



सत्यमेव जयते

# Barasat Government College



## Green Audit Report Academic Session 2023-24 PART II

Vermicomposting, Solar Power, Energy Management, Waste Management, Water Management, Carbon Footprint Management, Soil analysis, Carbon Budget, Green Campus Facilities and Activities

### GREEN AUDIT TEAM

Prof. Samar Chattopadhyay, Principal, WBSES (Chairperson)

Dr. Chandan Surabhi Das, Associate Professor, Department of Geography (Jt. Convener)

Dr. Rituparna Kundu Chaudhuri, Assistant Professor, PG Department of Botany (Jt. Convener)

- Dr. Jibanananda Jana, Associate Professor, Department of Chemistry
- Dr. Bidyut Pramanik, Associate Professor, Department of Geography
- Dr. Sarajit Biswas, Assistant Professor, PG Department of Physics
  - Smt. Indrani Banerjee, SACT, PG Department of Zoology

# Content

Sl No.	Green Audit Components (2023-24)	Page Number
1.	Composting/Vermicomposting	3
2	Solar Power, Renewable Energy	5
3	Energy Management	6
4	Waste management	13
5.	➤ E Waste management	
6.	➤ Solid Waste Management	
7.	➤ Chemical Waste management	
8.	Water Management	17
9.	Carbon Footprint Management	23
10.	Sound Level Determination at campus	28
11.	Soil Sample Analysis from College Campus	30
12.	Estimation of Carbon Sequestration by Vegetation, Soil	32
13.	Carbon Emission from electricity consumption, Fuel, water	35
	Carbon Budget of College Campus	36
14.	Actions Taken to fulfill Environmental Objectives	37
15.	➤ Green Campus Facilities and Activities	
	ANNEXURE 1A	40
	ANNEXURE 1B	41
	ANNEXURE 1C	42
	ANNEXURE 1D	43
	ANNEXURE 1E	44
	ANNEXURE 1F	45
	Outreach Programmes Beyond campus ANNEXURE 2A	46
16.	Within Campus Activities ANNEXURE 2B	51
17.	Rain Water Harvesting/Ground Water Recharging	54
18.	ANNEXURE 3 (ISO Certifications)	55
19.	Future Suggestions	56
20.	Conclusion	57

## VERMICOMPOSTING

*Vermicomposting unit is present within college campus that is deployed to produce significant amount of compost utilisable for maintenance of garden area.*

The Zoology department has been maintaining a vermicomposting unit since 2018. The unit is located in a shady area within BGC campus, just behind the department building. The unit consists of a series of bins, each of which is filled with a mixture of organic matter, such as food scraps, paper, and cardboard. The worms are added to the bins, and these are very efficient to break down organic matter into compost. The worms are fed a mixture of cow dung, vegetable waste and paper waste. The waste is added to the bins on a weekly basis. The worms are very sensitive to temperature and moisture levels.

The compost is ready to be harvested after 4-6 months. The compost is harvested by removing the worms from the bins and then sifting the compost to remove any large pieces of organic matter. The compost is used to fertilize the plants in the campus's garden. Therefore, the process of vermicomposting takes several months, but the end result is a rich, nutrient-rich compost that can be used to fertilize plants.

The installations are being used regularly by college authority. Annually 28-30 kg of vermicompost could be produced.

It was found that vermicomposting is a great way to reduce the amount of waste that the department produces. The department also uses the compost to fertilize the plants in the garden of BGC campus. In addition to being a sustainable practice, vermicomposting is also a great way to educate students about the importance of recycling and composting, to provide students with experiential learning and learn by doing, to train the students in vermiculture and composting methods, its application in agricultural practices, and their role in waste management, to promote the production of vermicompost, to develop the management and marketing skills of students, to develop a research culture among the students, finally to maintain an eco-friendly college campus.

### **Strategy for maintenance of Vermicompost unit:**

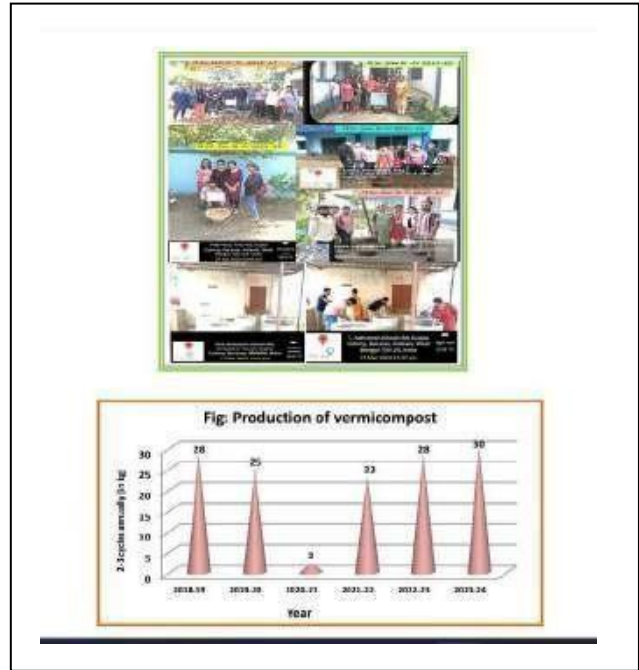
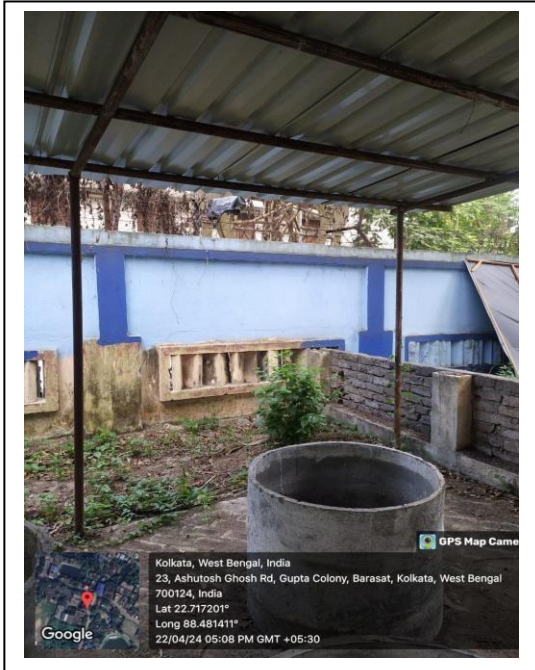
The pit is 2ft in diameter and 3ft in depth, constructed under a shade to avoid rainwater directly pouring into the pit. This is commonly used for small scale production of biocompost. The raw material includes organic green wastes from kitchen, uncontaminated soil (Excrements of carnivorous animals, such as dogs and cats, diseased plants, dairy products, meat, bones, or fish remains needs to be avoided), sawdust, dried brown leaf-litters were collected from the surrounding vegetation. The wastes and soil are applied in layers, the length of the plant parts ranges between 3 to 5 inches. All the green and brown wastes were kept moist (avoid water logging) and mixed. For aeration the pit was covered with mosquito net or mesh. The compost is ready when it smells and looks like soil at room temperature. It can be used directly on plants. Maintenance and regular monitoring is necessary every week, The precautions are as follows:

The compost must not be allowed to dry.

- Compost soil should always be moist but not wet or soaked.
- Ventilation and air circulation is necessary within the pit. The organic residues are decomposed and degraded naturally within 4 to 6 months forming organic compost. This compost is used in the horticulture/vegetable and medicinal garden of the college. Biocompost is a nutrient rich compost which helps in better plant growth and crop yield and improves physical structure of soil and increase water holding capacity of soil. The organic mass decomposed

and degraded improves fertility of soil. It improves root growth of plants and enhances germination, plant growth, and crop yield. Nearly 28 to 30 Kg of compost can be produced annually.

### A VERICOMPOST UNIT AT BARASAT GOVERNMENT COLLEGE



*A Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## SOLAR POWER STATION/ RENEWABLE ENERGY

Two solar power units (10kWp and 20kWp by WBREDA) have been installed at the rooftop of the main administrative building directly connected to the grid that helps in reducing the electric bills.

**Name of the Facility: (i) 20kWp Solar Panel (ii) 10kWp Solar Panel**

**Location:** Rooftop, Barasat Government College

**Service:** Provides maximum (i) 26000kWh(units) and (ii)13000kWh (units)electricity supply per year respectively

**Benefits:** Reduces electricity expenditure

**Expenditure for Installation:** Rs. 10,53,768/-



10kWp and 20kWp rooftop Solar power units



Schematic Diagram of Solar Power Connections

*A. Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



# ENERGY MANAGEMENT

## Introduction

Thermal and Hydroelectric power sources primarily meet the need of global demand of electricity. The energy production mainly is from natural gas, coal, hydroelectric and other renewable sources. However, due to overpopulation, excessive consumption, waste of energy, deteriorated infrastructure, natural disasters global energy crisis occurs. At present, the world is going through crisis of conventional or non-renewable sources of energy. Implacably the world needs judicious steps are taken for energy management and control, the situation. To produce lesser carbon foot print remains another goal to aim for sustainable future. In this regard, some immediate steps are required to explore sources of renewable energy with proper implementation in each and every sector involving environmentalists, scientists and industrialists.

The energy crisis also has severe environmental consequences. The burning of fossil fuels leads to air and water pollution, which affects human health and the environment. The depletion of natural resources and environmental degradation have also resulted in the loss of biodiversity and ecosystem services. To combat the crisis we need to conserve energy.

**Objective of Energy audit** report is a vital data analysis regarding electric energy consumption. It helps to identify some disorder in the electrical connectivity, uneven load distribution, detection of overload area etc and hence precautionary measurement can be taken for some particular overloaded area. The Principal of Barasat Govt College has taken the initiative for preparing the energy audit report in the academic year 2021-22 and 2022-23.

### Strategy taken for audit:

Energy audit report is a vital data analysis regarding electric energy consumption. It helps to identify some disorder in the electrical connectivity, uneven load distribution, detection of overload area etc and hence precautionary measurement can be taken for some particular overloaded area. The Principal of Barasat Govt College has taken the initiative for preparing the energy audit report in the academic year 2021-22, 2022-23 and 2023-24. A team has been formed comprising with Dr. Madhusudan Ghosh (Associate Professor of Physics), Dr. Abhijit De (Associate Professor of Physics) Mr. Narayan Ch. Paul (Lab Bearer) and Shri Pintu Chowdhury, Staff, PWD under the guidance of Principal, Barasat Govt College for completion of energy audit report. The college buildings comprises with eight isolated Depts (Physics, Chemistry, Mathematics, Zoology, Botany, Geography, Economics & Bengali), Arts classrooms (for five Arts Depts: Sanskrit, Philosophy, History, English & Political Science), Staff room, Seminar room, Language room, Principal room, office, Cashier room, Library, Kayashree room, NSS room, ICC room, Cheap store, Student's Common rooms, PWD room, canteen, Union room, corridors, Toilet, Garden & Lawn. A solar panel setup of 10 KW has been installed in the roof-top of the main building in November, 2021 by West Bengal Pollution Control Board. Initially the solar panel was not connected in "ON GRID" mode through a recording meter and hence energy saving has not be recorded. But, later this solar panel has been connected in "ON GRID" mode (in the session 2022-23). The energy audit report team has collected all connected load and plug point load (room wise) and then calculated the maximum power requirement, maximum energy consumption in a month and so many energy consumption analysis (using bar diagram). The team also analyse the actual power consumption (month wise) and make a comparative study on monthly consumption. Device wise consumption and there comparative is also presented in bar diagram.

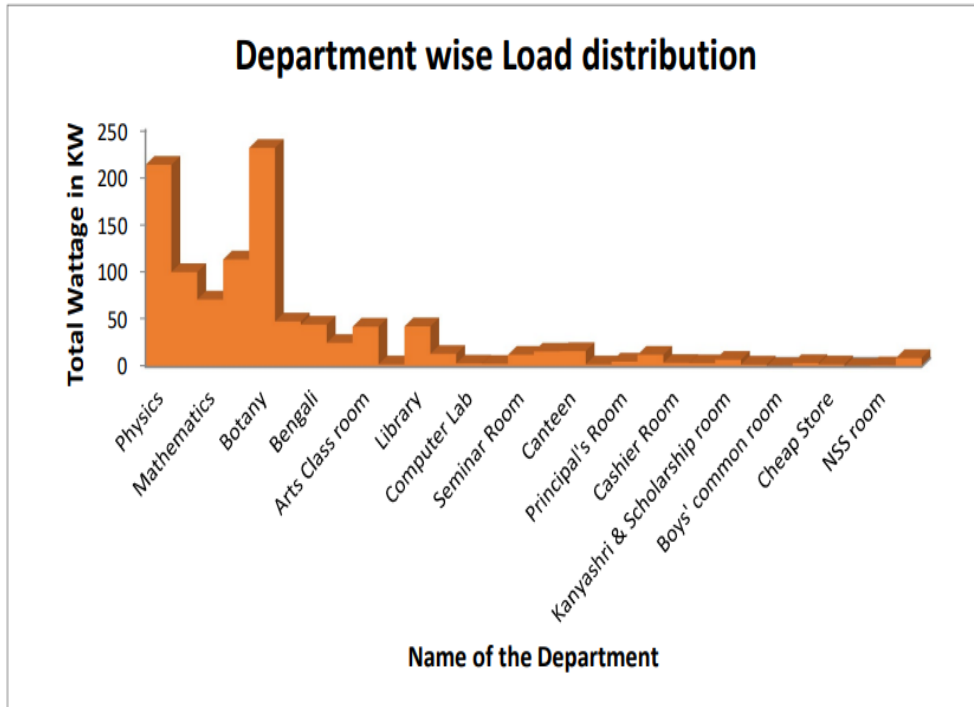
### **A Solar panel setup of 10 kWp and 20kWp has been installed in the roof-top of the main building.**

Initially the solar panel was not connected in "ON GRID" mode through a recording meter and hence energy saving has not be recorded. But, later this solar panel has been connected in "ON GRID" mode (in the session 2022-23). The energy audit report team has collected all connected load and plug point load (room wise) and then calculated the maximum power requirement, maximum energy consumption in a month and so many energy consumption analysis (using bar diagram). The team also analyse the actual power consumption (month wise) and make a comparative study on monthly consumption. Device wise consumption and there comparative is also presented in bar diagram.

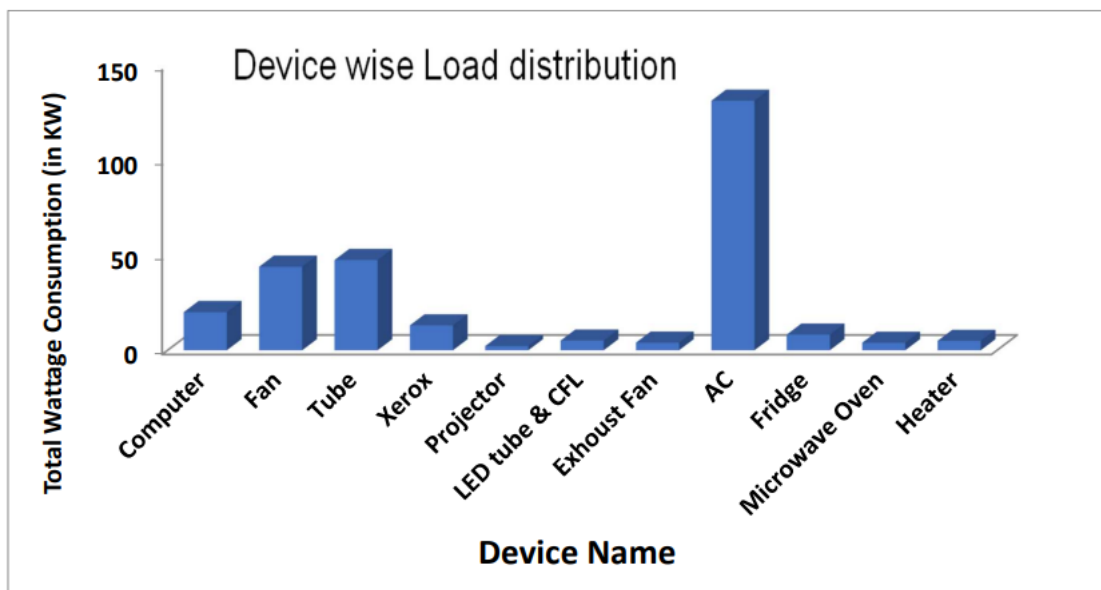
List of Energy Consuming Sources: - (Table Format) [Principal's Room, Principal's Office and Department wise)

**List of Energy Consuming Sources: - (Table Format) [Principal's Room, Principal's Office and Department wise)**

Name of Dept/Section/ Room	Computer	Fan	Tube	Xerox/ Projector	Extra LED tube/ Ex-Fan/ CFL	AC	Fridge	Microwave Oven	Heater	16 Amp plug	6 Amp plug	Lab Instrument (Type-1)	Lab Instrument (Type-2)	Total Plug points Power in Watt	Total Power without plug Points in Watt	Total Watt
	No of Computer	No of Fan	No of Tube	No of Xerox/Proj	No of LED	No of AC	No of Fridge	No of oven	No of Heater	No of Plug	No of Plug	No of Instrument	No of Instrument			
Physics	31	77	119	4	14	6	2	0	0	160	274	3	0	176440	36558	212998
Chemistry	7	75	240	0	19	10	5	1	0	54	94	5	2	59640	40268	99908
Mathematics	20	21	35	0	0	4	0	0	0	52	135	0	0	60100	10870	70970
Zoology	13	40	63	3	29	12	6	0	0	69	88	4	1	74280	39000	113280
Botany	19	85	185	7	0	17	18	3	5	150	165	56	0	159900	70920	230820
Geography	13	34	53	7	9	2	0	0	0	28	90	0	0	33400	14431	47831
Bengali	6	55	93	2	4	9	0	0	0	16	68	0	0	20080	24410	44490
Economics	2	24	24	1	0	0	0	0	0	21	20	0	0	22200	3090	25290
Arts Class room	0	61	101	0	13	0	0	0	0	31	47	0	0	33820	8570	42390
Toilet	0	4	21	0	14	0	0	0	0	0	0	0	0	0	2620	2620
Library	7	41	126	1	7	3	0	0	0	22	68	0	0	26080	16587	42667
Language room	1	7	9	0	0	2	0	0	0	7	11	0	0	7660	5990	13650
Computer Lab	0	11	8	0	0	0	0	0	0	2	7	0	0	3510	2000	3510
Netaji Open University room	0	7	9	0	0	0	0	0	0	2	6	0	0	2360	850	3210
Seminar Room	0	12	28	0	0	5	0	0	0	3	7	0	0	3420	9348	12768
Staff room	1	10	12	0	0	4	0	0	0	6	8	0	0	6480	9690	16170
Canteen	0	10	10	0	2	0	0	0	0	15	5	0	0	15300	1300	16600
IQAC	1	4	4	0	0	2	0	0	0	0	0	0	0	0	2590	2590
Principal's Room	1	3	4	0	0	1	0	0	0	3	7	0	0	3420	2140	5560
Office	5	7	0	0	14	2	0	0	0	6	15	0	0	6900	5820	12720
Cashier Room	1	2	2	0	0	1	0	0	0	2	5	0	0	2300	1870	4170
ICC room	0	3	3	0	0	0	0	0	0	3	9	0	0	3540	330	3870
Kanyashri & Scholarship room	2	3	5	0	0	1	0	0	0	4	30	0	0	5800	1710	7510
Girls' common room	0	3	5	0	0	0	0	0	0	2	1	0	0	2060	410	2470
Boys' common room	0	4	8	0	0	0	0	0	0	0	4	0	0	240	600	840
Union Common room	1	4	5	0	4	2	0	0	0	0	5	0	0	300	3710	4010
Cheap Store	1	0	1	1	0	0	0	0	0	1	4	0	0	1240	1390	2630
PWD room	0	1	1	0	0	0	0	0	0	0	1	0	0	60	110	170
NSS room	1	1	2	0	0	0	0	0	0	1	5	0	0	1300	300	1600
Lawn & Ground	0	16	25	0	47	0	0	0	0	4	7	0	0	4420	4870	9290
<b>Grand Total</b>	<b>133</b>	<b>625</b>	<b>1201</b>	<b>26</b>	<b>176</b>	<b>83</b>	<b>31</b>	<b>4</b>	<b>5</b>	<b>664</b>	<b>1186</b>	<b>68</b>	<b>3</b>	<b>736250</b>	<b>322352</b>	<b>1056602</b>



**Bar diagram for Department/Section wise load distribution**



**Bar diagram for Device specific power consumption**



**Calculation of Electrical Load & Consumption: - (Table Format) [Equipment Item wise]**

Sl. No.	Name of the Equipment	Total No. of Equipment	Wattage	Total Wattage	Demand Factor	Max. Demand	Remarks
1	Computer	133	150-200	20220	0.8	16176	
2	Fan	625	70-100	44280	0.85	37638	
3	Tube	1201	36-40	47836	0.85	40660.6	
4	Xerox	11	1200	13200	0.85	11220	
5	Projector	15	150	2250	0.8	1800	
6	LED tube & CFL	149	20-40	5136	0.85	4365.6	
7	Exhaust fan	27	70 - 300	4050	0.85	3442.5	
8	AC	83	1000-2000	131450	1	131450	
9	Fridge	31	8020	8320	0.85	7072	
10	Microwave Oven	4	1000	4000	0.85	3400	
11	Heater	5	1000	5000	0.85	4250	
12	Lab Instrument	71	200 - 2000	35700	0.85	30345	
13	16 Amp Plug	664	1000	664000	0.25	166000	
14	6 Amp Plug	1186	60	71160	0.5	35580	

**Total Wattage = 493400 KWH**

**Sum of individual maximum demand in KW = 493.4 KWH**

**Simultaneous maximum demand (50% of Total Demand) = 246.7 KWH**

**Maximum Energy consumption one hour per day (kwh) = 247 KWH**

**Maximum Energy consumption five hour per day (kwh) = 1233 KWH**

**Maximum Energy consumption for one year (taking 240 working days) = 296040 KWH**

**Maximum Energy consumption for rest 125 days (taking 5% of normal consumption) = 7709 KWH**

**Maximum Energy consumption for one Year = 303749 KWH**

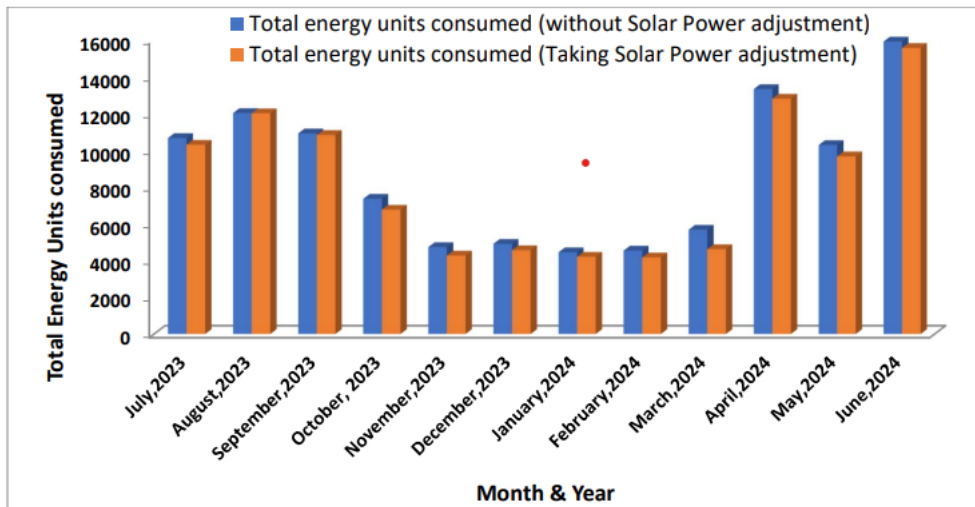
**Maximum Energy consumption (average) for one month = 25312 KWH**

Consumption of Energy in the Period July, 2023 till June, 2024: - (Table Format)

Month and Year	Energy units (KWH) consumed (Cust. Id 950039105 Installation no. 20937801)	Energy units (KWH) consumed (Cust. Id 950027217 Installation no. 19165902)	Solar energy adjustment (units)	Total energy units consumed	Remarks
July,2023	8854	2195.5	365	10684.5	Solar Panel was installed in 2017 but the meter for "ON Grid" power return back to the source has been installed in January, 2023, but billing amount has been reduced immediate after installation of the Solar panel.
August,2023	9736	2315	12	12039	
September,2023	9056	1964.5	86	10934.5	
October, 2023	6180	1789	593	7376	
November,2023	3790	1415.5	462	4743.5	
December,2023	3928	1341.5	349	4920.5	
January,2024	3552	1151	244	4459	
February,2024	3649	1275.5	374	4550.5	
March,2024	4973	1779.5	1062	5690.5	
April,2024	10045	3827	524.5	13347.5	
May,2024	8530.5	2387.5	617	10301	
June,2024	11042.5	5227	344.5	15925	

<b>Yearly Total (off grid)</b>	<b>104971.5 KWH</b>
<b>Yearly Total (on grid)</b>	<b>99938.5 KWH</b>
<b>Monthly Average (off grid)</b>	<b>8748.0 KWH</b>
<b>Monthly Average (on grid)</b>	<b>8328.0 KWH</b>
<b>Monthly Savings (for on grid)</b>	<b>419.0 KWH</b>

Bar Chart showing the relative consumption in the different months for the Period – July,23 to June,24



**Comparative of monthly energy consumption in the Academic Year 2023-24**

## Observations:

- a) Filament bulbs are completely replaced by LED bulbs and Tubes which save the power
- b) consumption.
- c) In the 2023-24 period, consumption has seen a slight increase compared to the previous year, as the prior year's consumption was limited due to the adjustments made in the "new normal" following the Covid-19 pandemic.
- c) Solar power reduces the monthly billing units though reduced data is not recorded due to lack of "ON GRID" meter connection
- d) Most of the energy consumption done by AC.
- e) Most of the plug points uses for low wattage devices.
- f) The Dept of Botany uses maximum energy closely followed by Physics Dept out of total consumption of the college.

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## SUMMARY OF ENERGY CONSUMPTION

### OFF GRID AND ON GRID CONSUMPTION OF ENERGY AND SAVINGS DUE TO SOLARPOWER INSTALLATION

Yearly Total (off grid)	104971.5 KWH
Yearly Total (on grid)	99938.5 KWH
Monthly average (Off Grid)	8748.0 KWH
Monthly average (On grid)	8328.0 KWH
Monthly savings (for on grid)	419.0 KWH

### Conclusions:

- During data collection for energy audit we find the actual load distribution among different Dept/Section inside the college campus. The load distribution data helps us for this particular precautionary measurement.
- Energy audit must help to reduce the energy consumption as well as saving the electric power Consumption billing amount. This study may prevent the accidental event caused by overload or short-circuit.

*Ahatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## WASTE MANAGEMENT

### **ELECTRONIC WASTE MANAGEMENT SYSTEM: ANNEXURE 1B**

**E-waste management:** The College comes under the purview of West Bengal state government and hence cannot independently dispose of e-waste without the permission and intervention of the government authorities. It has been resolved that the e-waste of the college will be disposed through Webel Technology Limited and departments have been asked to prepare a list of the e waste items lying in the respective departments. As per guidelines of Higher Education Department a committee of E-waste management has been formed comprising of 5 associate professors and one assistant professor. The team has met with members of the DM office to finalize the process of e waste disposal.

- Faculties Dr. Nishith Chandra das and Dr. Jaydip Dey, Barasat Government college attended seminar on e-Waste management organized by North 24 Pargana District Administration and procured certification on the same.
- An E-waste repository room has been assigned within the college campus to deposit the E Waste and the solid metallic wastes. These are disposed of through Government undertaking Agency (WEBEL).

**The List of E wastes are in the process of being prepared by the concerned personnels.**

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## 1. **SOLID WASTE MANAGEMENT: ANNEXURE 1C**

Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. Solid waste management reduces or eliminates the adverse impact on the environment and human health. A number of processes are involved in efficiently managing waste for an organization. It is necessary to manage the solid waste properly to reduce the load on waste management system.

The solid waste audit focused on volume, type and current management practice of solid waste generated in college campus. The solid wastes collected was bio- degradable waste, non-biodegradable wastes, paper waste, plastic, glass, metallic sharp objects as waste, construction waste, electronic waste (e-waste) and other miscellaneous waste. Solid waste disposal management audit is a survey & assessment to determine and improve efficiency and effective waste disposal system.

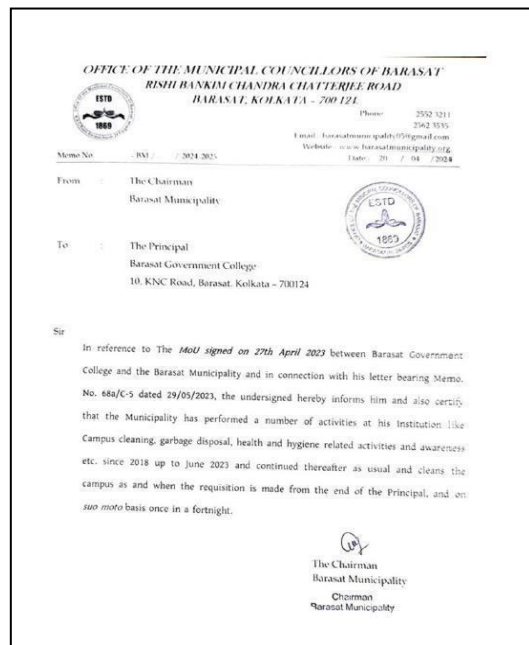
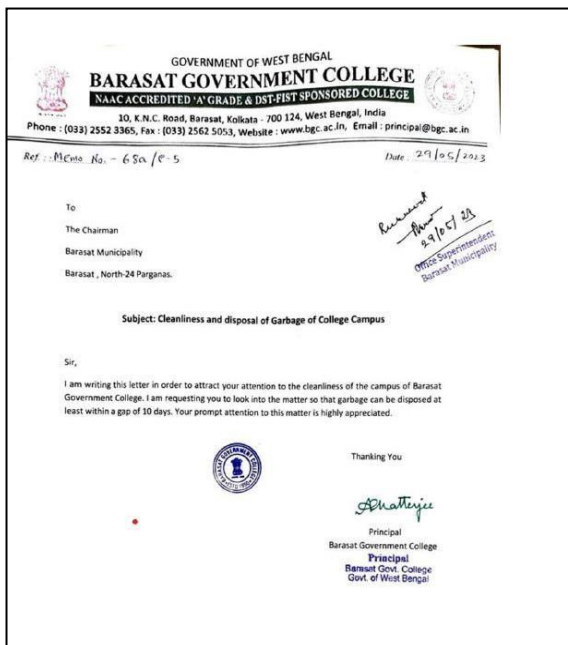
- ✚ Bio degradable waste, Nonbiodegradable wastes and paper wastes are collected in the Vat for clearance by the local municipality (Barasat and Madhyamgram Municipality at a regular interval of time.
- Various colour-coded bins are used for segregation of different kind of wastes. Green coloured bins are used for biodegradable wastes and Blue Coloured bins are used for non-biodegradable wastes following the instructions from Municipality. Red coloured bins are utilized for disposing sharp metallic, glass or plastic objects.
- The **waste papers are mostly from office** and are reused for other rough work or writing purpose. Other paper wastes generated like cardboards, packing boxes are disposed in a **yellow-coloured bins** separately.
- All the floors of the Main, Annexe, Chemistry and Library buildings are provided with blue and green colour coded waste-bins for non-degradable and biodegradable wastes. **Solid Chemical wastes are disposed within black-coloured containers kept at Chemistry Department.**
- The Canteen is also provided with three colour coded dustbins. The kitchen wastes are used for vermicompost preparation.
- The other organic wastes from garden area like leaf litters and different plantparts are collected weekly and stored. the leaf litters are utilised for vermicompost preparation. Around 5 to 8 kgs of leaf wastes are collected per month round the year.
- Per capita production per day: About 15 to 17 kilograms of waste product produced within the college per day
- After every 10 days (Monthly thrice) the wastes are being disposed utilizing Barasat Municipality Logistics.
- **A Mou has been signed with Barasat and Madhyamgram Municipality.**
- **Barasat Municipality** primarily assisted in Garbage disposal, Campus cleaning programmes with the help of their logistics. Also they provided expertise in health and hygiene related awareness programmes organized by Barasat Government College both within and outside the campus. **(Annexure 2A and Annexure 2B)**
- Various campus cleaning programmes, seminars and awareness programmes on campus sanitization and solid waste management were held. **(Annexure 2A and Annexure 2B)**

*A Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## Records of Solid Waste at College Campus

Sl. No.	Location of dustbin	Floor number	No. of dustbins					Quantity of collection (per day) In kg (Approx.)	Disposal time
			Biodegradable wastes (Green Colour)	Non Biodegradable (Blue Colour)	Paper wastes (Yellow colour)	Glass, Metal, sharp objects (Red)	Hazardous wastes (Black)		
1.	Main building	Ground floor	1	1	1	1	3	7-9am	
		1 <sup>st</sup> floor	1	1	1	1	1.5	7-9am	
		2 <sup>nd</sup> floor	1	1	1	1	1.5	7-9am	
2.	Chemistry Building	Ground floor	1	1	1	1	1	7-9am	
		1 <sup>st</sup> floor	1	1		1	1	7-9am	
3.	Annexe Building	Ground floor	1	1	1	1	1.5	7-9am	
		1 <sup>st</sup> Floor	1	1			1.5	7-9am	
		2 <sup>nd</sup> floor	1	1			2	7-9am	
4.	Library Building	Ground floor	1	1	1		0.5	7-9am	
		1 <sup>st</sup> floor	1	1			0.25	7-9am	
		2 <sup>nd</sup> floor	1	1			0.25	7-9am	
5.	Canteen	Ground Floor	1	1	1		2	7-9am	



**Declaration certificate from Barasat Municipality for campus cleaning, garbage cleaning, health and hygiene related activities including awareness programmes.**

*A. Chatterjee*  
 Principal  
 Barasat Govt. College  
 Govt. of West Bengal



## CHEMICAL WASTE MANAGEMENT SYSTEM: ANNEXURE 1 C

To reduce the volume of chemical waste generated in the laboratories the following initiatives have been taken:

- Purchase of minimum possible quantity of hazardous chemicals required for our laboratories.
- Sharing surplus chemicals with other laboratories of biological sciences.
- Practicing green chemistry i.e. substituting hazardous chemicals with non- hazardous chemicals whenever possible.
- Reducing the scale of laboratory experiments to reduce the volume of wastes being produced.
- Specially constructed Waste Accumulation Area (WAA) outside the Department of Chemistry to dispose the liquid waste, produced from the experiments are conducted through pipelines to the WAA.

### Minimized use of chemical pollutants:

Sl No	Dept	Name of the wastes			Method of Disposal	Agency involved
		Chemical (a)	Biological waste (b)	Microbial waste (c)		
1.	Botany	Cytological stains, Ethanol, Methanol, Acids	Plant materials	<i>Bacillus sp.</i> <i>Rhizobium sp.</i>	Plant materials are disposed in biodegradable waste bins	Barasat Municipality
2.	Zoology	Biological Stains, Ethanol, Methanol, Acids etc	Animal/fins/insects /fish bodies	Nil	Animal/insect/fish bodies are disposed in biodegradable vat	Barasat Municipality
3.	Chemistry	Ethanol, Methanol, Acids	Nil	Nil	Many hazardous chemicals Collected in a disposal chamber	Barasat Municipality

### Future suggestions:

- More awareness regarding solid waste disposal needs to be generated among the students and other stakeholders for maintaining proper environment within campus.
- A Fume hood needs to be installed at Chemistry Department for proper handling of toxic chemicals

  
Principal  
Barasat Govt. College  
Govt. of West Bengal





# WATER MANAGEMENT

Water which is precious natural resource available with fixed quantum. The availability of water is decreasing due to increasing population of nation, as per capita availability of utilizable water is going down. Due to the ever-rising standard of living of people, industrialization, urbanization, demand of fresh water is increasing day by day. The unabated discharge of industrial effluent in the available water bodies is reducing the quality of the sample sources of water continuously. Hence, the national mission on water conservation was declared by the then Hon. Prime Minister appealed to all citizens to collectively address the problem of water shortage, by conserving every drop of water and suggested for conducting water audit for all sectors of water use. A water audit is an onsite survey & assessment to determine and improve efficiency of water use.

## ❖ Objectives of Water audit:

The general objective of water audit is to prepare a baseline report on water conservation measures to mitigate consumption, improve quality and sustainable practices.

## ❖ The specific objectives are:

To monitor the water consumption and water conservation practices. To assess the quantity of water, usage, quantity of waste water generation and their reduction within the college.

## ❖ Audit Parameters

Following are the key parameters used in water management audit:

1. Sources of water
2. Quality of water
3. Measurement & Consumption
4. Waste water disposal
5. Awareness
6. Best Practices
7. Suggestions

## Methodology followed for conducting water audit:

### Step 1: General Survey :

- ✚ Understanding of existing water sourcing, storage and distribution facility.  
Assessing the water demand and water consumption areas/processes.

### Step 2: Secondary Data Collection

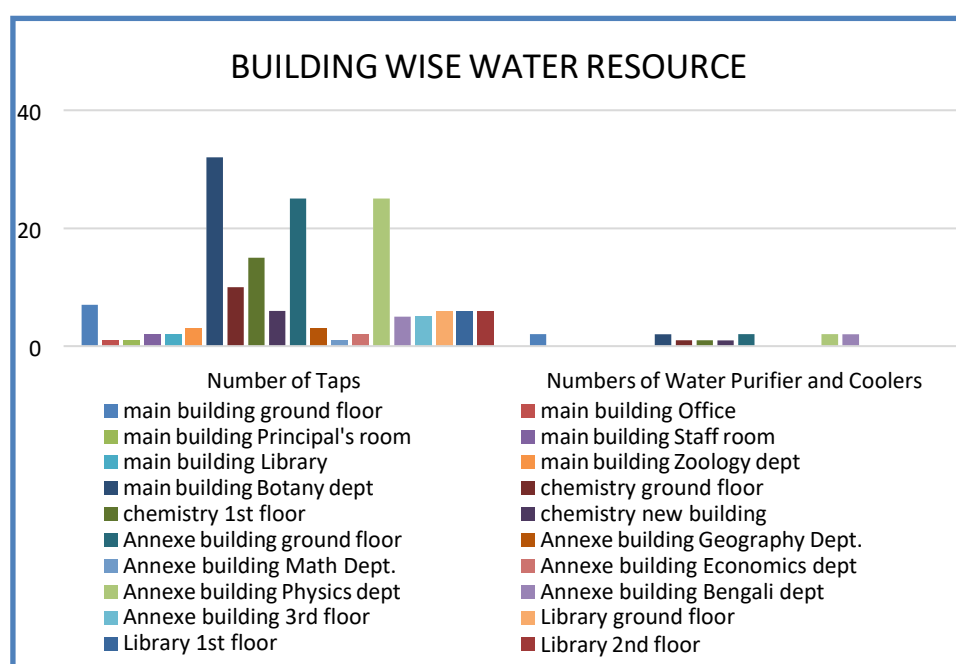
- ✚ Conduction of Detailed Water Audit & Field Measurements:

- ✚ Establishing water consumption pattern
- ✚ Water Quality Analysis from tap sources and drinking water
- ✚ Determination of key opportunities for water consumption reduction, reuse & recycle.

**Step 3: Preparation of Water Audit Report:**

- ✚ Documentation of collected & analysed water measurement details.
- ✚ Opportunities for water conservation based on reduce/ recycle/ reuse and recharge options.

Water Storage capacity in campus: Barasat Government College has four water storage tanks with 10000 litre capacity and two smaller size tank with 5000 litre capacity underground. Water Resource distribution, consumption and qualitative analysis of tap water and drinking water has been represented graphically.



*A Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## Water Resource Facilities and Water Use

S. No.	Building Name	Floor	Wash Basin Numbers	Toilet Number	Urinal Number	Number of Taps	Numbers of Water Purifier and Coolers
Main Building	ground floor	4 porcelain/marble	Indian style 3	female 2+2	7	2	Approximately 1226 for mainbuilding
	1st floor	14 porcelain	7	female 3+male 2+2	26	3	
	2nd floor	22 porcelain	4 commodes	female 2+ male2	32	2	
	rooftop				2		
Chemistry	ground floor	4	Indian style 2	female 3 male 2	10	1	Approximate Ly1300 for chemistry building
	1st floor	wash basin 3 lab basin 8	commode 2	male 1 female1	15	1	
	new building	wash basin 2	commode 2	male 1 female1	6	1	
Annex Building	ground floor	wash basin 11 lab basin 2	commode 6	male 9 female 6	25	2	Approximately 300 for ANNEXE Building
	1st floor	wash basin 11 lab basin 2	commode 6	male 9 female 7	25	2	
	2nd floor	wash basin 11 lab basin 3	commode 7	male 9 female 8	25	2	
	roof top				2		
Library	ground floor	wash basin 2	commode 2	male 1 female 1	6	1	Approximately 617 for Library Building
	1st floor	wash basin 2	commode 2	male 1 female 1	6		
	2nd floor	wash basin 2	commode 2	male 1 female1	6		

The water usage pattern determines the most utilization of water at Chemistry building followed by Annexe and new library building. However resource wise Department of Botany has higher number of tap installations followed by library (1<sup>st</sup> floor ) and Physics.

The audit report facilitates us to consider the usage of water through data collection, introspection which provides opportunities for conservation of water, reduce water consumption.

Waste water generated after using fresh water is removed down the drain through separate pipes which take it to a larger sewer pipe under the road and further join the network of other sewers that eventually follows to sewage treatment procedure maintained and provided by the municipality.

### WATER QUALITY ANALYSIS:

Water which is used for all activities in the college campus includes usage in all academic buildings (Science, Arts), office, canteen, gardens, Science Laboratories and in toilets. Testing water quality is important for human health because it helps to identify potential contaminants that can cause health problems. The main parameters that are tested are pH, dissolved oxygen, BOD, total dissolved solids (TDS), conductivity, hardness. Physico-chemical analysis of different parameters was done using water sample collected from different buildings of Barasat Government College –

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



The following parameters were checked for water quality analysis:

District	Location	Parameters	Source		Standards for drinking water (Desirable)
North 24 Pgs	Barasat Government College		Drinking water	Tap water	WHO (1998,2019) AND BIS (1993& 2012)
		pH	7.2	7.5	6.5-8.5
		Colour	colourless	colourless	—
		Odour	odourless	odourless	—
		DO (mg L <sup>-1</sup> )	6.87	5.79	4-6
		BOD (mg L <sup>-1</sup> )	2.48	3.97	6
		Conductivity(mS/cm)	0.78x10 <sup>-3</sup>	0.78x10 <sup>-3</sup>	0.05-0.5
		TDS(ppm)	74	120	500
		Total Hardness(ppm)	322.3	382.4	300
		Chloride(ppm)	26.48	51.67	250
		Nitrate (ppm)	5	5	50
		Nitrite(ppm)	nil	<<0.5	3
		Ammonium(ppm)	nil	nil	0.2
		Arsenic(ppm)	nil	nil	0.05
		Fecal Coliform (MPN/100 ml)	<1	<1	Shall not be detectable in any100 ml sample

### Analysis of Drinking and Tap water at BGC Campus

*Ahatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



### ❖ Awareness :

Various programmes and seminars were undertaken to make students aware of importance of water conservation and their methods were discussed in programmes. A Value Added Course on water quality analysis was performed by Chemistry Department. Botany Zoology and Chemistry department analyzed the qualitative and quantitative parameters of drinking and tap water collected from college campus.

### ❖ Best Practices:

- The water taps are kept closed after using to reduce run off water wastage.
- Water conservation awareness slogans are displayed at water outlets to save water.

### ❖ Future Suggestions

- Rain Water Harvesting (RWH): Higher authority approval has been received, work will initiate soon.
- Water consumption to be measured using flow meters. Measurement will help in reduction of usage.
- Plan to switch over to double switch cisternae to flush water after use according to need.
- To avoid overflowing / wastages from Over Head Tanks, sensor system to be installed

## CARBON FOOT PRINT MANAGEMENT

The most common greenhouse gases are carbon di oxide, water vapor, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon-di-oxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon-di-oxide gas into the earth's atmosphere through human activities is commonly known as carbon emissions. We need to figure out methods to reduce carbon emissions. Often the challenge lies in choosing just the right approach that will contribute most to the objective. Naturally, the results of these interventions also have to be monitored and assessed. Many colleges want to reduce their carbon di oxide (CO<sub>2</sub>) emissions. considering a range of factors such as, mobility waste and energy consumption. So, gaining insight into CO<sub>2</sub> emissions is extremely important.

An important aspect of doing an audit is to be able to measure impact so that we can determine better ways to manage the resource. We can determine what our carbon footprint is, based on the amount of carbon emissions created by fossil fuels. 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. As per latest estimates the average carbon emissions per capita in India is 1.9 MT / capita out of this transportation accounts for approximately 15%. In our Institutions, the major sources of carbon emission are vehicles. While vehicles are restricted within the campus, the total emissions due to travel by students and staff from their home to the campus is an important parameter to be measured. CO<sub>2</sub> emission within various zones of the campus were measured through-out the year with the help of CO<sub>2</sub> meter monitor (GC 2028, Lutron, ISO 9001 certified) that partially assess carbon contribution by the students and staffs.

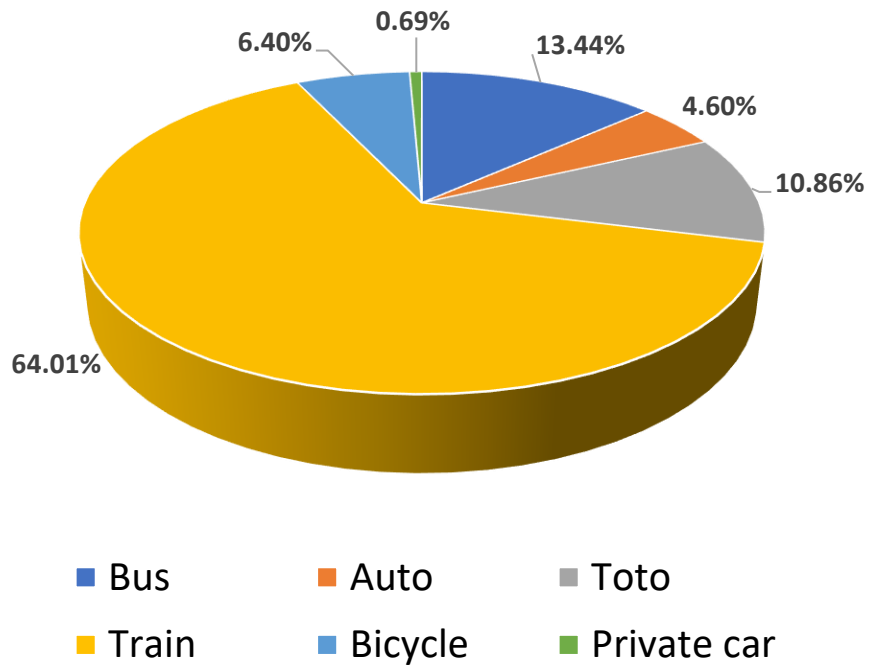
College owns a **silent generator** which is significant to provide an **uninterrupted, noise-free** and smooth service during a sudden power cut especially while operating classes with computational logistics, running of instruments, a practical class is taken or specifically University Examinations are being held for providing students with facilitated ambience. The diesel consumption data has been documented per academic year. Fuel consumption per month for running the instrument has been recorded.

### ❖ Audit Parameters

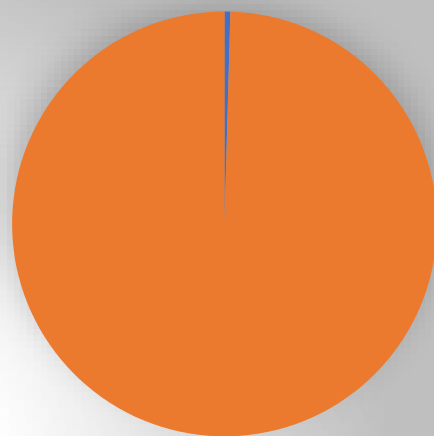
Following are the key parameters used in carbon emissions audit:

1. Sources, Measurement of Carbon foot print
2. Awareness
3. Best Practices
4. Suggestions

### Commuting pattern among Students Teachers and Staff



*Ahatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



■ Private transport  
■ Public transport

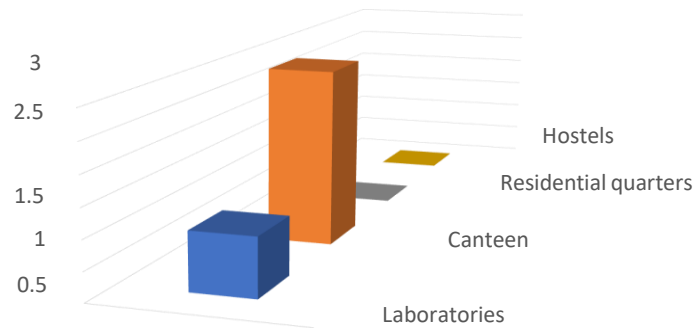
### Public transport VS Private transport

*Ahatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



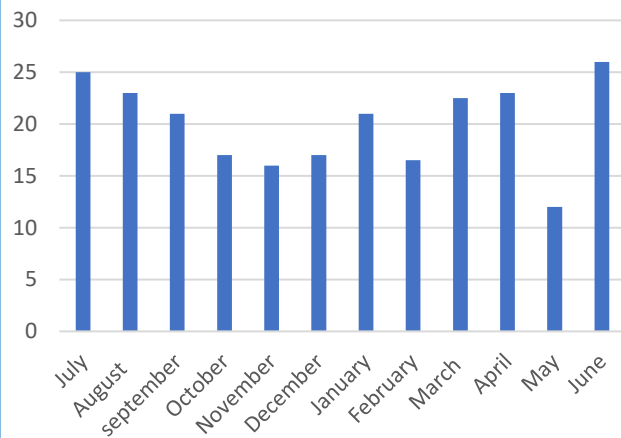


## LPG USE



Month	Litre
July	25
August	23
September	21
October	17
November	16
December	17
January	21
February	16.5
March	22.5
April	23
May	12
June	26
<b>Total</b>	<b>240</b>

## Diesel Consumption for Silent Generator Academic year 2023-24



*A Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



- **More than 75% percent students commute by train and Toto, Carbonneutral vehicles.**
- A significant number of students utilizes bicycle.
- **More than 99 percent of total staff and students utilize public vehicles.**
- A very low number of scooter and private cars (0.61 %) are deployed for commuting.
- **Annual utilization of silent generator has been provided which amounts to be approximately 240 litre in this Academic Session.**

*A Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



❖ **Best Practices**

- ❖ Bicycle garage is present within campus, where more than 200 vehicles can be accommodated at a time.

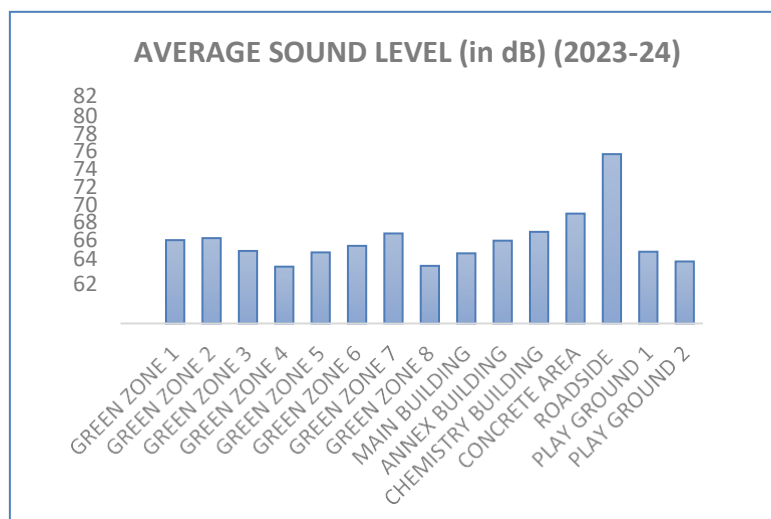
Out of more than 3000 students, teaching and non-teaching staff very few (about 20) utilizes personal vehicle for commuting to college. More than 99% of the student and staff utilizes public vehicle. Among them mostly commute by the train (approximately 80%) followed by toto and autoservices. However a significant number of students, nearly 7% commute with the help of bicycle. All these data support an environment friendly commuting modes followed by students and staffs.

❖ **Future Suggestions**

- ❖ A higher number of display board could be installed to address the initiatives related to environmental issues and carbon emissions, specifically minimization of the use of unsustainable transport.
- ❖ More plantation within campus is needed for better sequestration of carbon and
  - improved air quality could be ensured within campus.
  - 
  -

*A Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal





Various data from the college campus suggest about a pollution level that needs to be reduced. The College is located at heartland of urbanized city Barasat surrounded by dense population and market place and located just beside the main road connecting station and bus auto toto routes. This advantageous position makes this institute highly suitable for commuting from distant or local residences.

However the air quality pollution level is recorded as moderately high. It is imperative to create a greenery within the campus to mitigate the challenge of pollution. More than one fifth of the campus area has been turned to green and as green campus initiatives the automobile restriction has been imposed. Students are encouraged to use bicycle for commuting to college so that the pollution level could be restricted. A bicycle garage also has been constructed to keep the vehicles

*Ahatterjee*

**Principal**  
Barasat Govt. College  
Govt. of West Bengal



❖ **Best Practices**

- Automobile restriction within campus has been declared
- Usage of bicycles inside the campus is encouraged
- Bicycle garage is present within campus, where nearly 200 vehicles can be accommodated at a time
- A moderate number of plant and vegetation cover helps in mitigation of carbon load.

❖ **Future Suggestion:**

More plantation is needed in the campus that could be conducted with NSS volunteers or the Nature cell volunteers, members of Nature Club and other students.  
More students need to avail Bicycle for commuting to college.

—  
—  
—  
—

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## SOIL SAMPLE ANALYSIS FROM COLLEGE CAMPUS

### Soil Nutrient Dynamics of Barasat Govt. College


A nutrient analysis of soil samples from both the vegetated and unvegetated zones was conducted to determine the comparative nutrient content and assess the ecological health of the respective areas within the Barasat Govt. College campus.

Sample Name	Co-ordinate	Area in m <sup>2</sup>	Type of Material	Total Weight of Collected fresh field sample (gm) (wf)	Weight of carry bag	Net weight of fresh field sample	Weight of the sub sample	Weight of dry sub sample	TN (kg/ha)	TP (kg/ha)	TK (kg/ha)	OC (%)	OM (%)
Vegetated Land	22°43'01" N, 88°28'51"E	4384.97	Soil	107 (gm)	2 (gm)	102 (gm)	15 (gm)	7 (gm)	20.41	29.48	35	0.32	0.44
Unvegetated Land	22°43'02" N, 88°28'51"E	5707.74	Soil	113 (gm)	2 (gm)	105 (gm)	15 (gm)	7 (gm)	14.56	10.25	21.4	0.25	0.18

**Abbreviation: TN- Total Nitrogen, TP- Total phosphate, TK-Total potassium, OC-Organic carbon, OM –**

#### Organic matter

\*\*Soil testing conducted at the Department of Geography, West Bengal State University using Wilson Soil Testing Kit



**WEST BENGAL STATE UNIVERSITY**  
Berunanpukuria, Malikapur Barasat  
24 Parganas (North), Kolkata - 700 126  
Phone : (033) 2524 1975 / 1976 / 1978 / 1979 Fax : (033) 2524 1977

---

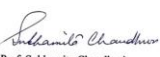
Ref. No : WBSU/Geo/Lab/24-01      Date : .....


15-04-2024

To  
The Principal  
Barasat Govt. College  
10, KNC Road, Kolkata 700124

I am pleased to inform you that the analysis of soil samples requested under Memo No. 16/WBSU dated 12.04.2024 has been completed. The attached report contains the details findings of the analysis.

Sample No	Description	Nutrient Measurements				
		TN (kg/ha)	TP (kg/ha)	TK (kg/ha)	OC (%)	OM (%)
1	Vegetated Land	20.41	29.48	35	0.32	0.44
2	Unvegetated Land	14.56	10.25	21.40	0.25	0.18

  
 Prof. Subhamita Chaudhuri  
 Head, Department of Geography

  
**Dr. Subhamita Chaudhuri**  
 Professor and Head  
 Department of Geography  
 West Bengal State University  
 Barasat, Kolkata - 700126

  
**Principal**  
 Barasat Govt. College  
 Govt. of West Bengal



### Results :

- The vegetated zone, total nitrogen (TN) content measured 20.41 kg/ha, significantly higher than the 14.56 kg/ha found in the unvegetated zone, indicating better nitrogen availability for plant growth in the vegetated areas. Similarly, total phosphorus (TP) content was substantially higher in the vegetated zone at 29.48 kg/ha compared to 10.25 kg/ha in the unvegetated zone, suggesting enhanced soil fertility and nutrient retention in areas with vegetation cover. Total potassium (TK) levels were relatively similar between the two zones, with 35 kg/ha in the vegetated zone and 21.40 kg/ha in the unvegetated zone.
- Organic carbon (OC) and organic matter (OM) content were also higher in the vegetated zone, measuring 0.32% and 0.44% respectively, compared to 0.25% and 0.18% in the unvegetated zone. Comparing the observed values with standard limits set by agricultural or environmental agencies, such as the USDA (United States Department of Agriculture) or local soil quality guidelines, the nutrient content within the campus exceeds typical ranges, indicating fertile soil conducive to sustaining a diverse ecosystem.

### Conclusion and Future Suggestions:

With most of the unconstructed areas within the campus being vegetated, it is suggesting that the campus may be marked as a thriving and ecologically rich environment. Although, future suggestions may include implementing targeted soil enrichment programs in unvegetated zones to improve nutrient levels and promote ecosystem health across the entire campus.

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## Estimation of Carbon Sequestration by Vegetation

Pre-Audit Data to be Provided by the College Authority (2022-23) _BGC_VU_03/2024																
S. No.	Common name	Scientific Name	Number	Plant Height (Feet)	Circumference of the tree trunk at the breast height (cm)	Circumference of the tree trunk at the breast height (inch) (H)	Plant DBH (Diameter at breast Height in cm)	Plant DBH (Diameter at breast Height in inch) (D) Observed diameter of trees (D2)	Green Weight above Ground (W1)	Green weight below ground (W2) W2= W1 * 0.2	Total Green Weight (TW) = W1 + W2	dry weight of the tree (Dw): TW * 0.725	Carbon Sequestration in trees (WC) =Dry Weight (DW) * 0.47(IPCC,2006) in Pound	Weight of Carbon-di-oxide (CO2) Sequestration (WCS) = Weight of Carbon (WC) * 3.6663 Pearson et.al.,2007) in Pound	Weight of Carbon-di-oxide (CO2) Sequestration (WCS) * No. of trees in Pound	Weight of Carbon-di-oxide (CO2) Sequestration (WCS) * No. of trees in kg (1Pound = 0.454 kg)
1	Ranjana	<i>Adenanthera pavonina</i>	1	70	275	108.27	87.58	34.48	362.04	72.41	434.45	314.98	148.04	542.75	542.75	246.41
2	Chatim	<i>Alstonia sp</i>	3	30	91	35.83	28.98	11.41	51.34	10.27	61.61	44.67	20.99	76.97	230.92	104.84
3	Kadam	<i>Anthocephalus cadamba</i>	2	60	202	79.53	64.33	25.327	227.95	45.59	273.53	198.31	93.21	341.72	683.45	310.29
4	Araucaria	<i>Araucaria sp.</i>	12	18	67	26.38	21.34	8.4006	37.80	7.56	45.36	32.89	15.46	56.67	680.06	308.75
5	Shupuri	<i>Areca sp.</i>	11	35	37	14.57	11.78	4.6391	40.59	8.12	48.71	35.32	16.60	60.85	669.40	303.91
6	Kathal	<i>Artocarpus sp</i>	3	45	174	68.50	55.41	21.817	147.26	29.45	176.71	128.12	60.22	220.77	662.30	300.69
7	Neem	<i>Azadirachta india</i>	3	30	80	31.50	25.48	10.031	75.23	15.05	90.28	65.45	30.76	112.78	338.34	153.61
8	Bamboo	<i>Bambusa tulda</i>	10	7	18	7.09	5.73	2.2569	3.95	0.79	4.74	3.44	1.61	5.92	59.21	26.88
9	Peacock flower	<i>Caesalpinia sp</i>	2	25	110	43.31	35.03	13.792	51.72	10.34	62.06	45.00	21.15	77.54	155.07	70.40



10	Papaya	<i>Carica papaya</i>	4	12	22	8.66	7.01	2.7584	8.28	1.66	9.93	7.20	3.38	12.41	49.62	22.53
11	Fishtail palm	<i>Caryota sp.</i>	2	25	161	63.39	51.27	20.187	75.70	15.14	90.84	65.86	30.95	113.49	226.97	103.04
12	Cassia	<i>Cassia sp</i>	2	27	81	31.89	25.80	10.156	41.13	8.23	49.36	35.78	16.82	61.66	123.33	55.99
13	Jhau	<i>Casuarina sp.</i>	1	70	202	79.53	64.33	25.327	265.94	53.19	319.12	231.36	108.74	398.68	398.68	181.00
14	Batabi	<i>Citrus maxima</i>	2	30	100	39.37	31.85	12.538	94.04	18.81	112.84	81.81	38.45	140.98	281.95	128.01
15	Cycas	<i>Cycas sp.</i>	3	4	68	26.77	21.66	8.526	8.53	1.71	10.23	7.42	3.49	12.78	38.35	17.41
16	Gulmohor	<i>Delonix regia</i>	7	35	304	119.69	96.82	38.116	200.11	40.02	240.13	174.10	81.83	300.00	2099.97	953.39
17	Joba	<i>Hibiscus rosa-sinensis</i>	3	6	19	7.48	6.05	2.3823	3.57	0.71	4.29	3.11	1.46	5.36	16.07	7.30
18	Bottle palm	<i>Hyophorbe lagenicaulis</i>	4	10	131	51.57	41.72	16.425	24.64	4.93	29.57	21.43	10.07	36.94	147.74	67.07
19	Rongon	<i>Ixora sp.</i>	8	6	19	7.48	6.05	2.3823	3.57	0.71	4.29	3.11	1.46	5.36	42.86	19.46
20	Jarul	<i>Lagerstroemia speciosa</i>	4	28	216	85.04	68.79	27.083	113.75	22.75	136.50	98.96	46.51	170.52	682.09	309.67
21	Aam	<i>Mangifera Indica</i>	3	60	289	113.78	92.04	36.236	326.12	65.22	391.34	283.72	133.35	488.90	1466.71	665.88
22	Bokul	<i>Mimusops elengi</i>	4	20	36	14.17	11.46	4.5138	22.57	4.51	27.08	19.63	9.23	33.83	135.34	61.44
23	Banana	<i>Musa sp.</i>	14	15	57	22.44	18.15	7.1468	26.80	5.36	32.16	23.32	10.96	40.18	562.49	255.37
24	Mussaenda	<i>Musasenda sp</i>	2	12	64	25.20	20.38	8.0245	24.07	4.81	28.89	20.94	9.84	36.09	72.18	32.77
25	Date palm	<i>Phoenix dactylifera</i>	2	20	43	16.93	13.69	5.3914	26.96	5.39	32.35	23.45	11.02	40.41	80.83	36.69
26	Kathgolap	<i>Plumeria sp</i>	2	20	23	9.06	7.32	2.8838	14.42	2.88	17.30	12.54	5.90	21.62	43.23	19.63
27	Debdaru	<i>Polyalthia longifolia</i>	9	17	137	53.94	43.63	17.177	43.80	8.76	52.56	38.11	17.91	65.67	591.00	268.31
28	Panthopadop	<i>Ravenala Madagascariensis</i>	12	45	118	46.46	37.58	14.795	99.87	19.97	119.84	86.88	40.84	149.72	1796.59	815.65
29	Royal palm	<i>Roystonea regia</i>	10	60	186	73.23	59.24	23.321	209.89	41.98	251.87	182.60	85.82	314.66	3146.57	1428.54
30	Segun	<i>Tectona grandis</i>	2	90	114	44.88	36.31	14.294	192.96	38.59	231.56	167.88	78.90	289.28	578.56	262.67
31	Arjun	<i>Terminalia arjuna</i>	3	70	259	101.97	82.48	32.474	340.98	68.20	409.17	296.65	139.43	511.18	1533.53	696.22
			150						Total Carbon-di-oxide (CO2) Sequestration (WCS) by the Trees						18136.15	8233.81

**NOTE: Green weight of the trees above ground ( $W_1$ ) ..... (Xu and Mitchel 2011)**  
<https://www.researchgate.net/publication/261884694> **Carbon sequestered in the trees on a university campus A case study**

Below 10 inch diameter (D),  $W_1 = 0.25D^2 \times H$   
 Above 10 inch diameter (D),  $W_1 = 0.15D^2 \times H$

Number of trees	Weight of Carbon Dioxide Sequestration (Pound)	Weight of Carbon Dioxide Sequestration (Kg)
150	18136.15	8189

**Estimation of Carbon Sequestration by Soil/ Year**

Type of the area	Area (meter square)	Soil Organic carbon (%)	Soil Organic Carbon (SOC) (g/m <sup>2</sup> )	Total Carbon (C) sequestration (kg)	Carbon Dioxide (CO <sub>2</sub> ) sequestration (kg) Pearson et al 2007 <a href="https://www.fs.usda.gov/research/treesearch/13292#">https://www.fs.usda.gov/research/treesearch/13292#</a>
Area under Plantation (Vegetative cover)	2204.95	0.32	0.10400078	0.23	0.8416
Open bare land	1659.97	0.25	0.081250609	0.13	0.4950
Grass covered area	2180.02	0.32	0.10400078	0.23	0.8321
			Total	0.590914	2.17

### Estimation of Carbon Emission from Electricity Consumption/ Year

Electricity Consumption in KWh	CO <sub>2</sub> Emission/KWh	Emission of CO <sub>2</sub> in kg/ Year
296040 – 99938.5 [Solar Energy Produced (On Grid)]	The Emission Factor for Electricity is 0.82 kg CO <sub>2</sub> /KWh <a href="https://iitbhu.ac.in/contents/institute/admin/doc/admin_carbon_emissions%20in_co2.pdf">https://iitbhu.ac.in/contents/institute/admin/doc/admin_carbon_emissions%20in_co2.pdf</a> <a href="https://cea.nic.in/wp-content/uploads/baseline/2023/01/Approved_report_emission_2021_22.pdf">https://cea.nic.in/wp-content/uploads/baseline/2023/01/Approved_report_emission_2021_22.pdf</a>	242752.8 - 81949.57 = 1,60,803.23

### Estimation of Carbon Emission from Fuel

Component	Type of Fuel	Consumption of Fuel/ Year	Emission factor of Petrol/ Diesel in Kg CO <sub>2</sub> /litter  <a href="https://shaktifoundation.in/wp-content/uploads/2017/06/WRI-2015-India-Specific-Road-Transport-Emission-Factors.pdf">https://shaktifoundation.in/wp-content/uploads/2017/06/WRI-2015-India-Specific-Road-Transport-Emission-Factors.pdf</a>	CO <sub>2</sub> Emission/Year
Car	Petrol	654.6	2.27	1486
Bike	Petrol	38.4	2.27	87
Generator	Diesel	240	2.64	633.6
			Total	2206.6

### Estimation of Carbon Emission from LPG Consumption/ Year

Component	Uses	Consumption of LPG Cylinder / Year	CO <sub>2</sub> Emission Factor in kg/ LPG (IPCC, 4 APRIL 2014) <a href="https://ghgprotocol.org/sites/default/files/Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx">https://ghgprotocol.org/sites/default/files/Emission_Factors_from_Cross_Sector_Tools_March_2017.xlsx</a>	CO <sub>2</sub> Emission / Year
LPG (14.2)	Laboratories	12	6.1	1039
LPG (14.2)	Canteen	36	6.1	3118
			Total	4157

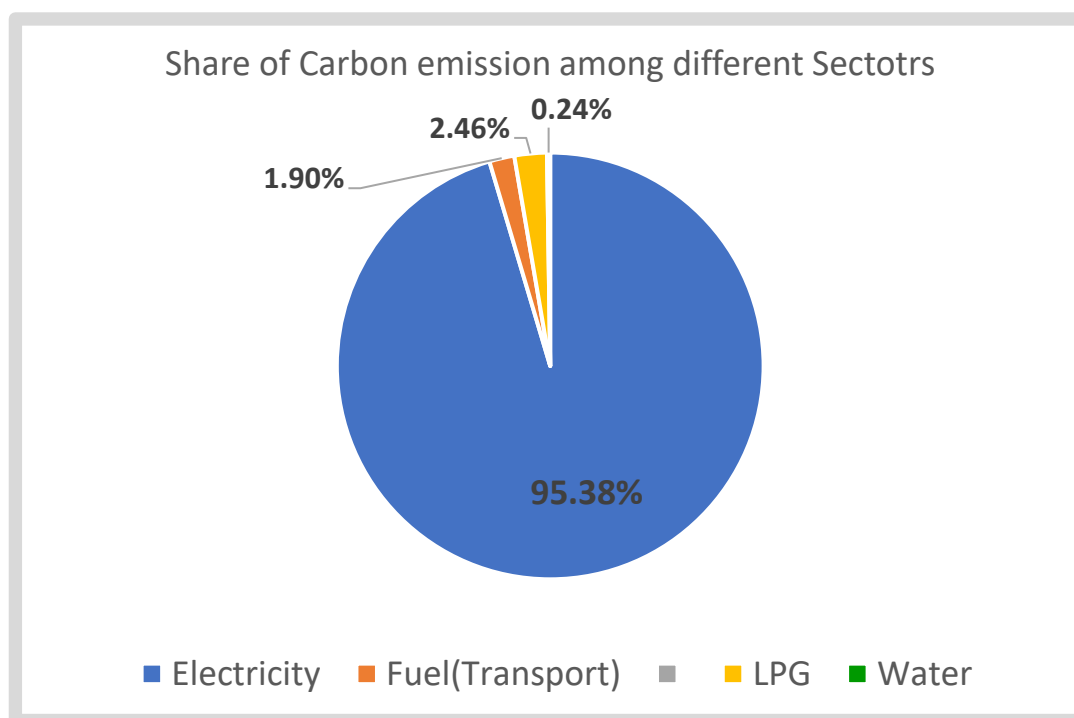
### Estimation of Carbon Emission from Water Consumption/ Year

Water Consumption/L/ Day	Water Consumption/ L/ 204 Day	Emission factor of Water <a href="https://www.researchgate.net/figure/Calculation-boundary-for-CO-2-emission-factor-of-water_fig_2_276044385">https://www.researchgate.net/figure/Calculation-boundary-for-CO-2-emission-factor-of-water_fig_2_276044385</a>	L to m <sup>3</sup>	Emission of kg CO <sub>2</sub> from Water
3443	702372	0.59 kg CO <sub>2</sub> / m <sup>3</sup>	702.37	414.4

### Carbon Budget of the College (2023-24)

Carbon Sequestration (Kg CO <sub>2</sub> )		Carbon Emission (Kg CO <sub>2</sub> )			
Plant	Soil	Electricity	Fuel (Transport)	LPG	Water
8233.81	2.17	1,60803.23	3202	4157	414.4
<b>Total Sequestration 8235.98</b>		<b>Total Emission 168576.63</b>			
<b>Carbon Budget 160340.65 (-ve)</b>					

### Relative share of carbon emission



## Actions Taken to fulfill Environmental Objectives

### A. Green Campus Facilities available within Campus

1. **Solar power, an alternate source of Energy:** Solar power plants were installed of 20Kwp 10Kwp (two units) at the rooftop of main administrative building connected to the grid and is being maintained properly for efficient power generation as Alternate Sources of Energy. (Annexure 1A)

2. **Energy conservation through switching to LED:** As Energy conservation measures installation of LED lights in all the buildings of the college is being done nearly 25 percent CFL and tube lights have been replaced with LED lights from time to time.

3. **Carbon neutral vehicle utilization:** All the students and teaching and nonteaching staffs are encouraged to commute by bicycle. The college authority has provided stand for keeping the bicycles, where nearly 200 cycles can be garaged at a time.

4. **A sensor based monitoring station** for measuring ambient air quality in the campus has been installed and maintained for documentation of air and sound quality of surrounding ambience. (Annexure 1A)

5. **College owns a silent generator** which is significant to provide an **uninterrupted, noise free** and smooth service during a sudden power cut especially while operating **classes with computational logistics, running of instruments, while practical class is** taken or specifically University Examinations are being held for providing students with facilitated ambience. The diesel consumption data has been documented annually. (Annexure 1A)

#### 6. **Plastic free College Campus:**

Declaration of college campus as plastic free, clean and Green zone: Campus is declared as plastic free campus. (Annexure 1B)

7. **Energy saving messages** are exhibited at the walls of every building in each floor. The students are aware of switching off the electrical logistics every time they vacate the working place. (Annexure 1B)

#### 8. **Waste management:**

Barasat Government College signed a MoU with Barasat Municipality to manage different solid wastes (Biodegradable & Non-degradable) in regular basis. Solid wastes generated in college campus including college canteen is being segregated in different containers and disposed of by the Barasat Municipality logistics. E wastes are accumulated within campus. Prior to disposal of E Wastes these were stored in an assigned room (Annexure 1C).

Students of NSS Unit has been trained through a Training Programme (Orientation programmes) They functioned as instrumental to generate awareness among the common people in nearby localities regarding sanitization and other vector borne diseases.

**9.Landscaping and Medicinal Plant Garden:** Floristic diversity of Barasat Government College has been studied and documented. Several trees, shrubs and herbs are found in this college of which many of the trees are planted, few trees are there which are assumed to be standing since long time back. Shrubs and herbs are mainly cultivated species of which many are of medicinal importance. Apart from the planted trees, shrubs and herbs, there is a vegetable garden with ornamental flower species and palm garden. Department of Botany maintains a small unit of Medicinal Plant Garden within the college campus as a green campus initiative. The college campus green zones are estimated to be contributing about more than **22 percent** greenery and landscaping of total built-up area. Some plant species are being maintained since the time of its' establishment and a few were later incorporated to enrich the landscape view. Nature Club students were involved in such documentation. (**Annexure 1D**)

#### **10.Academic courses offered on environmental issues (Annexure 1E and 1F)**

- a.** Department of Chemistry arranged a **Value-Added Course on Assessment and Analysis of Quality of food and Water**. The seminar also entails about the immediate necessity of conservation of ground water.
- b.** Department of Geography also arranged a **Value Added Course on Environmental Education and Sustainable Development**.
- c.** Knowledge on **mushroom cultivation** is regularly disseminated by Department of Botany and students percolate the practice at their residence. A **Value-Added Course** on crop protection and Mushroom Cultivation and Biofertilizer applications was arranged by Department of Botany.
- d.** College has an installation of a Vermi-Compost Unit beside medicinal Plant Garden which is being maintained by Zoology Department and Nature club students. The trained students help to produce Vermi-compost that keeps the vegetable garden and medicinal plant garden green and healthy. This practise will be continued for learning and greening purpose of the campus.
- e.** Environmental science is being taught as a paper in every subject (Hons or General), which is part of University Curricula.

#### **B.Environmental Activities Beyond College Campus (Annexure 2A)**

- a)** Most of our outreach programs were addressed to topical issues like vector borne diseases. **Awareness rallies** were held regularly as part of this program and continued.
- b)** The Post Graduate Botany Department of the college took some unique initiatives in spreading agricultural knowhow and **use of bio fertilizer** among farmers of the locality and students to booster self- employment schemes and increase agricultural yields.
- c)** Knowledge on mushroom cultivation is regularly disseminated by Department of Botany and students will be employed in percolating the practise among the farmers and general public in their neighbourhoods.
- d)** **Sanitization programmes** were regularly being held and will be further encouraged within and beyond the campus.
- e)** **Visit to agricultural field** to study plant diseases and interaction with farmers was arranged for students of Botany to strengthen their knowledge regarding plant pathogen interaction, to gain knowledge about control measures and to become aware about their societal and economic consequences.

### C. Environment Related Academic and Sensitization Activities Within Campus: (Annexure 2B)

a) Celebration of the **Commemorative days** like World Wildlife day and World environment day **Earth Day, International Biodiversity Day, World Environment Day** were performed through arranging seminars, publication of wall magazine and poster competitions on conservation of nature and natural resources.

b) Class rooms and common corridors retain **awareness posters** for saving energy and save water, conserve biodiversity messages, which are also widely spread in college campus. Dedicated **wall magazines** for conservation of natural resources are being published by the students every year and will be further continued.

c) World Environment Day was celebrated through **sapling plantation** at college campus. This practice will be further continued to generate holistic general awareness about nature among the students and faculty and all the staff members.

d) Student sensitization for clean environment through sanitization, cleaning of campus, Maintenance of medicinal plant garden were also performed by campaigning and involving NSS unit within the college campus.

#### **Maintenance of healthy sanitary conditions:**

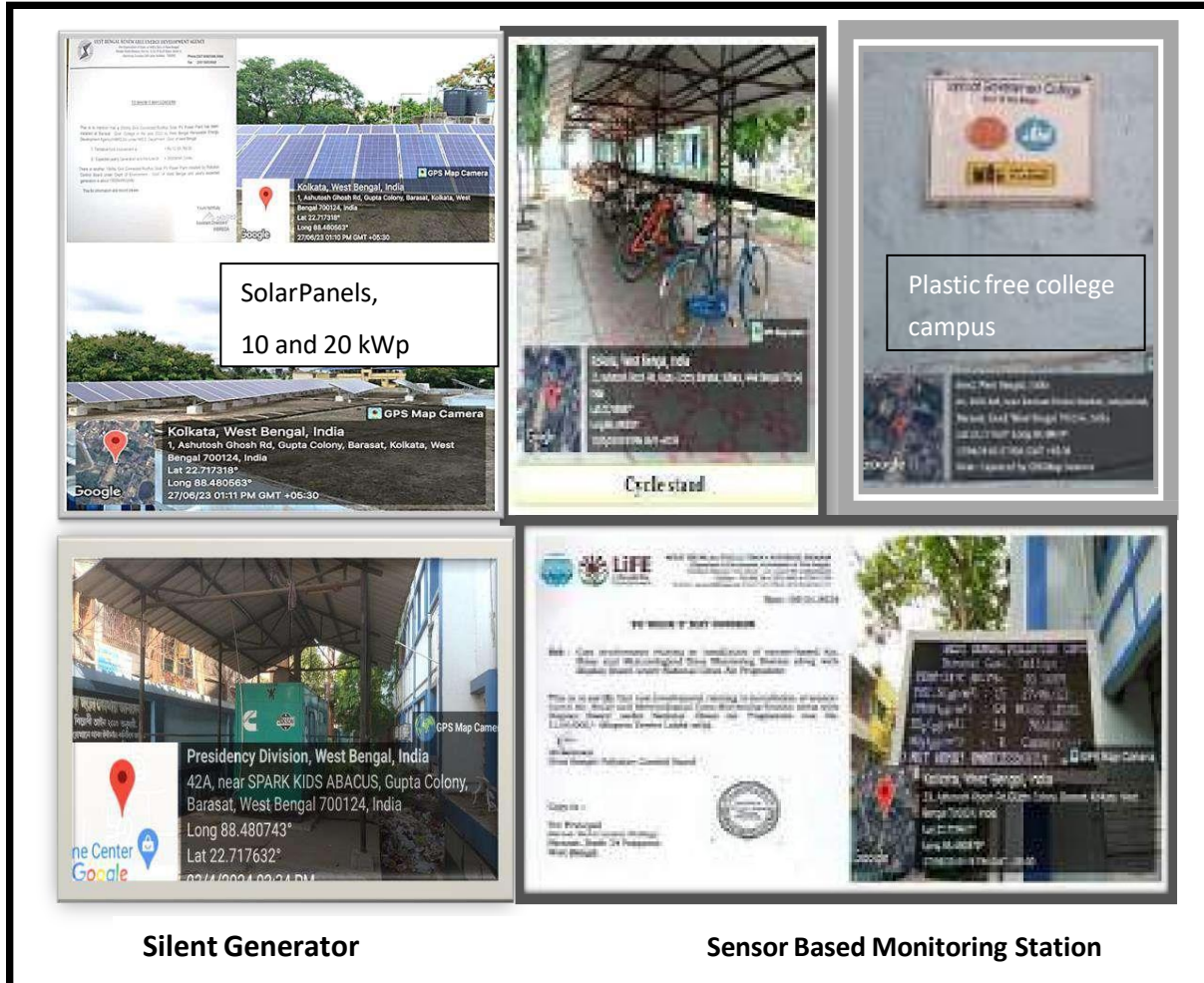
The college campus toilettes are regularly being cleaned employing the temporary cleaning staffs. More over Housekeeping staff was deployed by the college involving in separating the generated wastes in daily basis. College will take the initiatives for keeping the campus clean and green by deploying students from NSS.

**Conduction of Green Audit is being performed regularly. ISO Certification** on Energy and Environment for past few years has been obtained and will be accrued from the competent certifying agency for current passing academic year. (Green Audit report) and ISO certifications (**Annexure 3**)

*Ahatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## ANNEXURE 1A





## ANNEXURE 1B



Awareness messages and signage boards within campus

*Ahatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal

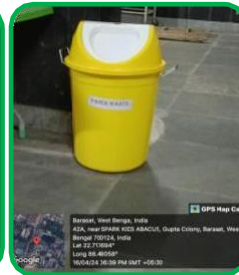


# ANNEXURE 1C (SOLID WASTE AND CHEMICAL WASTE DISPOSAL)

## Solid and liquid waste disposal MoU with Barasat municipality



Barasat and Barasat Panchayati Samiti, established in the "Panchayati Samiti" and individuals in Barasat, West Bengal, India, have entered into a Memorandum of Understanding (MoU) with the Barasat Municipality, established in the "Municipality" and individuals in Barasat, West Bengal, India, for the disposal of solid and liquid waste. The MoU is for a period of five years, starting from the date of signing and ending on the 31st day of March 2025. The MoU is for a period of five years, starting from the date of signing and ending on the 31st day of March 2025. The MoU is for a period of five years, starting from the date of signing and ending on the 31st day of March 2025.



## Solid and liquid waste disposal MoU with Madhyamgram municipality



Barasat and Barasat Panchayati Samiti, established in the "Panchayati Samiti" and individuals in Barasat, West Bengal, India, have entered into a Memorandum of Understanding (MoU) with the Madhyamgram Municipality, established in the "Municipality" and individuals in Madhyamgram, West Bengal, India, for the disposal of solid and liquid waste. The MoU is for a period of five years, starting from the date of signing and ending on the 31st day of March 2025. The MoU is for a period of five years, starting from the date of signing and ending on the 31st day of March 2025. The MoU is for a period of five years, starting from the date of signing and ending on the 31st day of March 2025.

Colour coded bins for biodegradable (Green), non-biodegradable(blue), Metallic or Plastic Sharp objects (Red), paper wastes (Yellow) and Chemical wastes (Black)

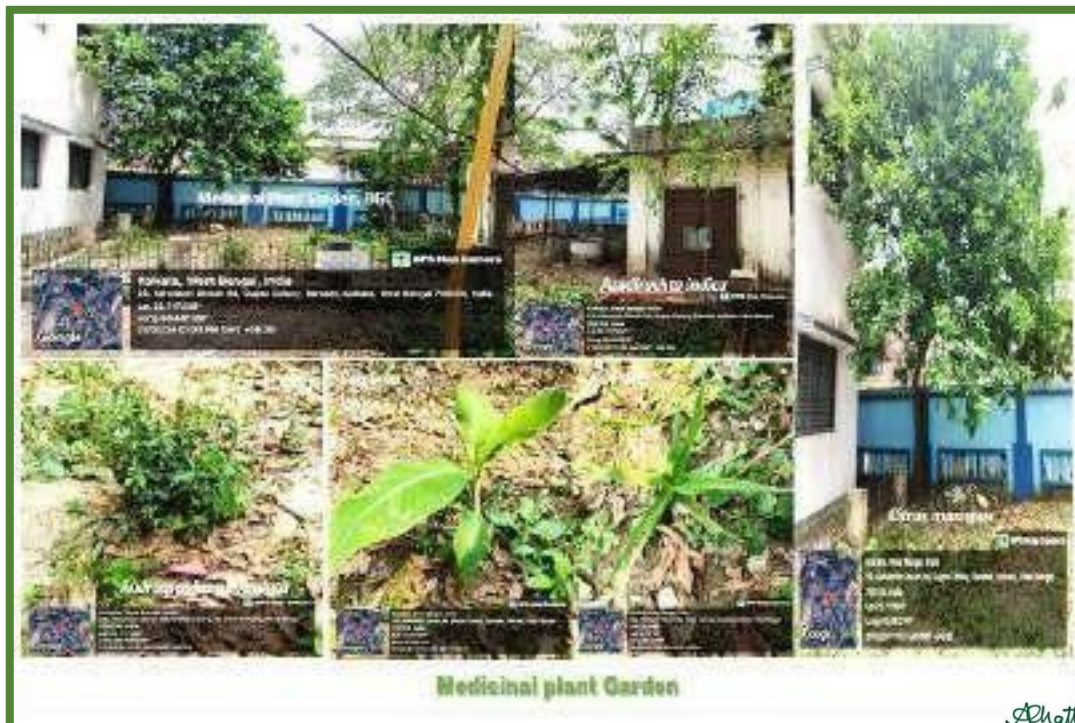
- Waste Accumulation Area for liquid Chemical Wastes (WAA)

## Mou with Barasat and Madhyamgram Municipality



## ANNEXURE 1D

### LANDSCAPE AND GARDEN AT COLLEGE CAMPUS



## ANNEXURE 1E

### ENVIRONMENT RELATED VALUE ADDED COURSES (VAC)



**INFORMATION BIOCHINA**  
DEPARTMENT OF GEOGRAPHY  
**BARASAT GOVERNMENT COLLEGE**  
WAC ACCREDITED WITH 'A' GRADE & ISO 9001:2015 CERTIFIED COLLEGE

PRESENTS  
**VALUE ADDED COURSE**

**ENVIRONMENTAL EDUCATION AND SUSTAINABLE DEVELOPMENT**  
BGC/GEVAC/01/23-24

EXPERIENCED FACULTIES  
INTERACTIVE CLASSES  
36 CONTACT HOURS

**JUNE 18-25, 2024**  
FROM 10:30 AM IST  
APPLY NOW  
www.bgc.ac.in  
bgc.geographydept@gmail.com

INTERDISCIPLINARY MODULES  
CERTIFICATE ON SUCCESSFUL COMPLETION  
TEACHING, LEARNING AND EVALUATION  
JOB-ORIENTED MENTORING  
INTAKE CAPACITY: 40  
INCREASING EMPLOYABILITY  
CONTEMPORARY IMPORTANCE



DEPARTMENT OF CHEMISTRY  
**BARASAT GOVERNMENT COLLEGE**  
OFFERS  
**VALUE ADDED COURSE**  
ON  
**FRUIT AND WATER QUALITY ANALYSIS AND IDENTIFICATION OF ADULTERANTS IN FOOD**  
20 - 26TH JUNE, 2024  
chemistry@bgc.ac.in



**BARASAT GOVERNMENT COLLEGE**

**POST GRADUATE DEPARTMENT OF BOTANY**  
**VALUE ADDED COURSE**  
ON  
**INSIGHTS IN MYCOLOGY AND PLANT PATHOLOGY:  
FROM MUSHROOM CULTIVATION TO PEST MANAGEMENT**

**MAY 17-24, 2024**

**Chief patron**  
**Dr. Samar Chattopadhyay**  
Principal  
Barasat Govt. College

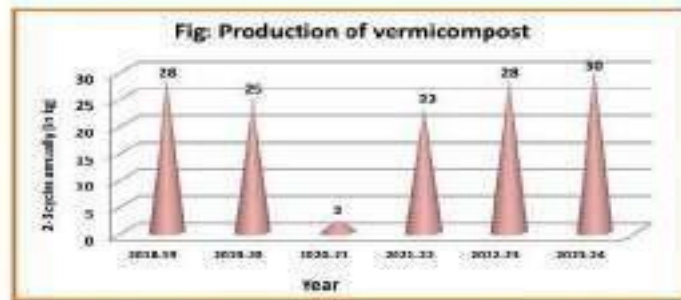
Venue: Departmental Seminar Room  
Certificates on successful completion of the course  
Course Coordinator: Dr. Anuradha Bandopadhyay  
Contact no: 8910848697  
Last date of registration: 16.05.2024  
Registration Link: <https://forms.gle/p4SenTtZ5vgZJVxn7>

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## ANNEXURE 1F

### A VERICOMPOST UNIT AT BARASAT GOVERNMENT COLLEGE



*A Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



ANNEXURE 2A  
OUTREACH PROGRAMMES BEYOND CAMPUS (2023-24)

**OUTREACH PROGRAMMES BEYOND CAMPUS (2023-24)**

The College is located at heartland of urbanized city Barasat surrounded by dense population and market place and slum area, where the most common problem remains unclean, unhealthy ambience that relates to many diseases.

- Botany department performed an outreach programme where the students for consecutive three years visited an agricultural land and observed the plant pathogen interaction in causing diseases that incurred economical losses to the farmers. Students under guidance of Dr. Anuradha Bandopadhyay, SACT Teacher of Barasat Government College, interacted with the farmers for probable causes and suggested remedial measures accordingly.
- Dr. Anuradha Bandopadhyay also trained many farmers on utilization of biofertilizer and mushroom cultivation.

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## Outreach Programmes performed during Academic Session

2023-24

Sl. No.	Date	Event/ Participants	Location of event	Nature of the event	Weblink
1.	04.03.2022 (2021-22) 28.02.2023 (2022-23)  15.03.2024 (2023-24)	An agricultural field had been selected to visit for three consecutive academic years by students for continuous study and identification of plant diseases. Interactive sessions with farmers helped to enrich the stakeholders about the field disease and possible solutions were also offered to them.  M.Sc. SEM-II and SEM- IV students visited during academic session 2021-22, (26 students), 2022-23 (24 students), 23-24 (20 students)	Madhabpur, Nilganj Santoshpur adjoining area, Amdanga, North 24 Parganas	Farmer's field visit to learn about 1. Different diseases in Agricultural crops 2. To identify causes of outbreak of diseases in agricultural Field.  3. To suggest a solution through interactive session	<a href="https://bgc.ac.in/pdf/activities/botany/Agricultural%20Field%20visit%202022--24.pdf">https://bgc.ac.in/pdf/activities/botany/Agricultural%20Field%20visit%202022--24.pdf</a>
2.	<b>Faculty member associated with nonremunerative consultancy services</b>	Farmers are being trained in utilizing biofertilizers under the guidance of Faculty member Dr. Anuradha Bandopadhyay. She has been associated with <b>Sudharma Krishi consultancy P(Ltd), an organization that operates on ICAR (Indian Council of agricultural research) mechanism to offer benefit to the farmers through researches on Agricultural technologies.</b>	Madhabpur And adjoining areas	To train the farmers in the field of organic farming through application of Biofertilizers and Biopesticides	<a href="https://bgc.ac.in/pdf/activities/botany/WhatsApp-Image-2024-04-17-at-10-15-54-PM.pdf">https://bgc.ac.in/pdf/activities/botany/WhatsApp-Image-2024-04-17-at-10-15-54-PM.pdf</a>

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



1. **Agricultural field visit for plant disease identification and farmers' interactions** by M.Sc. Sem2 and Sem4 students, P.G. Department of Botany, BGC, at Sarpadihi, Amdanga Subdivision, North 24 Parganas., on 15.03.2024 for consecutive three academic sessions (2021-22, 2022-23 and 2023-24)



*Ahatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal





**A BRIEF SUMMARY OF AGRICULTURAL FIELD VISIT(AN INITIATIVE  
BY PG DEPARTMENT OF BOTANY)**

**Introduction:** A field visit was conducted for plant pathological study and local farmers' interaction. The objective was to assess crop health, study disease patterns and symptoms and promote knowledge exchange with farmers.

Academic session/Dates	Number of student participants	Semester II	Semester IV Special Paper Plant pathology and Virology	Place
2021-22 4.03.2022	26	22	4	Sarpadihi, Nilganj Santoshpur road, Amdanga, North 24 Parganas.
2022-23 28.02.2023	24	19	5	
2023-24 15.04.2024	20	18	2	

- Faculty:** Dr. Anuradha Bandopadhyay(SACT), Dept. of Botany. Barasat Government College
- Farmers:**
  - Mehenaj Uddin, vegetable grower and seller
  - Fakir, rice and vegetable grower

**Activities and Observations**

- Crop Assessment and disease study:**
  - Different seasonal vegetable crops like tomato, potato, brinjal, cauliflower, chillies, broadbeans, bottle gourd, pointed gourd etc. and rice were studied in the field.
  - Symptoms like early blight and late blight, powdery and downy mildews, leaf spots and flecks, wilts, rusts, anthracnose, blasts, yellow mosaic virus, leaf curl virus and phytoplasma were found dominating in the field.
  - **Rice blast** lesions and brown spot lesions were prevalent in low-lying areas due to excessmoisture.
  - Tomato plants were highly affected by symptoms of early blight, late blight and *Fusarium* wilt due to untimely intermittent heavy rain in winter.
- Interactive Sessions:**
  - Dr. Bandopadhyay explained disease symptoms and management strategies to farmers.
  - Farmers shared their experiences and traditional practices.
  - Tomato fields were affected most which could not be controlled by traditional application of fungicides like mancozeb.
  - Integrated management by organic and chemical pesticides were advised.

**Conclusion :**

Through the field study, students gained knowledge about various disease symptoms of crops, hands-on training on disease identification through symptomological and app-based study. The field visit also facilitated valuable interactions between students, teacher and farmers. The students got familiar with practical problems of disease incidence on agricultural field crops. It also highlighted the need for tailored solutions, knowledge dissemination, and sustainable practices for farmers.

## 2. Certification of Farmers' training obtained by Dr. Anuradha Bandopadhyay, SACT, Department of Botany



*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## ANNEXURE 2B

### WITHIN CAMPUS ACTIVITIES (2023-24)

- Various commemorative days are celebrated such **World Wildlife Day, International Biological Diversity Day, World Environment Day** to make students aware of the significance of nature and natural resources.
- Environment Protection and Nature Cell organized awareness programme by arranging Poster and slogan writing competition against dengue and Vector borne diseases
- Awareness regarding conservation of water and energy and other resources are celebrated through publication of wall magazines, students seminar and documentation of natural resources within the campus.
- Students are actively involved in various awareness programmes like sensitization of vector borne diseases, sanitization programmes within the campus.
- **Sapling Plantation on World Environment Day was performed with NSS volunteers.**
- Students took part in campus sanitization and cleaning programmes.
- **Value Added Courses organized by Department of Botany, Geography and Chemistry imparted knowledge on various Environment related issues.**
- Vermitechnology remains an important part of in campus activity, Department of Zoology maintains the unit to produce compost with the help of students. The compost is again utilized for the maintenance of the garden.

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



## Within Campus Programmes Performed during Academic year Session (2023-24)


Sl No	Dates	Event	Nature of events	Outcome	Participants/weblink
1.	22.08.2023	<b>Environment Protection and Nature Cell</b> of Barasat Government College organized an awareness program on <b>prevention of vector borne diseases</b> by displaying posters and slogans made by students of different departments of the college.	Dengue and Vector borne disease awareness program	<b>Student awareness and capacity building programme</b>	<b>Number of Students participants 15</b>
2.	05.4.24	<b>Environment Protection and Nature Cell</b> of Barasat Government College in collaboration with IQAC organized a seminar on “ <b>Save Water, Save Energy</b> ” <b>1. Dr. Dhananjay Roy, Associate Professor, Department of Physics spoke on Energy conservation for sustainable future.</b> <b>2. Oral presentation on Water Conservation and Management in Daily Life by Student volunteers from Nature Club :</b> i Trishna Hazra , PG Semester IV, Department of Botany ii. Pratyusa Deb, PG Semester IV, Department of Botany iii. Safina Alam, UG Semester IV, department of Zoology <b>Students from Chemistry Department demonstrated the methods of detection of Hardness of water and analysed the quality of water from college campus.</b> 1. Rima Biswas, Semester VI 2. Md. Rohan Ali, Semester VI	Water and Energy Conservation Awareness Programme	Student awareness	<b>Number of Students 26. Number of teachers: 11</b>
3	30.04.2024	<b>A seminar on “Role of Mangrove Army in Protecting Climate Change” organized by Geography and Botany Department by Uma Shankar Mondal, Purbasha Eco help line secretary</b>	Environment awareness seminar	Student awareness programme	<b>Number of participants: 87</b>
4.	15.06.2024	1. Tree plantation 2. Academic Seminar By Dr. Narayan Chandra Karmakar (Botany) and Dr. Srikanta Guria (Zoology) on the occasion of World Environment Day organized by NSS and Environment Protection and Nature Cell	Celebration of World Environment Day Commemorative Event	Student awareness programme	Number of Participants: 50
5..	18.06.2024	Academic Seminar on the occasion of World Wildlife Day & World Environment Day organized by Post	Celebration of World Wildlife Day	Student awareness programme	Number of Participants: 77

*A Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



		Graduate Department of Zoology, Barasat Govt. College in association with IQAC, Barasat Govt. College	& World Environment Day Commemorative Event		
6.	22.06.2024	Dept of Botany celebrated International Biological Diversity Day By field visit and biodiversity documentation at Kishalaya Orphanage Home led by Dr. G.G. Maity, Dr. Narayan Chandra Karmakar and Dr. Sautrik Basu	Celebration of International Biological Diversity Day Commemorative Day	Student awareness programme	Number of participants:22
7.	22.06.2024	<b>Dept of Botany celebrated International Biological Diversity Day</b> <b>By inaugurating Wall magazine Blooming Buds 2.2</b>	Celebration of International Biological Diversity Day Commemorative Day	Student awareness programme	Number of participants: 22
8.	18.06.2024 to 25.06.2024 (36 contact hours)	VAC on “Environmental Education and Sustainable Development” BGCGEOVAC001/23-24	Value Added Course organized by <b>Geography Department</b>	Student awareness about <b>Environmental Sustainable Education</b>	Number of Participants:53
9.	20.06.2024 to 26.06.2024 (36 contact hours)	VAC on Fruit and Water Quality analysis And Identification of Adulterants In Food	Value added Course organized by <b>Chemistry Department</b>	Student Awareness about Water Resources and Management	Number of Participants: 20 students from zoology and Chemistry
10.	20.06.2024 to 26.06.2024 (36 contact hours)	VAC on Insights in Mycology and Plant Pathology: from Mushroom Cultivation to Pest Management	Value added Course organized by <b>Botany Department</b>	Student Awareness about Water Resources and Management	Number of Participants: 62
11.	27.09.23.	NSS Unit of Barasat Government College has observed <b>NSS Day</b> on The Programme started with <b>Campus Cleaning</b> by the NSS Volunteers.  Bleaching powder and Phenyl were given in several areas for <b>Preventing Dengue</b> .  In collaboration with Botany Department, Plantation and establishment of <b>Medicinal Garden</b> were performed	Student build up Programme	NSS Day Celebration	Number of Participants: 85 NSS volunteers
12.	02.12.2023	<b>Weeding &amp; Maintenance of Medicinal Plants</b>	Student build up Programme	Awareness Programme within campus	Number of participants:20 <a href="https://bgc.ac.in/pdf/nss/2022-23%20Report_NSS,%20BGC,%20NAAC.pdf">https://bgc.ac.in/pdf/nss/2022-23%20Report_NSS,%20BGC,%20NAAC.pdf</a>

# 1. Dengue and Vector Borne disease Awareness Poster Competition on 22.08.2023

  
 GOVERNMENT OF WEST BENGAL  
**BARASAT GOVERNMENT COLLEGE**  
 POST GRADUATE DEPARTMENT OF BOTANY  
 10, K.N.C. Road, Barasat, Kolkata - 700124, West Bengal, India  
 Phone: (033) 2552 3365, Fax: (033) 2562 5053, Website: www.bgc.org.in, E-Mail: principal@bgc.org.in

Dt: 28.08.23

To  
 The Principal  
 Barasat Government College  
 10 KNC Road, Barasat, Kol-124

*Appreciates the program.*  
*ধন্যবাদ*

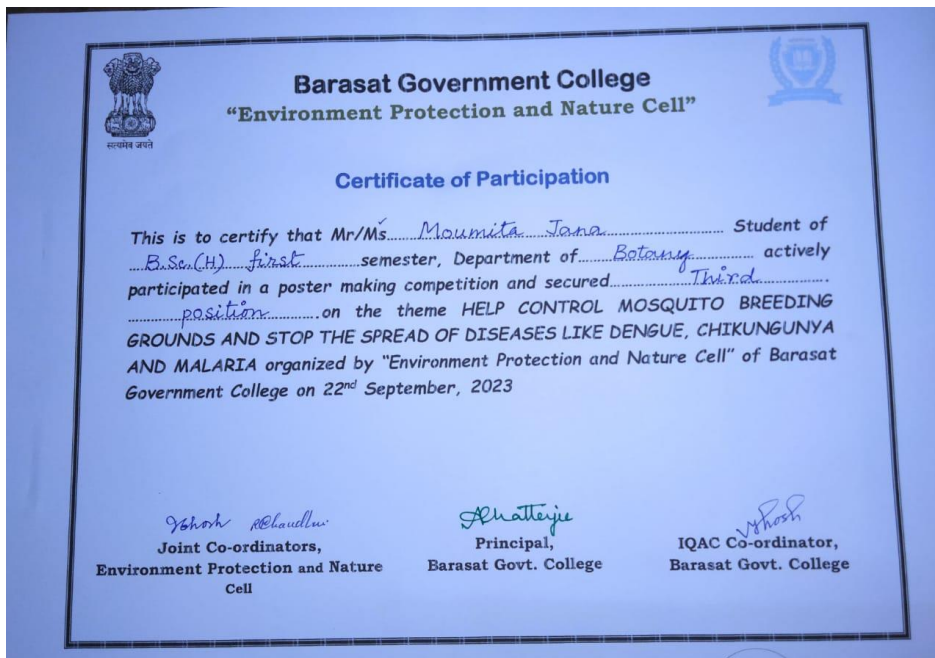
Respected Sir,

This is to inform you that in context with a rise in vector borne diseases like Dengue, Malaria and Chikungunya in the North 24 Parganas District, "Environment Protection and Nature cell", Barasat Govt. College wishes to organise a poster and slogan making drive among PG and UG students as a part of "Dengue Awareness Programme".

We shall be obliged if you kindly permit to arrange such an event at the college campus on September and do the necessary arrangements.

Thanking You,

Convener,  
 Environment Protection and Nature cell  
*Dr. Jayati Ghosh*  
*Dr. Ritaparna Kundu Chaudhuri*



  
**Principal**  
 Barasat Govt. College  
 Govt. of West Bengal



## 2. Water and Energy Conservation awareness programme and Seminar

To  
The Principal  
Barasat Government College  
10 KNC Road, Barasat  
700124

*Maybe Professor of  
2024  
01/04/24*

Date - 1.04.2024

Subject: (Organization of a Seminar and Awareness Programme on Energy and Water Conservation by Environment Protection and Nature cell in Collaboration with IQAC)

Sir,

This is for your kind information that Environment Protection and Nature Cell is going to arrange a seminar and student awareness programme on 5.04.2024 in Collaboration with IQAC, Barasat Government College, on conservation of energy and water.

Dr. Dhananjay Roy, Associate Professor in Physics, Barasat Government College, would speak on the topic "Energy conservation for sustainable Future", followed by oral presentation by Nature Club students of Botany, Zoology and Chemistry on conservation of water at Botany Seminar room. Kindly allow us to arrange for the same as mentioned above.

Thanking You  
Yours Sincerely,  
Dr. Jayati Ghosh (Joint Convener, Environment protection and Nature Cell)  
Dr. Rituparna Kundu Chaudhuri (Joint Convener, Environment protection and Nature Cell)

*Jayati Ghosh 1/04/2024*  
*Rituparna Kundu Chaudhuri 1/04/2024*

**BARASAT GOVERNMENT COLLEGE**

The Environment Protection and Nature Cell of Barasat Government College in collaboration with IQAC, is going to organize a seminar on....

**"SAVE WATER, SAVE ENERGY"**

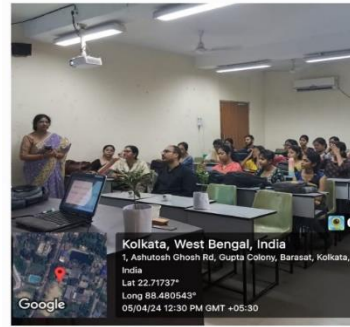
**PATRON- PROF. SAMAR CHATTOPADHYAY**  
PRINCIPAL, BARASAT GOVERNMENT COLLEGE

**SPEAKER- DR. DHANANJOY ROY**  
ASSOCIATE PROFESSOR, PG DEPT. OF PHYSICS,  
BARASAT GOVERNMENT COLLEGE

**TOPIC 1- ENERGY CONSERVATION FOR SUSTAINABLE FUTURE**

Oral Presentation by student volunteers on  
**TOPIC 2- WATER CONSERVATION AND MANAGEMENT IN DAILY LIFE**  
DEPARTMENT OF BOTANY, ZOOLOGY AND CHEMISTRY

**05.04.24 | 12:00 PM**  
**VENUE- BOTANY SEMINAR HALL**



"Save Water Save Energy" Seminar

Sr. no.	Name of Teachers	Signature	Date
1.	Jayati Ghosh (Zoology)	<i>Jayati Ghosh</i>	05.04.24
2.	Rituparna Kundu Chaudhuri (Botany)	<i>Rituparna Kundu Chaudhuri</i>	05.04.24
3.	Soma Naha (Geography)	<i>Soma Naha</i>	05.04.24
4.	Dr. ABHJIT DE (Physics)	<i>Dr. Abhjit De</i>	05.04.24
5.	Dr. Balaram Das (History)	<i>Dr. Balaram Das</i>	05.04.2024
6.	Dr. Subhasree Mukhopadhyay (Chemistry)	<i>Dr. Subhasree Mukhopadhyay</i>	05.04.2024
7.	Dibyendu Sekhar Mahanta (Biology)	<i>Dibyendu Sekhar Mahanta</i>	05.04.2024
8.	Dr. Jayati Ghosh	<i>Dr. Jayati Ghosh</i>	05.04.2024
9.	Dr. Rituparna Kundu Chaudhuri	<i>Dr. Rituparna Kundu Chaudhuri</i>	05.04.2024
10.	Rituparna Kundu Chaudhuri	<i>Rituparna Kundu Chaudhuri</i>	05.04.2024
11.	Mihir Hazra	<i>Mihir Hazra</i>	05.04.2024
12.	Sanku Bandyopadhyay	<i>Sanku Bandyopadhyay</i>	05.04.2024
13.	Dr. Sarati Ray (Geography)	<i>Dr. Sarati Ray</i>	05.04.24

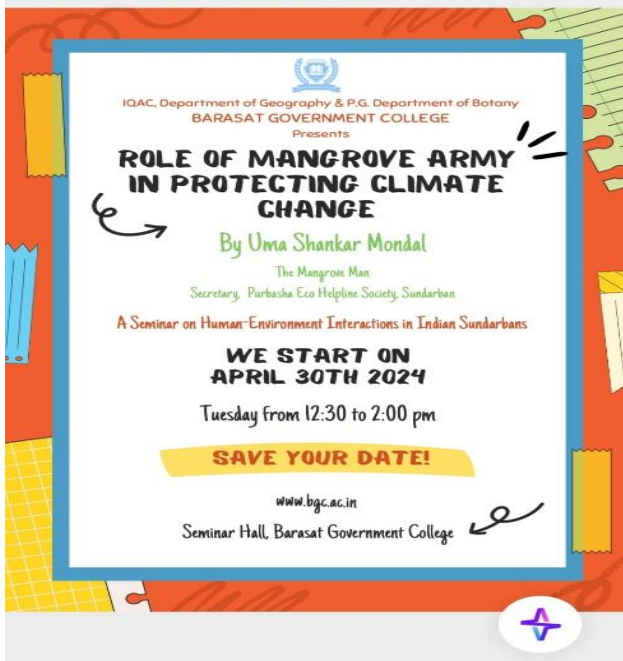
Seminar on "Save Water Save Energy"  
Name of the speaker: Dr. Dhananjay Roy, Dept. of Physics, Barasat Government College

Sr. No.	Name of the student	Signature
1.	Safina Alam (English)	<i>Safina Alam</i>
2.	Prinyanti Banerjee (Zoology)	<i>Prinyanti Banerjee</i>
3.	Trishita Chatterjee (Biology)	<i>Trishita Chatterjee</i>
4.	Trishita Chatterjee (Biology)	<i>Trishita Chatterjee</i>
5.	Mihir Choudhury (Biology)	<i>Mihir Choudhury</i>
6.	Mihir Choudhury (Biology)	<i>Mihir Choudhury</i>
7.	Manjushree Das (Biology)	<i>Manjushree Das</i>
8.	Angana Ghosh (Biology)	<i>Angana Ghosh</i>
9.	Angana Ghosh (Biology)	<i>Angana Ghosh</i>
10.	Sangamita Chatterjee (Biology)	<i>Sangamita Chatterjee</i>
11.	Sangamita Chatterjee (Biology)	<i>Sangamita Chatterjee</i>
12.	Pratik Chatterjee (Biology)	<i>Pratik Chatterjee</i>
13.	Pratik Chatterjee (Biology)	<i>Pratik Chatterjee</i>
14.	Sushanta Ray (Biology)	<i>Sushanta Ray</i>
15.	Abanika Das (Biology)	<i>Abanika Das</i>
16.	Riya Das (Biology)	<i>Riya Das</i>
17.	Sabane Mandal (Biology)	<i>Sabane Mandal</i>
18.	Rena Das (Biology)	<i>Rena Das</i>
19.	Rina Das (Biology)	<i>Rina Das</i>
20.	Angana Ghosh (Biology)	<i>Angana Ghosh</i>
21.	Sangamita Chatterjee (Biology)	<i>Sangamita Chatterjee</i>
22.	Sangamita Chatterjee (Biology)	<i>Sangamita Chatterjee</i>
23.	Sangamita Chatterjee (Biology)	<i>Sangamita Chatterjee</i>
24.	Sangamita Chatterjee (Biology)	<i>Sangamita Chatterjee</i>
25.	Sangamita Chatterjee (Biology)	<i>Sangamita Chatterjee</i>
26.	Sangamita Chatterjee (Biology)	<i>Sangamita Chatterjee</i>

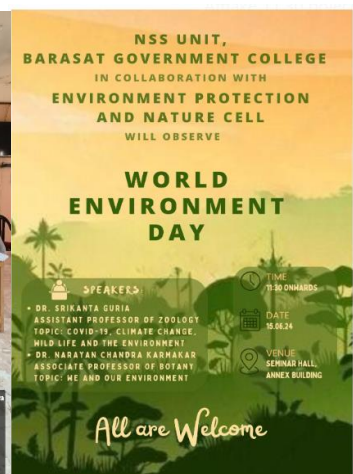
*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



3. Seminar on climate change resilience by mangrove plants, organized by Botany and Geography Department



4. Celebration of World Environment Day (5.06. 2024) on 15.06 2024 by NSS and Environment Protection and Nature Cell



*A Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal





## 5. Celebration of World Wildlife Day and World Environment Day by Department of Zoology on 18.06.2023

**Academic Seminar on the occasion of World Wildlife Day & World Environment Day organized by Post Graduate Department of Zoology, Barasat Govt. College in association with IQAC, Barasat Govt. College will be held on 18<sup>th</sup> June, 2024**

**Speaker:**

**DR. BULGANIN MITRA**, Former Scientist C, Zoological Survey of India, Emeritus Professor, Department of Zoology, Ramakrishna Mission Vivekananda Centenary College (Autonomous), Rahara

**TOPICS OF THE PRESENTATION**

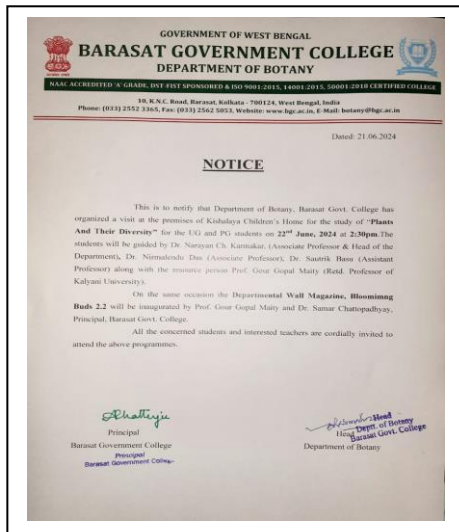
1. FOUR DECADES OF INDIAN SCIENTIFIC EXPEDITIONS AND CLIMATE CHANGE IN ANTARCTICA
2. THE GALÁPAGOS' WILDLIFE EXPERIENCES – A BEGINNER'S GUIDE



*A Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



6. Celebration of **International Biological Diversity Day** on 22.05.2023, through field visit at Kishalaya Orphanage home for documentation of Biodiversity and Wall Magazine "Blooming Buds 2.2" inauguration



Field Visit on "Plants and their diversity" dated: 22.06.24  
 Resource Person: Prof. G. G. Maity (Retd. Prof. of Botany, Kalyani University)

Sl. No.	NAME	CLASS 2 Semester	Signature
1.	Agar Biswas	UG Bot - I	Agar Biswas
2.	Sanghata Ghosh	UG Bot - II	Sanghata Ghosh
3.	KRISHNENDU JINDAL	PG Sem - II	KRISHNENDU JINDAL
4.	Mitina Kabari	PG Sem - II	Mitina Kabari
5.	Abaritika Das	PG Sem - II	Abaritika Das
6.	Mahimya Banerjee	PG Sem - II	Mahimya Banerjee
7.	Snehasree Bhattacharya	PG Sem - II	Snehasree Bhattacharya
8.	Sarali Buchhara	PG Sem - II	Sarali Buchhara
9.	Ranika Das	PG Sem - II	Ranika Das
10.	Sonali Ghosh	PG Sem - II	Sonali Ghosh
11.	Sahani Mandal	PG Sem - II	Sahani Mandal
12.	Riya Palan	PG Sem - II	Riya Palan
13.	Sneha Bhattacharya	PG Sem - II	Sneha Bhattacharya
14.	Dhruwan Das	PG Sem - II	Dhruwan Das
15.	Sangita Chatterjee	PG Sem - II	Sangita Chatterjee
16.	Pranika Ghosh	PG Sem - II	Pranika Ghosh
17.	Shobhita Mandal	PG Sem - II	Shobhita Mandal
18.	Sudipta Ganguly	PG Sem - II	Sudipta Ganguly
19.	Rishi Palan	PG Sem - II	Rishi Palan
20.	Purnima Sen	PG Sem - II	Purnima Sen
21.	Akash Das	PG Sem - II	Akash Das

*Ahatterjee*  
**Principal**  
**Barasat Govt. College**  
**Govt. of West Bengal**



7. VAC organized by Geography and Chemistry department on Environmental Education and sustainable Development



INFORMATION BROCHURE

DEPARTMENT OF GEOGRAPHY  
BARASAT GOVERNMENT COLLEGE  
MAAC ACCREDITED WITH 'A' GRADE & DISTRICT SPONSORED COLLEGE

PRESENTS

VALUE ADDED COURSE

**ENVIRONMENTAL  
EDUCATION  
AND  
SUSTAINABLE  
DEVELOPMENT**

BGC GEOVAC001/23-24

EXPERIENCED FACULTIES  
INTERACTIVE CLASSES  
36 CONTACT HOURS

**JUNE  
18-25, 2024**


FROM 10:30 AM IST

APPLY NOW

www.bgc.ac.in  
bgc.geographydept@gmail.com

INTERDISCIPLINARY MODULES  
CERTIFICATE ON SUCCESSFUL COMPLETION  
TEACHING, LEARNING AND EVALUATION  
JOB-ORIENTED MENTORING  
INTAKE CAPACITY: 40  
INCREASING EMPLOYABILITY  
CONTEMPORARY IMPORTANCE

8. VAC organized by Chemistry Department Fruit and water Quality analysis, Identification of adulterants in Food (20<sup>th</sup> to 26<sup>th</sup> June 2024)



DEPARTMENT OF CHEMISTRY  
BARASAT GOVERNMENT COLLEGE  
OFFERS  
VALUE ADDED COURSE  
ON

**FRUIT AND WATER  
QUALITY ANALYSIS AND  
IDENTIFICATION OF  
ADULTERANTS IN FOOD**

20 - 26TH JUNE, 2024

chemistry@bgc.ac.in

*A. Hatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



9.VAC organized by Chemistry Department Fruit and water Quality analysis,  
Identification of adulterants in Food (20<sup>th</sup> to 26<sup>th</sup> June 2024)



**BARASAT GOVERNMENT COLLEGE**  
POST GRADUATE DEPARTMENT OF BOTANY  
VALUE ADDED COURSE  
ON  
INSIGHTS IN MYCOLOGY AND PLANT PATHOLOGY:  
FROM MUSHROOM CULTIVATION TO PEST MANAGEMENT

**MAY 17-24, 2024**

**Chief patron**  
Dr. Samar Chattopadhyay  
Principal  
Barasat Govt. College

Venue: Departmental Seminar Room  
Certificates on successful completion of the course  
Course Coordinator: Dr. Anuradha Bandopadhyay  
Contact no: 8910848697  
Last date of registration: 16.05.2024  
Registration Link: <https://forms.gle/p4SenTtZ5vgZJVxn7>

*A. Chatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal



10.NSS Day celebration through Campus cleaning and Plantation on 27.09.2023



11.Weeding and maintenance of Medicinal Plants 2.12.2023 by NSS volunteers with Botany Department



## RAIN WATER HARVESTING AND GROUND WATER RECHARGING

The unit has not been installed till date. The proposal has been sanctioned: Document for sanction letter and approval has been obtained from Higher Education Department. The work is in progress.

Higher Education Department

Memo No:GO2324015928HE  
File No:HEd-16011(11)4/2024-CG

Date: 15/03/2024

This order is issued with the concurrence of FINANCIAL ADVISOR (Higher Education) of this Department vide their / his U.O No. AA2324040127FA00 Dated 22/02/2024.

From:- DEPUTY SECRETARY  
Higher Education  
GOVERNMENT OF WEST BENGAL  
Higher Education

To: The  
Director, State Water Investigation Directorate (SWID)

Subject: Administrative Approval for the Roof top Rain Water Harvesting and Recharging System at Barasat Govt.College  
Project ID:- HE232415189S000

The undersigned is directed, by order of the Governor, to say that the Governor has been pleased to accord Administrative Approval for the Project Roof top Rain Water Harvesting and Recharging System at Barasat Govt.College, the details of which has been given below.

Name of the Project: Roof top Rain Water Harvesting and Recharging System at Barasat Govt.College

Project ID: HE232415189S000

Address: Barasat Govt.College

Administrative Approval: Rs 1385584 (Thirteen Lakh Eighty Five Thousand Five Hundred Eighty Four Only.)

Phasing amount and chargeable head of accounts

Sl No.	Financial Year	Head	Scheme Type	Scheme Name	Amount
1	2023-24	70-4202-01-203-00-004-53-00-V	State Development Schemes	Development of other Government Colleges (Higher)	1385584
Total					1385584

DEPUTY SECRETARY  
Government of West Bengal  
Higher Education Department

Memo No: GO2324015928HE

Date: 15/03/2024

Copy forwarded for information and necessary action:

The Principal Secretary / Secretary-(Higher Education)  
The Principal Accountant General(A&E)-WestBengal  
The Principal Accountant General(Audit)-WestBengal  
The Principal Accountant General(RW/LBA)-WestBengal  
The Financial Advisor-(Higher Education)  
The Finance department-(Group GR1)  
The Principal D-I-C-Barasat Govt.College  
The Executive engineer (A-I)-SWID-III, Krishnagar, Nadia

DEPUTY SECRETARY  
Government of West Bengal  
Higher Education Department

*A Phatterjee*  
Principal  
Barasat Govt. College  
Govt. of West Bengal





## FUTURE SUGGESTIONS FOR BETTER ENVIRONMENT AT COLLEGE CAMPUS AND SURROUNDINGS

1. Energy efficient Solar panels should be installed at Annexe and Library building for efficient energy utilization and economical benefits.
2. Functional Fume hood for Chemistry department needs to be installed.
3. Minimized use of hazardous chemicals at chemistry laboratory is recommended.
4. More plantation at the campus is required to bring about carbon neutrality
5. Present status of Medicinal plant garden needs to be improved by adding other rare and endangered plants and enrich campus diversity. This would provide an opportunity for the college to be recognized as a germplasm preservation Centre in future.
7. QR coding of the medicinal plants in near future is suggested.
6. A butterfly garden could be designed and formed. This would assist in beautification of the college campus as well as enrich campus faunal diversity.
7. All the stakeholders including students, teachers, and nonteaching staff members would be encouraged to use carbon neutral vehicle to commute to college and further minimize the carbon footprint data.
8. Rain Water Harvesting and Ground Water Recharging facility will be installed. Higher authority approval has been received and the work has been started.
9. Water consumption could be measured using flow meters. Efficient measurement of consumption will help to reduce indiscriminate usage.
10. A future plan is considered to switch over to double switch cistern (will be used according to need) to reduce unnecessary loss of water through flushing.
11. To avoid overflowing / wastages from Over Head Tanks, sensor system needed.
12. More programmes related to sensitization regarding environmental issues need to be organized at regular frequency within and beyond campus.
13. Various outreach programmes in relation to field visit needs to be carried out more often to gather the knowhow about neighbourhood field conditions and efforts would be given to disseminate knowledge and encourage sustainable practices among farmers.

*A. Phatterjee*  
Principal  
Barasat Gov. College  
Govt. of West Bengal






## CONCLUSIONS

- Annual documentation of Green Audit provides the opportunity for data collection on various environmental resources that needs to be sustainably used. The findings after the data collection helps to introspect and redesign judicious utilization pattern.
- The Energy audit data indicates about efficient utilization of solar panel to reduce electric bill. The Energy and water audit refers to the need to utilize energy and water in more efficient manner. The carbon footprint indicates a healthy habit within campus by restriction of automobiles. Also there is an increased tendency to use carbon neutral vehicle such as train, toto and bicycle among stakeholders over other fuel dependent vehicles.
- The various data collected on Flora and Faunal diversity helps to ensure campus diversity conservation and future enrichment.
- Environmental activities by students and staffs would generate awareness about sustainable utilization of energy, water and other resource management. This audit also aims towards estimation of carbon budget and reduction in carbon foot print in future.
- Sensitization programmes through celebration of commemorative days and awareness about cleanliness and sanitization of college campus within and surroundings would help to raise community awareness about cleanliness and hygiene and could prevent vector borne diseases and could improve general health conditions.
- Sapling plantation, organizing Value Added Courses on Environmental Issues, Vermicomposting and Training on Mushroom Cultivation remains Best Green Practices within the campus.
- A field visit to neighbourhood field facilitated valuable interactions between students, teacher and farmers. The students got familiar with practical problems of disease incidence on agricultural field crops. It also highlighted the need for tailored solutions, knowledge dissemination, and sustainable practices for farmers.

Barasat Government College thus ensures a gradual shift towards more environment friendly operations whereby it will not only create environmental consciousness among the students and staff, but also emerge as a role model for other public offices and institutes in the neighbouring area.


### Green Audit Members

1. 

2. 

3. Samajit Bhowmik

4. Indrans Banerjee

 (Convener)  
Green audit committee  
Barasat Government College  
Convener  
Green Audit Committee  
Barasat Government College

  
Principal  
Barasat Govt. College  
Govt. of West Bengal

