MUGBERIA GANGADHAR MAHAVIDYALAYA

P.O.—BHUPATINAGAR, Dist.—PURBA MEDINIPUR, PIN.—721425, WEST BENGAL, INDIA
NAAC Re-Accredited B+Level Govt. aided College
CPE (Under UGC XII Plan) & NCTE Approved Institutions
DBT Star College Scheme Award Recipient
E-mail : mugberia_college@rediffmail.com // www.mugberiagangadharmahavidyalaya.ac.in

Green audit/environmental audit report from recognized bodies

GREEN AND ENVIRONMENTAL AUDIT REPORT

(2021-2022)

MUGBERIA GANGADHAR MAHAVIDYALAYA, PURBA MEDINIPUR, WEST BENGAL

CONSULTRAIN MANAGEMENT SERVICES, LAKE ROAD, KOLKATA

TROPICAL INSTITUTE OF EARTH AND ENVIRONMENTRAL RESEARCH (TIEER), MEDINIPUR

CONSULTRAIN MANAGEMENT SERVICE
Lake Road, Kolkata, West Bengal, India

TROPICAL INSTITUTE OF EARTH AND ENVIRONMENTAL RESEARCH (TIEER)
Reg. No. S/1L/42578 of 2006-07
Office address: M-10, Bidhannagar, Medinipur-721101, W.B., India

(TIEER) MIDNAPUR REG NO - S/1L/42578 ESTD - 2007

GREEN AND ENVIRONMENTAL AUDIT CERTIFICATE

Academic Year: 2021-2022

This is to certify that Mugberia Gangadhar Mahavidyalaya, Bhupati Nagar, Purba Medinipur, West Bengal has good and healthy eco-friendly environment created for saving Earth and Nature. Tropical Institute of Earth and Environmental Research associated with Consultrain Management Service are satisfied after successful completion of Green and Environmental Audit with moral support of Honorable Principal, IQAC Team, Staff and Students for academic year 2021-2022. This efforts taken by Faculty and Students towards environment and sustainable are highly appreciable and commendable.

(Dr. Binoy Kr. Chanda)
President, TIEER

(Dr. Pranab Sahoo)
Asst. Professor &
Secretary, TIEER

(Mrs. Sanchita Bhattachariya)
ISO-Auditor& CEO, CMS
Auditor for
IS09001, IS014001
& IS050001

(Dr.Sudipta kr. Maiti)
Expert & Member TIEER
Expert
Tropical Institute of Earth
& Environmental Research

President
Secretary

ACKNOWLEDGEMENT

We, The Environment Audit Team thank the management of Mugberia Gangadhar Mahavidyalaya for assigning us such an important work on Green & Environmental audit. We appreciate the cooperation to our team for the assigned study, giving us necessary inputs to carry out audit activities.

Our special thanks to:

- Principal of the College
- IQAC Members
- Teaching & supporting staff

AUDIT EXPERT MEMBERS

The Committee members are listed below:

SL. No.	NAME	DESIGNATION	AREA IN INTEREST
1.	Dr. Binoy Kr. Chanda	President, TIEER & Former IC, VU	Environment Science & Climatology
2.	Dr. Pranab Sahoo	Secretary, TIEER & Assistant Professor and HOD, Dept of Geography, S.B. Mahavidyalaya, Kapgari	Climate Change and Environment Managementand Biogeography
3.	Mrs. Sanchita Bhattachariya	Consultant, Consultrain Management services, Kolkata, & Member, TIEER, ISO–9001,14001& 50001Cerfied Auditor.	Environment Management
4.	Dr. Pijush Kanti Panja	Associate Professor, Dept. of Geography, Haldia Govt. College	Ecology and Environment management
5.	Dr. Sudipta Maiti	Faulty, Dept. of Botany, Raja N.L. Khan Womens' College, Midnapore	Plants Diversity & Carbon stocking, Green Management
6.	Dr. Mrinmoy Ghorai	Assistant Professor in Zoology, PanskuraBanomali college.	Fauna & Aqua animals andBiodiversity conservation
7.	Sri Ananda Das	Asst. Teacher & expert	Electro physics
8.	Sri Raju Mahata	Drone Surveyor	Aerial Photography
9.	Dr. Mousam Majumder	Asst. Teacher & Expert	Biodiversity & Environment Management

10.	Mr. Prasun Sahoo	B.Tech Electrical Engineer	**Electric management service**
11.	Sri Sarat Chatterje e	Surveyor	Water and Air Quality Measurement
12.	Sri Sanjib Mahata	Surveyor & Expert in RS &GIS	Map Designer

CONTENT

INTRODUCTION:

The term 'Green' stands for Resource balance, Quality environment, Recycled products and Ecofriendly environment. Green and environmental Audit is a process of systematic, documented, periodic and objective evaluation of components of environmental diversity with the aim of ensuring readiness in eco-friendly environment and conservation of natural resources in its operations. The process starts with systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of the college.

Green auditing is a means of assessing environmental performance. Green audit is a valuable means for a College to determine how and where they are using the most energy or water or other resources; the College can then consider how to implement changes and make savings. It can create healthy consciousness and promotes environmental awareness, values and ethics.

Goals & Objectives:

It aims to analysis environments within and outside of the concerned area, which will have an impact on the eco-friendly atmosphere. It provides staff and students better understanding of Resource management on their area of work.

The Main Objectives of Carrying out of Green and Environment Audit:

- To ensure the performance of the Institution with respect to environmental activities they are involved in, in compliance with existing

laws and regulations

- To locate the Green area and the Geographical location of the College – aerial view
- To document the floral and faunal diversity of the College
- To develop and follow the waste management system
- To reduce the energy consumption of the Institution
- To report the expenditure on green initiatives, carbon foot print
- To record the air, water quality of the Institution
- To conserve the natural resources

Areas of Concern:

- WATER MANAGEMENT
- ENERGY MANAGEMENT
- AIR QUALITY AND CARBON FOOTPRINT
- WASTE MANAGEMENT
- E-WASTE MANAGEMENT
- BIODIVERSITY

This Audit has been conducted by a Committee constituted by the Experts & Scientists from different reputed Institutes. The Committee developed a questionnaire for audit based on the regulatory and statutory requirements of Centre as well State. The basic data was gathered and compiled, which the committee analyzed. By and large, the audit reveals a healthy environment inside the Mugberia College campus. The committee has suggested short term as well as long-term suggestions for improved environmental conditions to

Meeting with Hon'ble Principal & IQAC

ahigher level and authorities and all stakeholders of the College conform that they will give due attention and utilize opportunities for identified improvements.

About the College :

Mugberia Gangadhar Mahavidyalaya was established on 2nd of July, 1964 as a co- education college by a society of the same name in a village in Contai

Subdivision of Purba Medinipur District (Erstwhile Midnapore District) after the name of Medinipurs pride - Late Raisaheb Gangadhar Nanda - a great lover of education.

The college is situated in a culturally rich locale, and it is the only college in the vast area of Bhagwanpur–II block. The college is located in the rural area in HeNria Itaberia Road. It was founded with the help of the donations collected from the local people with the aim to serve the poor inhabitants of the area who were unable to send their wards to distant places for higher education. It is noteworthy that some eminent people, enthusiasts in education and social work, took the initiative in establishing this college. Notable among them are Shri Jyotirmay Nanda, Shri Hrishikesh Gayen, Shri Rammay Nanda, Shri Biswanath Sarangi, Shri Tarapada Maity, Shri Sudhir Kumar Hazra, Shri Rakhal Chandra Sarangi, Shri Nanda Gopal Maity, Shri Bankim Chandra Hazra, Shri Ajit Kumar Paria, Shri Jogesh Chandra Nanda, Shri Jagattaran Tripathy, Shri Sachikanta Nanda, Shri Satish Chandra Manna, Shri Swadesh Gayen, Shri Surendranath Jana, Shri Sitanath Das, Shri Gunadhar Maity and Shri Baneswar Maity. The authorities were mainly dependent on the charity of the people for buying the required land and construction of buildings.The college greatly owes to Mugberia Gangadhar Trust for a donation of Rs. 15,345/–, and to late Shri Sailajacharan Nanda for giving away a house along with land where a suitable hostel has been constructed recently.

Pandit Jyotirmay Nanda, B.A, Vedantakabyatirtha, Vidyabhusan was in charge of

the college as the secretary for six years from the commencement of the institution. His efficient administration enabled the college to begin its odyssey surmounting colossal difficulties.

The college is grateful to the famous psychiatrist Dr. Asit Baran Patra and his wife Prof. Gouri Patra for their donation of Rs. 3 lakhs in memory of Shri Bhimacharan Patra for the construction of the Science Building. Shri Kiranmay Nanda, Honble Minister of the Dept. of Fishery of the State Government who was the President of

the College did his best in terms of monetary donations and physical efforts for the development of the college. Moreover, he had taken initative for constructing an auditorium in memory of his father Shri Jyotirmay Nanda. Again, the college had received Rs. 5 lakhs from the Government of Uttar Pradesh under Shri Mulayam Singh Yadav through his endeavour. The boundaries of the campus was constructed with the help of his fund and co-operation of the local people.

A magnificent gate was constructed at the entrance of the college with the financial aid from the teaching and non-teaching staff as well as the students of the college. Several beautiful gardens were constructed to enhance the beauty of the premises at the initiative of NSS, NCC and the employees of the library. Dr. Nilabja Nayan Sarangi donated a substantial amount in memory of his mother Late Susama Devi and Smt. Jyotshna Sasmal of Contai town also donated a substantial amount in memory of her husband Late Aurovinda Sasmal. Apart from these major donations many well-wishers have contributed towards the development of the college and still continue to do so.The college is grateful to Late Prof. Sudhir Giri, the former M.P., for contributing Rs. 2 lakhs from his MPLAD fund. The former M.P. Shri Prasanta Pradhan had donated Rs. 7.5 Iakhs from his MPLAD fund for the construction of the Four Decade Memorial Building. The Zilla Parishad had given away Rs. 5 lakhs for the building of the B.P.Ed. section. Education Directorate, Government of West Bengal, Fishery Department, Governemnt of West Bengal and Shri Kiranmay Nanda (from BEUP fund) had granted Rs. 25 lakhs, Rs. 16 lakhs

and Rs. 18 lakhs respectively for the construction of college buildings and the purchase of laboratory equipments. Education Directorate, Government of West Bengal and Shri Ardendu Maity (froom BEUP fund) granted Rs. 24.6 lakhs and Rs. 3 lakhs respectively for the construction and repair of college buildings. The UGC has contributed in many respects and has granted Rs. 70 lakhs for womens hostel. Bhagwanpur II Panchayet Samiti has arranged for a tubewell in the college campus. ShriRanajit Mondal, the former President of the college, was instrumental in arranging for a grant of 1.6 lakhs from the Zilla Parishad for developing toilet facilities in the college.Mugberia Gangadhar High School had permitted the use of their rooms forthe first four years and the college remains ever grateful to them.The college has started a diploma course in Tourism and Hotel Management under Community College of UGC from July 2015. For this financial assistance has been given by UGC of Rs. 71.96 Lakhs.The college has been awarded the CPE status from 1st April 2016 to 31st March 2021 from the UGC for enhancing the quality of education in the college. For this UGC has granted Rs. 110 Lakhs.The college has a dedicated environmental cell that formed a Green Club aiming to encourage in a self sufficient, energy minimal college campus.

General Information:

Total area of the college campus – 5.8 acres

Building area: 2.37 acres,

Green & Vegetated area: 0.7 acres.

Play Ground & Vacant land area: 1.93 acre

Water Bodies area: 0.8 acre

Departments:

Post Graduate and Under Graduate-27

Laboratories: 12

Students: 2639

Teaching Faculties: 116

Non-teaching staff: 33

Others

stakeholder: 07

Total Stake

holders: 2795

Total classrooms:

55

Auditorium /Seminar hall: 02

Hostels: 04

Hostel students:

260 Gymnasium

Hall : 01

Smart class rooms: 37

The Green Club details:

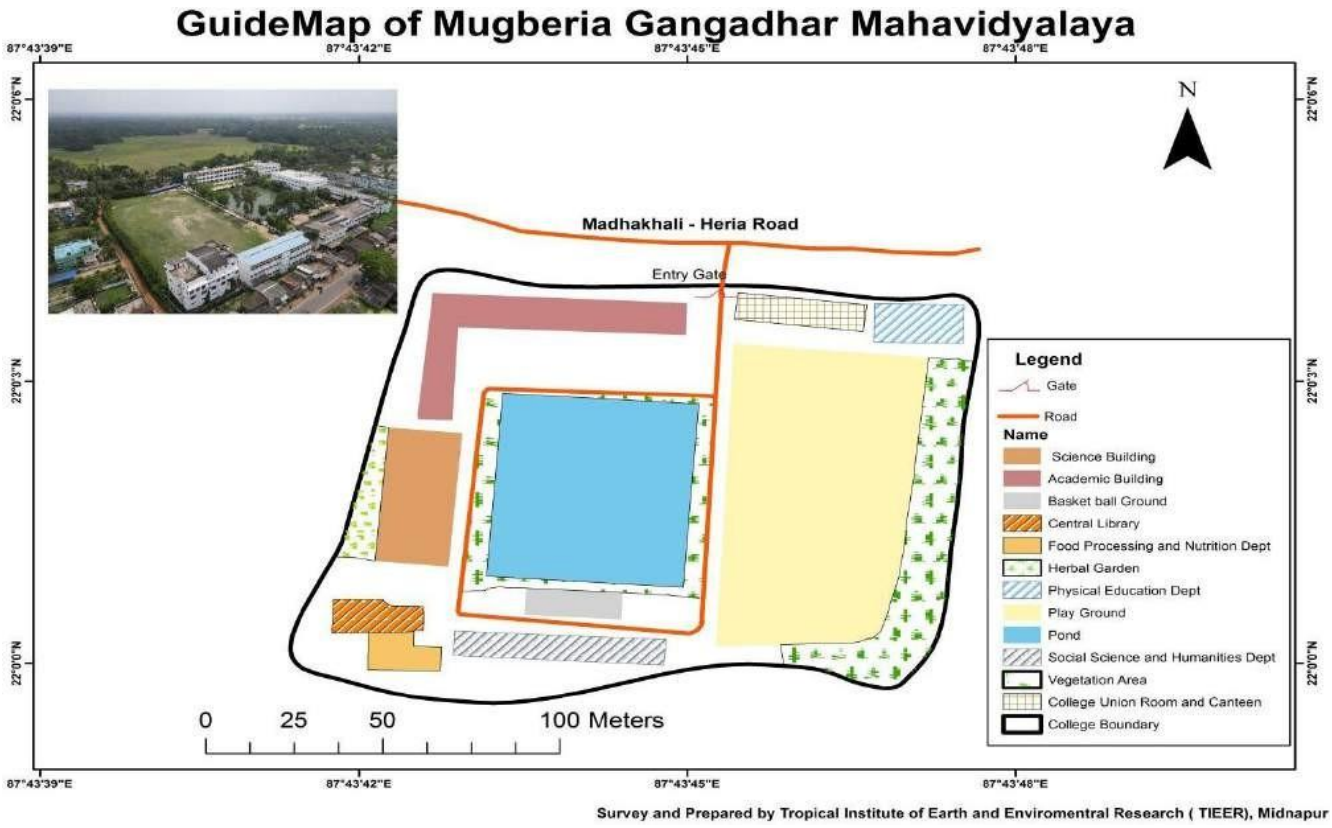
CO- ORDINATOR AND MEMBERS

S.No	Name of the faculty	Designation	Position in Green Club
01.	Irani Banerji Chatterjee	Assistant Professor	Co-ordinator

S.No	Name of the faculty	Designation	Position in Green Club
		Department of Geography	
02.	Dr. Prasenjit Ghosh	Associate Professor HOD History and Secretary, Teachers Council	Member
03.	Dr. Bidhan Samanta	Assistant Professor HOD Department of Chemistry	Member
04.	Dr. Goutam Barman	Assistant Professor Department of Bengali	Member
05.	Dr. Sourav Sikdar	Assistant Professor HOD Department of Zoology	Member
06.	Kingshuk Karan	Assistant Professor HOD Department of Education	Member
07.	Manas Khalua	Assistant Professor HOD	Member

S.No	Name of the faculty	Designation	Position in Green Club
		Department of Botany	
08.	Sougata Bera	Clerk and Secretary, Non Teaching Staff	Member
09.	Kamal Panda	General Secretary, Students Union	Member
10.	Durgapada Bhattacharya	Guest Faculty Vermicompost Cell	Member

The green club used to take up green audit internally previously to ensure a proper sustainable environment inspection.


GuideMap of Mugberia Gangadhar Mahavidyalaya
87°43'39"E
87°43'42"E
87°43'45"E
87°43'48"E
22°0'6"N
22°0'3"N
22°0'0"N
N
Madhakhali - Heria Road
Entry Gate
Legend
Gate
Road
Name
Science Building
Academic Building
Basket ball Ground
Central Library
Food Processing and Nutrition Dept
Herbal Garden
Physical Education Dept
Play Ground
Pond
Social Science and Humanities Dept
Vegetation Area
College Union Room and Canteen
College Boundary
0
25
50
100 Meters
Survey and Prepared by Tropical Institute of Earth and Enviromentral Research (TIEER), Midnapur

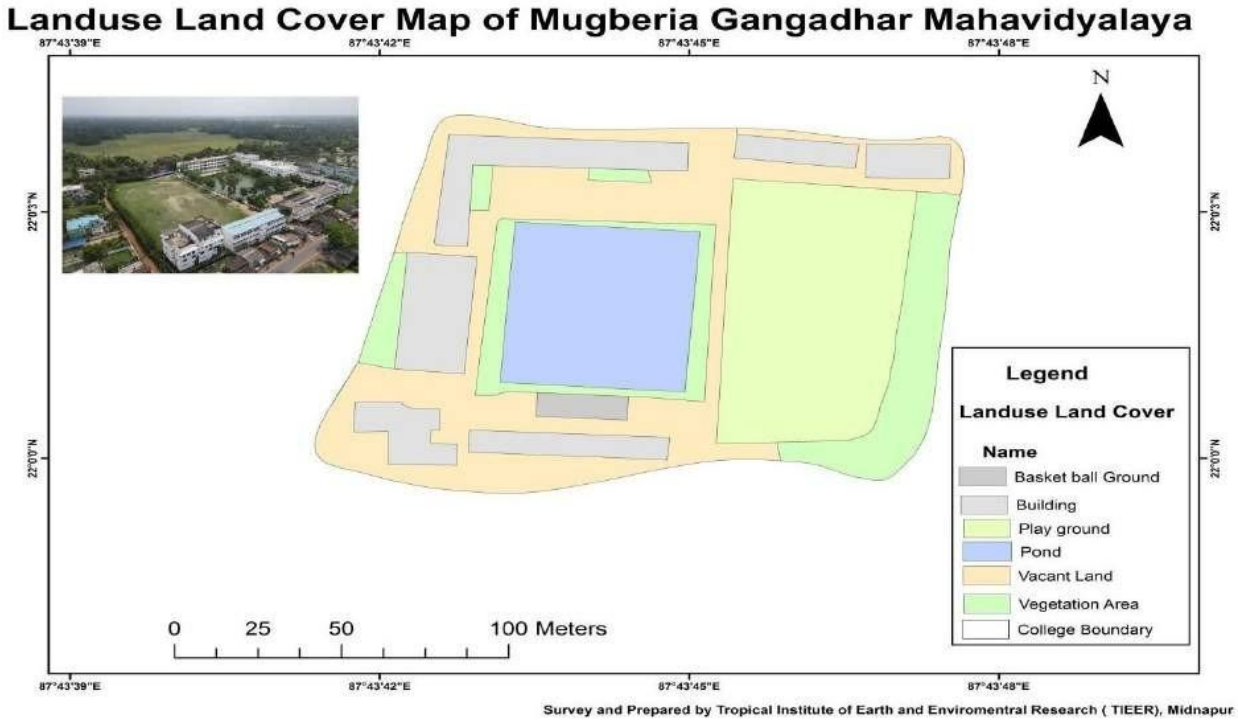
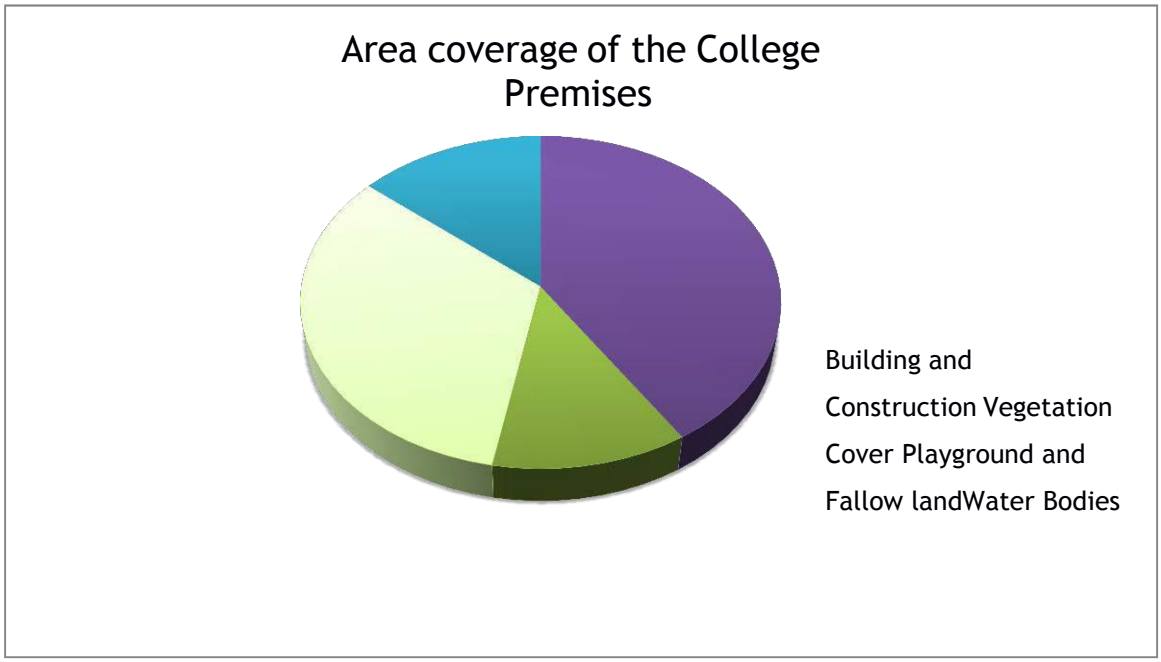

Landuse Land Cover Map of Mugberia Gangadhar Mahavidyalaya
87°43'39"E
87°43'42"E
87°43'45"E
87°43'48"E
22°0'3"N
22°0'0"N
N
Legend
Landuse Land Cover
Name
Basket ball Ground
Building
Play ground
Pond
Vacant Land
Vegetation Area
College Boundary
0
25
50
100 Meters
Survey and Prepared by Tropical Institute of Earth and Enviromentral Research (TIEER), Midnapur

Table 1 Area Coverage of the College Campus

Area Coverage of College Premises:	Area in Percentage
Building and Construction	40.86
Vegetation Cover	12.08
Playground and Fallow land	33.27
Water Bodies	13.79

Fig. 1 Area Coverage of College Premises



Academic Department and Research Centre

Purpose of Green and Environmental Auditing:

- To develop to more efficient resource management
- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid- wasteand water recycling
- To promote plastic free campus and evolve health consciousness among thestakeholders
- To recognize the cost saving methods through waste minimizing and managing
- To empower the organizations to frame a better environmental performance
- To develop an environmental ethics and values systems in youngsters.
- To establish valuable tools and methods for managing and monitoring of environmental and sustainable development programs.

PRE-AUDIT STAGE:

Methodology and Survey Schedules:

The methodology is adopted for this assessment by collecting the information by o observation. Perception study and opinion survey are also included in the AuditingReport.

The Audit team started the audit at the College Campus on 13th June,2022,

SL.NO	PURPOSE	DATE	REMARKS
1.	Communication withCollege authority	01.04.2022	Discussion about term and condition
2.	Opening Meeting	06.04.2022	Submitted the survey schedule
3.	Collection information about the College Campus visit , site enquiry	13.05.2022	Introduced to Administrative Officer Outdoor observation with
4.	and department survey &observation	13.05.2022	Drone camera & Photo camera, Laboratory enquiry
5.	Review data and Assessment	13.05.22 to 25.05.2022	Data generate and drone figures
6.	Pre Closing meeting	06.06.2022	Meeting with IQAC
7.	Closing Meeting	15.06.2022	Pre-submission of the Report
8.	Submission the auditreport	27.06.2022	Submission of theReport

Site Visit:

1. College and its premises were visited and analyzed by the audit-teams several timesto gather information.
2. Campus trees were counted and identified.
3. Medicinal garden, play grounds, canteen, library, All Department, office

rooms, Hostels, Staff Quarter and parking grounds were also visited to collect data.

4. Number and type of vehicles used by the stakeholders were counted and fuelconsumption for each vehicle was verified with the user.
5. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted.
6. Water taps were checked. Leakage of a few water taps and over-flow tanks werenoticed during the site inspection.

Ecofriendly College

Following steps were taken for data collection:

- Survey to each department, centers, Library, canteen etc.
- Data collected by observation and interview.
- Assessment of the environmental condition through measurement

Survey & Data Collection:

- A Questionnaire was developed covering all aspects of Green and Environment aspects for collection of data.
- Arrangement of Drone survey was made available to cover every corner of the college and its neighborhood areas.
- Data Analysis - Calculation of energy consumption, analysis of water reused, waste generation & disposal arrangements.
- Recommendation — On the basis of results of data analysis and observations, some steps for reducing power consumption, water consumption, waste management etc. were recommended.

We have discussed and interacted with different groups like teachers, students and

staff to identify the attitudes and awareness towards environmental issues at the institutional, district, national and global level. Data and information were also collected form utility bills, reuse of water, waste management, use of energy-saving devices and e-waste. This information was added to the carbon footprint data, generating a fairly clearer picture of the emissions and impact of the reduction measures undertaken.

Greenery campus with surface water

Academic Buildings

AUDIT STAGE :

Campus Survey and Enquiry:

Green and Environmental audit forms part of a resource management process. Total area including neighborhoods was surveyed using Drone and the data derived from this survey was detailed in our report.

Aerial Views of the College Campus

Eco-campus concept mainly focuses on the reduction of contribution to emissions, on the efficient use of energy and water; Minimize waste generation or pollution and

also economic efficiency. All these indicators are assessed in process of "Green Auditing of educational institute". Covered areas included in this green auditing are water, energy, air quality & carbon footprint, waste, biodiversity campus.

The Audit covered the following major areas:

1. Water Efficiency and Water Management
2. Energy Efficiency and Energy Management
3. Air Quality and Carbon foot print and Management
4. Waste Produce and Waste Management
5. Biodiversity and Green Zone management

Table-2 Total population of the College

Students -	2639	persons
Teaching, Non-teaching and Other Stakeholders	156	persons
Total	2795	persons
Approximate no of visitor (per day)-	15	persons

3.2 Water Efficiency and Water Management :

The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water and also proper water management practices along with rooftop rain water harvesting system must be installed in whole campus for recharging ground water and meeting part of the water requirements. It is therefore essential that any environmentally responsible institution examine its water use and Re-use practices.

a	Usage of water	That water is use for Drinking, Washing, Cleaning, Cooking, Bathing and gardening purpose. The maximum water is use for Bathing and washing in Hostels & Staff Quarter. About 27646 Litre water

		has been supplied for that sector.
b.	Consumption o fwater	About 40500 Litre water per day (the values not understood)
c.	Water wastage	The leakage and misuse of water is about 500 Litre in whole campus. Small drip from a leaky tap, sewage water from pan in toilets and over flow can waste significant amount of water per day.
d.	Water recycle	Waste water recycle is not practiced in the institute as grey water/ sewage treatment /recycle facility is not provided. One rain water harvesting system is available in Mugberia College

		campus.
e	Surface wate rHarvesting	The surface water bodies (one) are available in Mugberia College campus. About 0.8 acres area has covered with one pond.

Table-3 Use of water for Different Purpose of College Premises

Use of water for Different Purpose Per Day	Use in Percentage
Bathing and washroom	68.26
Cooking and washing	8.64
Cleaning and gardening	7.41
Drinking	10.76
Others	3.70
Misuse of Water	1.23

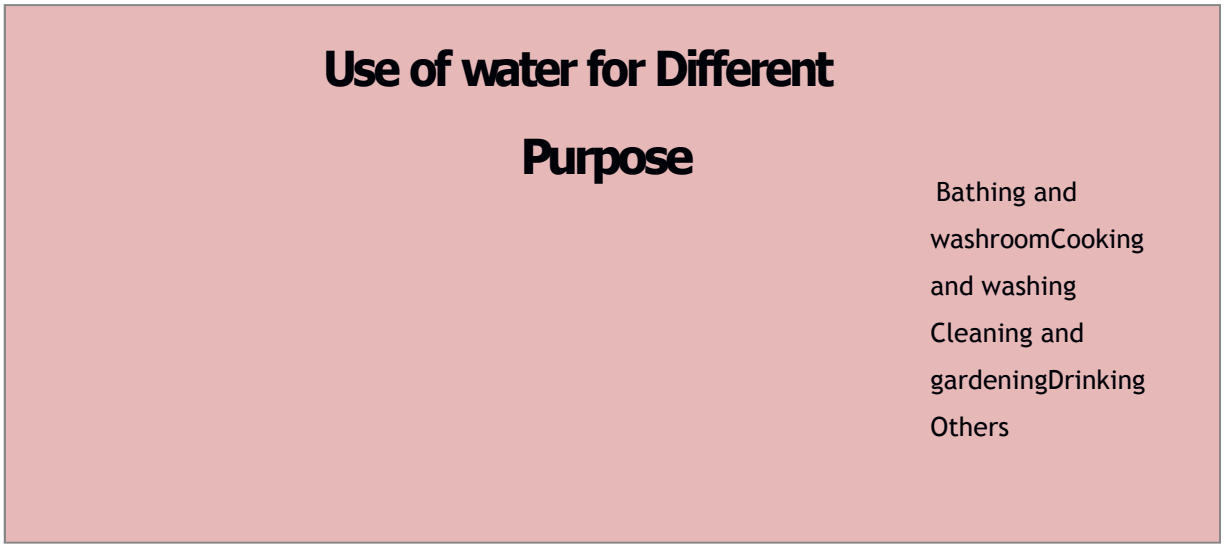


Fig.2 Use of water in Different Purpose Per Day

Taken Water management policy

Sl. No.	Factors	Weightage
1	Quality of Water	H
2	Re-use of water	M
3	Water Harvesting & Recharge	H
4	Use of Surface Water	H

* H denote- Taken management policy level above 60%

** M denote- Taken management policy level 40%-60%

*** L denote-Taken management policy level below 40%

Recommendation

Water conservation faucets in washrooms were not seen. Installation of such faucets can save water and will help in minimising the water footprint of the institute. Sanitary wastewater generated from washrooms is connected to sewerage system.

Energy Efficiency and Energy Management:

a	Energy sources	Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent Tube uses approximately 40W while an energy efficient light emitting diode (LED) uses only lessthan 24 W.

b.	Energy consumption	The useable energy is Conventional and Non-Conventional energy. The used energy is 56825 units costing to Rs. 568250/. About 20.27% energy is Non-conventional energy contributed from Solar Power. The Maximum energy is consumed for Light & Fan amounting to 43.7% of total consumption. Departmental and Computer laboratory uses about 39% of total consumed energy.
c.	Usage of LPG	It has been observed that LPG gas cylinders are used in Canteen, & Laboratories (27 PC/year) for cooking and other purpose. There are Green generators used in the premises.

Electric power unit and Green generator

Table-4 Source of Energy in Percentage

Source of Energy	In Percentage
Conventional	79.73
Non -Conventional	20.27

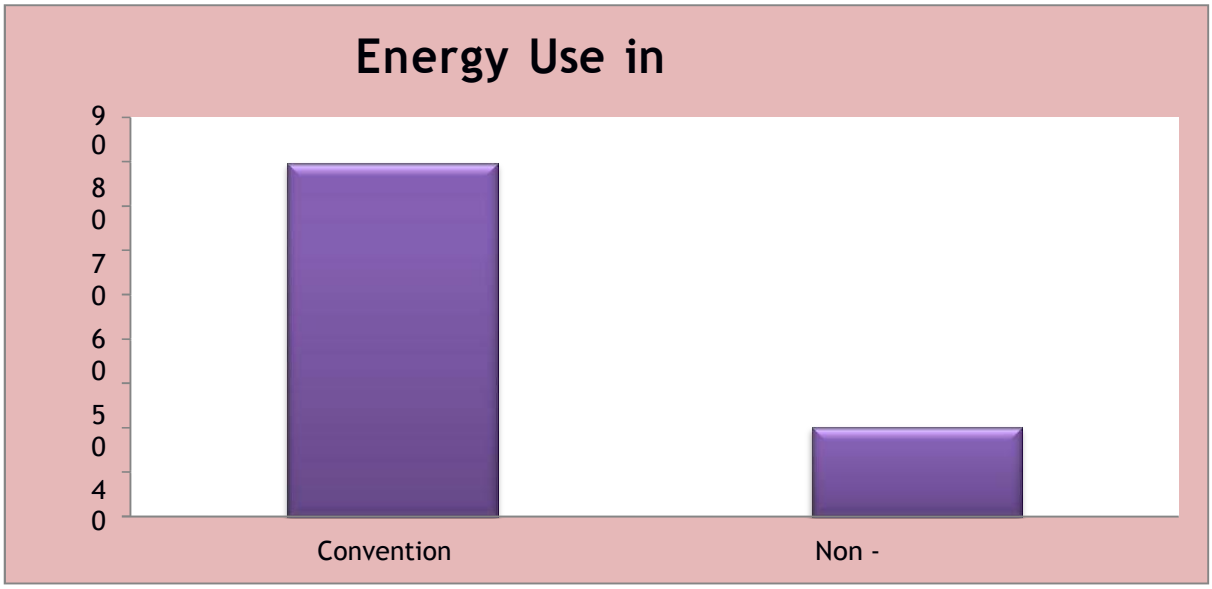


Fig. 3 Use of Energy in Percentage

Source of NCE (Solar

Table-5 Energy Consumption for different Purpose in Percentage

Energy Consumption for different Purpose	In Percentage
light and fans	43.7
AC	20.76
Pump	0.79
Computer and Laboratory	31.60
Others	3.15

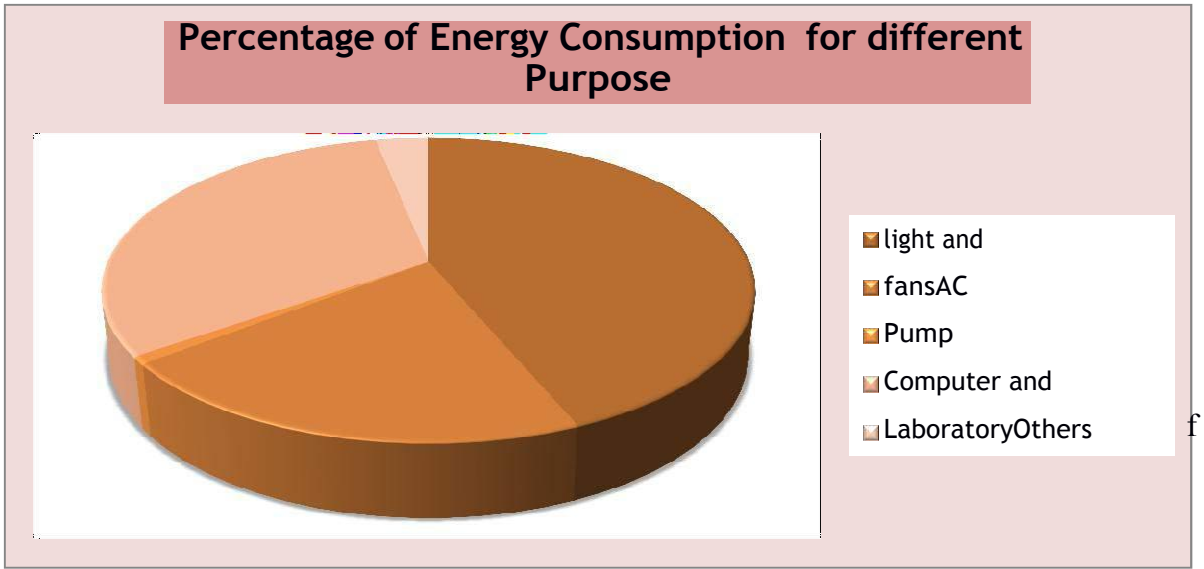


Fig. 4 Percentage of Energy Consumption in different Purpose

Recommendations:

a) Every classroom and lab with central switch board should have a diagram linking place of tube light, fan etc. with corresponding switch. This will ensure that correct fitting is switched on/ off and can save time & unnecessary operation.

b) Installation of automatic lights with sensors can be considered.

c) Standard Operation Procedures (SOPs) should be prepared and followed for green purchasing wherein equipment's with star rating; those using eco-friendly materials; those with safe disposal policy or return to supplier after unused, can be considered.

d) For purchasing new electronic appliances, star rating provided by Bureau of Energy Efficiency (BEE) should be considered. The equipment which has maximum

Energy used for different

and also operate at low cost.

e) Usage of light reflectors is recommended as the reflectors can spread light to relatively large areas.

f) Notices/ signage can be put up/ displayed near switches and on notice boards, informingstudents and staff to switch off all Departments & Sectors when not in use.

g) Use of large percentage renewable energy should be considered.

Air Quality and Carbon Footprints :

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as petrol, Diesel, LPG Gas). The most common greenhouse gases are carbon dioxide, CFC, water vapor, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most leading greenhouse gas, comprising about 214ppm (2019) to the Earth's atmosphere. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the

organization through which the carbon accounting is done. It is observed that the Outdoorair quality is Fresh and comfortable for breathing to human life.

Measurement of Air Quality

Table-6 Amount of CO2 (ppm) in different location of the College Campus

Different location of the College Premises	Amount of CO2 (ppm)
Principal Office	460
Chemistry Lab	465
Zoology Lab	430
Nutrition Lab	410
Computer Lab	475
Physics Lab	450
Library	475
Cycle Stand	390
Play Ground	370
Canteen	430
Hostel	420

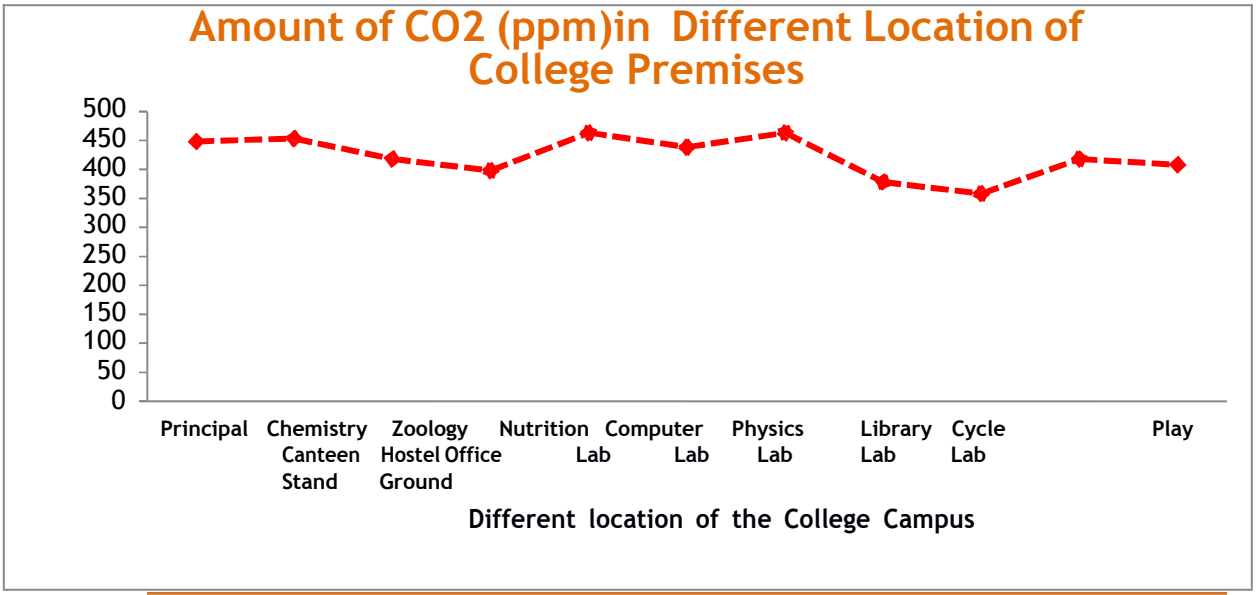


Fig-5 Amount of CO2 (ppm) in Different Location of the College Premises

Table-7 Amount of CO_2 (ppm) in the air in different location,(College Campus) session 2021–2022

Amount of CO_2 (ppm) in the Air in Different places of the College Premises	Amount of CO_2 (ppm)
Outdoor	390
Indoor (Class room)	430
Indoor (Laboratories)	460

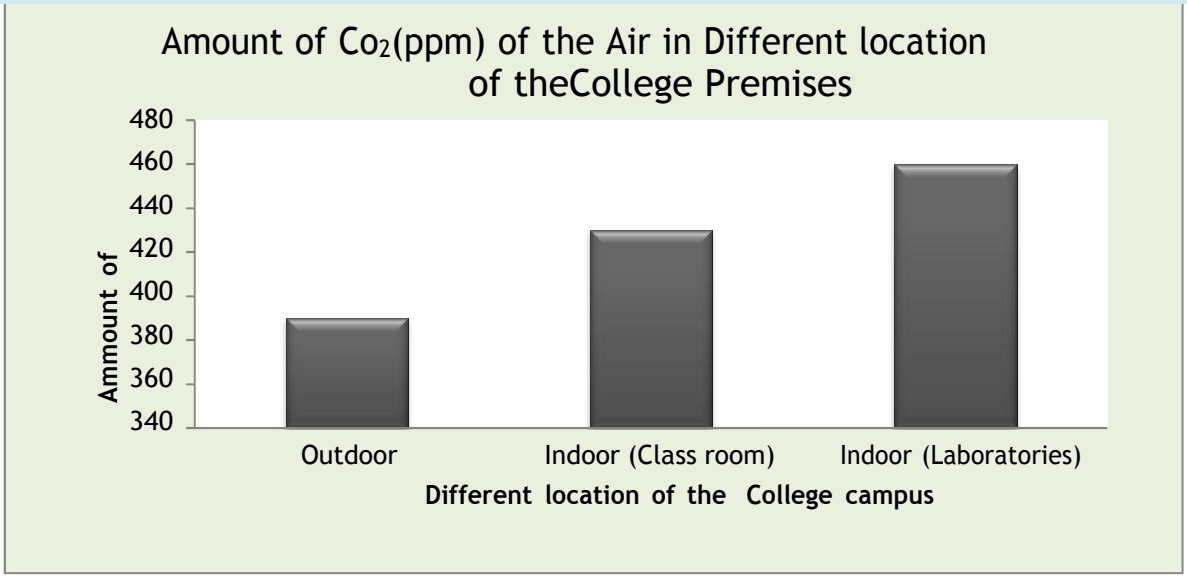
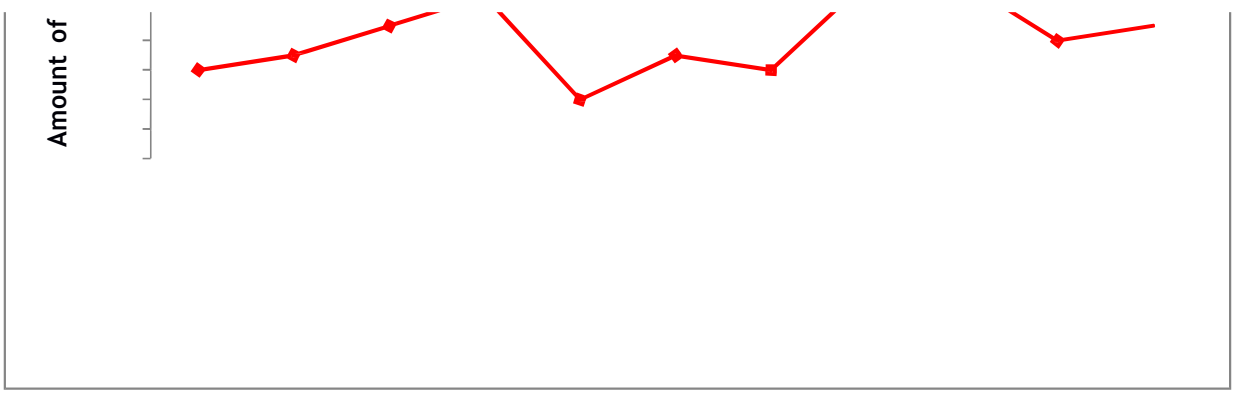
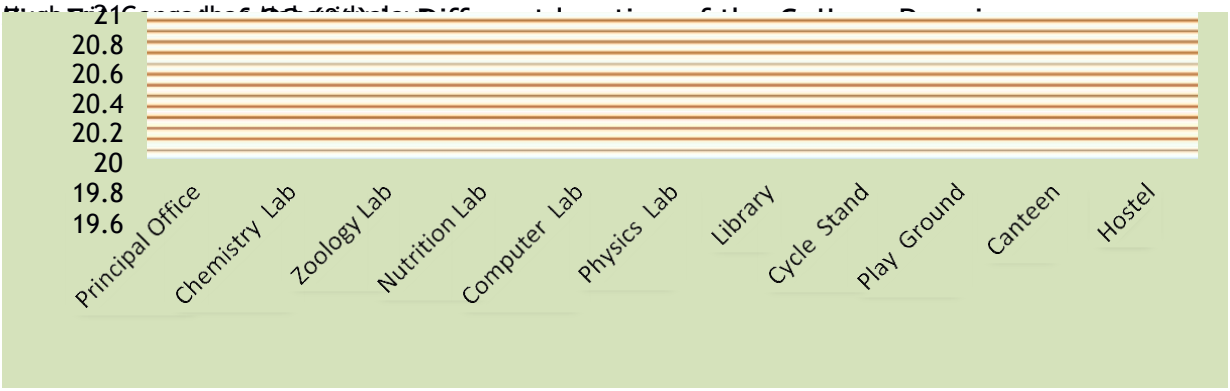


Fig. 6 Amount of Co_2(ppm) of the Air in Different location of the College Premises

Table 8 Amount of O_2 (%) of the Air in Different location of the College Premises

Different location of the	Colleg Premises e	Amount of O_2 (%)
Principal Office		20.2
Chemistry Lab		20.3
Zoology Lab		20.5
Nutrition Lab	(nothing is written about geography lab)	20.7
Computer Lab		20
Physics Lab		20.3
Library		20.2
Cycle Stand		20.8
Play Ground		20.8
Canteen		20.4
Hostel		20.5


Amount of


21
20.8
20.6
20.4
20.2
20
19.8
19.6
Principal Office
Chemistry Lab
Zoology Lab
Nutrition Lab
Computer Lab
Physics Lab
Library
Cycle Stand
Play Ground
Canteen
Hostel

d) Exhaust fans are only provided in washrooms and chemistry lab.

e) No indoor plants were observed in the entire institute (the department of geography has 14 indoor plants in the varanda) Indoor plants can be plotted not only for the aesthetic appearance but also for health benefits.

Generation of Waste and Waste Management:

Waste (or wastes) is useless or unusable materials or components which are discarded after principal use. Sometimes, it is a defective article and of no use. In modern outlook waste may be a valuable substance subject to an appropriate operation or action on the waste. With the context of waste management RRR (Reduce, Reuse and Recycle) model may be followed in appropriate fashion.

The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices. Keeping the objective of the audit the following study will be limited to the waste generated in an academic campus and surroundings.

Table-9 Types of wastes

Type of Wastage	Amount in Kg
Degradable	75
Non degradable	3.5

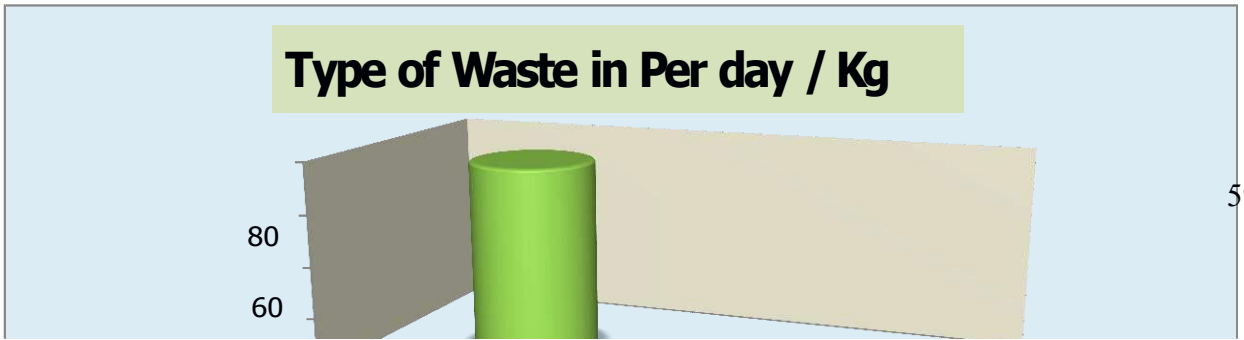


Fig. 8 Type and Amount of Waste

The following categories of wastes are generated in the College campus:

a) Solid waste – Waste generated through paper, plastic packaging causes nuisance. Some wastes are generated after various experiments, primarily, chemistry laboratory; broken test tube, glassware are the example.

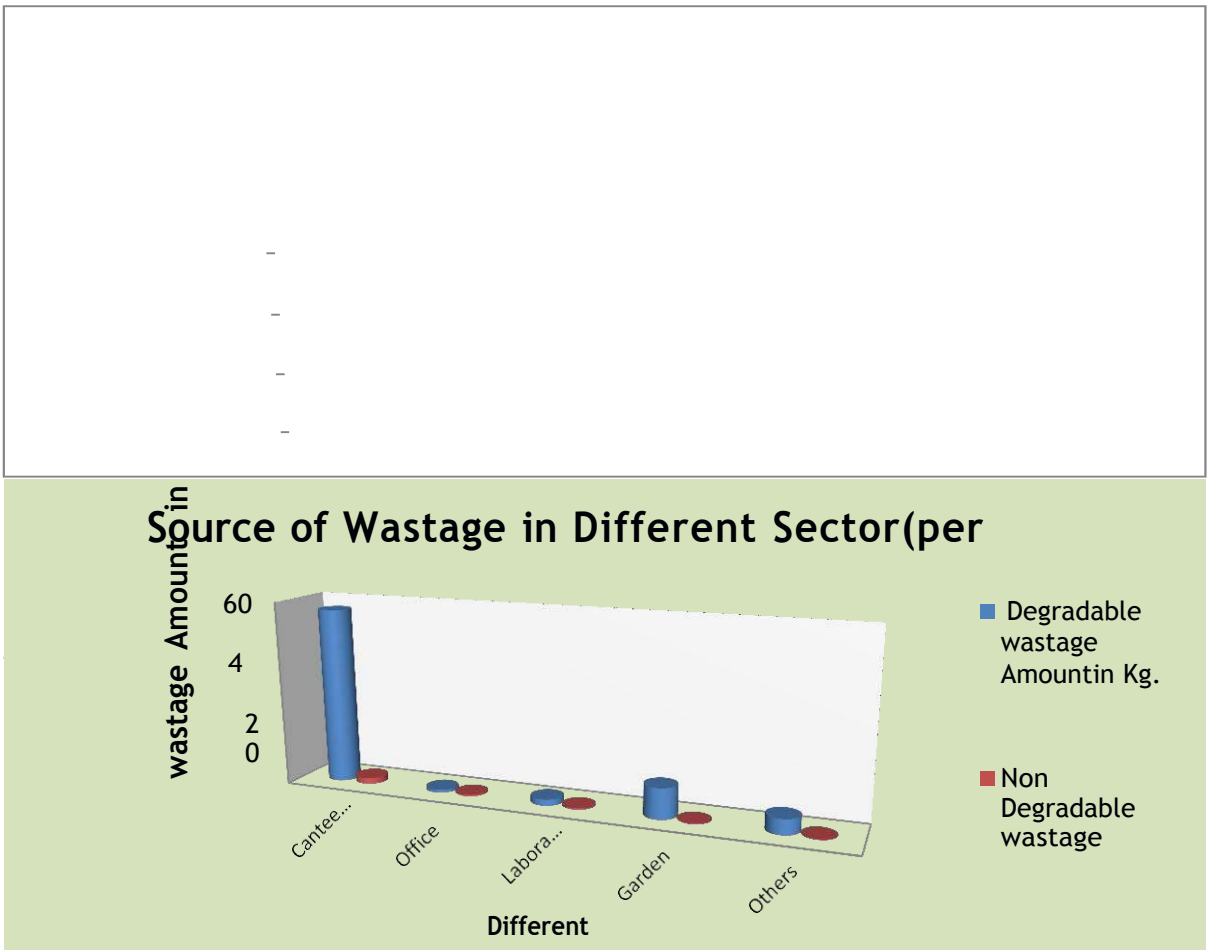
b) Liquid waste – There are bio-chemical wastes generated through various chemical reactions and biological processes. Generally, these are being drained to nearby Surface water bodies contaminating water and soil. Appropriate means is suggested to adopt scientific liquid waste management practices. These are neutralization, bacterial control, andnatural control through plantation.


Solid wastes

Table–10 Source of Wastage in Different Sector (per day in Kg)

Source of Wastage in Different Sector(per dayin Kg)	Degradable wastage Amount in Kg.	Non Degradable wastage Amount in Kg.
Canteen, Quarter and Hostels	57	2
Office	1	0.5
Laboratories	2	0.5

Garden	10	0.25
Others	5	0.25



d) Hazardous effect of the waste

e) Institutional action and mechanism for waste management Compliance audit of waste issues:

At the present stage the institute is capable in managing their waste. They are complying with the essential requirements of waste management although

suggestions are given for future improvements.

Performance Audit of Waste Issues:

No critical audit issue is there with respect to the waste management.

Implemented wastes management		
Sl.no	Factors/Indicators	Weightage
1	Plastic and Polythene free	M
2	Re-use of papers	H
3	Hazardous effect waste management	M

4	Removal of E-Wastes	M
5	Organic & food waste	M
6	Others solid wastes	M

* H denote- Taken management policy level above 60%

** M denote- Taken management policy level 40%-60%

*** L denote-Taken management policy level below 40%

Use of Separate Dustbin for waste

Auditing for Biodiversity & Green Campus Management:

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. In one year, a single mature tree will absorb up to 48 pounds of Carbon dioxide from the atmosphere, and release it as Oxygen. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people. So while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress.

About 12.08% area is under greenery and biodiversity zone and 13.79% area is water body also wet land. Biodiversity includes the genetic variability and diversity of life forms such as plants, animals, microbes etc. living in a wide range of ecosystems. Flora and fauna of College campus in Mugberia College premises is rich.

Table 11 Area Coverage of the College Campus

Area Coverage of College Premises:	Area in Percentage
Building and Construction	40.86
Vegetation Cover	12.08
Playground and Fallow land	33.27
Water Bodies	13.79

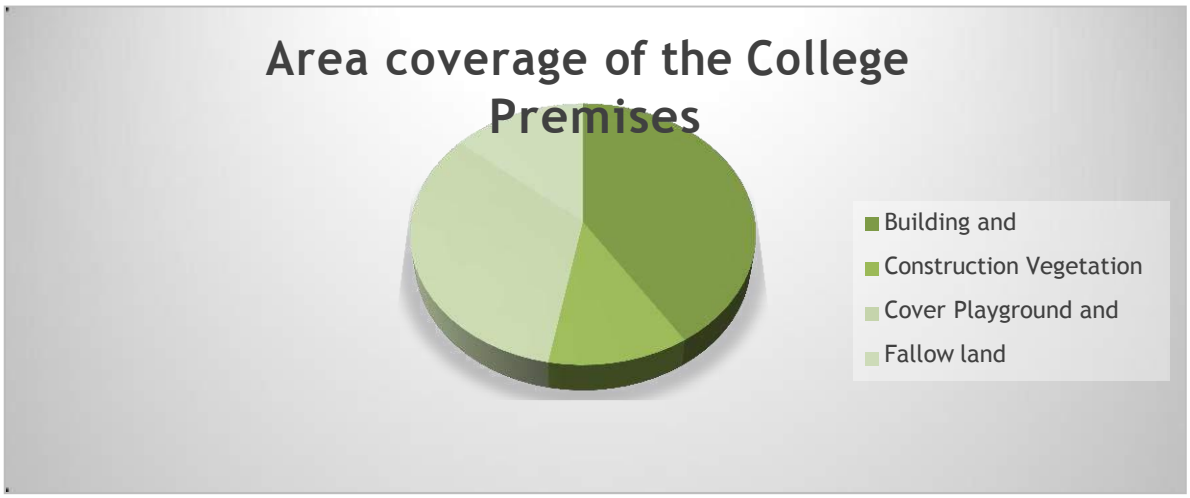


Fig. 10 Area coverage of the College Premises

Biodiversity Study

Plant diversity – The campus of Mugberia Gangadhar Mahavidyalaya is lashing green. There is a large pond in the centre of the college and a small in the boy's hostel. East side of the pond is a playground and other three sides are covered by different college buildings. East and south side of the playground is a large and dense (17-20 plant within 5m transect) plantation of Erica plam (*Dypsis lutescens*) found. It is reported that the seeds are sellable and college is earning rupees fifteen thousand per year regularly. There are 50 (approx.) Cuban royal plam (*Roystonea regia*) tree which are making an avenue on south and west side of the pond. There is a large banyan tree on north side of the pond but it is pruned. One medicinal plant garden is seen which needed restoration (Table -2). A small plantation of *Acacia auriculiformis* is found in front of Sailasuta

Students hostel (Boy's Hostel). There was a kitchen garden also. Details of plants are given in table -4. There are fruit gardens between boy's and girl's hostel (Bijoy Krisnha Girl's Hostel)

(Table -3). Sailaja Nanda Student's hostel (Bp.Ed. hostel) is another spot where two mango (*Mangifera indica*), one Neem (*Azadirachta indica*) and six coconut (*Cocos nucifera*) plants are available.

The plant diversity study has been done through quadrat method. Two sets of quadrats have been laid in the main campus. For this purpose a standard method has been followed i.e. 10m x 10m for trees, 5m x 5m for shrubs and 1m x 1m for herbs. Data of quadrats are given below (Quadrat – 1 and 2).

Quadrat - 1

Tree Quadrat (10m x 10m)

Sl. No.	Scientific name	GBH (in cm)	Height (in m)
1.	*Eucalyptus hybrid*	171	12
2.	*Eucalyptus hybrid*	224	14

Shrub quadrat (5m x 5m) - Nil

Herb quadrat (1m x 1m)

Sl. No.	Scientific name	Number of individuals
1.	*Cyanodon dactylon*	124
2.	*Cyperus kyllinga*	11
3.	*Andropogon aciculatus*	22

Quadrat - 2

Tree Quadrat (10m x 10m)

Sl. No.	Scientific name	GBH (in cm)	Height (in m)
1.	*Anthocephalus kadamba*	160	10
2.	*Anthocephalus kadamba*	105	9.5

Shrub quadrat (5m x 5m) - Nil

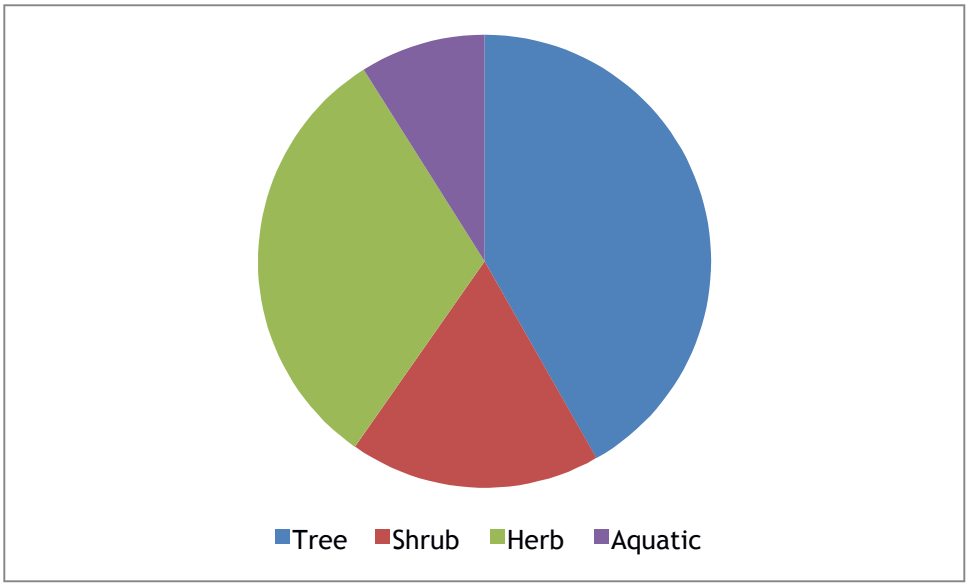
Sl. No.	Scientific name	Number of individuals
1.	*Nerium sp.*	1
2.	*Euphorbia pulcherima*	15
3.	*Asperagas racemosus*	

Herb quadrat (1m x 1m)

Sl. No.	Scientific name	Number of individuals
1.	*Cyanodon dactylon*	24
2.	*Desmodium gangeticum*	2
3.	*Andropogon aciculatus*	9
4.	*Digitaria sanguinales*	2

5.	*Oxalis corniculata*	6
6.	*Eclipta alba*	2
7.	*Desmodium gyrance*	3

It has been found from the study that there are approximately 28 tree species, 12 shrubs, 21 herbs and aquatic 6 species (Table-1 and Fig.-a). Beside this there are also 20 medicinal plants, 5 fruits



bearing and 7 kitchen garden plants. Medicinal plants are very important such as *Cymbopogon citrates, Hemidesmus indicus, Cissus quadrangularis* etc. (Fig,-b). From

Fig. – a: Plant composition of Mugberia Gangadhar Mahavidyalaya

Fig.-b: Composition of different types of plants

quadrat analysis three [illegible]lass of trees are calculated (Table-5). From this data Carbon sequestration potential [illegible] have been calculated. It is found that from above ground biomass of trees, 9023.5 kg. of ca[illegible]s been stocked under quadrats.

List of plants in Mugb[illegible]angadhar Mahavidyalaya campus.

Tree

Sl. No.	Scientific [illegible]	Local name	Family
1.	*Acacia aur[illegible]rmis*	Sonaj[illegible]	Fabaceae
2.	*Acacia auriculiformis* A.Cunn.exBenth.	Sonajhuri	Fabaceae
3.	*Albizzia lebbeck* (L.) Benth.	Khiris	Fabaceae
4.	*Anthocephalus cadamba* (Roxb.) Bosser	Kadam	Rubiaceae
5.	*Azadirachta indica* A.Juss.	Neem	Meliaceae
6.	*Butea monosperma* (Lam.) Taub.	Palas	Fabaceae
7.	*Casuarinas equsetifolia*	Jhau	Casuarinaceae
8.	*Cocos nucifera* L.	Narkol	Arecaceae
9.	*Dalbergia sissoo*Roxb.	Sisso	Fabaceae
10.	*Dypsis lutescens*	Areca plam	Arecaceae
11.	*Eucalyptus hybrid*	Euc	Myrtaceae

12.	*Ficus benghalensis* L.	Bot	Moraceae
13.	*Lagerstroemia perviflora* .	Jarul	Lythraceae
14.	*Mangifera indica* L.	Amm	Anacardiaceae
15.	*Michelia champaca* (L.) Baill. ex Pierre	Champa	Magnoliaceae
16.	Mimosops elangi	Bakul	
17.	*Murrya koenigii*(L.)Sprengel	Kamini	Rutaceae
18.	*Nyctanthes arbor-tristis* L.	Seuli	Oleaceae
19.	*Peltophorum pterocarpum* (DC.) K.Heyne.	Radhachura	Fabaceae
20.	*Phoenix sylvestris* (L.)Roxb.	Khejur	Arecaceae
21.	*Polyalthea longifolia*Sonn.	Debdaru	Annonaceae
22.	*Psidium guajava L.*	Peyara	Myrtaceae
23.	*Roystonea regia*	Cuban royal plam	Arecaceae
24.	*Samania saman* F.Muell	Siris	Fabaceae
25.	*Saracca asoca* (Roxb.)Willd.	Asoke	Fabaceae
26.	*Swietenia macrophylla* King	Mahogini	Meliaceae
27.	*Swietenia mahagoni* (L.) Jacq.	Mahogini	Meliaceae
28.	*Wodyetia bifurcata*A.K.Irvine	Plam	Arecaceae

Shrub

Sl. No.	Scientific Name	Local name	Family
1.	*Asperagas racemosus*	Satamuli	Asperagaceae
2	*Canna indica* L.	Kalabati	Cannaceae
3	*Duranta erecta* L.	Duranta	Verbenaceae
4	*Epipremnum aureum*	Devils Ivy	Araceae
5	*Euphorbia pulcherima*		Euphorbiaceae
6	*Hibiscus rosa-sinensis* L.	Joba	Malvaceae
7	*Hyophorbe lagenicaulis* (L.H.Bailey) H.E. Moore	Bottle plam	Arecaceae
8	*Ixora* coccinea	Rangan	Rubiaceae
9	*Mucuna pruriens*	Alkhusi	Fabaceae
10	*Nerium oleander*	Karabi	Apocynaceae

11	*Rhapis excelsa* (Thunb.) A. Henry	Lady plam	Arecaceae
12	*Tinospora cordifolia*	Giloi	Menispermaceae

Herb

Sl. No.	Scientific Name	Family
1	*Achyranthuys aspera*	Amaranthaceae
2	*Andropogon aciculatus*	Poaceae
3	*Blumea lacera*	Asteraceae
4	*Cephalandra indica*	Cucurbitaceae
5	*Cleome viscosum*	Capparaceae
6	*Cyanodon dactylon*	Poaceae
7	*Cyperus kyllinga*	Cyperaceae
8	*Desmodium gangeticum*	Fabaceae
9	*Desmodium gyrance*	Fabaceae
10	*Desmodium triflorum*	Fabaceae
11	*Digitaria sanguinales*	Poaceae
12	*Eclipta alba*	Asteraceae
13	*Heliotropium indicum*	Boraginaceae
14	*Oldanladia corymbosa*	Rubiaceae
15	*Oxalis corniculata*	Oxalidaceae
16	*Phyllanthus amaru*	Euphorbiaceae
17	*Scoparia dulsis*	Plantaginaceae
18	*Triamphetta rhomboida*	Malvaceae
19	*Urena lobata*	Malvaceae
20	*Vernonia cineria*	Asteraceae
21	*Vitis trifolia*	Vitaceae

Aquatic plants

Sl. No.	Scientific Name	Family
1.	*Commelina diffusa*	Commelinaceae
2.	*Enhydra fuctuens*	Asteraceae
3.	*Ipomoea aquatica*	Convolvulaceae
4.	*Jussiaea repens*	Onagraceae
5.	*Nymphea alba*	Nympheaceae
6.	*Salvinia sp.*	Salviniaceae

Gymnosperm

Sl.no.	Scientific Name	Family
1.	*Cycas* sp.	Cycadaceae

List of Medicinal Plants Present in Campus

Sl. No.	Scientific Name	Local name	Family
1	*Acalypha indica*	Muktijhuri	Euphorbiaceae
2	*Aloe vera*	Ghritakumari	Liliaceae
3	*Andrographis paniculata*	Kalmegh.	Acanthaceae
4	*Asparagus racemosus*	Satamul	Asparagaceae
5	*Bryophyllum pinnatum*	Patharkuchi	Crassulaceae
6	*Catharanthus roseus*	Nayantara	Apocyanaceae
7	*Cissus quadrangularis*	Harjora	Vitaceae
8	*Clitoria turnatea*	Aparajita	Papilionaceae (Fabaceae)
9	*Coleus amboinicus*	Mexican mint	Labiate (Lamiaceae
10	*Crotalaria pallid*	Atasi,	Papilionaceae (Fabaceae)
11	*Cymbopogon citrates*	Citronella	Poaceae
12	***Datura stramonium.***	Dhutra	Solanaceae
13	*Eclipta prostrata*	Keshutra	Asteraceae

14	*Hemidesmus indicus*	Anantamul	Asclepiadaceae
15	*Justicia adhatoda*	Basak	*Acanthaceae*
16	*Ocimum gratissimum*	Ramtulsi	Labiatae (Lamiaceae)
17	*Ocimum tenuiflorum*	Krishna tulsi	Labiatae (Lamiaceae)
18	*Ricinus communis* Linn.	Castor	Euphorbiaceae
19	*Tinospora cordifolia*	Gulancha	Menispermaceae
20	*Vitex negundo*	Nishinda	Verbinaceae

List of fruits plants present in campus

Sl. No.	**Scientific name**	Common name	Family
1	*Aegle marmelos*	Bel	Rutaceae
2	*Citrus decumana*.	Batabilabu	Rutaceae
3	*Eugenia jambolana*	Kalojam	Myrtaceae
4	*Psidium guava*	Piara	Myrtaceae
5	*Mangifera indica*	Aam	Anarcardiaceae

Plants of kitchen garden

Sl. No.	**Scientific name**	**Local name**	**Family**
1.	*Lycopersicum esculantum*	Tomato	Solanceae
2.	*Solanum melongena*	Begun	Solanaceae
3.	*Carica papaya*	Papaya	Caricaceae
4	*Zea mays*	Maize	Poaceae
5	*Alocasia esculanta*	Cochu	Araceae
6	*Basella rubra*	Pui	Basellaceae
7	*Capsicum annuum*	Lanka	Solanaceae

Carbon sequestration potential of trees of college campus

Sl. No.	GBH Class (in cm)	No. of Trees	Biomass (in Kg.)	Carbon stock (in Kg.)
1	100-150	1	1964	982
2	150-200	2	8442	4221
3	200-250	1	7641	3820.5

Faunal Diversity:

Mugberia Gangadhar Mahavidyalaya campus is a habitat of a number of wide varieties of fauna. Different types of insects including moths, butterfly, wasp, bees, amphibian, reptilian, birds and mammals are found here. There are one big size and one small size (in hostel) pond in the college campus. This pond is herbaring different indigenous fish species. Following tables are given an account on fauna. Members of different phylum are given in figure (Fig.-3).

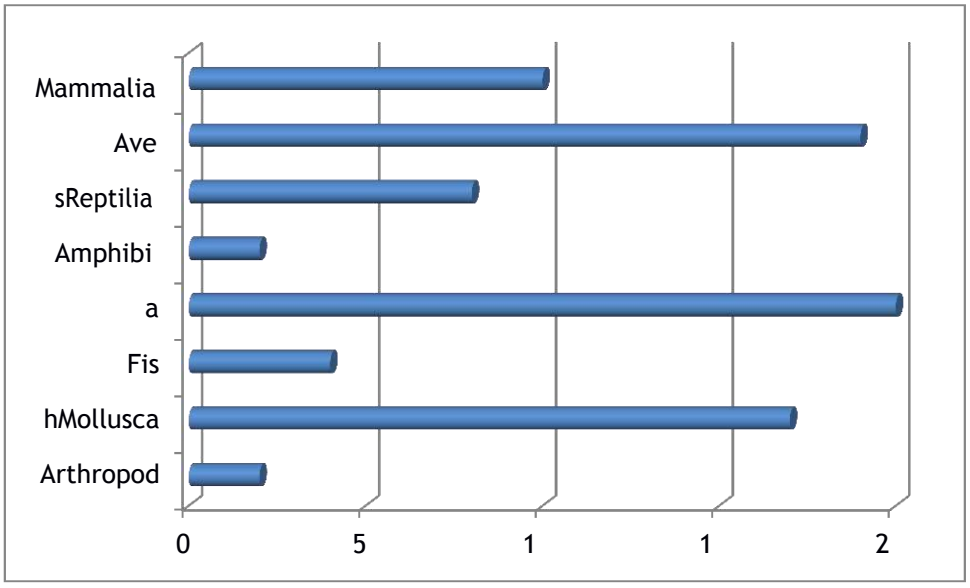


Fig.-c: Comparison between different animal members of different phylum found in the campus

Phylum: Annelida

Sl. No.	Scientific name	Local name
1.	*Hirudinaria* sp	Joke
2.	*Pheretima sp.*	Kecho

Phylum: Arthropoda

Sl. No.	Scientific name	Local name
1	*Anopheles* sp	Anopilis masa
2	*Apis* sp	Moumachi
3	*Buthus* sp	Kakrabicha
4	*Copris lunaris*	Gubrepoka
5	*Galleria* sp	Moth
6	*Julus* sp	Kenno
7	*Lampyri snoctiluca*	Jonaki
8	*Muska domestica*	Machi
9	*Nephila* sp	Makarsa
10	*Odontotermes* sp	Wepoka
11	*Oecophyllas maragdina*	Lalpipra
12	*Orthetrum* sp	Pharing
13	*Papilio* sp	Prajapati
14	*Periplaneta americana*	Arsola
15	*Schistocera gregaria*	Pangapal
16	*Scolopendra* sp	Tetulbicha
17	*Vespa orientalis*	Vimrul

Phylum: Mollusca

Sl. No.	Scientific name	Local name
1	*Acatina fulica*	Sthal samuk
2	*Bellamya bengalensis*	Gugli
3	*Lamellidens marginalis*	Jhinuk
4	*Pila globosa*	Jal samuk

Fresh water fishes

Sl. No.	Scientific name	Local name
1	*Amblypharyngo donmola*	Mourlamach
2	*Anabas atestudineus*	Koi mach
3	*Catla catla*	Katlamach
4	*Chanda* sp	Chandamach
5	*Channa gachua*	Chang mach
6	*Channa punctatus*	Latamach
7	*Channa striata*	Sholmach
8	*Cirrhinus mrigala*	Mrigelmach
9	*Clarias batrachus*	Magurmach
10	*Colisa* sp	Kholsamach
11	*Esomus danricus*	Dhariamach
12	*Heteropneus tesfossilis*	Singimach
13	*Labeo bata*	Bata mach
14	*Labeo calbasu*	Kalbose
15	*Labeo rohita*	Ruimach
16	*Mastacem belussp*	Pankalmach
17	*Mystus* sp	Tangra

18	*Notopterus notopterus*	Phaloimach
19	*Ompo kpabda*	Pabdamach
20	*Punti usticto*	Phutimach

Class : Amphibia

Sl. No.	Scientific name	Local name
1	*Duttaphrynusmelano stictus*	Kuno bang
2	*Rana tigrina*	Sona bang

Class: Reptilia

Sl. No.	Scientific name	Local name
1	*Ahaetullana sutas*	Loudaga sap
2	*Calottes versicolor*	Girgiti
3	*Daboia russelii*	Chandrabora sap
4	*Elachistodon westermanni*	Matiali sap
5	*Hemidactylus flaviviridis*	Tiktiki
6	*Ptyas mucosus*	Jamna sap
7	*Varanus* sp	Godi sap
8	*Xenochriphis piscator*	Jaldhora sap

Class : Aves

Sl. No.	Scientific name	Local name
1	*Acridotheres tristris*	Shalik
2	*Alcedo atthis*	Chotomachranga
3	*Amaurornis phooniurus*	Dahuk
4	*Ardeola grayii*	Bak
5	*Athene brama*	Kuturepancha
6	*Columba livia*	Paira
7	*Copsychuss aularis*	Doyel
8	*Corvus splendens*	Kak

9	*Dicrurous adsimilis*	Phinge
10	*Dinopium benga*	Kat thokra
11	*Eudynamys scolopacea*	Kokil
12	*Merops orientalis*	Baspati
13	*Orthoto mus*sp	Tuntuni
14	*Passer domesticus*	Charaipakhi
15	*Pisttacula* sp	Tia
16	*Pycnonotus* sp	Bulbul
17	*Streptopelia chinensis*	Gughu
18	*Turdoidesea udatus*	Satbhaya
19	*Tyto alba*	Lakhsmipancha

Class : Mammalia

Sl. No.	Scientific name	Local name
1	*Bandicota bengalensis*	Indur
2	*Felis chaus*	Katas
3	*Funam buluspennantii*	Katbirali
4	*Herpestes edwardsii*	Neul
5	*Musmus culus*	Nenhtiindur
6	*Pipistrellus tenuis*	Chamchika
7	*Prionailurus viverrinus*	Mechobiral
8	*Pteropus* sp	Badhur
9	*Suncus murinus*	Chucha
10	*Vulpes bengalensis*	Khaksial

Table–13 Green Coverage of the College Premises

Green Coverage of the College	Premises	Area in Percentage
Native and Natural Vegetation		27
Plantation		23
Agro-Plants		38
Medicinal Plants		12

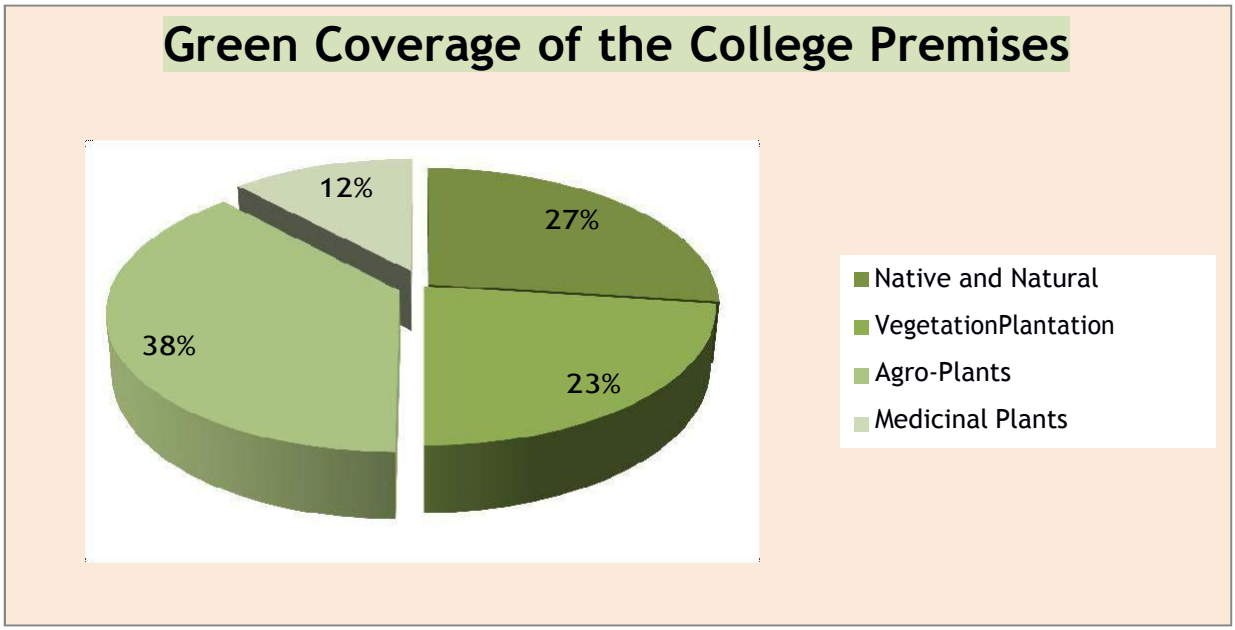


Fig. 11 Green Coverage of the College Premises

Table–14 The Avian fauna observed in the campus is enlisted below–

SL. NO.	COMMO NNAME	BENGALI NAME	SCIENTIFIC NAME	IUCN STATUS

1	Red Whiskered Bulbul	Sipahi Bulbul	*Pycnonotus*	LC
2	Red Vented Bulbul	Bulbul	*Pycnonotus*	LC
3	House Sparrow	ChotiCharai	*Passer*	LC
4	Eurasian	Par ghughu	*Streptopelia*	LC

	Collared Dove			
5	Oriental Turtle Dove			
	Spotted Dove	Chhiteghughu		DD
6	Rock Dove	Rock Pigeon		LC
	Black Drongo	Finga		LC
7	Asian Pied Starling	GuyeSalik		LC
8	White-breasted Kingfisher	SandabukMachhranga		VU
9	Common Kingfisher	ChottoMachhranga		LC
10	House Crow	Kak		LC
11	Jungle Babbler	Chhatare/Satbhai		LC
12	Black-headed Oriole	BeneBau		LC
13	Eurasian Golden Oriole	SonaBau		LC
14	Common Myna	Salik	Acridotherestristis	LC
15	Blue Rock Pigeon	GolaPayra		
16	Common Hoopoe	Mohonchura		LC
17	Asian Koel	Kokil		LC
18	Rose-ringed Parakeet	Tia		LC
19	Brown Shrike	Karkata		LC
20	Indian Treepie	HandiChacha		LC

Table–15 The Mammalian checklist is as follows–

SL. NO	COMMONNAME	BENGALINAME	SCIENTIFICNAME	IUCN RED LIST
1	FivestripedPalm Squirrel	Kath Berali	*Funambulus pennantii*	Least Concern(LC)
2	Free-rangingCat	Biral	*Felis catus*	DD
3	Free-rangingDog	Kukur	*Canis familiaris*	DD
4	AsianPalmCivet	Bham	*Paradoxurus hermaphroditus*	LC

5	FieldRat	MethoIndur	[illegible]	LC
6	GreyMongoose	Beji	[illegible]	LC
7	HouseMouse	NengtiIndur	[illegible]	LC
8	Small Indian Civet	Kotas	[illegible]	LC
9	Bengal Fox	Fox	[illegible]	LC
10	Indian gray mongoose	Neul	[illegible]	LC

*NE: Not evaluated; LC: Least concerned; NA: Not accessed

Implemented Biodiversity & Green Management		
Sl. No	Factors/ Indicators	Weightage
1	Plants Diversity	M
2	Birds and Insects	M
3	Mammals	M
4	Fishes and Amphibian	H
5	Fungus & Organisms	M

* H denote- Taken management policy level above 60%

** M denote- Taken management policy level 40%-60%

*** L denote-Taken management policy level below 40%

Reviews of Documents and Records:

Documents such as admission registers, registers of Engineering and water charge remittance, furniture register, laboratory equipment registers, purchase register, audited statements, and office registers were examined and data were collected.

College calendars, college magazines, annual report of the college and NAAC self-assessment reports, UGC report etc. were also verified as part of data collection.

Plant Diversity Counting and Species

Review of Policies:

Discussions were made with the College management regarding their policies on environmental management. Future plans of the College were also discussed. The management would formulate a revised environment /green policy for the college in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are to be in accordance with the Green Policy adopted by the institution.

Interviews:

In order to college information for green auditing different audit groups which are IQAC Cell, Dept. HOD, Green club members, Teaching and non-teaching staff, students, Students Union, parents and other stakeholders of the College. Discussions were also made with the office bearers to clarify doubts regarding certain points.

4.0 POST AUDIT STAGE :

T B gs are
s le s, on a
s a ensure

that they are carried out according to systems requirements and in the correct manner.

Although Green & Environmental audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. Each of the three components is crucial in ensuring that the organization's environmental performance meets the goals set in its green policy. The individual functioning and the success of integration will all play a role in the degree of success or failure of the organization's environmentalperformance.

lity

4.2 Results and Findings:

a) Water -

Water Audit and Assessment (Mugberia College):

Sl. No.	Object and Parameter	Observation and Finding
1	Source of water	➢ Underground(40000 liter) ➢ Surface water bodies(0.8 acre)
2	Capacity of water storage (Daily)	➢ Reservoir and Overhead tanks-35000 liter ➢ Lift of Surface water – 5500ltr ➢ Total amount of used & misusedwater- 40500ltr ➢ Total misuse of water-500 ltr
3	Amount of used water per day	40000liter
4	Misuse of water in daily	Leakage, overflow and Misuse-500 liter
5	Maximum used of water per day -Clinging and Gardening purpose	7.41% (3000 liter)
6	Amount of water for used per day-Drinking Purpose	10.76 % (4354 liter)
7	Number of Rain Water Harvestingunit	One unit
8	Installation of water reuse units	In the processing

9	pH level of drinking water	6.6-6.9
10	TDS level of drinking water	130ppm –150 ppm
11	Use of surface water	5500 ltr

b. Energy-

- Electricity Consumption - 56,825 Unit, Rs.- 5,68,250/- Per Year
  a) Conventional energy- 45,305 Unit
  b) Nonconventional energy- 11,520 Unit Less-Rs. 115200/ .Rs. for Paid-Rs.-4,53,050 /

- Fossil fuel consumption per Year:
  a. Number of Gas cylinders used for cooking purpose(Hostels& Canteen) – 16 PC
  b. Number of Gas cylinders used in Chemistry Laboratory - 07 PC
  c. Diesel used for green Generator- 90 liter
- Number of Green Generators - 03
- Cost of generator fuel – Rs. 1275 /month

Energy Audit and Assessment (Mugberia College)

Sl. No.	Object and Parameter	Observation and Finding
1	Source of energy (conventional)	79.73 %
2	Source of energy (Non-conventional)	Solar- 20.27 %(17 Kwh Grid)
3	Total consumption of Electric Power	56825 unit
4	The maximum use of conventional Electric Power	45305 unit
5	Maximum energy consumption in the purpose	Light and fans - 277.76 Unit/Day
6	Energy Consumption in Computer & Lab.	201 unit /Day
7	No. of LPG Gas cylinder for coking purpose	16PC/ Year
8	No. of LPG Gas cylinder used in Laboratories	07pc/Year
9	Amount of diesel used for green generator	90 liter/Year
10	No. of AC and use of energy	132 Kwh/Day

Energy consumption for different purpose, 2021–22		
1.	Lights & Fans	24832.52 unit
2.	Air Condition	11796.87 unit

3. Lifting of water(HP pump)	4048.92 unit
4. Computer & Dept. Lab	17956.7 unit
5. Others(CCTV,TV, water cooler & others)	1789.99 unit

c. Wastes-

- Total Students - 2639 persons
- Other Stakeholders – 156 persons

- Total Stakeholders - 27 95 persons
- Departments – 27
- Student Hostels & Staff Quarters - 07
- Canteen- 02

D. Wastes Management Policy:

- Biological Wastes treatment by Vermi-compost system .
- E-wastes- computers, electrical and electronic parts – Disposal by selling
- Plastic waste- disposal by selling
- Solid wastes – Damaged furniture, Iron & Metal scraps- Disposal by Selling
- Food wastes – Waste Rice, Vegetable, Paper plates- Disposal in Earthen pit .
- Chemical wastes – Laboratory waste – Not proper treatment
- Waste water – washing, urinals, and bathrooms in soak pits.
- Glass waste – Broken glass wares from the labs by selling.
- Napkin & Clothes incinerators- Disposal in earthen pit

Waste Audit and Assessment

Sl. No.	Object and Parameter	Observation and Finding
1	Degradable waste	75 (Kg/Day)
2	Non degradable	3.5 (Kg/Day)

3	Source of waste (Organic)	Hostels, Canteen and Garden
4	Source of waste (Chemical Waste)	Zoology Lab., Chemistry Lab.,Botany Lab. and Nutrition
5	Plastic waste management	Use of separate dustbin and Established of different waste unit

d) Green Campus-

Green cover of the campus- 0.7 acre area

Free space including Playground- 1.93 acre area

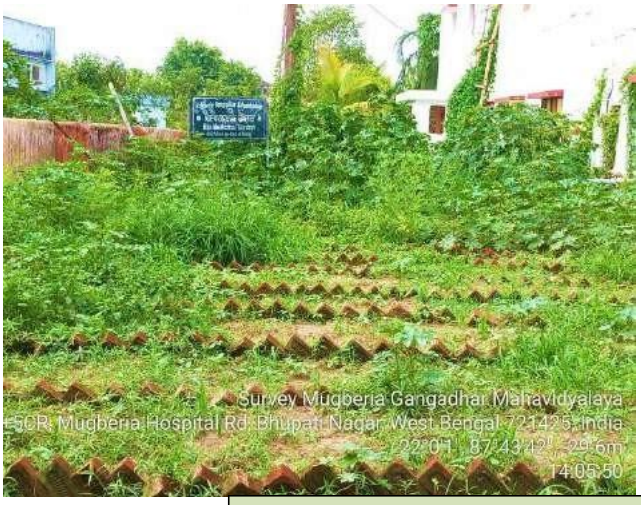
Crops cultivated in the campus:

Banana, Tapioca, Chilly, Cabbage, Tomato, Spinach, Brinjal, Cauliflower, Ladies finger, Pea and different seasons flowers are produced during different seasons in Hostels and Quarters Kitchen garden and College premises area.

Table 17 Biodiversity and Green Coverage

Sl. No.	Object and Parameter	Observation and Finding
1	Vegetation coverage area	12.08 %(0.7 Acre)
2	Types of green coverage	➢ Native and Natural Vegetation- 27% ➢ Medicinal plants- 12% ➢ Agro-plants- 38 %
3	Different types of Animal	➢ Mammals -Squirrel, Rat, Free ranging Cat, Free ranging Dog, Field Rat, Bengal Fox etc. ➢ Amphibian-Snake, Frogs ➢ Birds- Crow, Common Moyna, Pigeon, etc. ➢ Insects– Ants, Butterfly, Spider etc.

4	Biodiversity and Green Management Programme	➢ Awareness program arrange by- Dept. ofZoology and Dept. of Botany among the students and Stuff through the year ➢ Observation and celebration ofenvironmental days ➢ Maintain the ponds ecosystem & fishescultivation ➢ Installation of different trees and plantsnaming plate



Medicinal plants garden and Vermi- compost unit

Table–18 Green Coverage of the College Premises

Aerial views and Green coverage area

Green Coverage of the College	Premises	Area in Percentage
Native and Natural Vegetation		27
Plantation		23
Agro-Plants		38
Medicinal Plants		12

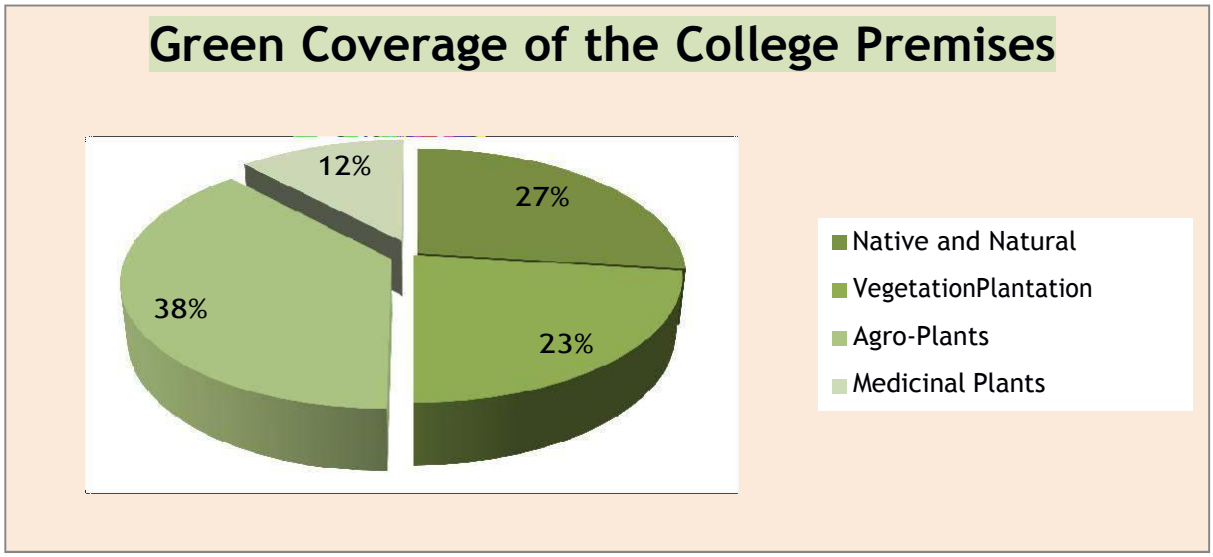


Fig.–12 Green Coverage of the College Premises

Campus farming

Organic vegetable cultivation as interim crop is another plan to be materialized soon. The department of Zoology has been consistently undertaking Fishes cultivation , and Botany department has been planting of flowers and ornaments trees in winter .

e) Carbon Footprint-

- Number of Students & Staff using cycles – 550
- Number of persons using cars – 15
- Number of persons uses two wheelers – 95
- Number of students uses Buses -
- Number of persons using other transportations – 1600
- Number of visitors per day – 15
- Number of Students staying in the hostel –260
- Average distance travelled by stake holders – 20 kms /day
- Expenditure for transportation per person per day – Rs.30 /-

SUMMARY:

I. The environmental awareness initiatives are adequate.
II. The College campus is plastic free and maintained the outdoor air quality.
III. The installation of solar panels, organic vegetable cultivation, Vermi composting practices are adequate.
IV. There is NSS team of the College towards its environmental performance for Community development.
V. Indoor air quality of the laboratories is very uncomfortable and inhospitable.

VI. Use of notice boards and signs are inadequate to reduce over exploitation of naturalresources.

VII. Programs on green initiatives have to be increased. Campus is declared "Clean Campus"

VIII. Fully carbon foot prints and wastes free zone actions should be taken to maintain this.

IX. Rain water harvesting systems, solar power generation, Bio Gas, Re-use of waterenvironmental education programs have to be fully explored.

Implemented Air Quality management		
Sl No	**Indicator**	**Weightage**
1	Carbon & Smoke free	H
2	Exhaust fans &Ventilation	M
3	Emission of GHGs	L
4	Indoor Plants	L

*H denote- Taken management policy level above 60%

** M denote- Taken management policy level 40%-60%

*** L denote-Taken management policy level below 40%

Major Audit Observations		
Sl. No	**Sectors/Indicators**	weightage
1	Water efficiency Audit	H
2	Energy efficiency Audit	M
3	Air Quality & Carbon foot print Audit	H
4	Wastes Audit	M
5	Green & Biodiversity Audit	H

* H denote- Taken management policy level above 60%

** M denote- Taken management policy level 40%-60%

*** L denote-Taken management policy level below 40%

Environmental Education:

The following environmental education program may be implemented in the College before the next green and environmental auditing:–

- Training programs in solid waste management, liquid waste management, setting up of medicinal plant nursery, water management, vegetable cultivation, tree planting, energy management, landscape management, and rain water harvesting and water re-use methods.
- Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.
- Activate the nature or green clubs
- Set up Organic vegetable garden, Honey farm, Mushrooms, Indigenous fish farm etc. for providing proper training to the students.
- Conduct exhibition of recyclable waste products
- Implement chemical treatment system for waste water from the Laboratories.

4.7

Common Recommendations

- ✓ Establish water, waste and energy management systems
- ✓ Establish a 'Nature Club' for Resources and Green campus management (it is there)
- ✓ Maintain of Indoor air quality
- ✓ Establish a solar pump house or solar submersible pump
- ✓ Adopt an environmental policy for the college
- ✓ Establish a purchase policy for environmental friendly materials
- ✓ Introduce UGC Environmental Science course to all students
- ✓ Conduct more seminars and group discussions on environmental education
- ✓ Students and staff can be permitted to solve local environmental problems
- ✓ Renovation of cooking system in the canteen to save gas and wooden fuel

4.8 Criteria Wise Recommendations

Water Audit

- Remove damaged taps and install sensitive taps is possible.
- Drip irrigation for gardens and micro irrigation technology can be initiated.
- Establish the re-use water management methods.
- Establish rain water harvesting systems for each building and each campus.
- Establish the more water reuse unit in the Hostel & staff quarter's area.
- Establish water treatment systems.
- Awareness programs on water conservation to be conducted.
-

Energy Audit

- ✓ Employment of more solar panels and other renewable energy sources.
- ✓ Conduct more save energy awareness programs for students and staff.
- ✓ Replace computers and TVs with LED monitors.
- ✓ More energy efficient fans, tubes and bulb should be replaced.
- ✓ Automatic power switch off systems may be introduced.

Waste Audit

- ❖ Establish a Regular functional bio gas plant.
- ❖ A model solid waste treatment system to be established.
- ❖ Practice of waste segregation to be initiated.
- ❖ Establish of a unit for chemical liquid wastes and Hazardous waste management
- ❖ A model Vermi composting plant to be set up in the Hostels, canteen and Quarters ofcollege campus.
- ❖ Establish an e-waste management unit

Green Campus Audit

- ✓ All trees in the campus should be named scientifically.
- ✓ Create more space for planting in vacant land.
- ✓ Develop the Herbal and medicinal plants garden for large area

- ✓ Establish a butterfly park.
- ✓ Establish an Orchid ex-situ zone .
- ✓ Develop the Fruits trees area for Birds conservation
- ✓ Grow potted indoor plants at verandah, class rooms and Laboratories.
- ✓ Create automatic drip irrigation system during summer holidays.
- ✓ Not just celebrating environment day but making it a daily habit.
- ✓ Providing funds to nature club for making campus more green
- ✓ Encouraging students not just through words, but through action for making the campus green

- ✓ Conducting competitions among departments for making students more interestedin making the campus green.

Carbon footprint Audit

- ❖ Establish a system of carpooling among the staff and visitors to reduce the numberof four wheelers coming to the college.
- ❖ Establish the indoor plants in office rooms ,computer lab and other laboratories to CO_2 management
- ❖ Providing more college bus services to the students and staff.
- ❖ Encourage students and staff to use cycles.
- ❖ Establish a more efficient cooking system to save gas.

Survey Team with Staff

(kindly insert atleast one picture with the green club members)

Executive Summary: 2021-22

Environmental Audit is a process of systematic, documented, periodic and objective evaluation of components of environmental diversity with the aim of safeguarding the environment and natural resources. The process starts with the systematic identification, quantification, recording, reporting and analysis of components of environmental diversity and is a means of assessing environmental performance (Welford, 2002). It aims to analyze environments within and outside of the concerned area, which will have an impact on the eco-friendly atmosphere. Green and Environmental audit is a valuable means for an institution to determine how and where they are using the most resources; the institution can then consider how to implement changes and take necessary management measures. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of green impact on their area of work. Environmental auditing and the implementation of mitigation measures is a win-win situation for the institution, the learners and the planet. It can also create health

consciousness and promote to holistic approaches to environmental management, awareness, values and ethics. Green and Environmental auditing promote financial savings through efficiency of resource usage. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the institute

evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation toenvironmental sustainability is more prevalent.

In Mugberia Gangadhar Mahavidyalaya, Purba Medinipur, W.B the audit process involved initial interviews with the teachers and staffs to clarify policies, activities, records and the cooperation in the implementation of mitigation measures. This was followed by collection of data through the questionnaires, review of records, observation and enquiry of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the Green and Environmental auditing process. The baseline data prepared for the St. Xavier's College, Kolkata will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development. Existing data will allow the College to compare its programmers and operations with those of peer institutions, identify areas in the need of improvement, and prioritize the implementation of future projects.

The area of the College premises is 5.8 acre out of which about 0.7 acre areas is covered by trees, plants etc. and 0.8 acre areas is covered by surface water bodies and wetland In the present audit report most of

the aspects are covered such as tree plantation, awareness about environment programmers, rain water harvesting and plastic free premises. The College has already taken some steps to protect the environment with help of teachers, staff and students under the guidance of Dr. Swapan Kumar Misra, Principal, Mugberia Gangadhar Mahavidyalaya, Purba Medinipur. We expect that the management will be committed to implement the green and environmental audit recommendations. We are happy to submit this green and environmental audit report to the Mugberia Gangadhar Mahavidyalaya, Purba Medinipur,W.B.

Gren and Healthy Environment

GREEN AND ENVIRONMENTAL AUDIT REPORT

(2022-2023)

MUGBERIA GANGADHAR MAHAVIDYALAYA, PURBA MEDINIPUR, WEST BENGAL

CONSULTRAIN MANAGEMENT SERVICES, LAKE ROAD, KOLKATA

TROPICAL INSTITUTE OF EARTH AND ENVIRONMENTRAL RESEARCH (TIEER), MEDINIPUR

CONSULTRAIN MANAGEMENT SERVICE
Lake Road, Kolkata, West Bengal, India

TROPICAL INSTITUTE OF EARTH AND ENVIRONMENTAL RESEARCH (TIEER)
Reg. No. S/1L/42578 of 2006-07
Office address: M-10, Bidhannagar, Medinipur-721101, W.B., India

GREEN AND ENVIRONMENTAL AUDIT CERTIFICATE

Academic Year: 2022-2023

This is to certify that Mugberia Gangadhar Mahavidyalaya, Bhupati Nagar, Purba Medinipur, West Bengal has good and healthy eco-friendly environment created for saving Earth and Nature. Tropical Institute of Earth and Environmental Research associated with Consultrain Management Service are satisfied after rapid ecological survey with moral support of Honorable Principal, IQAC Team, Staff and Students for academic year 2022-2023 This efforts taken by Faculties and Students towards environment and sustainable are highly appreciable and commendable.

(Dr. Binoy Kr. Chanda)	(Dr. Pranab Sahoo)	(Mrs. Sanchita Bhattachariya)	(Dr. Sudipta Kr. Maiti)
President, TIEER	Asst. Professor & Secretary, TIEER	ISO-Auditor & CEO, CMS	Expert & Member, TIEER

ACKNOWLEDGEMENT

We, The Environment Audit Team thank the management of Mugberia Gangadhar Mahavidyalaya for assigning us such an important work on Green & Environmental audit. We appreciate the cooperation to our team for the assigned study, giving us necessary inputs to carry out audit activities.
Our special thanks to:

- Principal of the College
- IQAC Members
- Teaching & supporting staff

AUDIT EXPERT MEMBERS

The Committee members are listed below:

SL. No.	NAME	DESIGNATION	AREA IN INTEREST
1.	Dr. Binoy Kr. Chanda	President, TIEER & Former IC, VU	Environment Science & Climatology
2.	Dr. Pranab Sahoo	Secretary, TIEER & Assistant Professor and HOD, Dept of Geography, S.B. Mahavidyalaya, Kapgari	Climate Change and Environment Management and Biogeography
3.	Mrs. Sanchita Bhattachariya	Consultant, Consultrain Management services, Kolkata, & Member, TIEER, ISO-9001,14001& 50001Cerfied Auditor.	Environment Management
4.	Dr. Pijush Kanti Panja	Associate Professor, Dept. of Geography, Haldia Govt. College	Ecology and Environment management
5.	Dr. Sudipta Maiti	Faulty, Dept. of Botany, Raja N.L. Khan Womens' College, Midnapore	Plants Diversity & Carbon stocking, Green Management
6.	Dr. Mrinmoy Ghorai	Assistant Professor in Zoology, Panskura Banomali college.	Fauna & Aqua animals and Biodiversity conservation
7.	Sri Ananda Das	Asst. Teacher & expert	Electro physics
8.	Sri Raju Mahata	Drone Surveyor	Aerial Photography
9.	Dr. Sarita Swar	Faulty, Dept. of Environment, New Alipure College	Water and Waste Management
10.	Mr. Prasun Sahoo	B.Tech Electrical Engineer	**Electric management service**
11.	Sri Sarat Chatterjee	Surveyor	Water and Air Quality Measurement
12.	Sri Sanjib Mahata	Surveyor & Expert in RS &GIS	Map Designer
13.	Sri Soumitra Patra	M.Tech in Agriculture and surveyor	Micro irrigation technology and water management
14.	Ms. Sonali Dandapat	Assistant Reserchер	Ecology and Bio-diversity

CONTENTS

1.0 INTRODUCTION:

The term 'Green' stands for Resource balance, Quality environment, Recycled products and Ecofriendly environment. Green and environmental Audit is a process of systematic, documented, periodic and objective evaluation of components of environmental diversity with the aim of ensuring readiness in eco-friendly environment and conservation of natural resources in its operations. The process starts with systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of the college. Green auditing is a means of assessing environmental performance. Green audit is a valuable means for a College to determine how and where they are using the most energy or water or other resources; the College can then consider how to implement changes and make savings. It can create healthy consciousness and promotes environmental awareness, values and ethics.

1.1 Goals & Objectives:

It aims to analysis environments within and outside of the concerned area, which will have an impact on the eco-friendly atmosphere. It provides staff and students better understanding of Resource management on their area of work.

The Main Objectives of Carrying out of Green and Environment Audit:

- To ensure the performance of the Institution with respect to environmental activities they are involved in, in compliance with existing laws and regulations
- To locate the Green area and the Geographical location of the College – aerial view
- To document the floral and faunal diversity of the College
- To develop and follow the waste management system
- To reduce the energy consumption of the Institution
- To report the expenditure on green initiatives, carbon foot print
- To record the air, water quality of the Institution
- To conserve the natural resources

Areas of Concern:

- WATER MANAGEMENT
- ENERGY MANAGEMENT

- AIR QUALITY AND CARBON FOOTPRINT
- WASTE MANAGEMENT
- E-WASTE MANAGEMENT
- BIODIVERSITY

This Audit has been conducted by a Committee constituted by the Experts & Scientists from different reputed Institutes. The Committee developed a questionnaire for audit based on the regulatory and statutory requirements of Centre as well State. The basic data was gathered and compiled, which the committee analyzed. By and large, the audit reveals a healthy environment inside the Mugberia College campus. The committee has suggested short term as well as long-term suggestions for improved environmental conditions to

Meeting with Hon'ble Principal & IQAC Team

ahigher level and authorities and all stakeholders of the College conform that they will give due attention and utilize opportunities for identified improvements.

1.2 About the College :

Mugberia Gangadhar Mahavidyalaya was established on 2nd of July, 1964 as a co-education college by a society of the same name in a village in Contai Subdivision of Purba Medinipur District (Erstwhile Midnapore District) after the name of

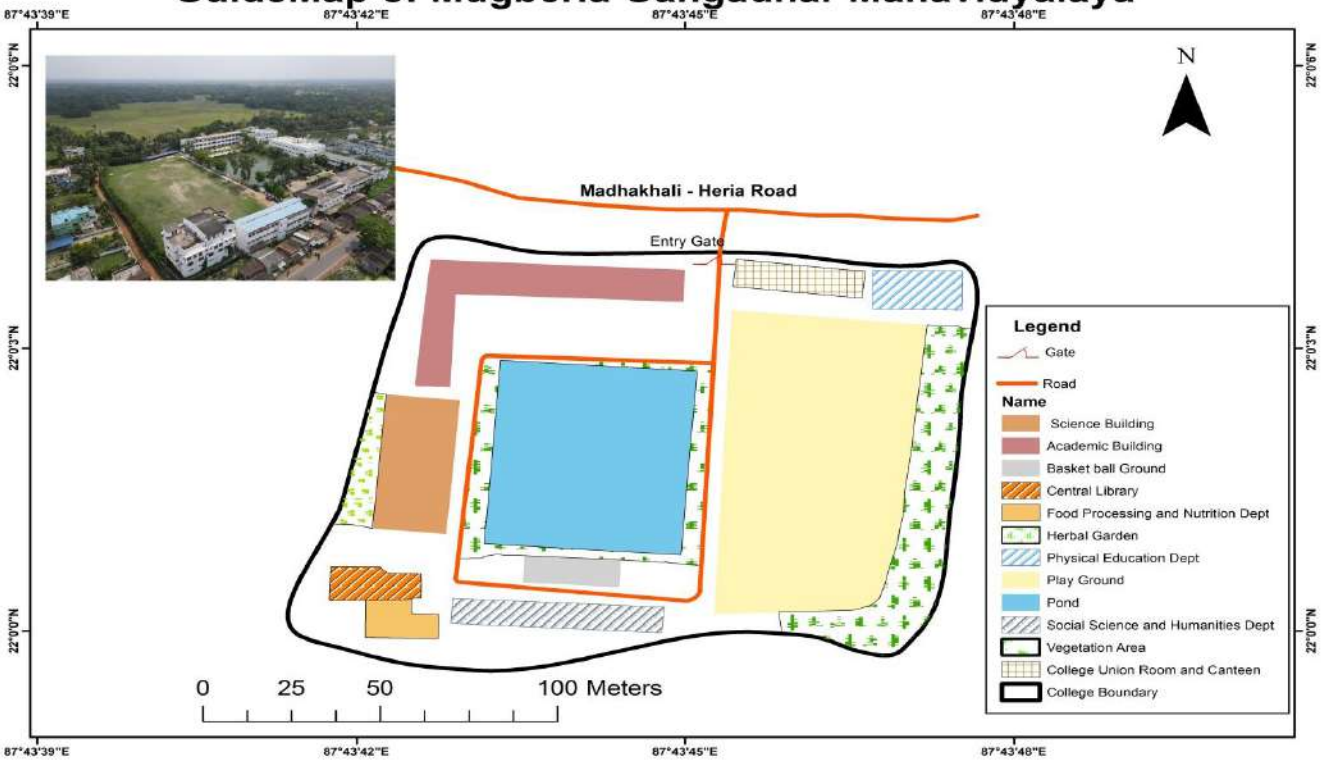
Medinipurs pride - Late Raisaheb Gangadhar Nanda - a great lover of education. The college is situated in a culturally rich locale, and it is the only college in the vast area of Bhagwanpur-II block. The college is located in the rural area at Henria Itaberia Road , Purba Medinipur .

The college has started a diploma course in Tourism and Hotel Management under Community College of UGC from July 2015. For this financial assistance has been given by UGC of Rs. 71.96 Lakhs.

The college has been awarded the CPE status from 1st April 2016 to 31st March 2021 from the UGC for enhancing the quality of education in the college. For this UGC has granted Rs. 110 Lakhs.

The college has a dedicated environmental cell that formed a Green Club aiming to encourage in a self-sufficient, energy minimal college campus.

GuideMap of Mugberia Gangadhar Mahavidyalaya



Survey and Prepared by Tropical Institute of Earth and Enviromentral Research (TIEER), Midnapur

Landuse Land Cover Map of Mugberia Gangadhar Mahavidyalaya

Survey and Prepared by Tropical Institute of Earth and Enviromentral Research (TIEER), Midnapur

Table 1 Area Coverage of the College Campus

Area Coverage of College Premises:	Area in Percentage
Building and Construction	41.00
Vegetation Cover	14.21
Playground and Fallow land	31.00
Water Bodies	13.79

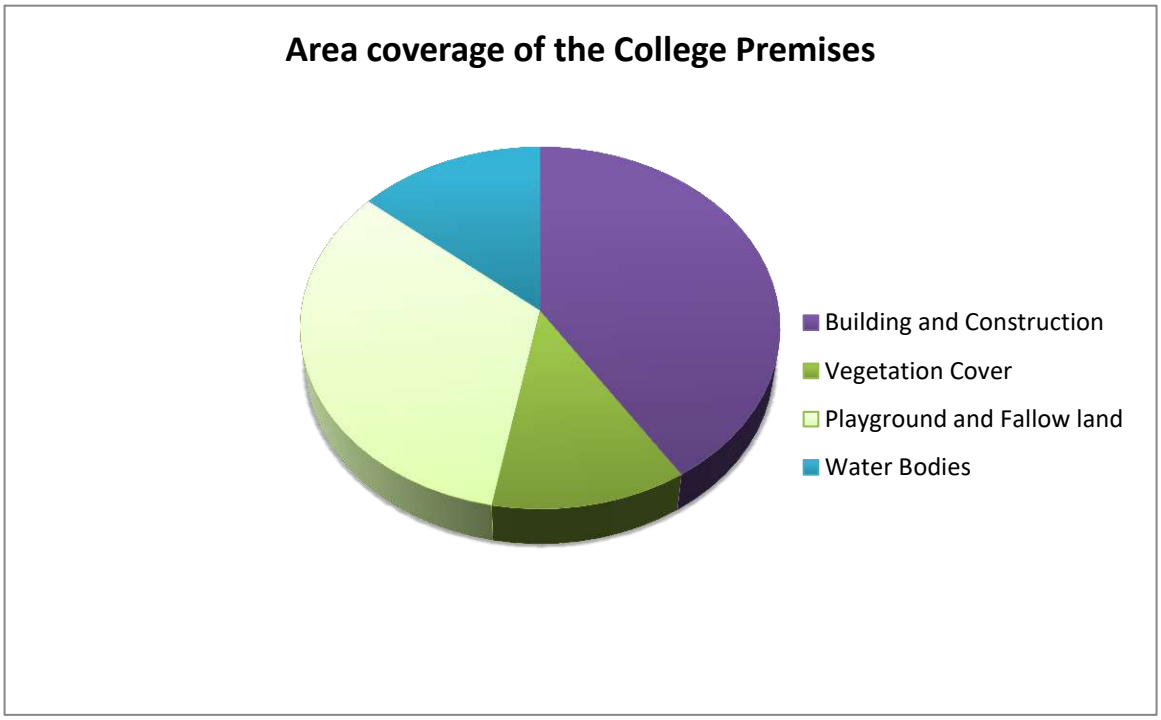


Fig. 1 Area Coverage of College Premises

General Information:

Total area of the college campus – 5.8 acres,
Building area: 2.38 acres,
Green & Vegetated area: 0.82 acres.
Play Ground & Vacant land area: 1.8 acre
Water Bodies area: 0.8 acre
Departments: Post Graduate and Under Graduate-27
Laboratories: 12
Students: 3200
Teaching Faculties: 116
Non-teaching staff: 33
Others stakeholder: 07

Total Stake holders: 3356
Total classrooms: 55
Auditorium /Seminar hall: 02
Hostels: 04
Hostel students: 220
Gymnasium Hall : 01
Smart class rooms: 37

The Green Club details:

Coordinator and members

S.No	Name of the faculty	Designation	Position in Green Club
01.	Irani Banerjee Chatterjee	Assistant Professor, Department of Geography	Co-ordinator
02.	Dr. Prasenjit Ghosh	Associate Professor, HOD , History and Secretary, Teachers Council	Member
03.	Dr. Bidhan Samanta	Assistant Professor ,HOD, Department of Chemistry	Member
04.	Dr. Goutam Barman	Assistant Professor ,Department of Bengali	Member
05.	Dr. Sourav Sikdar	Assistant Professor ,HOD, Department of Zoology	Member
06.	Kingshuk Karan	Assistant Professor , HOD, Department of Education	Member
07.	Manas Khalua	Assistant Professor , HOD, Department of Botany	Member
08.	Sougata Bera	Clerk and Secretary, Non Teaching	Member

S.No	Name of the faculty	Designation	Position in Green Club
		Staff	
09.	Kamal Panda	General Secretary, Students Union	Member
10.	Durgapada Bhattacharya	Guest Faculty, vermi- compost Cell	Member

The green club used to take up green audit internally previously to ensure a proper sustainable environment inspection.

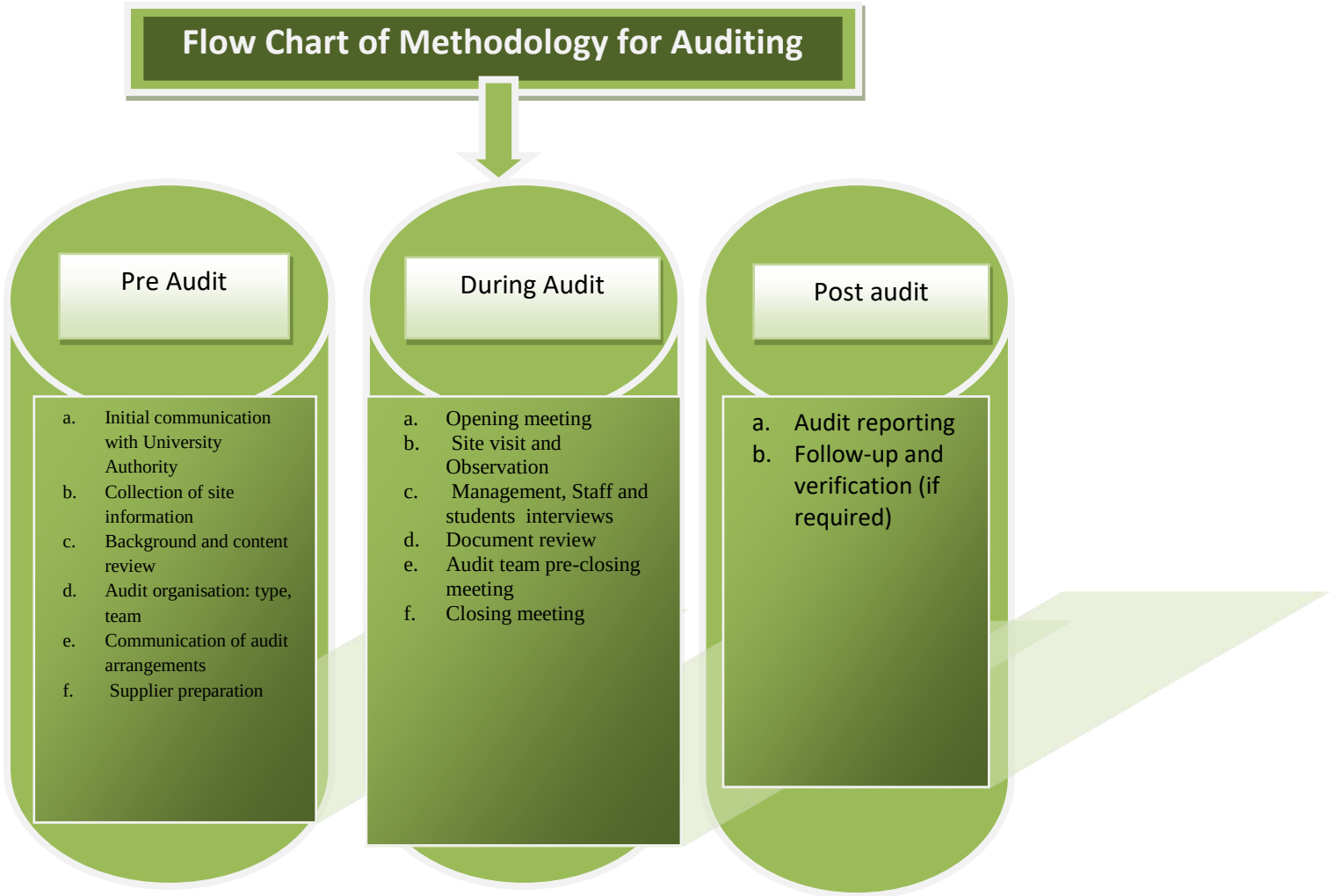
1.3 Purpose of Green and Environmental Auditing:

- To develop to more efficient resource management
- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To promote plastic free campus and evolve health consciousness among the stakeholders
- To recognize the cost saving methods through waste minimizing and managing
- To empower the organizations to frame a better environmental performance
- To develop an environmental ethics and values systems in youngsters.
- To establish valuable tools and methods for managing and monitoring of environmental and sustainable development programs.

2.0 PRE-AUDIT STAGE:

2.1 Methodology and Survey Schedules:

The methodology is adopted for this assessment by collecting the information by onsite visit, group discussion, campus survey, enquiry, observation. Perception study and opinion survey are also included in the Auditing Report.



The Audit team started the audit at the College Campus on 23th June,2023

SL.NO	PURPOSE	DATE	REMARKS
1.	Communication with College authority	11.05.2023	Discussion about term and condition
2.	Opening Meeting	16.05.2023	Submitted the survey schedule
3.	Collection information about the College	17.05.2023	Introduced to Administrative Officer
4.	Campus visit , site enquiry and department survey & observation	23.06.2023	Outdoor observation with Drone camera & Photo camera, Laboratory enquiry
5.	Review data and Assessment	24.06.23 to 29.06.2023	Data generate and drone figures
6.	Closing meeting & Report Submitted	30.06.2023	Meeting with IQAC and Report submitted

2.2 Site Visit:

1. College and its premises were visited and analyzed by the audit-teams several times to gather information.
2. Campus trees were counted and identified.
3. Medicinal garden, play grounds, canteen, library, All Department, office rooms, Hostels, Staff Quarter and parking grounds were also visited to collect data.
4. Number and type of vehicles used by the stakeholders were counted and fuel consumption for each vehicle was verified with the user.

5. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted.
6. Water taps were checked. Leakage of a few water taps and over-flow tanks were noticed during the site inspection.

Ecofriendly College premises

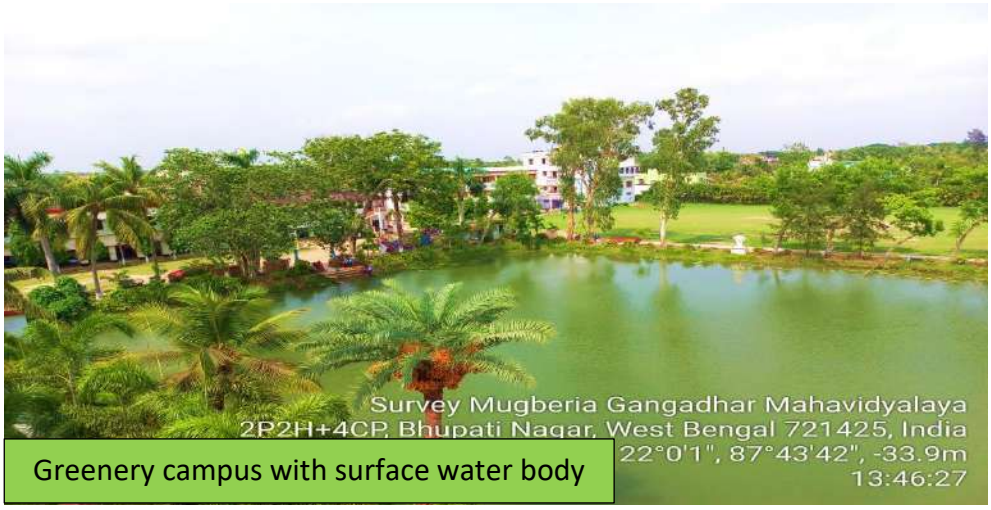
Following steps were taken for data collection:

- Survey to each department, centers, Library, canteen etc.
- Data collected by observation and interview.
- Assessment of the environmental condition through measurement

2.3 Survey & Data Collection:

- A Questionnaire was developed covering all aspects of Green and Environment aspects for collection of data.
- Arrangement of Drone survey was made available to cover every corner of the college and its neighborhood areas.
- Data Analysis - Calculation of energy consumption, analysis of water reused, waste generation & disposal arrangements.
- Recommendation — On the basis of results of data analysis and observations, some steps for reducing power consumption, water consumption, waste management etc. were recommended.

We have discussed and interacted with different groups like teachers, students and staff to identify the attitudes and awareness towards environmental issues at the institutional, district, national and global level. Data and information were also collected form utility bills, reuse of water, waste management, use of energy-saving devices and e-waste. This information was added to the carbon footprint data, generating a fairly clearer picture of the emissions and impact of the reduction measures undertaken.



Greenery campus with surface water body

Academic Buildings

3.0 AUDIT STAGE :

3.1 Campus Survey and Enquiry:

Green and Environmental audit forms part of a resource management process. Total area including neighborhoods was surveyed using Drone and the data derived from this survey was detailed in our report.

Eco-campus concept mainly focuses on the reduction of contribution to emissions, on the efficient use of energy and water; Minimize waste generation or pollution and also economic efficiency. All these indicators are assessed in process of "Green Auditing of educational institute". Covered areas included in this green

Aerial Views of the College Campus

auditing are water, energy, air quality & carbon footprint, waste, biodiversity campus.

The Audit covered the following major areas:

1. Water Efficiency and Water Management
2. Energy Efficiency and Energy Management
3. Air Quality and Carbon foot print and Management
4. Waste Produce and Waste Management
5. Biodiversity and Green Zone management

Visit in Dept. Of Geography

Table-2 Total population of the College

Students -	3200	persons
Teaching, Non-teaching and Other Stakeholders	156	persons
Total	3356	persons
Approximate no of visitor (per day)-	**15**	**persons**

3.2 Water Efficiency and Water Management :

The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water and also proper water management practices along with rooftop rain water harvesting system must be installed in whole campus for recharging ground water and meeting part of the water requirements. It is therefore essential that any environmentally responsible institution examine its water use and Re-use practices.

a	Usage of water	That water is use for Drinking, Washing, Cleaning, Cooking, Bathing and gardening purpose. The maximum water is use for Bathing and washing in Hostels & Staff Quarter. About 29050 Litre water has been supplied for that sector.
b.	Consumption of water	About 41500 Litre water per day
c.	Water wastage	The leakage and misuse of water is about 400 Litre in whole campus. Small drip from a leaky tap, sewage water from pan in toilets and over flow can waste significant amount of water per day.

d.	Water recycle	Waste water recycle unit has installed in the institute for the drinking water and other purpose, mainly pond water has been recycling by the proper treatment. It is Unique water saving model for sustainable resource management. One rain water harvesting system is available in Mugberia College campus.
e	Surface water Harvesting	The surface water bodies (one) are available in Mugberia College campus. About 0.8 acres area has covered with one pond.

Table-3 Use of water for Different Purpose of College Premises

Use of water for Different Purpose Per Day	Use in Percentage
Bathing and washroom	70.00
Cooking and washing	8.64
Cleaning and gardening	6.00
Drinking	10.76
Others	3.80
Misuse of Water	0.8

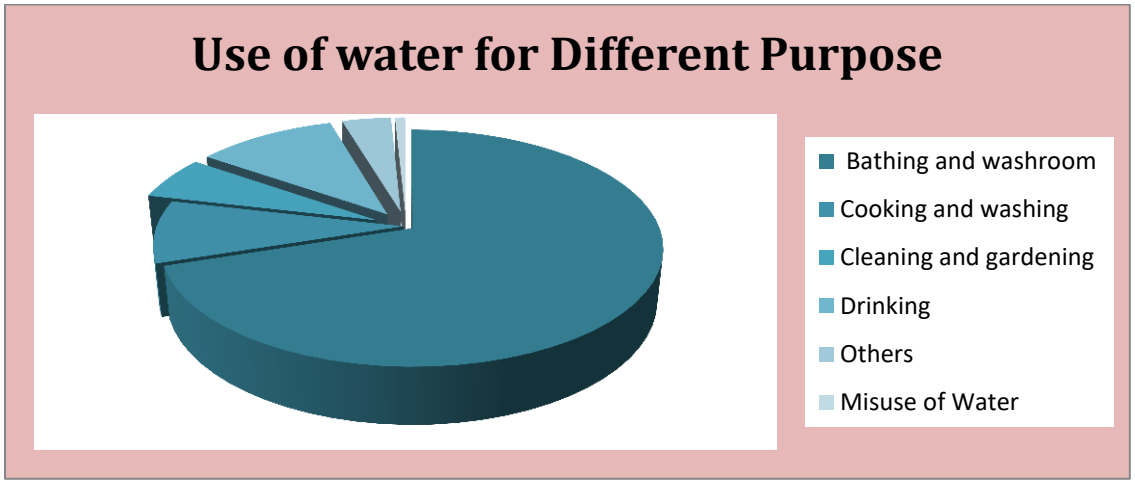


Fig.2 Use of water in Different Purpose Per Day

Taken Water management policy

Sl. No.	Factors	Weightage
1	Quality of Water	H
2	Re-use of water	H
3	Water Harvesting & Recharge	H
4	Use of Surface Water	H

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

Observation and Recommendation

Water conservation faucets in washrooms were not seen. Installation of such faucets can save water and will help in minimising the water footprint of the institute. Sanitary wastewater generated from washrooms is connected to sewerage system.

3.3 Energy Efficiency and Energy Management:

a	Energy sources	Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent Tube uses approximately 40W while an energy efficient light emitting diode (LED) uses only less than 24 W.
b.	Energy consumption	The useable energy is Conventional and Non-Conventional energy(24175unit+6512unit). The used energy is 30687 units costing to Rs. 265587/. About 21% energy is Non-conventional energy contributed from Solar Power. The Maximum energy is consumed for Light & Fan amounting to 43.7% of total consumption. Departmental and Computer laboratory uses about 39% of total consumed energy.
c.	Usage of LPG	It has been observed that LPG gas cylinders are used in Canteen, & Laboratories (40 PC/year) for cooking and other purpose. There are Green generators used in the premises.

Electric power unit and Green generator

Table-4 Source of Energy in Percentage

Source of Energy	In Percentage
Conventional	79.00
Non -Conventional	21.00

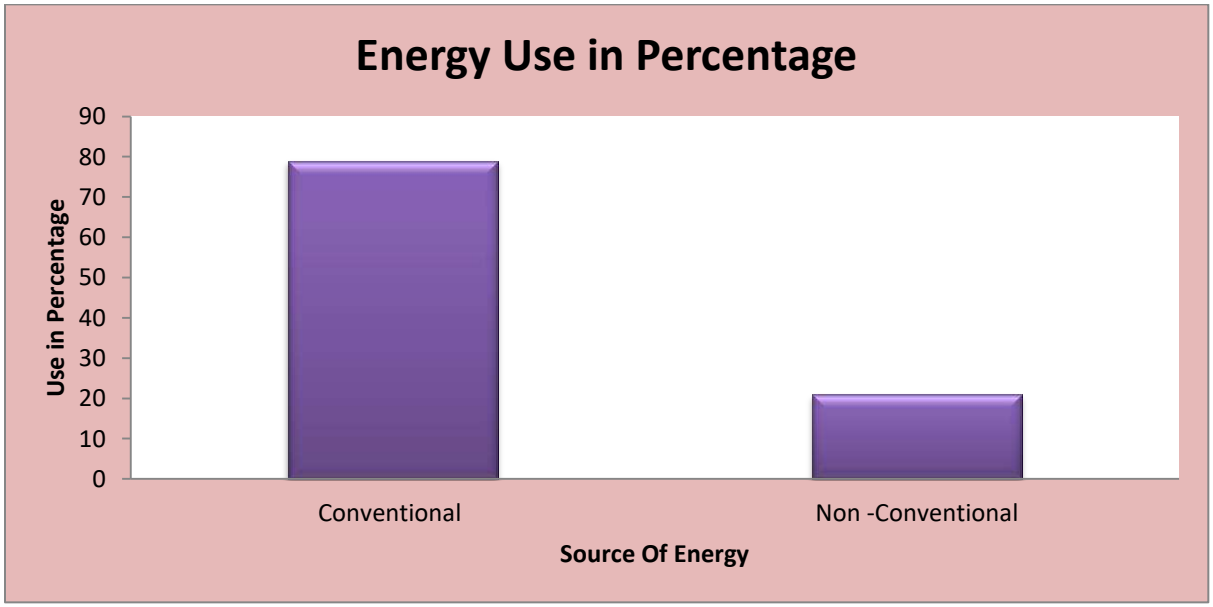


Fig. 3 Use of Energy in Percentage

Table-5 Energy Consumption for different Purpose in Percentage

Energy Consumption for different Purpose	In Percentage
light and fans	43.7
AC	19.80
Pump	0.79
Computer and Laboratory	31.60
Others	4.11

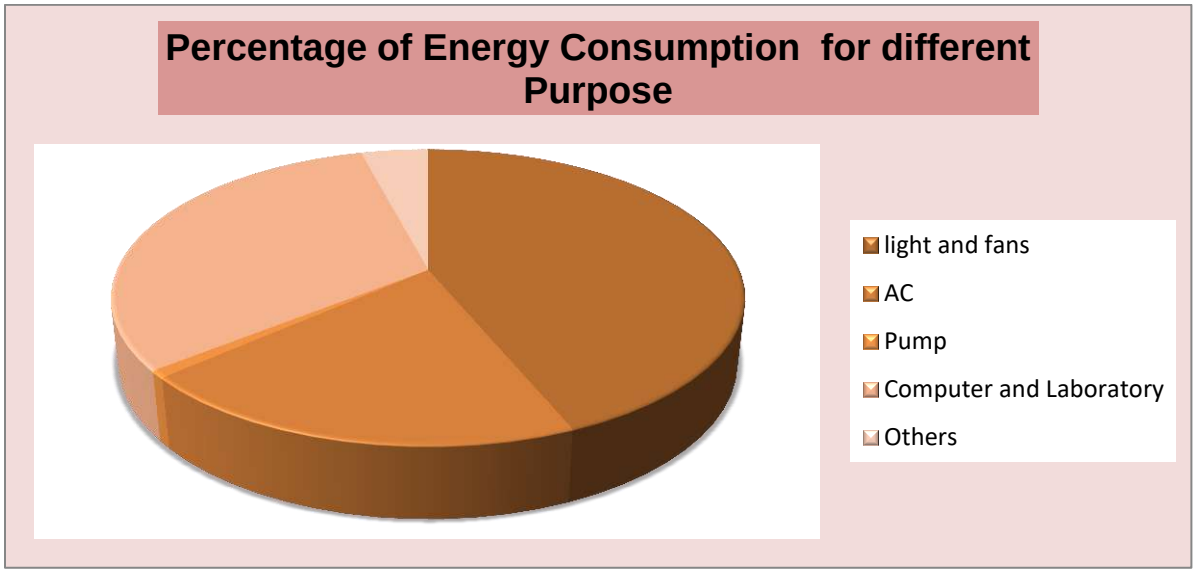


Fig. 4 Percentage of Energy Consumption in different Purpose

Observation and Recommendations:

a) Every classroom and lab with central switch board should have a diagram linking place of tube light, fan etc. with corresponding switch. This will ensure that correct fitting is switched on/ off and can save time & unnecessary operation.

b) Installation of automatic lights with sensors can be considered.

c) Standard Operation Procedures (SOPs) should be prepared and followed for green purchasing wherein equipment's with star rating; those using eco-friendly materials; those with safe disposal policy or return to supplier after unused, can be considered.

d) For purchasing new electronic appliances, star rating provided by Bureau of Energy Efficiency (BEE) should be considered. The equipment which has maximum star ratings could be purchased, which will consume less energy, ensure environmental sustainability and also operate at low cost.

e) Usage of light reflectors is recommended as the reflectors can spread light to relatively large areas.
f) Notices/ signage can be put up/ displayed near switches and on notice boards, informing students and staff to switch off all Departments & Sectors when not in use.
g) Use of large percentage renewable energy should be considered.

3.4 Air Quality and Carbon Footprints :

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as petrol, Diesel, LPG Gas). The most common greenhouse gases are carbon dioxide, CFC, water vapor, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most leading greenhouse gas, comprising about 214ppm (2019) to the Earth's atmosphere. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is observed that the Outdoor air quality is Fresh and comfortable for breathing to human life.

Measurement of Air Quality

Table-6 Amount of CO2 (ppm) in different location of the College Campus

Different location of the College Premises	Amount of CO2 (ppm)
Principal Office	450
Chemistry Lab	465
Zoology Lab	430
Nutrition Lab	410
Computer Lab	480
Physics Lab	450
Library	465
Cycle Stand	390
Play Ground	370
Canteen	430
Hostel	440

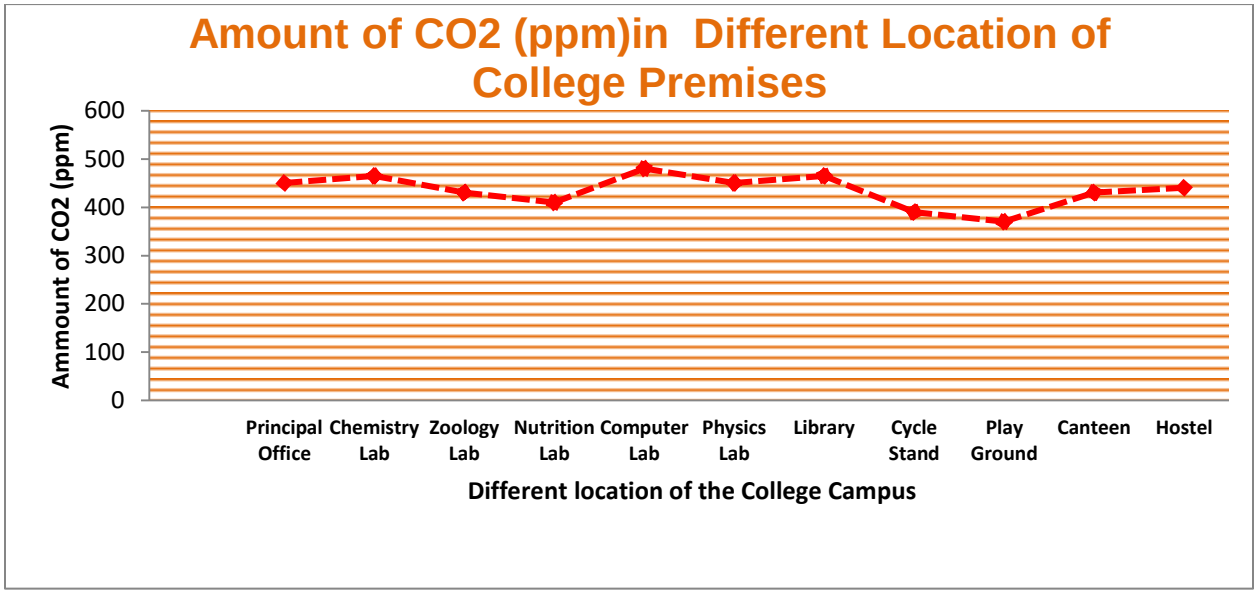


Fig. 5 Amount of CO2 (ppm) in Different Location of the College Premises

Table-7 Amount of CO_2 (ppm) in the air in different location,(College Campus) session 2022-2023

Amount of CO_2 (ppm) in the Air in Different places of the College Premises	Amount of CO_2 (ppm)
Outdoor	392
Indoor (Class room)	420
Indoor (Laboratories)	450

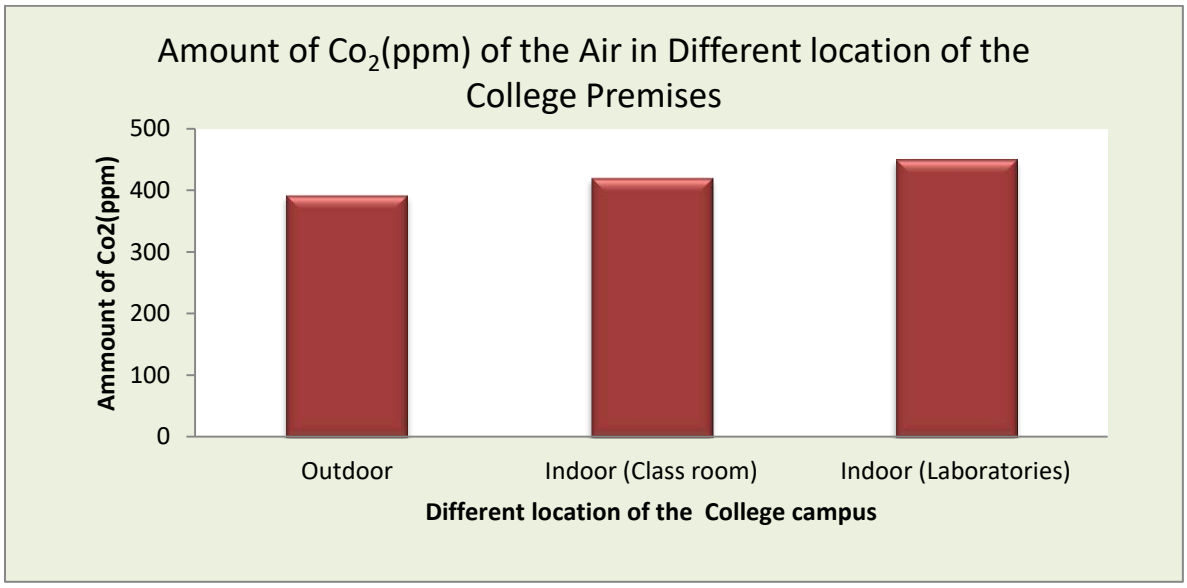


Fig. 6 Amount of Co_2(ppm) of the Air in Different location of the College Premises

Table 8 Amount of O_2 (%) of the Air in Different location of the College Premises

Different location of the College Premises	Amount of O_2 (%)
Principal Office	20.3
Chemistry Lab	20.3
Zoology Lab	20.5
Nutrition Lab	20.7
Computer Lab	20
Physics Lab	20.3
Library	20.2
Cycle Stand	20.8
Play Ground	20.9
Canteen	20.4
Hostel	20.4

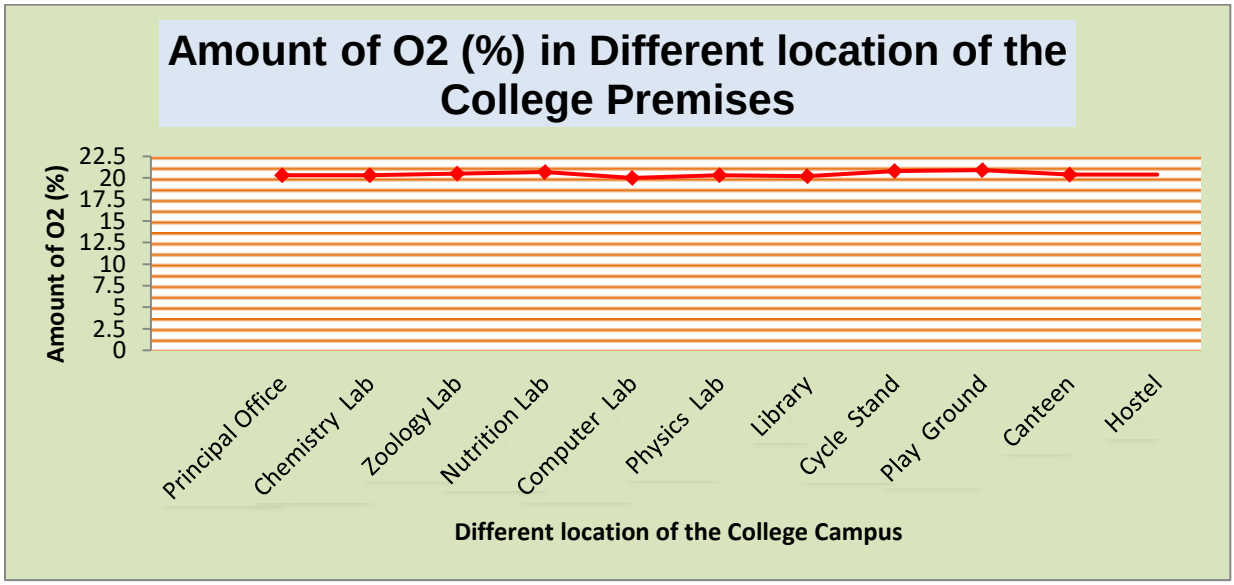


Fig. 7 Amount of O2 (%) in Different location of the College Premise

Observation and Recommendation:

a) Ventilation is achieved by fans in the institute and air conditioners in Official and Lab. places.

b) Heating Ventilation and Air Conditioning (HVAC) system is not installed.
d) Exhaust fans are only provided in washrooms and chemistry lab.

e) No indoor plants were observed in the entire institute. Indoor plants can be plotted not only for the aesthetic appearance but also for health benefits.

Carbon footprint spot(Wood Burner) at Kitchen

3.5 Generation of Waste and Waste Management:

Waste (or wastes) is useless or unusable materials or components which are discarded after principal use. Sometimes, it is a defective article and of no use. In modern outlook waste may be a valuable substance subject to an appropriate operation or action on the waste. With the context of waste management RRR (Reduce, Reuse and Recycle) model may be followed in appropriate fashion.

The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices. Keeping the objective of the audit the following study will be limited to the waste generated in an academic campus and surroundings.

Table-9 Types of wastes

Type of Wastage	Amount in Kg
Degradable	90.00
Non degradable	4.00

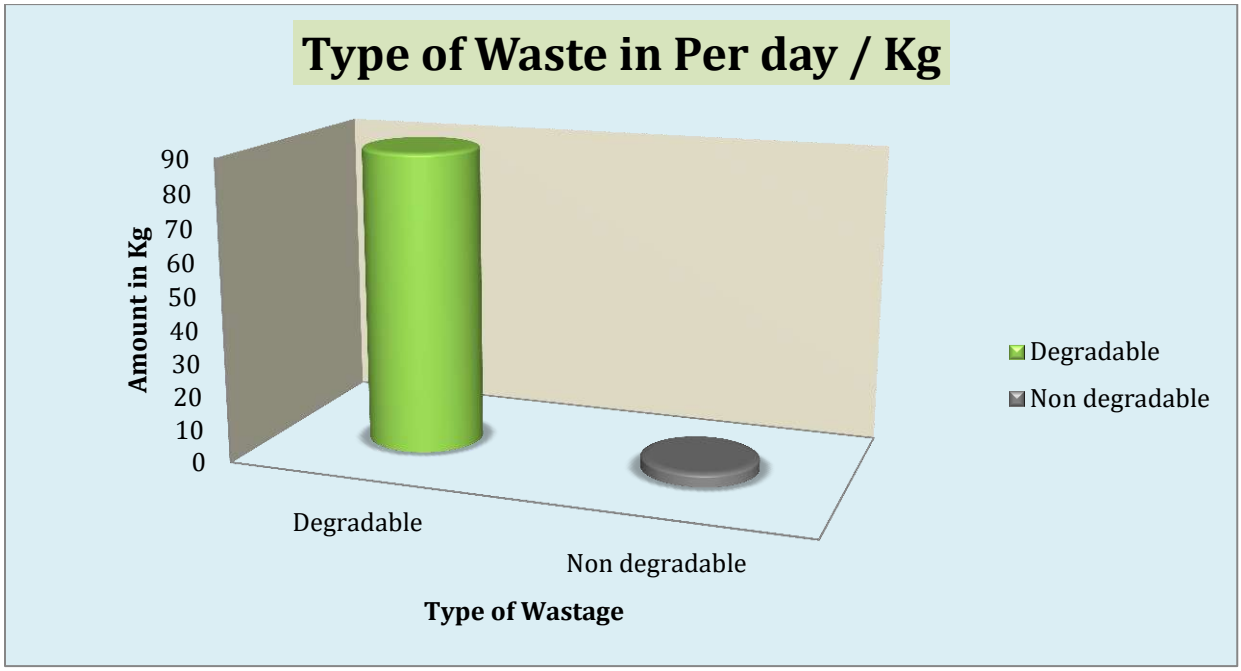


Fig. 8 Type and Amount of Waste

The following categories of wastes are generated in the College campus:

a) Solid waste - Waste generated through paper, plastic packaging causes nuisance. Some wastes are generated after various experiments, primarily, chemistry laboratory; broken test tube, glassware are the example.

b) Liquid waste - There are bio-chemical wastes generated through various chemical reactions and biological processes. Generally, these are being drained to nearby Surface water bodies contaminating water and soil. Appropriate means is suggested to adopt scientific liquid waste management practices. These are neutralization, bacterial control, and natural control through plantation.

Table-10 Source of Wastage in Different Sector (per day in Kg)

Source of Wastage in Different Sector(per day in Kg)	Degradable wastage Amount in Kg.	Non Degradable wastage Amount in Kg.
Canteen, Quarter and Hostels	70	2
Office	1	0.5
Laboratories	2	0.5
Garden	11	0.25
Others	6	0.75

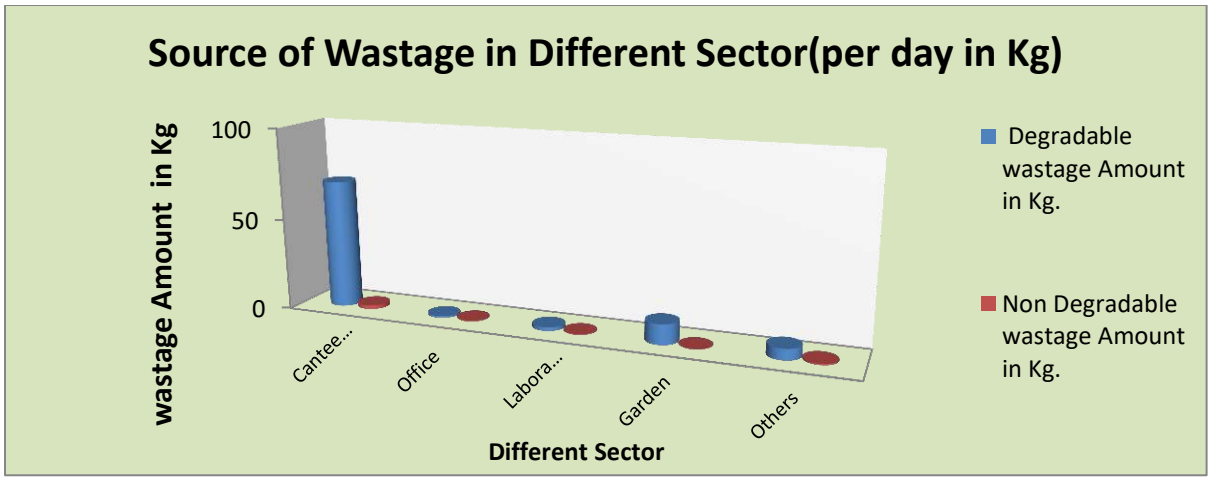


Fig. 9 Source and Amount of Wastage in Different Sector (per day in Kg)

The following are being emphasized during audit of waste management:

a) Name of the waste

b) Category of waste

c) Quantity of waste

d) Hazardous effect of the waste

e) Institutional action and mechanism for waste management

Compliance audit of waste issues:

Organic waste Treatment unit (Vermi Compost)

At the present stage the institute is capable in managing their waste. They are complying with the essential requirements of waste management although suggestions are given for future improvements.

Performance Audit of Waste Issues:

Implemented wastes management		
Sl.no	Factors/Indicators	Weightage
1	Plastic and Polythene free	H
2	Re-use of papers	H
3	Hazardous effect waste management	M
4	Removal of E-Wastes	M
5	Organic & food waste	H
6	Others solid wastes	M

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%
No critical audit issue is there with respect to the waste management.

3.6 Auditing for Biodiversity & Green Campus Management:

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. In one year, a single mature tree will absorb up to 48 pounds of Carbon dioxide from the atmosphere, and release it as Oxygen. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people. So while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress.

About 14.21% area is under greenery and biodiversity zone and 13.79% area is water body also wet land. Biodiversity includes the genetic variability and diversity of life forms such

as plants, animals, microbes etc. living in a wide range of ecosystems. Flora and fauna of College campus in Mugberia College premises is rich.

Table 11 Area Coverage of the College Campus

Area Coverage of College Premises:	Area in Percentage
Building and Construction	41
Vegetation Cover	14.21
Playground and Fallow land	31
Water Bodies	13.79

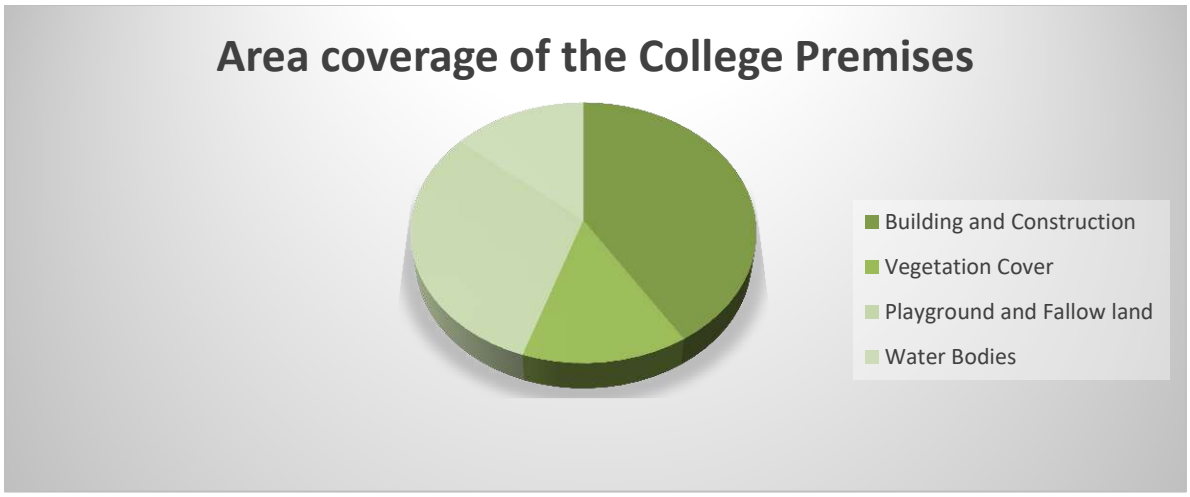


Fig. 10 Area coverage of the College Premises

Biodiversity Study

Plant diversity – The campus of Mugberia Gangadhar Mahavidyalaya is lashing green. There is a large pond in the centre of the college and a small in the boy's hostel. East side of the pond is a playground and other three sides are covered by different college buildings. East and south side of the playground is a large and dense (17-20 plant within 5m transect) plantation of Erica plam (*Dypsis lutescens*) found. It is reported that the seeds are sellable and college is earning rupees fifteen thousand per year regularly. There are 50 (approx.) Cuban royal plam (*Roystonea regia*) tree which are making an avenue on south and west side of the pond. There is a large banyan tree on north side of the pond but it is pruned. One medicinal plant garden is seen which needed restoration (Table -2). A small plantation of *Acacia auriculiformis* is found in front of Sailasuta

Students hostel (Boy's Hostel). There was a kitchen garden also. Details of plants are given in table -4. There are fruit gardens between boy's and girl's hostel (Bijoy Krisnha Girl's Hostel) (Table -3). Sailaja Nanda Student's hostel (Bp.Ed. hostel) is another spot where two mango (*Mangifera indica*), one Neem (*Azadirachta indica*) and six coconut (*Cocos nucifera*) plants are available.

The plant diversity study has been done through quadrat method. Two sets of quadrats have been laid in the main campus. For this purpose a standard method has been followed i.e. 10m x 10m for trees, 5m x 5m for shrubs and 1m x 1m for herbs. Data of quadrats are given below (Quadrat – 1 and 2).

Quadrat - 1

Tree Quadrat (10m x 10m)

Sl. No.	Scientific name	GBH (in cm)	Height (in m)
1.	*Eucalyptus hybrid*	171	12
2.	*Eucalyptus hybrid*	224	14

Shrub quadrat (5m x 5m) - Nil

Herb quadrat (1m x 1m)

Sl. No.	Scientific name	Number of individuals
1.	*Cyanodon dactylon*	124
2.	*Cyperus kyllinga*	11
3.	*Andropogon aciculatus*	22

Quadrat - 2

Tree Quadrat (10m x 10m)

Sl. No.	Scientific name	GBH (in cm)	Height (in m)
1.	*Anthocephalus kadamba*	160	10
2.	*Anthocephalus kadamba*	105	9.5

Shrub quadrat (5m x 5m) - Nil

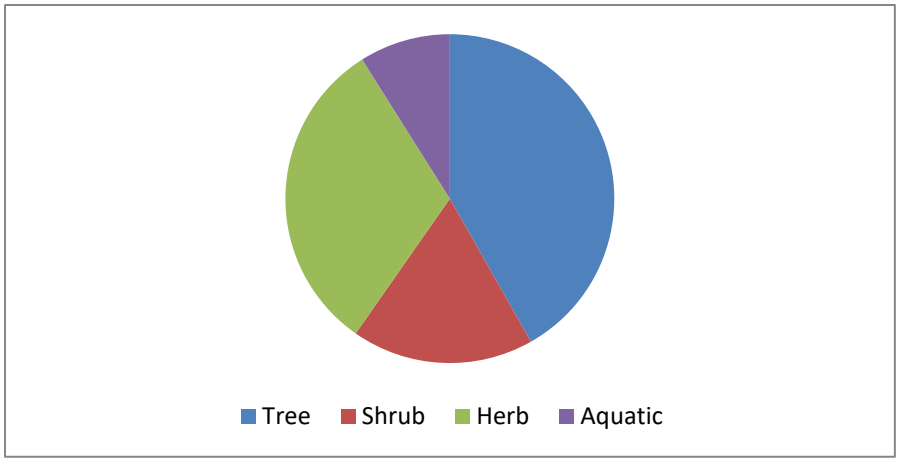
Sl. No.	Scientific name	Number of individuals
1.	*Nerium sp.*	1
2.	*Euphorbia pulcherima*	15
3.	*Asperagas racemosus*	

Herb quadrat (1m x 1m)

Sl. No.	Scientific name	Number of individuals

1.	*Cyanodon dactylon*	24
2.	*Desmodium gangeticum*	2
3.	*Andropogon aciculatus*	9
4.	*Digitaria sanguinales*	2
5.	*Oxalis corniculata*	6
6.	*Eclipta alba*	2
7.	*Desmodium gyrance*	3

It has been found from the study that there are approximately 28 tree species, 12 shrubs, 21 herbs and aquatic 6 species (Table-1 and Fig.-a). Beside this there are also 20 medicinal plants, 5 fruits



bearing and 7 kitchen garden plants. Medicinal plants are very important such as *Cymbopogon citrates, Hemidesmus indicus, Cissus quadrangularis* etc. (Fig,-b). From

Fig. – a: Plant composition of Mugberia Gangadhar Mahavidyalaya

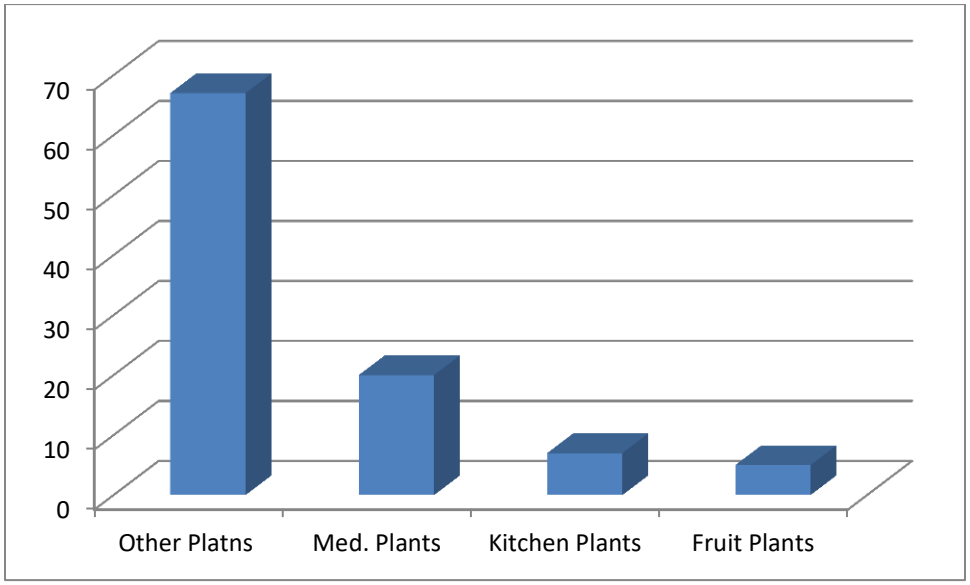


Fig.-b: Composition of different types of plants

quadrat analysis three girth class of trees are calculated (Table-5). From this data Carbon sequestration potential of trees have been calculated. It is found that from above ground biomass of trees, 9023.5 kg. of carbon has been stocked under quadrats.

List of plants in Mugberia Gangadhar Mahavidyalaya campus.

Tree

Sl. No.	Scientific Name	Local name	Family
1.	*Acacia auriculiformis*	Sonajhuri	Fabaceae
2.	*Acacia auriculiformis* A.Cunn.exBenth.	Sonajhuri	Fabaceae
3.	*Albizzia lebbeck* (L.) Benth.	Khiris	Fabaceae
4.	*Anthocephalus cadamba* (Roxb.) Bosser	Kadam	Rubiaceae
5.	*Azadirachta indica* A.Juss.	Neem	Meliaceae
6.	*Butea monosperma* (Lam.) Taub.	Palas	Fabaceae
7.	*Casuarinas equsetifolia*	Jhau	Casuarinaceae
8.	*Cocos nucifera* L.	Narkol	Arecaceae
9.	*Dalbergia sissoo*Roxb.	Sisso	Fabaceae
10.	*Dypsis lutescens*	Areca plam	Arecaceae

11.	*Eucalyptus hybrid*	Euc	Myrtaceae
12.	*Ficus benghalensis* L.	Bot	Moraceae
13.	*Lagerstroemia perviflora* .	Jarul	Lythraceae
14.	*Mangifera indica* L.	Amm	Anacardiaceae
15.	*Michelia champaca* (L.) Baill. ex Pierre	Champa	Magnoliaceae
16.	Mimosops elangi	Bakul	
17.	*Murrya koenigii*(L.)Sprengel	Kamini	Rutaceae
18.	*Nyctanthes arbor-tristis* L.	Seuli	Oleaceae
19.	*Peltophorum pterocarpum* (DC.) K.Heyne.	Radhachura	Fabaceae
20.	*Phoenix sylvestris* (L.)Roxb.	Khejur	Arecaceae
21.	*Polyalthea longifolia*Sonn.	Debdaru	Annonaceae
22.	*Psidium guajava L.*	Peyara	Myrtaceae
23.	*Roystonea regia*	Cuban royal plam	Arecaceae
24.	*Samania saman* F.Muell	Siris	Fabaceae
25.	*Saracca asoca* (Roxb.)Willd.	Asoke	Fabaceae
26.	*Swietenia macrophylla* King	Mahogini	Meliaceae
27.	*Swietenia mahagoni* (L.) Jacq.	Mahogini	Meliaceae
28.	*Wodyetia bifurcata*A.K.Irvine	Plam	Arecaceae

Shrub

Sl. No.	Scientific Name	Local name	Family
1.	*Asperagas racemosus*	Satamuli	Asperagaceae
2	*Canna indica* L.	Kalabati	Cannaceae
3	*Duranta erecta* L.	Duranta	Verbenaceae
4	*Epipremnum aureum*	Devils Ivy	Araceae
5	*Euphorbia pulcherima*		Euphorbiaceae
6	*Hibiscus rosa-sinensis* L.	Joba	Malvaceae
7	*Hyophorbe lagenicaulis* (L.H.Bailey) H.E. Moore	Bottle plam	Arecaceae
8	*Ixora* coccinea	Rangan	Rubiaceae

9	*Mucuna pruriens*	Alkhusi	Fabaceae
10	*Nerium oleander*	Karabi	Apocynaceae
11	*Rhapis excelsa* (Thunb.) A. Henry	Lady plam	Arecaceae
12	*Tinospora cordifolia*	Giloi	Menispermaceae

Herb

Sl. No.	Scientific Name	Family
1	*Achyranthuys aspera*	Amaranthaceae
2	*Andropogon aciculatus*	Poaceae
3	*Blumea lacera*	Asteraceae
4	*Cephalandra indica*	Cucurbitaceae
5	*Cleome viscosum*	Capparaceae
6	*Cyanodon dactylon*	Poaceae
7	*Cyperus kyllinga*	Cyperaceae
8	*Desmodium gangeticum*	Fabaceae
9	*Desmodium gyrance*	Fabaceae
10	*Desmodium triflorum*	Fabaceae
11	*Digitaria sanguinales*	Poaceae
12	*Eclipta alba*	Asteraceae
13	*Heliotropium indicum*	Boraginaceae
14	*Oldanladia corymbosa*	Rubiaceae
15	*Oxalis corniculata*	Oxalidaceae
16	*Phyllanthus amaru*	Euphorbiaceae
17	*Scoparia dulsis*	Plantaginaceae
18	*Triamphetta rhomboida*	Malvaceae
19	*Urena lobata*	Malvaceae
20	*Vernonia cineria*	Asteraceae
21	*Vitis trifolia*	Vitaceae

Aquatic plants

Sl. No.	Scientific Name	Family
1.	*Commelina diffusa*	Commelinaceae
2.	*Enhydra fuctuens*	Asteraceae
3.	*Ipomoea aquatica*	Convolvulaceae
4.	*Jussiaea repens*	Onagraceae
5.	*Nymphea alba*	Nympheaceae
6.	*Salvinia sp.*	Salviniaceae

Gymnosperm

Sl.no.	Scientific Name	Family
1.	*Cycas* sp.	Cycadaceae

List of Medicinal Plants Present in Campus

Sl. No.	Scientific Name	Local name	Family
1	*Acalypha indica*	Muktijhuri	Euphorbiaceae
2	*Aloe vera*	Ghritakumari	Liliaceae
3	*Andrographis paniculata*	Kalmegh.	Acanthaceae
4	*Asparagus racemosus*	Satamul	Asparagaceae
5	*Bryophyllum pinnatum*	Patharkuchi	Crassulaceae
6	*Catharanthus roseus*	Nayantara	Apocyanaceae
7	*Cissus quadrangularis*	Harjora	Vitaceae
8	*Clitoria turnatea*	Aparajita	Papilionaceae (Fabaceae)
9	*Coleus amboinicus*	Mexican mint	Labiate (Lamiaceae

10	*Crotalaria pallid*	Atasi,	Papilionaceae (Fabaceae)
11	*Cymbopogon citrates*	Citronella	Poaceae
12	***Datura stramonium.***	Dhutra	Solanaceae
13	*Eclipta prostrata*	Keshutra	Asteraceae
14	*Hemidesmus indicus*	Anantamul	Asclepiadaceae
15	*Justicia adhatoda*	Basak	*Acanthaceae*
16	*Ocimum gratissimum*	Ramtulsi	Labiatae (Lamiaceae)
17	*Ocimum tenuiflorum*	Krishna tulsi	Labiatae (Lamiaceae)
18	*Ricinus communis* Linn.	Castor	Euphorbiaceae
19	*Tinospora cordifolia*	Gulancha	Menispermaceae
20	*Vitex negundo*	Nishinda	Verbinaceae

List of fruits plants present in campus

Sl. No.	**Scientific name**	Common name	Family
1	*Aegle marmelos*	Bel	Rutaceae
2	*Citrus decumana*.	Batabilabu	Rutaceae
3	*Eugenia jambolana*	Kalojam	Myrtaceae
4	*Psidium guava*	Piara	Myrtaceae
5	*Mangifera indica*	Aam	Anarcardiaceae

Plants of kitchen garden

Sl. No.	**Scientific name**	**Local name**	**Family**
1.	*Lycopersicum esculantum*	Tomato	Solanceae
2.	*Solanum melongena*	Begun	Solanaceae
3.	*Carica papaya*	Papaya	Caricaceae
4	*Zea mays*	Maize	Poaceae
5	*Alocasia esculanta*	Cochu	Araceae
6	*Basella rubra*	Pui	Basellaceae

7	*Capsicum annuum*	Lanka	Solanaceae

Carbon sequestration potential of trees of college campus

Sl. No.	GBH Class (in cm)	No. of Trees	Biomass (in Kg.)	Carbon stock (in Kg.)
1	100-150	1	1964	982
2	150-200	2	8442	4221
3	200-250	1	7641	3820.5

Faunal Diversity:

Mugberia Gangadhar Mahavidyalaya campus is a habitat of a number of wide varieties of fauna. Different types of insects including moths, butterfly, wasp, bees, amphibian, reptilian, birds and mammals are found here. There are one big size and one small size (in hostel) pond in the college campus. This pond is herbaring different indigenous fish species. Following tables are given an account on fauna. Members of different phylum are given in figure (Fig.-3).

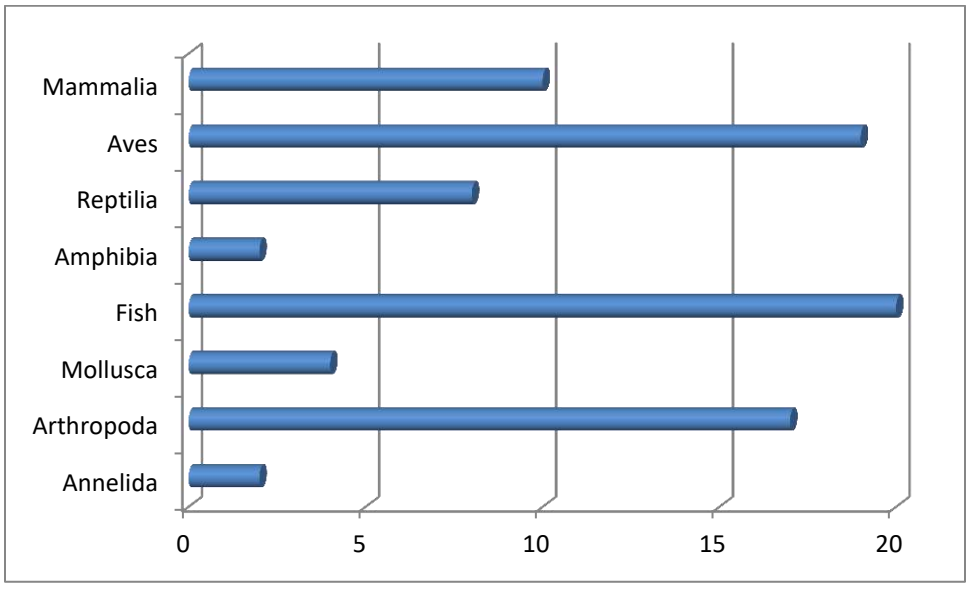


Fig.-c: Comparison between different animal members of different phylum found in the campus

Phylum: Annelida

Sl. No.	Scientific name	Local name
1.	*Hirudinaria* sp	Joke
2.	*Pheretima sp.*	Kecho

Phylum: Arthropoda

Sl. No.	Scientific name	Local name
1	*Anopheles* sp	Anopilis masa
2	*Apis* sp	Moumachi
3	*Buthus* sp	Kakrabicha
4	*Copris lunaris*	Gubrepoka
5	*Galleria* sp	Moth
6	*Julus* sp	Kenno
7	*Lampyri snoctiluca*	Jonaki
8	*Muska domestica*	Machi
9	*Nephila* sp	Makarsa
10	*Odontotermes* sp	Wepoka
11	*Oecophyllas maragdina*	Lalpipra
12	*Orthetrum* sp	Pharing
13	*Papilio* sp	Prajapati
14	*Periplaneta americana*	Arsola
15	*Schistocera gregaria*	Pangapal
16	*Scolopendra* sp	Tetulbicha

17	*Vespa orientalis*	Vimrul

Phylum: Mollusca

Sl. No.	Scientific name	Local name
1	*Acatina fulica*	Sthal samuk
2	*Bellamya bengalensis*	Gugli
3	*Lamellidens marginalis*	Jhinuk
4	*Pila globosa*	Jal samuk

Fresh water fishes

Sl. No.	Scientific name	Local name
1	*Amblypharyngo donmola*	Mourlamach
2	*Anabas atestudineus*	Koi mach
3	*Catla catla*	Katlamach
4	*Chanda* sp	Chandamach
5	*Channa gachua*	Chang mach
6	*Channa punctatus*	Latamach
7	*Channa striata*	Sholmach
8	*Cirrhinus mrigala*	Mrigelmach
9	*Clarias batrachus*	Magurmach
10	*Colisa* sp	Kholsamach
11	*Esomus danricus*	Dhariamach
12	*Heteropneus tesfossilis*	Singimach
13	*Labeo bata*	Bata mach
14	*Labeo calbasu*	Kalbose
15	*Labeo rohita*	Ruimach

16	*Mastacem belussp*	Pankalmach
17	*Mystus* sp	Tangra
18	*Notopterus notopterus*	Phaloimach
19	*Ompo kpabda*	Pabdamach
20	*Punti usticto*	Phutimach

Class : Amphibia

Sl. No.	Scientific name	Local name
1	*Duttaphrynusmelano stictus*	Kuno bang
2	*Rana tigrina*	Sona bang

Class: Reptilia

Sl. No.	Scientific name	Local name
1	*Ahaetullana sutas*	Loudaga sap
2	*Calottes versicolor*	Girgiti
3	*Daboia russelii*	Chandrabora sap
4	*Elachistodon westermanni*	Matiali sap
5	*Hemidactylus flaviviridis*	Tiktiki
6	*Ptyas mucosus*	Jamna sap
7	*Varanus* sp	Godi sap
8	*Xenochriphis piscator*	Jaldhora sap

Class : Aves

Sl. No.	Scientific name	Local name
1	*Acridotheres tristris*	Shalik
2	*Alcedo atthis*	Chotomachranga
3	*Amaurornis phooniurus*	Dahuk
4	*Ardeola grayii*	Bak
5	*Athene brama*	Kuturepancha

6	*Columba livia*	Paira
7	*Copsychuss aularis*	Doyel
8	*Corvus splendens*	Kak
9	*Dicrurous adsimilis*	Phinge
10	*Dinopium benga*	Kat thokra
11	*Eudynamys scolopacea*	Kokil
12	*Merops orientalis*	Baspati
13	*Orthoto mus*sp	Tuntuni
14	*Passer domesticus*	Charaipakhi
15	*Pisttacula* sp	Tia
16	*Pycnonotus* sp	Bulbul
17	*Streptopelia chinensis*	Gughu
18	*Turdoidesea udatus*	Satbhaya
19	*Tyto alba*	Lakhsmipancha

Class : Mammalia

Sl. No.	Scientific name	Local name
1	*Bandicota bengalensis*	Indur
2	*Felis chaus*	Katas
3	*Funam buluspennantii*	Katbirali
4	*Herpestes edwardsii*	Neul
5	*Musmus culus*	Nenhtiindur
6	*Pipistrellus tenuis*	Chamchika
7	*Prionailurus viverrinus*	Mechobiral
8	*Pteropus* sp	Badhur

9	*Suncus murinus*	Chucha
10	*Vulpes bengalensis*	Khaksial

Table-13 Green Coverage of the College Premises

Green Coverage of the College Premises	Area in Percentage
Native and Natural Vegetation	22
Plantation	25
Agro-Plants	38
Medicinal Plants	15

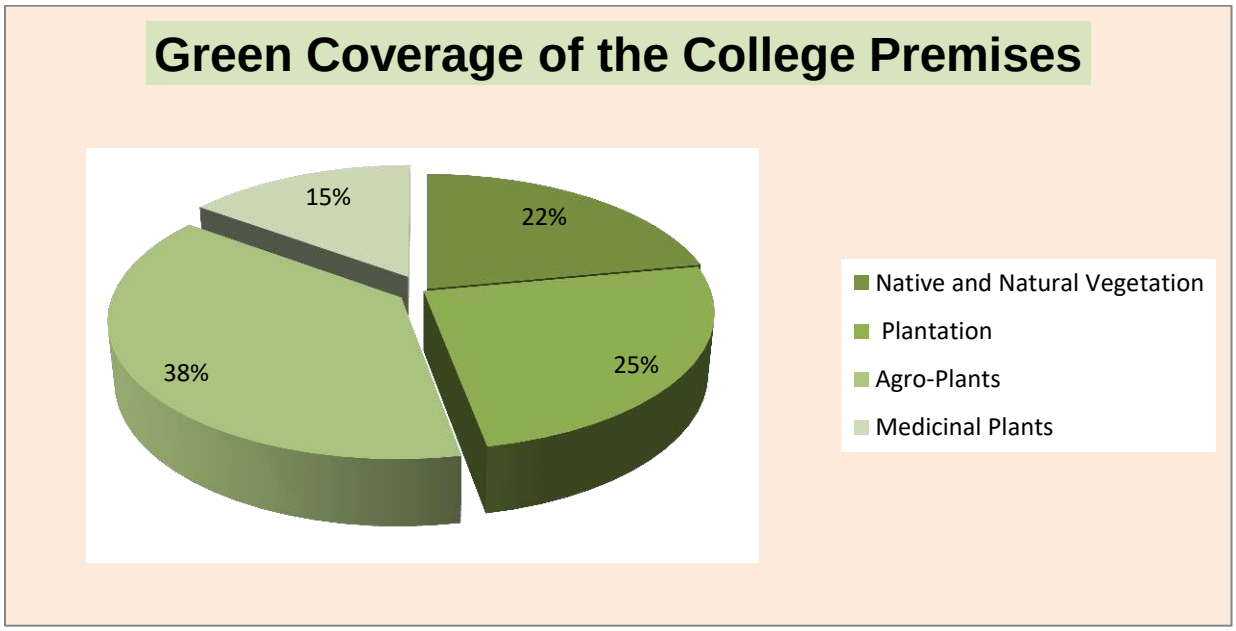


Fig. 11 Green Coverage of the College Premises

Table-14 The Avian fauna observed in the campus is enlisted below-

SL. NO.	COMMON NAME	BENGALI NAME	SCIENTIFIC NAME	IUCN STATUS
1	Red Whiskered Bulbul	Sipahi Bulbul	*Pycnonotusjocosus*	LC
2	Red Vented Bulbul	Bulbul	*Pycnonotuscafer*	LC

3	House Sparrow	ChotiCharai	*Passer domesticus*	LC
4	Eurasian Collared Dove	Par ghughu	*Streptopeliadecaocto*	LC
5	Oriental Turtle Dove		*Streptopaliaorientalis*	
	Spotted Dove	Chhiteghughu	*Streptopeliachinensis*	DD
6	Rock Dove	Rock Pigeon	*Columba livia*	LC
	Black Drongo	Finga	*Dicrurusmacrocercus*	LC
7	Asian Pied Starling	GuyeSalik	*Sturnus contra*	LC
8	White-breasted Kingfisher	SandabukMachhranga	*Halcyon smyrnensis*	VU
9	Common Kingfisher	ChottoMachhranga	*Alcedoatthis*	LC
10	House Crow	Kak	*Corvussplendens*	LC
11	Jungle Babbler	Chhatare/Satbhai	*Argyastriatus*	LC
12	Black-headed Oriole	BeneBau	*Oriolusxanthornus*	LC
13	Eurasian Golden Oriole	SonaBau	*Oriolusoriolus*	LC
14	Common Myna	Salik	Acridotherestristis	LC
15	Blue Rock Pigeon	GolaPayra	*Columba liviadomestica*	
16	Common Hoopoe	Mohonchura	*Upupaepops*	LC
17	Asian Koel	Kokil	*Eudynamysscolopacea*	LC
18	Rose-ringed Parakeet	Tia	*Psittaculakrameri*	LC
19	Brown Shrike	Karkata	*Laniuscristatus*	LC
20	Indian Treepie	HandiChacha	*Dendrocittavagabunda*	LC

Table-15 The Mammalian checklist is as follows-

SL. NO	COMMONNAME	BENGALINAME	SCIENTIFICNAME	IUCN RED LIST
1	FivestripedPalm Squirrel	Kath Berali	*Funambuluspennantii*	Least Concern (LC)
2	Free-rangingCat	Biral	*Felisdomesticus*	DD

3	Free-rangingDog	Kukur	*Canisfamiliaris*	DD
4	AsianPalmCivet	Bham	*Paradoxurushermaphroditus*	LC
5	FieldRat	MethoIndur	*Bandicotabengalensis*	LC
6	GreyMongoose	Beji	*Herpestesedwardsii*	LC
7	HouseMouse	NengtiIndur	*Musmusculus*	LC
8	Small Indian Civet	Kotas	*Viverriculaindica*	LC
9	Bengal Fox	Fox	*Vulpesbengalensis*	LC
10	Indian gray mongoose	Neul	*Herpestesedwardsii*	LC

*NE: Not evaluated; LC: Least concerned; NA: Not accessed

Implemented Biodiversity & Green Management		
Sl. No	Factors/ Indicators	Weightage
1	Plants Diversity	M
2	Birds and Insects	M
3	Mammals	M
4	Fishes and Amphibian	H
5	Fungus & Organisms	M

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

3.7 Reviews of Documents and Records:

Documents such as admission registers, registers of Engineering and water charge remittance, furniture register, laboratory equipment registers, purchase register, audited statements, and office registers were examined and data were collected. College calendars, college magazines, annual report of the college and NAAC self-assessment reports, UGC report etc. were also verified as part of data collection.

Plant Diversity Counting and Specie

3.8 Review of Policies:

Discussions were made with the College management regarding their policies on environmental management. Future plans of the College were also discussed. The management would formulate a revised environment /green policy for the college in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are to be in accordance with the Green Policy adopted by the institution.

3.9 Interviews:

Biodiversity Patch

In tion for green auditing different audit groups which are IQAC Cell, Dept. HOD, Teaching and non-teaching staff, students, Students Union, parents and other stakeholders of the College. Discussions were also made with the office bearers to clarify doubts regarding certain points.

4.0 POST AUDIT STAGE :

4.1. Data Analysis and Assessment :

The base of any Green audit and Environmental audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner.

Although Green & Environmental audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. Each of the three components is crucial in ensuring that the organization's environmental performance meets the goals set in its green policy. The individual functioning and the success of integration will all play a role in the degree of success or failure of the organization's environmental performance.

ycle unit

4.2 Results and Findings:

a) Water -

Water Audit and Assessment (Mugberia College):

Sl. No.	Object and Parameter	Observation and Finding
1	Source of water	➢ Underground(35000 liter) ➢ Surface water bodies(0.8 acre)
2	Capacity of water storage (Daily)	➢ Reservoir and Overhead tanks- 35500 liter ➢ Lift of Surface water – 6000ltr ➢ Total amount of used & misused water- 41500ltr ➢ Total misuse of water-400 ltr
3	Amount of used water per day	41100liter
4	Misuse of water in daily	Leakage, overflow and Misuse-400 liter
5	Maximum used of water per day - for Clinging and Gardening purpose	7.41% (3046 liter)
6	Amount of water for used per day- Drinking Purpose	10.76 % (4422liter)
7	Number of Rain Water Harvesting unit	One unit
8	Installation of water reuse & Recycle units	One unit
9	pH level of drinking water	6.6-6.9
10	TDS level of drinking water	130ppm -150 ppm
11	Use of surface water	6000 ltr

b. Energy-

❖ Electricity Consumption - 30687 Unit, Rs.- 265587 /- Per Year

a) Conventional energy- 24175 Unit

b) Nonconventional energy- 6512 Unit Less-Rs. 59914 / .Rs. for Paid-Rs.-265587 /

- Fossil fuel consumption per Year:
  a. Number of Gas cylinders used for cooking purpose(Hostels& Canteen) – 34 PC
  b. Number of Gas cylinders used in Chemistry Laboratory - 06 PC
  c. Diesel used for green Generator- 90 liter
- Number of Green Generators - 03
- Cost of generator fuel – Rs. 1275 /month

Energy Audit and Assessment (Mugberia College)

Sl. No.	Object and Parameter	Observation and Finding
1	Source of energy (conventional)	79.00 %
2	Source of energy (Non-conventional)	Solar- 21 %(3015W Grid)
3	Total consumption of Electric Power	30687 unit
4	The maximum use of conventional Electric Power	24175 unit
5	Maximum energy consumption in the purpose	Light and fans - 277.76 Unit/Day
6	Energy Consumption in Computer & Lab.	201 unit /Day
7	No. of LPG Gas cylinder for cooking purpose	34PC/ Year
8	No. of LPG Gas cylinder used in Laboratories	06pc/Year
9	Amount of diesel used for green generator	90 liter/Year
10	No. of AC and use of energy	132 Kwh/Day

Energy consumption for different purpose, 2022-23		
1.	Lights & Fans	13410.2unit
2.	Air Condition	6076.03 unit
3.	Lifting of water(HP pump)	242.4unit
4.	Computer & Dept. Lab	9697.1unit

5. Others(CCTV,TV, water cooler & others)	1261.2 unit

c. Wastes-

- Total Students - 3200 persons
- Other Stakeholders – 156 persons
- Total Stakeholders - 3371 persons
- Hostel students- 220
- Departments – 27
- Student Hostels & Staff Quarters - 07
- Canteen- 02

D. Wastes Management Policy:

- Biological Wastes treatment by Vermi-compost system .
- E-wastes- computers, electrical and electronic parts – Disposal by selling
- Plastic waste- disposal by selling
- Solid wastes – Damaged furniture, Iron & Metal scraps- Disposal by Selling
- Food wastes – Waste Rice, Vegetable, Paper plates- Disposal in Earthen pit and Compost pit.
- Chemical wastes – Laboratory waste – Not proper treatment
- Waste water – washing, urinals, and bathrooms in soak pits.
- Glass waste – Broken glass wares from the labs by selling.
- Napkin & Clothes incinerators- Disposal in earthen pit

Waste Audit and Assessment

Sl. No.	Object and Parameter	Observation and Finding
1	Degradable waste	90 (Kg/Day)
2	Non degradable	4 (Kg/Day)
3	MainSource of waste (Organic)	Hostels, Canteen and Garden
4	Source of waste (Chemical Waste)	Zoology Lab., Chemistry Lab., Botany Lab. and Nutrition

5	Plastic waste management	Use of separate dustbin and Established of different waste unit

d) Green Campus-

Green cover of the campus- 0.82 acre area

Free space including Playground- 1.8 acre area

Crops cultivated in the campus:

Banana, Tapioca, Chilly, Cabbage, Tomato, Spinach, Brinjal, Cauliflower, Ladies finger, Pea and different seasons flowers are produced during different seasons in Hostels and Quarters Kitchen garden and College premises area.

Table 17 Biodiversity and Green Coverage

Sl. No.	Object and Parameter	Observation and Finding
1	Vegetation coverage area	14.21 %(0.82 Acre)
2	Types of green coverage	➢ Native and Natural Vegetation- 22% ➢ Medicinal plants- 15% ➢ Agro-plants- 38 %
3	Different types of Animal	➢ Mammals -Squirrel, Rat, Free ranging Cat, Free ranging Dog, Field Rat, Bengal Fox etc. ➢ Amphibian-Snake, Frogs ➢ Birds- Crow, Common Moyna, Pigeon, etc. ➢ Insects- Ants, Butterfly, Spider etc.
4	Biodiversity and Green Management Programme	➢ Awareness program arrange by- Dept. of Zoology and Dept. of Botany among the students and Stuff through the year ➢ Observation and celebration of environmental days ➢ Maintain the ponds ecosystem & fishes cultivation ➢ Installation of different trees and plants naming plate

Aerial views and Green coverage area

Table-18 Green Coverage of the College Premises

Green Coverage of the College Premises	Area in Percentage
Native and Natural Vegetation	22
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Medicinal Plants	15

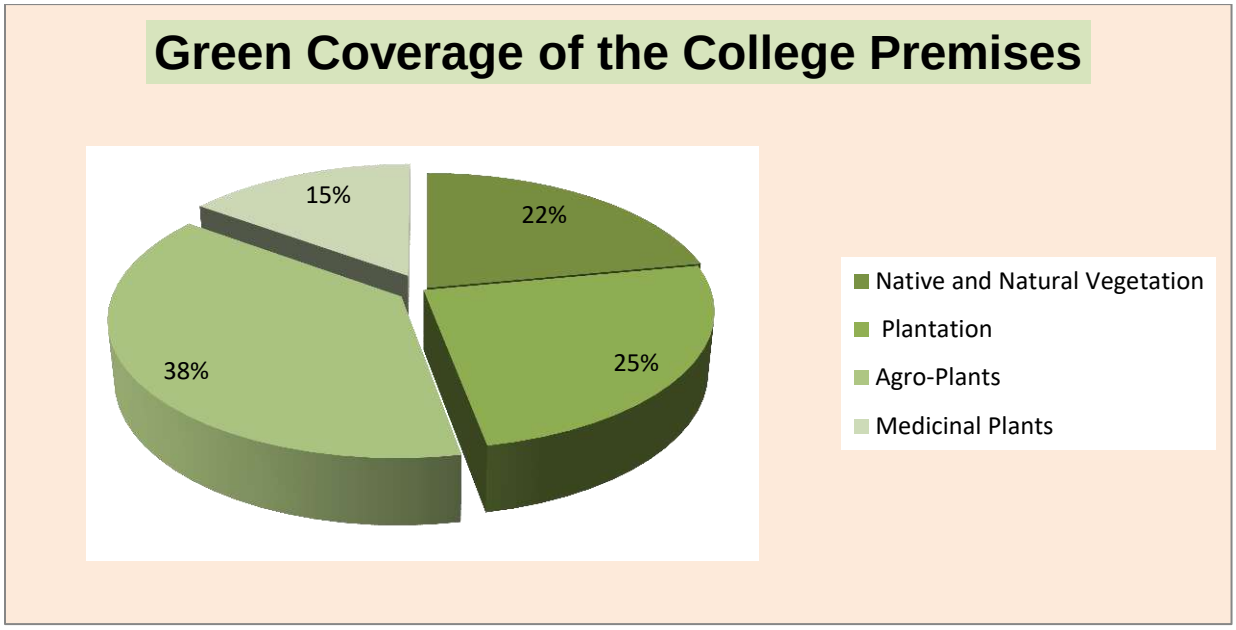

Fig.-12 Green Coverage of the College Premises

Campus farming

Organic vegetable cultivation as interim crop is another plan to be materialized soon. The department of Zoology has been consistently undertaking Fishes cultivation , and Botany department has been planting of flowers and ornaments trees in winter .

e) Carbon Footprint-

- Number of Students & Staff using cycles – 1500
- Number of persons using cars – 15
- Number of persons uses two wheelers – 75
- Number of students uses Buses - 1000
- Number of persons using other transportations – 546
- Number of visitors per day – 15
- Number of Students staying in the hostel –220
- Average distance travelled by stake holders – 20 kms /day
- Expenditure for transportation per person per day – Rs.30 /-

4.4 SUMMARY:

I. The environmental awareness initiatives are adequate.
II. The College campus is plastic free and maintained the outdoor air quality.
III. The installation of solar panels, organic vegetable cultivation, Vermi composting practices are adequate.

IV. There is NSS team of the College towards its environmental performance for Community development.
V. Indoor air quality of the laboratories is very uncomfortable and inhospitable.
VI. Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
VII. Programs on green initiatives have to be increased. Campus is declared "Clean Campus"
VIII. Fully carbon foot prints and wastes free zone actions should be taken to maintain this.
IX. Rain water harvesting systems, solar power generation, Bio Gas, Re-use of water environmental education programs have to be fully explored.

Implemented Air Quality management		
Sl No	**Indicator**	**Weightage**
1	Carbon & Smoke free	H
2	Exhaust fans &Ventilation	M
3	Emission of GHGs	M
4	Indoor Plants	M

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

Major Audit Observations		
Sl. No	**Sectors/Indicators**	weightage
1	Water efficiency Audit	H
2	Energy efficiency Audit	M
3	Air Quality & Carbon foot print Audit	M
4	Wastes Audit	H
5	Green & Biodiversity Audit	H

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

4.5 Environmental Education:

The following environmental education program may be implemented in the College before the next green and environmental auditing:-

- Certificate training course and programme in waste management by Zoology Department ,
- Setting up Water recycle and Reuse project of pond water for Drinking water purpose.
- Setting up of medicinal plant nursery, water management, vegetable cultivation, tree planting, energy management, landscape management programme , and rain water harvesting and water re-use methods.
- Increase the number of display boards on environmental awareness such as – save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.
- Activate the nature or green clubs
- Set up Organic vegetable garden, Honey farm, Mushrooms, Indigenous fish farm etc. for providing proper training to the students.
- Conduct exhibition and poster competition on Green and Clean campus for sustainable and healthy academic environment .

4.7 Common Recommendations

- ✓ Maintain of Indoor air quality
- ✓ Establish a solar pump house or solar submersible pump
- ✓ Adopt an environmental policy for the college
- ✓ Establish a purchase policy for environmental friendly materials
- ✓ Introduce UGC Environmental Science course to all students
- ✓ Conduct more seminars and group discussions on environmental education
- ✓ Students and staff can be permitted to solve local environmental problems
- ✓ Renovation of cooking system in the canteen to save gas and wooden fuel
- ✓ Installation of modern e-waste management unit
- ✓ Establish the crasser machine for plastic waste treatment
- ✓ Establish a biodiversity park
- ✓ Establish a scientific treatment unit for chemical waste management.

4.8 Criteria Wise Recommendations

Water Audit

- Remove damaged taps and install sensitive taps is possible.
- Drip irrigation for gardens and micro irrigation technology can be initiated.
- Establish the re-use water management methods.
- Establish rain water harvesting systems for each building and each campus.
- Establish the more water reuse unit in the Hostel & staff quarter's area.
- Establish water treatment systems.
- Awareness programs on water conservation to be conducted.
- .

Energy Audit

- ✓ Employment of more solar panels and other renewable energy sources.
- ✓ Conduct more save energy awareness programs for students and staff.
- ✓ Replace computers and TVs with LED monitors.
- ✓ More energy efficient fans, tubes and bulb should be replaced.
- ✓ Automatic power switch off systems may be introduced.

Waste Audit

- ❖ Establish a Regular functional bio gas plant.
- ❖ A model solid waste treatment system to be established.
- ❖ Practice of waste segregation to be initiated.
- ❖ Establish of a unit for chemical liquid wastes and Hazardous waste management
- ❖ A model Vermi composting plant to be set up in the Hostels, canteen and Quarters of college campus.
- ❖ Establish an e-waste management unit
- ❖ Establish the crasser machine for plastic waste treatment

Green Campus Audit

- ✓ All trees in the campus should be named scientifically.
- ✓ Establish a biodiversity park
- ✓ Create more space for planting in vacant land.
- ✓ Develop the Herbal and medicinal plants garden for large area
- ✓ Establish a butterfly park.
- ✓ Establish an Orchid ex-situ zone .
- ✓ Develop the Fruits trees area for Birds conservation
- ✓ Grow potted indoor plants at verandah, class rooms and Laboratories.
- ✓ Create automatic drip irrigation system during summer holidays.
- ✓ Not just celebrating environment day but making it a daily habit.
- ✓ Providing funds to nature club for making campus more green
- ✓ Encouraging students not just through words, but through action for making the campus green
- ✓ Conducting competitions among departments for making students more interested in making the campus green.

Carbon footprint Audit

- Establish a system of carpooling among the staff and visitors to reduce the number of four wheelers coming to the college.
- Establish the indoor plants in office rooms ,computer lab and other laboratories to CO_2 management
- Providing more college bus services to the students and staff.
- Encourage students and staff to use cycles.
- Establish a more efficient cooking system to save gas.

Perception study about the college.

Executive Summary: 2022-23

Environmental Audit is a process of systematic, documented, periodic and objective evaluation of components of environmental diversity with the aim of safeguarding the environment and natural resources. The process starts with the systematic identification, quantification, recording, reporting and analysis of components of environmental diversity and is a means of assessing environmental performance (Welford, 2002). It aims to analyze environments within and outside of the concerned area, which will have an impact on the eco-friendly atmosphere. Green and Environmental audit is a valuable means for an institution to determine how and where they are using the most resources; the institution can then consider how to implement changes and take necessary management measures. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of green impact on their area of work. Environmental auditing and the implementation of mitigation measures is a win-win situation for the institution, the learners and the planet. It can also create health consciousness and promote to holistic approaches to environmental management, awareness, values and ethics. Green and Environmental auditing promote financial savings through efficiency of resource usage. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the institute evaluate its own contributions toward a sustainable future. 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.

In Mugberia Gangadhar Mahavidyalaya, Purba Medinipur, W.B the audit process involved initial interviews with the teachers and staffs to clarify policies, activities, records and the cooperation in the implementation of mitigation measures. This was followed by collection of data through the questionnaires, review of records, observation and enquiry of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the Green and Environmental auditing process. The baseline data prepared for the Mugberia Gangadhar Mahavidyalaya, Purba Medinipur will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development. Existing data will allow the College to compare its programmers and operations with those of peer institutions, identify areas in the need of improvement, and prioritize the implementation of future projects.

The area of the College premises is 5.8 acre out of which about 0.82 acre areas is covered by trees, plants etc. and 0.8 acre areas is covered by surface water bodies and wetland In the present audit report most of the aspects are covered such as tree plantation, awareness about environment programmers, rain water harvesting and plastic free premises. The College has already taken some steps to protect the environment with help of teachers, staff and students under the guidance of Dr. Swapan Kumar Misra, Principal, Mugberia Gangadhar Mahavidyalaya, Purba Medinipur. We expect that the management will be committed to implement the green and environmental audit recommendations. We are happy to submit this green and environmental audit report to the Mugberia Gangadhar Mahavidyalaya, Purba Medinipur,W.B.