DIMORIA COLLEGE, KHETRI

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CRITERION 7

INSTITUTIONAL VALUES AND BEST PRACTICES

7.1.3 **Quality audits on environment and energy regularly undertaken by the Institution**

Submitted to

National Assessment and Accreditation Council
An Autonomous Institution of the University Grants Commission
राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद्
विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान

Green Audit Report
Dimoria College, Khetri
Kamrup (M), Assam
2020-2021

Submitted by
Green Audit Committee
Dimoria College,
Khetri, Kamrup (M)
Assam, 782403

ACKNOWELEDGEMENT

We the members of the Green Audit Committee would like to express a deep sense of gratitude to the authorities of Dimoria College for giving us the opportunity as well the responsibility to prepare the Green Audit Report of the College and its nearby areas. We also acknowledge with much appreciation the crucial role played by the faculty members of those departments (namely, **Botany, Chemistry, Geography, Geology, Environmental Management, Eco-Restoration, Zoology**) in preparation of the report. We are also thankful to the Coordinators of NAAC, Dr. A.K. Buzarbaruah and IQAC, Mr. Manabjyoti Barkakaty of Dimoria College and other staff members who were actively involved in preparing the report and collecting the data for the report.

Our special thanks also goes to Dr. Biman Kumar Bhatta, Principal, Dimoria College for his invaluable advice, support during the preparation of the report.

Dr. S.A. I Choudhury (Convenor)
On behalf of Green Audit Committee
Dimoria College, Khetri,
Kamrup (M), Assam.

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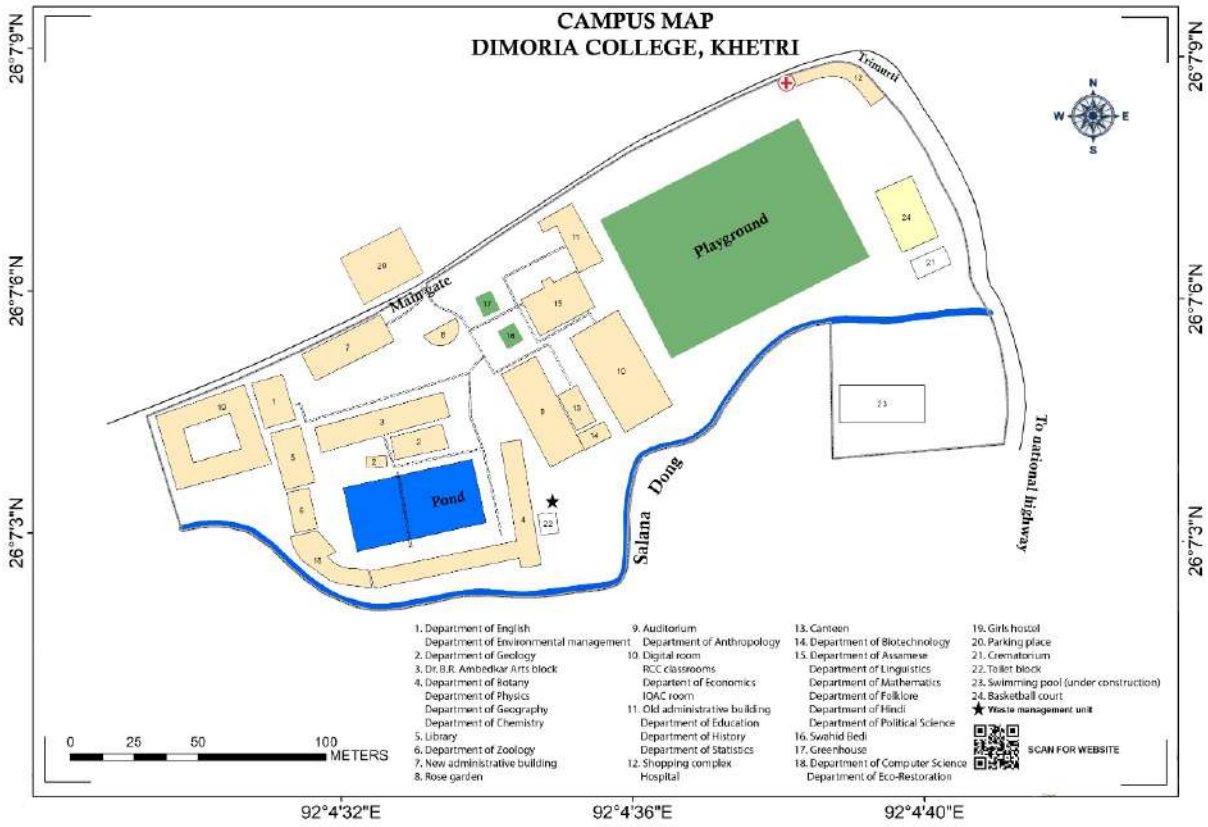


Courtesy: Mr. Sourav Chetia, Assistant Professor, Dept. of Geography, Dimoria College

What is Green Audit ?

Green Audit is a **process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments**. It aims to analyse environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. The Green Audit Report of a particular institute gives a direction as how to improve biodiversity and other environmental status.

Methodology of the Green Audit Report Preparation:

The methodology includes physical inspection of the College campus and its surrounding areas, collection of data through minor projects, observations, interviewing key persons, collecting data from officials and NSS etc. The audit mainly based on certain points like flora and fauna, waste management, water analysis, land use, electricity consumption etc.

Green Audit Committee:

Sl. No.	Portfolio	Name
1.	Chairperson	Dr. Biman Kumar Bhatta (Principal)
2.	Convenor	Dr. S.A.I Choudhury
3.	Asst. Convenor	Mr. Anup Dutta Baruah
4.	Asst. Convenor	Mr. Partha Pratim Gogoi
5.	Member	Dr. Pratap Chutiya
6.	Member	Mr. Sourav Chetia
7.	Member	Mrs. Jonali Barman

1. Introduction: About the College

Dimoria College is the brain child of a group of highly motivated social entrepreneurs who in the seventies dreamt of bringing the gospel of higher education to this relatively backward tribal belt area of Dimoria. The initiative of some farsighted personalities of the locality led to the establishment of Dimoria College. The college was inaugurated on 29th August, 1979 in a small classroom at Khetri High School with 57 students and 3 teachers. Late Pandit Binanda Chandra Barman was the founder Principal (1979-80).

Arts stream of the college was brought under deficit grants-in-aid system on 1st February, 1986. This development encouraged the college to open science stream in HS level in the year 1987. B.Sc. course was started in 1992 and the stream got a fillip with the inauguration of the Ambedkar Science Block by the then honourable Vice President of India, Late Sri K.R. Narayanan. The science stream was brought under deficit grants-in-aid system in 1996.

Always striving for the goals of greater excellence, the college opened Post Graduate Classes in Assamese, Political Science and Economics in 1992. Famous Scholar like Professor V.V. Rao and Sahitya Acharjya Professor Golak Chandra Goswami used to take PG Classes in the early years and helped and encouraged the college with their invaluable advice and wisdom. A feather was added to the PG wing in 2004 with the introduction of a totally unique and emerging science course in Eco-Restoration. In 2008, Dimoria College earned the rare distinction of signing a MOU with Brandenburg Technical University, Cottbus, Germany on mutual exchange of students and faculty and evaluation of courses of study along with mutual recognition of Eco-Restoration students' performance in Dimoria College. It was followed by the introduction of a PG course in Environmental Management in the year 2008.

Apart from this, several UGC sponsored vocational courses along with Distance Education Programme under IGNOU and KKHSOU have been introduced. In recognition of the values and social orientation of the college, UGC has provided it with a Centre for Ambedkar Studies with the objective of spreading the teachings and philosophy of Dr. B.R. Ambedkar.

In addition to the hard work and perseverance of the college community, we are blessed to have among our patrons, a great intellectual figure like Former Prime Minister of India Dr. Manmohan Singh who visited the college on more than one occasion and extended his helping hand in the completion of various projects of the college. Being the only rural PG institution in Assam, Dimoria College was awarded " **A Grade**" by **NAAC** in recognition of its role as a harbinger of social change through the instrument of higher education. The year 2010 saw our college being placed in the coveted position of a "**College with Potential for Excellence**" by the UGC by dint of which it earned the highly cherished membership of a select club of 149 colleges out of more than 6000 colleges throughout India under UGC's recognition. The august arrival of Former President of India Late Dr. A.P.J. Abdul Kalam to our college on 6th February 2010 to motivate our students on the path of nation building was the jewel on the crown with regard to the above achievements. Thus, from a very humble beginning in 1979, the college has matured itself into a full-fledged centre for learning and excellence.

The present day college has a sprawling campus of more than 24 bighas of land including build-up areas and a spacious playground along with an under constructed swimming pool. Presently more than 100 teaching and non-teaching staffs are working in the college for promotion of teaching, learning, evaluation, innovation, research and extension services for the greater goals of all-round upliftment of our society.

2. Executive Summary

With the rising concern for climate change under the tremendous anthropogenic pressure, it is important to preserve the nature and the biodiversity that surrounds us. With this objective, it is essential to have a correct assessment of the local area in terms of biodiversity, waste management, energy management, Land Use Land Cover, water quality etc. Dimoria College strictly adheres to all the climate protocols put forward by IPCC and paves a road map for various green initiatives for the years to come. Dimoria College pledges to be plastic free, eco-friendly and pollution free campus by 2025. In addition to this it is also kept in mind to go paperless by next 2 years.

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for Dimoria College which will lead for sustainable development inside the campus. Dimoria College, Khetri, is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution.

The methodology included:

1. Land Use and Land Cover Study conducted by the Dept. of Geography and Dept. of Geology.
2. Water Audit conducted by the Dept. of Environmental Management.
3. Waste Disposal Audit by the Dept. of Chemistry.
4. Energy Audit by the Dept. of Physics.
5. Environmental Quality Audit by Eco-Restoration.
6. Bio-diversity Audit on local Flora and Fauna by the Dept. of Botany and Zoology respectively.
7. Health Audit by IQAC

With this in mind, the specific objectives of the audit was to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the Departments are in compliance with the applicable regulations, policies and standards. It

can make a tremendous impact on student health and learning college operational costs and the environment.

3. Objectives of the Green Audit Report:

The aims and objectives of the Green Audit Report are to access the environmental quality and management strategies being implemented in Dimoria College, Khetri, Kamrup (M), Assam. The main objectives are as follows:

1. To suggest measures to improve biodiversity within the college campus.
2. To introduce and aware students to real concerns of environment and its Sustainability.
3. To secure the environment and cut down the threats posed to human health by analysing the pattern and extent of resource use of the campus.
4. To bring out a status report on environmental.
5. To suggest sustainable energy uses and water conservation practices.
6. To quantify LULC patterns of the regions.
7. To suggest measures for solid waste management plans in the campus and surrounding locality.

4. Waste Segregation Unit: Under NSS

A waste segregation unit within the Dimoria College Campus has been set up by NSS, Dimoria College Unit supported by Kamrup Metropolitan District Water and Sanitation Committee, Kamrup (M), Assam. The dry waste and wet waste of the college campus are regularly decomposed in the waste segregation unit to maintain the campus waste free. In addition to this, several dustbins are kept in various corners of the college to keep the college clean and green. A photo of the waste segregation unit is shown below.

Figure 1: Waste Segregation Unit, Dimoria College

5. Waste Disposal Study by the Dept. of Chemistry on Khetri Daily Market:

The problems associated with solid waste management are more acute in markets of rural areas which are under controlled of Gaon Panchayats than in urban area which are under Municipal Corporation. Lack of financial resources and infrastructures to deal with solid waste creates the problem even more critical; lack of resources leads to low quality of service provision. The problem is further complicated by rapid growth in population and urbanization, which adds greatly to the volume of waste being generated and to the demand for waste retrieval service in both Panchayat and Municipal areas. The unplanned solid waste disposal leads to the other serious problems like health and hygiene problems specially children and pregnant women, nearby stream water pollution, soil pollution, and air pollution, blocked drainage systems etc. In rural areas, lack of proper collection and transportation facilities, improper planning coupled with rapid growth of population add congestion in streets, stream bank, and residential areas. This is further evidence by the increasing dumpsites and abandoned waste and deposit in the streets. The uncollected waste pilling up than becomes a breeding ground for disease carrying organisms leading to disease such as cholera and malaria etc. The problem of solid waste in most rural communities is manifested in air pollution as a result of burning waste, water pollution due to dumping of solid waste in waterways and soil contamination through solid waste accumulation. Solid waste management is one of the main responsibilities of both urban and rural communities and the fundamental objectives of solid waste management program is to minimize the pollution of the environment as well as utilizing the waste as a resource. All forms of human activity result in the generation of waste which can cause change in the environment and harm to animals, plants and ecosystem.

The purpose of the audit was to ensure that the practices followed in the Khetri local market are in accordance with the Green Policy adopted by the govt. agencies. The methodology include: preparation and filling up of questionnaire, physical inspection and observation, interviewing key persons and data analysis, measurements and recommendations. The specific objectives of the audit are to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the Departments are in compliance with the applicable regulations, policies and standards. It can make a tremendous impact on health and the environment. The criteria, methods and recommendations used in the audit were based on the identified risks.

5.1 Observation and Recommendation:

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. and recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the Khetri weekly market in the vicinity of the college. The different solid wastes collected as mentioned above.

Table 1. Statistical data of Khetri weekly market

Details about luggage carrying vehicles			
Sl. no.	**Shop type**	**No. of vehicle**	**Type**
1	Whole seller	10	Truck
2	Cloths	12	D.I
3	Cosmetics	5	Three-wheeler
4	Grocery	4	Truck

Shop keepers are trained how to separate wastes at point of generation. Each of the shop keepers was supplied two bags/day of different colors. One of these is used for collection of biodegradable waste such as vegetable waste, fruit wastes etc. The second one is use for collection of non-biodegradable waste such as metals, polymer materials, cartoons etc. The ratio of dry weight of each component to the total dry weight of that type of waste gives the composition of the solid waste.

The total solid waste (biodegradable and non-biodegradable) collected in the market is 27 Kg/day. During the collection, some of the biodegradable waste is missed as some of the local people refused to deliver it. They use it for animal feeding purpose. Moreover, metallic wastes which are recyclable are usually collected by local people for selling to scrap collectors. Biodegradable waste includes vegetable waste, fruit waste, leaves, rice straw etc. whereas non-biodegradable waste include plastics, papers, bags, thermo cool, cartoons, woods, glass, metal, aluminum etc. More serious problems are polythene and plastic materials which are not recyclable. They are dumped in street site, open landfill and also on the bank of stream flowing nearby to the Market.

The study findings revealed that there are significant issues with unauthorized waste disposal practices due to the lack of proper waste management process. This has significantly impacted on the natural environment of the study area. The lack of Public waste bins and proper waste collection processes have significantly encouraged the unauthorized waste disposal practices. Moreover, the absence of sanitary land filling and inadequate processes by Khetri Gaon Panchayat are significant issues with SWM. The absence of practical usage of regulation and laws is identified as a barrier to residents engaging in proper waste management processes. The lacks of knowledge, awareness and cooperation have been identified. Moreover, one commercial vermicomposting plant can be installed under direct controlled either of the market authority or Panchayat.

Figure 2: Waste Disposal System of Khetri Daily Market

6. Biodiversity Audit by the Dept. of Botany:

Biodiversity is the variety and variability of life on Earth. Biodiversity is typically a measure of variations at the genetic, species and eco-system level. Biodiversity is important to most aspects of our lives. We value biodiversity both for what it provides to humans, and for the value it has in its own right. It provides many basic needs humans obtain from biodiversity such as food, fuel, shelter, and medicine. Further, ecosystems provide crucial services such as pollination, seed dispersal, climate regulation, water purification, nutrient cycling, and control of agricultural pests. Biodiversity also holds value for potential benefits not yet recognized, such

as new medicines and other possible unknown services. Biodiversity has cultural value to humans as well, for spiritual or religious reasons for instance. The intrinsic value of biodiversity refers to its inherent worth, which is independent of its value to anyone or anything else. This is more of a philosophical concept, which can be thought of as the inalienable right to exist.

Over the last century, humans have come to dominate the planet with rapid population as well as developmental growth, causing rapid change to ecosystem and massive loss of biodiversity across the planet. Major direct threats to biodiversity include habitat loss and fragmentation, unsustainable resource use, invasive species, pollution, and global climate change.

6.1 Dimoria College campus biodiversity:

Dimoria College is located at the eastern fringe of Kamrup (Metro) district of Assam. It lies between 92° 04′ 28′′ E to 92° 45′ 39′′ E Longitude and 26° 07′ 10′′ N to 26° 07′ 03′′ N Latitude. It has tropical climate, with average temperature ranging between 37° C maximum and 13° C minimum. Soil type is brown and reddish sandy loam rich in both macro and micronutrients. The college campus is located in a biodiversity hotspot region. It is surrounded by hills, stream and agricultural fields.

The College has a land area of 24 bighas which is entirely in plains. Out of this area, nearly 40% area is covered by college playground. About 10% of the college campus is water body. A perennial stream, sourcing from the adjacent hills of the college campus, flows along the southern boundary of the campus. Besides, there is a pond right inside the campus which harbours many plant species and aquatic life. About 25% area of the college campus is plains with vegetation and the remaining about 25% of the campus area is built-up area accommodating for various infrastructures of the college. The diverse physiography influenced by adjacent forested hilly terrain, helps the campus to harbour rich vegetation.

Area surrounding the campus is sparsely populated and the locality being a rural one, human intervention is relatively low. Lush green hills with thick forests of Meghalaya are also in close proximity to the college campus. The diverse physiography in the vicinity of the college campus like hills, plains and stream has considerable influence in the biodiversity of the area. The campus is endowed with terrestrial as well as aquatic vegetation. Most of the plant species are dicotyledonous. Some species are monocotyledonous, and some are gymnosperms. Plant species with their available local names are listed below:

ANGIOSPERMS
Dicotyledons

Sl.	Name of species	Family	Local Name
1	*Ranunculus cantoniensis* DC.	Ranunculaceae	--
2	*Polyalthia longifolia* (Sonner) Thw.	Annonaceae	Debadaru
3	*Polyalthia var. pendula* (Sonner) Thw.	Annonaceae	Debadaru
4	*Nymphaea nouchali* Burm. F.	Nymphaeaceae	Boga Bhet
5	*Nymphaea rubra* Roxb. Ex Andrews	Nymphaeaceae	Ronga Bhet
6	*Nelumbo nicifera* Gaertn.	Nelumbonaceae	Podum
7	*Argemone mexicana* L.	Papaveraceae	Xilkata
8	*Cleome viscosa* L.	Cleomaceae	Hurhuria
9	*Mesua ferrea* L.	Clusiaceae	Naahor
10	*Abutilon indicum* (L.) Sweet	Malvaceae	Jopa
11	*Hibiscus rosa-sinensis* L.	Malvaceae	Rakta Joba
12	*Malvaviscus arborieus* Cav.	Malvaceae	Tikani-Joba
13	*Sida cordifolia* L.	Malvaceae	Sonborial
14	*Sterculia villosa* Roxb.	Sterculiaceae	Odal
15	*Elaeocarpus floribundus* BL.	Elaeocarpaceae	Jalphai
Sl.	**Name of species**	**Family**	**Local Name**
16	*Biophytum sp*	Oxalidaceae	
17	*Oxalis corniculate* L.	Oxalidaceae	Tengechi
18	*Oxalis corymbosa* L.	Oxalidaceae	Bor tengechi
19	*Averrhoa carambola* L.	Averrhoaceae	Kordoi
20	*Impatiens balsamina* L.	Balsaminaceae	Keruphool
21	*Aegle marmelos* (L.) Correa	Rutaceae	Bel
22	*Citrus reticulata* Blanco.	Rutaceae	Sumothira
23	*Murrya koenzii* (L.) Spreng.	Rutaceae	Narasingha
24	*Murrya paniculata* (L.) Jack	Rutaceae	Kaaminikanchan
25	*Azadirachta indica* A. Juss.	Meliaceae	Maha neem
26	*Melia azedarach* L.	Meliaceae	Ghora neem

27	*Ziziphus mauritiana* Lamk.	Rhamnaceae	Bogori
28	*Mangifera indica* L.	Anacardiaceae	Aam
29	*Moringa oleifera* Lamk.	Moringaceae	Sajina
30	*Acacia auriculiformis* A. Cunn. ex Benth.	Fabaceae	Australian acacia
31	*Albizia lebbek* Benth.	Fabaceae	Sirish
32	*Butea monosperma* (Lam) Kuntz.	Fabaceae	Palash
33	*Caesalpinia pulcherrima* (L.) Sw.	Fabaceae	Radhachura
34	*Cassia fistula* L.	Fabaceae	Sonaru
35	*Cassia sophera* L.	Fabaceae	Medelua
36	*Cassia tora* L.	Fabaceae	Saru medelua
37	*Crotolaria pallida* Ait.	Fabaceae	Junjunia
38	*Dalbergia sisoo* Roxb.	Fabaceae	Sishu
39	*Desmodium heterophyllum* (Willd.) DC.	Fabaceae	
40	*Desmodium trifolium* (L.) DC.	Fabaceae	
Sl.	**Name of species**	**Family**	**Local Name**
41	*Mimosa pudica* L.	Fabaceae	Lajukilata
42	*Pterocarpus santalinus* L.	Fabaceae	Ronga chanda
43	*Samanea saman* (Jacq.) Merr.	Fabaceae	
44	*Saraca asoca* (Roxb.) de Wilde	Fabaceae	Ashok gas
45	*Senna siamea* (Lam.) Irwin et Barneby	Fabaceae	
46	*Rosa damascena* Mill.	Rosaceae	Golap
47	*Terminalia arjuna* (DC) W. & A.	Combretaceae	Arjun Gos
48	*Terminalia chebula* Retz.	Combretaceae	Xilikha
49	*Eucalyptus maculata* Hook.	Myrtaceae	
50	*Psidum guajava* L.	Myrtaceae	Madhuriaam
51	*Syzygium cumini* (L.) Skeels.	Myrtaceae	Kalajamu
52	*Melastoma malabathricum* L.	Melastomataceae	Futuka
53	*Ladwigia adscendens* (L.) H. Hara	Onagraceae	Halosee

54	*Centella asiatica* (L.) Urban	Apiaceae	Bor-Manimuni
55	*Hydrocotyle sibthorpioides* Lamk.	Apiaceae	Saru-Manimuni
56	*Anthocephalus cadamba* Miq.	Rubiaceae	Kadam
57	*Mussaenda philippica* A. Rich.	Rubiaceae	
58	*Ageratum conyzoides* L.	Asteraceae	Gendheli bon
59	*Eclipta alba* Hassk	Asteraceae	Keheraj
60	*Parthenium hysterophorus* L.	Asteraceae	
61	*Sonchus wightianus* DC.	Asteraceae	
62	*Tridax procumbens* L.	Asteraceae	
63	*Vernonia cinerea* (L.) Less.	Asteraceae	
64	*Xanthium indicum* Koenig	Asteraceae	Agara
65	*Mimusops elengi* Roxb.	Sapotaceae	Bakul
Sl.	**Name of species**	**Family**	**Local Name**
66	*Nyctanthus arbor-tristis* L.	Oleaceae	Xewali
67	*Cascabela thevetia* (L.) Lippold	Apocynaceae	Karabi
68	*Catharanthus roseus* (L.) G. Don.	Apocynaceae	Nayantora
69	*Rauvolfia canascens* L.	Apocynaceae	Sarpagandha
70	*Tebernaemontana divericata* (L.) R. Br.	Apocynaceae	Kathanda
71	*Calotropis gigantea* (L.) Roxb.	Asclepiadaceae	Aakon
72	*Cuscuta reflexa* Roxb.	Convolvulaceae	Raghumola
73	*Evolvulus nummularius* (L.) L.	Convolvulaceae	
74	*Ipomoea aquatica* Forssk.	Convolvulaceae	Kalmou
75	*Datura metal* L.	Solanaceae	Dhatura
76	*Solanum indicum* L.	Solanaceae	Katahi Bengena
77	*Solanum nigrum* L.	Solanaceae	Kaisi
78	*Solanum torvum* L.	Solanaceae	Haati Bhekuri

79	*Solanum viarum* Dunal	Solanaceae	Bhekuri Tita
80	*Bacopa monnieri* (L.) Pennel	Scrophulariaceae	Brahmisaak
81	*Justicia adhatoda* L.	Acanthaceae	Boga Bahok
82	*Clerodendrum* serratum (L.) Spreng	Verbinaceae	Nangal bhanga
83	*Duranta erecta* L.	Verbaneceae	
84	*Gmelina arborea* Roxb.	Verbanaceae	
85	*Lantana camera* L.	Verbanaceae	
86	*Leucas plukentii* (Roth) Spreng	Lemiaceae	Doron
87	*Ocimum tenuiflorun* L.	Lemiaceae	Kaltulashi
88	*Ocimum basilicum* L.	Lamiaceae	Ram tulashi
89	*Boerhavia diffusa* L.	Nyctaginaceae	Purnanoba
90	*Achyranthes aspera* L.	Amaranthaceae	Obhat kata
Sl.	**Name of species**	**Family**	**Local Name**
91	*Alternanthera philoxeroides* (Martius) Grisebach	Amaranthaceae	Neuthoni-Sak
92	*Alternanthera sessilis* (L.) R. Brown	Amaranthaceae	Maati Kaduri
93	*Amaranthus spinosus* L.	Amaranthaceae	Kata Khutura
94	*Amaranthus viridis* L.	Amaranthaceae	Khutura
95	*Persicaria barbata* (L.) Hara	Polygonaceae	
96	*Persicaria hydropiper* (L.) Spach.	Polygonaceae	Bihalongoni
97	*Polygonum plebeium* Roxb.	Polygonaceae	
98	*Rumex maritimus* L.	Polygonaceae	
99	*Rumex nepalensis* Spreng	Polygonaceae	Tarboura
100	*Santalum album* L.	Santalaceae	Boga Chandan
101	*Codiaeum variegatum* (L.) Bl.	Euphorbiaceae	Patbahar
102	*Euphorbia hirta* L.	Euphorbiaceae	Gakhirati bon
103	*Euphorbia pulcherrima* Willd.	Euphorbiaceae	Lalpata

104	*Jatropha gossypifolia* L.	Euphorbiaceae	Bhatera
105	*Phyllanthus acidus* Skeel	Euphorbiaceae	Poramlakhi
106	*Phyllanthus emblica* L.	Euphorbiaceae	Aaamlokhi
107	*Ricinus communis* L.	Euphorbiaceae	Eragos
108	*Ficus benghalensis* L.	Moraceae	Batgos
109	*Ficus benjamina* L.	Moraceae	Jarigos

Monocotyledons

1	*Hydrilla verticillata* (L.f.) Royle	Hydrochaaritaceae	
2	*Rhyncostylis retusa* (L.) Bl.	Orchidaceae	Kopou phool
3	*Curcuma caesia* Roxb.	Zingiberaceae	
4	*Ravenala madagascariensis* J.F. Gamble	Sterlitziaceae	Traveller's tree
Sl.	**Name of species**	**Family**	**Local Name**
5	*Sterlitzia reginae - juncea*	Strelitziaceae	
6	*Canna indica* L.	Cannaceae	Parijat
7	*Crinum asiaticum* L.	Amaryllidaceae	Bon Naharu
8	*Yucca gloriosa* L.	Asparagaceae	Dagger plant
9	*Eichhornia crassipes* (Mart.) Solms.	Pontedarniaceae	Meteka
10	*Commelina benghalensis* L.	Commelinaceae	Kona shimolu
11	*Cocos nucifera* L.	Arecaceae	Naarikol
12	*Crysalidocarpus lutescens*	Arecaceae	Momaitamul
13	*Roystonea regia* (Kunth) O. F. Cook.	Arecaceae	
14	*Alocasia fornicate (*Roxb.) Schott	Araceae	Kachu
15	*Colocasia esculenta* (L.) Schott	Araceae	Kala kochu
16	*Pistia stratioetes* L.	Araceae	Bar puni
17	*Lemna perpurilla* Torrui	Lemnaceae	Saru puni
18	*Cyperus cephalotes* Vahl.	Cyperaceae	
19	*Cyperus compressus* L.	Cyperaceae	Muthi bon

20	*Cyperus natans* Vahl.	Cyperaceae	
21	*Cyperus pilosus* Vahl.	Cyperaceae	
22	*Cyperus platystylis* Roxb.	Cyperaceae	
23	*Cyperus rotundus* L.	Cyperaceae	Keyanbon
24	*Fimbristylis globulosa* (Retz.) Kunth	Cyperaceae	
25	*Coix lacryma-jobi* L.	Poaceae	Kauri moni
26	*Cymbopogon nardaus* (L.) Rendle	Poaceae	Chitrnella
27	*Cynodon dactylon* (L.) Pers.	Poaceae	Duboribon
28	*Digitaria ciliaris* L.	Poaceae	
29	*Panicum repens* L.	Poaceae	

Gymnosperm

Sl.	**Name of species**	**Family**	**Local Name**
1	*Cycas pectinata* Buch-Ham.	Cycadaceae	
2	*Pinus Khasiana* Hook. f.	Pinaceae	Saral gos
3	*Araucaria heterophylla* (Salisb.) Franco.	Araucariaceae	
4	*Cryptomeria japonica* (L. f.) D. Don	Cupressaceae	
5	*Thuja occidentalis*	Cupressaceae	

Presence of 143 species of Angiospermic taxa representing 120 genera under 61 families, with many valuable and economically important plants, makes the Dimoria College campus bio-diversitically rich.

a. Recommendation of the Biodiversity Audit:

The Green Audit Committee has recommended the concerned authority to take appropriate measures to make the college campus green. The following recommendations are made:

1. To revive the existing medicinal garden of the college with more species and varieties of plants.

2. The committee also suggests to increase the greenery of the playground and the swimming pool area by planting economically important plants.

3. The committee also suggests to aesthetically beautify the college campus by plants flowering plants and maintain the campus gardens.

7. Land Use and Land Cover/Lithology Study in and around Dimoria College and Khetri Region: Geology Dept.

The geological field work was done on 23 March, 2021 at Dimoria College, Khetri under the supervision of Prof. Madhurima Baruah, HOD, Department of Geology, Dimoria College, Khetri, as part of the Practical paper for TDC (Science) 5th semester examination (Geology) conducted by Gauhati University. The area under investigation lies in the eastern part of the Kamrup (M) district of Assam. It is covered by the Survey of India toposheet numbered 83B/4 in the scale of 1:150.00. The area measuring a total of 15 sq. km. is bounded by the latitudes 26°05'N to 26°10'N and longitudes 92°03'E to 92°06'E. The area is important from geological point of view. The study of rocks both lithologically and structurally will help to understand the present geological condition of the area. A brief outline of objective of the study area is given below:

1. Study of important structural features in different rock types encountered in the area.
2. Petrological study of different rocks of the area.

The whole area is covered by the Survey of India toposheet numbered 83 B/4 and it lies on both sides of the National Highway No. 27 around Khetri and is about 40 kms from Guwahati.

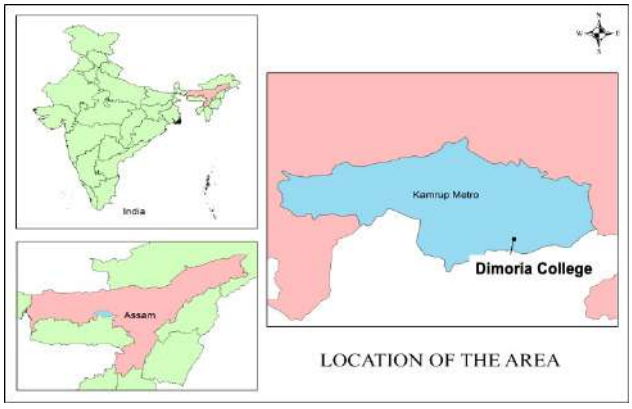


Figure 3: Study location of the geological study

The study area has good drainage coverage. The area is nicely drained by a number of small rivers and streams, originating in the hills and following down the slope. Most of them are seasonal becoming dry in the winter, while in summer, these are overflowed by the water of seasonal rain. The area is surrounded almost from three sides of river. The area is covered by Umpri River in the south, Dighalpani River by South-west. Due to the hilly terrain the rivers show dendritic pattern in that area. The drainage density is found high in higher altitude.

The area experiences generally a monsoon type of climatic conditions. During winter season the rainfall becomes very thin. The summer season starts at March and continues up to September. Heavy rainfall occurs during this season due to south-west monsoon. The temperature in the area is almost same as other parts of Assam. But slight variation of climate is also present due to its elevation. The daily temperature of the Shillong varies between 30°C and 37°C during the summer months and between 25°C and 30°C during the winter season. The climatic condition of the area favours the growth of some valuable plants like Sal, Tita Sapa, Nahar, some, Nooni, Betel Nut, plum, orange etc. Rice, potato, ginger and various vegetables are common agricultural products of the region. Geological formation and the resultant soil types are also factors that favour the growth of vegetation. On the basis of lithology, the area comprises of Pre-Cambrian rocks. The present area is dominated by granite-gneiss.

The rocks are highly weathered due to physical, chemical and biological factors. Rapid temperature variations, heavy rainfall and fracture plane of rocks through which percolation takes place, are the factors that help weathering of the rocks. The fractured rocks become loosened due to the penetration of trees. The agents of denudation like surface and rainwater are active in weathering the rocks of the area. Weathering in the present area is mainly due to the presence of well- developed foliation and joints planes.

The area under investigation comprises one third of by alluvium and other part by a high hilly terrain formed by elongate ridges and a few valleys in between these ridges. These hilly terrains are more or less parallel to the strike direction of the litho-units of the Shillong Group. The maximum contour height of the area is above 141 meters and minimum contour is less than 130 meters above mean sea level. The ridge is a whole trend along NE-SW direction. The drainage pattern of the area is mostly dendritic.

Figure 4: Geological Study near Dimoria College by Dept. of Geology (LULC/Lithology Study)

The field investigation has been carried out on 23 March 2021. Approximately 15 sq. km. area was covered for detailed investigation. The field investigations were confined mainly to traversing different geological outcrops and noting their field relationship and related features in detail. During the traversing, all the major and minor structures were noted and recorded with the help of sketches and photograph. In well-developed exposures and in-situ rocks the attitude of formation, lineation, foliation, joints, etc. have been measured and recorded with the help of Clinometers and Brunton pocket transit compass. Fresh and oriented samples were collected for laboratory studies.

The field data collected related to lineation, foliation, joints and other structures were used for detailed analysis. About 15 representative samples collected from the field were used for detailed study. The field data collected relating to foliation, lineation, joint, fold etc. of the different rocks of the area have been plotted in the map with their appropriate symbols. The Precambrian rocks are well developed in some parts of Assam. They form as basement of the whole region. According to Pascoe (1950), Meghalaya plateau is the remnant of the Precambrian of Indian Peninsular Shield. The plateau stands on Precambrian gneisses, which are well exposed in most parts of the plateau. The Indo-Gangetic trough has separated the plateau from the Indian Peninsula. Considerable lithological variation, complexity in metamorphism and tectonic history are the most evident character of the rocks belongs to the plateau. General stratigraphy of the area as follows in Table 1.

The study area, Khetri block, falls under Sonapur gaon panchayat of Kamrup Metropolitan district. The area consists of hilly terrain of maximum elevation of 200 meter and minimum elevation of 100 meter. The Precambrian basement complex occurs as enclaves within the granitic terrain. The Shillong Group of rocks which is meta-sedimentary basically occurs in the southern part of the study area. The SG rocks are quartzite with intercalations of phyllites, Quartz sericite schist, and mica schist. The metapelites bear sillimanite. The litho packages of SG rocks are intruded by non- porphyritic granites (NPG). The NPG are migmatised which show migmatic structures. The NPG is of two variety pink variety and grey variety. The grey granite is older and the pink variety is younger which intrudes the lithology. An intrusion of

dolerite which changes to meta-dolerites intrudes the NPG. The dolerite occurs as dyke which is nearly 1 to 2 meter in thickness. In the upper part of Tegheria, the Porphyritic Granite bearing phenocryst of feldspar intrudes the NPG. Pegmatitic vein and Quartz vein are also seen. Pegmatitic vein occurs in great thickness and Quartz vein occurs in small thickness.

8. Water Quality Study in and around Dimoria College by the Dept. of Environmental Management:

8.1 Introduction: Water forms the basis and essential for all living organisms existing in the Universe. Water acts as a reclaim in organisms in which complex metabolic processes which are necessary for life take place. Organisms simply cannot function without water and if deprived you will rapidly die. Organisms not only needs water but also needs the clean water. Human beings are affected by the most subtle variations in water chemistry, and supply. According to World Health Organization (WHO) an estimate mentioned that 1200 million people lack a satisfactory or safe water supply. Water quality is the measure of the suitability of water for a particular use based on specific physical, chemical and biological characteristics. Assessment of the quality of the water body, whether surface water or ground water, can help us answer questions about whether the water is acceptable for drinking, bathing or irrigation to name a few applications. It also allows scientists to determine whether the water in a particular system is improving or worsening and why. We can use the results of water quality, assessments to compare the quality of water from one water body to another in a region, State or across the whole country.

India has long tradition of managing water, but increasing demands and abuse due to population, industrial growth and agricultural growth poses new challenge. Surface water avail in rivers, lakes, ponds and dams are used for drinking, irrigation and other purposes. Dams are constructed for different purposes like water needs for urban population, irrigation and industrial use and also for the electricity production.

The main reason behind this auditing is to determine the quality of water which are generally consumed by the nearest peoples including the students of the college and for the identification of water sources which are generally exploited by the nearest peoples of Dimoria college for daily purposes including drinking. Some methodology has been adopted for the accomplishment of this audit which generally includes preparation and filling up of

questionnaire, physical inspection and observation, interviewing key persons, and data analysis.

8.2 Suggestions and Recommendations: This present study has been carried out on the quantitative variation of different water sources near the college and during the study; we have found different Ring-Wells from which water has been utilized by the peoples. Some samples were collected from the sources for some physico-chemical tests which are tested later in the laboratory. In order to estimate the status of quality of water in the study area some selected water quality parameters like colour, odour, pH, Total Alkalinity, Sulphate, Chloride, Iron, fluoride, etc. are studied. It was observed that the many parameters of this study were within the permissible range prescribed by WHO but the range of Iron in every source exceeded the permissible range. Moreover, for this audit 5 water samples were collected from five houses (near the college) and tested the physico-chemical parameters in the laboratory and also the hygiene of the water sources was analysed with direct observation during the time of sample collection. It was found that all water sources have good hygiene conditions. During the time of sample collection, a small questionnaire session was done with the owner of the house and it came to know that out of 5 houses, members of 3 houses use tap water for drinking which is supplied by the water supply scheme and for the other regular purpose they depend on the ring well and the Other 2 houses completely depend on their ring well.

Table 1: Indian Standards for various chemical and biological constituents

S.No.	Parameters	Drinking water IS 10500 : 2012		Probable Effects
		Permissible Limit	Maximum Limit	
1	Odor	Agreeable	Agreeable	Aesthetically undesirable.
2	Taste	Agreeable	Agreeable	Aesthetically undesirable.
3	pH	6.5 to 8.5	No relaxation	Affects taste, corrosivity & supply system.
4	TDS (mg/l)	500	2000	May cause gastro-intestinal irritation, corrosion and laxative effect to new users.
5	Hardness (as CaCO3) (mg/l)	200	600	Causes scaling, excessive soap consumption, calcification of arteries.
6	Alkalinity (as CaCO3) (mg/l)	200	600	Imparts unpleasant taste, deleterious to humans in presence of high pH, hardness and TDS
7	Nitrate (mg/l)	45	No relaxation	Causes infant methaemoglobinaemia, at very high concentration causes gastric cancer and effects central nervous& cardiovascular system
8	Sulfate (mg/l)	200	400	Causes gastro-intestinal irritation. Along with Mg or Na can have a cathartic effect. Concentration more than 750 mg/l may have laxative effect
9	Fluoride (mg/l)	1	1.5	Reduces dental carries, very high concentration may cause crippling skeletal fluorosis
10	Chloride (mg/l)	250	1000	May be injurious to heart or kidney patients. Taste, indigestion, corrosion &palatability are affected
11	Turbidity (NTU)	5	10	Indicates pollution/ contamination
12	Total Coliform, Fecal Coliform (cfu)	0	0	Causes water borne diseases like coliform jaundice; Typhoid, Cholera etc. produces infections involving skin mucous membrane of eyes, ears and throat.

.

Table 2: Results of different parameters

Sl. No	***Parameters***	***S1***	***S2***	***S3***	***S4***	***S5***
1	**Odor**	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
2	**Taste**	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	**Ph**	6.8	6.8	7.2	6.9	7.6
4	**Alkalinity (mg/l)**	256	254	285	266	244
5	**Nitrate (mg/l)**	39	36	35	31	40
6	**Sulphate (mg/l)**	150	145	166	136	144
7	**Fluoride (mg/l)**	0.6	0.3	0.8	0.6	0.9
8	**Iron (mg/l)**	1.2	1.9	1.5	0.9	1.1

Figure 5: Sites of water analysis near Dimoria College

9. Study of Fauna in and around Dimoria College conducted by Dept. of Zoology

Flora and Fauna are very important for human existence. The flora liberates oxygen that is consumed by the fauna for respiratory activities. Dimoria College is situated in South Eastern part of the Kamrup (M) district of Assam and on the south bank of river Brahmaputra. Forest type of Dimoria development block are semi-evergreen and mixed deciduous with the presence of occasional sub-tropical broad leaved forest. This forest are occupied by different types of plants mainly deciduous type and also number of wild animals. The study conducted in and around the college where a number of wild species are found. The names of some of the species are given below:

List of animals:

A. Amphibians:

1.Common toad - *Bufomelano sticstus* 2.Common Frog- *Rana trigrina*

3. Tree Frog- *Hyla*

B. Reptiles

1.House lizard -*Hemidactylus frenatus* 2.Branded krait - *Bungarus fasciatus* 3. Python

4. Garden lizard - *Calories versicolor*

C. Aves

1. Pigeon - *Columba Livia*
2. House sparrow - *Passer domestics*
3. Crow -*Corvus*
4. White thoated kingfisher- *Halcyon smyrnensis*
5. Myna - *Acriotheras tristis*
6.Bulbul - *Pycnonotus cafer*

D. Mammal

1. Common dog - *Canis lupus*
2. Cat - *Felis catus*
3. Mongoose-*Herpetes auropunctatus*
4. Molina bandor - *Rhesus macaque*
5. Jungle cat -*Felis chaus*
6. Johamol - *Viverricula indica*
7. Jackal - *Canisius aureus indices*
8. Kerketua - *Dremomys lokriah*

10. Study on Energy Conservation conducted by IQAC

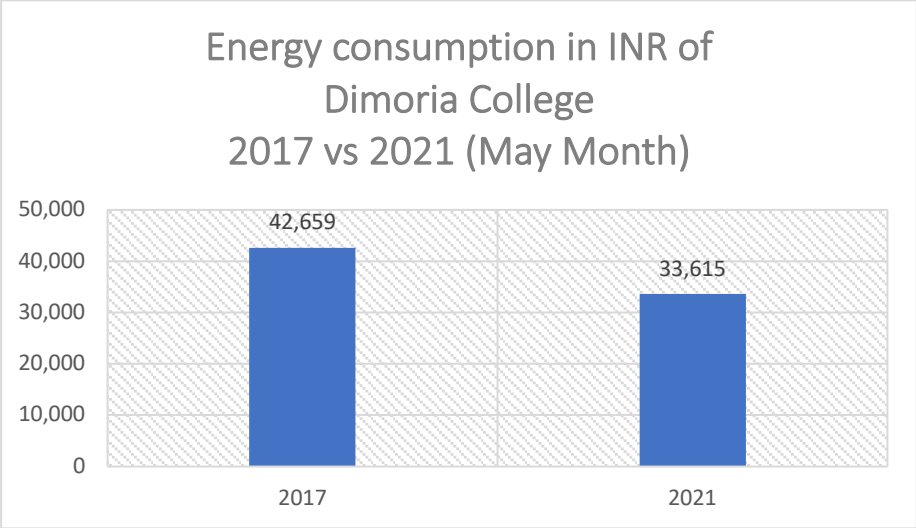
Energy conservation is an important aspect of college campus sustainability which is also linked with carbon footprint of the campus. Energy auditing relates to the conservation and methods to reduce its consumption which is directly related to environmental degradation. Here in this report we put forward the energy consumption records of Dimoria College. It is observed that Dimoria College authority is successful in cutting down the energy consumption in using its electrical appliances economically. Reduction of energy consumption in done by replacing the conventional filament bulbs with the LEDs and CFL bulbs. However, it regards to this, strict notification has been given to use electrical energy judiciously by following certain protocols such as:

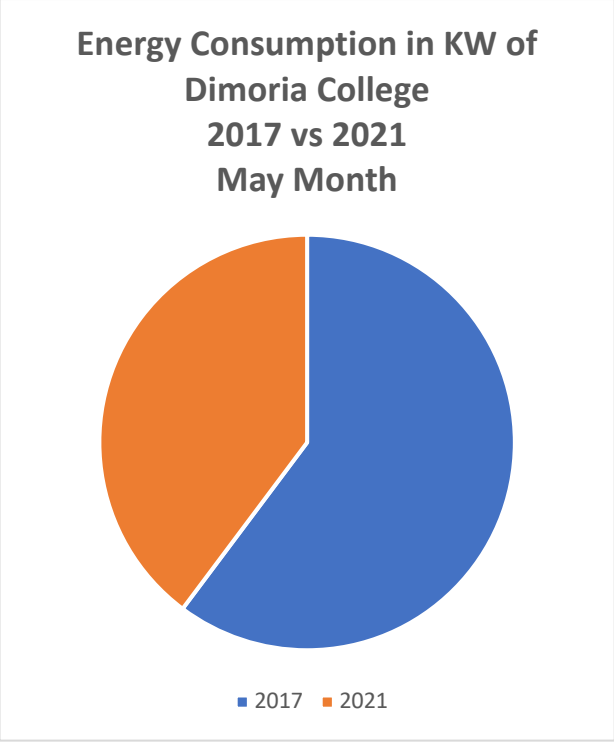
1. Switching off the lights and fans when not in use.

2. Using of water judiciously.
3. Use of printers and photocopy machines judiciously.
4. ACs must be switched off when not in use.

Table 2: Comparison of Energy Consumption during Summer season of 2017 and 2021

Sl. No.	Electrical items	Nos.	No. of items used	No. of days in a month	Total consumption (averaged) 2017 (May)	Total consumption (averaged) 2021 (May)
1.	LED/CFL/Tube lights	250	150	25	Rs. 42,659/-	Rs. 33,615/-
2.	Fans and ACs	350	250		4080 units	2694 units
3.	Computer	60	24			
4.	Photocopy machine	4	3			
5.	Instruments	120	60			
6.	Heater	5	2			
7.	Electric Kettle	25	22			
8.	Projectors	12	6			
9.	Water motor	7	7			
10.	Water cooler	3	3			
11.	Refrigerator	8	8			
12.	Printer	15	15			


Energy consumption in INR of
Dimoria College
2017 vs 2021 (May Month)
50,000
40,000
30,000
20,000
10,000
0
42,659
33,615
2017
2021


Energy Consumption in KW of
Dimoria College
2017 vs 2021
May Month
2017
2021

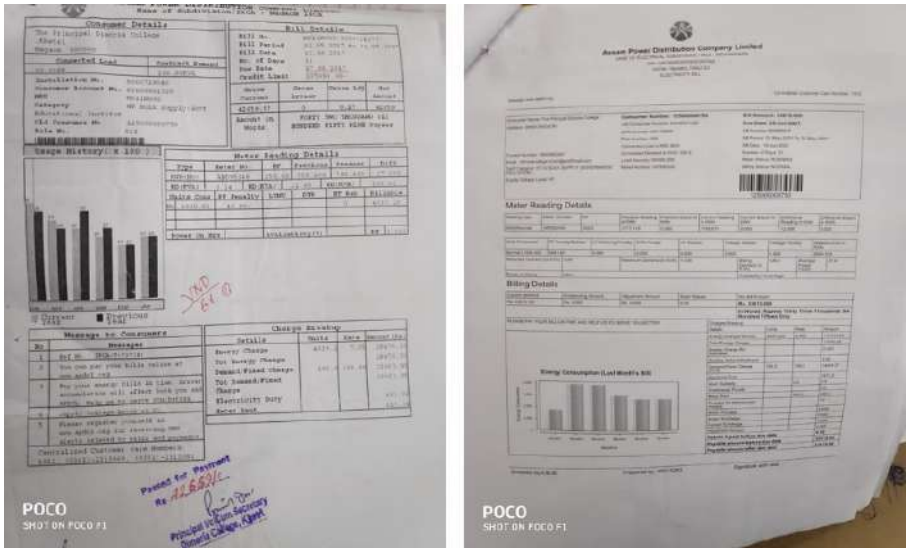


Figure 6: Electricity bill of 2017 and 2021 (May Month)

As per recommendations of the Green Audit Committee the college authority has installed 15 nos. of Solar Lights in different locations of the college campus. We are thankful to Star Cement, Samata Pather, Dimoria, Assam for their sponsorship in installing the lights under CSR programme. Installation of these lights will grossly help in cutting down the energy consumption of the college.

Figure 7: Solar Lights installed in the College Campus (sponsored by Star Cement under CSR Programme)

Figure 8: Use of CFL, LED and Tube lights

11. Recommendations from the Committee:

1. Suggests to go for more plantation in barren land.
2. Use of organic fertilizer instead of chemical fertilizer
3. Restriction of use of vehicles inside the campus.
4. Try to avoid burning of dry leaves and litter in the campus.
5. Avoid using plastic utensil inside the campus in any event.
6. Suggest to organize more Biodiversity and other environmental workshop for awareness.
7. The College authority try to use LED bulb in the entire college to reduce the energy consumption.

12. Conclusion:

The environmental related minor projects are done by the two Post Graduate Departments namely, Environmental Management and Eco-restoration respectively. So, these are the witness to the fact that the College is sensitive to the environmental issues. The Committee also recommended some suggestions that are added to the report to make the campus environment eco-friendly and sustainable.

Sl. No.	Name and Department	Signature
1.	Dr. Biman Kumar Bhatta Chairperson cum Principal	Principal Dimoria College,Khetri
2.	Dr. S.A. I Choudhury (Convenor) Dept. of Botany	
3.	Mr. Anup Dutta Baruah Dept. of English	
4.	Mr. Partha Pratim Gogoi Dept. of Geology	
5.	Dr. Alee Sarma Dept. of Botany	
6.	Dr. Pratap Chutiya Dept. of Environmental Management	
7.	Dr. Hima Rani Kalita Dept. of Chemistry	Head of the Deptt. of Chemistry Dimoria College : Khetri.
8.	Mr. Sunil Kumar Deka Dept. of Zoology	P.O Khetri-782 403 Assam
9.	Mrs. Jonali Barman Dept. of Eco-restoration	
10.	Mr. Sourav Chetia Dept. of Geography	

Dimoria College Estd. 1979 Khetri

A REPORT ON

ENERGY AUDIT AT DIMORIA COLLEGE, KAMRUP (M), ASSAM

SUBMITTED TO

THE PRINCIPAL
DIMORIA COLLEGE
KHETRI KAMRUP (M) ASSAM
PIN: 782403

SUBMITTED BY: K Talukdar

Khanindra Talukdar
BEE certified energy auditor
H.No.8, 5thBye lane, Gandhibasti
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Contents

1. Background

With population of world having reached seven billion (700 Crores) demand for resources is bound to increase. India as a developing country with a population of 130 crores plus is no different. With climate change looming large scientists and leaders throughout the world have called for reducing dependence on fossil fuel. On the contrary India has to import 80% of its fossil fuel to move its economy. About 70% of Electricity in India is generated from fossil fuel of which major component is coal. India has to depend on fossil fuel to sustain its GDP and to raise quality of life of its people. In contrast burning of fossil fuel like coal, diesel and petrol emanates CO_2 leading to accumulation of greenhouse gases in atmosphere. Accumulation of greenhouse gases in atmosphere is an anthropogenic factor leading to global warming. Human activities like burning of fossil fuel for power generation, industrial production and transportation have had a telling effect on pollution of land, air and sea, degradation of land, melting of glaciers and so on. We have only one earth to live. In order to reduce adverse impact of climate change emission of greenhouse gases have to be reduced. It is at this juncture that electricity and water need to be used efficiently. We need to remove inefficiencies in use of electricity so as to use it efficiently. Dimoria College is embarking on a road map to use electricity efficiently. It has taken the lead to carry on energy audit.

2. Introduction to Energy Audit

Energy Audit is a better way to increase energy efficiency and reduce energy consumption. An energy audit is an assessment of the energy consumed within a time frame in a given location to find out inefficiencies.

As per Energy Conservation Act, 2001, Energy Audit is defined as "the verification, monitoring and analysis of use of energy including submission of technical report containing recommendation for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption".

In the provision of the Energy Conservation Act, 2001 the Bureau of Energy Efficiency has been set up under the ministry of power. The parliament of India passed the bill on conservation of energy bill in 2001 there by enlisting a set of rules to make efficient use of energy.

3. Scope of Work

3.1 Assessment of actual operating load and scope for optimizing

- Review of existing electrical load in the campus
- Review of electrical load based on actual requirement

3.2 Study of individual units and means to conserve electrical power

- Study of existing use of power
- Review of unit wise electrical load based on requirement
- Recommendation for saving electricity

3.3 Energy conservation in Air-conditioning and water pumping system

- Observation in use of power and water
- Methods to save power and water

3.4 Diesel Generator (DG) set

- Existing standard of operation
- Performance of DG set in terms of specific fuel consumption (SFC-Kwh/lit)
- Recommendation for optimum use of DG set

4. Energy Scenario of Dimoria College

Dimoria college is located in a sprawling campus of about 24 bighas of land dotted with administrative block, Academic blocks with library, various departments with science and art streams, auditorium and canteen with power supplied by A.P.D.C.L.

Sl. No.	Data on power supply	Values
1	Rating of Distribution Transformer	150 kva
1	Connected Load	120kw
2	Contract Demand	106 Kva
3	Billed Electricity Consumption in kwh ((Jan21-Jan'22)	
4	Annual cost of Electricity Consumption@Rs.7.45/unit	Rs.249621.49
5	Annual bill for Maximum Demand @Rs.180/kva	Rs.165359.96
6	Annual cost of electricity charges	Rs.443355.00
7	Working hours (Administrative and Academic)	8 Hrs

8	Sub-metering of individual units	Nil
9	Average annual cost of operating DG set	Rs.35000.00

5. Methodology for Energy Audit

The methodology for energy audit consists of preliminary audit, audit and post audit stages.

Step 1- Building a team for Energy conservation (ECC).

During preliminary audit an Energy Conservation Committee (ECC) is formed with Principal as the team leader. The idea of Energy Audit is a collective effort. It is essential that an energy conservation team is formed to carry forward the objective of energy audit. A meeting is scheduled between the auditor and the team to start with process. Agenda of the meeting focuses on objectives, scope of works, rules and regulations, roles and responsibilities of team members and description of scheduled project activities. During meeting the team is enlightened about power system within the campus, energy system specifications, standard operating practices, importance of saving electricity and safety measures to be adopted during operation of various electrical equipment.

Step- 2. Walk in Audit

After formation of ECC members along with energy auditor goes round the entire campus to take stock of various electrical power consuming devices including lighting system, fan, and various laboratory equipment in science blocks.

Step-3. Documents verification

In this phase various documents like energy bills, agreements with utility are verified, log sheets of DG set are looked into to ascertain if the pattern of energy consumption are tallying.

Step-4. Identification of energy consuming devices

After a study of the facilities energy consuming devices are identified and where appropriate field measurements are collected to substantiate findings.

Step-5. Bills by utility for analysis

This is one of the steps where bills served by utilities have to be verified to ascertain if cost incurred on electricity charges are reasonable. It also seeks to verify balance between energy actually required and energy consumed.

Step-6. Evaluation and feasibility of Energy Conservation Measures.

After walk in audit, scrutiny of relevant data, information based on available documents, measurements where required feasibility of conservation measures is studied with pay back method. This may be segregated to short-, medium- and long-term period.

Step-7. Preparation of Audit finding report

The findings and recommendations of audit are documented in the audit report. This report includes description of the existing power network within the campus and focuses on areas of major energy consuming locations. A discussion with the Energy conservation Committee highlights the need for saving energy. This will lead to save cost on electricity consumption and recommends the short, medium and long-term measures. These Energy saving measures try to rationalize the use of electricity and estimates payback period after implementation of the recommendations.

Step -8. Post audit period

The energy conservation measures will bring benefits of energy and costs saving only after the recommendations are implemented. The onus is on the user and stake holders of the institution to implement the ECM. The energy auditor has to highlight the importance of implementing ECM so as to achieve broader goal of efficient use of energy as stated in the Energy Conservation Act 2001.

6. Energy conservation committee, Walk-in-audit, observation and evaluation

6.1 Energy Conservation Committee (ECC)

As a part of energy audit exercise energy auditor visited Dimoria College on 22nd Feb, 2022. The purpose was to have first hand information of electrical loads, consumption pattern and prospect of saving energy. Conserving energy is always a team work and a collaborative action. The management of Dimoria College was committed to exercise of energy audit. In the process of forming ECC and to ensure full participation of stake holders including teachers, staff and students an energy conservation committee is formed with principal as the team leader. ECC included following members.

1. Dr. Biman Kumar Bhatta, Principal, Dimoria College – Chairman.
2. Mr. Manabjyoti Barkakaty, Dept. of Geography, IQAC Coordinator – Member.
3. Dr. SAI Choudhury, Dept. of Botany – Member.
4. Mrs. Jonali Barman, Dept. of Eco-restoration – Member.
5. Mr. Bhaskar Jyoti Deka, Dept. of Physics – Member.
6. Sri. Madan Chandra Das. – Member.
7. Mr.Nabajyoti Deka, President, Students Union – Member.

6.2 Walk in audit and observation:

Walk in audit forms a part of preliminary audit. In this exercise energy auditor along with Energy Conservation Team (ECC) takes a round of the college campus to observe use of electrical energy at different blocks and departments of the college and have objective assessment. The purpose of walk-in - audit is to have an insight into electrical network and power consuming devices and explore if there was any possibility of saving power. The devices included lights both LED & CFL, Fans, plug points (both 6 and 16 amps), computers, projectors, audio visual systems, incinerators, diesel generator, water pumps, air conditioners and so on. The team went round different blocks of college including office of principal, administrative block, Central library, departments and Class rooms of Zoology, Botany, Physics, Mathematics, Chemistry and related laboratories of science departments. The team also had a round of department of environmental science, anthropology, departments and class rooms of History, Economics, Geography, Political Science, Education, English, Assamese, Sociology, Folklore, Philosophy and canteen toilets etc. This was a learning experience

for members and energy auditor to observe and evaluate the need for electricity at locations in an objective manner. This walk-in audit helped the team to judge whether there can be saving of power by its optimum use.

Some observations during walk in audit

- There were a number of plug points (6 and 16 amps) in the science laboratories which were rarely used.
- CFL lamps used for illumination needed to be replaced by LED lamps to save power.

- The DG set was used occasionally and had no logbook for record.

- The 150 kva transformer needs to be checked for oil level. If oil level is low it has to be topped up to ensure cooling of coils of transformer. The terminal joints of conductors needed to be checked for any loose connections to avoid energy loss due to spark.
- There was a scope to install roof top solar system on roof facing south direction.
- Water taps in toilets needed to be leak proof to prevent wastage of water.

- Air filters of air conditioners needed to be cleaned as a part of annual maintenance contract to save power.
- All class rooms should have a MCB (miniature circuit breaker) to put off electrical appliances after classes are over.

- There could be some hoarding in prominent places in the campus to highlight about need to save power.

- There was substantial use of day light in some of class rooms which could help save grid power.

- The illumination level of class rooms and toilets need to be optimized.

6.3 Data Collection

Walk in audit is followed by data collection, information related to bills served by the utility (Assam Power Distribution Company Limited), log book of DG Set, and other relevant documents related to use of electricity.

Relevant data have been tabulated in various tables for scrutiny and analysis.

- Table-1 shows list of room wise electrical devices installed starting from Principal's office room.
- Table-2 shows list of devices used in college. Connected load is calculated on assumption that they are in used daily for 6 hours for 30 days a month. Monthly power consumption is estimated on same basis.

- Table- 3 illustrates monthly energy bills for power consumption of college on the basis of bills served by the utility.

- A pie chart illustrates the component of billed amount for energy, maximum demand and electricity duty as component of total electricity bills served by the utility for a year.

- The pie chart illustrates components of electrical loads like light, fan, pump, AC load and others.

6.4 Analysis and Evaluation:

- It was evident from walk in audit that there were 378 no of 6A and 119 no of 16A plug points which increased connected load and could be done away with. It is to be reviewed if such numbers are actually required.
- In all utility bills the contract demand was mentioned as 106 kva. However the recorded kva was not available in the utility bills. The utility (APDCL) should mention recorded maximum demand in

energy bills. It will help us to determine actual required maximum demand and to review requirement of contract basis.

- All CFL lamps need to be removed and replaced by LED lights.
- There were a number of shops within the college boundary with power in single phase power from college transformer. It adds extra load to the transformer. This entire establishment should be separated with a different connection from the utility so as to reduce load on the transformer.
- The power supply to the hostels should be separated from the college transformer. Instead a separate supply should be provisioned. College authorities will be in a position to monitor the consumption pattern of energy by hostels and will be able to load it on the users.
- The DG set needs to be maintained with an annual maintenance contract. A log book needs to be in place to assess performance of the DG set

Table-1 shows location of electrical devices in each of rooms on page 11.

Figure: Solar lamps installed in the campus

13. Acknowledgement:

We express our thanks and gratitude to the management of Dimoria College for giving us the opportunity to conduct the Energy Audit at Dimoria College.

We are also grateful to Dr.Biman Kumar Bhatta, Principal, Dimoria College, Khetri, Assam for his valuable comments/feedback and for support with which we could prepare this audit report.

We express our sincere thanks to all other concerned official for their support and guidance during the exercise of energy audit.

K Talukdar.

Khanindra Talukdar.
B.E.E Certified Energy Auditor
(EA-5846)

Dated- 6th March, 2022.

Campus Biodiversity Report

CAMPUS BIODIVERSITY OF DIMORIA COLLEGE, KHETRI

Introduction:

Biodiversity is the variety and variability of life on Earth. B is typically a measure of variations at the genetic, species and eco-system level. Biodiversity is important to most aspects of our lives. We value biodiversity both for what it provides to humans, and for the value it has in its own right. It provides many basic needs humans obtain from biodiversity such as food, fuel, shelter, and medicine. Further, ecosystems provide crucial services such as pollination, seed dispersal, climate regulation, water purification, nutrient cycling, and control of agricultural pests. Biodiversity also holds value for potential benefits not yet recognized, such as new medicines and other possible unknown services. Biodiversity has cultural value to humans as well, for spiritual or religious reasons for instance. The intrinsic value of biodiversity refers to its inherent worth, which is independent of its value to anyone or anything else. This is more of a philosophical concept, which can be thought of as the inalienable right to exist.

Over the last century, humans have come to dominate the planet with rapid population as well as developmental growth, causing rapid change to ecosystem and massive loss of biodiversity across the planet. Major direct threats to biodiversity include habitat loss and fragmentation, unsustainable resource use, invasive species, pollution, and global climate change.

Dimoria College campus biodiversity:

Dimoria College is located at the eastern fringe of Kamrup (Metro) district of Assam. It lies between 92° 04′ 28″ E to 92° 45′ 39″ E Longitude and 26° 07′ 10″ N to 26° 07′ 03″ N Latitude. It has tropical climate, withaverage temperatureranging between 37° C maximum and 13° C minimum. Soil type is brown and redish sandy loam rich in both macro and micronutrients. The college campus is located in a biodiversity hotspot region. It is surrounded by hills, stream and agricultural fields.

The College has a land 8.9 Hector which is entirely in plains. Out of this area, nearly 40% area is covered by college playground. About 10% of the college campus is water body. A perennial stream, sourcing from the adjacent hills of the college campus, flows along the southern boundary of the campus. Besides, there is a pond right inside the campus which harbours many plant species and

Dimoria College Estd. 1979 Khetri

accommodating for various infrastructures of the college. The diverse physiography influenced by adjacent forested hilly terrain, helps the campus to harbour rich vegetation.

Area surrounding the campus is sparsely populated and the locality being a rural one, human intervention is relatively low. Lush green hills with thick forests of Meghalaya are also in close proximity to the college campus. The diverse physiography in the vicinity of the college campus like hills, plains and stream has considerable influence in the biodiversity of the area. The campus is endowed with terrestrial as well as aquatic vegetation. Most of the plant species are dicotyledonous. Some species are monocotyledonous, and some are gymnosperms. Plant species with their available local names are listed below:

ANGIOSPERMS

Dicotyledons

Sl.	Name of species	Family	Local Name
1	*Ranunculus cantoniensis* DC.	Ranunculaceae	--
2	*Polyalthia longifolia* (Sonner) Thw.	Annonaceae	Debadaru
3	*Polyalthia var. pendula* (Sonner) Thw.	Annonaceae	Debadaru
4	*Nymphaea nouchali* Burm. F.	Nymphaeaceae	Boga Bhet
5	*Nymphaea rubra* Roxb. Ex Andrews	Nymphaeaceae	Ronga Bhet
6	*Nelumbo nicifera* Gaertn.	Nelumbonaceae	Podum
7	*Argemone mexicana* L.	Papaveraceae	Xilkata
8	*Cleome viscosa* L.	Cleomaceae	Hurhuria
9	*Mesua ferrea* L.	Clusiaceae	Naahor
10	*Abutilon indicum* (L.) Sweet	Malvaceae	Jopa
11	*Hibiscus rosa-sinensis* L.	Malvaceae	Rakta Joba
12	*Malvaviscus arborieus* Cav.	Malvaceae	Tikani-Joba
13	*Sida cordifolia* L.	Malvaceae	Sonborial
14	*Sterculia villosa* Roxb.	Sterculiaceae	Odal
15	*Elaeocarpus floribundus* BL.	Elaeocarpaceae	Jalphai

Dhmorie College Estd. 1979 Khetri

Alee Sam.

Sl.	Name of species	Family	Local Name
16	*Biophytum sp*	Oxalidaceae	
17	*Oxalis corniculate* L.	Oxalidaceae	Tengechi
18	*Oxalis corymbosa* L.	Oxalidaceae	Bor tengechi
19	*Averrhoa carambola* L.	Averrhoaceae	Kordoi
20	*Impatiens balsamina* L.	Balsaminaceae	Keruphool
21	*Aegle marmelos* (L.) Correa	Rutaceae	Bel
22	*Citrus reticulata* Blanco.	Rutaceae	Sumothira
23	*Murrya koenzii* (L.) Spreng.	Rutaceae	Narasingha
24	*Murrya paniculata* (L.) Jack	Rutaceae	Kaaminikanchan
25	*Azadirachta indica* A. Juss.	Meliaceae	Maha neem
26	*Melia azedarach* L.	Meliaceae	Ghora neem
27	*Ziziphus mauritiana* Lamk.	Rhamnaceae	Bogori
28	*Mangifera indica* L.	Anacardiaceae	Aam
29	*Moringa oleifera* Lamk.	Moringaceae	Sajina
30	*Acacia auriculiformis* A. Cunn. ex Benth.	Fabaceae	Australian acacia
31	*Albizia lebbek* Benth.	Fabaceae	Sirish
32	*Butea monosperma* (Lam) Kuntz.	Fabaceae	Palash
33	*Caesalpinia pulcherrima* (L.) Sw.	Fabaceae	Radhachura
34	*Cassia fistula* L.	Fabaceae	Sonaru
35	*Cassia sophera* L.	Fabaceae	Medelua
36	*Cassia tora* L.	Fabaceae	Saru medelua
37	*Crotolaria pallida* Ait.	Fabaceae	Junjunia
38	*Dalbergia sisoo* Roxb.	Fabaceae	Sishu
39	*Desmodium heterophyllum* (Willd.) DC.	Fabaceae	
40	*Desmodium trifolium* (L.) DC.	Fabaceae	

Sl.	Name of species	Family	Local Name
41	*Mimosa pudica* L.	Fabaceae	Lajukilata
42	*Pterocarpus santalinus* L.	Fabaceae	Ronga chandan
43	*Samanea saman* (Jacq.) Merr.	Fabaceae	
44	*Saraca asoca* (Roxb.) de Wilde	Fabaceae	Ashok gas
45	*Senna siamea* (Lam.) Irwin et Barneby	Fabaceae	
46	*Rosa damascena* Mill.	Rosaceae	Golap
47	*Terminalia arjuna* (DC) W. & A.	Combretaceae	Arjun Gos
48	*Terminalia chebula* Retz.	Combretaceae	Xilikha
49	*Eucalyptus maculata* Hook.	Myrtaceae	
50	*Psidum guajava* L.	Myrtaceae	Madhuriaam
51	*Syzygium cumini* (L.) Skeels.	Myrtaceae	Kalajamu
52	*Melastoma malabathricum* L.	Melastomataceae	Futuka
53	*Ladwigia adscendens* (L.) H. Hara	Onagraceae	Halosee
54	*Centella asiatica* (L.) Urban	Apiaceae	Bor-Manimuni
55	*Hydrocotyle sibthorpioides* Lamk.	Apiaceae	Saru-Manimuni
56	*Anthocephalus cadamba* Miq.	Rubiaceae	Kadam
57	*Mussaenda philippica* A. Rich.	Rubiaceae	
58	*Ageratum conyzoides* L.	Asteraceae	Gendheli bon
59	*Eclipta alba* Hassk	Asteraceae	Keheraj
60	*Parthenium hysterophorus* L.	Asteraceae	
61	*Sonchus wightianus* DC.	Asteraceae	
62	*Tridax procumbens* L.	Asteraceae	
63	*Vernonia cinerea* (L.) Less.	Asteraceae	
64	*Xanthium indicum* Koenig	Asteraceae	Agara
65	*Mimusops elengi* Roxb.	Sapotaceae	Bakul

Alee Sarma.

Sl.	Name of species	Family	Local Name
66	*Nyctanthus arbor-tristis* L.	Oleaceae	Xewali
67	*Cascabela thevetia* (L.) Lippold	Apocynaceae	Karabi
68	*Catharanthus roseus* (L.) G. Don.	Apocynaceae	Nayantora
69	*Rauvolfia canascens* L.	Apocynaceae	Sarpagandha
70	*Tebernaemontana divericata* (L.) R. Br.	Apocynaceae	Kathanda
71	*Calotropis gigantea* (L.) Roxb.	Asclepiadaceae	Aakon
72	*Cuscuta reflexa* Roxb.	Convolvulaceae	Raghumola
73	*Evolvulus nummularius* (L.) L.	Convolvulaceae	
74	*Ipomoea aquatica* Forssk.	Convolvulaceae	Kalmou
75	*Datura metal* L.	Solanaceae	Dhatura
76	*Solanum indicum* L.	Solanaceae	Katahi Bengena
77	*Solanum nigrum* L.	Solanaceae	Kaisi
78	*Solanum torvum* L.	Solanaceae	Haati Bhekuri
79	*Solanum viarum* Dunal	Solanaceae	Bhekuri Tita
80	*Bacopa monnieri* (L.) Pennel	Scrophulariaceae	Brahmisaak
81	*Justicia adhatoda* L.	Acanthaceae	Boga Bahok
82	*Clerodendrum* serratum (L.) Spreng	Verbinaceae	Nangal bhanga
83	*Duranta erecta* L.	Verbaneceae	
84	*Gmelina arborea* Roxb.	Verbanaceae	
85	*Lantana camera* L.	Verbanaceae	
86	*Leucas plukentii* (Roth) Spreng	Lemiaceae	Doron
87	*Ocimum tenuiflorun* L.	Lemiaceae	Kaltulashi
88	*Ocimum basilicum* L.	Lamiaceae	Ram tulashi
89	*Boerhavia diffusa* L.	Nyctaginaceae	Purnanoba
90	*Achyranthes aspera* L.	Amaranthaceae	Obhat kata

Dimoria College Estd. 1979 Khetri

Sl.	Name of species	Family	Local Name
91	*Alternanthera philoxeroides* (Martius) Grisebach	Amaranthaceae	Neuthoni- Sak
92	*Alternanthera sessilis* (L.) R. Brown	Amaranthaceae	Maati Kaduri
93	*Amaranthus spinosus* L.	Amaranthaceae	Kata Khutura
94	*Amaranthus viridis* L.	Amaranthaceae	Khutura
95	*Persicaria barbata* (L.) Hara	Polygonaceae	
96	*Persicaria hydropiper* (L.) Spach.	Polygonaceae	Bihalongoni
97	*Polygonum plebeium* Roxb.	Polygonaceae	
98	*Rumex maritimus* L.	Polygonaceae	
99	*Rumex nepalensis* Spreng	Polygonaceae	Tarboura
100	*Santalum album* L.	Santalaceae	Boga Chandan
101	*Codiaeum variegatum* (L.) Bl.	Euphorbiaceae	Patbahar
102	*Euphorbia hirta* L.	Euphorbiaceae	Gakhirati bon
103	*Euphorbia pulcherrima* Willd.	Euphorbiaceae	Lalpata
104	*Jatropha gossypifolia* L.	Euphorbiaceae	Bhatera
105	*Phyllanthus acidus* Skeel	Euphorbiaceae	Poramlakhi
106	*Phyllanthus emblica* L.	Euphorbiaceae	Aaamlokhi
107	*Ricinus communis* L.	Euphorbiaceae	Eragos
108	*Ficus benghalensis* L.	Moraceae	Batgos
109	*Ficus benjamina* L.	Moraceae	Jarigos

Monocotyledons

1	*Hydrilla verticillata* (L.f.) Royle	Hydrochaaritaceae	
2	*Rhyncostylis retusa* (L.) Bl.	Orchidaceae	Kopou phool
3	*Curcuma caesia* Roxb.	Zingiberaceae	
4	*Ravenala madagascariensis* J.F. Gamble	Sterlitziaceae	Traveller's tree

Alee Sam.

Sl.	Name of species	Family	Local Name
5	*Sterlitzia reginae - juncea*	Strelitziaceae	
6	*Canna indica* L.	Cannaceae	Parijat
7	*Crinum asiaticum* L.	Amaryllidaceae	Bon Naharu
8	*Yucca gloriosa* L.	Asparagaceae	Dagger plant
9	*Eichhornia crassipes* (Mart.) Solms.	Pontedarniaceae	Meteka
10	*Commelina benghalensis* L.	Commelinaceae	Kona shimolu
11	*Cocos nucifera* L.	Arecaceae	Naarikol
12	*Crysalidocarpus lutescens*	Arecaceae	Momaitamul
13	*Roystonea regia* (Kunth) O. F. Cook.	Arecaceae	
14	*Alocasia fornicate* (Roxb.) Schott	Araceae	Kachu
15	*Colocasia esculenta* (L.) Schott	Araceae	Kala kochu
16	*Pistia stratioetes* L.	Araceae	Bar puni
17	*Lemna perpurilla* Torrui	Lemnaceae	Saru puni
18	*Cyperus cephalotes* Vahl.	Cyperaceae	
19	*Cyperus compressus* L.	Cyperaceae	Muthi bon
20	*Cyperus natans* Vahl.	Cyperaceae	
21	*Cyperus pilosus* Vahl.	Cyperaceae	
22	*Cyperus platystylis* Roxb.	Cyperaceae	
23	*Cyperus rotundus* L.	Cyperaceae	Keyanbon
24	*Fimbristylis globulosa* (Retz.) Kunth	Cyperaceae	
25	*Coix lacryma-jobi* L.	Poaceae	Kauri moni
26	*Cymbopogon nardaus* (L.) Rendle	Poaceae	Chitrnella
27	*Cynodon dactylon* (L.) Pers.	Poaceae	Duboribon
28	*Digitaria ciliaris* L.	Poaceae	
29	*Panicum repens* L.	Poaceae	

Alee Sana.

29	*Panicum repens* L.	Poaceae	

Gymnosperm

Sl.	Name of species	Family	Local Name
1	*Cycas pectinata*Buch-Ham.	Cycadaceae	
2	*Pinus Khasiana*Hook. f.	Pinaceae	Saralgos
3	*Araucaria heterophylla* (Salisb.) Franco.	Araucariaceae	
4	*Cryptomeria japonica* (L. f.) D. Don	Cupressaceae	
5	*Thuja occidentalis*	Cupressaceae	

Presence of 143 species of Angiospermic taxa representing 120 genera under 61 families,with many valuable and economically important plants, makes the Dimoria College campus with rich biodiversity.

Alee Sarma.

Dr. Alee Sarma, Associate Prof.

Co-ordinator

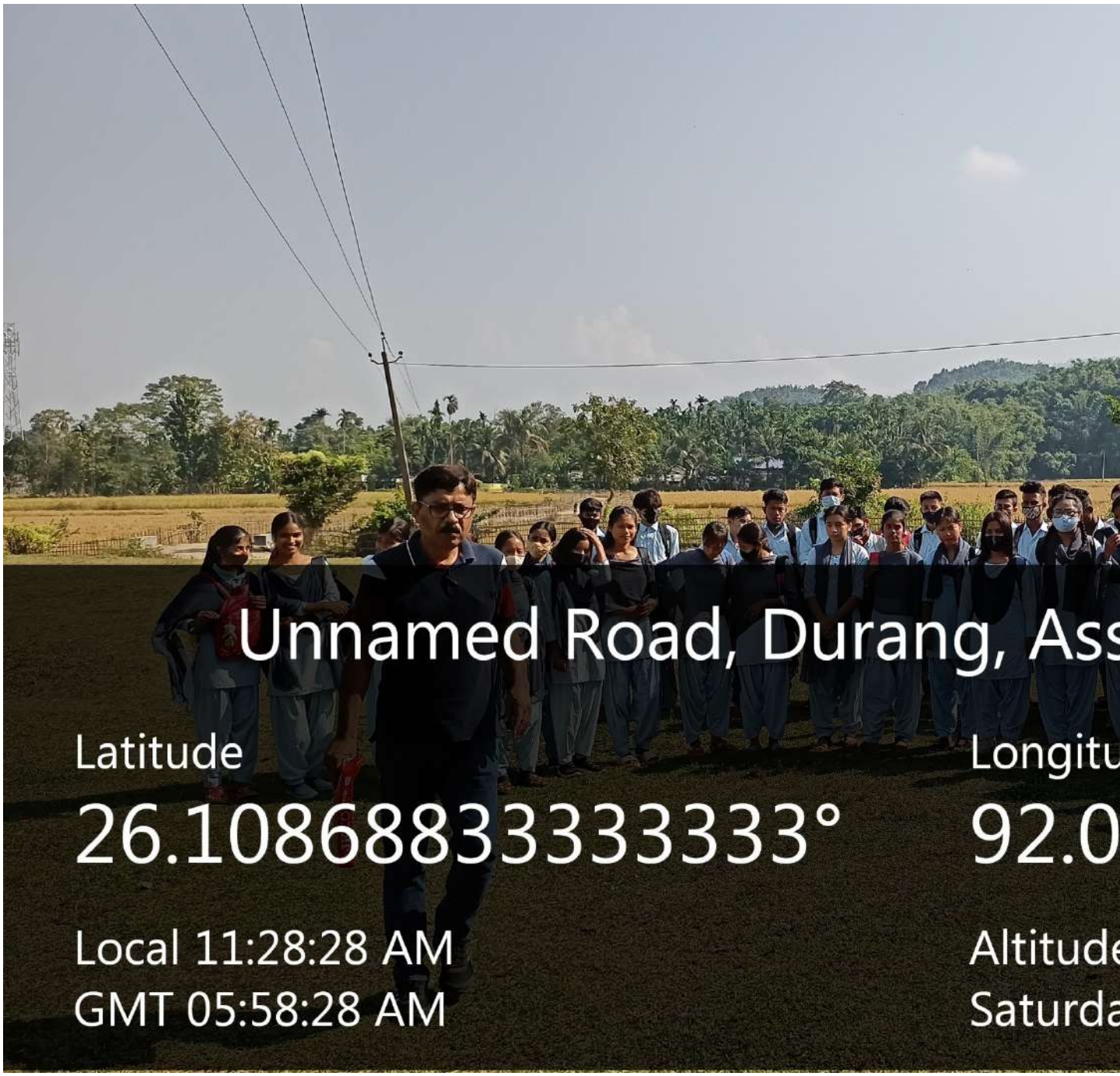
Department of Botany

Dimoria college.

Principal
Dimoria College,Khetri

Dimoria College Estd. 1979 Khetri

Beyond Campus Initiative for environment restoration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Department of Botany in Collaboratio
Dimoria College
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NATIONAL SCIENCE DAY, 2022
Training Programme For Local Farmers
on
Importance and Utilization of Biofertilizers in the Field
Organised by :
Department of Botany in Collaboration with IQAC,
Dimoria College
Sponsored By :
College, Khetri, Kamrup (M),
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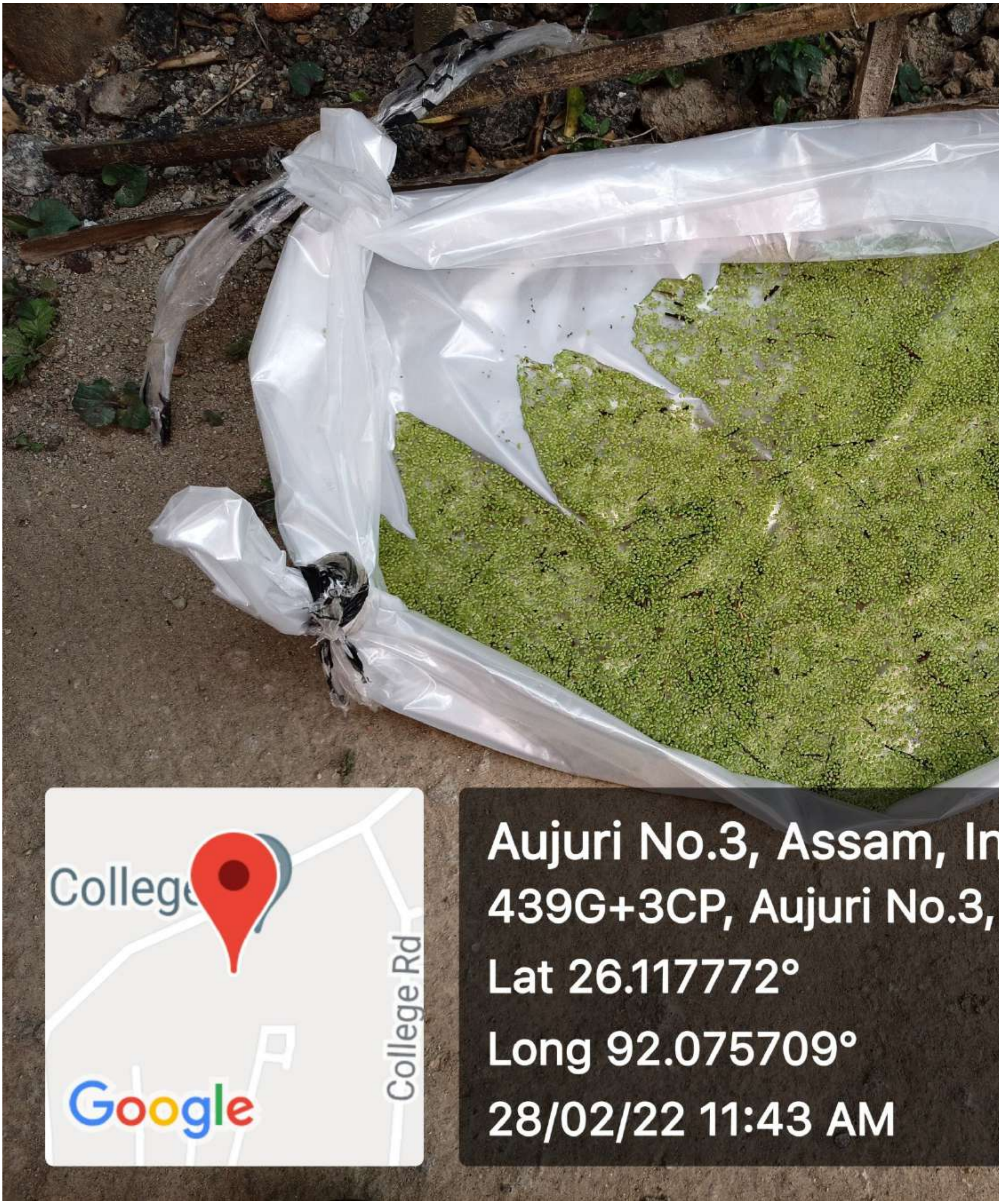
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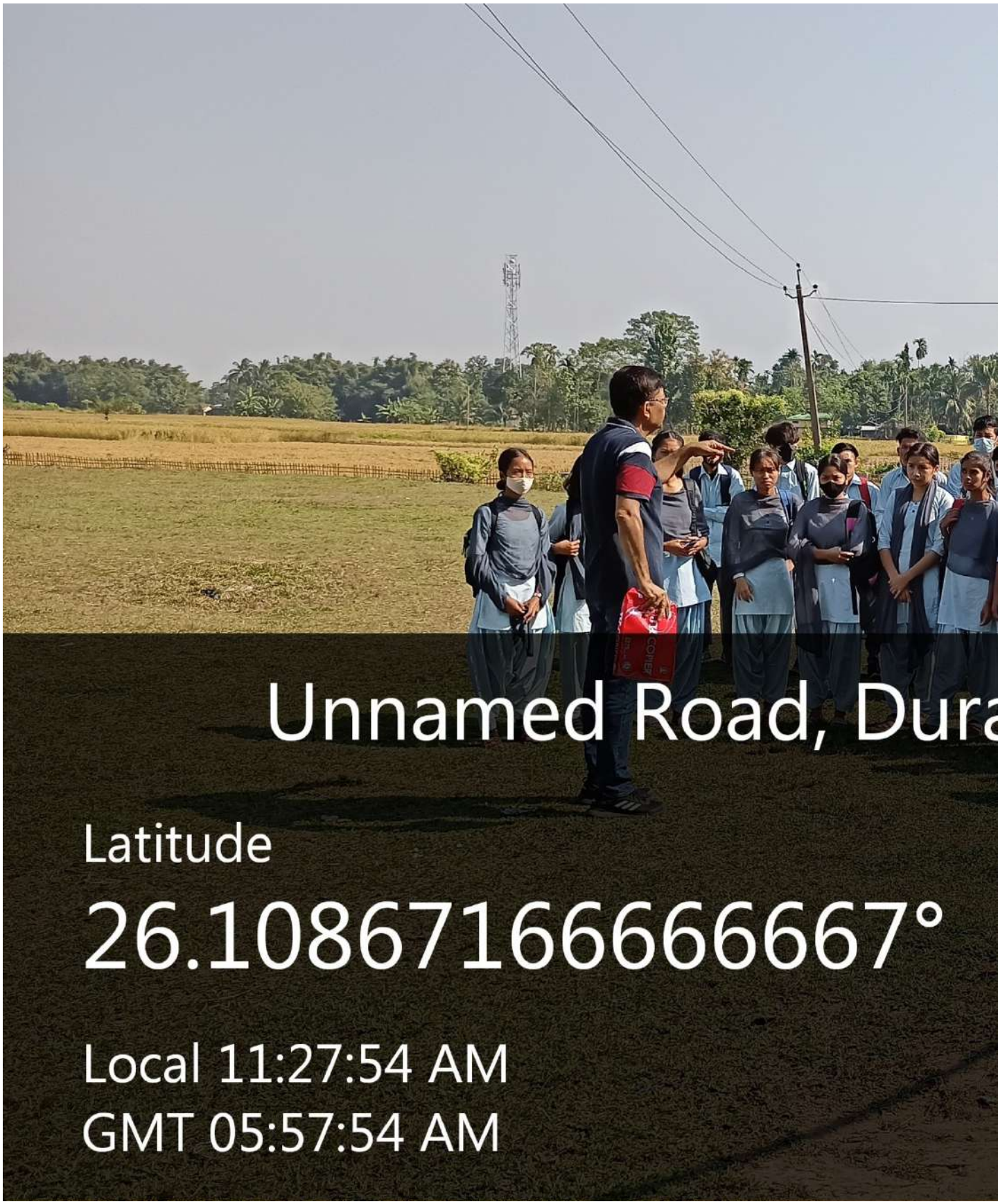
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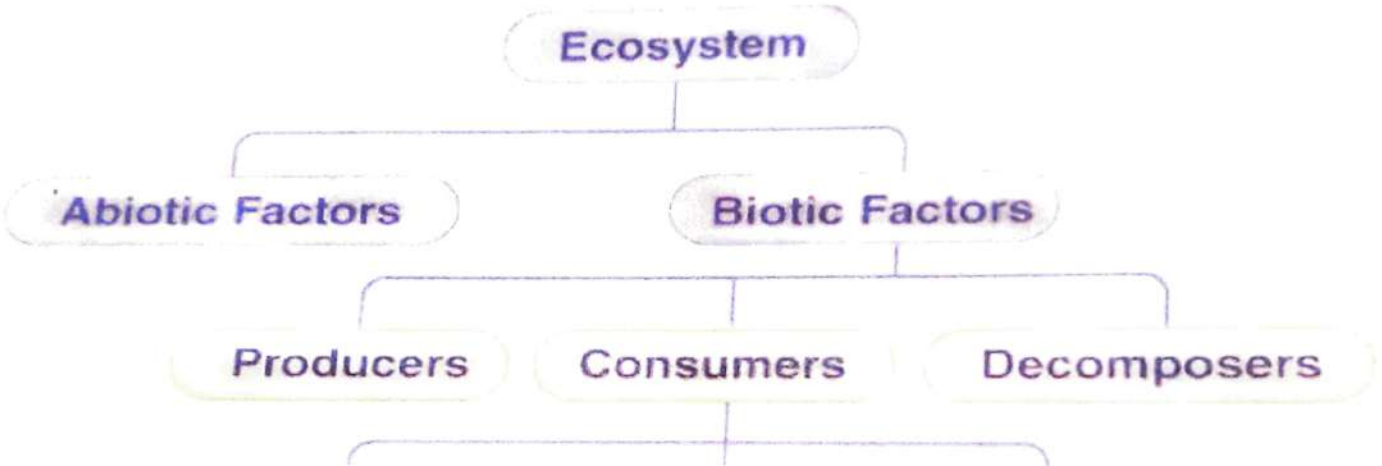
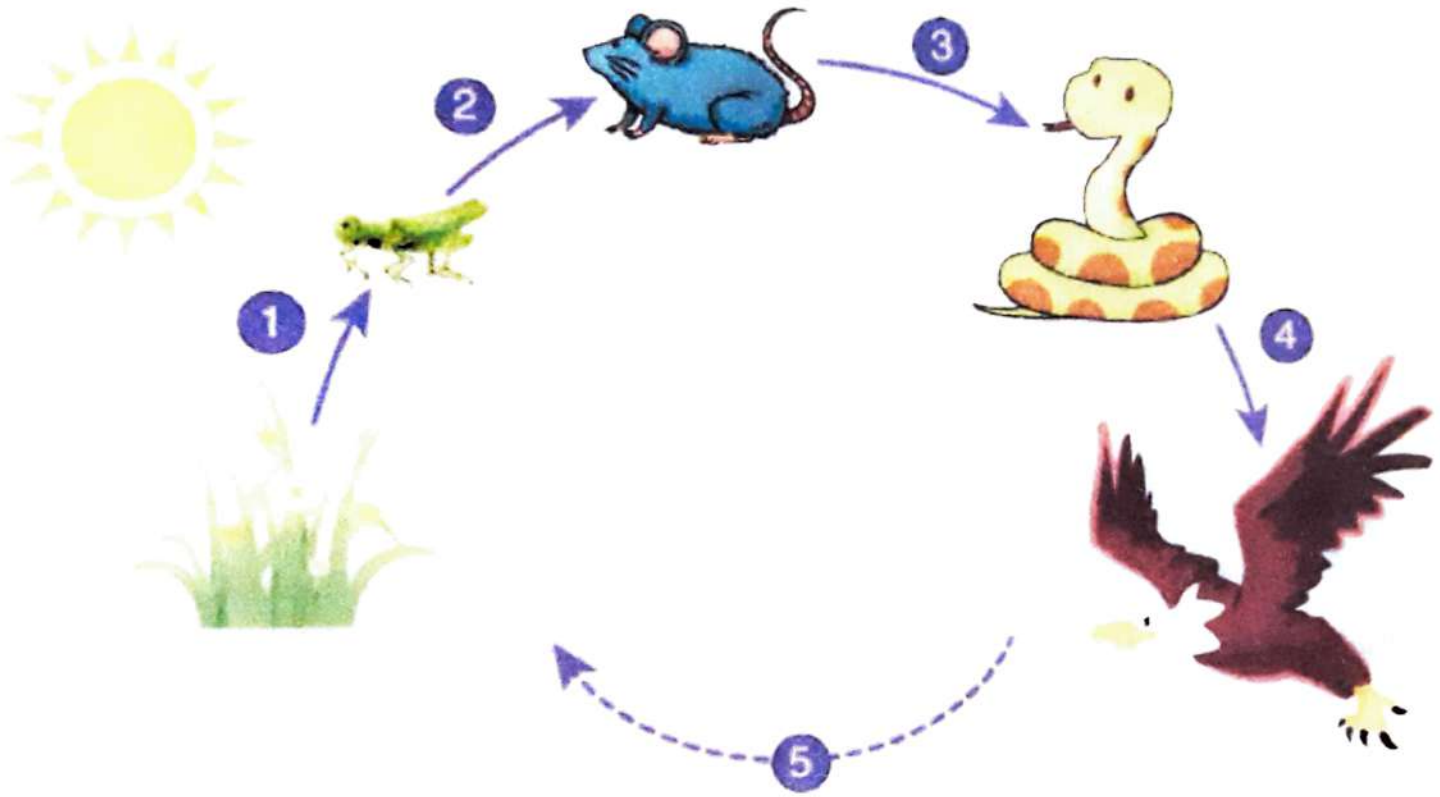
Structure and Functions of Ecosystem

Name: Raktim Saikia
Roll.no: 34 Class- 2nd Semester.
Exam Roll.no:US-211-013-0075
7/14/2022
Department - Zoology Class roll no. - 34.


Ecosystem
Abiotic Factors
Biotic Factors
Producers
Consumers
Decomposers



Food Chain

1. The grasshopper eats the plants
2. The mouse eats the grasshopper
3. The snake eats the mouse
4. The eagle eats the snake
5. When the eagle dies, fungi break down the body and turn them into nutrients

Structure of the Ecosystem

The structure of an ecosystem is characterise -d of both biotic and abiotic components. This includes the distribution of energy in our environment.

It also includes the climatic conditions prevailing in that particular environment.

The structure of an ecosystem can be split into two main components, namely.

- Biotic components
- Abiotic components

The biotic and abiotic components are interrelate in an ecosystem.

DIMORIA COLLEGE,

KHETRI

ENVIRONMENTAL

STUDIES

TOPIC : ECOLOGICAL SUCCESSION

Submitted By : Hina Boro

Class : BSC 2nd Semester(Zoology)

Class roll no : 83

Exam roll no : US-211-013-0034

Session : 2022-23

ASSIGNMENT

[illegible] FOREST ECOSYSTEM

YEAR 2021-22

SUBMITTED BY SUMI KURI

ROLL NO.- US-211-013-0089

CLASS- BSC 5TH SEMESTER

[illegible]

(zoology hons.)

DEMORIA COLLEGE KHETRI

DIMORIA COLLEGE , KHETRI

ENVIRONMENTAL STUDIES

TOPIC: ECOSYSTEM DEGRADATION

SUBMITTED BY

NAME: AMBIKA DEVI

CLASS: BA 2ND SEMESTER (HINDI)

CLASS ROLL NO: 375

EXAM ROLL NO : UA-211-013-0007

SESSION : 2022-2023

DIMORIA COLLEGE, KHETRI

ENVIRONMENT EDUCATION

TOPIC: REPORT ON HILL AREA (DHOUMARA PAHAR)

Submitted To:-

Bhaskar Dev Swargiari

SUBMITTED BY

NAME : HIMADRI DEY

CLASS ROLL NO : 57

GU ROLL NO : UA-211-013-0062

REGISTRATION NO : 21003997

CLASS : B.A 2nd SEMESTER (HINDI)

SESSION : 2022-23

DIMORIA COLLEGE KHETRI

SUBJECT:-ENVIRONMENTAL EDUCATION

TOPIC:-FIELD REPORT

POBITORA WILDLIFE SANCTUARY

SUBMITTED TO:-
BHASKAR DEV SWARGEARI

SUBMITED BY:-
NAME:-JURI BORAH
CLASS:-B.A. 2nd SEMESTER
CLASS ROOL NO:-172
ADMIT ROLL NO:-UA-211-013-0073
Regd NO:-21004010
YEAR:-2022