



GREEN & ENVIRONMENTAL AUDIT REPORT 2023-2024

**THE BHAWANIPORE EDUCATION SOCIETY COLLEGE, KOLKATA,
WEST BENGAL**

**CONSULTRAIN MANAGEMENT
SERVICES, LAKE ROAD,
KOLKATA**

**TROPICAL INSTITUTE OF EARTH,
& ENVIRONMENTAL RESEARCH
(TIEER), MIDNAPORE**

GREEN AUDIT : 2023-24

A Committee constituted by the Experts & Scientists from different reputed Institutes has conducted this Audit. The Committee developed a questionnaire for audit based on the regulatory & statutory requirements of Central as well State. The basic data was gathered & compiled, which the committee analyzed. By and large, the audit reveals a healthy environment inside the College premises. The committee has suggested short term as well as long-term suggestions for improved environmental conditions to a higher level and authorities and all stakeholders of the College conformed that they will give due attention and utilize opportunities for identified improvements. The Committee members are listed below:

LIST OF EXPERTS AND SCIENTISTS

SL.No.	NAME	DESIGNATION	AREA OF 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, Kappari	Climate Change and Environment Management and Biogeography
3	Mrs. Sanchita Bhattacharya	ISO 14001 auditor, Consultrain Management services, Kolkata	Environment management
4.	Dr. Bhaskar Bhowmik	Assistant Professor , Dept. of Green Entrepreneurship, IIT, Kharagpur	Green Technology & Marketing
5	Dr. Somnath Ghosal	Assistant prof, G-1, Rural Development IIT, KHARAGPUR	Biodiversity, Environment and Green Urban Planning
8	Dr. SK Mafizul Haque	Assistant Professor in Geography, CU	Climate Change and Environment Management and RS-GIS Techniques
6.	Dr. Bodruddza Arefin	Assistant Professor, Dept of Botany, Jhargram Raj College	Botany & Indigenous Flora
9	Dr. Mrinmoy Ghorai	Assistant Professor in Zoology, Panskura Banomali College	Fauna & Aqua animals
10	Sri Indrajit Dasgupta	Consultrain Management Services	Auditing & Management
15	Sri Amal Sasmal	Consultant, EIA and EMS	Environmental management
12	Dr. Chandan Karan	Faculty, Dept. of Geography, S.B. Mahavidyalaya, Kappari	Land use Survey, Technician for Lab test. and Map Designer
13	Dr. Suwendu Ghosh	Assistant Teacher	Soil Management and Environment Management
14	Manisha Bhowmick	Researcher at TIEER & Consultrain Management Services	Environment Science and RS-GIS

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CHAPTER-1

1.0 INTRODUCTION

Environmental auditing is a systematic, documented, periodic and objective evaluation to assess an organization's activities and services in relation to:

- Facilitating management control of environmental practices
- Promoting good environmental management
- Raising staff awareness and enforcing commitment to the departmental environmental policy
- Exploring improvement opportunities
- Establishing the performance baseline for developing an Environmental Management System (EMS)

1.1 Goals and Our Mission

Environment auditing is the process of identification and determination of the Institution's practices in creating awareness and practicing environment friendly measures. Over exploitation of resources like energy, water etc for a prolonged period has resulted in environmental degradation and loss of biodiversity. It is necessary to check whether our way of living and using the resources is going to cause detrimental effects in our surroundings. Environment audit report aims at summarizing the College's contribution and its activeness in creating awareness and consciousness in practically applying the environment friendly measures towards an institute.

The main objectives of carrying of Environmental audit are:

- To estimate the Energy requirements of the Institution
- To report the expenditure on green initiatives, carbon footprint
- To record the air and water quality
- To conserve natural resources
- To record the waste disposal system

1.2 Advantages of Green & Environmental Audit

- To develop and build a 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 create plastic free campus and evolve health consciousness among the stakeholders
- To develop environmental ethics and values system in youngsters.
- Green and Environmental auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs.

CHAPTER-2 ABOUT COLLEGE



2.1 About the College

The Bhawanipur Education Society College (or The Bhawanipur College) is a private, co-educational, undergraduate College affiliated to the University of Calcutta in Kolkata, India. It is situated at 5, Lala Lajpat Rai Sarani (Elgin Road) of the Bhawanipur area of South Kolkata.

The Bhawanipur Education Society College was founded in 1966 with the motto "Education for Excellence" through the Bhawanipur Gujarati Education Society. Accredited by NAAC and affiliated to the University of Calcutta, BESC was created under Article 30 (1) of the Indian Constitution, which guarantees linguistic minorities, such as the Gujarati-speaking community in Kolkata, the right to establish and administer educational institutions of their choice. We started in 1966 with less than a hundred students, but in the decades since, BESC has strived to extend its motto to a truly diverse body of students, admitting eligible pupils regardless of linguistic, religious or regional backgrounds. *The College is established and administered by The Bhawanipur Gujarati Education Society. It is a minority-run institution affiliated to the University of Calcutta and is recognised under section 2(f) & 12(B) of the UGC Act, 1956.*

Umang is the annual cultural fest and the college also conducts Model United Nation Conference which was started in 2016.

NAAC Grading:

The National Assessment and Accreditation Council (NAAC) awarded The Bhawanipur Education Society College with "A" grade.

2.1 Campus Area and Infrastructure

Total area of the College – 3946.84 Sqm Main
College Building –3460.22 Sqm
Annex building –486.62 Sqm
Unit 2 -739.59 Sqm

Facilities available area wise:		
MAIN CAMPUS	ANNEX BUILDING	UNIT 2
Administrative building	Science Laboratories	Roof water harvesting
Society Office rooms	Pump House	Garden
Central Library	Electrical	
Classrooms		
Conferences		
Theatres		
Lifts		
Sports complex		
Auditorium		
Playground		
Over Head Water Reservoir		
Centralized Air conditioning		
Garden		
No. of Departments:	23	Main campus/Annex building/Unit 2
Science	07	
Humanities	12	
Commerce	03	
Other	01	
No of Class rooms :	82	Main Campus
No. of Laboratories :	33	Main Campus – 10 nos, Annex building – 23 Nos
Science Labs:	23	Annex Building
Computer Labs:	07	Main Campus – 06 Nos, Unit 2 – 01 Nos
Film studies labs:	01	Main campus
Conferences:	03	Main campus – 03
College Auditorium:	02	Main campus
Central Library:	01	Main campus
Kitchen:	02	Main Campus
Cafeteria:	01	Main Campus
No of Elevators:	05	Main Campus – 04 Nos, Annex Building – 01 Nos
Office rooms :	41	Main Campus – 38, Annex building – 03 nos
Toilets :	55	Main Campus – 48 Nos, Annex Building – 07 nos
Play Ground (own)	01	Main Campus
Garden area:	01	Main Campus
Butterfly Garden	0	
Medicinal plant garden	0	
Garbage area / Heap	01	Main Campus
Open Drainage	0	
Water Supply	Bulk Water Supply by KMC	
-- 6 --		
Service:		

Green Generator:	02	Main Campus
Roof water harvesting & Ground water recharge unit:	01	Unit - 2
Reuse of water unit	01	Unit - 2
Total Strength of the College (students, teachers and non-teaching staff) :	12,256	
No of Students :	11800	
No of Teachers:	187	
No of non-teaching staff	76	
Others	30	
Bus/Railway Station :	Within 500 Mtr	
Guard Outpost:	2	Main Gate & Annex building



2.3 Academic Department and Growth Centre

Academic Departments
GRADUATION :
Humanities (BA)
English
Bengali
Hindi
Education
Sociology
Geography
History
Political Science
Psychology
Journalism & Mass Com
Film Studies
Commerce (B Com Morning; Evening & Afternoon)
Science (B Sc)
Maths
Physics
Chemistry
Economics
Computer Science
Electronics
Statistics
Business Administration (BBA)
POST GRADUATION
English
Commerce



CHAPTER – 3 : Green & Environmental Auditing

3.1 Affirmation and commitment of the College:

The Management along with the ISO team & Infrastructure Department of the College has shown commitment towards the Green Audit process during the pre-audit meeting. They were always ready to encourage and support all green activities. The teaching fraternity, Environment Club along with students decided to promote all activities that are environment friendly such as awareness programs on the environment, campus farming, planting more trees, biodiversity management on the campus etc., after Green Audit. The College Management was willing to formulate policies based on the Green Audit report.

3.2 Methodology and Survey Schedules

The methodology adopted for this Assessment is formulated by collecting information from Onsite visit, group discussion, Campus survey, Enquiry, Observation, Perception study and opinion – all these were included in the Auditing Report.

SL.NO	PURPOSE	DATE	REMARKS
1.	Communication with the College authority	06-03-2024	Discuss terms and conditions
2.	Opening Meeting	08-03-2024	Submitted the survey schedule
3.	Collection of information about the College	08-03-2024	Introduction to Departmental Heads / Office staff
4.	Campus visit and observation	13-02-2024	Touring the entire campus and enquiring with Audit team
5.	Departmental visit and enquiry	13-02-2024	Enquiry conducted in Departments and Laboratories
6.	Interviewing faculty and students	08-03-2024	Data collection
7.	Review data and Assessment	13-02-2024	Meeting with auditors
8.	Pre Closing meeting	08-03-2024	Deciding on timeline
9.	Closing Meeting	08-03-2024	Meeting with the Green Audit team, concerned members in presence of TIC
10.	Submission of Audit report	01-04-2024	Report submission

Site Visit :

The campus and its premises were visited and analyzed by the audit-teams several times to gather information. Campus trees were counted and identified. Medicinal garden, Ground, canteen, library, classrooms, office rooms, were visited to collect data. The energy usage is calculated by identifying the total electricity consumption. Details of water taps and water usage were determined. The sources of wastes are identified and categorized into biodegradable and non-biodegradable wastes.

Group Discussion

The Discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional, district, national and global level. From the Group Discussion we gathered information on office-based environmental impacts like built-up area, utility bills, reuse of water, waste management energy-saving devices and IT equipment/e- waste was collected. This information was added to the carbon footprint data, generating a fairly clearer picture of the emissions and impact of the reduction measures undertaken.

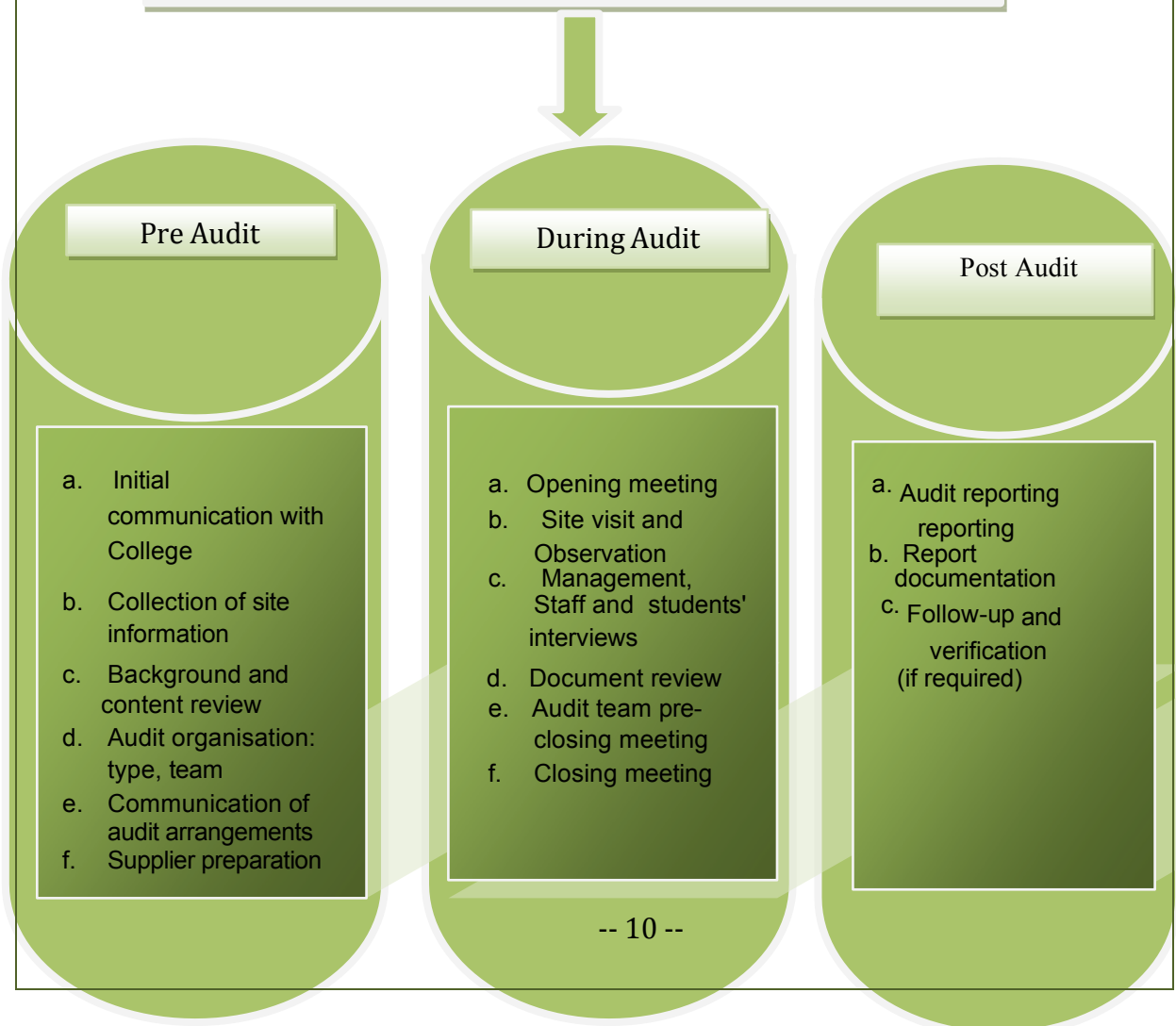
Purpose of Green and Environmental Auditing

The Green Audit is essential as per NAAC mandates. It is necessary to conduct Green Audit in the College campus to make students aware of the importance of having a green zone, its advantages to save the planet & this helps them to become good and responsible citizens of our country. The Green Audit practically involves use of renewable sources, conservation of energy, rainwater harvesting program, effects of carbon neutrality, plantation of trees, E-waste management and hazardous waste management. The national & local governments are putting lot of effort for maintaining a green planet. If caring for the environment is made must for all students and various programs are organized to make the students aware and environment friendly then they would be responsible for saving our planet, keep it green & also save energy.

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 also included in the Auditing Report.

Flow Chart of Methodology for Auditing



Chapter 4.0 : AUDITING

4.1 Campus Survey and Enquiry

Green audit forms part of a resource management process. Although they are individual events, the real value of green audit is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses 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". Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the Institute's energy and water consumption, reduce wastes to landfill, integrate environmental considerations into all contracts and services. This is considered to have significant environmental impacts. 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 & Carbon footprint Management
4. Waste and Waste Management
5. Biodiversity & Green Zone Management

Audit Stages

Pre Audit	During Audit	Post Audit
a. Initial communication with College Authority	a. Opening meeting	a. Audit reporting
a. Collection of site information	b. Site visit and observation	b. Follow-up and verification (if required)
a. Background and content review	c. Management, Staff and students' interviews	
b. Audit organisation: type, team	d. Document review	
c. Communication of audit arrangements	e. Audit team pre-closing meeting	
d. Supplier preparation	f. Closing meeting	

4.2 Water Efficiency and Water Management

The assessment of water requirement comprises of sanitation, laboratory, kitchen, drinking, washing, etc. The water is used for Drinking, Washing, Cleaning, Cooking and gardening purposes. Main water resource is bulk supply by Kolkata Municipal Corporation (KMC).

Its Water storage Capacity of overhead tank is 42,800 litres Qty

of water used per day : 35000 – 40000 litres

Water harvesting unit is installed and the recycled water is used mainly for ground water recharge and partly for gardening purpose.

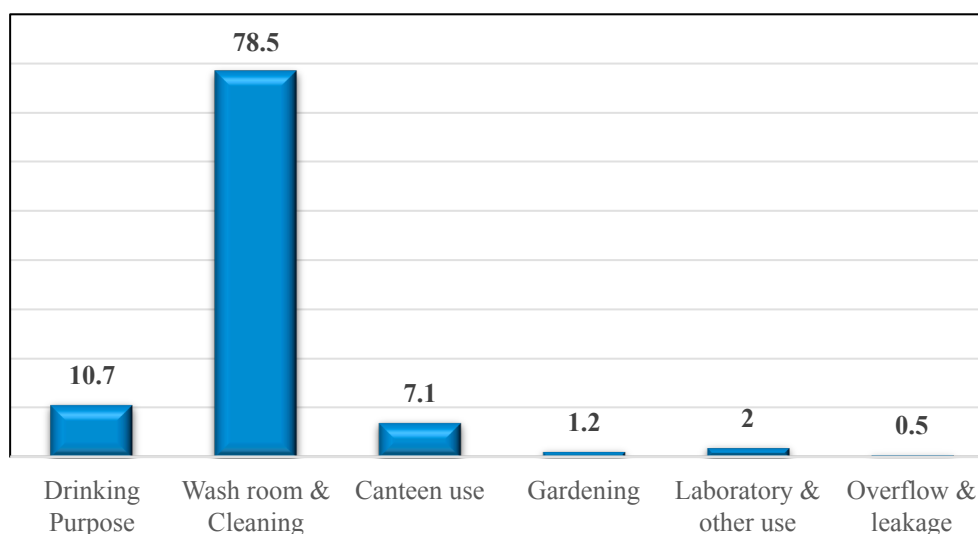
Water consumption :

S.No.	Question	Status	
		Nos	Amount in ltrs
1.	No. of water coolers/Gasser. Amount of water used per day.(in liters)	19	500 – 700
2.	No. of drinking water taps. Amount of water used per day.	150	6000 – 7000
3.	No. of water taps in laboratories. Amount of water used per day in each lab.	60	200 - 250
4.	No. of toilet, urinals. Amount of water used per Day.	34	12000 – 15000
5.	No. of taps in canteen. Amount of water used per day.	10	1500 – 2000
6.	Amount of water used per day for garden use.	--	200 – 250

Water Consumption (2022-23) & (2023-2024)

Sl no.	Purpose	Use of %	
		2022-23	2023-24
1	Drinking Purpose	10.64	10.70
2	Wash room & Cleaning	78.01	78.5
3	Canteen use	7.09	7.10
4	Gardening	0.89	1.20
5	Laboratory & other use	1.77	2.0
6	Overflow & leakage	0.53	0.50

Water uses (in %)



By the investigation with the help of Water P^H meter and TDS meter, we have assessed that the water quality of drinking water is highly healthy for human health. As a result, quality of water weightage is high (H). On the other hand, we have observed that only one rechargeable unit is active, so the medium category of water harvesting and water recharge methods are applied in the campus. By the observation, reuse of water and use of surface water in the campus is not properly managed. So, weightage of taken water management policy level is Low (L) .

Water management policy

Sl.No	Factors	Weightage (2022-23)	Weightage (2023-24)
1	Quality of Water	H	H
2	Re-use of water	L	M
3	Water Harvesting & Recharge	M	M
4	Use of Surface Water	L	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%

4.3 Energy Efficiency and Energy Management:

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy used is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. All tubes and lights are converted to an energy efficient light emitting diode (LED) uses only less than 10 W. On enquiring we found that the College is planning for non-conventional energy source. The used energy is 430483 units which amounts to Rs. 44,60996.00 in the year 2023-24, higher than last year.

Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices. Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. The details of Energy consumption is given below:

Sl.No	Items	Qty	Usage
1	Air conditioning machine	890.13 Ton	5700 unit/day
2	Elevators	05 Nos	200 unit/day
3	Computers	297 Nos	297 unit/day
4	Lights (Panel Light, 2x2 Grid lights, LED lights, LED flood light, Profile lights)	2074 Nos	670 unit/day
5	Fans	784 Nos	392 unit/day



Good Daylight Design and Ventilation:

- a) All the corridors receive good daylight due to the large windows.
- b) Corridors are wide with good ceiling height.
- c) Classrooms also have high ceiling with wide doors and large windows. Windows are kept open to receive sunlight.
- d) Curtains are provided on some of the windows to avoid glare. Due to the location some classrooms do not receive ample natural light and fresh air. Hence these rooms are provided with tube lights even during daytime.

It was observed that reflectors are not provided for tube lights which can reduce electricity consumption. Computers are always kept on standby mode with power saving screensavers. There are signages encouraging users to switch off lights and fans to save electricity.

Providing signage through screensavers & posters near electrical switchboards help in making students responsible for conservation of electricity.

Our Observations :

- a) Every classroom and lab with central switch board has a diagram linking place of tube light, fan etc. with corresponding switch. This ensures that correct fitting is switched on/ off and can save time & unnecessary operation.
- b) Installation of automatic lights is already done in toilets, they can also be used in corridors with sensors.
- c) 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.
- d) Usage of light reflectors is recommended as the reflectors can spread light to relatively large areas.
- e) Notices/ signage can be put up/ displayed near switches and on notice boards, informing students and staff to switch off all Department electrical gadgets when not in use.
- f) Use of large number of percentage renewable energy should be considered.

4.4 Air Quality and Carbon Footprint:

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 vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most leading greenhouse gas, comprising 407.4 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as **carbon emission**. An important reason for doing an audit is to be able to measure individual impact so that better ways can be implemented to manage the impact. In addition to the water, waste, energy and biodiversity audits we can also determine what our carbon footprint is, based on the amount of carbon emissions created. One aspect is to consider the distance and method travelled between home and College every day. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development. It is therefore essential that any environmentally responsible institution examine its carbon footprint.

It was observed that the Outdoor air quality is fresh and comfortable for breathing.

On enquiring, it was observed that more than 23% Oxygen is available in the air. Indoor air quality especially Computer and Departmental Laboratories is usually uncomfortable, there the level of Oxygen is less than 21.80%. On the other hand, the amount of CO₂ is very high in the departmental and Computer laboratories which amounts to more than 450 ppm (parts per million). Amount of CO₂ (

in ppm) of the air in different location

Location	Density of CO ₂ (ppm)
Out Door	435
Indoor (Classroom)	400
Laboratory	415

Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, as it relates to the health and comfort of building occupants. Some common indoor pollutants are listed as below:

- Molds and other allergens – This may arise from water seeping into the building envelope or skin, plumbing leaks, condensation due to improper ventilation, or from ground moisture penetrating a building part.
- Carbon monoxide – Sources of carbon monoxide can be traced to incomplete combustion of fossil fuels.
- Volatile organic compounds – VOCs are emitted by paints and lacquers, paint strippers, pesticides, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions etc.
- Carbon dioxide – Due to human respiration

Amount of O₂ (in %) of the air in different locations

- Particulate matter – Due to construction and maintenance activities

Air quality record in Different station CO₂ in ppm & Amount of Oxygen in %

Air quality record in Different station CO ₂ ppm	Density of CO ₂ (ppm)	Amount of O ₂ in %
Road Side	475	22.0
Corridors	435	21.6
Canteen	415	21.80
Play ground	387	21.9
Conference Hall	390	21.6
Chemistry Lab	410	21.8
Physics Lab	402	21.75
Library	400	21.3
Offices	410	21.8

Major observations under indoor air quality are as below:

- 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 also installed.
- c) Exhaust fans are only provided in washrooms and chemistry lab.
- d) A lot of indoor plants were observed in the entire Institute which not only enhances aesthetic appearance but also ensures health benefits.

4.5 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. Pollution from waste is aesthetically displeasing and results in large amounts of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals. This indicator addresses waste production and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals and petrol. Unscientific landfills may contain harmful contaminants that leak into soil and water supplies and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Thus the minimization of solid waste is essential to a sustainable College. 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.

Types of Waste:

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

- a) Solid waste - Nearby the Science department old instruments, Plastic containers, Bottles and furniture cause dump. Waste generated through paper, plastic packaging causes nuisance. Some wastes are generated after various experiments, primarily chemistry laboratory; broken test tube, glassware are the examples.
- b) Liquid waste - Bio-chemical wastes are generated through various chemical reactions and biological processes. Generally, these are being drained to nearby surface water bodies contaminating water and soil. Suggested appropriate means is to adopt scientific liquid waste management practices. These are neutralization, bacterial control, and natural control through plantation.

Waste Management

a) Solid waste

It was observed that:

- a) Plastic waste, non-plastic waste, wet waste and dry waste segregation is very meticulously practiced in the premises. Separate bins are provided for wet and dry waste. Plastic, non-plastic and hazardous bins are accessible for all departments and functions within the College premises.
- b) Combined waste is handed over to the PCB approved vendor in contract with the College for waste management.
- c) Canteen is the main area where biodegradable and non-biodegradable waste is generated.
- e) In other areas like classrooms, it is mostly paper waste and plastic wrappers



Old Instruments: The suggestion is that old instruments may be preserved in a central museum (may be developed if does not exist). The same may be used for demonstration to the new and passionate students and also for their project purpose.

Old Furniture: Old furniture may be reassembled to make stools, desks, chairs, tables, racks and book shelves with appropriate renovation. Moreover, since cutting of trees is not suggested, whatever resources we have from the ancestors must be preserved and utilised properly.

Plastic Waste: For plastic products and waste, a three-dimensional packaging and disposal of waste practice is suggested. Firstly, awareness programs on plastic product and its life cycle, its uses and disposal should be conducted regularly for the knowledge of the staff and students. In the second stage, practice of disposing of plastics wrapping, packaging, and other plastic-made things in the appropriate bin should be practiced. To support this purpose, enough bins are already in place in appropriate locations like students' common room, canteen etc. Regular collection of waste is in place by PCB approved dedicated vendor. In the end, unused or disposed plastic products should be recycled by grinding/ chopping instrument and final material is to be dispatched to market. The Institution has accepted the suggestion of use of such innovative recycling machine and has been suggested to design the machine.

Paper Waste Management: Being an academic Institution, wastepaper is the main solid waste generated in the premises. The Institution has taken steps to minimize and avoid paper usage. Faculty and administrative staff use recycled and used papers for internal usage as Inter Office correspondence, moderation of question papers, rough work, file markers, page separators etc. Few paper notices are displayed on the notice boards. The dissertation reports, journals, and answer papers are stored as per the College rules. After that the waste paper is destroyed in paper shredders. About 80% wastes are Bio-Degradable. 60% of the degradable waste is paper mainly examination paper, which amounts to 10 to 12 tons. After every two years, old submissions and answer papers are archived and stored in a record room at Examination control room. Old publications are still stored in the library. As per norms, for disposal of old newspaper, scrap dealer is called by Infrastructure department. Reusing paper instead of throwing it away is a new initiative of the College

E-Waste Management: Most of the storage of E- Wastes is generated in computer laboratory, library, Geography Lab, Remote Sensing & GIS and MBA Departments. Generated e-waste is collected centrally by the IT department and handed over to the concerned department for its final disposal to the approved vendor.

Hazardous waste: Wastes generated from chemical experiments are to be disposed safely maintaining chemical hazard disposal protocol.

Liquid waste: Liquid waste is generated from canteen, toilets and also from chemical experiments, washing of used glassware etc. Appropriate means suggested is to adopt scientific liquid waste management practices. These are neutralization, bacterial control, and natural control through plantation.

Waste prevention

Since waste demands a cost for recycling, it is better to design such product which takes less recycling cost. So, at the design phase the proper need assessment is to be undertaken to reduce the target cost for disposal.

Major audit issues in management of waste:

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:

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

- Total no of Students & other Stakeholders inside the campus – 12256
- Departments – 23
- Office Building-1
- Canteen - 1

➤ **Type of Wastes & Management:**

- 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
 - Papers wastes – Disposal by Selling
 - Food wastes – Waste Rice, Vegetable, Paper plates- Disposal to municipal waste Collection centers.
 - All Chemical waste in laboratories are treated by BOD, COD and PH methods
- Waste water – washing, urinals, and bathrooms in soak pits
- Glass waste – Broken glass wares from the labs to municipal waste collection centers.
- Napkin & Clothes incinerators- Disposal to municipal waste Collection centers.

Quantity of waste generated:-

- Biodegradable – 12 kg/day (office), (except Exam. Evaluation sheet)
- Non biodegradable – 2 kg/day (office)
- Biodegradable – 2.2kg/day (labs)
- Non-biodegradable – 2.5 kg/day (including glass bottles)
- Hazardous waste –220gm/day

Canteen waste

- Biodegradable College canteen – 62kg/day
- Non biodegradable – 4 kg/day

d) Green Campus

- Total number of plant species identified – more than 200 species.
- Tree cover of the campus – 54 acre area
- Free space including play ground- 49 acre area

Performance audit of waste issues:

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

Implemented waste management			
Sl.no	Factors/Indicators	Weightage (2022-'23)	Weightage (2023-'24)
1	Plastic and Polythene free	H	H
2	Re-use of papers	H	H
3	Hazardous effect of waste management	L	M
4	Removal of E-Waste	M	
5	Organic & food waste	M	M
6	Others solid wastes	M	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%

4.6 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. Without this variability in the living world, ecological systems and functions would break down with detrimental consequences for all forms of life, including human beings. Newly planted and existing trees decrease the amount of carbon dioxide



in the atmosphere. Trees play an important ecological role within the urban environment, as well as improve public health and provide aesthetic benefits to cities. 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, hence it becomes necessary for an Institution to have some trees around.

As the College is placed in the heart of the city, scope of plantation is very less. Plantation is needed in the compound in the periphery of the campus to keep down severe heat and cold. The trees should be planted in such a way that they should not completely obstruct the view of the building from outside and prevent sunlight from entering the room.

- a) Indoor plants can be spotted along the corridors of the Departments, classrooms and also Laboratories which maintain air quality. For enhancing the scenic beauty, it is suggested to plant flowering trees, which bloom in different seasons, in front of the large trees along the periphery.
- b). Vertical Gardening is done in a part of canteen, it can be done on the compound wall of the institute.

4.7 Review of Documents and Records

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

4.8 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 Green Audit was to ensure that the practices followed in the campus should be in accordance with the Green Policy adopted by the Institution.

4.9 Interviews

In order to gather information for Green Auditing, different audit groups interviewed the ISO and Green Audit Team, Infrastructure, HR, Principal, Dept. HODs, Teaching and non-teaching staff, students, and other stakeholders of the College.



CHAPTER : 5.0 POST AUDIT STAGE

Bio-degradable waste is collected and made into compost. Non-degradable and electronic waste and toxic materials are regularly disposed of. Important days like World Environment Day, Ozone Day, Hiroshima Day etc are observed and several programs including processions with placards, competitions and street plays are conducted by various departments to create awareness in environment protection and conservation.

e) Carbon Footprint

- ✓ Number of Students & Staff using cycles – 100
- ✓ Number of persons using cars – no car inside the campus
- ✓ Number of persons uses two wheelers – 10% (1200)
- ✓ Number of students uses other transportations - 70% (8400)
- ✓ Number of visitors per day – 10 nos
- ✓ Average distance travelled by stake holders – 5-6 kms /day
- ✓ Expenditure for transportation per person per day – Rs.80/-

5.3 Consolidation of Audit Findings

We hope that students and stakeholders have already developed a greater appreciation and understanding of the impact of their actions on the environment. They have successfully been able to determine the impact on the environment through the various auditing exercises. Participating in this green auditing procedure have helped them gain knowledge about the need of sustainability of the College campus. It will create awareness on the use of the Earth's resources in their home, College, local community and beyond.

5.4 Summary of Green Auditing and Environmental Auditing

- The environmental awareness initiatives have improved and still there is room for improvement.
- The College campus is plastic free and the indoor and outdoor air quality is maintained.
- Solar panels are yet to be installed
- Fire extinguishers training and awareness signages are adequate.
- There is an environmental committee of the College which works towards maintaining its environmental performance for Community development.
- Gardens inside the College premises are very well maintained.
- Greenery noticed in and around the College premises
- A few medicinal plants were witnessed.
- Indoor air quality of the laboratories is suitable and comfortable for breathing.
- Use of notice boards and signs are adequate to reduce over exploitation of natural resources.
- Programs on green initiatives are conducted throughout the year and provisions are there to increase them
- Initiatives to maintain fully carbon footprint and wastes free zones are in progress.
- Process to introduce rainwater harvesting systems, solar power generation, Bio- Gas, re-use of water environmental education programs is in progress.

Water Audit

- ❖ There is no water consumption monitoring system in the College campus.
- ❖ The College does not have wastewater treatment for wastewater Generated from laboratories, canteen, kitchen, washrooms and office rooms.
- ❖ The wastewater from canteen and kitchens is not suitably controlled and are not re-used for gardening.

- ❖ The College has to take action to strengthen rainwater harvesting. Rainwater harvesting for separate buildings is lacking.
- ❖ Measurement of quantity of water obtained from the rainwater harvesting should be done.
- ❖ Automatic switching system is not installed for pump sets used for overhead tank filling.
- ❖ Per day use of water is very high and there is no control over wastage of water.
- ❖ Display boards against the misuse of water use are lacking.

Energy Audit

- The communication process for awareness in relation to energy conservation is found inadequate.
- Assessment of electrical load calculation is yet to be done by the College.
- Monthly use of electricity in the College is very high.
- Objectives for reducing energy, water and fuel consumption are meagre.
- All lights, fans and Acs are power saving. Only LEDs are used for lighting arrangements.
- Regular monitoring of equipment and immediate rectification of any problems.
- Most of the floors of the College have better access to sunlight so electricity can be used less.

Waste Audit

- Solid waste management systems established are proper.
- The College has proper communication with the local body for regular collection of solid waste from the campus.
- Implementation of sustainable projects to attain set environmental goals is not in place.
- Biogas plant is not found.
- Proper composting systems are lacking.
- Chemistry, Physics, Electronics and Computer Science Labs are in place and very meticulously maintained.
- Wood waste (furniture, small items) has reduced to around 400-500 kg.
- For E-waste management, College should maintain a Register book for all departments.

Green Campus Audit

- ✓ Tree cover of the College with respect to the stakeholder's strength is enough.
- ✓ Regular planting of trees in the campus is not feasible.
- ✓ Vegetables cultivation is not possible because of space constraint.
- ✓ Display boards for all plants are visible.
- ✓ Water uses for gardens are high during dry season.
- ✓ Two plant biopods are present in the College campus, one in society office and the other in the library.
- ✓ There are only very few fruit trees in the College to attract birds.
- ✓ Some useful herbs are displayed in different departments.

Carbon Foot Print Audit

- College has not yet taken any initiative for carbon accounting.
- Adequate common transportation facilities should be provided by the College
- Encourage students to use cycles.
- Fossil fuel is burned every day for the functioning of the College. This is too high carbon emission.
- Energy from Non-conventional power is being planned.
- Use of 130 gas cylinders per month is a necessity.

Implemented Air Quality management			
SI No	Indicator	Weightage (2022- '23)	Weightage (2023-'24)
1	Carbon & Smoke free	H	H
2	Exhaust fans & Ventilation	M	M
3	Emission of GHGs	M	M
4	Indoor Plants	L	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			
SI. No	Sectors/Indicators	Weightage (2022- '23)	Weightage (2023-24)
1	Water efficiency Audit	L	M
2	Energy efficiency Audit	M	M
3	Air Quality & Carbon foot print Audit	H	H
4	Wastes Audit	M	H
5	Green & Biodiversity Audit	H	H

* H denote- Taken management policy level above 25%

** M denote- Taken management policy level 15%-25%

*** L denote-Taken management policy level below 15%

5.5 Follow Up Action and Plans

Green Audits are exercises which generate considerable quantities of valuable management information. The time, effort and cost involved in this exercise is often substantial and in order to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and that action plans and implementation programs result from the findings. Audit follow up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organisational priorities and with passing time.

5.6 Environmental Education

The following environmental education program may be implemented in the College before the next green 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, pollution monitoring methods, and rainwater harvesting and water re-use methods should be imparted.
- ❖ 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 model rainwater harvesting system, rainwater pits, Organic vegetable garden, medicinal plant garden, Honey farm, Mushrooms, Indigenous fish farm etc. for providing proper training to the students.

5.7 Preparation of Action Plan

Policies referring to College's management and approach towards the use of resources need to be considered. The College has a Green policy/Environmental policy for its sustainable development. The Environmental Policy formulated by the College Management has been implemented meticulously. The College should have a policy on awareness spreading or training programs (for ground staff or kitchen staff for example) and College also should have a procurement policy (the College's policy for purchasing materials).

- ❖ Conduct exhibition of recyclable waste products
- ❖ Continue chemical treatment system for wastewater from the Laboratories.

Awareness on Carbon Consumption

- ✓ Students and Staff members may be made totally aware of pollution caused by use of vehicles.
- ✓ The carbon consumption awareness programs on carbon emission at Individual as well as social level will help to avoid air and noise pollution in the campus due to vehicles.

5.8 Conclusion of Recommendations

Green Audit assists in the process of testing performance in the environmental arena and is fast becoming an indispensable aid to decision making in a College. The Green Audit report assists in the process of attaining an ecofriendly approach to the sustainable development of the College. Hope that the observations provided in the Green Audit report will serve as a guide for educating the College community on the existing environment related practices and resource usage at the College as well as spawn new activities and innovative practices. A few recommendations are added to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development. It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited organisation. Moreover these standpoints often help staff who have been too close to problems or methods to see the value of alternative approaches. This report is very powerful and a valuable communication tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

Common Recommendations

- ✓ Adhere to the Environmental Policy decided for the College
- ✓ Establish a purchase policy for environment 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
- ✓ To install Fire Extinguisher in the Storeroom

Criteria Wise Recommendations

Water

- Remove damaged taps and install sensor-based hand free taps, if possible and same may be implemented for urinals.
- Drip irrigation for gardens and vegetable cultivation can be initiated.
- Establish the re-use of water management methods.
- Establish water treatment systems.
- Awareness programs on water conservation to be conducted.

Energy

- ✓ Cut down on light
- ✓ Conduct more save energy awareness programs for students and staff.
- ✓ Observe a power saving day every quarter.
- ✓ Automatic power switch off systems may be introduced.

Air Quality & Carbon footprint

- ❖ Air quality to be checked while class is in progress.
- ❖ Encourage students and staff to use cycles.
- ❖ Discourage the usage of two wheelers amongst students for commuting.
- ❖ More use of generators every day should be discouraged.

Waste

- ❖ E-waste register to be maintained
- ❖ A model for solid waste treatment system to be established.
- ❖ Practice of waste segregation to be initiated.
- ❖ A plastic free campus to be established
- ❖ Usage of paper plates and cups for all functions in the College to be reduced.

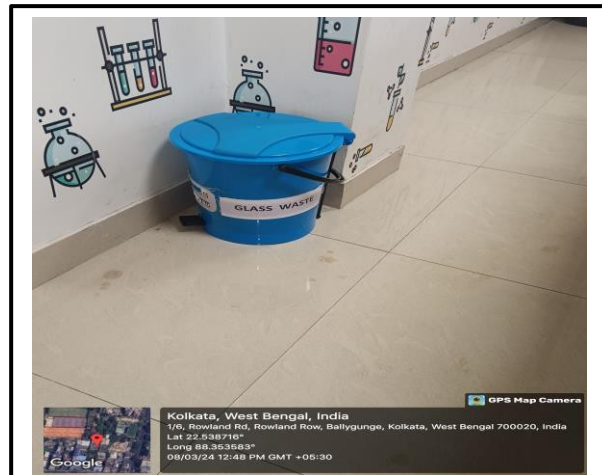
Green Campus

- ✓ All trees in the campus should be named scientifically.
- ✓ Increase more outdoor plants.
- ✓ Grow potted plants at corridors, classrooms 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.

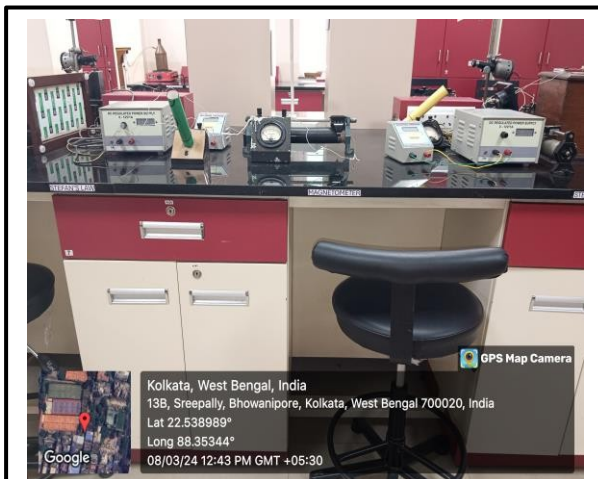
**PHOTOGRAPHS AND IMAGES
(Laboratory)**



Water consuming tap at lab

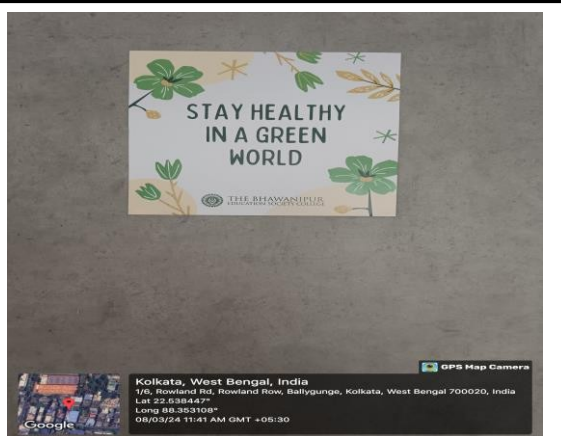
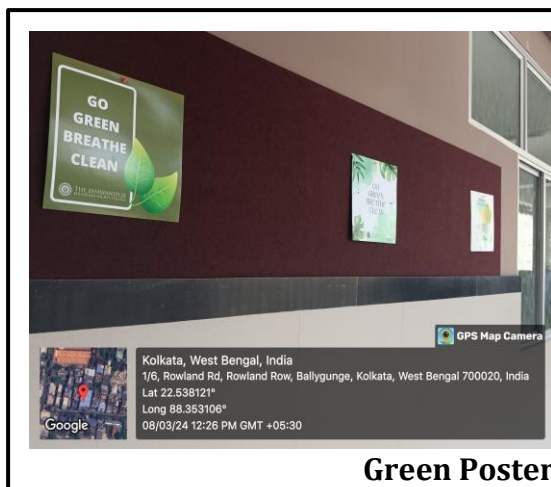


Glassware bin at lab

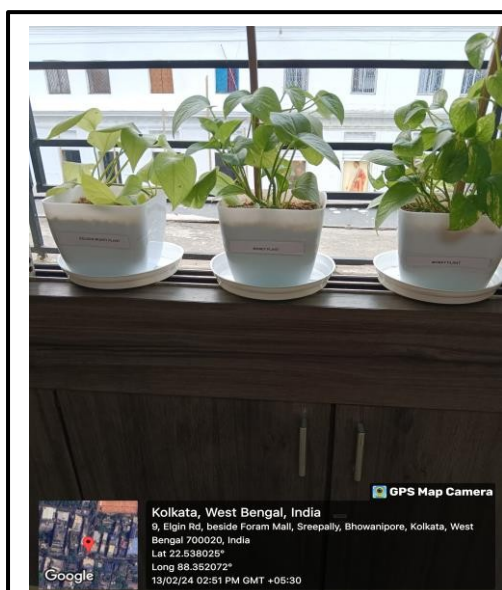


Some instruments with labels

Photo and images of other places



Photographs and Images of Medicinal plants & Indoor plants



Indoor plants and Vertical Garden

Photographs and Images of Audit process

