A GREEN AUDIT REPORT-2020







BISWANATH COLLEGE, CHARIALI ASSAM-784176

Certificate

This is to certify that green audit on various aspects for maintaining an eco-friendly environment was carried out at Biswanath College campus on 25th of January, 2020. It has been observed that the college is maintain a very good green and sustainable environment.

I wish all the success and a bright future of the institution.

Name and Designation of the Auditor:

Signature of the Auditor: Date: 2501/2020

Seal: Divisional Forest Officer Biswanath Wildlife Division Biswanath Chariali

PREFACE

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. Raising the concern about the degrading quality of natural environment and imbibing the values of environment is a natural outcome as a part of teaching learning process. Biswanath College, in its pursuit for maintaining and improving the wholesome environmental quality of its campus, has taken up an initiative of carrying out a self-assessment through Green Audit. The Green Audit report (2020-2021)of Biswanath college is a joint venture of Botany and Zoology department of the College. All the faculty members and students of Botany and Zoology departments have taken active part in this noble initiative for clean and green campus.

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INTRODUCTION

1. ABOUT OF THE COLLEGE

Biswanath college is named after Biswanath Temple, situated in Biswanth Chariali is one of the famous as well as oldest temples in the north-eastern part of India. The college came into existence on 7th September, 1960 through the untiring efforts of the magnanimous people of this place and Naazibur Rahman, the then executive engineer in the PWD department, Assam in particular. The college is located 26.7267° N (Latitude) and 93.1479° E (Longitude) on the north bank of river Brahmaputra with an area of 11.99 hectares

Biswanath College was brought under deficit system of grant –in –aid by the Govt. of Assam on 01-04-63. The science stream was introduced with the beginning of Pre-University classes under Gauhati University in the year 1970 with 46 students. Degree courses in science subjects started from 1976. The science section was brought under deficit system of grant-in-Aid on 01-01-08. The college was brought under provincialized system by Govt. of Assam in 2005. The college offers major/honours courses in all subjects with 18 departments (Arts & Science) along with competent and committed teachers, strong library and an environment conducive to teaching and learning. The college is introducing different job-oriented vocational courses. The faculty of Commerce and faculty of computer application were introduced in the college 2012 and 2017 respectively.

2. GREEN AUDIT

Due to modernization and industrialization, our environment is in serious threat and is facing various global issues like global warming, greenhouse effect, ozone depletion and climate change etc. Considering the present environmental problems of pollution and excess use of natural resources, Hon. Prime Minister, Shri. Narendra Modiji has declared the Mission of Swachch Bharat Abhiyan. Also, University Grants Commission has mentioned "Green Campus, Clean Campus" mission mandatory for all higher educational institutes. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. Green Audit is the most efficient ecological tool to solve such environmental problems. It is a process of regular identification, quantification, documenting, reporting and monitoring of environmentally important components in a specified area. Through this process the regular environmental activities are monitored within and outside of the concerned sites which have direct and indirect impact on surroundings. Green audit can be one of the initiative for such institutes to account their Biodiversity, energy consumption, water management system, solid waste, E-waste, hazardous waste generation and management. Green Audit process can play an important role in promotion of environmental awareness and sensitization about resource use. It can create consciousness towards ecological values and ethics. Through green audit one can get direction about how to improve the condition of environment.

3. NEED OF GREEN AUDITING

Green auditing is the process of identifying and determining whether institutions practices are eco-friendly and sustainable. Green audit regulates all such practices and gives an efficient way of natural resource utilization. In the era of climate change and resource depletion it is necessary to verify the processes and convert it in to green and clean one. Green audit provides an approach for it. It also increases overall consciousness among the people working in institution towards an environment.

4. OBJECTIVES OF GREEN AUDIT

- To examine the current practices which can impact on environment such as of resource utilization, waste management etc.
- To identify and analyze significant environmental issues.
- Setup goal, vision and mission for Green practices in campus.
- Establish and implement Environmental Management in various departments.
- Continuous assessment for betterment in performance in green practices and its evaluation

METHODOLOGY

The purpose of the green audit of Biswanath College is to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. Some data have also been taken from the students' research works carried out by various science departments of the college. The study covered the following areas to summarize the present status of environment management in the campus.

• Review of the Documentation:

For the purpose of this audit the Green Policy of the institute was reviewed. Other relevant standards, Green audit frameworks etc. were also considered.

• Interviews:

Interviews were conducted with the Principal, concern regarding the management of recourses, environmental awareness, plantation etc.

• Physical Inspection:

The audit team was in the college to inspect the campus, census of tree plants, measurement of the campus, observations of tree diversity of fauna such as birds, insects, butterflies counting of Birds, Fauna, Insects of the campus.

GEOGRAPHICAL LOCATION WITH CAMPUS MAP



LAND USE ANALYSIS OF BISWANATH COLLEGE

Categories of land use	Areas in Hectares
Build up area	1.43
Tea garden	1.34
Road area	0.35
Open space and plantation	8.87



Fig: Land use analysis of Biswanath College

GREEN SPOTS OF THE CAMPUS

A total of seven green spots has been identified in the campus which are full of greenery maintained by various plant species to maintain an eco-friendly campus.

1. Plantation near basketball court:

A garden is developed near the basketball court where various ornamental shrubs and trees are planted such as *Tecoma stans*, *Saraca asoca*, *Mesua ferrea*, *Thuja sp.* etc along with grass lawn is also well developed.

2. Space in front of Philosophy department:

This green spot is full of various trees like *Arthrocarpus lucucha*, *Cocos nucifera*, *Elaeocarpus serratus*, *Tamarindus indica*, *Ziziphus sp*.etc, all are shaded plants, students use to seat under these shaded plants and do their studies and have group discussion related to studies in this way it has its own different impedances.

3. In front of Zoology department:

This spot also has varied type of trees like *Ficus religiosa*, *Ziziphus sp.*, *Mimusops elengi*, *Zamia sp.* were number of birds, insects and different creatures visits and dwell.

4. In front of Chemistry and Physics department:

In front of these departments a small area has been spotted out which is partially covered with various trees such as *Polyalthia longifolia*, *Mimusops elengi*, *Psidium guajava*, *Techtona grandis*, *Bouganvilla sp.*, *Mangifera indica* etc. All trees are useful for shade and increase the beauty of the campus.

5. Space beside Geography and Botany department:

A spot has been located beside Geography and Botany department which is covered by *Melaleuca viminalis, Magnolia campaca, Ficus racemosa, Tabernaemontana divaricata etc.* This spot is also rich various types of herbs such as *Solanum nigrum, Solanum villosum, parthenium hysterophorus, Ageratum conizoides.*

- 6. **The Tea Garden**: Biswanath college has a mini tea garden covering an area of 1.34 Ha. Apart from *Camellia sinensis* L.(O) Kuntze., the garden has a number of shade trees of the genus *Albizia odoratissima*, *Falcataria moluccana*, *Bombax ceiba etc*.
- 7. **Space beside the auditorium:** A green spot has been identified beside the college auditorium covered with these like *Cassia fistula, Senna siamea, Elaeocarpus serratus* etc.



Satellite view of Biswanath College Campus

GREEN SPOTS



Green spot near Basketball court

Philosophy green spot



Chemistry and Physics green spot

Zoology green spot



Geography and Botany green spot

Tea garden

GREEN AUDIT ACTIVITIES

The College has taken steps to ensure an eco-friendly campus. All kinds of initiatives are taken to maintain the greenery of the campus and to generate more and more awareness and concern for a healthy environment.

Some of the initiatives taken by the college to make the campus eco-friendly are:

Energy conservation:

- In its drive for saving energy, Biswanath College has taken steps to replace all existing bulbs and lights with LED lights phase wise. In fact, all newly constructed buildings have been equipped with LED lights and 5-star rating ceiling fans with a view to reducing the consumption of energy.
- Required amount of lights and fans are used in classrooms and laboratories only during class hours to save electricity.
- To minimize the consumption of electricity during night time, only street lights has been used.

Use of renewable energy:

The college has a planning to reduce the consumption of conventional source of electricity to renewable resources shorty by planting various plant unit like Biogas, solar energy etc. for educational and utility purpose.

Water harvesting:

This region receives heavy rainfall not only during rainy and summer seasons, but also during winter season. The three months of pre monsoon season remains almost without rainfall, but the scarcity of water has never been felt during this time till date. Biswanath College has set up natural water reservoir with this sole motive of water and energy conservation.

Plantation:

Biswanath college have been taken remarkable initiative in participating various activities for green environment. Various initiatives for plantation are as follows.

- Various plantation drives have been initiated by the college authorities and various departments in various occasion like world environment day celebration, foundation day etc.
- As per the institutional policy student taking free admissions have to plant and nourish at least one sapling in the campus.

Biswanath college owns and manages a healthy productive tea plantation inside the campus covering 1.34 Hectares. Along with tea bushes there is a impressive cover of shade trees in the plantation providing shade and several secondary environmental benefits like hosting different kind of birds, butterflies, wild animals and insects.

Effort of carbon neutrality:

With a larger green coverage, the college has always adopted all possible means to create a carbon neutral environment.

- The college authority takes up initiative by organising seminars, talks and workshops for creating sustainable effort for an eco-friendly campus.
- The college authority has adopted measures to check carbon emission in the campus by banning the burning of waste paper, dry leaves and other such waste products.
- The campus has a health tree cover letting in considerable amount of carbon dioxide mitigation potential of 1273 tons.

Hazardous waste management:

- Standard protocol have been maintained for solid waste management by the college authority.
- the college ensures that chemical extracts and all kinds of hazardous wastes like glass wares, plastic materials and litters are properly buried in pits dug out or disposed through the municipal corporation
- Proper labelling of chemicals is done to ensure safety.

• The laboratories are well equipped with means that ensure safety. The laboratory assistants are also well trained in safety measures.

Drainage system:

Biswanath College is fortunate enough to have been located in a congenial geographical location. The proper surface level of all buildings does not create any problem of water logging and erosion. The college has sufficient number of canals to drain out water and a natural reservoir to collect excess water. Besides, the nature of soil in this region allows seepage of water easily.

E-waste management:

E-wastes such as damaged computer parts, batteries, electronic items, electrical appliances, empty toner containers, are disposed as scrap and given away to agencies and the municipal corporation, that recycle such products.

Vermi- compost Unit:

Vermicompost (vermi-compost) is the product of the decomposition of waste materials using various species of earthworms. This vermi-compost act as a biofertilizer.Biswanath College has installed a vermicompost unit for decomposing of leaves litters in the campus using a species of earthworm called *Eisenia fetida*.

Biodiversity Register:

Biswanath college can be regarded as green campus because out of 11.99 hectares of campus area, about 8.7 hectares of land are under green vegetation cover area. About 1.34 ha land area has been allotted for tea plantation. Varied type of floras and fauna has been found in this campus. A Biodiversity register is maintained for faunal and floral diversity of the campus.

a) Faunal Biodiversity of Biswanath College Campus

Biodiversity underpins the health of the planet and has direct impacts on all our lives. Biswanath College Campus, covering an area of 11.99 ha, houses diverse form of living organism ranging from invertebrates to advanced vertebrates. Each species has their own significant role to play in their natural habitat; hence their survival is akin to proper functioning of the ecosystem and human lives as well. Thus to ensure that the current institutional development meets the needs of the present without compromising or threatening the survival of the persisting species and future generation as a whole, practices has been adopted for environmental impact assessment. This can be done by survey of the faunal diversity within the campus at regular interval of time, to assess any decline or increase and if necessary to adopt remedial measures. Hence with the support and approval of the institution, Department of Zoology has always organised activities in collaboration with Wild Life organisation to sensitise the students as well as to assess the biodiversity of the Biswanath College Campus. The faunal biodiversity as documented so far as follows:

Sl. No.	Common name	Family	Binomial Name
1	Common Ciliate Blue	Lycaenidae	Anthene definita
2	Straight Pierrot	Lycaenidae	Caleta roxus
3	Elbowed pierrot	Lycaenidae	Caleta elna
4	Common Pierrot	Lycaenidae	Castalius rosimon
5	Orchid Tit	Lycaenidae	Chliaria othona
6	Long Branded Silverline	Lycaenidae	Cigaritis lohita
7	Bright Sunbeam	Lycaenidae	Curetis bulis
8	Purple Sapphire	Lycaenidae	Heliophorus epicles
9	Common Tit	Lycaenidae	Hypolycaena erylus
10	Yamfly	Lycaenidae	Loxura atymnus
11	Malayan	Lycaenidae	Megisba malaya
12	Common Quacker	Lycaenidae	Neopithecops zalmora
13	Tailless Lineblue	Lycaenidae	Prosotas dubiosa indica
14	Common Line Blue	Lycaenidae	Prosotas nora
15	Acacia Blue	Lycaenidae	Surendra quercetorum
16	Fluffy Tit	Lycaenidae	Zeltus amasa
17	Colour Sergeant	Nymphalidae	Athyma inara

Table I: Checklist of Butterfly diversity recorded from Biswanath College campus

18	Common Castor	Nymphalidae	Ariadne merione
19	Black- vein Sergeant	Nymphalidae	Athyma ranga
20	Tawny Rajah	Nymphalidae	Charaxes bernardus
21	Large Yeoman	Nymphalidae	Cirrochroa aoris
22	Common Crow	Nymphalidae	Euploea core
23	Blue King Crow	Nymphalidae	Euploea klugii
24	Grey Pansy	Nymphalidae	Junonia atlites
25	Chocolate Pansy	Nymphalidae	Junonia iphita
26	Lemon Pansy	Nymphalidae	Junonia lemonias
27	Commander	Nymphalidae	Moduza procris
28	Common Sailor	Nymphalidae	Neptis hylas
29	Common Nawab	Nymphalidae	Polyura athamus
30	Wizard	Nymphalidae	Rhinopalpa polynice
31	Blue Tiger	Nymphalidae	Tirumala limniace
32	Common Windmill	Papilionidae	Byasa polyeuctes
33	Tailed Jay	Papilionidae	Graphium agamemnon
34	Common Jay	Papilionidae	Graphium doson
35	Common Bluebottle	Papilionidae	Graphium serpadon
36	Common Rose	Papilionidae	Pachliopta aristolochiae
37	Common lime butterfly	Papilionidae	Papilio demoleus
38	Yellow Helen	Papilionidae	Papilio nephelus
39	Paris Peacock	Papilionidae	Papilio paris
40	Common Mormon	Papilionidae	Papilio polytes
41	Spangle	Papilionidae	Papilio protenor
42	Chocolate Albatross	Pieridae	Appias lyncida
43	Black-veined Albatross	Pieridae	Appias olferna
44	Mottled Emigrant	Pieridae	Catopsilia pyranthe
45	Common Emigrant	Pieridae	Catopsilia pomona

46	Tree Yellow	Pieridae	Gandaca harina
47	Great Orange Tip	Pieridae	Hebomoia glaucippe
48	Yellow Orange Tip	Pieridae	Ixias pyrene
49	Psyche	Pieridae	Leptosia nina
50	Chocolate Demon	Hesperiidae	Ancistroides nigrita

Table II: Checklist of Spider diversity recorded from Biswanath College campus

Sl. No	Common Name	Family	Scientific Name
1.	Oval St. Andrew's Cross Spider	Araenidae	Argiopeaemula
2.	Garden Cross Spider	Araenidae	Argiopepulchella
3.	Hasselti's Spiny Spider	Araenidae	Gasteracantha hassetli
4.	Black and White Spiny Spider	Araenidae	Gasteracantha kuhli
5.	Spotted Orb Weaver	Araenidae	Neosconamukherjei
б.	Lynx Spider	Nephilidae	Nephilapelipes
7.	Striped Lynx Spider	Oxyopidae	Oxyopesjavanus
8.	Striped Lynx Spider	Oxyopidae	Oxyopes salticus
9.	Giant Daddy Long legs spider	Pholcidae	Artema Atlanta
10.	Tailed cellar spider	Pholcidae	Crossopriza lyoni
11.	Adanson's house jumper	Salticidae	Hasarius adansoni
12.	Giant Crab Spider	Sparasidae	Heteropodavenatoria
13.	Banded Phintella	Salticidae	Phintella vittata
14.	Jumping Spider	Salticidae	Plexippuspaykulli
15.	Jumping Spider	Salticidae	Rheneflavigera
16.	Two striped Jumper	Salticidae	Telamonia dimidiata
17.	Red House Spider	Theridiidae	Nesticodesrufipes

Table III: Checklist of Amphibian diversity recorded from Biswanath College campus

Sl. NO	Common Name	Family	Binomial Name
1	Asian Common Toad	Bufonidae	Bufo melanostictus
2	Indian Bullfrog	Dicroglossidae	Hoplobatrachus tigerinus
3	Indian Skipper Frog	Dicroglossidae	Euphlyctis cyanophlyctis
4	Two-striped bubble-nest tree frog	Rhacophoridae	Chiromantis vittatus

Table IV: Checklist of Reptiles diversity recorded from Biswanath College campus

Sl. NO	Common Name	Family	Binomial Name
1	Oriental Garden Lizard	Agamidae	Calotes versicolor
2	Painted Bronzeback	Colubridae	Dendrelaphis pictus
3	Indian Wolf Snake	Colubridae	Lycodon aulicus
4	Red necked keelback	Colubridae	Rhabdophis subminiatus
5	Oriental Rat snake	Colubridae	Pytus mucosa
6	Assam Day Gecko	Gekkonidae	Cnemaspis assamensis
7	Spotted House Gecko	Gekkonidae	Hemidactylus brookii
8	Common House Gecko	Gekkonidae	Hemidactylus frenatus
9	White-spotted supple skink	Scincidae	Lygosoma albopunctatum
10	Diard's blind snake	Typhlopidae	Typhlops diardii

Table V: Checklist of Bird diversity recorded from Biswanath College campus

SI	Common Name	Family	Scientific name
INO.			
1.	Cattle Egret	Ardeidae	Bubulcus ibis
2.	Intermediate Eggret	Ardeidae	Ardea intermedia
3.	Common Tailorbird	Cisticollidae	Orthotomus sutorius
4.	Eurasian Collard-Dove	Columbidae	Streptopelia decaocto

5.	Red Collard/Turtle-Dove	Columbidae	Streptopedia tranquebarica
6.	Spotted Dove	Columbidae	Spilopelia chinensis
7.	Yellow-footed Green- Pigeon	Columbidae	Teron phoenicoptera
8.	Indian Roller	Coraciidae	Coraciousbenghalensis
9.	Large-billed Crow	Corvoidea	Corvus macrorhynchos
10.	Asian Koel	Cuculidae	Eudynamys scolopaccus
11.	Spangled Drongo	Dicruridae	Dicrurus bracteatus
12.	Black Drongo	Dicruridae	Dicrurus macrocercus
13.	Scaly-breasted Munia	Estrrildidae	Lonchura punctulata
14.	Barn Swallow	Hirundinidae	Hirundo rustica
15.	Brown Shrike	Laniidae	Lanius cristatus
16.	Long-tail Shrike	Laniidae	Lanius schach
17.	Blu- throated Barbet	Megalaimidae	Megalaima asiatica
18.	Lineated Barbet	Megalaimidae	Psopogon lineatus
19.	Green Bee-eater	Meropidae	Merops orientalis
20.	Blue-tail Bee-eater	Meropidae	Merops philippinus
21.	White Wagtail	Motacillidae	Motacilla alba
22.	Oriental Magpie-Robin	Muscicapidae	Copsychus saularis
23.	Siberian Stonchat	Muscicapidae	Saxicola maurus
24.	Black-hooded Oriole	Oriolidae	Oriolus xanthornus
25.	Fulvous-breasted Woodpecker	Picidae	Dendrocopos macei
26.	Cinereous Tit	Paridae	Parus cinereus
27.	House Sparrow	Passeridae	Passer domesticus
28.	Rose-ringed Parakeet	Psittaculidae	Psittacula kameri
29.	Red-vented Bulbul	Pycononotidae	Pycnonotus cafer
30.	Greenish Warbler	Phylloscopidae	Phylloscopus trochiloides
31.	White-breasted Waterhen	Rallidae	Amaurornis phoenicurus
32.	Spotted Owlet	Strigidae	Athene brama
33.	Jungle Myna	Sturnidae	Acridotheres fuscus

34.	Common Myna	Sturnidae	Acridotheres tristis
35.	Asian pied Starling	Sturnidae	Gracupica contra
36.	Chesnut-tailed Starling	Sturnidae	Sturnia malabarica
37.	Indian White-eye	Zosteropspalpc	Zosterops palpebrosus

Table VI: Checklist of Mammal diversity recorded from Biswanath College campus

Sl. No	Common Name	Family	Binomial Name
1	Cow	Bovidae	Bos indicus
2	Goat	Bovidae	Cpra aegagrus hircus
3	Dog	Canidae	Canis familiaris
4	Assam Macaque	Cercopithecidae	Macaque assamensis
5	Cat	Felidae	Felis catus
6	Mongoose	Herpestidae	Herpestes edwardsi
7	Rabbit	Leporidae	Caprolagus hispidus
8	Black rat	Muridae	Rattus rattus
9	House Mouse	Muridae	Mus musculus
10	Flying Fox	Pteropodidae	Pteropus sp.
11	Squirrel	Sciuridae	Callosciurus pygerythrus

b) Floral Biodiversity of Biswanath College Campus

The college campus has rich floral diversity with luxuriant growth of herbs, shrubs and trees. About 71 species of herbs, 16 species of shrubs and 66 species of trees has been recorded.

i) Herbs:

A total of 71 species of herbs has been documented through field survey of the campus. The species belonging to the family Asteraceae, Poaceae are mostly dominant in the college campus. *Ageratum coinizoides, Parthenium sp., Eragorstis amabilis, Axonepus* compressus etc. are some of the dominant species. The following Table 1 shows the list of herbaceous species with it common names found inside the campus.

Sl no.	Name of the species	Family name	Common name
1	Mimosa pudica L.	Fabaceae	Touch-me-not/shame plant
2	Cyanthillium cinereum (L.) H.Rob.	Asteraceae	Iron weed
3	Ageratum conizoides L.	Asteraceae	Billy goat weed
4	Evolvulus nummularius (L.)L.	Convolvulacaeae	Roundleaf Bindweed
5	Cleome rutidosperma DC.	Cleomaceae	Fringed spider flower fig
6	Eragrostis amabilis (L.) Wight & Arn.	Poaceae	Japanese lovegrass
7	Oxalis articulata Savign	Oxalidaceae	Pink sorrel
8	Centella asiatica (L.) Urban	Apiaceae	Gotu kola
9	Thelypteris palustris (Salisb.) Schott	Thelypteridaceae	Marsh fern
10	Hydrocotyle ranunculoides L.f.	Araliaceae	Floating pennywort
11	Cuphea carethagenesis (Jacq.) J.F.Macbr.	Lythraceae	Colombian waxweed
12	Urena lobata L.	Malvaceae	Bur mallow
13	Cynadon dactylon (L.) Pers.	Poaceae	Bermuda glass
14	Digitaria ciliaris (Retz.) Koeler	Poaceae	Wild crabgrass
15	Achyranthes aspera L.	Amaranthaceae	Pricky chaff flower
16	Phyllantus urenaria L.	Phyllanthaceae	Chamber bitter
17	Kyllinga brevifolia Rottb.	Cyperaceae	Shortleaf spikesedge
18	Oxalis dellenii Jacq.	Oxalidaceae	Woodsorrel
19	Colocasia esculenta (L.) Schott	Araceae	Coco yam
20	Solanum nigrum L.	Solanaceae	Black nightshade
21	Oxalis corniculata L.	Oxalidaceae	Creeping woodsorrel
22	Ambrosia artemisiifolia L.	Asteraceae	Common ragwood
23	Leucas aspera (Willd.) Link	Lamiaceae	Thumbai/Thumba
24	Fimbristylis miliacea (L.) Vahl	Cyperaceae	Grasslike
			fimbry/hoorahgrass
25	Sida ulmifolia Mill	Malvaceae	Common
			wirewood/common fanpetals
26	Mentha spicata L.	Lamiaceae	Spearmint
27	Amaranthus viridis L.	Amaranthaceae	Slender amaranth
28	Claytonia perfoliata Donn ex Willd.	Montiaceae	Miner's lettuce
29	Hypochaeris radiata L.	Asteraceae	Cat's ear
30	Mecardonia procumbens (Mill.)Small	Plantaginaceae	Baby jump up
31	Rorippa palustris (L.) Besser	Brassicaeae	Yellowcress
32	Stellaria media (L.) Vill	Caryophyllaceae	Chickweed
33	Stachys arevensis (L.) L.	Lamiaceae	Staggerweed
34	Mikania micrantha Kunth	Asteraceae	Bitter vine
35	Chromolaena odorata (L.) R.King & H.Rob.	Asteraceae	Siam weed
36	Biden pilosa L.	Asteraceae	Begger tick
37	Crassocephalum crepidioides	Asteraceae	Ebolo
	(Benth.) S.Moore		

Table VII: List of herbaceous species found in the college campus

38	Paederia foetida L.	Rubiaceae	Skunk vine
39	Bryophyllum pinnatum (Lam.)	crassulaceae	Air plant
40	Scroparia dulcis Linn.	Plantaginaceae	Figworts
41	Chamaenerion angustifolium (L.) Holub	Onagraceae	Fireweed
42	Asparagus racemosus Willd.	Asparagaceae	Nightshade groundcherry
43	Syngonium podophyllum Schott	Araceae	Shatavari
44	Begonia serratifolia Vahl	Bignoniaceae	Arrowhead vine
45	Glechoma hederacea L.	Lamiaceae	Yellow lapacho
46	Solanum vilosum Mill.	Solanaceae	Ground-ivy
47	Ageratum houstonianum Mill.	Asteraceae	Hairy nightshade
49	Crassocephalum	Asteraceae	Floss flower
	crepidioides(Benth.) S.Moore		
50	Chromolaena odorata (L.) R.King &	Asteraceae	Redflower ragleaf
	H.Rob.		
51	Eclipta prostrata (L.) L.	Asteraceae	Bitter bush
52	Spilanthes acmella Murr.	Asteraceae	False daisy
53	Mikania micrantha H.B.K	Asteraceae	Akarkara
54	Parthenium hysterosphorus L.	Asteraceae	Whitetop weed
55	Tagetes erecta L.	Asteraceae	Aztec marigold
56	Vernonia cinera (L.) Less.	Asteraceae	Little ironweed
57	Cleome rutidosperma DC.	Cleomaceae	Fringed spider flower
58	Crotalaria pallida Aiton	Fabaceae	Rattleweed
59	Argemone mexicana L.	Papaveraceae	Mexican poppy
60	Papaver somniferum L.	Papaveraceae	Opium poppy
61	Solanum surattense Burm. F.	Solanaceae	Yellow fruit nightshade
62	Solanum americanum Mill.	Solanaceae	American black
			nightshade/glossy
			nightshade
63	Carex baccans Nees	cyperaceae	Crimson seeded sedge
64	Cyperus rotundus Linn	cyperaceae	Nut sedge
65	Tacca integrifolia Ker Gawl.	Dioscoreaceae	Bat plant/bat flower
66	Axonopus compressus (Sw.) P. Beauv	Poaceae	Broad-leaved carpetgrass
67	Imperata cylindrica (L.) Rauschel	Poaceae	Cogon grass
68	Saccharum officinarum L.	Poaceae	Sugarcane
69	Musa paradisiaca L.	Musaceae	French plantain
70	Dioscorea alata Linn.	Dioscoreaceae	Purple yam
71	Alternathera philoxeroides (Mart.) Griesb.	Amaranthaceae	Alligator weed



Figure 1:Distribution of herb species

ii) Shrubs

About 16 species of shurbs are prevalent inside the campus. Mostly species belonging to Family Verbinaceae, Euphorbiaceae and Fabaceae are common in occurrence. The dominant species are

Clerodendrum infortunatum, Cassia sophera, Ricinus communis and *Lantana camera* are found in luxuriant growth in this campus. Following is the list of shrubs species found in the campus.

sl no.	Name of the species	Family name	common name
1	Solanum torvum Sw.	Solanaceae	Turkey berry
2	Cassia sophera L.	Caesalpiniaceae	Kasunda
3	Senna alata (L.)Roxb.	Fabaceae	candelabra bush
4	Clerodendrum infortunatum L.	Lamiaceae	hill glory
5	Murraya koenigii (L.) Spreng	Rutaceae	Curry tree
6	Adhatoda vasica Nees	Acanthaceae	Malabar nut
7	Calotropis gigantea(L.) R. Br. in Ait.	Asclepiadaceae	Sweet Arka
8	Ricinus communis L.	Euphorbiaceae	castor bean
9	Euphorbia neriifolia L.	Euphorbiaceae	Indian spurge tree

Tał	ole	VIII:	List	of shrub	s species	of Biswanath	college	campus
1 al	nu		LISU	or sin up	o opecies	or piswanam	concge	campus

10	Caesalpinia pulcherrima (L.) Sw.	Fabaceae	Peacock Flower
11	Hibiscus rosa-sinensis L.	Malvaceae	China rose
12	Ixora coccinea L.	Rubiaceae	jungle flame
13	Citrus sp.	Rutaceae	lemon
14	Lantana camara L.	Verbinaceae	Gu phool
15	Bougainvillea glabra Choisy	Nyctaginaceae	Bougainvillea
16	Jasmimum grandiflorum Linn	Oleaceae	Royal jasmine



Figure 2: Distribution of Shrub species

iii. Trees

A total of 66 species of trees belonging to 24 families has been documented. Out of which family Fabaceae has the highest number of species followed by Lamiaceae and Moraceae. Following is the list of different types of tree species found inside the campus.

Sl no.	Name of the species	Family name	Common name
1	Aegiphila sp,	Lamiaceae	
2	Albizia lebbeck (L.) Benth.	Fabaceae	Women's tongue tree
3	Albizia odoratissima (L.f.) Benth	Fabaceae	Black Siris, Ceylon Rosewood, Red Seasam, fragrant albizia, tea shade tree
4	Albizia procera (Roxb.) Benth.	Fabaceae	White Siri's, Karoo tree
5	Alstonia scholaris (L.) R. Br.	Apocynaceae	Blackboard tree
6	Aquilaria malaccensis Lam.	Thymelaeacea	Agar wood, Eagle wood
7	Araucaria sp.	Araucariaceae	Australian pine
8	Areca catechu L.	Aracaceae	Betel palm
9	Arthocarpus lacucha Robx.	Moraceae	Monkey fruit
10	Artocarpus heterophyllus Lam.	Moraceae	Jack fruit
11	Azadirachta indica A. Juss.	Meliaceae	Neem tree
12	Ziziphus sp.		
13	Baccaurea courtallensis (Wight) Müll.Arg	Phyllanthaceae	Mootapalam
14	Bombax ceiba L.	Malvaceae	Silk cotton tree
15	Caesalpinia pulcherrima (L.)Sw.	Fabaceae	Peacock tree
16	Cassia fistula L.	Fabaceae	Golden shower tree
17	Cocos nucifera L.	Aracaceae	Coconut
18	Dalbergia sissoo Sensu Miq.	Fabaceae	Indian rosewood
19	Delonix regia (Hook)Raf.	Fabaceae	Royal poinciana
20	Drypetes sp.	Euphorbiaceae	
21	Dypsis lutescens (H. Wendel.) Beentje & Dransf.	Aracaceae	Areca palm
22	Elaeocarpus serratus L.	Elaeocarpacea e	Ceylon olive L.f.
23	Falcataria moluccana (Miq.)Barneby & J.W.Grimes	Fabaceae	Moluccan akbizia
24	Ficus racemosa L.	Moraceae	Cluster fig
25	Ficus religiosa L.	Moraceae	Sacred fig
26	Ficus rumphii Bl.	Moraceae	Golden rumph's fig
27	Gmelian arborea Roxb. ex Sm.	Lamiaceae	Gamhar
28	Grevillea robusta A. Cunn. ex R. Br.	Proteaceae	Southern silk oak
30	Hyophorbe lagenicaulis (L.H.Bailey) H.E.Moore	Aracaceae	The bottle palm
31	Indigoferra tysmanii Miq.	Fabaceae	Zollinger's indigo
32	Lagerstroemia indica L.	Lythraceae	Crepe-myrtle
33	Lannea coromandelica (Houtt.) Merr.	Anacardiaceae	Indian ash tree

Table IX: List of tree species found in Biswanath college campus

34	Laurus nobilis L	Lauraceae	Sweet bay
35	Litsea monopetala (Roby ex	Lauraceae	Meda Khuwalu
	Baker) Pers.	Luurueeue	lifeda, isliawara
36	Magnolia champaca L.	Magnoliaceae	Champak
37	Mangifera indica L.	Anacardiaceae	Mango
38	Melaleuca alternifolia (Maiden &	Myrtaceae	Tea tree
	Betche) Cheel		
39	Melaleuca viminalis (Sol. ex Gareth.) G.Don	Myrtaceae	Weeping bottlebrush
40	Melia azedarach L.	Meliaceae	Chinaberry tree
41	Mesua ferrea L.	Calophyllacea	Ceylon ironwood
		e	
42	Michelia campaca	Magnoliaceae	champak
43	Mimusops elengi L.	Sapotaceae	Spanish cherry
44	Moringa oleifera Lam.	Moringaceae	Mornings, Drumstick tree
45	Murraya koenigii (L.) Sprengel	Rutaceae	Curry tree
46	Neolamarckia cadamba (Robx.) Bosser	Rubiaceae	Burflower tree
47	Nerium oleander L	Apocynaceae	Oleander, Nerium
48	Oroxylum indicum (L.) Benth. ex	Bignoniaceae	Midnight horror, Indian
	Kurz	8	trumpet flower
49	Phyllanthus emblica L.	Phyllanthaceae	Indian gooseberry
50	Plumeria pudica Jacq.	Apocynaceae	Golden arrow
51	Polyalthia longifolia (Sonn.)	Annonaceae	false ashoka
	Thwaites		
52	Psidium guajava L.	Myrtaceae	guava
53	Putranjiva roxburghii Wall.	Putranjivaceae	Putranjiva
54	Salix alba L.	Salicaceae	white willow
55	Saraca asoca L.	Fabaceae	asoka tree
56	Senna siamea (Lam.) Irwin et Barneby	Fabaceae	cassod tree
57	Swietenia macrophylla King	Meliaceae	Mahagony
58	Syzygium sp.	Myrtaceae	
59	Tamarindus indica L.	Fabaceae	Imli tree
60	Tecoma stans (L.) Juss. ex Kunth	Bignoniaceae	yellow trumpetbush
61	Tectona grandis L.f.	Lamiaceae	Teak
62	Terminalia arjuna (Roxb.) Wight	Combretaceae	arjun tree
	& Arn.		
63	Terminalia bellirica (Gaertn.)	Combretaceae	bedda nut tree
	Koxb.		
64	I erminalia chebula Retz.	Combretaceae	cnebulic myrobalan
65	Thuja occidentalis L.	Cupressaceae	northern white cedar
66	Vitex sp.	Lamiaceae	



Figure 3: Dominant families of tree species

c) Tree Census

The college campus is fully green with various trees, shrubs, herbs, climbers, medicinal plants, garden plants, ornamental plants. Near about 567 total numbers of trees are found in the college campus with about 66 species belonging to 24 families of angiosperm and gymnosperm which are having medicinal, religious, educational and environmental importance making the campus rich heritage of plant species.

The dominant species are Albizia odoratissima, Falcataria moluccana, Lagerstroemia indica, Lannea coromandelica etc.

Sl no.	Name of the species	Number
1	Aegiphila sp,	1
2	Albizia lebbeck (L.) Benth.	6
3	Albizia odoratissima (L.f.) Benth	42
4	Albizia procera (Roxb.) Benth.	1
5	Alstonia scholaris (L.) R. Br.	4
6	Aquilaria malaccensis Lam.	10
7	Araucaria sp.	10

Table	X:	List o	f number	• of tre	e species	found in	Biswanath	college can	anus
abic	1N •	LISCO	I number	or u c	c species	Iounu m	Diswanaun	conce can	Thas

	-	
8	Areca catechu L.	2
9	Arthocarpus lacucha Robx.	4
10	Artocarpus heterophyllus Lam.	1
11	Azadirachta indica A. Juss.	3
12	Baccaurea courtallensis (Wight) Müll.Arg	1
13	Bombax ceiba L.	9
14	Caesalpinia pulcherrima (L.)Sw.	2
15	Cassia fistula L.	6
16	Cocos nucifera L.	12
17	Dalbergia sissoo Sensu Miq.	1
18	Delonix regia (Hook)Raf.	16
19	Drypetes sp.	8
20	Dypsis lutescens (H. Wendel.) Beentje & Dransf.	3
21	Elaeocarpus serratus L.	6
22	Falcataria moluccana (Miq.)Barneby &	37
	J.W.Grimes	
23	Ficus racemosa L.	27
24	Ficus religiosa L.	1
25	Ficus rumphii Bl.	1
26	Gmelian arborea Roxb. ex Sm.	36
27	Grevillea robusta A. Cunn. ex R. Br.	10
28	Hyophorbe lagenicaulis (L.H.Bailey) H.E.Moore	12
30	Indigoferra tysmanii Miq.	1
31	Lagerstroemia indica L.	39
32	Lannea coromandelica (Houtt.) Merr.	50
33	Laurus nobilis L.	1
34	Litsea monopetala (Robx. ex Baker) Pers.	3
35	Magnolia champaca L.	4
36	Mangifera indica L.	11
37	Melaleuca alternifolia (Maiden & Betche) Cheel	1
38	Melaleuca viminalis (Sol. ex Gareth.) G.Don	2
39	Melia azedarach L.	9
40	Mesua ferrea L.	13
41	Michelia campaca	1
42	Mimusops elengi L.	21
43	Moringa oleifera Lam.	6
44	Murraya koenigii (L.) Sprengel	7
45	Neolamarckia cadamba (Robx.) Bosser	4
46	Nerium oleander L.	1
47	Oroxylum indicum (L.) Benth. ex Kurz	6
48	Phyllanthus emblica L.	5

49	Plumeria pudica Jacq.	4
50	Polyalthia longifolia (Sonn.) Thwaites	21
51	Psidium guajava L.	7
52	Putranjiva roxburghii Wall.	2
53	Salix alba L.	2
54	Saraca asoca L.	1
55	Senna siamea (Lam.) Irwin et Barneby	8
56	Swietenia macrophylla King	1
57	Syzygium sp.	7
58	Tamarindus indica L.	1
59	Tecoma stans (L.) Juss. ex Kunth	2
60	Tectona grandis L.f.	11
61	Terminalia arjuna (Roxb.) Wight & Arn.	4
62	Terminalia bellirica (Gaertn.) Roxb.	2
63	Terminalia chebula Retz.	7
64	Thuja occidentalis L.	3
65	Vitex sp.	2
66	Ziziphus sp.	12





i. Details of tree census in College campus:

The beginning of the 21st century brought growing concern about global warming, climate change, food security, poverty, and population growth. CO2 is a principle component causing global warming. Atmospheric carbon dioxide levels have increased to >40% from preindustrial levels to about 418 ppm CO2. During March,2020 and March, 2021, the yearly change of 3.51ppm (0.85%) have been recorded (Source NOAA). The present status of tree cover and vegetation carbon storage assessment of area under Biswanath college Campus. In an era of global warming and climate change; carbon emission, carbon sequestration, mitigation, adaptation are the keywords in academia. Carbon sequestration is a phenomenon of converting atmospheric carbon i.e. CO2 in to other pools of carbon such as vegetation, soil, etc. in various forms to mitigate global warming. It is one of the important clauses of Kyoto Protocol. Current tree census methodology has adopted from the guidelines set by Indian Institute of Remote Sensing, Dehradun, Govt. of India.

• Total number of trees enumerated in Biswanath college campus: 567

Total 567 numbers of trees were recorded with 66 species belonging to 24 different families.

Dendrometric measurement of the different tree parameters were carried out to study the structure, composition, characteristics and environmental services of the campus vegetation.

Stand Characteristics:

Number of species: 66

Number of families: 24

Tree Species with Highest population

sl no.		Botanical name	Number	
	1	Albizia odoratissima		42
	2	Falcataria moluccana		37
	3	Ficus racemosa		27
4	4	Gmelian arborea		36
	5	Lagerstroemia indica		39
(6	Lannea coromandelica		50

Table XI: Tree species with Highest population



Figure 5: Tree species with highest population

• Basal area:

Basal area is the common term used to describe the average amount of an area occupied by tree stems. It is defined as the total cross-sectional area of all stems in a stand measured at breast height, and expressed as per unit of land area. To standardize measurements, tree diameter is typically measured at 1.3m from the ground, or approximately breast height. This is referred to as diameter at breast height (DBH).

Tree Basal area cover of the campus= 11.57 m²/ha

Tree density in the campus= 64.65 trees/ha

Tea density in the campus= 11400stems/ha

• Size distribution of trees





• Total biomass:

Biomass, in ecology, is the mass of living biological organisms in a given area or ecosystem at a given time. Biomass can refer to species biomass, which is the mass of one or more species, or to community biomass, which is the mass of all species in the community. The mass can be expressed as the average mass per unit area, or as the total mass in the community. 694.3 tons of total biomass of woody vegetation have been recorded in Biswanath college campus during the current tree census. The total biomass density of the woody vegetation has been recorded to be 79.17 tons/ ha.

• Carbon Sequestration:

Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change. It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels. Vegetation carbon pool having the potential of 560 Pg (Pg: Petagram= billion ton) of carbon storage globally. In the current study the focus is given on the

assessment of existing carbon stock stored Biswanath college campus in the form of woody vegetation by enumerating every tree species. Overall 1272.95 tons of CO2 has captured and stored by the woody plants present in the college campus.

CONCLUSION

Biswanath College has an eco-friendly campus. Some of the practices that needed to be followed are:

- Paper and glass waste should be disposed properly.
- Electricity consumption should be minimized.
- Toilets and bathrooms are consuming more water so roof top rain water harvesting should be initiated which is useful for filling up of tanks on campus.
- E-waste segregation, handling and disposal should be properly done.

Few **best practices** for green audit which has been initiated by the college authority and various departments of Biswanath college are as follows:

- The college has also been declared as a plastic free zone. Use of polythene bags and plastic glasses is strictly prohibited within the campus.
- Gutkha, pan masala or other hazardous substances are banned in the college campus.
- No printed stickers or posters are allowed to be stuck on the walls during the election of the student's union of the college.
- To check noise pollution, the authority has declared the campus a No Tobacco and No Horn Zone.
- The college has also organized a programme on Wild Life Week to draw the interest of the students to environment and wild life.

SNAPSHOTS OF GREEN PRACTICES







Signature of Auditor: Mello. Divisional Forest Officer Biswanath Wildlife Division Name: Markut Electron Bownall . Designation: Deputy Conservation of Freet Definition: Deputy Conservation of Freet Definition: Deputy Conservation of Freet