 Nos
7	Depth of well (borig/Hand pump)	80 m
8	Water level	Normal
9	Type of water tanks	Reserver
10	Capacity of Tank/ reserver (Total)	4000 L
11	Quantity of water pumped every day	3000 L per day

12	Indication of water wastage with reasons	Wastage of water is prominent Reasons marked <i>leakage in old pipes</i> <i>overflow from water tanks/ taps</i>
13	Water usage for gardening	50 L per day
14	Use of waste water	No
15	Fate of wastewater from labs	NA
16	Any wastewater treatment for lab water	NA
17	Whether any green chemistry method practiced in Labs	No
18	Rain water harvest available?	No
19	No of units and amount of water harvested	NA
20	No of leaky taps	Few
21	Amount of water lost per day	250 liters
21	water management plan used	Awareness and display of card are not seen
22	water saving techniques followed	Not in use
23	Signage for reminding peoples to turn off tap	NO
24	Cleaning of the reservoirs	Occasional

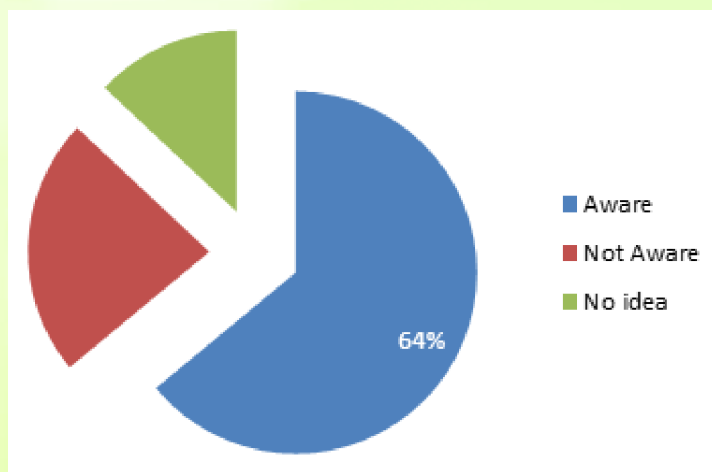


Fig 2 : Awareness among the stakeholders regarding water conservation

WATER QUALITY ASSESSMENT

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

Table 2: Water quality analysis report

Sl No	Parameters	Values
1	pH	6.4-6.8
2	Total Hardness (mg/l)	72-118
3	Alkalinity (mg/l)	74-136
4	Turbidity (N.T.U)	1-2
5	Calcium Hardness (mg/l)	56-78
6	Total Dissolved Solids (mg/l)	24-29
7	Sulphates (mg/l)	0
8	Chloride(mg/l)	26-34
9	Fluoride (mg/l)	0.09-0.11
10	Iron (mg/l)	0.32-0.48
12	Nitrate (mg/l)	Nil
13	Arsenic (mg/l)	Nil
14	Manganese (mg/l)	0.11-0.13
15	Magnesium (mg/l)	9-13
16	Bacteriological count	Nil

Observations

- The College authority is concerned with water and its use.
- Higher awareness for saving/ conservation of water is a positive sign.
- Wastage of water was marked where attention is required

Suggestions and recommendations

- A proper water consumption monitoring system could be introduced to reduce 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.
- Display sinage for water conservation and regular monitoring should installed on priority basis which the college will able show as one of the best practices for water conservation.

AUDITING FOR WASTE MANAGEMENT

Any activities in an establishment create waste which seems to be aesthetically unpleasing. 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 agaist 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 supplies, 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, more paper and plastic waste were recorded to be generated in the Administrative Block and Departments/common rooms as well. Bio-medical waste is almost nil. A little e-waste was reported during the survey mostly generated in the Administrative block. As no laboratory is there, estimation of hazardous waste could not be possible. But, it was found that there was neither centralized collection point nor any disposal policy for the used batteries of any kind. A table is given here to show an estimated generation of different types of waste on monthly basis in the Manabendra Sarma Girls' College 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	Avg waste generated/month
1	Academic Departments	Paper waste Plastic waste Organic waste E-waste Biomedical waste	1.5 kg 0.15 kg 3.2 kg Nil Nil
2	Administrative Office	Paper waste Plastic waste Organic waste E-waste Biomedical waste	4 kg 0.5 kg 5 kg 0.001 kg Nil
3	Hostels	Paper waste Plastic waste Organic waste E-waste Biomedical waste	NA
4	Canteens	Paper waste Plastic waste Organic waste E-waste Biomedical waste	1.6 kg 1.5 kg 35 kg Nil 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 strated in the phase manner. One initiative has also been taken to install one composting unit which the auditors feel a commendable approach to mitigate the organisc waste including the leaf litters. As the construction is going on in the campus, temporary dumping of construction materials were seen which are regularly disposed off with the help of Municipalty agencies.

During a survey carried out among the stackholders of Manabendra Sarma Girls' College by the Green Audit Team, a majority of the respondents (73 %) were confident about their understanding of waste and their obligation in disposing of material (Fig. 3).

Fig 3: Opinion of stackholders regarding waste disposal mechanism of Manabendra Sarma Girls' College

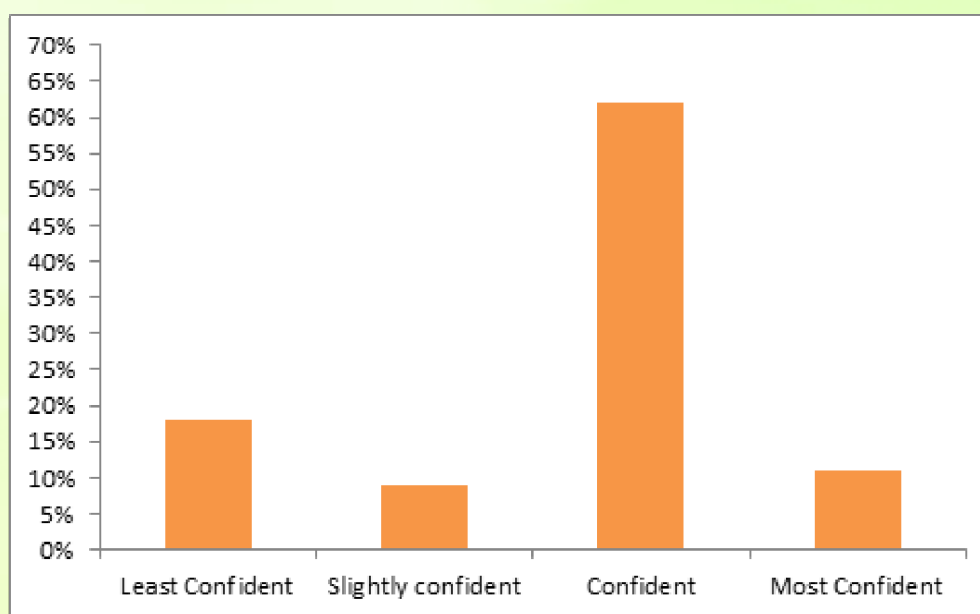


Table 4: waste management practices adopted

Sl No.	Practice/Strategies adopted	Response	Quanification if any
1	Organised Collection of Organic waste	No	NA
2	Leaf Litter desposal	Yes	On regular basis
3	Vermi composting Unit	No	NA
4	Use of Plastic/plastic wares	In use	NA
5	Segregation of waste as per Govt. directives	Yes	Not sufficient
6	Dasbins in proper place	Yes	Not sufficient
7	Dustbin clearing	Yes	On weekly basis
8	Solid waste recycling process	No	NA
9	Awarness programme organized	Yes	Once in a year

Observations

1. Academic Departments do not generate large quantities of waste.
2. Plastic mataerial are still in use in large quantities.
3. Frequency for garbage and litter collection is less.
4. Any educational institution is subject to budgetary and management constraints that limits the effectiveness of a waste handling system , that is also true in case Manabendra Sarma Girls' College as it is reflected in inadequate funds for waste management programs and staff.

Suggestions and Recommendations

- Manabendra Sarma Girls' College campus is to be declared as a plastic-free campus.
- The practice of using biodegradable materials should be encouraged.
- Vermi composting facilities should be installed along with composting pits.

HEALTH AUDIT

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

- Swatccha Bharat Abhiyan Date: 23-01-2020
- Plantation Programme Date: 06-03-2020
- World Environment Day Every Year
- Cleanliness Drive Date: 13-11-2021
- Yoga a way of career Date: 11-11-2019
- A popular talk on Health & Education Date: 06-06-2022
- A popular talk on Yoga and Effects of Electronic Gadgets in Adolescent Health Date: 29-12-2021
- Breast cancer awareness programme Date: 31-08-2018
- Yoga and Meditation Programme Date: 08-06-2022



**Cleanliness drive in the
College Campus
Plate 2**



**Plantation drive in the
College Campus**

Plate 3

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 to reduce energy use and improvement of performance. The present audit therefore aimed to cover the aggregate consumption of Electrical and Natural gas energy in Manabendra Sarma Girls' College 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

The electricity supply for Manabendra Sarma Girls' College is provided by Assam Power Distribution Company Limited 7.0 KV connected load under the Consumer No. 077000002173 . The Energy consumed by the College falls under LT Category. The College has no DG sets. LPG are utilised for cooking in Canteens only. Energy is mainly used on this facility for 1) illumination, 2) Office equipment, 3) Air conditioners, 4) Fan, 5) Water pump and 6) Cleaning and construction purposes

Table 5: Energy consumption in Manabendra Sarma Girls' College

Annual Electrical Energy consumption in Manabendra Sarma Girls' College (2020-2021)		: Rs. 4494/- per month (In terms of money)
Billing Demand		: 8.23 KVA
Average Power factor		: 85.0
LPG requirement per year		: 30 Nos
Fuel (Diesel)		: NA
Water Pump		: 02 (1.5 HP 5 nos)
No of energy efficient AC		: 3 Nos
	Refrigerator	: Nil
	Xerox machine	: 02
	Water Cooler	: Nil
Per centage replacement of non energy efficient machines in last 2 years: : 30%		
No of LED installation at present:	: Bulb- 68	Tube- 32
Percentage of increase in last 2 years	: 84%	
Building Energy Performance Index	: 0.80 kwh/m ² /year	

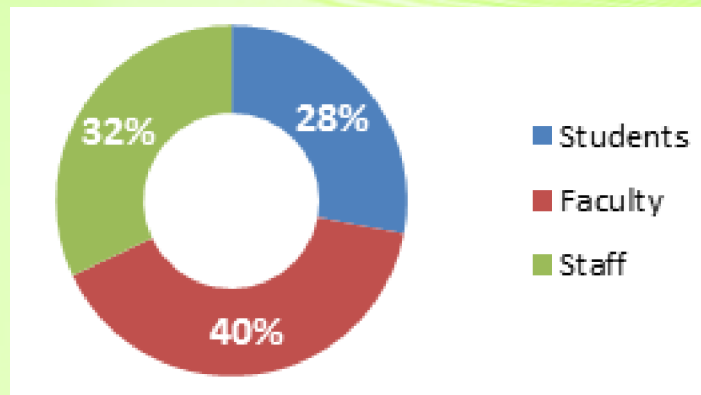
Energy efficiency assessment

The Energy efficiency assessment was conducted for the load connected to the mains supply of all college buildings. The entire campus including common facility centers are equipped with LED lamps and LED tube lights, except at few locations. Computers are set to automatic power saving mode when not in use.

In campus premises, electricity is usually shut down when not in use and during the vacations, both in office and class rooms 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).

Fig 4: Stack holders' involvement in energy conservation



Suggestions and recommendations

- Installation of LED lamps in the entire campus
- Replacement of the old tube lights with the new LED tubes.
- 5 star rated ACs, Fans and other electrical appliances should be procured.
- Cleaning of tube lights and bulbs need to be done periodically to remove dust over it.
- To compensate for the rising power requirement, solar panels could be installed within the College campus.

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, pollination of 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 birdwatching, 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 on the campus.

Spreading over 1.97 acres of land (as per land record), the Manabendra Sarma Girls' College campus 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

Since the Manabendra Sarma Girls' College campus is located with a land locked residential areas, it houses a good number of urban animals from each different phylum. Providing support to faunal diversity indicates a good health of the campus. In the present study 52 number of animals were reported in the college campus belonging to different phylum and class. There were 02 nos of annelida, 24 species of Arthropods including butterflies and 02 nos of Mollusca species recorded belonging to invertebrate. Altogether 03 nos of amphibians, 01 no of reptiles and 19 birds were recorded during the audit period. Mammalian diversity is poor and is represented by 01 nocturnal species.

Table 6 : Fauna of Manabendra Sarma Girls' College Campus

Invertebrates

Sl. No	Common Name	Scientific Name	Family
		Annelida	
1	Earthworm	<i>Pheretima posthuma</i>	Megascolecidae
2	Leech	<i>Hirudinea granulosa</i>	Hirudinidae
		Arthropods (General Insects)	
3	Indian Tiger Centipede	<i>Scolopendra hardwickei</i>	Scolopendridae
4	Millipede	<i>Harpagomorpha spp.</i>	Paradoxosomatidae
5	Mosquito	<i>Culex tritaeniorhynchus</i>	Culicidae
6	Black Spider	<i>Chilobrachys assamensis</i>	Theraphosidae
7	Hairy caterpillar	<i>Spilarctia obliqua</i>	Erebidae
8	Firefly	<i>Lampyris noctiluca</i>	Lampyridae
9	Housefly	<i>Musca domestica</i>	Muscidae
10	Grasshopper	<i>Acrida exaltata</i>	Acrididae
11	Ladybird beetle	<i>Coccinella septimpunctata</i>	Coccinellidae
12	Dragon fly	<i>Libellula spp.</i>	Libellulidae
13	Water bug	<i>Diplonychus rusticus</i>	Belostomatidae
14	Asian Lady bird beetle	<i>Harmonia spp.</i>	Coccinellidae
15	Dung beetle	<i>Onitis philemon</i>	Scarabaeidae
16	Scarab beetle	<i>Apogonia blanchardi</i>	Scarabaeidae
17	Scarab beetle	<i>Anomala chromosma</i>	Scarabaeidae
		Arthropods (Butterflies)	
18	Leamon Pansy	<i>Junonia lemonias</i>	Nymphalidae
19	Common Baron	<i>Euthalia aconthea</i>	Nymphalidae
20	Common Evening Brown	<i>Melanitis leda</i>	Nymphalidae
21	Plain Tiger butterfly	<i>Danaus chrysippus</i>	Nymphalidae
22	Dark Grass Blue	<i>Zizeeria karsandra</i>	Lycaenidae
23	Indian Cabbage White	<i>Appiascanidia spp.</i>	Pieridae
24	Common Grass Yellow	<i>Euremahecabe spp.</i>	Pieridae
25	Common Mormon	<i>Papilio polytes</i>	Papilionidae
26	Grey Pansy	<i>Junonia atlites</i>	Nymphalidae

Mollusca			
27	Apple snail	<i>Pila globosa, Pila scutata</i>	Ampullariidae
28	Snail	<i>Bellamya bengalensis</i>	Viviparidae

Vertebrates

Amphibians			
1	Tree Frog	<i>Hyla spp.</i>	Hylidae
2	Bull Frog	<i>Rana tigrina</i>	Ranidae
3	Asian common toad	<i>Bufo melanostictus</i>	Bufoidea
Reptiles			
4	House lizard	<i>Hemidactylus frenatus</i>	Gekkonidae
Birds			
5	Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae
6	Little Egret	<i>Egretta garzetta</i>	Ardeidae
7	Greater adjutant	<i>Leptoptilos dubius</i>	Ciconiidae
8	Asian open-bill stork	<i>Anastomus oscitans</i>	Ciconiidae
9	Lesser adjutant	<i>Leptoptilos javanicus</i>	Ciconiidae
10	Indian ring dove	<i>Streptopelia decaocto</i>	Columbidae
11	Common myna	<i>Acridotheres tristis</i>	Sturnidae
12	Oriental magpie robin	<i>Copsychus albospectularis</i>	Muscicapidae
13	Red-vented bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae
14	Pigeon	<i>Columba livia</i>	Columbidae
15	Black-hooded oriole	<i>Oriolus xanthornus</i>	Oriolidae
16	Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae
17	House sparrow	<i>Passer domesticus</i>	Passeridae
18	House crow	<i>Corvus splendens</i>	Corvidae
19	Crimson sunbird	<i>Aethopyga siparaja</i>	Nectariniidae
20	Duck	<i>Anas platyrhynchos</i>	Anatidae
21	Asian Koel	<i>Eudynamis scolopaceus</i>	Cuculidae
22	Pileated woodpecker	<i>Dryocopus pileatus</i>	Picidae
23	Bulbul	<i>Pycnonotidae spp.</i>	Pycnonotidae
Mammals			
24	Indian Flying Fox	<i>Pteropus spp.</i>	Chiroptera

FLORAL DIVERSITY

The campus is small with a variety of trees, bushes and grass. Besides the resident flora, 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. All the plants provide a good ecological services in maintaining green campus within the small township. Altogether 34 species of plants belonging to herb, shrub and tree categories are recorded and enlisted below.

Table 7: List of plants growing within the Manabendra Sarma Girls' College Campus

1. <i>Polyalthia longifolia</i>	Annonaceae	Tree
2. <i>Hibiscus rosa sinensis</i>	Malvaceae	Shrub
3. <i>Impatiens balsamia</i>	Balsaminaceae	Herb
4. <i>Citrus limon</i>	Rutaceae	Shrub
5. <i>Azadirachta indica</i>	Meliaceae	Tree
6. <i>Zigyphus jujube</i>	Rhamnaceae	Tree
7. <i>Mangifera indica</i>	Anacardiaceae	Tree
8. <i>Acacia moniliformis</i>	Fabaceae	Tree
9. <i>Cassia fistula</i>	Fabaceae	Tree
10. <i>Cassia sophera</i>	Fabaceae	Shrub
11. <i>Dalbergia sissoo</i>	Fabaceae	Tree
12. <i>Delonix regia</i>	Fabaceae	Tree
13. <i>Terminalia arjuna</i>	Combretaceae	Tree
14. <i>Callistemon lanceolatus</i>	Myrtaceae	Shrub
15. <i>Psidium guajava</i>	Myrtaceae	Shrub/Tree
15. <i>Syzygium cumini</i>	Myrtaceae	Tree
16. <i>Neolamarckia cadamba</i>	Rubiaceae	Tree

17. <i>Ageratum conyzoides</i>	Asteraceae	Herb
18. <i>Chromolaena odorata</i>	Asteraceae	Herb
19. <i>Mimusops elengi</i>	Sapotaceae	Tree
20. <i>Nyctathes arbor- tristis</i>	Oleaceae	Shrub
21. <i>Nerium oleander</i>	Apocynaceae	Shrub
22. <i>Gmelina arborea</i>	Lamiaceae	Tree
23. <i>Leucas aspera</i>	Lamiaceae	Herb
24. <i>Polygonum</i> sp.	Polygonaceae	Herb
25. <i>Phyllanthus niruri</i>	Phyllanthaceae	Tree
26. <i>Phyllanthus emblica</i>	Phyllanthaceae	Tree
27. <i>Euphorbia hirta</i>	Euphorbiaceae	Herb
28. <i>Canna indica</i>	Cannaceae	Herb
29. <i>Dracaena</i> sp.	Agavaceae	Shrub
30. <i>Colocasia</i> sp.	Araceae	Herb
31. <i>Saccharum spontaneum</i>	Poaceae	Herb
32. <i>Equisetum</i> sp.	Equisetaceae	Herb
33. <i>Aglaomorpha quercifolia</i>	Polypodiaceae	Herb
34. <i>Pteris vittata</i>	Pteridaceae	Herb

Recommendations

- The existing campus of Manabendra Sarma Girls' College supports a good number of plants and animals. A few of which are ecologically, aesthetically and culturally important, these 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.
- Students may be encouraged to take care of the plants and the campus.
- Since it is a flood prone region, special care must be taken to protect the plants from uprooting.

AUDIT SUMMARY

This report on "Green Audit" of Manabendra Sarma Girls' College for the year 2021-2022 was prepared with a 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 through questionnaires in all the sectors related to environmental quality. The data thus collated were analyzed to prepare this audit report of Manabendra Sarma Girls' College.

With a area of 1.97 acres of land, the college accommodates one green space, one parking lot and one play ground. Little Disturbances were noted in dedicated green areas/gardens that need management intervention. Organized plantations in the campus are seen along the internal roads and hostel units. The topography of campus leads to periodic inundation problems with the interferences with the nearby residential areas which the College is trying to mitigate by constructing a drain leading to nearby river. At present, the drainage links are found to be missing.

The Manabendra Sarma Girls' College extracted @ 3000 L ground water per day to fill up the water tanks of the capacity 4000 L. Though majority of

stakeholders are conscious, it was noted that wastage of water is prominent which need intervention of the college authority. 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. Further, Display signage for water conservation and regular monitoring need to be installed so that it can be highlighted as one of the best practices for water conservation in the college. The installation of rain water harvesting unit is suggested. A periodical maintenance of water taps/ water pipes/ reservoirs to prevent the loss of water is also suggested.

In the college, paper/ plastic/organic waste were recorded to be generated and it is seen that the college is trying to mitigate the problem in a organized way. Bio-medical and e-waste waste are negligible. The college neither has any centralized collection point nor disposal policies for the used batteries of any kind, that may be initiated as soon as possible. The college is committed to keep the campus waste free. Installation of dustbins has been started in the phase manner. It is also noted that no visible segregation practice exists to separate different wastes which need attention. Installation of one vermi-composting unit to mitigate the organic waste including the leaf litters will be helpful for the campus in future. Further, it is good to see that around 73 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 material are still in use large quantities. It is hence suggested that Manabendra Sarma Girls' College campus is to be declared as a plastic-free campus. Another noticeable point is that the frequency for garbage and litter collection is less, which needs attention.

In order to encourage the students to respect the environment and think about conservation, the college in collaboration with some external agencies regularly organise different awareness programme on Swachhata and maintenance of healthy environment, A couple of plantation programmes during Republic Day, Independence Day , World Environment Day, International Day of Yoga were also organised in and around the Manabendra Sarma Girls' College 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 for 1) illuminating the campus 2) running office equipment, 3) Air conditioners, 4) Fan, 5) Water pump and 6) Cleaning and construction purposes. The main source of electricity in Manabendra Sarma Girls' College is Assam Power Distribution Company Limited. The College do not have any fuel used DG sets. Of course, LPG are utilised for cooking in Canteens. The Energy efficiency assessment was conducted for the load connected to the mains supply of college building. The entire campus

including common facility centers are equipped with LED lamps and LED tube lights, except at few locations. Percentage replacement of non energy efficient machines in last 2 years was 30% and percentage of increase LED installation in last 2 years was about 84%.

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 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 Manabendra Sarma Girls' College campus houses around 52 number of animals of different phylum. The campus accommodates around 19 birds and 01 mammals. No of arthropods particularly butterflies were reported to be higher in the campus. Harboring of rich faunal diversity is also an indicator of good health of the campus.

The campus is evergreen with 34 species of trees, shrubs and herbs including grass. 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 services in maintaining a green campus these should be conserved in a proper way to support and to achieve more biodiversity values in future.

The report contains some specific suggestions and recommendations in each category to be implemented to improve the existing environment-related practices of Manabendra Sarma Girls' College.
