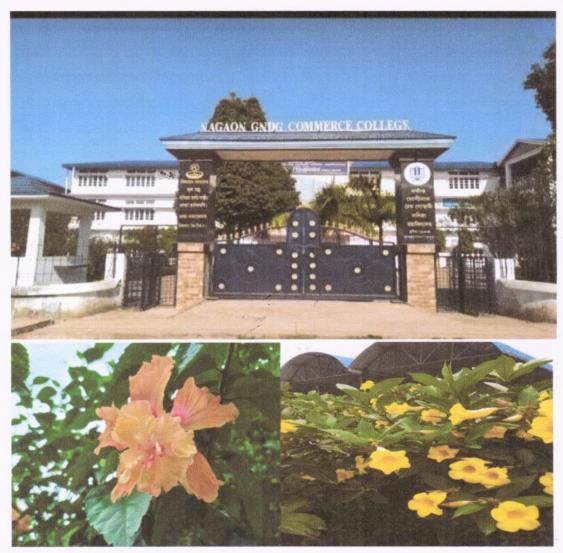
GREEN AND ENVIROMENTAL AUDIT REPORT 2021-2022





Nagaon G.N.D.G Commerce College Panigaon, Nagaon, Assam Pin-782003

DHING COLLEGE: DHING: NAGAON: ASSAM

DEPARTMENT OF BOTANY



CERTIFICATE

This is to certify that Nagaon G.N.D.G Commerce College has conducted a detailed "Green cum Environmental Audit" of their campus and successfully established eco friendly practices and management systems for conservation of environment at all levels. The environment awareness initiatives are substantial. This will surely boost the new generation to take care of environment and propagate this view for many generations to come. The efforts undertaken by the supervision of Principal, faculty members, non-teaching members and students of Nagaon G.N.D.G Commerce College towards environment and sustainability are highly appreciated and commendable.

External Auditor Green Audit

Dr. Sanjeeb Kumar Nath HOD & Associate Professor Department of Botany Dhing College Dhing : Nagaon Assam

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Introduction

Green audit is a process of systematic identification, quantification, recording, reporting and analysis of components of flora and fauna diversity within the campus. It aims to analyze green practices inside and outside of the concerned sites, which will have an impact on the eco-friendly environment. Green Audit provides direction for improvement of the condition of environment. It is carried out with the aid of performing tasks like waste management, energy saving and tree plantation to turn into a better environment friendly institute. Green audit can be a useful tool for universities and colleges to determine their consumption of energy or water or other resources and then plan to implement changes and make savings. It can create health consciousness and promote environmental awareness, values and ethics. It allows faculty members, students and other staff members to better understand the impacts of green activities on the premises.

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. The biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. Without this variability in the living world, ecological systems and functions would break down with detrimental consequences for all form of life, including human beings. In this context, it is necessary to adopt a green campus system for the institute, which will lead to sustainable development while reducing the large amount of atmospheric CO₂ emission to the environment.

In the background of this scenario, government of India through its National Environment Policy (2006) has made mandatory for all higher educational institution to conduct green audit in order to ensure a clean and healthy environment within and outside the institution. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environment sustainability is more prevalent. Accordingly, realizing the need of being responsible towards environment NAAC has also added the concept of environmental audit in accreditation methodologies of state, central universities and colleges.

Overview of the College

Nagaon Gopinath Dev Goswami Commerce College is one of the pioneer institutions of higher education in the entire central Assam region. The college was started on the 24th of September, 1984 in the premises of Sankardev Natya Chora under the name of Nagaon Commerce College. It was renamed as Nagaon GNDG Commerce College. After the name of Late Gopinath Dev Goswami, an illustrious son of Nagaon and was shifted to its present site at Panigaon, Nagaon in 1991.

Environmental Setting

College is easily accessible by road as it is located at the road side of the AT Road (NH 37) and at the very entrance of the Nagaon Town from the eastern side i.e. from Tezpur, Jorhat, etc. and from other direction it is 3 km away from the centre of Nagaon Town. By railways it is nearly 2km from Morikolong railway station and 5km from the Haiborgaon railway station. The college is spread over 3 acres of area. Although campus is located in semi urban area, presence of green belt including gardens, lawns and an herbal garden has considerably reduced pollution in the campus.

College Campus Land area and Total Building area

Campus area = 135039sqft = 12558.63m (3 acres 1 katha 11 losha)

Academic & others College Building Area = 51700 sqft.

Administrative Building Area = 6266 sqft.

Girls Hostel = 3614 sqft.

Total = 61580sqft,

It is approximately 50% of total area (after adding the pathways and concrete front yard)

Thus the College have a green area of nearly 50% out of the total area, which includes lawn, garden, open space, road side shrubs and boundary side shrubs and trees.



Fig 1. Google Map- Aerial view of Nagaon GNDG Commerce College

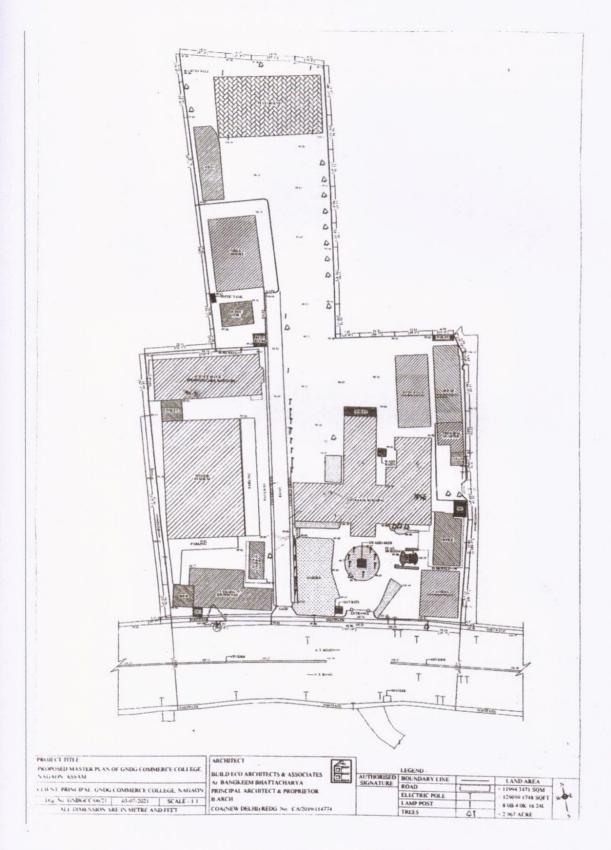


Fig 2. Proposed master plan of Nagaon GNDG Commerce College



Fig 3. Master plan of Nagaon GNDG Commerce College

Audit Objectives and Methodology

Green audit is done with the objective to conduct assessment of environment related issues and to minimize these issues particularly inside the campus. So adequate steps have been taken and will be taken to maintain an eco-friendly environment inside the campus mainly focus on sustainable development. The main aims and objectives are as follows.

- To document the green area management and plant diversity of the campus
- > To document the water and waste management of the campus
- > To ensure environment friendly activities and review the implementation of policies
- To secure the environment and cut down the threats posed to human health by ensure optimum utilization of resources
- > To promote environmental awareness among students and staff members
- > To establish a baseline data to assess future sustainability by avoiding the interruptions in environment

Honourable principal, Dr. Mriganka Saikia with a discussion with all the staff members formed a Green cum Environmental Audit Committee (including both internal and external members) on 18th May 2022. The need for a Green and Environment Audit Report was raised in the meeting organized by Green Audit Team of the college with external member on 28th May, 2022. In order to perform green audit, the methodology included physical inspection of the campus, observation, measurements and documentation. The methods of plant identification include expert determination, recognition, comparison and the use of keys, manuals, monographs and E-flora. The present report covered the areas like green area management, water management, waste management, environment friendly practices etc.

Green cum Environmental Audit Team

A Green cum Environmental Audit Committee has been formed to perform the task of Green and Environment Audit of Nagaon GNDG Commerce College with effect from the year 2021-22.

External Member

 Dr. Sanjeeb Kumar Nath, HOD & Associate Professor, Department of Botany, Dhing College, Dhing, Nagaon, Assam

Internal Members

- Dr. Bhaswati Sarma, Assistant Professor, Department of Botany, Nagaon G.N.D.G Commerce College
- 3. Dr. Anamika Talukdar, Assistant Professor, Department of Chemistry, Nagaon G.N.D.G Commerce College
- 3. Miss Silpa Saikia, Assistant Professor, Department of Zoology, Nagaon G.N.D.G Commerce College
- 4. Mr. Mintu Gayan, Assistant Professor, Department of Information and Technology, Nagaon G.N.D.G Commerce College
- Mr. Suman Saikia, Junior Assistant, Nagaon G.N.D.G Commerce College



Green cum Environmental Audit Committee

Campus Biodiversity

Nagaon GNDG Commerce College harbours rich plant diversity even if has small area and besides situated side by the national highway. All the way through the preliminary research, hundred numbers of species were identified and listed below herewith. The species were classified and listed as medicinal, fruit plant and ornamental plants. In addition some of species have more potential and used as insecticide, pesticide, biodiesel, air purifier etc. The plant diversity is explored during May and June months of this year as we know the rainy season has more species richness. More diversity exploration work in different seasons of the year is necessary to have a complete flora list of the campus. It is a continuous work and our college had already initiated a digital biodiversity register involving students and all the staff members with a noble idea to help the local community.

Table1: List of medicinal plants of the campus

SL.NO	SCIENTIFIC NAME	LOCAL NAME	COMMON NAME/ ENGLISH NAME
1.	Ageratum conyzoides L.	Gendhali Bon	Billygoat weed
2.	Altenanthera sessilis (L.) R.Br. ex DC.	Matikaduri	Sessile joyweed
3.	Axonopus compresus (Sw.) P. Beauv.	Dolicha-bon	Carpet grass
4.	Azadirachta indica A. Juss.	Neem	Neem
5.	Caesalpinia pulcherrima (L.) Sw.	Krishnachuda	peacock flower/Gold Mahur
6.	Cassia javanika L.	Golopia Sonaru	Pink shower
7.	Chrysopogon gryllus (L.) Trin.	Bonguti ghah	scented grass
8.	Cleome viscose L.	Hurhuriya	Fringed spider flower

SL.NO	SCIENTIFIC NAME	LOCAL NAME	COMMON NAME/ ENGLISH NAME
9.	Clitoria ternatea L.	Aparajita	Butterfly creeper
10.	Coix lacryma L.	Kaurimoni	Job's tear
11.	Colocasia esculanta (L.)Schott	Kola kachu	Taro
12.	Commelina benghalensis L.	Kona-shimolu	Benghal dayflower
13.	Crassocephalum crepidioides(Benth.) S. Moore	-	Redflower ragleaf
14.	Cymbogan citratus(DC.) Stapf	Gondha biringa	Lemongrass
15.	Cynodon dactylon (L.) Pers.	Dubori bon	Devil' grass
16.	Desmodium trifolium (L.) DC.		Creeping tick trefoil
17.	Digitaria cilliaris (Retz.) Koeler	Ghah	Southern crabgrass
18.	Diplazium esculentum (Retz.) Sw.	Dhekia xak	vegetable fern
19.	Dracaena reflexa Lam.	-	Song of India
20.	Eleusine indica(L.) Gaertn.	Bobosa-bon	Goosegrass
21.	Eryngium foetidum L.	Man-dhonia	Culantro
22.	Euphorbia hirta L.	Gakhiroti Bon	Asthma plant
23.	Euphorbia milii Des Moul.	Sijwu	Crown of thorns
24.	Ficus religiosa L.	Aahot	Ficus
25.	Galinsoga quadriradiata Ruiz & Pav		Shaggy soldier
26.	Glinus oppositifolius (L.) Aug. DC.	-	Slender Carpet-weed
27.	Heliotropium indicum L.	Hatisur	Indian heliotrope
28.	Helminthotheca echioides (L.)Holub		brisstly oxtongue
29.	Jatropha curcus L.	Bhot-era	Bubble bush
30.	Kalanchoe pinnata(Lam.)Pers.	Dupar tenga	Miracle leaf
31.	Kyllinga brevifolia Rottb.	Kariah Bon	Green kyllinga
32.	Leucus aspera (Wild.) Link	Durun	Thumba
33.	Mikania micrantha Kunth	Japani lata	mile-a-minute

SL.NO	SCIENTIFIC NAME	LOCAL NAME	COMMON NAME/ ENGLISH NAME
34.	Murraya koenigii (L.) Sprengel	Narasingha	Inidian curry leaf plant
35.	Mimosa pudica L.	Nilaji bon	Touch-me-not
36.	Nyctanthaes arbor-tristis L.	Sewali	Night jasmine
37.	Ocimum tenuiflorum L.	Tulasi	Holy basil
38.	Oldenandia corymbosa L.	Bon-jaluk	Diamond flower
39.	Oplismenus hirtellus (L.) P. Beauv.	A type of Ghah	Basket grass
40.	Oxalis corniculata L.	Tengeshi-tenga	Sleeping beauty
41.	Oxalis corymbosa DC.	Tengeshi-tenga	Pink shamrock
42.	Panicum dichotomiflorum Michx	Bon	Fall panicgrass
43.	Panicum maximum Jacq.	Bon	Guinea grass
44.	Parietaria officinalis I.	-	Lichwort
45.	Persicaria strigosa (R.Br.) Nakai	-	Spotted knotweed
46.	Phyllanthus niruri L.	Bhui-amlakhi	Bhumi amla
47.	Piper betle L.	Pan	Betel leaf
48.	Pouzolzia zeylanica (L.) Benn.	Borali Bokua	Graceful Pouzolz's Bush
49.	Ruellia angustifolia	Petunia	Wild petunias
50.	Scoparia dulcis L.	Bon-dhonia	Goatweed
51.	Senna occidentalis (L.) Link	Kusum	Coffee Senna
52.	Setaria pumila (Poir.) Roem. & Schult		yellow foxtail
53.	Sida acuta Burm. f.	Bor sonborial	Common wirewood
54.	Solanum nigrum L.	Pokmou	Black nightshade
55.	Solanum torvum Sw.	Tita bhekuri	Turkey berry
56.	Typhonium trilobatum (L.) Schott	Samakochu	Bengal Arum
57.	Vernonia cineria (Carl Linnaeus) H. Rob	kuk shim	little ironweed

Few medicinal plants of Nagaon GNDG Commerce College campus



Heliotropium indicum L.

Leucus aspera (Wild.) Link



Mimosa pudica L.

Ageratum conyzoides L.

Green Belt of College campus



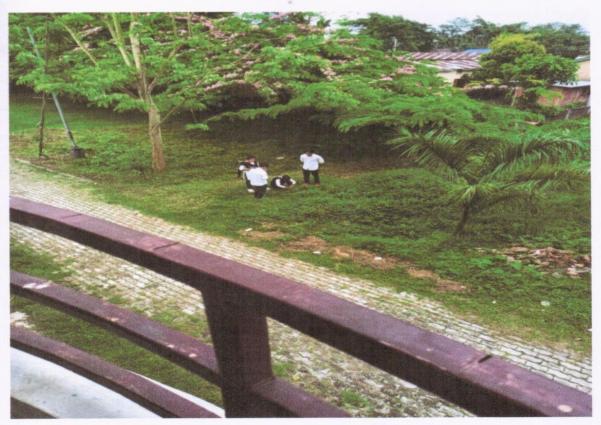
Bottle palm plantation at the College campus



Hedge plantation at the entrance of Girls' Hostel



Part of the garden of the College



Students exploring plant diversity

Table2: List of fruit plants of the campus

SL.NO	SCIENTIFIC NAME	LOCAL NAME	COMMON NAME/ ENGLISH NAME
1.	Carica papaya L.	Amita	Papaya
2.	Cucurbita pepo L.	Rangalao	Pumpkin
3.	Citrus limon (L.) Osbeck	Nemu	Lemon
4.	Coccos nucifera L.	Narikol	Coconut
5.	Mangifera indica L.	Aam	Mango
6.	Musa acuminata Colla	Cheni champa kol	wild banana
7.	Musa paradisica L.	Malbhog kol	Banana
8.	Psidium guajava L.	Madhuri Aam	Guava
9.	Punica granatum L.	Dalim	Pomegranate
10.	Solanum lycopersicum L.	Bilahi	Tomato
11.	Ziziphus jujube Mill.	Bogori	Indian Cherry

Table3: List of garden plants and indoor plants of the campus

SL.NO	SCIENTIFIC NAME	LOCAL	COMMON NAME/ ENGLISH NAME
1.	Agave angustifolia Haw.	+	Narrow centuary plant
2.	Allamanda cathartica L.	Ghanta-phul	Yellow Bell
3.	Araucaria heterophylla (Salisb.) Franco	-	Christmas living tree
4.	Begonia sierra L.	Begonia	Begonia
5.	Caladium bicolor (Aiton) Vent.	Futuki Kochu	Heart of Jesus
6.	Carex siderosticta Hance		leaf sedge
7.	Catharanthus roseus (L.) G. Don	Nayantara	Rosy Periwinkle
8.	Cestrum nocturnum L.	Hasnahana	Night jasmine
9.	Chlorophytum laxum R. Br.		spider plant
10.	Codiaeum variegatum (L.) A. Juss.	Pat bahar	Garden croton
11.	Cordyline fruticosa (L.) A. Chev.		Ti-plant
12.	Cycas sp	Cycas	Cycas
13.	Dracaena trifasciata (Prain) Mabb.		Snake plant

SL.NO	SCIENTIFIC NAME	LOCAL NAME	COMMON NAME/ ENGLISH NAME
14.	Dypsis lutescens (H. Wendl.) Beentje	Momai-Tamul	Areca palm
15.	Epipremmum aureum G.S. Bunting.		Money plant
16.	Gerbera jamesonii Bolus ex Hooker f.	Daisy ful	Barberton daisy
17.	Hibiscus rosa-sinensis L.	Jaba	china rose (peach)
18.	Hydrangea macrophylla (Thunb.) Seringe	-	Big leaf hydrangea
19.	Hyophorbe lagenicaulis (L.H. Bailey) H. E. Moore	_	Bottle palm
20	Ixora coccinea L.	Ranga Rangan	Scarlet jungle flame
21.	Mesua ferrea L.	Nahor	Ceylon ironwood
22.	Mussaenda phillipica A. Rich.	Mithai phul	Mussaenda
23.	Nephrolipis obliterata (R.Br.) J. Sm.	-	Kimberley Queen ferr
24.	Nerium oleander L.	Korobi(Pink)	oleander
25.	Pilea cadierei Gagnep. & Guillaumin.		Aluminum plant
26.	Polyathia longifolium Sonn. B. Xue & R.M.K. Saunders	Debadaru	Indian mast tree
27.	Saribus rotundifolius(Lam.) Blume	- ***	Fan palm
28.	Syngonium podophyllum Schott	/	American evergreen
29.	Tabernamontana divaricata R.Br. ex Roem. & Schult.	Kathana	Crape jasmine
30.	Thuja orientalis L.	Thuja	Thuja
31.	Tradescantia spathacea Sw.		Boat lily, oyster plant

Water management

The major sources of water in the college campus are ground water produced by bore wells and stored in reservoirs. Water is mainly used for drinking, conducting practical in the laboratories, bathroom, toilet, gardening and cooking in hostel and canteen. Aqua-guards have been installed for drinking purposes in different locations throughout the entire college. A large cooler cum filter is installed for common use, especially for students.

Rain Water Harvesting

All living things including plants, animals and human being need water to live and to carry out different kinds activities. It is hard to imagine a day without water. We use water for different kinds of day to day activities such as cleaning, washing, bathing, cocking, drinking, gardening and other domestic and industrial use.

Water is precious, essential and an abiotic component of the ecosystem. Today we all are heading toward to scarcity of water. This is mainly become of the lack of water conservation and pollution of water bodies. So let us not waste water and start conserving water for further use.

There are different kinds methods used for conserving water. One such method is rain water harvesting. Rain water harvesting is the simple process used to conserved rainwater by collecting, storing, purifying of rain water that runs off from rooftop, roads, open ground etc. for later use.

It is a process of accumulation and storage of rainwater for reuse rather than allowing it to run off.

Rain water harvesting is a method of collecting rainwater for further use on reuse before it reaches the ground. Generally rainwater is collected from the

rooftop through pipe and stored in over ground tank or underground storing structure.

The water collected from rain water harvesting system shall be used as a secondary source if water and will be used for all other purposes like gardening, cleaning, washing hands etc. which does not require drinking water quality.

In Nagaon G.N.D.G. Commerce College, we have rain water harvesting unit where the rain water coming from roof tops are collected through pipe in a tank of 1000 Litres and used for gardening and other uses.



Rain water Harvesting



Cold water unit



Drinking water station

Waste management

The solid waste generated in the campus is segregated at source by providing separate dustbins for biodegradable and non-biodegradable. The college has a tie up with Nagaon Municipal Corporation (NMC) for disposal of waste generated. The waste generated by newspapers, magazines, cartoons and examination oriented waste are reused as possible and stored in the proper places. The plastic waste generated in the campus is regularly put in the 'plastic tank'. Metal waste, concrete waste and wooden waste are stored and given to scrap agents for further processing. Kitchen waste of hostel are dumped in pits and used as fertilizer.

We are in dire need of sustainable alternatives to dispose sanitary napkins in India. In an effort promote proper disposal of menstrual waste and promote the Swach Bharat Mission, Sanitary pad vending machines and eco-friendly incinerators were installed in Girls' hostel of our college.

The electronic wastes like obsolete computer, laptops, monitors, compact discs, printers, scanners, calculators etc are repaired and reused and those irreparable are sold out. The college try to reduce the volume of e-waste by upgrading the software at the right time and period checking of electronic items.



Eco-friendly Incinerators and Sanitary pad vending Machine at girls' hostel of the college campus

Environment friendly practices

Tree plantation programme

The college undertakes tree plantation programmes every year on various occasions like Environment Day, Teachers day etc. The plantation programme includes plantation of various types of air purifying plants (like Neem), economically important plants, ornamental, fruit plants and medicinal plant species. The NSS unit of the college conducted tree plantation programme at our adopted village, Karaiani time to time. This activity is done particularly during the rainy season of the year. These types of programme help to maintain a green environment and helps in the conservation of biodiversity of the college in particular and the surrounding area.

Encouraged to "reuse, refill, replenish"

The college has been trying to make it plastic free campus by creating awareness regarding the same among the students and staff members by displaying boards and other programmes. Another practice of the college is the use of reusable utensils which help in keeping the campus plastic free. Students were encouraged to incorporate reusable bottles use as well as other sustainable practices into their lives, such as using their own reusable service-ware for takeout and using reusable bags instead of disposable plastic or paper.

Cleanliness Drive

The college authority has maintained cleanliness throughout the college campus and nearby adopted village. The students and other members have been actively taking part in cleanliness drives mobilized through NSS unit of our college. The hostel girls clean the college campus on Sunday of every week.

Awareness programs

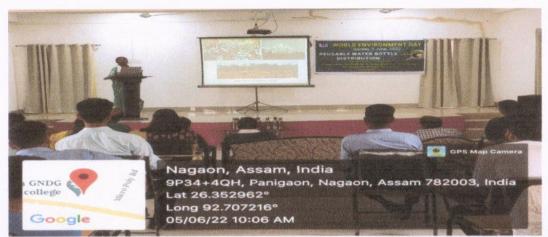
Seminars on environmental problems are organised from time to time with an aim to aware the students and college staff about climate change and its impact. A resource talk on 'Climate change and its impact on water resources' delivered by Dr. Jagannath Biswakarma, Scientist Water resources and drinking water EAWAG, Switzerland organized by IQAC of the college on 23rd April, 2022. Another seminar on 'Green house gases and climate change' was organised by our college on the eve of World Environment Day, 5th June, 2022 to create awareness. Nagaon GNDG Commerce College is trying to popularise the usage of bicycle by organising rally on the occasion of World Bicycle Day, in order to solve the problem of Global Warming and unhealthy lifestyle issues.

Digital Biodiversity Register:

Preparation of Institutional Digital Biodiversity Register along with Students already initiated on 5th June'2022 by identifying species and keeping their uses in different fields. With a hope to give information and take benefit by the college staff, students and for common people.



Reusable water bottle distribution



Seminar on climate change



Quiz competition
World Environment Day Celebration



Plantation at the college campus on 5th June, 22



World Bicycle Day celebration on 10th June, 2022



Community cleaning by NSS unit of the college at adopted village Karaiani and Tree plantation at 350 no Hengulichuk NB school



Display board for plastic free campus

Eco-friendly rules in the campus-

- Turn off everything
- Using LED light bulbs
- * Reduce, reuse, recycle
- Water-usage control
- Wash cups and plates, don't use disposable paper or plastic utensils
- Walk, bike and use public transport instead of a car
- Using electronics instead of paper

Suggestions and Recommendation

- 1. The college should maintain the existing green cover and increase if possible through the creation of botanical garden and other such measures.
- 2. The college should emphasize on the regular monitoring of drinking water quality, air quality and ambient noise level within the campus.
- 3. Proposal for NO HORN ZONE at the college campus
- 4. The inclusion of faunal diversity of the college campus is essential to have a complete biodiversity picture.
- 5. Colour coded bins should be placed around the campus for segregating the biodegradable and non-biodegradable waste.
- 6. More environment awareness posters should be displayed in the different places around the college campus.

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