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Rammohan College

102/1, 85A, 85B, 85C & 85D, Raja Rammohan Sarani, Kolkata, West Bengal 700009

Green, Environmental and Energy Audit Report

2018-2019



Prepared by

Rammohan College

In association with

RSP Green Development & laboratories Pvt. Ltd.

(ISO Certified and QCI - NABET Accredited Environmental Consultant Organization)





RSP Green Development & Laboratories Pvt. Ltd.

An ISO 9001: 2015 & ISO 14001: 2015 Certified Company

QCI-NABET ACCREDITED ENVIRONMENTAL CONSULTANT

CIN NO: U74999WB2017PTC219565



To
The Principal
Rammohan College
102/1, Raja Rammohan Sarani,
Kolkata-700009

Sub: Submission of the Green Audit Report Conducted by Rammohan College, 102/1, 85A, 85B, 85C & 85D, Raja Rammohan Sarani, Kolkata-700009 in association with RSP Green Development & Laboratories Pvt. Ltd.

Respected Madam,

On behalf of RSP Green Development & Laboratories Pvt. Ltd., it has been certified that the assigned **Green Audit Programme**, comprising **Energy Audit, Water Audit, Biodiversity Audit, Green Campus Management Audit, Plastic Waste Management, Carbon Foot Print Audit and Carbon Credit**, had been successfully completed by Rammohan College, 102/1, 85A, 85B, 85C & 85D, Raja Rammohan Sarani, Kolkata-700009 in association with RSP Green Development & Laboratories Pvt. Ltd. on 15.03.2019. After completion of the work, **Final Report** has been submitted to you. The report is compiled with **Work-sheets, Comparative Assessment** through analyses and suggestions for your Institution at the end.

The organization is thankful for your necessary support and adequate cooperation by providing needful information, requisite documents and sharing your institutional activities. We are further thankful to your humble hospitality for our staff and volunteers at the time of work.

Yours sincerely,

Pinaki Roy
Managing Director
RSP Green Development & Laboratory Pvt. Ltd.



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1. Introduction

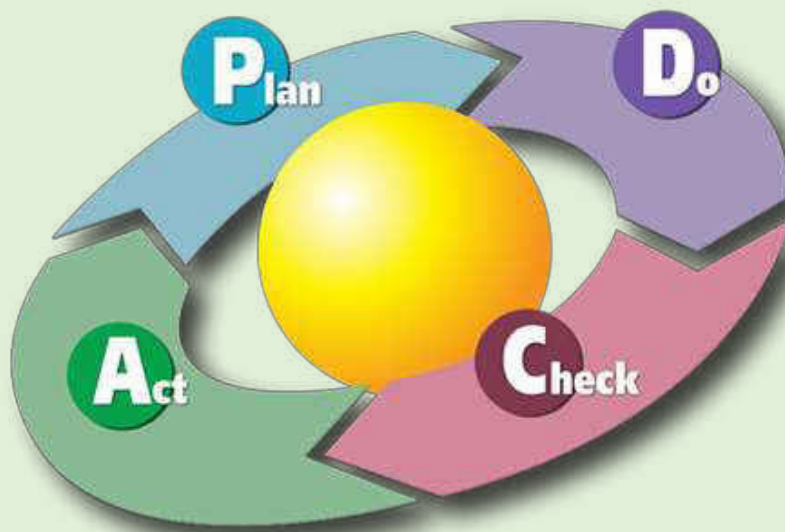
Green Audit is a stage wise review process of systematic identification, quantification, recording, reporting, analysis and documentation of components of environmental diversity of the institute or organization. It is a systematic assessment of day-to-day activity with reference to the utilization of resources as well as waste management. It aims to analyze environmental practices within and outside of the concerned place; leading to an eco-friendly atmosphere. It helps to determine how and where the energy, water or other resources are being used, based on which the institution can design effective management policies and implement changes towards sustainable use of resources. It can create health consciousness and promote environmental awareness, values and ethics. It also helps to enlighten staff and students of the institution for better understanding of Green impact on campus. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for environmental sustainability. Especially in colleges and universities where young minds dwell, ensuring an ecosystem with endurable qualities is the need of the hour. The green influence on the campus is vital to guarantee the best learning environment and healthy ecosystem for everyone associated with the site. The green audit report determines the greenery quotient on the campus and covers other influential environmental aspects. It includes the consumption and management of energy resources and environmental components.

National Assessment and Accreditation Council (NAAC) was introduced by the University Grants Commission or UGC in September 1994. NAAC was established for reviewing the performance and operational quality of Indian universities and colleges. The National Assessment and Accreditation Council have made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the mitigation of global warming through enforcement of carbon footprint reduction measures and improved management steps.

- **Self-assessment** – It allows the universities and colleges to review the ideal steps and implement them for the campus. The audit assists in self-assessment and the decision-making process.

- **Awareness** – It develops awareness among everyone associated with the campus with conscious and consistent efforts.
- **Improved scopes** – By complying with the norms, universities can ensure higher scopes of getting the best grade from NAAC. It is vital to follow the systematic way and implement the best steps for green audits on the campus under professional guidance.

The PDCA cycle audit is a systematic way of checking and improving the quality and performance and it involves four phases: planning the improvement, implementing the change, measuring the results, and acting on the feedback.



PDCA Cycle of Green Audit

1.1 Need for Green Audit

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that accredits the institution according to the scores assigned at the time of accreditation.

The Audit report helps to understand the current practices of sustainability with regard to the use of water and energy, generation of wastes, transportation, purchase of goods, etc; establishing a baseline of existing environmental conditions with focus on natural and physical environment and create awareness among students and staff concerning real issues of environment and its

sustainability. Based on the audit report, the college can make the best strategies to make the campus ideal for students, teachers, and anyone associated. It also helps the college acknowledge the wastage volume and consider different recycling projects for developing a sustainable ecosystem for the learners. Simply put, it is a way to minimize wastage and create a more suitable place for learning with improved NAAC grades.

1.2 Objectives of Green Audit

The main aim of this green audit is to assess the environmental quality and the sustainable management strategies being implemented in Rammohan College.

The objectives of Green Audit include:

- Documentation of baseline data of good practices, strategies and action plans towards improving environmental quality for future along with corrective actions and future plans.
- Maintain conformity with the norms and standards in the environmental management system and to design ideal protocols that develop a sustainable ecosystem on the campus.
- Assessment of water use, waste management, energy consumption, health and environmental quality in the campus.
- Identification of the gap areas and suggest recommendations to improve the Green Campus status of the College.
- Generation of awareness among the students, teaching and non teaching members of the institution.

1.3 About the Institution

Rammohan College owes its origin to City College, Calcutta which is one of the oldest first grades College in West Bengal. It was founded in 1881 by a band of patriotic and selfless Brahma leaders like Ananda Mohan Bose, Pandit Sivnath Sastri and Umesh Chandra Dutta. Rastraguru Surendranath Banerjee later joined the College as teacher. Up to 1961 City College had a women's Department in morning which has separately affiliated in 1961 to the Calcutta University and renamed as Rammohan College. The Geo coordinates of old building are 22.581023°N and 88.370149°E and Geo coordinates of new building are 22.582952°N and 88.370997°E.

The aim of College according to the founders, is to promote the cause of education in its highest and widest sense, to make education a comprehensive training of the mind, heart and body, and founded on theistic basis conducive to the good of man and glory of God.

The College is open to all female students irrespective of race, creed or caste. It has record of brilliant result. The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

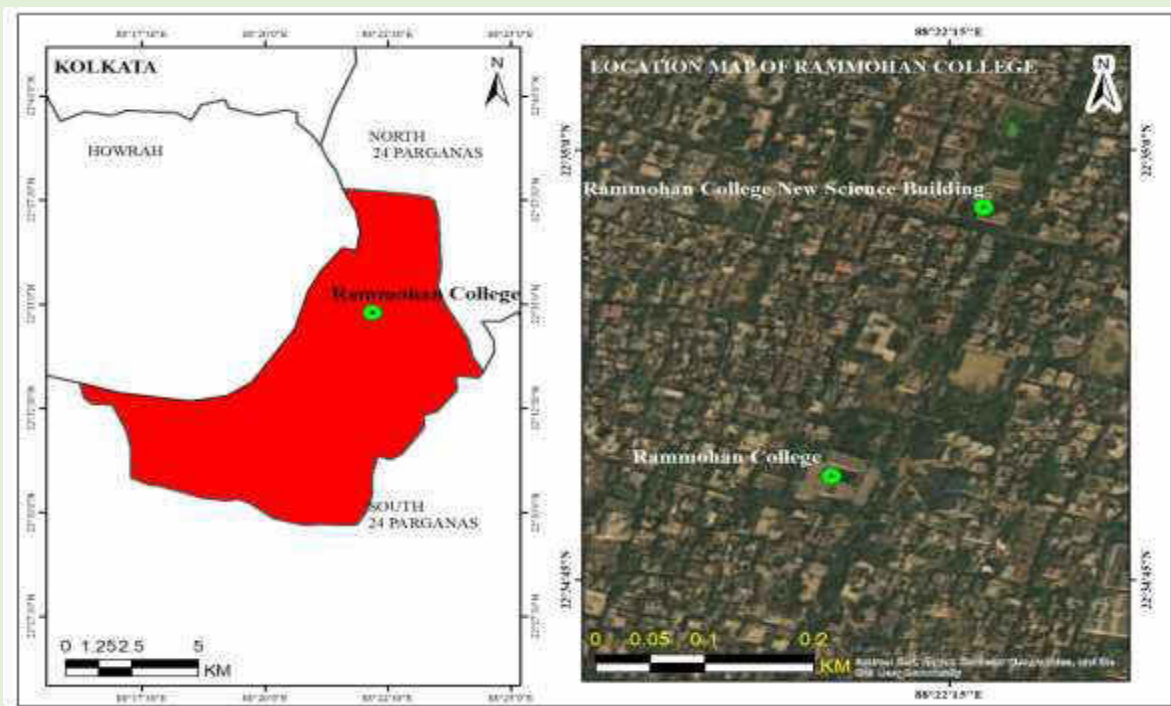


Figure 1: Location Map

1.3.1 Vision of the College

The Vision of the college is "Sradhaban Lavate Gyanam" or "Wisdom Belongth to Reverence". The goal of the college is to make a comprehensive training of mind, body and soul for girl students of all strata of society. Relentless effort is there to ensure an environment conducive for attaining self-respect for the students to trigger their inner strength to attain independence in thought to be aware of their rights so that in time they would be able to make an identity of themselves.

1.3.2 Mission of the College

The Mission of the institution is reflected in its policies. Principal and committed faculty members and non-teaching staff render their utmost efforts to ensure transparency in the functioning of the college and to maintain core values of the institution. If Vision is the Goal, Mission is the road-map. That pathway is not mere imparting of syllabus oriented lectures in class rooms. The College aspires to train students to be responsible citizens having a wider and positive vision of life.

1.3.3 Physical Structure of the College

Rammohan College in North Kolkata is famed for its immensity. With around 2500 students and nearly 140 teaching and non-teaching staff, it is one of the few colleges in West Bengal running in morning shift and catering to all three streams of Science, Arts and Commerce at undergraduate level along with post graduation in Bengali and Human Physiology.

The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

Rammohan College has recently acquired the heritage building at 85A, 85B, 85C and 85D Raja Rammohan Sarani which was once the family residence of Raja Rammohan Roy, and his descendants. A memorial courses especially for women will be housed here under autonomous body of management at the ancestral house. A New 3 storied Science Building (NSB) for Rammohan College is also under construction next to the heritage building. The ground floor

and the first and second floor of this building are complete and both PG and UG classes are being held there. The College has elevator for the teaching, non-teaching members and students. The College received possession of plot nos. 85B, C&D, Raja Rammohan Sarani, Kolkata- 700 009 on the 4th August, 2005 from the First Land Acquisition Collector, Calcutta. Execution and registration of the deed by West Bengal Government in favour of the college will prepare a plan for construction of College building on those premises too.

Rammohan College Central Library is well equipped with books on each subject and with periodicals, magazines of generalized and specialized interest. Teachers and students equally benefit from the library. At present the library has a huge collection of 40000 books (approx.), among which 24962 are purchased books and rests [14582 Approx] are presented. Along with the central library, seminar libraries are also maintained by the various departments. The college infrastructure, strength of student, teaching and non teaching members and departments have been presented in Table 1, 2 and 3.

Infrastructure elements such as wall textures, ceiling heights, window positioning, air flow, lighting, fan designs, and other factors can produce stressful environment. The phrase "environmental stress" is used to characterize the physical, chemical, and biological constraints on the diversification of organisms and ecosystems. Air temperature (dry bulb temperature, wet bulb temperature, and dew point temperature), relative humidity, direct solar radiation and air flow are the four major variables of human thermal comfort which is defined as "condition of mind which express satisfaction with thermal environment". College teachers and other stakeholders may experience professional burnout as a result of the environment's stress. A study by Acharjee et al, 2023, conducted in the classrooms at Rammohan College in two separate buildings showed that the indoor classroom environment of the New Building is consistently within the "Partial Discomfort" range (lowest and highest Thermo hygrometric index (THI) values 75.86 & 79.20). According to the reference range, the indoor classroom atmosphere of the old building runs from "Comfortable to Partial Discomfort" (74.15 & 77.56).

Table 1: College Infrastructure

Campus Area			
Old Campus	Old Building 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 0K – 2CH – 32 Sq.ft. (≈ 0.3333 Acre)	
New Campus	New Science Building & Museum 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	2B – 6K – 0CH – 43 Sq.ft. (≈ 0.7613 Acre)	
	85B, 85C & 85D Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 10K – 6CH – 15 Sq.ft. (≈ 0.5024 Acre)	
Sadhana Sarkar Memorial Hostel	35 Abhedananda Road, Kolkata-6, W.B.	10K – 5CH – 27 Sq.ft. (≈ 0.171 Acre)	
Total Campus Area		5B – 6K – 15CH – 27 Sq.ft. (≈ 1.768 Acre)	
Campus Built Up Area			
Campus	Building Type	Floor	Area in sq. mtr.
Old Campus 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	Old Building	G+4 floor	7364
NEW CAMPUS 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	New Science Building	Ground (502.93 sq.m)	2514.65
		First (502.93 sq.m)	
		Second (502.93 sq.m)	
		Third (502.93 sq.m)	
		Fourth (502.93 sq.m)	
	Raja Rammohan Roy Memorial Museum	Ground (537.78 sq.m)	1246.78
		First (537.78 sq.m)	
Second (171.37 sq.m)			
Sadhana Sarkar	Hostel Building	Ground Floor (432.58 sq.m.)	1481.92

Memorial Hostel 35, Abhedananda Road, Kolkata-6, W.B.	First Floor (349.78 sq.m.)	
	Second (349.78 sq.m)	
	Third (349.78 sq.m)	
Total Built Up Area		12607.35
No. of Buildings	2	
No. of Departments	17	
Teachers' Room	8	
Principal's Room	2	
Class Rooms	30	
Smart Class Rooms	4	
Dry Laboratories	14	
Wet Laboratories	17	
Library	2 (Central Library along with Departmental Seminar Libraries) + PG Library	
Auditorium	1	
Seminar Hall	3	
Canteen	4	
Common Room	1 (300sq ft) for students	
Office Room	3	
Hostel	1	
Gymnasium	1	
Staff Quarter	-----	

Table 2: Total Strength of Students, Teachers & Non-teaching Staff

No. of Teachers			No. of Students			No. of Non Teaching Staffs		
Male	Female	Others	Male	Female	Others	Male	Female	Others
39	60	0	07 (PG)	2295 (UG) + 66 (PG) = 2361		16 (permanent) + 19 (contractual) = 35	02 (permanent) + 04 (contractual) = 06	0

Table 3: Academic Departments

Undergraduate		
Science	Humanities	Commerce
Botany	Bengali	
Chemistry	English	
Mathematics	Economics	
Physics	Education	
Physiology	Geography	
Zoology	Hindi	
	History	
	Philosophy	
	Political Science	
	Sanskrit	
Post Graduation		
Human Physiology	Bengali	



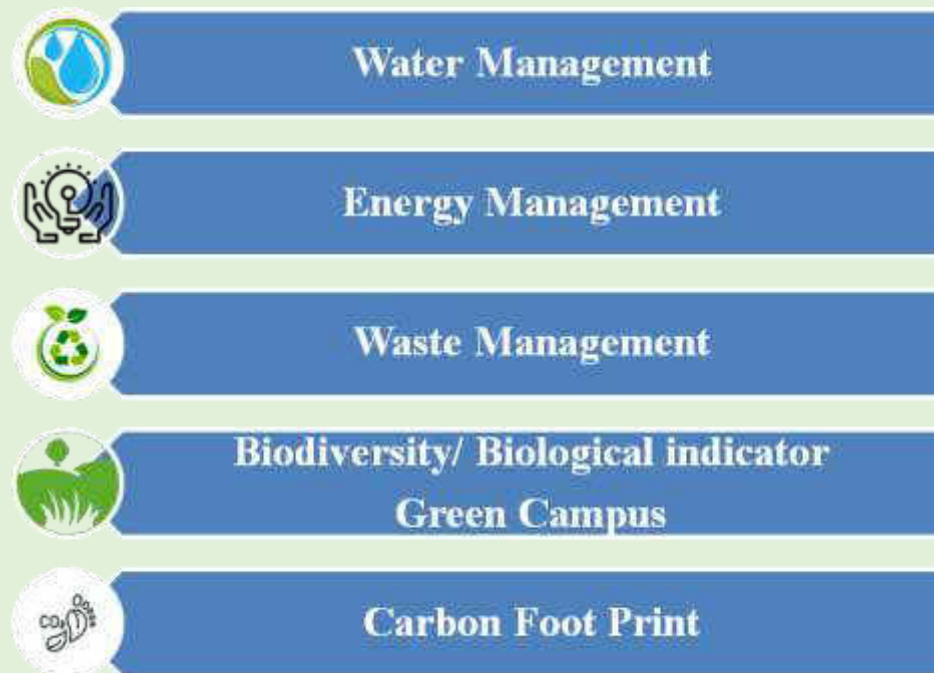
College Gate



New campus of Ram Mohan college

2. Methodology

In order to perform green audit, the methodology that included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations was adapted.



Target Areas of Green Audit

2.1 Target Areas of Green Audit

Green audit aims to evaluate the efficient use of energy and water; minimize waste generation or pollution, biodiversity status and also efficiency in resource utilization. These indicators are assessed focusing on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, biodiversity and carbon footprint.

2.1.1 Water Management Auditing

Water is a natural resource which is required for sustenance of all living creatures. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Hence it is essential to examine the quality and usage of water in the Institutions or organizations. Water auditing is conducted for the evaluation of facilities of water intake, water usage and facilities for water treatment &/or reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

2.1.2 Energy Management Auditing

Energy conservation is an important aspect of campus sustainability which is also linked with carbon foot print of the campus. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices and incorporate alternative energy resources wherever possible. The energy signature method has been used in to extract the total heat loss coefficient of the building.

2.1.3 Waste Management Auditing

Human activities create waste; and unsustainable ways of waste handling, storage, collection, transport and disposal may pose risks to the environment and public health. Solid waste generated in the campus can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste.

1. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc.
2. Non-biodegradable wastes include plastic, tins and glass bottles etc.
3. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college.

Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid

waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

2.1.4 Biodiversity/ Green Campus Management Auditing

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus. Campus biodiversity is reflection of the ecological health of the campus. A sustainable strategy is required for adopting environment friendly viable way outs for a green campus. Ecological indicator species like butterflies can be used to assess the environmental quality of the campus.

2.1.5 Carbon Footprint Auditing

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence to assess the method of transportation that is practiced in the college is important.

2.2 Methods Adopted

The methodology adopted to conduct the Green Audit of the Institution had the following components.

2.2.1 Onsite Data Collection

Both Physical and virtual tour of the college campus was organized by the Green Audit Team. The data samples and relevant photographs were collected through geo-tagged photographs. The key focus of the audit was on assessing the status of the green cover of the Institution, species biodiversity, their waste management practices and energy conservation strategies etc.

2.2.2 Focus Group Discussion

The Focus Group discussions were held with the staff members and the management focusing various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

2.2.3 Water, Energy, Waste, Biodiversity and Carbon Foot Print Analysis Survey

With the help of teachers and staff, the audit team has assessed the energy consumption pattern, heat signature, waste generation, disposal and treatment facilities of the college. The monitoring was conducted with a detailed questionnaire survey method.

2.3 Audit Team

A Team comprised of the Faculty members, non teaching staff and student representative of Rammohan College named **BASUDHA** has been formed. The team along with the representatives from the RSP Green Development & Laboratories Pvt. Ltd. (ISO Certified and QCI - NABET Accredited Environmental Consultant Organization) conducted the Green Audit.

Members of BASUDHA (Green Team) of Rammohan College

- Dr. Saswati Sanyal, Principal, Rammohan College
- Dr. Krishnendu Sarkar (Teaching Staff)
- Dr. Samarendra Nath Banerjee (Teaching Staff)
- Dr. Santi Ranjan Dey (Teaching Staff)
- Dr. Kaustav Dutta Chowdhury (Teaching Staff)
- Dr. Ashesh Garai (Teaching Staff)
- Dr. Samiran Mondal (Teaching Staff)
- Smt. Priti Prava Dutta (Teaching Staff)
- Mr. Tapas Narayan Ray (Teaching Staff)
- Smt. Jayanti Sen (Teaching Staff)
- Smt. Anima Roy (Teaching Staff)
- Mr. Amitava Mahapatra (Non Teaching Staff)
- Ms. Shreyasi Sarkar (Student)

Members from RSP Green Development & Laboratories Pvt. Ltd.

- Ms. Sreerupa Chatterjee (Jr. Environmentalist)
- Ms. Madhumanti Bag (Jr. Environmentalist)

2.4 Audit Stages

Green auditing in Rammohan College, Kolkata began with the assessment of the status of the green cover of the Institution followed by waste management practices and energy conservation strategies etc. The team monitored different facilities at the college, determined different types of appliances and utilities (lights, taps, toilets, air conditioners, etc.) as well as measuring the usage per item (Watts indicated on the appliance, etc.) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified several times to clarify the data received through survey and discussions.

3. Observations & Findings

The findings and observations after campus visit, group interactions, survey and review have been analyzed and represented below.

3.1. Water Management

3.1.1 Source of water and its uses

The major source of water used in the College is supplied by Kolkata Municipal Corporation at free of cost. The amount of water supplied is sufficient for the daily college activities and hence no additional tanker water is needed to meet its demand. No ground water is used in the campus by means of well or any other activities.

Total 4 numbers of water tanks are available in the New Science Building (NSB) with capacity of 4000 L each. One tank with 5000 L capacity and another with 3000 L capacity is also installed in the old building and hostel respectively. A total of 9000 L of water is pumped every day using 5 hp (NSB), 5 hp old building, 4.5 hp (hostel) motors. Water consumption meter is not installed and hence no record is maintained for daily water consumption. An average of 2,34,000 L of water is used by the College per month. Water is used for drinking purpose, toilets, canteen, laboratories, hostel and gardening. RO based water purifier units and coolers have been installed in different floors of the campus to treat the water for drinking purpose. Distilled water requirement in laboratories are by the distillation unit set in the college itself. College has displayed signboards for spreading awareness regarding water conservation. Dry mopping/cleaning methods are adopted to ensure water conservation. Uses of low flow/flow control water equipment or gadgets are manually controlled by supervisor. There is no formal water management plan available with the institute. Water consumption at each consumption level is monitored manually. There are two small rain water storage at the New campus in front side of the campus. The stored rain water is used for gardening and plantation. There is no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained to main drainage system of the city. Details of water consumption in hostel could not be procured during audit process.

3.1.2 Water Quality Analysis

As the water is primarily supplied by the Municipal Corporation, it can be assumed that the water is properly treated and meets the requisite norms of BIS standards. The routine parameters

of drinking water available in the campus (eg. pH, conductivity, salinity, DO etc.) are regularly checked in college laboratory by the students (data attached below).



Water lily plantation in Rain water storage



Phone : 2350-5687,
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Accredited B** Grade by NAAC

Ref.

Date 20-02-2019

Water parameter analysis of drinking water-2018-2019

At New Science Building

(85A, Raja Rammohan Sarani, Kolkata-700009)

(Data are average of three independent observations)

Name of the parameter	Dates			
	14.07.2018	27.09.2018	08.11.2018	18.02.2019
pH	6.4	6.65	6.73	6.9
Dissolved oxygen (mg/dl)	0.58	0.53	0.55	0.5
Free dissolved carbon di oxide (mg/l)	3.8	3.6	3.3	3.96
Salinity (ppt)	0.0022	0.0028	0.0026	0.0031
TDS (ppm)	156	148	143	141

S. Sanjay
Principal
Rammohan College
Kolkata-9

**Principal
Rammohan College**



Test report of water quality parameters in college laboratory

3.2 Energy Audit

Energy conservation plays a pivotal role in promoting campus sustainability and is intricately connected to the carbon footprint of the institution. Energy auditing is the process of managing and diminishing energy consumption, with a keen focus on minimizing carbon foot print. Consequently, it is imperative for any environmentally-conscious institution to scrutinize its energy utilization practices and embrace alternative energy sources wherever feasible.

3.2.1 Electrical Bill Analysis

Electricity is supplied by Calcutta Electricity Supply Corporation. All the electrical appliances in the old and new college building and hostel run on three different meters. Electricity consumption in last 12 months has been depicted below. An average consumption of 1848.08kWh/month is estimated in New Science Building during normal operating scenario (Table 4) whereas 12406.33kWh/month is the average consumption of Ram Mohan college old building (Table 6) and 2977.17kWh/ month in hostel as assessed in the season 2021-2022 (Table 8).

Table 4: New Science Building electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	37038446004
Meter No.	2354905 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	23.5
50% of Con. Demand (KVA)	11.75
Sanctioned load (KW)	23.5

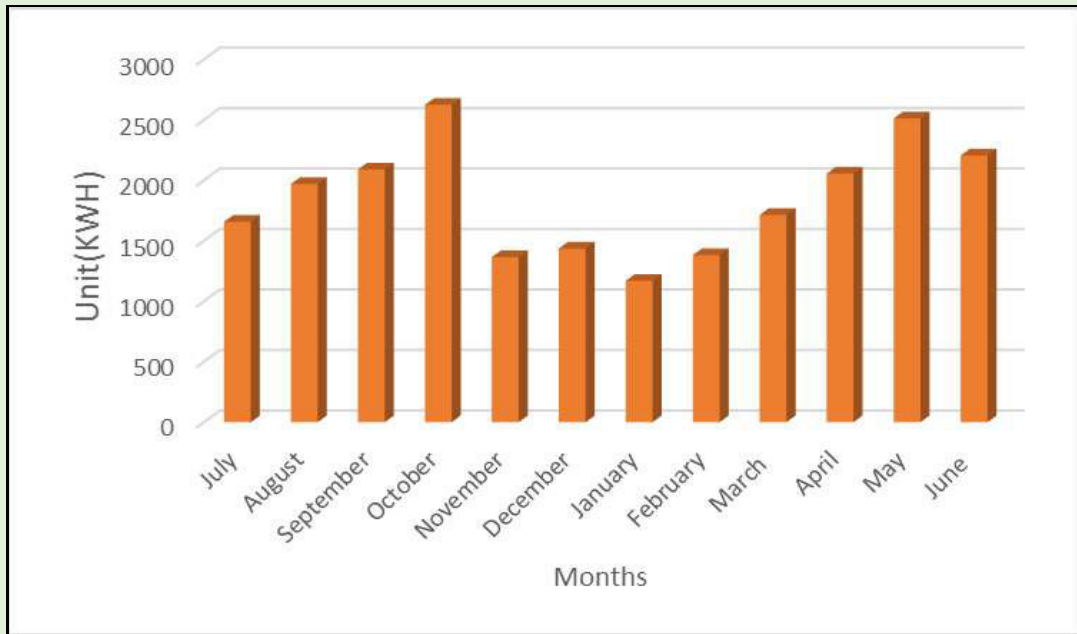


Fig-2: New Science Building electricity consumption during 2018-2019

Table 5: New Science Building electricity consumption during 2018-2019

Sl. No.	Months	Unit(KWH)
1	July	1657
2	August	1970
3	September	2089
4	October	2624
5	November	1365
6	December	1436
7	January	1169
8	February	1381
9	March	1713
10	April	2056
11	May	2512
12	June	2205
Average unit		1848.08

Table 6: Electricity consumption in Old Building

Consumer Name	Principal, City College
Consumer No.	85305001041
Meter No.	2869308 01
Electricity Supply Company	CESC
Tariff Category	P/3 Ph
Contract Demand (kVA)	70.6
50% of Con. Demand (KVA)	35.3
Sanctioned load (KW)	70.6

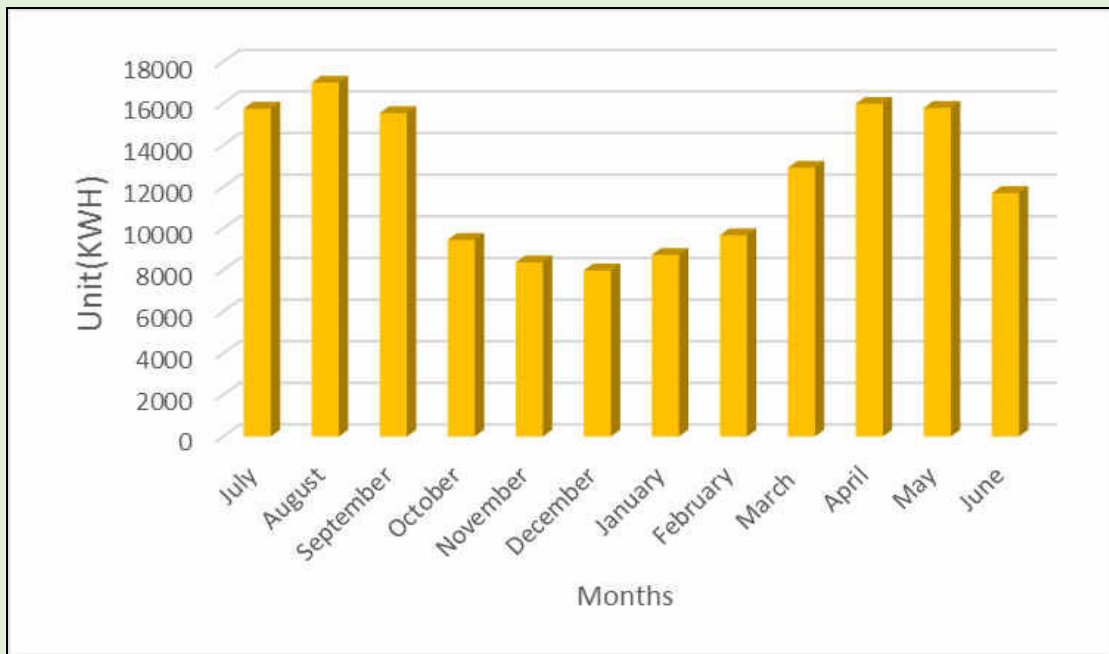


Fig-3: Old Building electricity consumption during 2018-2019

Table 7: Old Building electricity consumption during 2018-2019

Sl. No.	Months	Unit(KWH)
1	July	15756
2	August	17000

3	September	15540
4	October	9450
5	November	8370
6	December	7976
7	January	8724
8	February	9670
9	March	9670
10	April	12914
11	May	15986
12	June	15790
Average unit		12406.33

Table 8: Hostel electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	38038091001
Meter No.	2154477 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	14.2
50% of Con. Demand (KVA)	7.1
Sanctioned load (KW)	14.2

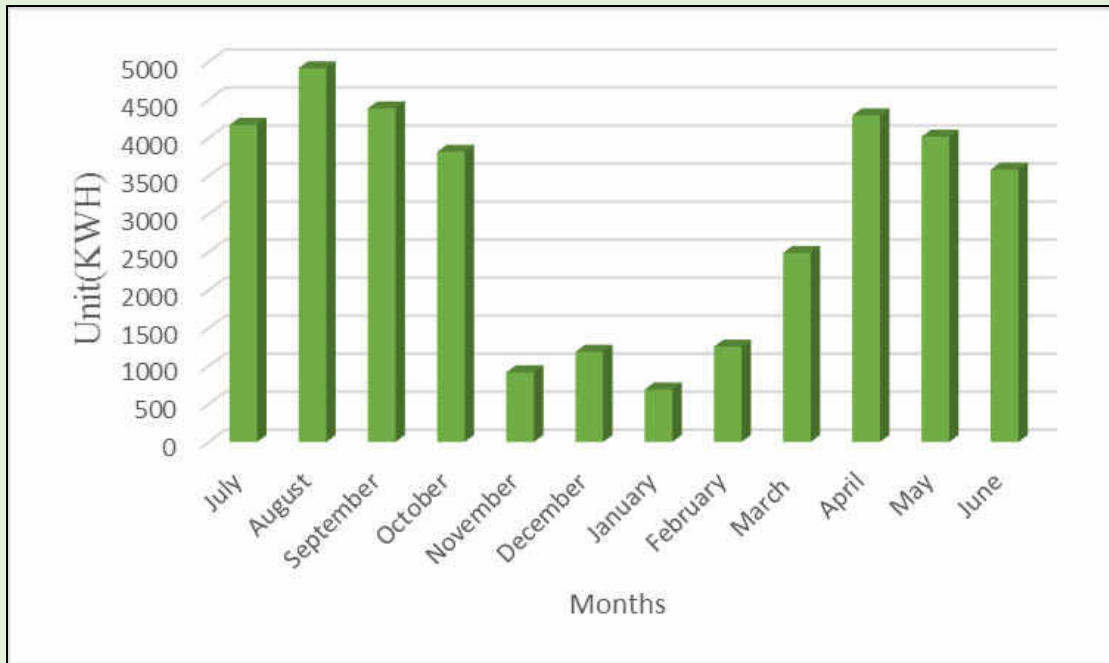


Fig-4: Electricity Consumption in Hostel during 2018-2019

Table 9: Electricity Consumption in Hostel during 2018-2019

Sl.No	Months	Unit(KWH)
1	July	4171
2	August	4916
3	September	4388
4	October	3817
5	November	916
6	December	1187
7	January	692
8	February	1254
9	March	2487
10	April	4297
11	May	4016
12	June	3585
Average unit		2977.17

3.2.2 Electrical Appliances

The commonly used electrical appliances in the College include tube lights, CFL lights, Ceiling fans, refrigerators, water purifier, hot air oven, air conditioners, computers, pump, UPS and other power back-ups etc. The average numbers of these appliances have been enlisted in the following table. The correct lux levels (70-300 lux) is maintained to avoid excessive light. The Information Technology Lab has 12 computers in total. The animal house used for Zoology and Physiology Department provides Photocell occupancy sensor for automatic light control. Numbers of different types of electrical devices and their average running time have been presented in Table 10 - 14.

Table 10: Electrical Appliances in the College

Sl. No.	Name of Appliances	No. of Units	KWH
1	Tube Light	335	
2	Compact Fluorescent Lamps (CFL)	1+1+1+36	
3	Ceiling Fans	301	
4	Water Purifiers	7	
5	Refrigerators	5+5	
6	Hot air Ovens	4	
7	Air-conditioners	8 (1.5 tones split)	
8	Grinders	56	
9	Computers	Total 140 including 12 in IT Lab	
10	Pumping Machines	3	
11	UPS and Other Power Back-up	140	
12	Heater	3	

Table 11: Distribution of Electrical appliances (New Science Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation	
		Light	Fan	Hrs/Day	Days/Month
401	Lights, Fans	5	3	12	26
402	Lights, Fans	6	5	12	26
403(Library)	Lights, Fans	16	6	12	26
404	Light, Fans	12	8	12	26
405	Lights, Fan	8	6	12	26
406(Auditorium)	Lights, Fan	14	9	-	-
4 th Floor Corridor	Lights, Fan	4 Double	5	12	26
307	Lights, Fan	4	2	12	26
306	Lights, Fan	16	7	12	26
3 rd Floor Corridor	Lights, Fan	6 Single, 4 Double	6	12	26
305 (IQAC room)	Lights, Fan	2	2	12	26
303	Lights, Fan	12	6		
101(Principal Room)	Lights, Fan	2 Single Tube	2	12	26
102 (IT)	Lights, Fan	2 Single Tube, 1 Double Tube	3	12	26
103 (Office)	Lights, Fan	1 Single Tube	2	12	26
Canteen	Lights, Fan	5 Tubes		12	26

Table 12: Distribution of Electrical appliances (Old Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation	
		Light	Fan	Hrs/Day	Days/Month
Accounts	Light and Fan	20 Normal Tube	4+1 Stand	12	26
Office		8 Tube	10		
Principal Room					
Front Room					

5		8	5	12	26
6		8	5	12	26
7A		6	5	12	26
16		5	5	12	26
17		7	6	12	26
19A		6	5	12	26
20		7	7	12	26
22		4	5	12	26
23		4	2	12	26
26		3	3	12	26
27		3	5	12	26
28		2	1	12	26
28A		2	1	12	26
29		5	5	12	26
30		6	6	12	26
32B		5	6	12	26
32A		4	6	12	26
33		4	6	12	26
33A		3	4	12	26
32		4	4	12	26
N1		4	4	12	26
N2		4	4	12	26
N3		4	4	12	26
N4		4	4	12	26
N5		4	4	12	26
N6		5	5	12	26

N7		5	4	12	26
Commerce Room		2	3	12	26
Geography Room		13	20	12	26
Teachers' Room		4	6	12	26
Bursar Room		2	1	12	26
NCC Room		3	1	12	26
Rector Room		3	2	12	26
Staff Canteen		2+1 Heater	1+ 1 Fridge	12	26
Teachers Canteen		10+1 Heater	5+ 1 Fridge	12	26
Student Canteen		10+1 Heater	7+ 2 Fridge	12	26

Table 13: Distribution of Electrical appliances (Hostel)

	Room No. / Name	Type of Electrical Device	Quantity Nos	Operation		
			Light	Fan	Hrs/Day	Days/Month
1.	Hostel	Light and Fan	80 Tube light	49 + 2 table fan	24	30
			56 CFL			

Table 14: Air Conditioning System in the Campus

Air Conditioners							
Room No. / Name	Type	Capacity	Quantity	Power	Operation		Star Rating
		TR	Nos.	Watt/Unit	Hrs/Day	Days/Month	
	Split/ Window AC						3 Star
Old Building	Split AC	-	0	-	12	26	
New Science Building	Split AC	1	2	1000	12	26	✓
		1.5	3	1500			✓

3.2.3 Efficient Energy Management Practices

All electrical appliances are regular maintained for sustainable energy management. The college is gradually shifting towards LED lights by replacing existing lighting fixtures with LEDs and other energy efficient lighting fixtures to conserve energy. Correct lux levels (70-300 lux) are maintained to avoid excessive light. All ACs are 3 star rated and the temperature is kept between 22-24 degree Celsius. The switching and operation is manual in nature. Servicing of the electrical appliances is done at regular intervals to ensure energy efficiency. Institute is utilizing the natural light to its maximum. The classroom and laboratories are designed in such a way that it allows maximum sun light and reduces requirement of artificial lights. The classrooms and offices in the premises are well ventilated and the wide corridors are open to daylight. The operable glass windows are useful to facilitate natural light. The smart class room, auditorium and linguistic laboratory have insulated and tinted glass to filter heat gain. The fans are operational and adequately placed to affect the sufficient air changes. Fans installed are not star-rated. College has done indoor plantation to provide fresh air inside the premises. LED monitors and Email/ electronic communication mode is preferred to save energy. Awareness posters regarding energy conservation is being displayed in the premises. The canteen uses LPG gas for cooking purpose. However, the Institute has not adapted to any sensor-based energy conservation technique. Since there is limited facility in hostel and canteen, no solar water heating system is installed. Since the biodegradable waste generation is low, there is no Bio-gas plant.

3.3 Waste Management

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is one of the most challenging issues in academic institutions. Unscientific handling of solid waste can pose threat to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

3.3.1 Types of waste generated in the campus

The campus generates different types of biodegradable (paper, food waste etc.) and non-biodegradable (plastic, packaging product etc.) waste in the office, classrooms, canteen, and hostel. The wet and dry laboratories generate biodegradable (tissue, blood, animal and plant parts), chemical waste as well as e waste.

Table 15: Approximate quantity of waste generated per day (in kg)

Office	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic		
> 10 kg	Paper			
Classrooms	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Paper	Food wrapper	NA	NA
2 - 10 kg				
> 10 kg				
Labs	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Animal and plant parts	Broken glassware, plastic waste	Chemical	E-Waste
2 - 10 kg				
> 10 kg				
Canteen	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic, Other Packaging Product		
> 10 kg	Vegetable peel, Food waste			

3.3.2 Waste Disposal Practices Adopted by the College

The source of wastewater is Domestic Waste Water i.e., Sewage water. The Sewage water mainly comes from toilets and canteen. The wet laboratories also generate waste water. There is

no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained through internal drainage system and carried to main drainage system of the city. The everyday solid waste is collected by Kolkata Municipal Corporation for necessary disposal. The College has color coded waste bins are visibly available in the college. The segregation of waste needs to be done more efficiently. There is no biomedical or radioactive waste getting generated in the college. Old instruments, waste paper, cartons discarded tools, gadgets, computer parts, chemical bottles are discarded following administrative protocol through authorized vendors.

3.3.3 Reduce, Reuse, Recycle

The office and departments follow both sided printing to save energy and reduce waste. Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Broken furniture, appliance or computers are repaired and reused in terms of minimize waste. Examination related documents are stored for a fixed period and disposed as per the University guideline. Waste glass bottles are partially reused in the laboratories. Waste papers, cartons and scraps are occasionally sent to unorganized recyclers and scrap dealers. Dry leaves are used for composting in the garden area. There is a ban on use of single use plastic in the campus area. Very less plastic waste is generated by some departments, office, garden etc. Awareness regarding plastic pollution is spread in the campus.

Discarded electronic products produce electronic garbage, or e-waste. In the last several decades, there has been a notable surge in the production of electronic trash. The rising rate of e-waste generation worldwide is close to 2 metric tons (Mt) annually. The projected amount of e-waste created in 2030 is 74 million tons. E-waste can therefore pose a serious risk to the environment. E-waste releases toxic metals into the environment, including as lead, mercury, nickel, and cadmium, which eventually find their way into surface water, groundwater, soil, and sediment. The health of people, aquatic life, and plants are all negatively impacted when harmful metals are released into the environment. As a result, effective e-waste management is crucial and has become a global issue. According to a survey, home and office electrical appliances account for over half of all e-waste produced, making them the main source of the garbage. The combination of biological, physical, and chemical processes exhibits relatively high removal efficiency among remediation technologies, and it has several advantages over other remediation technologies. Recycling is among the most effective e-waste management techniques. The

College emphasizes on proper disposal of e-waste and use of recycled goods to decrease pollution load in the environment, as a part of social responsibility. E-waste generated in the campus is managed, keeping in mind the environmental hazards that may arise if not disposed properly. The cartridges of laser printers are refilled outside the college campus. Purchase of electronic products from companies which have service for disposal of product with buyback policy or exchange is encouraged by the college. The E- wastes and defective items from computer laboratories are being stored properly and recycled in effective manner. The dismantled electronic spare parts are immediately sold for reuse.



Flag hoisting ceremony in the new campus of college

3.4 Green Campus

3.4.1 Campus Biodiversity

Approximately 2000 sq m free space is available in the institution in the form of garden and backyard. There is moderate vegetation in the campus along with some indoor plants. The campus premises have also presence of common birds like crow, sparrow, Myna, Sun bird, Nightingale and squirrel, domestic cat and dogs.

More than 50 medicinal plants have been cultivated in the Medicinal Plants Garden in the new campus at 85A, Raja Rammohan Sarani, Kol-9. The campus also has presence of ornamental trees & shrubs. Some of them are listed in Table 13. More than 70 weed species have been documented in the campus and enlisted in Table 15.

The campus is also a habitat of numbers of butterflies which is a crucial component of the environment due to their role in pollination. It can be used as a tool for management and conservation choices involving butterflies. Institutional campuses with undisturbed natural flora and seasonal flowering plantations provide suitable habitat for butterfly populations since they are frequently free of any development operations and pollutants. They are also regarded as reliable ecological indicators because to their sensitivity to climatic and environmental changes. The species richness, abundance or mortality rate of butterfly species can shed light on the surrounding environmental quality. In Rammohan College campus 21 species of butterflies (Table 17) belonging to 4 families, 8 subfamilies were found more or less throughout the year, but there is no significant correlation between butterfly species richness and Air Quality Index (PM_{2.5}, PM₁₀, O₃ ect.) (Mitra et al. 2023 a,b)

Table 16: Plant species in the campus







Medicinal Plants		
Amlaki/Amla	<i>Emblica officinalis</i>	Fruits are good source of vitamin C
Nayantara/Periwinkle	<i>Catharanthus roseus</i>	Roots contain vincristine & vinblastine which are used to treat cancer,
Berela	<i>Sida rhombifolia</i>	Leaves contain antibacterial properties & antioxidants. It is used in diarrhoea, malarial fever, asthma etc.
Ornamental trees & shrubs		
Swarna Champa Tree.	<i>Michelia champaca</i>	Flowers intensely fragrant.
Rangan	<i>Ixora coccinea</i>	Shrub
Sheuli	<i>Nyctanthes arbor-tristis</i>	Shrub or small tree
Rokto korobi	<i>Nerium odoratum</i>	
Sukhdarshan	<i>Crinum asiaticum</i>	
Wild plants		
Kyllinga	<i>Kylling abbrevistylis</i>	
Tridaksha	<i>Tridax procumbens</i>	
Uchanti	<i>Ageratum conyzoides</i>	



Table 17: Weed flora of New Campus, Rammohan College


Sl. No.	Scientific Name	Family	Comment
1	<i>Solanum nigrum</i>	Solanaceae	Annual herb
2	<i>Eragrostis tenella</i>	Poaceae	Perennial herb with rhizome
3	<i>Eleusine indica</i>	Poaceae	Perennial herb with rhizome
4	<i>Cynodon dactylon</i>	Poaceae	Perennial herb with wiry rhizome
5	<i>Oldenlandi acorymbosa</i>	Rubiaceae	Annual herb
6	<i>Oldenlandi apaniculata</i>	Rubiaceae	Annual herb
7	<i>Dactyloctenium aegyptium</i>	Poaceae	Perennial rhizomatous herb
8	<i>Ageratum conyzoides</i>	Asteraceae	Annual herb
9	<i>Blumea lacera</i>	Asteraceae	Annual herb
10	<i>Lindenbergia indica</i>	Scrophulariaceae	Annual herb
11	<i>Vandellia crustacea</i>	Scrophulariaceae	Annual herb
12	<i>Lindernia parviflora</i>	Scrophulariaceae	Annual herb
13	<i>Phylla nodiflora</i>	Verbenaceae	Perennial prostrate herb
14	<i>Rungia parviflora</i>	Acanthaceae	Annual herb
15	<i>Desmodium triflorum</i>	Fabaceae	Perennial prostrate herb
16	<i>Alternanthera sessilis</i>	Amaranthaceae	Perennial herb
17	<i>Alternanthera paronychioides</i>	Amaranthaceae	Perennial herb
18	<i>Alternanthera ficoides</i>	Amaranthaceae	Perennial herb
19	<i>Amaranthus viridis</i>	Amaranthaceae	Annual herb
20	<i>Amaranthus spinosus</i>	Amaranthaceae	Annual prickly herb
21	<i>Tillanthera philoxeroides</i>	Amaranthaceae	Annual herb
22	<i>Aerva lanata</i>	Amaranthaceae	Perennial herb with somewhat woody rootstock
23	<i>Mecardonia procumbens</i>	Scrophulariaceae	Annual prostrate herb
24	<i>Laportia interrupta</i>	Urticaceae	Annual herb with stinging hairs
25	<i>Nicotiana plumbaginifolia</i>	Solanaceae	Annual herb
26	<i>Cyperus rotundus</i>	Cyperaceae	Perennial herb with corm
27	<i>Cyperus iria</i>	Cyperaceae	Annual herb
28	<i>Kyllinga brevistylis</i>	Cyperaceae	Perennial rhizomatous herb
29	<i>Andrographis paniculata</i>	Acanthaceae	Annual/perennial herb
30	<i>Andropogon aciculatus</i>	Poaceae	Perennial rhizomatous herb
31	<i>Dentella repens</i>	Rubiaceae	Annual prostrate herb
32	<i>Oplismenus burmannii</i>	Poaceae	Perennial herb
33	<i>Digitaria ciliaris</i>	Poaceae	Annual herb
34	<i>Digitaria sanguinalis</i>	Poaceae	Annual herb







Sl. No.	Scientific Name	Family	Comment
35	<i>Chloris barbata</i>	Poaceae	Annual herb
36	<i>Sida rhombifolia</i>	Malvaceae	Perennial undershrub
37	<i>Sida acuta</i>	Malvaceae	Perennial undershrub
38	<i>Sida cordifolia</i>	Malvaceae	Perennial undershrub
39	<i>Crotalaria pallida</i>	Fabaceae	Annual herb
40	<i>Euphorbia hirta</i>	Euphorbiaceae	Perennial herb
41	<i>Euphorbia parviflora</i>	Euphorbiaceae	Annual herb
42	<i>Euphorbia microphylla</i>	Euphorbiaceae	Annual prostrate herb
43	<i>Phyllanthus urinaria</i>	Euphorbiaceae	annual herb
44	<i>Phyllanthus fraternus</i>	Euphorbiaceae	Annual herb
45	<i>Tribulus terrestris</i>	Zygophyllaceae	Prostrate herb
46	<i>Physalis minima</i>	Solanaceae	Annual herb
47	<i>Solanum sisymbriifolium</i>	Solanaceae	Perennial prickly herb
48	<i>Evolvulus nummularius</i>	Convolvulaceae	Perennial prostrate herb
49	<i>Evolvulus nummularius</i>	Convolvulaceae	Annual prostrate herb
50	<i>Heliotropium indicum</i>	Boraginaceae	Annual herb
51	<i>Leucas aspera</i>	Lamiaceae	Annual aromatic herb
52	<i>Leucas cephalotes</i>	Lamiaceae	Annual herb
53	<i>Leonurus japonicus</i>	Lamiaceae	Annual herb
54	<i>Cleome viscosa</i>	Capparidaceae	Annual herb
55	<i>Cleome rutidosperma</i>	Capparidaceae	Annual herb
56	<i>Cleome gynandra</i>	Capparidaceae	Annual herb
57	<i>Bulbostylis densa</i>	Cyperaceae	Annual herb
58	<i>Brachiaria distachya</i>	Poaceae	Perennial herb
59	<i>Dichanthium annulatum</i>	Poaceae	Annual herb
60	<i>Echinochloa stagnina</i>	Poaceae	Annual herb
61	<i>Leptochloa chinensis</i>	Poaceae	Annual herb
62	<i>Hybanthus enneaspermus</i>	Violaceae	Annual herb







Name	Photographs	Name	Photographs
<i>Alternanthera ficoides</i>		<i>Mikania scandens</i>	
<i>Coccinia cordifolia</i>		<i>Peperomia pellucida</i>	
<i>Dentella repens</i>		<i>Sida rhombifolia</i>	


Selected photographs of the weeds found in the campus

Table 18: Butterfly species in the campus

Sl.	Scientific Name	Common Name	Photograph
1	<i>Graphium agamemnon</i> (Linnaeus)	Tailed Jay	

Sl.	Scientific Name	Common Name	Photograph
2	<i>Papilio polytes</i> (Linnaeus)	Common Mormon	
3	<i>Atrophaneura aristolochiae</i> (Fabricius)	Common Rose	
4	<i>Cepora nerissa</i> (Fabricius)	Common Gull	
5	<i>Leptosia nina</i> (Fabricius)	Psyche	
6	<i>Danaus chrysippus</i> (Linnaeus)	Plain Tiger	
7	<i>Euploea core</i> (Cramer)	Common Crow	

Sl.	Scientific Name	Common Name	Photograph
8	<i>Melanitis leda</i> (Linnaeus)	Common Evening Brown	
9	<i>Ariadne ariadne</i> (Linnaeus)	Angled Castor	
10	<i>Ariadne merione</i> (Cramer)	Common Castor	
11	<i>Junonia atlites</i> (Linnaeus)	Grey Pansy	
12	<i>Zizeeria karsandra</i> (Moore)	Dark Grass Blue	
13	<i>Euchrysops cnejus</i> (Fabricius)	Gram Blue	

Sl.	Scientific Name	Common Name	Photograph
14	<i>Borbo cinnara</i> (Wallace)	Rice Swift	



Avian diversity in the campus



Mammal biodiversity in the campus

3.4.2 Green Campus Initiatives

Swachh Bharat Abhiyan

A cleanliness programme was organized at the premises of New Science building of Rammohan College and the Rammohan Sarani every year. On that day, all the NSS volunteers participated to clean the adjacent path of the college and the nearby street. They picked up the junk from the campus, along the streets and also swept the whole surrounding. Then they spread bleaching powder. This programme was arranged to make the students understand the importance of cleanliness, how they can keep their surrounding clean and also to make them aware of their duty as a responsible member of the community.



Campus cleaning programme in the college

3.4.3 Sustainable Practices

- Restricted entry of automobiles
- Walking is encouraged for internal transport.
- Institute has initiated banning plastic in the campus.
- Email/ electronic communication mode is preferred to save papers.
- Both side printing is being adopted to save paper and trees.
- The premises have fire extinguishers installed at required locations which are regularly checked and maintained.
- The campus has established lift and ramp for easy movement of disabled persons.

3.4.4 Green Mindset

- Minimization of waste and proper disposal of e waste
- Composting of leaf litters and use of the compost in gardens
- Utilization of renewable energy resources like solar energy
- Maintenance of the local vegetation and fauna
- Landscaping in the campus to reduce the ambient temperature in the campus

3.5 Carbon Foot Print Analysis

Table 19: Carbon Foot Print Analysis

Sl. No.	Parameter	Numbers	Annual CO ₂ emission
1	Total no. of vehicles used by the stakeholders (per day)	5bikes+10car	(4680 +1903) = 6583 kg CO ₂ (considering 10 km distance travelled in 6 days a week)
2	No. of Cycles used.	5	-
3	No. of two wheelers used		
3a	Average distance travelled (per day)	Within 5km	
3b	Quantity of Fuel Used (per day)		
4	No. of four wheelers used		
4a	Average distance travelled (per day)		
4b	Quantity of Fuel Used (per day)		
5	No. of persons using public transportation	Most	
6	No. of persons using college conveyance		
7	No. of generators used per day		
7a	Amount of fuel used		
8	No. of LPG cylinders used in canteens	6 commercial cylinders	170.4 kg CO ₂
9	No. of LPG cylinders used in labs	14.2 kg X2 (Chemistry Lab), 5 kgX2 (Zoology lab)	43.5 + 15 = 58.5 kg CO ₂
10	Reams of paper used		
11	Paperless works to reduce paper usage		
12	Use of any other fossil fuels in the college		
13	Any efforts to reduce the use of fuels		

As per the estimates from the Central Electricity Authority, the weighted average emission factor for the Indian power grid stands at 0.79 kg CO₂/kWh. Hence, the total CO₂ emission in a year from electricity consumption of the New Science Building is equivalent to 30575Kg CO₂ and 13372 kg CO₂ in the hostel.

4. Suggestions and Recommendations

4.1 Water Management

- Monitoring of water consumption will be required for ensuring water efficiency. Water meter to be installed to monitor the consumption. The water meter readings to be recorded every day or every week at a fixed time.
- It is recommended to check water quality from water source for dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, and conductivity, total dissolved solids and E-coli/ coliform.
- The wash basin taps may be equipped with water saving fixtures.
- The flush tanks of the toilets may be fitted with dual volume system.
- Awareness campaigns and signboards need to be displayed on every floor.
- A detailed water use and management plan should be prepared and displayed.
- Rain water harvesting to be prepared.

4.2 Energy Management

- The energy audit recommends to avoid the use of more energy consuming electrical appliances and to replace with more environment friendly and energy efficient appliances (for example five stars rated Air conditioner, star rated fans) in the college.
- Ceiling fans have a very good scope for reducing power consumed using a technology called Brushless DC Motor or simply BLDC motor. BLDC technology, in general, has been in the market for a couple of decades. The traditional fan uses an induction motor and typically consumes 70- 90 watts. But BLDC fan, on the other hand, can reduce power consumption up to 65%.
- Prominent advantages of BLDC motor over induction motor are Lower Electricity Consumption, Longer backup on Inverters (even on Solar), improved reliability, Noise reduction, longer lifetime.
- The Hostel and other facilities may use solar heating units to reduce electricity consumption.
- College may adopt sensor-based (occupancy sensors) energy conservation approach for offices, classrooms and washrooms as well.

- College may also replace all existing tube lights with LEDs.
- To increase the carbon offset, it is recommended to extend the Solar PV for not just college building but also for hostel.
- More frequent awareness campaigns to be organized and signboards need to be displayed on every floor.

4.3 Waste Management

- College must arrange color coded, covered and separate waste bin for efficient segregation and disposal of waste at accessible location on each and every floor.
- Workshops need to be conducted regarding stages of waste management and 3R scheme.
- College may undertake feasibility study to install sewage water treatment in the campus to recycle waste water and use it in flush or for gardening purpose.
- Leaf litter from the campus can be effectively used for aerobic/ vermi composting, so that the composted material can also be used as good manure.
- Laboratory waste may be managed efficiently to reduce any scope of contamination.
- Try to completely ban the use of plastic in the campus, and to encourage the use of biodegradable materials as alternatives. Try to achieve the goal of plastic free campus.
- Annual agreement with recyclers/ vendors for all kind of scraps and e waste needs to be followed up.
- Important and confidential reports/ papers can be sent for pulping and recycling after completion of their preservation period.
- Metal waste, wooden waste, unused equipments and scraps should be sent to authorized scrap agents for further processing
- Awareness signboards/ posters need to be displayed on every floor.

4.4 Green Campus

- Maintenance of biodiversity is needed.
- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records.
- Nature Club may assign scientific and common name tags on the plants to spread awareness among students.
- College may consider planting tree on the land, away from city, managed by college to offset the carbon footprint.
- Emphasis may be given to develop kitchen garden and roof top garden giving emphasis on indoor and Bonsai plants.
- Students may be encouraged to engage in preparing People's Biodiversity Register (PBR) in and around the campus.
- Environment friendly lifestyles to be encouraged among students, teachers and non teaching staffs.

5. Green Audit Checklist

I. Water Efficiency & Wastewater Management			
Sl.No.	Measures	Status	Remarks
1	RO based water purifiers for drinking water	Yes	
2	Aerators to water taps	No	
3	Automatic toilet faucets	No	
4	Drip irrigation/ Sprinklers (for plant watering system)	No	
5	Dual flush toilet with cistern	No	
6	Dry mopping/ cleaning methods adopted	Yes	
7	Sewage treatment plant for sewage recycle	No	
8	Rain water harvesting		Going to install
9	Regular maintenance for leakage free plumbing system	Yes	
10	Use of low flow/ flow control water equipment or gadget	No	Manually controlled by the supervisor
11	Water balance diagram and water consumption monitoring at each Consumption level	No	Manually controlled by the supervisor
12	Routine monitoring of water quality		Internal assessment by the laboratories
13	Awareness signs displayed for promoting water conservation		
II. Energy Efficiency and On-site Energy Generation Mechanism			
Sl.No.	Measures	Status	Remarks
1	Maintaining correct lux levels (70-300 lux) to avoid excessive light	Yes	
2	Computerized monitoring of electrical system	No	
3	On-site energy generation (Diesel generators, LPG)	No	
4	Use of renewable energy (Solar, biogas)	No	
5	Photo cell occupancy sensor for automatic light control		In animal house
7	Regular maintenance of electrical system	Yes	

8	Use of energy efficient equipment like VFDs, maximum star rated equipment.	Yes	
9	Use of energy saving bulbs (Compact florescent light/LED lights)	No	
10	Awareness signage on electricity conservation	Yes	

III. Solid Waste Management

Sl.No.	Measures	Status	Remarks
1	Waste segregation practices and supporting hardware for waste segregation (Dry recyclable, organic, plastic, hazardous and E-waste)	Yes	Through proper process
2	Setting up recycling/ composting/ bio gas generation facility	No	Going to install
3	Minimize use of paper through digitalization	Yes	
4	Printing on both sides of paper/ Reuse of printed paper/ envelops	Yes	
5	Mechanism for collection & disposal of E-waste as applicable regulation	No	
6	Single use plastic free campus	Yes	
7	Inventories of waste generation and records of waste disposal		Yet to develop
8	Recycle/ archiving of paper waste		
9	Segregation of dry and wet waste		As per KMC regulation
10	Purchase of electronic products from companies which have service for disposal of product with buy back policy?	Yes	As per Government regulation
11	Recreating into new sustainable products	No	

IV. Good Day light Design

Sl.No.	Design Feature	Status	Remarks
1	Wide corridors open to daylight	Yes	
2	Broad doors and windows allowing daylight	Yes	
3	Building architecture which allows sunlight within buildings	Yes	

4	Presence of Skylight/ Rooflight	Yes	
5	Enough natural illumination in classrooms/ seminar halls/ laboratories	Yes	
6	Ultraviolet (UV) filtering windows/ Use of exterior louvers or light coloured fabric or blinds for windows to control glare	Yes	Only in the auditorium
7	Operable/ openable windows.	Yes	
8	Use of glass as facilitator of natural light	Yes	
9	Use of insulated and tinted glass to filter heat gain		In smart class room, auditorium and linguistic laboratory.

V. Ventilation

Sr. No.	Design Feature	Status	Remarks
1	Good ceiling height which allows internal air circulation	Yes	
2	Self-movement ventilators in the roof	No	
3	Wide windows and doors for classrooms, laboratories, seminar halls	Yes	
4	Wide corridors	Yes	
5	Operable louvers		
6	Exhaust fans in kitchen/ toilets	Yes	

VI. Temperature and Acoustic Control

Sl.No.	Design Feature	Status	Remarks
1	Roof design & type (Double/ False ceiling with plaster of paris etc.)	Yes	Auditorium, Principal's chamber and meeting room
2	Sand stone cladding/ tiling outside the walls	No	
3	Specially designed walls for temperature control, Sound noise barriers for windows/ walls		Auditorium and Linguistics Lab
4	Building construction allows diffused sunlight but not the heat. Specially designed glass walls/ windows with better U value/ factor depending upon climate conditions	Yes	Main campus (old building)

5	Use of insulation material (e.g. autoclaved aerated blocks, hollow blocks, Thermocrete etc.)	No	
6	Use of water bodies/ fountain to maintain temperature within campus	Yes	
7	Climbing creepers on the walls	No	
8	Retro fitting the existing roofs with cool roof technology	No	
9	Use of landscaping gas sound barrier	No	
10	Water free urinals (No flush urinals/ Zero flush urinals/ water less urinals/ air-based flushing system)	No	
11	Water balance diagram and water consumption monitoring at each consumption level	No	Manually maintained by supervisor
12	Routine monitoring of water quality	Yes	Internally monitored by laboratories
13	Awareness signs displayed for promoting water conservation	Yes	

VII. Environmental Audit

Sl.No.	Type of audit	Status	Remarks
1	Energy audit (includes energy consumption, thermal comfort, visual comfort)	Yes	
2	Sound/ Noise and lux level monitoring (including indoor noise level, outdoor noise level)	Yes	
3	Water and waste audit (including water consumption, quality, solid waste generation, solid waste disposal process)	Yes	
4	Safety Audit	Yes	

VIII. Universal Access and Efficient Operation and Maintenance of Building

Sl.No.	Design feature	Status	Remarks
1	Easy access to the main entrance of the building and minimum two exits	Yes	
2	Energy efficient elevator	Yes	
3	Car pooling by staff and students/ use of Public transport/ Use of bicycles and battery-operated vehicles within campus		

4	Preferred car park spaces for differently abled	Yes	New building
5	Ramp/ stairs with handrails on at least one side	Yes	New building
6	Restrooms (toilets) in common areas/ Restroom for differently abled	Yes	New building
7	Braille assistance for differently abled	No	Going to procure
8	Availability of wheelchair	Yes	
9	Emergency response plan for natural and manmade emergencies	Yes	
10	Fire exits, assembly points, first aids, firefighting systems	Yes	
11	Regular maintenance of building	yes	

IX. Green Program

Sl.No.	Green program	Status	Remarks
1	Upcycling of waste. Recycling beyond books i.e. paper, aluminium, plastic, e-waste	Yes	By authorized vendor
2	Creation of “GreenTeam” in the institution/ library	Yes	BASUDHA
3	Awareness programs on environment, energy management & safety (external Sessions and academic courses)	Yes	NSS
4	Outreach, activities, green programs (Tree plantation, waste segregation, plastic waste collection, cleaning etc.) records/ photos of programs	Yes	NSS
5	Presence of system/ methodology available for implementation of green initiatives and green projects (long term system-based continuity and not an isolated/ stand alone activity)	Yes	NSS
6	Mindset for reduction, recycle of waste (Green mindsets)	Yes	
5	Digitization	Yes	
6	E-archiving	Yes	
7	E-resources: E-books, Online Journals, membership of consortium		Departmental library
8	Maintaining green campus/ Greening of campus	Yes	



Rammohan College

102/1, 85A, 85B, 85C & 85D, Raja Rammohan Sarani, Kolkata, West Bengal 700009

Green, Environmental and Energy Audit Report

2019-2020



Prepared by

Rammohan College

In association with

RSP Green Development & laboratories Pvt. Ltd.

(ISO Certified and QCI - NABET Accredited Environmental Consultant Organization)





RSP Green Development & Laboratories Pvt. Ltd.

An ISO 9001: 2015 & ISO 14001: 2015 Certified Company

QCI-NABET ACCREDITED ENVIRONMENTAL CONSULTANT

CIN NO: U74999WB2017PTC219565



To
The Principal
Rammohan College
102/1, Raja Rammohan Sarani,
Kolkata-700009

Sub: Submission of the Green Audit Report Conducted by Rammohan College, 102/1, 85A, 85B, 85C & 85D, Raja Rammohan Sarani, Kolkata-700009 in association with RSP Green Development & Laboratories Pvt. Ltd.

Respected Madam,

On behalf of RSP Green Development & Laboratories Pvt. Ltd., it has been certified that the assigned **Green Audit Programme**, comprising **Energy Audit, Water Audit, Biodiversity Audit, Green Campus Management Audit, Plastic Waste Management, Carbon Foot Print Audit and Carbon Credit**, had been successfully completed by Rammohan College, 102/1, 85A, 85B, 85C & 85D, Raja Rammohan Sarani, Kolkata-700009 in association with RSP Green Development & Laboratories Pvt. Ltd. on 16.03.2020. After completion of the work, **Final Report** has been submitted to you. The report is compiled with **Work-sheets, Comparative Assessment** through analyses and suggestions for your Institution at the end.

The organization is thankful for your necessary support and adequate cooperation by providing needful information, requisite documents and sharing your institutional activities. We are further thankful to your humble hospitality for our staff and volunteers at the time of work.

Yours sincerely,

Pinaki Roy
Managing Director
RSP Green Development & Laboratory Pvt. Ltd.



NABET

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1. Introduction

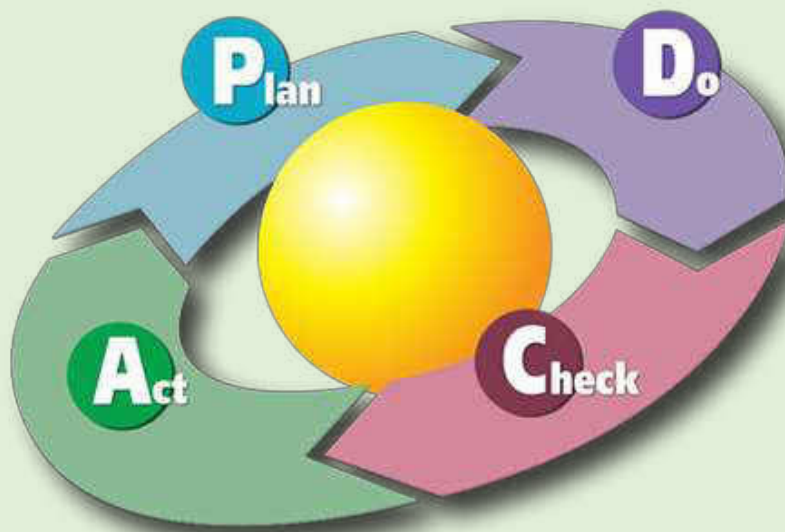
Green Audit is a stage wise review process of systematic identification, quantification, recording, reporting, analysis and documentation of components of environmental diversity of the institute or organization. It is a systematic assessment of day-to-day activity with reference to the utilization of resources as well as waste management. It aims to analyze environmental practices within and outside of the concerned place; leading to an eco-friendly atmosphere. It helps to determine how and where the energy, water or other resources are being used, based on which the institution can design effective management policies and implement changes towards sustainable use of resources. It can create health consciousness and promote environmental awareness, values and ethics. It also helps to enlighten staff and students of the institution for better understanding of Green impact on campus. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for environmental sustainability. Especially in colleges and universities where young minds dwell, ensuring an ecosystem with endurable qualities is the need of the hour. The green influence on the campus is vital to guarantee the best learning environment and healthy ecosystem for everyone associated with the site. The green audit report determines the greenery quotient on the campus and covers other influential environmental aspects. It includes the consumption and management of energy resources and environmental components.

National Assessment and Accreditation Council (NAAC) was introduced by the University Grants Commission or UGC in September 1994. NAAC was established for reviewing the performance and operational quality of Indian universities and colleges. The National Assessment and Accreditation Council have made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the mitigation of global warming through enforcement of carbon footprint reduction measures and improved management steps.

- **Self-assessment** – It allows the universities and colleges to review the ideal steps and implement them for the campus. The audit assists in self-assessment and the decision-making process.

- **Awareness** – It develops awareness among everyone associated with the campus with conscious and consistent efforts.
- **Improved scopes** – By complying with the norms, universities can ensure higher scopes of getting the best grade from NAAC. It is vital to follow the systematic way and implement the best steps for green audits on the campus under professional guidance.

The PDCA cycle audit is a systematic way of checking and improving the quality and performance and it involves four phases: planning the improvement, implementing the change, measuring the results, and acting on the feedback.



PDCA Cycle of Green Audit

1.1 Need for Green Audit

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that accredits the institution according to the scores assigned at the time of accreditation.

The Audit report helps to understand the current practices of sustainability with regard to the use of water and energy, generation of wastes, transportation, purchase of goods, etc; establishing a baseline of existing environmental conditions with focus on natural and physical environment and create awareness among students and staff concerning real issues of environment and its

sustainability. Based on the audit report, the college can make the best strategies to make the campus ideal for students, teachers, and anyone associated. It also helps the college acknowledge the wastage volume and consider different recycling projects for developing a sustainable ecosystem for the learners. Simply put, it is a way to minimize wastage and create a more suitable place for learning with improved NAAC grades.

1.2 Objectives of Green Audit

The main aim of this green audit is to assess the environmental quality and the sustainable management strategies being implemented in Rammohan College.

The objectives of Green Audit include:

- Documentation of baseline data of good practices, strategies and action plans towards improving environmental quality for future along with corrective actions and future plans.
- Maintain conformity with the norms and standards in the environmental management system and to design ideal protocols that develop a sustainable ecosystem on the campus.
- Assessment of water use, waste management, energy consumption, health and environmental quality in the campus.
- Identification of the gap areas and suggest recommendations to improve the Green Campus status of the College.
- Generation of awareness among the students, teaching and non teaching members of the institution.

1.3 About the Institution

Rammohan College owes its origin to City College, Calcutta which is one of the oldest first grades College in West Bengal. It was founded in 1881 by a band of patriotic and selfless Brahma leaders like Ananda Mohan Bose, Pandit Sivnath Sastri and Umesh Chandra Dutta. Rastraguru Surendranath Banerjee later joined the College as teacher. Up to 1961 City College had a women's Department in morning which has separately affiliated in 1961 to the Calcutta University and renamed as Rammohan College. The Geo coordinates of old building are 22.581023°N and 88.370149°E and Geo coordinates of new building are 22.582952°N and 88.370997°E.

The aim of College according to the founders, is to promote the cause of education in its highest and widest sense, to make education a comprehensive training of the mind, heart and body, and founded on theistic basis conducive to the good of man and glory of God.

The College is open to all female students irrespective of race, creed or caste. It has record of brilliant result. The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

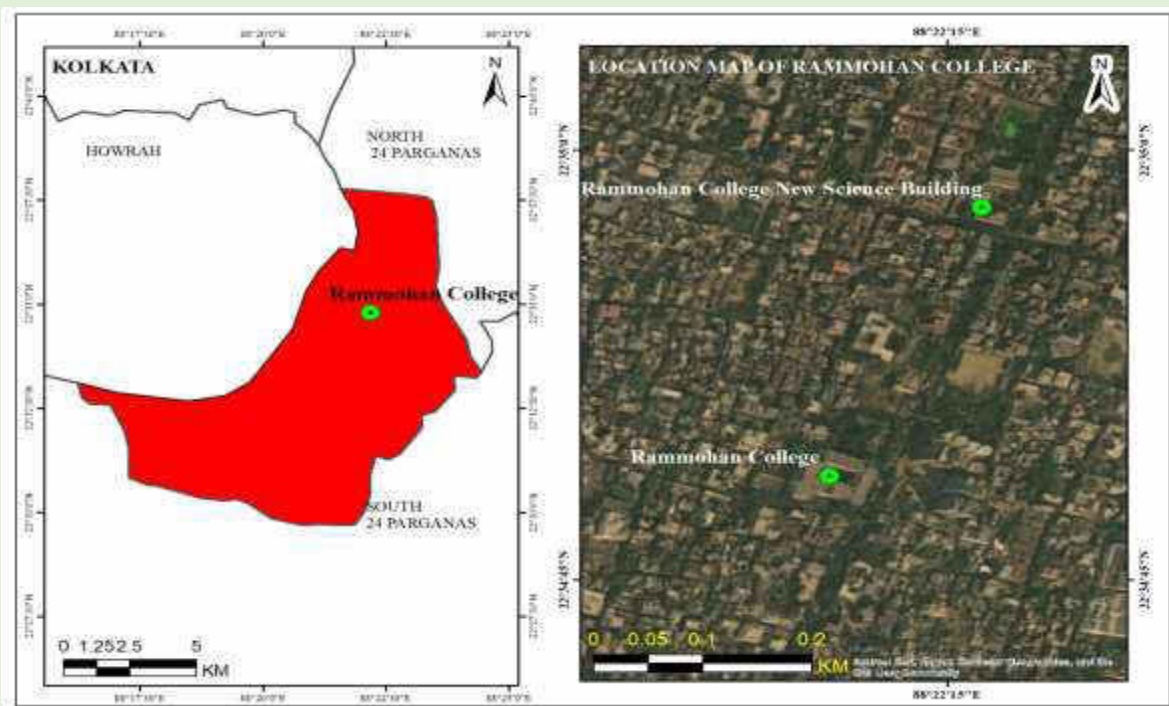


Figure 1: Location Map

1.3.1 Vision of the College

The Vision of the college is "Sradhaban Lavate Gyanam" or "Wisdom Belongth to Reverence". The goal of the college is to make a comprehensive training of mind, body and soul for girl students of all strata of society. Relentless effort is there to ensure an environment conducive for attaining self-respect for the students to trigger their inner strength to attain independence in thought to be aware of their rights so that in time they would be able to make an identity of themselves.

1.3.2 Mission of the College

The Mission of the institution is reflected in its policies. Principal and committed faculty members and non-teaching staff render their utmost efforts to ensure transparency in the functioning of the college and to maintain core values of the institution. If Vision is the Goal, Mission is the road-map. That pathway is not mere imparting of syllabus oriented lectures in class rooms. The College aspires to train students to be responsible citizens having a wider and positive vision of life.

1.3.3 Physical Structure of the College

Rammohan College in North Kolkata is famed for its immensity. With around 2500 students and nearly 140 teaching and non-teaching staff, it is one of the few colleges in West Bengal running in morning shift and catering to all three streams of Science, Arts and Commerce at undergraduate level along with post graduation in Bengali and Human Physiology.

The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

Rammohan College has recently acquired the heritage building at 85A, 85B, 85C and 85D Raja Rammohan Sarani which was once the family residence of Raja Rammohan Roy, and his descendants. A memorial courses especially for women will be housed here under autonomous body of management at the ancestral house. A New 3 storied Science Building (NSB) for Rammohan College is also under construction next to the heritage building. The ground floor

and the first and second floor of this building are complete and both PG and UG classes are being held there. The College has elevator for the teaching, non-teaching members and students. The College received possession of plot nos. 85B, C&D, Raja Rammohan Sarani, Kolkata- 700 009 on the 4th August, 2005 from the First Land Acquisition Collector, Calcutta. Execution and registration of the deed by West Bengal Government in favour of the college will prepare a plan for construction of College building on those premises too.

Rammohan College Central Library is well equipped with books on each subject and with periodicals, magazines of generalized and specialized interest. Teachers and students equally benefit from the library. At present the library has a huge collection of 40000 books (approx.), among which 24962 are purchased books and rests [14582 Approx] are presented. Along with the central library, seminar libraries are also maintained by the various departments. The college infrastructure, strength of student, teaching and non teaching members and departments have been presented in Table 1, 2 and 3.

Infrastructure elements such as wall textures, ceiling heights, window positioning, air flow, lighting, fan designs, and other factors can produce stressful environment. The phrase "environmental stress" is used to characterize the physical, chemical, and biological constraints on the diversification of organisms and ecosystems. Air temperature (dry bulb temperature, wet bulb temperature, and dew point temperature), relative humidity, direct solar radiation and air flow are the four major variables of human thermal comfort which is defined as "condition of mind which express satisfaction with thermal environment". College teachers and other stakeholders may experience professional burnout as a result of the environment's stress. A study by Acharjee et al, 2023, conducted in the classrooms at Rammohan College in two separate buildings showed that the indoor classroom environment of the New Building is consistently within the "Partial Discomfort" range (lowest and highest Thermo hygrometric index (THI) values 75.86 & 79.20). According to the reference range, the indoor classroom atmosphere of the old building runs from "Comfortable to Partial Discomfort" (74.15 & 77.56).

Table 1: College Infrastructure

Campus Area			
Old Campus	Old Building 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 0K – 2CH – 32 Sq.ft. (≈ 0.3333 Acre)	
New Campus	New Science Building & Museum 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	2B – 6K – 0CH – 43 Sq.ft. (≈ 0.7613 Acre)	
	85B, 85C & 85D Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 10K – 6CH – 15 Sq.ft. (≈ 0.5024 Acre)	
Sadhana Sarkar Memorial Hostel	35 Abhedananda Road, Kolkata-6, W.B.	10K – 5CH – 27 Sq.ft. (≈ 0.171 Acre)	
Total Campus Area		5B – 6K – 15CH – 27 Sq.ft. (≈ 1.768 Acre)	
Campus Built Up Area			
Campus	Building Type	Floor	Area in sq. mtr.
Old Campus 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	Old Building	G+4 floor	7364
NEW CAMPUS 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	New Science Building	Ground (502.93 sq.m)	2514.65
		First (502.93 sq.m)	
		Second (502.93 sq.m)	
		Third (502.93 sq.m)	
		Fourth (502.93 sq.m)	
	Raja Rammohan Roy Memorial Museum	Ground (537.78 sq.m)	1246.78
		First (537.78 sq.m)	
Second (171.37 sq.m)			
Sadhana Sarkar	Hostel Building	Ground Floor (432.58 sq.m.)	1481.92

Memorial Hostel 35, Abhedananda Road, Kolkata-6, W.B.	First Floor (349.78 sq.m.)	
	Second (349.78 sq.m)	
	Third (349.78 sq.m)	
Total Built Up Area		12607.35
No. of Buildings	2	
No. of Departments	17	
Teachers' Room	8	
Principal's Room	2	
Class Rooms	30	
Smart Class Rooms	4	
Dry Laboratories	14	
Wet Laboratories	17	
Library	2 (Central Library along with Departmental Seminar Libraries) + PG Library	
Auditorium	1	
Seminar Hall	3	
Canteen	4	
Common Room	1 (300sq ft) for students	
Office Room	3	
Hostel	1	
Gymnasium	1	
Staff Quarter	-----	

Table 2: Total Strength of Students, Teachers & Non-teaching Staff

No. of Teachers			No. of Students			No. of Non Teaching Staffs		
Male	Female	Others	Male	Female	Others	Male	Female	Others
39	60	0	07 (PG)	2295 (UG) + 66 (PG) = 2361		16 (permanent) + 19 (contractual) = 35	02 (permanent) + 04 (contractual) = 06	0

Table 3: Academic Departments

Undergraduate		
Science	Humanities	Commerce
Botany	Bengali	
Chemistry	English	
Mathematics	Economics	
Physics	Education	
Physiology	Geography	
Zoology	Hindi	
	History	
	Philosophy	
	Political Science	
	Sanskrit	
Post Graduation		
Human Physiology	Bengali	



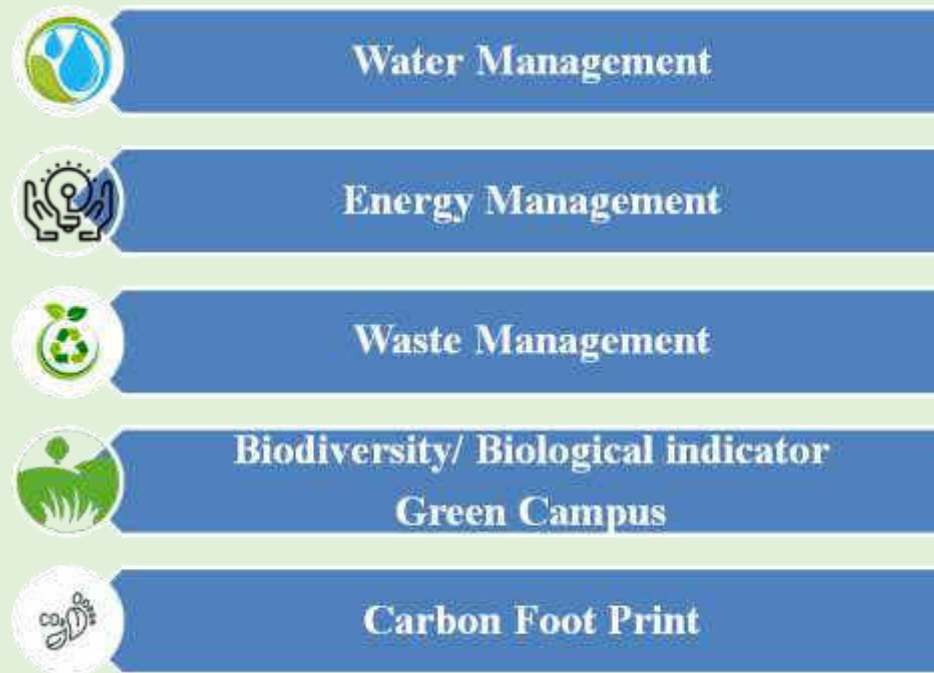
New campus of Rammohan college



Rammohan college old campus

2. Methodology

In order to perform green audit, the methodology that included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations was adapted.



Target Areas of Green Audit

2.1 Target Areas of Green Audit

Green audit aims to evaluate the efficient use of energy and water; minimize waste generation or pollution, biodiversity status and also efficiency in resource utilization. These indicators are assessed focusing on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, biodiversity and carbon footprint.

2.1.1 Water Management Auditing

Water is a natural resource which is required for sustenance of all living creatures. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Hence it is essential to examine the quality and usage of water in the Institutions or organizations. Water auditing is conducted for the evaluation of facilities of water intake, water usage and facilities for water treatment &/or reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

2.1.2 Energy Management Auditing

Energy conservation is an important aspect of campus sustainability which is also linked with carbon foot print of the campus. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices and incorporate alternative energy resources wherever possible. The energy signature method has been used in to extract the total heat loss coefficient of the building.

2.1.3 Waste Management Auditing

Human activities create waste; and unsustainable ways of waste handling, storage, collection, transport and disposal may pose risks to the environment and public health. Solid waste generated in the campus can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste.

1. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc.
2. Non-biodegradable wastes include plastic, tins and glass bottles etc.
3. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college.

Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid

waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

2.1.4 Biodiversity/ Green Campus Management Auditing

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus. Campus biodiversity is reflection of the ecological health of the campus. A sustainable strategy is required for adopting environment friendly viable way outs for a green campus. Ecological indicator species like butterflies can be used to assess the environmental quality of the campus.

2.1.5 Carbon Footprint Auditing

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence to assess the method of transportation that is practiced in the college is important.

2.2 Methods Adopted

The methodology adopted to conduct the Green Audit of the Institution had the following components.

2.2.1 Onsite Data Collection

Both Physical and virtual tour of the college campus was organized by the Green Audit Team. The data samples and relevant photographs were collected through geo-tagged photographs. The key focus of the audit was on assessing the status of the green cover of the Institution, species biodiversity, their waste management practices and energy conservation strategies etc.

2.2.2 Focus Group Discussion

The Focus Group discussions were held with the staff members and the management focusing various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

2.2.3 Water, Energy, Waste, Biodiversity and Carbon Foot Print Analysis Survey

With the help of teachers and staff, the audit team has assessed the energy consumption pattern, heat signature, waste generation, disposal and treatment facilities of the college. The monitoring was conducted with a detailed questionnaire survey method.

2.3 Audit Team

A Team comprised of the Faculty members, non teaching staff and student representative of Rammohan College named **BASUDHA** has been formed. The team along with the representatives from the RSP Green Development & Laboratories Pvt. Ltd. (ISO Certified and QCI - NABET Accredited Environmental Consultant Organization) conducted the Green Audit.

Members of BASUDHA (Green Team) of Rammohan College

- Dr. Saswati Sanyal, Principal, Rammohan College
- Dr. Krishnendu Sarkar (Teaching Staff)
- Dr. Samarendra Nath Banerjee (Teaching Staff)
- Dr. Santi Ranjan Dey (Teaching Staff)
- Dr. Kaustav Dutta Chowdhury (Teaching Staff)
- Dr. Ashesh Garai (Teaching Staff)
- Dr. Samiran Mondal (Teaching Staff)
- Smt. Priti Prava Dutta (Teaching Staff)
- Mr. Tapas Narayan Ray (Teaching Staff)
- Smt. Jayanti Sen (Teaching Staff)
- Smt. Anima Roy (Teaching Staff)
- Mr. Amitava Mahapatra (Non Teaching Staff)
- Ms. Shreyasi Sarkar (Student)

Members from RSP Green Development & Laboratories Pvt. Ltd.

- Ms. Sreerupa Chatterjee (Jr. Environmentalist)
- Ms. Madhumanti Bag (Jr. Environmentalist)

2.4 Audit Stages

Green auditing in Rammohan College, Kolkata began with the assessment of the status of the green cover of the Institution followed by waste management practices and energy conservation strategies etc. The team monitored different facilities at the college, determined different types of appliances and utilities (lights, taps, toilets, air conditioners, etc.) as well as measuring the usage per item (Watts indicated on the appliance, etc.) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified several times to clarify the data received through survey and discussions.

3. Observations & Findings

The findings and observations after campus visit, group interactions, survey and review have been analyzed and represented below.

3.1. Water Management

3.1.1 Source of water and its uses

The major source of water used in the College is supplied by Kolkata Municipal Corporation at free of cost. The amount of water supplied is sufficient for the daily college activities and hence no additional tanker water is needed to meet its demand. No ground water is used in the campus by means of well or any other activities.

Total 4 numbers of water tanks are available in the New Science Building (NSB) with capacity of 4000 L each. One tank with 5000 L capacity and another with 3000 L capacity is also installed in the old building and hostel respectively. A total of 9000 L of water is pumped every day using 5 hp (NSB), 5 hp old building, 4.5 hp (hostel) motors. Water consumption meter is not installed and hence no record is maintained for daily water consumption. An average of 2,34,000 L of water is used by the College per month. Water is used for drinking purpose, toilets, canteen, laboratories, hostel and gardening. RO based water purifier units and coolers have been installed in different floors of the campus to treat the water for drinking purpose. Distilled water requirement in laboratories are by the distillation unit set in the college itself. College has displayed signboards for spreading awareness regarding water conservation. Dry mopping/cleaning methods are adopted to ensure water conservation. Uses of low flow/flow control water equipment or gadgets are manually controlled by supervisor. There is no formal water management plan available with the institute. Water consumption at each consumption level is monitored manually. There are two small rain water storage at the New campus in front side of the campus. The stored rain water is used for gardening and plantation. There is no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained to main drainage system of the city. Details of water consumption in hostel could not be procured during audit process.

3.1.2 Water Quality Analysis

As the water is primarily supplied by the Municipal Corporation, it can be assumed that the water is properly treated and meets the requisite norms of BIS standards. The routine parameters

of drinking water available in the campus (eg. pH, conductivity, salinity, DO etc.) are regularly checked in college laboratory by the students (data attached below).



Water lily plantation in Rain water storage



Phone : 2350-5687,
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RAMMOHAN COLLEGE

(Formerly City College W.Dept.)
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E-mail : rmc.tic85b@yahoo.in, rmc.principal@gmail.com
Accredited B⁺ Grade by NAAC

Ref.

Date 11-03-2020

Water parameter analysis of drinking water-2019-2020

At New Science Building

(85A, Raja Rammohan Sarani, Kolkata-700009)

(Data are average of three independent observations)

Name of the parameter	Dates			
	19.07.2019	12.10.2019	03.12.2019	06.03.2020
pH	6.5	6.9	6.4	6.96
Dissolved oxygen (mg/dl)	0.57	0.53	0.53	0.5
Free dissolved carbon di oxide (mg/l)	3.9	3.3	3.1	3.8
Salinity (ppt)	0.0021	0.0028	0.0031	0.0029
TDS (ppm)	147	132	139	144

S. Sanyal
Principal
Rammohan College
Kolkata-9

**Principal
Rammohan College**



Test report of water quality parameters in college laboratory

3.2 Energy Audit

Energy conservation plays a pivotal role in promoting campus sustainability and is intricately connected to the carbon footprint of the institution. Energy auditing is the process of managing and diminishing energy consumption, with a keen focus on minimizing carbon foot print. Consequently, it is imperative for any environmentally-conscious institution to scrutinize its energy utilization practices and embrace alternative energy sources wherever feasible.

3.2.1 Electrical Bill Analysis

Electricity is supplied by Calcutta Electricity Supply Corporation. All the electrical appliances in the old and new college building and hostel run on three different meters. Electricity consumption in last 12 months has been depicted below. An average consumption of 2002.67kWh/month is estimated in New Science Building during normal operating scenario (Table 4) whereas 9096.33kWh/month is the average consumption of Ram Mohan college old building (Table 6) and 1675kWh/ month in hostel as assessed in the season 2021-2022 (Table 8).

Table 4: New Science Building electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	37038446004
MeterNo.	2354905 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	23.5
50% of Con. Demand (KVA)	11.75
Sanctioned load (KW)	23.5

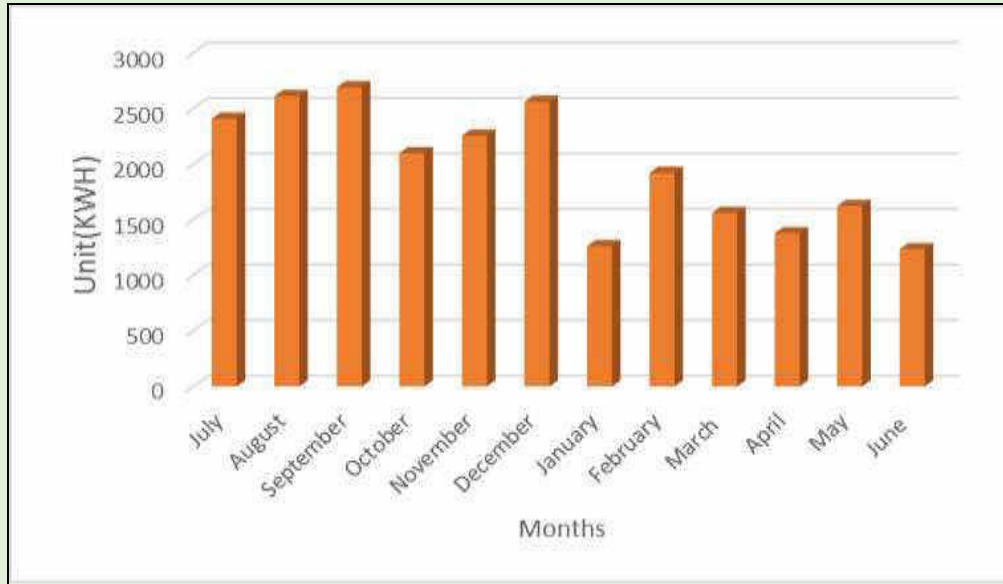


Fig-2: New Science Building electricity consumption during 2019-2020

Table 5: New Science Building electricity consumption during 2019-2020

Sl. No.	Months	Unit(KWH)
1	July	2411
2	August	2614
3	September	2694
4	October	2101
5	November	2258
6	December	2563
7	January	1664
8	February	1924
9	March	1563
10	April	1380
11	May	1624
12	June	1236
Average unit		2002.67

Table 6: Electricity consumption in Old Building

Consumer Name	Principal, City College
Consumer No.	85305001041
Meter No.	2869308 01
Electricity Supply Company	CESC
Tariff Category	P/3 Ph
Contract Demand (kVA)	70.6
50% of Con. Demand (KVA)	35.3
Sanctioned load (KW)	70.6

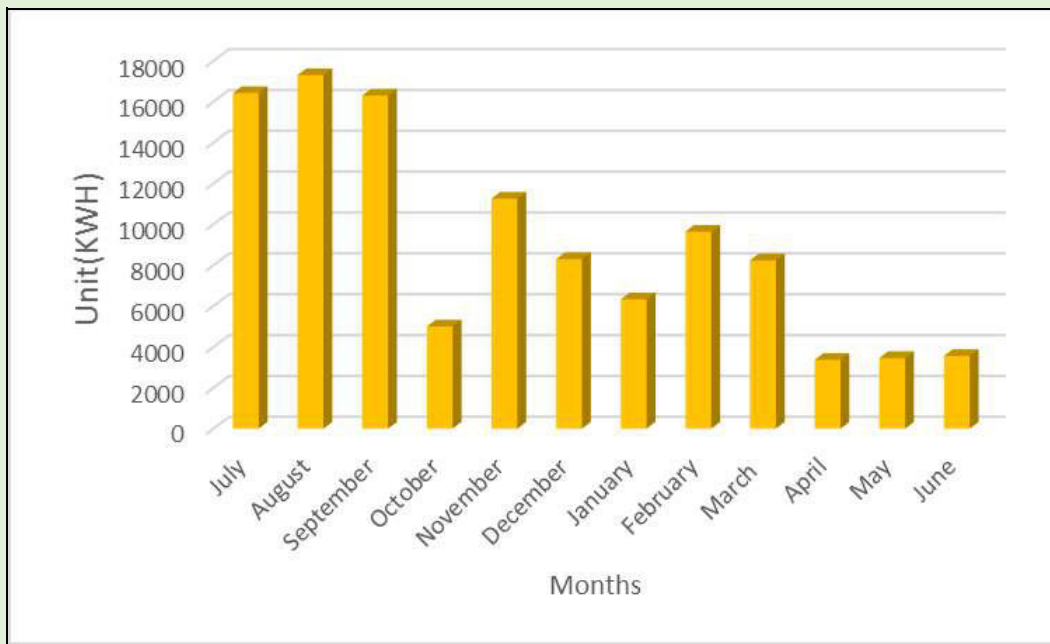


Fig-3: Old Building electricity consumption during 2019-2020

Table 7: Old Building electricity consumption during 2019-2020

Sl. No.	Months	Unit(KWH)
1	July	16422
2	August	17301
3	September	16300

4	October	5000
5	November	11260
6	December	8295
7	January	6325
8	February	9640
9	March	8236
10	April	3367
11	May	3450
12	June	3560
Average unit		9096.33

Table 8: Hostel electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	38038091001
Meter No.	2154477 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	14.2
50% of Con. Demand (KVA)	7.1
Sanctioned load (KW)	14.2

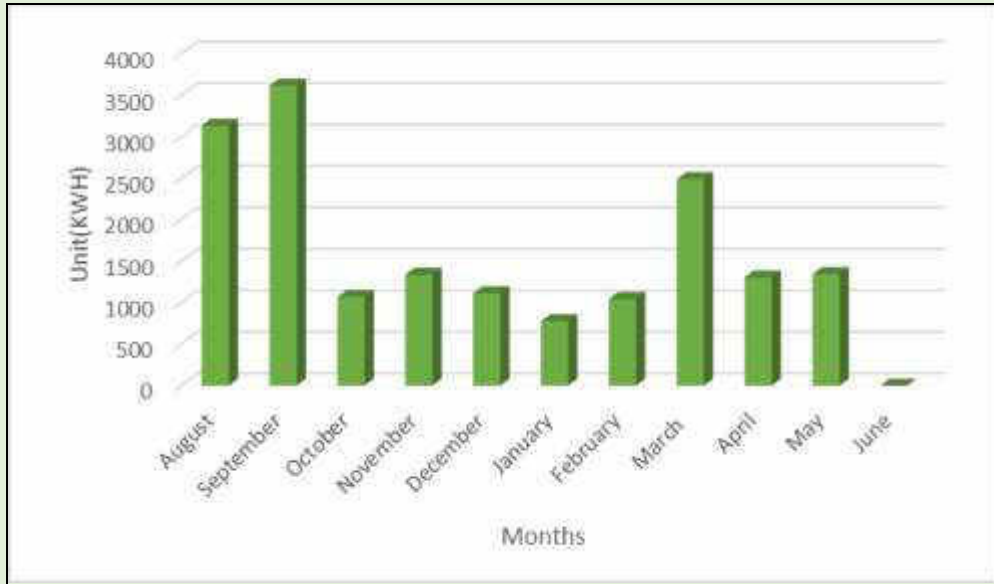


Fig-3: Electricity Consumption in Hostel during 2019-2020

Table 9: Electricity Consumption in Hostel during 2019-2020

Sl.No	Months	Unit(KWH)
1	July	2886
2	August	3132
3	September	3614
4	October	1068
5	November	1336
6	December	1112
7	January	776
8	February	1042
9	March	2487
10	April	1304
11	May	1343
12	June	0
Average unit		1675

3.2.2 Electrical Appliances

The commonly used electrical appliances in the College include tube lights, CFL lights, Ceiling fans, refrigerators, water purifier, hot air oven, air conditioners, computers, pump, UPS and other power back-ups etc. The average numbers of these appliances have been enlisted in the following table. The correct lux levels (70-300 lux) is maintained to avoid excessive light. Most of the ACs are 3 starred and the temperature is kept between 22-24 degree Celsius for efficient energy consumption. The switching and operation is manual in nature. The Information Technology Lab has 12 computers in total. The animal house used for Zoology and Physiology Department provides Photocell occupancy sensor for automatic light control. Numbers of different types of electrical devices and their average running time have been presented in Table 10 - 14.

Table 10: Electrical Appliances in the College

Sl. No.	Name of Appliances	No. of Units	KWH
1	Tube Light	335 (135 LED+200 Tube)	
2	Compact Fluorescent Lamps (CFL)	1+1+1+36	
3	Ceiling Fans	301	
4	Water Purifiers	7	
5	Refrigerators	5+5	
6	Hot air Ovens	4	
7	Air-conditioners	8 (1.5 tones split)	
8	Grinders	56	
9	Computers	Total 140 including 12 in IT Lab	
10	Pumping Machines	3	
11	UPS and Other Power Back-up	140	
12	Heater	3	

Table 11: Distribution of Electrical appliances (New Science Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation	
		Light	Fan	Hrs/Day	Days/Month
401	Lights, Fans	5 LED	3	12	26
402	Lights, Fans	6 LED	5	12	26
403(Library)	Lights, Fans	16 LED	6	12	26
404	Light, Fans	12 LED	8	12	26
405	Lights, Fan	8 LED	6	12	26
406(Auditorium)	Lights, Fan	14 LED	9	-	-
4 th Floor Corridor	Lights, Fan	4 Double	5	12	26
307	Lights, Fan	4 LED	2	12	26
306	Lights, Fan	16 LED	7	12	26
3 rd Floor Corridor	Lights, Fan	6 Single, 4 Double	6	12	26
305 (IQAC room)	Lights, Fan	2 LED	2	12	26
303	Lights, Fan	12 LED	6		
101(Principal Room)	Lights, Fan	2 Single Tube	2	12	26
102 (IT)	Lights, Fan	2 Single Tube, 1 Double Tube	3	12	26
103 (Office)	Lights, Fan	1 Single Tube	2	12	26
Canteen	Lights, Fan	5 LED Tubes	4	12	26

Table 12: Distribution of Electrical appliances (Old Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation	
		Light	Fan	Hrs/Day	Days/Month
Accounts	Light and Fan	20 LED	4+1 Stand	12	26
Office		8LED	10		
Principal Room					
Front Room					
5		8	5	12	26

6		8	5	12	26
7A		6	5	12	26
16		5	5	12	26
17		7	6	12	26
19A		6	5	12	26
20		7	7	12	26
22		4	5	12	26
23		4	2	12	26
26		3	3	12	26
27		3	5	12	26
28		2	1	12	26
28A		2	1	12	26
29		5	5	12	26
30		6	6	12	26
32B		5	6	12	26
32A		4	6	12	26
33		4	6	12	26
33A		3	4	12	26
32		4	4	12	26
N1		4	4	12	26
N2		4	4	12	26
N3		4	4	12	26
N4		4	4	12	26
N5		4	4	12	26
N6		5	5	12	26
N7		5	4	12	26

Commerce Room		2	3	12	26
Geography Room		6 (Normal Tube) + 7(LED)	20	12	26
Teachers' Room		4	6	12	26
Bursar Room		2	1	12	26
NCC Room		3	1	12	26
Rector Room		3	2	12	26
Staff Canteen		2+1 Heater	1+ 1 Fridge	12	26
Teachers Canteen		10+1 Heater	5+ 1 Fridge	12	26
Student Canteen		10+1 Heater	7+ 2 Fridge	12	26



Classroom

Table 13: Distribution of Electrical appliances (Hostel)

	Room No. / Name	Type of Electrical Device	Quantity Nos	Operation		
			Light	Fan	Hrs/Day	Days/Month
1.	Hostel	Light and Fan	43 Tube light	49 + 2 table fan	24	30
			37 LED			
			56 CFL			

Table 14: Air Conditioning System in the Campus

Air Conditioners							
Room No. / Name	Type	Capacity	Quantity	Power	Operation		Star Rating
		TR	Nos.	Watt/Unit	Hrs/Day	Days/Month	
	Split/Window AC						3 Star
Old Building	Split AC	1.5	3	1500	12	26	✓
New Science Building	Split AC	1	2	1000	12	26	✓
		1.5	3	1500			✓

3.2.3 Efficient Energy Management Practices

All electrical appliances are regular maintained for sustainable energy management. The college is gradually shifting towards LED lights by replacing existing lighting fixtures with LEDs and other energy efficient lighting fixtures to conserve energy. Correct lux levels (70-300 lux) are maintained to avoid excessive light. All ACs are 3 star rated and the temperature is kept between 22-24 degree Celsius. The switching and operation is manual in nature. Servicing of the electrical appliances is done at regular intervals to ensure energy efficiency. Institute is utilizing the natural light to its maximum. The classroom and laboratories are designed in such a way that it allows maximum sun light and reduces requirement of artificial lights. The classrooms and offices in the premises are well ventilated and the wide corridors are open to daylight. The operable glass windows are useful to facilitate natural light. The smart class room, auditorium and linguistic laboratory have insulated and tinted glass to filter heat gain. The fans are operational and adequately placed to affect the sufficient air changes. Fans installed are not star-

rated. College has done indoor plantation to provide fresh air inside the premises. LED monitors and Email/ electronic communication mode is preferred to save energy. Awareness posters regarding energy conservation is being displayed in the premises. The canteen uses LPG gas for cooking purpose. However, the Institute has not adapted to any sensor-based energy conservation technique. Since there is limited facility in hostel and canteen, no solar water heating system is installed. Since the biodegradable waste generation is low, there is no Bio-gas plant.

3.3 Waste Management

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is one of the most challenging issues in academic institutions. Unscientific handling of solid waste can pose threat to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

3.3.1 Types of waste generated in the campus

The campus generates different types of biodegradable (paper, food waste etc.) and non-biodegradable (plastic, packaging product etc.) waste in the office, classrooms, canteen, and hostel. The wet and dry laboratories generate biodegradable (tissue, blood, animal and plant parts), chemical waste as well as e waste.

Table 15: Approximate quantity of waste generated per day (in kg)

Office	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic		
> 10 kg	Paper			
Classrooms	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Paper	Food wrapper	NA	NA

2 - 10 kg				
> 10 kg				
Labs	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Animal and plant parts	Broken glassware, plastic waste	Chemical	E-Waste
2 - 10 kg				
> 10 kg				
Canteen	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic, Other Packaging Product		
> 10 kg	Vegetable peel, Food waste			

3.3.2 Waste Disposal Practices Adopted by the College

The source of wastewater is Domestic Waste Water i.e., Sewage water. The Sewage water mainly comes from toilets and canteen. The wet laboratories also generate waste water. There is no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained through internal drainage system and carried to main drainage system of the city. The everyday solid waste is collected by Kolkata Municipal Corporation for necessary disposal. The College has color coded waste bins are visibly available in the college. The segregation of waste needs to be done more efficiently. There is no biomedical or radioactive waste getting generated in the college. Old instruments, waste paper, cartons discarded tools, gadgets, computer parts, chemical bottles are discarded following administrative protocol through authorized vendors.

3.3.3 Reduce, Reuse, Recycle

The office and departments follow both sided printing to save energy and reduce waste. Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Broken furniture, appliance or computers are repaired and reused in terms of minimize waste. Examination related documents are stored for a fixed period and disposed as per the University guideline. Waste glass bottles are partially reused in the laboratories. Waste papers,

cartons and scraps are occasionally sent to unorganized recyclers and scrap dealers. Dry leaves are used for composting in the garden area. There is a ban on use of single use plastic in the campus area. Very less plastic waste is generated by some departments, office, garden etc. Awareness regarding plastic pollution is spread in the campus.

Discarded electronic products produce electronic garbage, or e-waste. In the last several decades, there has been a notable surge in the production of electronic trash. The rising rate of e-waste generation worldwide is close to 2 metric tons (Mt) annually. The projected amount of e-waste created in 2030 is 74 million tons. E-waste can therefore pose a serious risk to the environment. E-waste releases toxic metals into the environment, including as lead, mercury, nickel, and cadmium, which eventually find their way into surface water, groundwater, soil, and sediment. The health of people, aquatic life, and plants are all negatively impacted when harmful metals are released into the environment. As a result, effective e-waste management is crucial and has become a global issue. According to a survey, home and office electrical appliances account for over half of all e-waste produced, making them the main source of the garbage. The combination of biological, physical, and chemical processes exhibits relatively high removal efficiency among remediation technologies, and it has several advantages over other remediation technologies. Recycling is among the most effective e-waste management techniques. The College emphasizes on proper disposal of e-waste and use of recycled goods to decrease pollution load in the environment, as a part of social responsibility. E-waste generated in the campus is managed, keeping in mind the environmental hazards that may arise if not disposed properly. The cartridges of laser printers are refilled outside the college campus. Purchase of electronic products from companies which have service for disposal of product with buyback policy or exchange is encouraged by the college. The E- wastes and defective items from computer laboratories are being stored properly and recycled in effective manner. The dismantled electronic spare parts are immediately sold for reuse.

3.4 Green Campus

3.4.1 Campus Biodiversity

Approximately 2000 sq m free space is available in the institution in the form of garden and backyard. There is moderate vegetation in the campus along with some indoor plants. The campus premises have also presence of common birds like crow, sparrow, Myna, Sun bird, Nightingale and squirrel, domestic cat and dogs.

More than 50 medicinal plants have been cultivated in the Medicinal Plants Garden in the new campus at 85A, Raja Rammohan Sarani, Kol-9. The campus also has presence of ornamental trees & shrubs. Some of them are listed in Table 13. More than 70 weed species have been documented in the campus and enlisted in Table 15.

The campus is also a habitat of numbers of butterflies which is a crucial component of the environment due to their role in pollination. It can be used as a tool for management and conservation choices involving butterflies. Institutional campuses with undisturbed natural flora and seasonal flowering plantations provide suitable habitat for butterfly populations since they are frequently free of any development operations and pollutants. They are also regarded as reliable ecological indicators because to their sensitivity to climatic and environmental changes. The species richness, abundance or mortality rate of butterfly species can shed light on the surrounding environmental quality. In Rammohan College campus 21 species of butterflies (Table 17) belonging to 4 families, 8 subfamilies were found more or less throughout the year, but there is no significant correlation between butterfly species richness and Air Quality Index (PM_{2.5}, PM₁₀, O₃ ect.) (Mitra et al. 2023 a,b)

Table 16: Plant species in the campus

Medicinal Plants		
Amlaki/Amla	<i>Emblica officinalis</i>	Fruits are good source of vitamin C
Nayantara/Periwinkle	<i>Catharanthus roseus</i>	Roots contain vincristine & vinblastine which are used to treat cancer,
Lemon Grass	<i>Cymbopogon citratus</i>	Leaves contain terpenoids, ethereal oils, used as antispasmodic, hypotensive, antirheumatic etc.
Berela	<i>Sida rhombifolia</i>	Leaves contain antibacterial properties & antioxidants. It is used in diarrhoea, malarial fever, asthma etc.
Ornamental trees & shrubs		
Swarna Champa Tree.	<i>Michelia champaca</i>	Flowers intensely fragrant.
Parijat	<i>Magnolia grandiflora</i>	Small tree. Flowers white, fragrant.
Rangan	<i>Ixora coccinea</i>	Shrub
Sheuli	<i>Nyctanthes arbor-tristis</i>	Shrub or small tree
Wild plants		
Kyllinga	<i>Kylling abbrevistylis</i>	
Tridaksha	<i>Tridax procumbens</i>	
Uchanti	<i>Ageratum conyzoides</i>	



Hexagonia fungus







Floral biodiversity of the College

Table 17: Weed flora of New Campus, Rammohan College



Sl. No.	Scientific Name	Family	Comment
1	<i>Solanum nigrum</i>	Solanaceae	Annual herb
2	<i>Eragrostis tenella</i>	Poaceae	Perennial herb with rhizome
3	<i>Eleusine indica</i>	Poaceae	Perennial herb with rhizome
4	<i>Cynodon dactylon</i>	Poaceae	Perennial herb with wiry rhizome
5	<i>Oldenlandi acorymbosa</i>	Rubiaceae	Annual herb
6	<i>Oldenlandi apaniculata</i>	Rubiaceae	Annual herb
7	<i>Dactyloctenium aegyptium</i>	Poaceae	Perennial rhizomatous herb
8	<i>Ageratum conyzoides</i>	Asteraceae	Annual herb
9	<i>Vernonia cineria</i>	Asteraceae	Perennial herb
10	<i>Blumea lacera</i>	Asteraceae	Annual herb
11	<i>Lindenbergia indica</i>	Scrophulariaceae	Annual herb
12	<i>Mazus rugosus</i>	Scrophulariaceae	Annual tiny herb
13	<i>Vandellia crustacea</i>	Scrophulariaceae	Annual herb
14	<i>Lindernia parviflora</i>	Scrophulariaceae	Annual herb
15	<i>Phylla nodiflora</i>	Verbenaceae	Perennial prostrate herb
16	<i>Rungia parviflora</i>	Acanthaceae	Annual herb
17	<i>Desmodium triflorum</i>	Fabaceae	Perennial prostrate herb
18	<i>Alternanthera sessilis</i>	Amaranthaceae	Perennial herb
19	<i>Alternanthera paronychioides</i>	Amaranthaceae	Perennial herb
20	<i>Amaranthus viridis</i>	Amaranthaceae	Annual herb
21	<i>Amaranthus spinosus</i>	Amaranthaceae	Annual prickly herb
22	<i>Tillanthera philoxeroides</i>	Amaranthaceae	Annual herb
23	<i>Aerva lanata</i>	Amaranthaceae	Perennial herb with somewhat woody rootstock
24	<i>Mecardonia procumbens</i>	Scrophulariaceae	Annual prostrate herb
25	<i>Pilea microphylla</i>	Urticaceae	Tiny annual herb
26	<i>Laportia interrupta</i>	Urticaceae	Annual herb with stinging hairs
27	<i>Nicotiana plumbaginifolia</i>	Solanaceae	Annual herb
28	<i>Cyperus rotundus</i>	Cyperaceae	Perennial herb with corm
29	<i>Cyperus iria</i>	Cyperaceae	Annual herb
30	<i>Kyllinga brevistylis</i>	Cyperaceae	Perennial rhizomatous herb
31	<i>Andrographis paniculata</i>	Acanthaceae	Annual/perennial herb
32	<i>Andropogon aciculatus</i>	Poaceae	Perennial rhizomatous herb
33	<i>Dentella repens</i>	Rubiaceae	Annual prostrate herb
34	<i>Oplismenus burmannii</i>	Poaceae	Perennial herb
35	<i>Digitaria ciliaris</i>	Poaceae	Annual herb
36	<i>Digitaria sanguinalis</i>	Poaceae	Annual herb







Sl. No.	Scientific Name	Family	Comment
37	<i>Chloris barbata</i>	Poaceae	Annual herb
38	<i>Sida rhombifolia</i>	Malvaceae	Perennial undershrub
39	<i>Sida acuta</i>	Malvaceae	Perennial undershrub
40	<i>Sida cordifolia</i>	Malvaceae	Perennial undershrub
41	<i>Crotalaria pallida</i>	Fabaceae	Annual herb
42	<i>Euphorbia hirta</i>	Euphorbiaceae	Perennial herb
43	<i>Euphorbia parviflora</i>	Euphorbiaceae	Annual herb
44	<i>Euphorbia microphylla</i>	Euphorbiaceae	Annual prostrate herb
45	<i>Phyllanthus urinaria</i>	Euphorbiaceae	annual herb
46	<i>Phyllanthus fraternus</i>	Euphorbiaceae	Annual herb
47	<i>Tribulus terrestris</i>	Zygophyllaceae	Prostrate herb
48	<i>Sida rhombifolia</i>	Malvaceae	Perennial undershrub
49	<i>Physalis minima</i>	Solanaceae	Annual herb
50	<i>Solanum sisymbriifolium</i>	Solanaceae	Perennial prickly herb
51	<i>Evolvulus nummularius</i>	Convolvulaceae	Perennial prostrate herb
52	<i>Evolvulus nummularius</i>	Convolvulaceae	Annual prostrate herb
53	<i>Heliotropium indicum</i>	Boraginaceae	Annual herb
54	<i>Leucas aspera</i>	Lamiaceae	Annual aromatic herb
55	<i>Leucas cephalotes</i>	Lamiaceae	Annual herb
56	<i>Leonurus japonicus</i>	Lamiaceae	Annual herb
57	<i>Scoparia dulcis</i>	Scrophulariaceae	Annual herb
58	<i>Cleome viscosa</i>	Capparidaceae	Annual herb
59	<i>Cleome rutidosperma</i>	Capparidaceae	Annual herb
60	<i>Brachiaria distachya</i>	Poaceae	Perennial herb
61	<i>Dichanthium annulatum</i>	Poaceae	Annual herb
62	<i>Echinochloa stagnina</i>	Poaceae	Annual herb
63	<i>Leptochloa chinensis</i>	Poaceae	Annual herb
64	<i>Hybanthus enneaspermus</i>	Violaceae	Annual herb







Name	Photographs	Name	Photographs
<i>Basella alba</i>		<i>Oxalis corniculata</i>	
<i>Eclipta prostrata</i>		<i>Wedelia trilobata</i>	




Selected photographs of the weeds found in the campus

Table 18: Butterfly species in the campus

Sl.	Scientific Name	Common Name	Photograph
1	<i>Graphium agamemnon</i> (Linnaeus)	Tailed Jay	
2	<i>Papilio polytes</i> (Linnaeus)	Common Mormon	

Sl.	Scientific Name	Common Name	Photograph
3	<i>Atrophaneura aristolochiae</i> (Fabricius)	Common Rose	
4	<i>Eurema hecabe</i> (Linnaeus)	Common Grass Yellow	
5	<i>Cepora nerissa</i> (Fabricius)	Common Gull	
6	<i>Leptosia nina</i> (Fabricius)	Psyche	
7	<i>Danaus chrysippus</i> (Linnaeus)	Plain Tiger	
8	<i>Euploea core</i> (Cramer)	Common Crow	

Sl.	Scientific Name	Common Name	Photograph
9	<i>Melanitis leda</i> (Linnaeus)	Common Evening Brown	
10	<i>Mycalesis perseus</i> (Fabricius)	Common Bushbrown	
11	<i>Ypthima huebneri</i> Kirby	Common Four-ring	
12	<i>Ariadne ariadne</i> (Linnaeus)	Angled Castor	
13	<i>Ariadne merione</i> (Cramer)	Common Castor	
14	<i>Junonia atlites</i> (Linnaeus)	Grey Pansy	

Sl.	Scientific Name	Common Name	Photograph
15	<i>Zizeeria karsandra</i> (Moore)	Dark Grass Blue	
16	<i>Euchrysops cnejus</i> (Fabricius)	Gram Blue	
17	<i>Borbo cinnara</i> (Wallace)	Rice Swift	





Avian diversity in the campus



Apple Snail in the campus

3.4.2 Green Campus Initiatives

Swachh Bharat Abhiyan

A cleanliness programme was organized at the premises of New Science building of Rammohan College and the Rammohan Sarani every year. On that day, all the NSS volunteers participated to clean the adjacent path of the college and the nearby street. They picked up the junk from the campus, along the streets and also swept the whole surrounding. Then they spread bleaching powder. This programme was arranged to make the students understand the importance of

cleanliness, how they can keep their surrounding clean and also to make them aware of their duty as a responsible member of the community.



Weeds variety in the Campus

3.4.3 Sustainable Practices

- Restricted entry of automobiles
- Walking is encouraged for internal transport.
- Institute has initiated banning plastic in the campus.
- Email/ electronic communication mode is preferred to save papers.
- Both side printing is being adopted to save paper and trees.
- The premises have fire extinguishers installed at required locations which are regularly checked and maintained.
- The campus has established lift and ramp for easy movement of disabled persons.

3.4.4 Green Mindset

- Minimization of waste and proper disposal of e waste
- Composting of leaf litters and use of the compost in gardens
- Utilization of renewable energy resources like solar energy
- Maintenance of the local vegetation and fauna
- Landscaping in the campus to reduce the ambient temperature in the campus

3.5 Carbon Foot Print Analysis

Table 19: Carbon Foot Print Analysis

Sl. No.	Parameter	Numbers	Annual CO ₂ emission
1	Total no. of vehicles used by the stakeholders (per day)	5bikes+10car	(4680 +1903) = 6583 kg CO ₂ (considering 10 km distance travelled in 6 days a week)
2	No. of Cycles used.	5	-
3	No. of two wheelers used		
3a	Average distance travelled (per day)	Within 5km	
3b	Quantity of Fuel Used (per day)		
4	No. of four wheelers used		
4a	Average distance travelled (per day)		
4b	Quantity of Fuel Used (per day)		
5	No. of persons using public transportation	Most	
6	No. of persons using college conveyance		
7	No. of generators used per day		
7a	Amount of fuel used		
8	No. of LPG cylinders used in canteens	6 commercial cylinders	170.4 kg CO ₂
9	No. of LPG cylinders used in labs	14.2 kg X2 (Chemistry Lab), 5 kgX2 (Zoology lab)	43.5 + 15 = 58.5 kg CO ₂
10	Reams of paper used		
11	Paperless works to reduce paper usage		
12	Use of any other fossil fuels in the college		
13	Any efforts to reduce the use of fuels		

As per the estimates from the Central Electricity Authority, the weighted average emission factor for the Indian power grid stands at 0.79 kg CO₂/kWh. Hence, the total CO₂ emission in a year from electricity consumption of the New Science Building is equivalent to 30575Kg CO₂ and 13372 kg CO₂ in the hostel.

Carbon Credit



Parties that have ratified the Kyoto Protocol and made commitments (Annex B Parties, of which India is one) have set goals for restricting or lowering emissions. The levels of permitted emissions, or assigned amounts, for the 2008–2012 commitment period are used to express these aims. Units of allocated amount (AAUs) are used to categorize the permitted emissions. According to Article 17 of the Kyoto Protocol, nations with spare emission units—that is, emissions that are allowed but not "used"—can sell their excess capacity to other countries that have exceeded their targets through the mechanism of emissions trading. As a result, emission removals or reductions became a new product. Since the main greenhouse gas is carbon dioxide, trade in carbon is the term used. These days, carbon is traded and tracked. As a result, emission removals or reductions became a new product. Since the main greenhouse gas is carbon dioxide, trade in carbon is the term used. These days, carbon is traded and tracked just like any other commodity. We refer to this as the "carbon market or carbon credit."

A country having an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) may carry out an emission-reduction project in developing nations under the Clean Development Mechanism (CDM), as outlined in Article 12 of the Protocol. These initiatives have the potential to generate marketable certified emission reduction (CER) credits, which are worth one tonne of CO₂ apiece and can be applied toward reaching the Kyoto targets. An example of a CDM project activity would be installing more energy-efficient lights or bulbs or doing a solar-powered electrification project in an area. While providing industrialized nations with considerable leeway in meeting their carbon reduction or limitation targets, the mechanism promotes sustainable development and emission reductions. Rammohan

College always abide by the rules or article 17 of Kyoto Protocol as “Law abiding College of India” and also try to generate awareness in the society.

A carbon credit can be calculated as a unit of exchange that individuals and firms alike use to offset their greenhouse gas (GHG) emissions. One carbon credit, or offset in the voluntary carbon market (VCM), is equal to one metric tonne of Green House Gas reduced or avoided from entering the atmosphere. In other words, a carbon credit is worth one tonne of CO₂ equivalent (tCO₂e) emissions which is equivalent to 556.2m³ of volume. “Carbon dioxide equivalent (tCO₂e)” is the standard unit for counting greenhouse gas emissions whether they're from CO₂ or another GHG.

In Rammohan College campus, 135 tubes (40 watts) have been replaced with LED (20 watts) resulting savings of 3369 kWh electricity annually. The calculation is made considering operation time of 6 hours daily for 8 months. The average carbon intensity for electricity generation in India is around 0.82 kilograms of CO₂ per kilowatt-hour (kgCO₂/kWh). Hence, the installation of LED lights have resulted in a reduction in CO₂ emission by 2763 Kg every year equivalent to 2.76 carbon credit.

The College has successfully installed 2 sets of 5 KWp Roof Top Solar PV Power Plant on the rooftop. In general, a 10 kW solar system produces about 40 units of electricity per day on average leading to 9600 kWh annually (considering 8 months operation time). This step has made a reduction in CO₂ emission by 7872 Kg every year equivalent to 7.87 carbon credit. All together on an average the carbon credit score becomes 10.63.

4. Suggestions and Recommendations

4.1 Water Management

- Monitoring of water consumption will be required for ensuring water efficiency. Water meter to be installed to monitor the consumption. The water meter readings to be recorded every day or every week at a fixed time.
- It is recommended to check water quality from water source for dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, and conductivity, total dissolved solids and E-coli/ coliform.
- The wash basin taps may be equipped with water saving fixtures.
- The flush tanks of the toilets may be fitted with dual volume system.
- Awareness campaigns and signboards need to be displayed on every floor.
- A detailed water use and management plan should be prepared and displayed.
- Rain water harvesting to be prepared.

4.2 Energy Management

- The energy audit recommends to avoid the use of more energy consuming electrical appliances and to replace with more environment friendly and energy efficient appliances (for example five stars rated Air conditioner, star rated fans) in the college.
- Ceiling fans have a very good scope for reducing power consumed using a technology called Brushless DC Motor or simply BLDC motor. BLDC technology, in general, has been in the market for a couple of decades. The traditional fan uses an induction motor and typically consumes 70- 90 watts. But BLDC fan, on the other hand, can reduce power consumption up to 65%.
- Prominent advantages of BLDC motor over induction motor are Lower Electricity Consumption, Longer backup on Inverters (even on Solar), improved reliability, Noise reduction, longer lifetime.
- The Hostel and other facilities may use solar heating units to reduce electricity consumption.
- College may adopt sensor-based (occupancy sensors) energy conservation approach for offices, classrooms and washrooms as well.

- College may also replace all existing tube lights with LEDs.
- To increase the carbon offset, it is recommended to extend the Solar PV for not just college building but also for hostel.
- More frequent awareness campaigns to be organized and signboards need to be displayed on every floor.

4.3 Waste Management

- College must arrange color coded, covered and separate waste bin for efficient segregation and disposal of waste at accessible location on each and every floor.
- Workshops need to be conducted regarding stages of waste management and 3R scheme.
- College may undertake feasibility study to install sewage water treatment in the campus to recycle waste water and use it in flush or for gardening purpose.
- Leaf litter from the campus can be effectively used for aerobic/ vermi composting, so that the composted material can also be used as good manure.
- Laboratory waste may be managed efficiently to reduce any scope of contamination.
- Try to completely ban the use of plastic in the campus, and to encourage the use of biodegradable materials as alternatives. Try to achieve the goal of plastic free campus.
- Annual agreement with recyclers/ vendors for all kind of scraps and e waste needs to be followed up.
- Important and confidential reports/ papers can be sent for pulping and recycling after completion of their preservation period.
- Metal waste, wooden waste, unused equipments and scraps should be sent to authorized scrap agents for further processing
- Awareness signboards/ posters need to be displayed on every floor.

4.4 Green Campus

- Maintenance of biodiversity is needed.
- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records.
- Nature Club may assign scientific and common name tags on the plants to spread awareness among students.
- College may consider planting tree on the land, away from city, managed by college to offset the carbon footprint.
- Emphasis may be given to develop kitchen garden and roof top garden giving emphasis on indoor and Bonsai plants.
- Students may be encouraged to engage in preparing People's Biodiversity Register (PBR) in and around the campus.
- Environment friendly lifestyles to be encouraged among students, teachers and non teaching staffs.

5. Green Audit Checklist

I. Water Efficiency & Wastewater Management			
Sl.No.	Measures	Status	Remarks
1	RO based water purifiers for drinking water	Yes	
2	Aerators to water taps	No	
3	Automatic toilet faucets	No	
4	Drip irrigation/ Sprinklers (for plant watering system)	No	
5	Dual flush toilet with cistern	No	
6	Dry mopping/ cleaning methods adopted	Yes	
7	Sewage treatment plant for sewage recycle	No	
8	Rain water harvesting		Going to install
9	Regular maintenance for leakage free plumbing system	Yes	
10	Use of low flow/ flow control water equipment or gadget	No	Manually controlled by the supervisor
11	Water balance diagram and water consumption monitoring at each Consumption level	No	Manually controlled by the supervisor
12	Routine monitoring of water quality		Internal assessment by the laboratories
13	Awareness signs displayed for promoting water conservation		
II. Energy Efficiency and On-site Energy Generation Mechanism			
Sl.No.	Measures	Status	Remarks
1	Maintaining correct lux levels (70-300 lux) to avoid excessive light	Yes	
2	Computerized monitoring of electrical system	No	
3	On-site energy generation (Diesel generators, LPG)	No	
4	Use of renewable energy (Solar, biogas)	No	
5	Photocell occupancy sensor for automatic light control		In animal house
7	Regular maintenance of electrical system	Yes	

8	Use of energy efficient equipment like VFDs, maximum star rated equipment.	Yes	
9	Use of energy saving bulbs (Compact florescent light/LED lights)	Yes	
10	Awareness signage on electricity conservation	Yes	

III. Solid Waste Management

Sl.No.	Measures	Status	Remarks
1	Waste segregation practices and supporting hardware for waste segregation (Dry recyclable, organic, plastic, hazardous and E-waste)	Yes	Through proper process
2	Setting up recycling/ composting/ bio gas generation facility	No	Going to install
3	Minimize use of paper through digitalization	Yes	
4	Printing on both sides of paper/ Reuse of printed paper/ envelops	Yes	
5	Mechanism for collection & disposal of E-waste as applicable regulation	No	
6	Single use plastic free campus	Yes	
7	Inventories of waste generation and records of waste disposal		Yet to develop
8	Recycle/ archiving of paper waste		
9	Segregation of dry and wet waste		As per KMC regulation
10	Purchase of electronic products from companies which have service for disposal of product with buy back policy?	Yes	As per Government regulation
11	Recreating into new sustainable products	No	

IV. Good Day light Design

Sl.No.	Design Feature	Status	Remarks
1	Wide corridors open to daylight	Yes	
2	Broad doors and windows allowing daylight	Yes	
3	Building architecture which allows sunlight within buildings	Yes	

4	Presence of Skylight/ Rooflight	Yes	
5	Enough natural illumination in classrooms/ seminar halls/ laboratories	Yes	
6	Ultraviolet (UV) filtering windows/ Use of exterior louvers or light coloured fabric or blinds for windows to control glare	Yes	Only in the auditorium
7	Operable/ openable windows.	Yes	
8	Use of glass as facilitator of natural light	Yes	
9	Use of insulated and tinted glass to filter heat gain		In smart class room, auditorium and linguistic laboratory.

V. Ventilation

Sr. No.	Design Feature	Status	Remarks
1	Good ceiling height which allows internal air circulation	Yes	
2	Self-movement ventilators in the roof	No	
3	Wide windows and doors for classrooms, laboratories, seminar halls	Yes	
4	Wide corridors	Yes	
5	Operable louvers		
6	Exhaust fans in kitchen/ toilets	Yes	

VI. Temperature and Acoustic Control

Sl.No.	Design Feature	Status	Remarks
1	Roof design & type (Double/ False ceiling with plaster of paris etc.)	Yes	Auditorium, Principal's chamber and meeting room
2	Sand stone cladding/ tiling outside the walls	No	
3	Specially designed walls for temperature control, Sound noise barriers for windows/ walls		Auditorium and Linguistics Lab
4	Building construction allows diffused sunlight but not the heat. Specially designed glass walls/ windows with better U value/ factor depending upon climate conditions	Yes	Main campus (old building)

5	Use of insulation material (e.g. autoclaved aerated blocks, hollow blocks, Thermocrete etc.)	No	
6	Use of water bodies/ fountain to maintain temperature within campus	Yes	
7	Climbing creepers on the walls	No	
8	Retro fitting the existing roofs with cool roof technology	No	
9	Use of landscaping gas sound barrier	No	
10	Water free urinals (No flush urinals/ Zero flush urinals/ water less urinals/ air-based flushing system)	No	
11	Water balance diagram and water consumption monitoring at each consumption level	No	Manually maintained by supervisor
12	Routine monitoring of water quality	Yes	Internally monitored by laboratories
13	Awareness signs displayed for promoting water conservation	Yes	

VII. Environmental Audit

Sl.No.	Type of audit	Status	Remarks
1	Energy audit (includes energy consumption, thermal comfort, visual comfort)	Yes	
2	Sound/ Noise and lux level monitoring (including indoor noise level, outdoor noise level)	Yes	
3	Water and waste audit (including water consumption, quality, solid waste generation, solid waste disposal process)	Yes	
4	Safety Audit	Yes	

VIII. Universal Access and Efficient Operation and Maintenance of Building

Sl.No.	Design feature	Status	Remarks
1	Easy access to the main entrance of the building and minimum two exits	Yes	
2	Energy efficient elevator	Yes	
3	Car pooling by staff and students/ use of Public transport/ Use of bicycles and battery-operated vehicles within campus		

4	Preferred car park spaces for differently abled	Yes	New building
5	Ramp/ stairs with handrails on at least one side	Yes	New building
6	Restrooms (toilets) in common areas/ Restroom for differently abled	Yes	New building
7	Braille assistance for differently abled	No	Going to procure
8	Availability of wheelchair	Yes	
9	Emergency response plan for natural and manmade emergencies	Yes	
10	Fire exits, assembly points, first aids, firefighting systems	Yes	
11	Regular maintenance of building	yes	

IX. Green Program

Sl.No.	Green program	Status	Remarks
1	Upcycling of waste. Recycling beyond books i.e. paper, aluminium, plastic, e-waste	Yes	By authorized vendor
2	Creation of “GreenTeam” in the institution/ library	Yes	BASUDHA
3	Awareness programs on environment, energy management & safety (external Sessions and academic courses)	Yes	NSS
4	Outreach, activities, green programs (Tree plantation, waste segregation, plastic waste collection, cleaning etc.) records/ photos of programs	Yes	NSS
5	Presence of system/ methodology available for implementation of green initiatives and green projects (long term system-based continuity and not an isolated/ stand alone activity)	Yes	NSS
6	Mindset for reduction, recycle of waste (Green mindsets)	Yes	
5	Digitization	Yes	
6	E-archiving	Yes	
7	E-resources: E-books, Online Journals, membership of consortium		Departmental library
8	Maintaining green campus/ Greening of campus	Yes	

1. Introduction

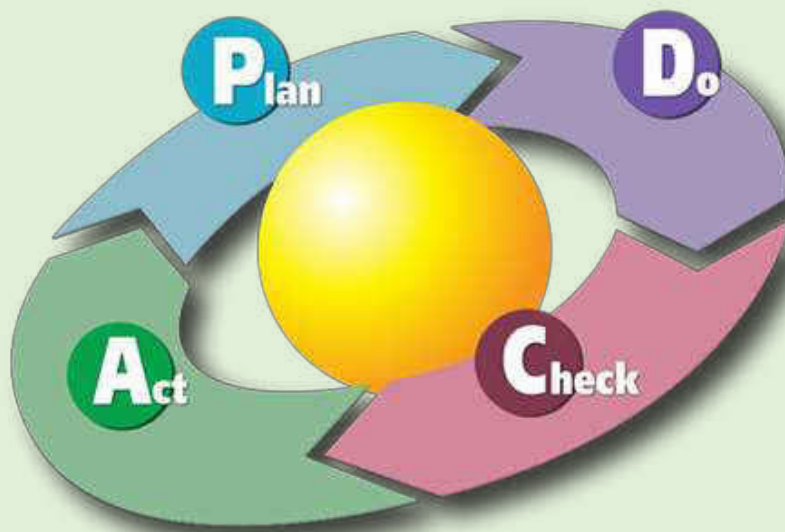
Green Audit is a stage wise review process of systematic identification, quantification, recording, reporting, analysis and documentation of components of environmental diversity of the institute or organization. It is a systematic assessment of day-to-day activity with reference to the utilization of resources as well as waste management. It aims to analyze environmental practices within and outside of the concerned place; leading to an eco-friendly atmosphere. It helps to determine how and where the energy, water or other resources are being used, based on which the institution can design effective management policies and implement changes towards sustainable use of resources. It can create health consciousness and promote environmental awareness, values and ethics. It also helps to enlighten staff and students of the institution for better understanding of Green impact on campus. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for environmental sustainability. Especially in colleges and universities where young minds dwell, ensuring an ecosystem with endurable qualities is the need of the hour. The green influence on the campus is vital to guarantee the best learning environment and healthy ecosystem for everyone associated with the site. The green audit report determines the greenery quotient on the campus and covers other influential environmental aspects. It includes the consumption and management of energy resources and environmental components.

National Assessment and Accreditation Council (NAAC) was introduced by the University Grants Commission or UGC in September 1994. NAAC was established for reviewing the performance and operational quality of Indian universities and colleges. The National Assessment and Accreditation Council have made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the mitigation of global warming through enforcement of carbon footprint reduction measures and improved management steps.

- **Self-assessment** – It allows the universities and colleges to review the ideal steps and implement them for the campus. The audit assists in self-assessment and the decision-making process.

- **Awareness** – It develops awareness among everyone associated with the campus with conscious and consistent efforts.
- **Improved scopes** – By complying with the norms, universities can ensure higher scopes of getting the best grade from NAAC. It is vital to follow the systematic way and implement the best steps for green audits on the campus under professional guidance.

The PDCA cycle audit is a systematic way of checking and improving the quality and performance and it involves four phases: planning the improvement, implementing the change, measuring the results, and acting on the feedback.



PDCA Cycle of Green Audit

1.1 Need for Green Audit

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that accredits the institution according to the scores assigned at the time of accreditation.

The Audit report helps to understand the current practices of sustainability with regard to the use of water and energy, generation of wastes, transportation, purchase of goods, etc; establishing a baseline of existing environmental conditions with focus on natural and physical environment and create awareness among students and staff concerning real issues of environment and its

sustainability. Based on the audit report, the college can make the best strategies to make the campus ideal for students, teachers, and anyone associated. It also helps the college acknowledge the wastage volume and consider different recycling projects for developing a sustainable ecosystem for the learners. Simply put, it is a way to minimize wastage and create a more suitable place for learning with improved NAAC grades.

1.2 Objectives of Green Audit

The main aim of this green audit is to assess the environmental quality and the sustainable management strategies being implemented in Rammohan College.

The objectives of Green Audit include:

- Documentation of baseline data of good practices, strategies and action plans towards improving environmental quality for future along with corrective actions and future plans.
- Maintain conformity with the norms and standards in the environmental management system and to design ideal protocols that develop a sustainable ecosystem on the campus.
- Assessment of water use, waste management, energy consumption, health and environmental quality in the campus.
- Identification of the gap areas and suggest recommendations to improve the Green Campus status of the College.
- Generation of awareness among the students, teaching and non teaching members of the institution.

1.3 About the Institution

Rammohan College owes its origin to City College, Calcutta which is one of the oldest first grades College in West Bengal. It was founded in 1881 by a band of patriotic and selfless Brahma leaders like Ananda Mohan Bose, Pandit Sivnath Sastri and Umesh Chandra Dutta. Rastraguru Surendranath Banerjee later joined the College as teacher. Up to 1961 City College had a women's Department in morning which has separately affiliated in 1961 to the Calcutta University and renamed as Rammohan College. The Geo coordinates of old building are 22.581023°N and 88.370149°E and Geo coordinates of new building are 22.582952°N and 88.370997°E.

The aim of College according to the founders, is to promote the cause of education in its highest and widest sense, to make education a comprehensive training of the mind, heart and body, and founded on theistic basis conducive to the good of man and glory of God.

The College is open to all female students irrespective of race, creed or caste. It has record of brilliant result. The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

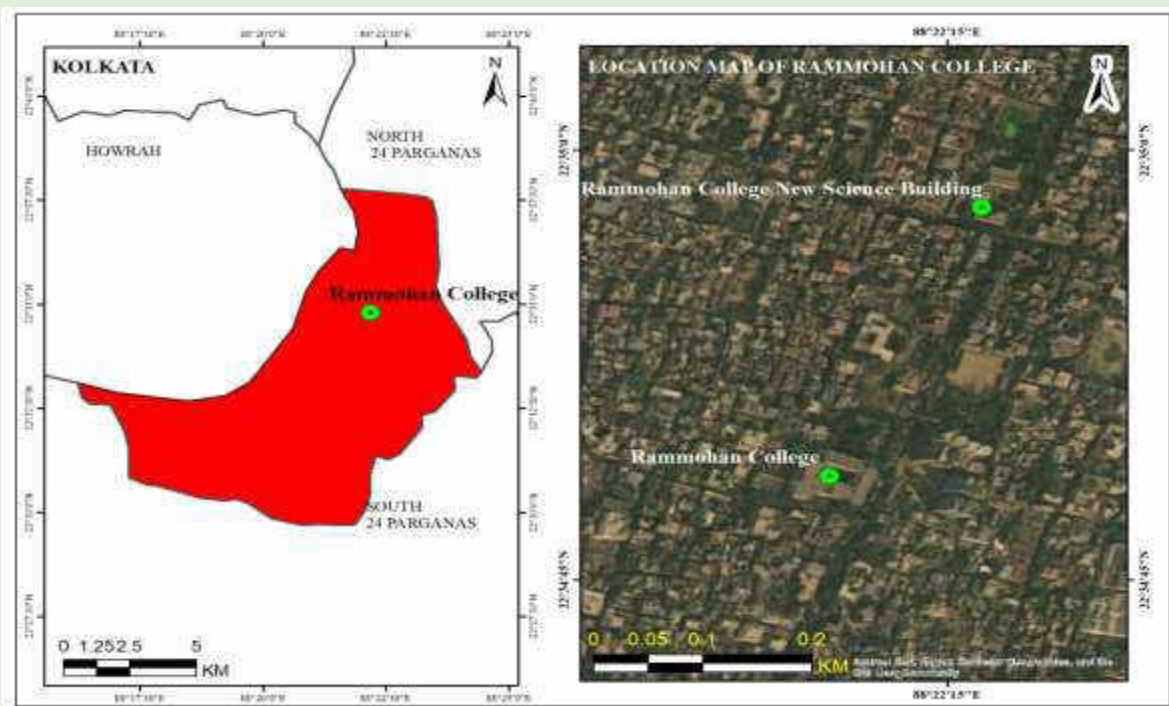


Figure 1: Location Map

1.3.1 Vision of the College

The Vision of the college is "Sradhaban Lavate Gyanam" or "Wisdom Belongth to Reverence". The goal of the college is to make a comprehensive training of mind, body and soul for girl students of all strata of society. Relentless effort is there to ensure an environment conducive for attaining self-respect for the students to trigger their inner strength to attain independence in thought to be aware of their rights so that in time they would be able to make an identity of themselves.

1.3.2 Mission of the College

The Mission of the institution is reflected in its policies. Principal and committed faculty members and non-teaching staff render their utmost efforts to ensure transparency in the functioning of the college and to maintain core values of the institution. If Vision is the Goal, Mission is the road-map. That pathway is not mere imparting of syllabus oriented lectures in class rooms. The College aspires to train students to be responsible citizens having a wider and positive vision of life.

1.3.3 Physical Structure of the College

Rammohan College in North Kolkata is famed for its immensity. With around 2500 students and nearly 140 teaching and non-teaching staff, it is one of the few colleges in West Bengal running in morning shift and catering to all three streams of Science, Arts and Commerce at undergraduate level along with post graduation in Bengali and Human Physiology.

The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

Rammohan College has recently acquired the heritage building at 85A, 85B, 85C and 85D Raja Rammohan Sarani which was once the family residence of Raja Rammohan Roy, and his descendants. A memorial courses especially for women will be housed here under autonomous body of management at the ancestral house. A New 3 storied Science Building (NSB) for Rammohan College is also under construction next to the heritage building. The ground floor

and the first and second floor of this building are complete and both PG and UG classes are being held there. The College has elevator for the teaching, non-teaching members and students. The College received possession of plot nos. 85B, C&D, Raja Rammohan Sarani, Kolkata- 700 009 on the 4th August, 2005 from the First Land Acquisition Collector, Calcutta. Execution and registration of the deed by West Bengal Government in favour of the college will prepare a plan for construction of College building on those premises too.

Rammohan College Central Library is well equipped with books on each subject and with periodicals, magazines of generalized and specialized interest. Teachers and students equally benefit from the library. At present the library has a huge collection of 40000 books (approx.), among which 24962 are purchased books and rests [14582 Approx] are presented. Along with the central library, seminar libraries are also maintained by the various departments. The college infrastructure, strength of student, teaching and non teaching members and departments have been presented in Table 1, 2 and 3.

Infrastructure elements such as wall textures, ceiling heights, window positioning, air flow, lighting, fan designs, and other factors can produce stressful environment. The phrase "environmental stress" is used to characterize the physical, chemical, and biological constraints on the diversification of organisms and ecosystems. Air temperature (dry bulb temperature, wet bulb temperature, and dew point temperature), relative humidity, direct solar radiation and air flow are the four major variables of human thermal comfort which is defined as "condition of mind which express satisfaction with thermal environment". College teachers and other stakeholders may experience professional burnout as a result of the environment's stress. A study by Acharjee et al, 2023, conducted in the classrooms at Rammohan College in two separate buildings showed that the indoor classroom environment of the New Building is consistently within the "Partial Discomfort" range (lowest and highest Thermo hygrometric index (THI) values 75.86 & 79.20). According to the reference range, the indoor classroom atmosphere of the old building runs from "Comfortable to Partial Discomfort" (74.15 & 77.56).

Table 1: College Infrastructure

Campus Area			
Old Campus	Old Building 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 0K – 2CH – 32 Sq.ft. (≈ 0.3333 Acre)	
New Campus	New Science Building & Museum 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	2B – 6K – 0CH – 43 Sq.ft. (≈ 0.7613 Acre)	
	85B, 85C & 85D Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 10K – 6CH – 15 Sq.ft. (≈ 0.5024 Acre)	
Sadhana Sarkar Memorial Hostel	35 Abhedananda Road, Kolkata-6, W.B.	10K – 5CH – 27 Sq.ft. (≈ 0.171 Acre)	
Total Campus Area		5B – 6K – 15CH – 27 Sq.ft. (≈ 1.768 Acre)	
Campus Built Up Area			
Campus	Building Type	Floor	Area in sq. mtr.
Old Campus 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	Old Building	G+4 floor	7364
NEW CAMPUS 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	New Science Building	Ground (502.93 sq.m)	2514.65
		First (502.93 sq.m)	
		Second (502.93 sq.m)	
		Third (502.93 sq.m)	
		Fourth (502.93 sq.m)	
	Raja Rammohan Roy Memorial Museum	Ground (537.78 sq.m)	1246.78
		First (537.78 sq.m)	
Second (171.37 sq.m)			
Sadhana Sarkar	Hostel Building	Ground Floor (432.58 sq.m.)	1481.92

Memorial Hostel 35, Abhedananda Road, Kolkata-6, W.B.	First Floor (349.78 sq.m.)	
	Second (349.78 sq.m)	
	Third (349.78 sq.m)	
Total Built Up Area		12607.35
No. of Buildings	2	
No. of Departments	17	
Teachers' Room	8	
Principal's Room	2	
Class Rooms	30	
Smart Class Rooms	4	
Dry Laboratories	14	
Wet Laboratories	17	
Library	2 (Central Library along with Departmental Seminar Libraries) + PG Library	
Auditorium	1	
Seminar Hall	3	
Canteen	4	
Common Room	1 (300sq ft) for students	
Office Room	3	
Hostel	1	
Gymnasium	1	
Staff Quarter	-----	

Table 2: Total Strength of Students, Teachers & Non-teaching Staff

No. of Teachers			No. of Students			No. of Non Teaching Staffs		
Male	Female	Others	Male	Female	Others	Male	Female	Others
39	60	0	07 (PG)	2295 (UG) + 66 (PG) = 2361		16 (permanent) + 19 (contractual) = 35	02 (permanent) + 04 (contractual) = 06	0

Table 3: Academic Departments

Undergraduate		
Science	Humanities	Commerce
Botany	Bengali	
Chemistry	English	
Mathematics	Economics	
Physics	Education	
Physiology	Geography	
Zoology	Hindi	
	History	
	Philosophy	
	Political Science	
	Sanskrit	
Post Graduation		
Human Physiology	Bengali	



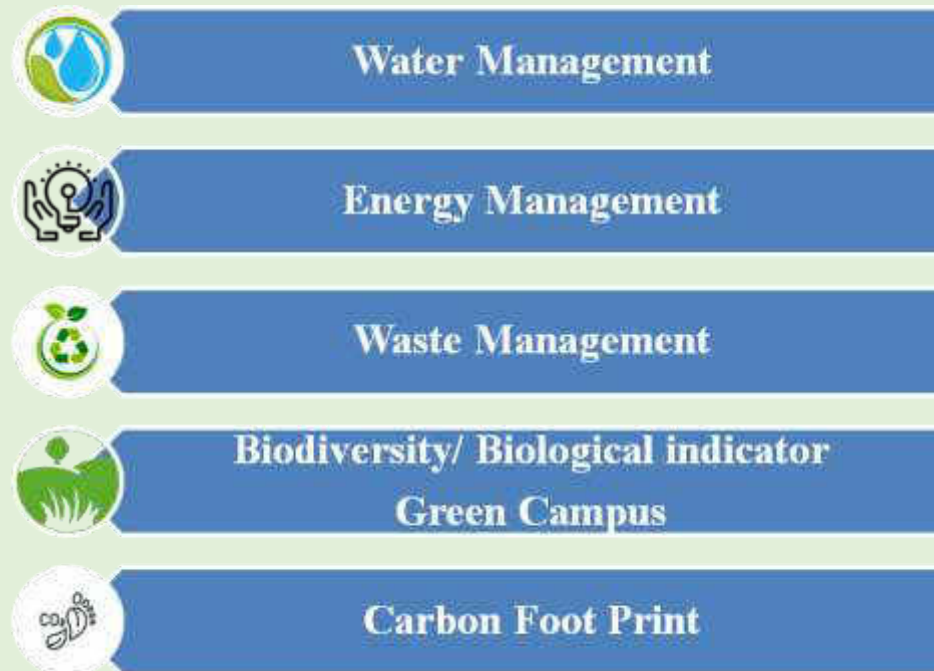
New campus of Rammohan college



Old campus of Rammohan college

2. Methodology

In order to perform green audit, the methodology that included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations was adapted.



Target Areas of Green Audit

2.1 Target Areas of Green Audit

Green audit aims to evaluate the efficient use of energy and water; minimize waste generation or pollution, biodiversity status and also efficiency in resource utilization. These indicators are assessed focusing on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, biodiversity and carbon footprint.

2.1.1 Water Management Auditing

Water is a natural resource which is required for sustenance of all living creatures. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Hence it is essential to examine the quality and usage of water in the Institutions or organizations. Water auditing is conducted for the evaluation of facilities of water intake, water usage and facilities for water treatment &/or reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

2.1.2 Energy Management Auditing

Energy conservation is an important aspect of campus sustainability which is also linked with carbon foot print of the campus. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices and incorporate alternative energy resources wherever possible. The energy signature method has been used in to extract the total heat loss coefficient of the building.

2.1.3 Waste Management Auditing

Human activities create waste; and unsustainable ways of waste handling, storage, collection, transport and disposal may pose risks to the environment and public health. Solid waste generated in the campus can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste.

1. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc.
2. Non-biodegradable wastes include plastic, tins and glass bottles etc.
3. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college.

Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid

waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

2.1.4 Biodiversity/ Green Campus Management Auditing

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus. Campus biodiversity is reflection of the ecological health of the campus. A sustainable strategy is required for adopting environment friendly viable way outs for a green campus. Ecological indicator species like butterflies can be used to assess the environmental quality of the campus.

2.1.5 Carbon Footprint Auditing

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence to assess the method of transportation that is practiced in the college is important.

2.2 Methods Adopted

The methodology adopted to conduct the Green Audit of the Institution had the following components.

2.2.1 Onsite Data Collection

Both Physical and virtual tour of the college campus was organized by the Green Audit Team. The data samples and relevant photographs were collected through geo-tagged photographs. The key focus of the audit was on assessing the status of the green cover of the Institution, species biodiversity, their waste management practices and energy conservation strategies etc.

2.2.2 Focus Group Discussion

The Focus Group discussions were held with the staff members and the management focusing various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

2.2.3 Water, Energy, Waste, Biodiversity and Carbon Foot Print Analysis Survey

With the help of teachers and staff, the audit team has assessed the energy consumption pattern, heat signature, waste generation, disposal and treatment facilities of the college. The monitoring was conducted with a detailed questionnaire survey method.

2.3 Audit Team

A Team comprised of the Faculty members, non teaching staff and student representative of Rammohan College named **BASUDHA** has been formed. The team along with the representatives from the RSP Green Development & Laboratories Pvt. Ltd. (ISO Certified and QCI - NABET Accredited Environmental Consultant Organization) conducted the Green Audit.

Members of BASUDHA (Green Team) of Rammohan College

- Dr. Saswati Sanyal, Principal, Rammohan College
- Dr. Krishnendu Sarkar (Teaching Staff)
- Dr. Samarendra Nath Banerjee (Teaching Staff)
- Dr. Santi Ranjan Dey (Teaching Staff)
- Dr. Kaustav Dutta Chowdhury (Teaching Staff)
- Dr. Ashesh Garai (Teaching Staff)
- Dr. Samiran Mondal (Teaching Staff)
- Dr. Md. Ahmadullah (Teaching Staff)
- Smt. Priti Prava Dutta (Teaching Staff)
- Mr. Tapas Narayan Ray (Teaching Staff)
- Smt. Jayanti Sen (Teaching Staff)
- Smt. Anima Roy (Teaching Staff)
- Mr. Amitava Mahapatra (Non Teaching Staff)
- Ms. Shreyasi Sarkar (Student)

Members from RSP Green Development & Laboratories Pvt. Ltd.

- Ms. Sreerupa Chatterjee (Jr. Environmentalist)
- Ms. Madhumanti Bag (Jr. Environmentalist)

2.4 Audit Stages

Green auditing in Rammohan College, Kolkata began with the assessment of the status of the green cover of the Institution followed by waste management practices and energy conservation strategies etc. The team monitored different facilities at the college, determined different types of appliances and utilities (lights, taps, toilets, air conditioners, etc.) as well as measuring the usage per item (Watts indicated on the appliance, etc.) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified several times to clarify the data received through survey and discussions.

3. Observations & Findings

The findings and observations after campus visit, group interactions, survey and review have been analyzed and represented below.

3.1. Water Management

3.1.1 Source of water and its uses

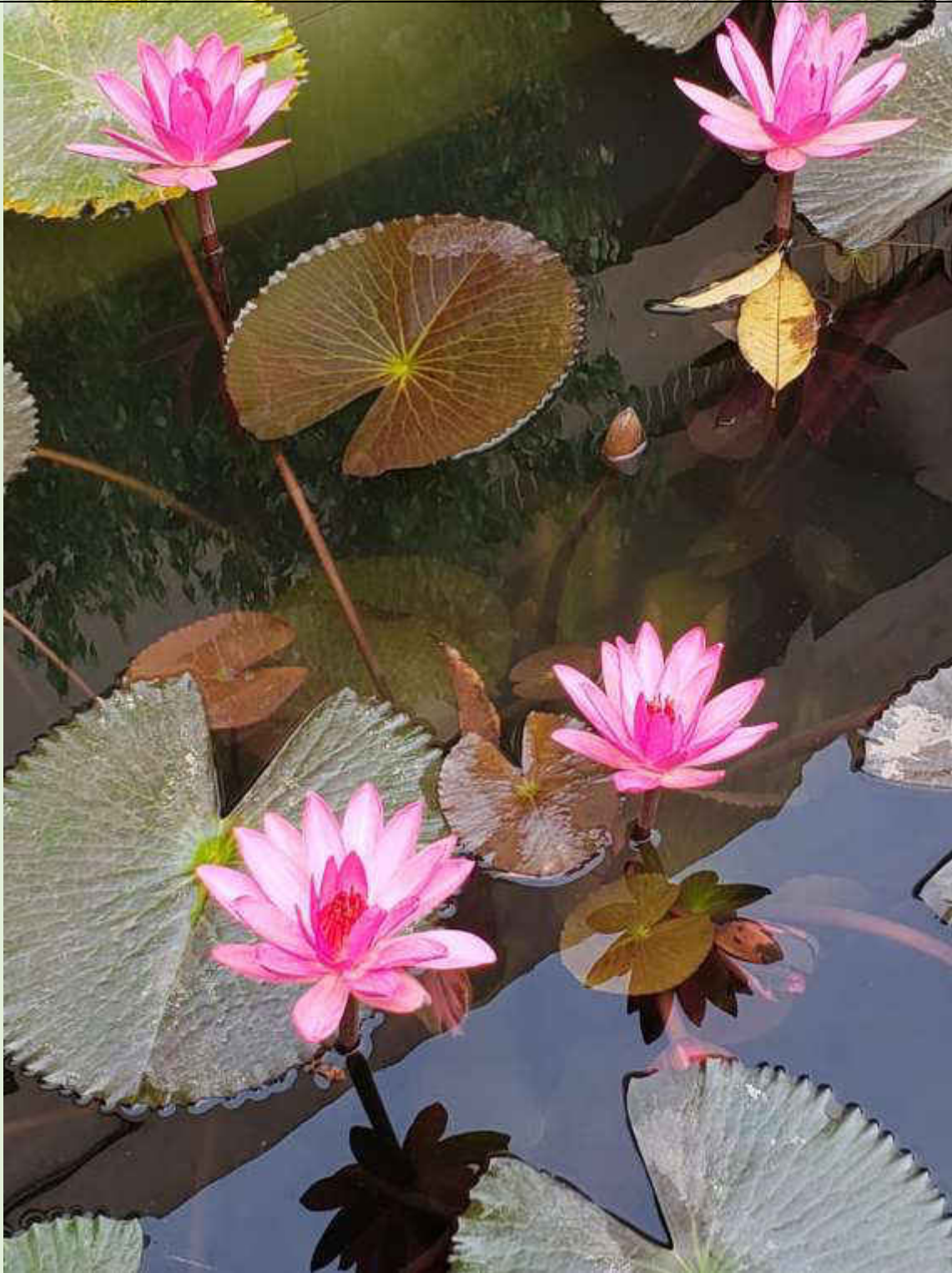
The major source of water used in the College is supplied by Kolkata Municipal Corporation at free of cost. The amount of water supplied is sufficient for the daily college activities and hence no additional tanker water is needed to meet its demand. No ground water is used in the campus by means of well or any other activities.

Total 4 numbers of water tanks are available in the New Science Building (NSB) with capacity of 4000 L each. One tank with 5000 L capacity and another with 3000 L capacity is also installed in the old building and hostel respectively. A total of 9000 L of water is pumped every day using 5 hp (NSB), 5 hp old building, 4.5 hp (hostel) motors. Water consumption meter is not installed and hence no record is maintained for daily water consumption. An average of 2,34,000 L of water is used by the College per month. Water is used for drinking purpose, toilets, canteen, laboratories, hostel and gardening. RO based water purifier units and coolers have been installed in different floors of the campus to treat the water for drinking purpose. Distilled water requirement in laboratories are by the distillation unit set in the college itself. College has displayed signboards for spreading awareness regarding water conservation. Dry mopping/cleaning methods are adopted to ensure water conservation. Uses of low flow/flow control water equipment or gadgets are manually controlled by supervisor. There is no formal water management plan available with the institute. Water consumption at each consumption level is monitored manually. There are two small rain water storage at the New campus in front side of the campus. The stored rain water is used for gardening and plantation. There is no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained to main drainage system of the city. Details of water consumption in hostel could not be procured during audit process.

3.1.2 Water Quality Analysis

As the water is primarily supplied by the Municipal Corporation, it can be assumed that the water is properly treated and meets the requisite norms of BIS standards. The routine parameters

of drinking water available in the campus (eg. pH, conductivity, salinity, DO etc.) are regularly checked in college laboratory by the students (data attached below).



Water lily plantation in Rain water storage



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RAMMOHAN COLLEGE

(Formerly City College W.Dept.)
102/1, Raja Rammohan Sarani, Kolkata – 700009
E-mail : rmc.tic85b@yahoo.in, rmc.principal@gmail.com
Accredited B⁺⁺ Grade by NAAC

Ref.

Date 26-02-2021

Water parameter analysis of drinking water-2020-2021

At New Science Building

(85A, Raja Rammohan Sarani, Kolkata-700009)

(Data are average of three independent observations)

Name of the parameter	Dates	
pH	08.12.2020	18.02.2021
Dissolved oxygen (mg/dl)	6.87	6.59
Free dissolved carbon di oxide (mg/l)	0.59	0.53
Salinity (ppt)	3.8	35
TDS (ppm)	0.0022	0.0027

S. Sanyal
Principal
Rammohan College
Kolkata-9

**Principal
Rammohan College**



Test report of water quality parameters in college laboratory

3.2 Energy Audit

Energy conservation plays a pivotal role in promoting campus sustainability and is intricately connected to the carbon footprint of the institution. Energy auditing is the process of managing and diminishing energy consumption, with a keen focus on minimizing carbon foot print. Consequently, it is imperative for any environmentally-conscious institution to scrutinize its energy utilization practices and embrace alternative energy sources wherever feasible.

3.2.1 Electrical Bill Analysis

Electricity is supplied by Calcutta Electricity Supply Corporation. All the electrical appliances in the old and new college building and hostel run on three different meters. Electricity consumption in last 12 months has been depicted below. An average consumption of 898.42kWh/month is estimated in New Science Building during normal operating scenario (Table 4) whereas 4680.58kWh/month is the average consumption of Ram Mohan college old building (Table 6) and 89kWh/ month in hostel as assessed in the season 2020-2021 (Table 8).

Table 4: New Science Building electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	37038446004
MeterNo.	2354905 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	23.5
50% of Con. Demand (KVA)	11.75
Sanctioned load (KW)	23.5

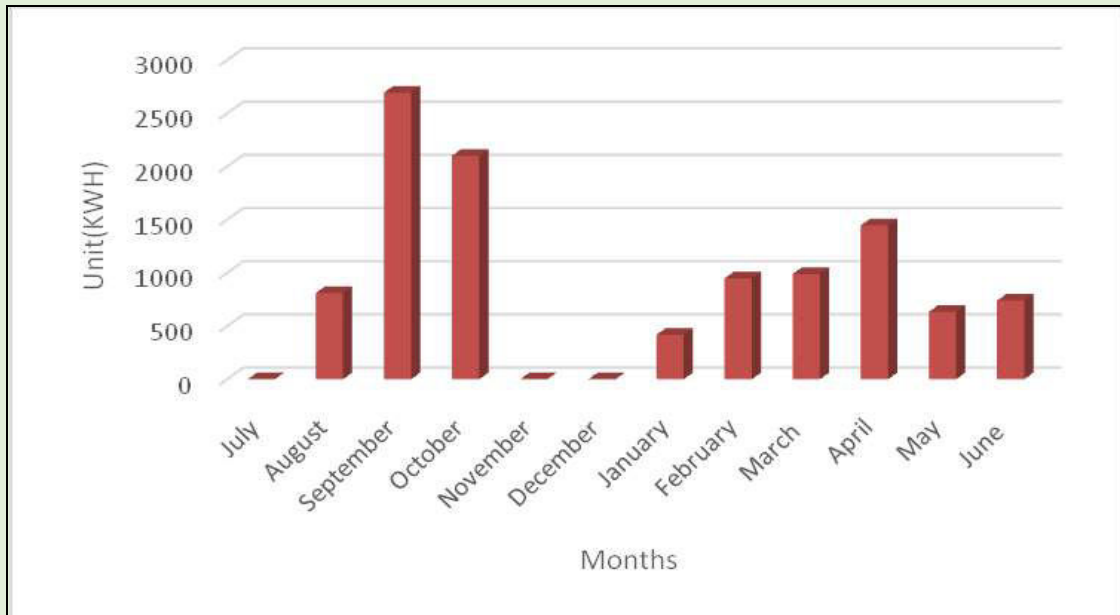


Fig-2: New Science Building electricity consumption during 2020-2021

Table 5: New Science Building electricity consumption during 2020-2021

Sl. No.	Months	Unit(KWH)
1	July	0
2	August	811
3	September	2694
4	October	2101
5	November	0
6	December	0
7	January	418
8	February	948
9	March	990
10	April	1446
11	May	634
12	June	739
Average unit		898.42

Table 6: Electricity consumption in Old Building

Consumer Name	Principal, City College
Consumer No.	85305001041
Meter No.	2869308 01
Electricity Supply Company	CESC
Tariff Category	P/3 Ph
Contract Demand (kVA)	70.6
50% of Con. Demand (KVA)	35.3
Sanctioned load (KW)	70.6

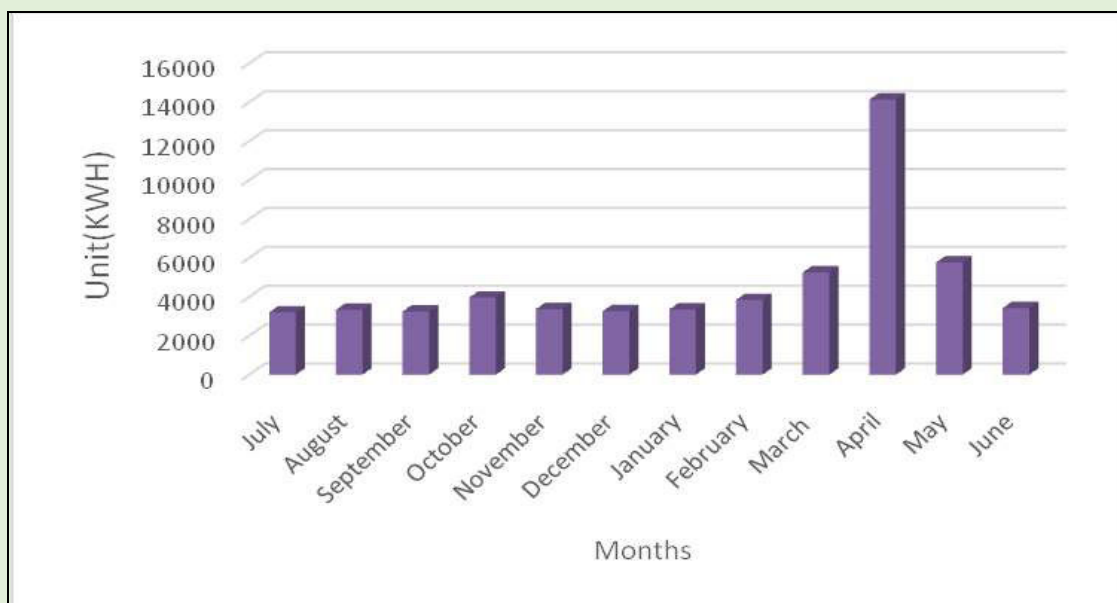


Fig-3: Old Building electricity consumption during 2020-2021

Table 7: Old Building electricity consumption during 2020-2021

Sl. No.	Months	Unit(KWH)
1	July	3205
2	August	3332
3	September	3248

4	October	3962
5	November	3371
6	December	3260
7	January	3354
8	February	3842
9	March	5256
10	April	14145
11	May	5768
12	June	3424
Average unit		4680.58

Table 8: Hostel electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	38038091001
Meter No.	2154477 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	14.2
50% of Con. Demand (KVA)	7.1
Sanctioned load (KW)	14.2

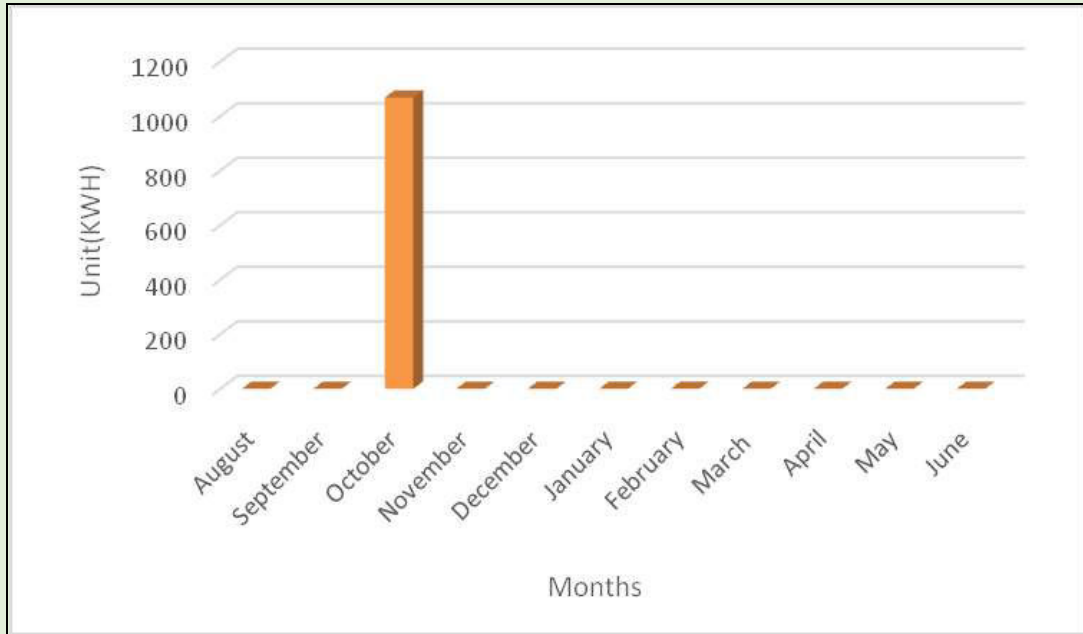


Fig-3: Electricity Consumption in Hostel during 2020-2021

Table 9: Electricity Consumption in Hostel during 2020-2021

Sl.No	Months	Unit(KWH)
1	July	0
2	August	0
3	September	0
4	October	1068
5	November	0
6	December	0
7	January	0
8	February	0
9	March	0
10	April	0
11	May	0
12	June	0
Average unit		89

3.2.2 Electrical Appliances

The commonly used electrical appliances in the College include tube lights, CFL lights, Ceiling fans, refrigerators, water purifier, hot air oven, air conditioners, computers, pump, UPS and other power back-ups etc. The average numbers of these appliances have been enlisted in the following table. The correct lux levels (70-300 lux) is maintained to avoid excessive light. Most of the ACs are 3 starred and the temperature is kept between 22-24 degree Celsius for efficient energy consumption. The switching and operation is manual in nature. The Information Technology Lab has 12 computers in total. The animal house used for Zoology and Physiology Department provides Photocell occupancy sensor for automatic light control. The College has one lift which is regularly maintained and checked. Numbers of different types of electrical devices and their average running time have been presented in Table 10 - 14.

Table 10: Electrical Appliances in the College

Sl. No.	Name of Appliances	No. of Units	KWH
1	Tube Light	335 (135 LED+200 Tube)	
2	Compact Fluorescent Lamps (CFL)	1+1+1+36	
3	Ceiling Fans	301	
4	Water Purifiers	7	
5	Refrigerators	5+5	
6	Hot air Ovens	4	
7	Air-conditioners	8 (1.5 tones split)	
8	Grinders	56	
9	Computers	Total 140 including 12 in IT Lab	
10	Pumping Machines	3	
11	UPS and Other Power Back-up	140	
12	Heater	3	

Table 11: Distribution of Electrical appliances (New Science Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation	
		Light	Fan	Hrs/Day	Days/Month
401	Lights, Fans	5 LED	3	12	26
402	Lights, Fans	6 LED	5	12	26
403(Library)	Lights, Fans	16 LED	6	12	26
404	Light, Fans	12 LED	8	12	26
405	Lights, Fan	8 LED	6	12	26
406(Auditorium)	Lights, Fan	14 LED	9	-	-
4 th Floor Corridor	Lights, Fan	4 Double	5	12	26
307	Lights, Fan	4 LED	2	12	26
306	Lights, Fan	16 LED	7	12	26
3 rd Floor Corridor	Lights, Fan	6 Single, 4 Double	6	12	26
305 (IQAC room)	Lights, Fan	2 LED	2	12	26
303	Lights, Fan	12 LED	6		
101(Principal Room)	Lights, Fan	2 Single Tube	2	12	26
102 (IT)	Lights, Fan	2 Single Tube, 1 Double Tube	3	12	26
103 (Office)	Lights, Fan	1 Single Tube	2	12	26
Canteen	Lights, Fan	5 LED Tubes	4	12	26

Table 12: Distribution of Electrical appliances (Old Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation	
		Light	Fan	Hrs/Day	Days/Month
Accounts	Light and Fan	20 LED	4+1 Stand	12	26
Office		8LED	10		
Principal Room					
Front Room					
5		8	5	12	26

6		8	5	12	26
7A		6	5	12	26
16		5	5	12	26
17		7	6	12	26
19A		6	5	12	26
20		7	7	12	26
22		4	5	12	26
23		4	2	12	26
26		3	3	12	26
27		3	5	12	26
28		2	1	12	26
28A		2	1	12	26
29		5	5	12	26
30		6	6	12	26
32B		5	6	12	26
32A		4	6	12	26
33		4	6	12	26
33A		3	4	12	26
32		4	4	12	26
N1		4	4	12	26
N2		4	4	12	26
N3		4	4	12	26
N4		4	4	12	26
N5		4	4	12	26
N6		5	5	12	26
N7		5	4	12	26

Commerce Room		2	3	12	26
Geography Room		6 (Normal Tube) + 7(LED)	20	12	26
Teachers' Room		4	6	12	26
Bursar Room		2	1	12	26
NCC Room		3	1	12	26
Rector Room		3	2	12	26
Staff Canteen		2+1 Heater	1+ 1 Fridge	12	26
Teachers Canteen		10+1 Heater	5+ 1 Fridge	12	26
Student Canteen		10+1 Heater	7+ 2 Fridge	12	26

Table 13: Distribution of Electrical appliances (Hostel)

	Room No. / Name	Type of Electrical Device	Quantity Nos	Operation		
			Light	Fan	Hrs/Day	Days/Month
1.	Hostel	Light and Fan	43 Tube light	49 + 2 table fan	24	30
			37 LED			
			56 CFL			

Table 14: Air Conditioning System in the Campus

Air Conditioners							
Room No. / Name	Type	Capacity	Quantity	Power	Operation		Star Rating
		TR	Nos.	Watt/Unit	Hrs/Day	Days/Month	
	Split/ Window AC						3 Star
Old Building	Split AC	1.5	3	1500	12	26	✓
New Science Building	Split AC	1	2	1000	12	26	✓
		1.5	3	1500			✓

3.2.3 Efficient Energy Management Practices

All electrical appliances are regular maintained for sustainable energy management. The college is gradually shifting towards LED lights by replacing existing lighting fixtures with LEDs and other energy efficient lighting fixtures to conserve energy. Correct lux levels (70-300 lux) are maintained to avoid excessive light. All ACs are 3 star rated and the temperature is kept between 22-24 degree Celsius. The switching and operation is manual in nature. Servicing of the electrical appliances is done at regular intervals to ensure energy efficiency. Institute is utilizing the natural light to its maximum. The classroom and laboratories are designed in such a way that it allows maximum sun light and reduces requirement of artificial lights. The classrooms and offices in the premises are well ventilated and the wide corridors are open to daylight. The operable glass windows are useful to facilitate natural light. The smart class room, auditorium and linguistic laboratory have insulated and tinted glass to filter heat gain. The fans are operational and adequately placed to affect the sufficient air changes. Fans installed are not star-rated. College has done indoor plantation to provide fresh air inside the premises. LED monitors and Email/ electronic communication mode is preferred to save energy. Awareness posters regarding energy conservation is being displayed in the premises. The canteen uses LPG gas for cooking purpose. However, the Institute has not adapted to any sensor-based energy conservation technique. Since there is limited facility in hostel and canteen, no solar water heating system is installed. Since the biodegradable waste generation is low, there is no Bio-gas plant.

3.3 Waste Management

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is one of the most challenging issues in academic institutions. Unscientific handling of solid waste can pose threat to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

3.3.1 Types of waste generated in the campus

The campus generates different types of biodegradable (paper, food waste etc.) and non-biodegradable (plastic, packaging product etc.) waste in the office, classrooms, canteen, and hostel. The wet and dry laboratories generate biodegradable (tissue, blood, animal and plant parts), chemical waste as well as e waste.

Table 15: Approximate quantity of waste generated per day (in kg)

Office	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic		
> 10 kg	Paper			
Classrooms	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Paper	Food wrapper	NA	NA
2 - 10 kg				
> 10 kg				
Labs	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Animal and plant parts	Broken glassware, plastic waste	Chemical	E-Waste
2 - 10 kg				
> 10 kg				
Canteen	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic, Other Packaging Product		
> 10 kg	Vegetable peel, Food waste			

3.3.2 Waste Disposal Practices Adopted by the College

The source of wastewater is Domestic Waste Water i.e., Sewage water. The Sewage water mainly comes from toilets and canteen. The wet laboratories also generate waste water. There is

no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained through internal drainage system and carried to main drainage system of the city. The everyday solid waste is collected by Kolkata Municipal Corporation for necessary disposal. The College has color coded waste bins are visibly available in the college. The segregation of waste needs to be done more efficiently. There is no biomedical or radioactive waste getting generated in the college. Old instruments, waste paper, cartons discarded tools, gadgets, computer parts, chemical bottles are discarded following administrative protocol through authorized vendors.

3.3.3 Reduce, Reuse, Recycle

The office and departments follow both sided printing to save energy and reduce waste. Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Broken furniture, appliance or computers are repaired and reused in terms of minimize waste. Examination related documents are stored for a fixed period and disposed as per the University guideline. Waste glass bottles are partially reused in the laboratories. Waste papers, cartons and scraps are occasionally sent to unorganized recyclers and scrap dealers. Dry leaves are used for composting in the garden area. There is a ban on use of single use plastic in the campus area. Very less plastic waste is generated by some departments, office, garden etc. Awareness regarding plastic pollution is spread in the campus.

Discarded electronic products produce electronic garbage, or e-waste. In the last several decades, there has been a notable surge in the production of electronic trash. The rising rate of e-waste generation worldwide is close to 2 metric tons (Mt) annually. The projected amount of e-waste created in 2030 is 74 million tons. E-waste can therefore pose a serious risk to the environment. E-waste releases toxic metals into the environment, including as lead, mercury, nickel, and cadmium, which eventually find their way into surface water, groundwater, soil, and sediment. The health of people, aquatic life, and plants are all negatively impacted when harmful metals are released into the environment. As a result, effective e-waste management is crucial and has become a global issue. According to a survey, home and office electrical appliances account for over half of all e-waste produced, making them the main source of the garbage. The combination of biological, physical, and chemical processes exhibits relatively high removal efficiency among remediation technologies, and it has several advantages over other remediation technologies. Recycling is among the most effective e-waste management techniques. The

College emphasizes on proper disposal of e-waste and use of recycled goods to decrease pollution load in the environment, as a part of social responsibility. E-waste generated in the campus is managed, keeping in mind the environmental hazards that may arise if not disposed properly. The cartridges of laser printers are refilled outside the college campus. Purchase of electronic products from companies which have service for disposal of product with buyback policy or exchange is encouraged by the college. The E- wastes and defective items from computer laboratories are being stored properly and recycled in effective manner. The dismantled electronic spare parts are immediately sold for reuse.

3.4 Green Campus

3.4.1 Campus Biodiversity

Approximately 2000 sq m free space is available in the institution in the form of garden and backyard. There is moderate vegetation in the campus along with some indoor plants. The campus premises have also presence of common birds like crow, sparrow, Myna, Sun bird, Nightingale and squirrel, domestic cat and dogs.

More than 50 medicinal plants have been cultivated in the Medicinal Plants Garden in the new campus at 85A, Raja Rammohan Sarani, Kol-9. The campus also has presence of ornamental trees & shrubs. Some of them are listed in Table 13. More than 70 weed species have been documented in the campus and enlisted in Table 15.

The campus is also a habitat of numbers of butterflies which is a crucial component of the environment due to their role in pollination. It can be used as a tool for management and conservation choices involving butterflies. Institutional campuses with undisturbed natural flora and seasonal flowering plantations provide suitable habitat for butterfly populations since they are frequently free of any development operations and pollutants. They are also regarded as reliable ecological indicators because to their sensitivity to climatic and environmental changes. The species richness, abundance or mortality rate of butterfly species can shed light on the surrounding environmental quality. In Rammohan College campus 21 species of butterflies (Table 17) belonging to 4 families, 8 subfamilies were found more or less throughout the year, but there is no significant correlation between butterfly species richness and Air Quality Index (PM_{2.5}, PM₁₀, O₃ ect.) (Mitra et al. 2023 a,b)

Table 16: Plant species in the campus

Medicinal Plants		
Amlaki/Amla	<i>Emblica officinalis</i>	Fruits are good source of vitamin C
Nayantara/Periwinkle	<i>Catharanthus roseus</i>	Roots contain vincristine & vinblastine which are used to treat cancer,
Lemon Grass	<i>Cymbopogon citratus</i>	Leaves contain terpenoids, ethereal oils, used as antispasmodic, hypotensive, antirheumatic etc.
Berela	<i>Sida rhombifolia</i>	Leaves contain antibacterial properties & antioxidants. It is used in diarrhoea, malarial fever, asthma etc.
Ornamental trees & shrubs		
Swarna Champa Tree.	<i>Michelia champaca</i>	Flowers intensely fragrant.
Parijat	<i>Magnolia grandiflora</i>	Small tree. Flowers white, fragrant.
Lobster lily	<i>Heliconia rostrata</i>	Rhizomatous plant, flowers throughout the year.
Rangan	<i>Ixora coccinea</i>	Shrub
Sheuli	<i>Nyctanthes arbor-tristis</i>	Shrub or small tree
Wild plants		
Kyllinga	<i>Kylling abbrevistylis</i>	
Tridaksha	<i>Tridax procumbens</i>	
Uchanti	<i>Ageratum conyzoides</i>	



Daldinia concentrica fungus in the college campus








Floral biodiversity of the College







Table 17: Weed flora of New Campus, Rammohan College






Sl. No.	Scientific Name	Family	Comment
1	<i>Solanum nigrum</i>	Solanaceae	Annual herb
2	<i>Eragrostis tenella</i>	Poaceae	Perennial herb with rhizome
3	<i>Eleusine indica</i>	Poaceae	Perennial herb with rhizome
4	<i>Cynodon dactylon</i>	Poaceae	Perennial herb with wiry rhizome
5	<i>Oldenlandi acorymbosa</i>	Rubiaceae	Annual herb
6	<i>Oldenlandi apaniculata</i>	Rubiaceae	Annual herb
7	<i>Dactyloctenium aegyptium</i>	Poaceae	Perennial rhizomatous herb
8	<i>Ageratum conyzoides</i>	Asteraceae	Annual herb
9	<i>Vernonia cineria</i>	Asteraceae	Perennial herb
10	<i>Blumea lacera</i>	Asteraceae	Annual herb
11	<i>Lindenbergia indica</i>	Scrophulariaceae	Annual herb
12	<i>Mazus rugosus</i>	Scrophulariaceae	Annual tiny herb
13	<i>Vandellia crustacea</i>	Scrophulariaceae	Annual herb
14	<i>Lindernia parviflora</i>	Scrophulariaceae	Annual herb
15	<i>Vandelliahirsuta</i>	Scrophulariaceae	Annual prostrate herb
16	<i>Phylla nodiflora</i>	Verbenaceae	Perennial prostrate herb
17	<i>Rungia parviflora</i>	Acanthaceae	Annual herb
18	<i>Desmodium triflorum</i>	Fabaceae	Perennial prostrate herb
19	<i>Alternanthera sessilis</i>	Amaranthaceae	Perennial herb
20	<i>Alternanthera paronychioides</i>	Amaranthaceae	Perennial herb
21	<i>Amaranthus viridis</i>	Amaranthaceae	Annual herb
22	<i>Amaranthus spinosus</i>	Amaranthaceae	Annual prickly herb
23	<i>Tillanthera philoxeroides</i>	Amaranthaceae	Annual herb
24	<i>Aerva lanata</i>	Amaranthaceae	Perennial herb with somewhat woody rootstock
25	<i>Nasturtium indicum</i>	Brassicaceae	Annual herb
26	<i>Mecardonia procumbens</i>	Scrophulariaceae	Annual prostrate herb
27	<i>Pilea microphylla</i>	Urticaceae	Tiny annual herb
28	<i>Laportia interrupta</i>	Urticaceae	Annual herb with stinging hairs
29	<i>Nicotiana plumbaginifolia</i>	Solanaceae	Annual herb
30	<i>Cyperus rotundus</i>	Cyperaceae	Perennial herb with corm
31	<i>Cyperus iria</i>	Cyperaceae	Annual herb
32	<i>Kyllinga brevistylis</i>	Cyperaceae	Perennial rhizomatous herb
33	<i>Andrographis paniculata</i>	Acanthaceae	Annual/perennial herb
34	<i>Andropogon aciculatus</i>	Poaceae	Perennial rhizomatous herb
35	<i>Dentella repens</i>	Rubiaceae	Annual prostrate herb
36	<i>Oplismenus burmannii</i>	Poaceae	Perennial herb



Sl. No.	Scientific Name	Family	Comment
37	<i>Digitaria ciliaris</i>	Poaceae	Annual herb
38	<i>Digitaria sanguinalis</i>	Poaceae	Annual herb
39	<i>Chloris barbata</i>	Poaceae	Annual herb
40	<i>Sida rhombifolia</i>	Malvaceae	Perennial undershrub
41	<i>Sida acuta</i>	Malvaceae	Perennial undershrub
42	<i>Sida cordifolia</i>	Malvaceae	Perennial undershrub
43	<i>Crotalaria pallida</i>	Fabaceae	Annual herb
44	<i>Euphorbia hirta</i>	Euphorbiaceae	Perennial herb
45	<i>Euphorbia parviflora</i>	Euphorbiaceae	Annual herb
46	<i>Euphorbia microphylla</i>	Euphorbiaceae	Annual prostrate herb
47	<i>Phyllanthus urinaria</i>	Euphorbiaceae	annual herb
48	<i>Phyllanthus fraternus</i>	Euphorbiaceae	Annual herb
49	<i>Tribulus terrestris</i>	Zygophyllaceae	Prostrate herb
50	<i>Centella asiatica</i>	Apiaceae	Perennial herb with runner
51	<i>Physalis minima</i>	Solanaceae	Annual herb
52	<i>Solanum sisymbriifolium</i>	Solanaceae	Perennial prickly herb
53	<i>Evolvulus nummularius</i>	Convolvulaceae	Perennial prostrate herb
54	<i>Evolvulus nummularius</i>	Convolvulaceae	Annual prostrate herb
55	<i>Heliotropium indicum</i>	Boraginaceae	Annual herb
56	<i>Leucas aspera</i>	Lamiaceae	Annual aromatic herb
57	<i>Leucas cephalotes</i>	Lamiaceae	Annual herb
58	<i>Leonurus japonicus</i>	Lamiaceae	Annual herb
59	<i>Scoparia dulcis</i>	Scrophulariaceae	Annual herb
60	<i>Cleome viscosa</i>	Capparidaceae	Annual herb
61	<i>Cleome rutidosperma</i>	Capparidaceae	Annual herb
62	<i>Cleome gynandra</i>	Capparidaceae	Annual herb
63	<i>Bulbostylis densa</i>	Cyperaceae	Annual herb
64	<i>Brachiaria distachya</i>	Poaceae	Perennial herb
65	<i>Dichanthium annulatum</i>	Poaceae	Annual herb
66	<i>Echinochloa stagnina</i>	Poaceae	Annual herb
67	<i>Leptochloa chinensis</i>	Poaceae	Annual herb
68	<i>Hybanthus enneaspermus</i>	Violaceae	Annual herb

Table 18: Butterfly species in the campus

Sl.	Scientific Name	Common Name	Photograph
1	<i>Graphium agamemnon</i> (Linnaeus)	Tailed Jay	
2	<i>Papilio polytes</i> (Linnaeus)	Common Mormon	
3	<i>Atrophaneura aristolochiae</i> (Fabricius)	Common Rose	
4	<i>Eurema hecabe</i> (Linnaeus)	Common Grass Yellow	
5	<i>Catopsilia pyranthe</i> (Linnaeus)	Mottled Emigrant	

Sl.	Scientific Name	Common Name	Photograph
6	<i>Cepora nerissa</i> (Fabricius)	Common Gull	
7	<i>Appias libythea</i> (Fabricius)	Striped Albatross	
8	<i>Leptosia nina</i> (Fabricius)	Psyche	
9	<i>Danaus chrysippus</i> (Linnaeus)	Plain Tiger	
10	<i>Euploea core</i> (Cramer)	Common Crow	
11	<i>Melanitis leda</i> (Linnaeus)	Common Evening Brown	

Sl.	Scientific Name	Common Name	Photograph
12	<i>Mycalesis perseus</i> (Fabricius)	Common Bushbrown	
13	<i>Ypthima huebneri</i> Kirby	Common Four-ring	
14	<i>Ariadne ariadne</i> (Linnaeus)	Angled Castor	
15	<i>Ariadne merione</i> (Cramer)	Common Castor	
16	<i>Junonia atlites</i> (Linnaeus)	Grey Pansy	
17	<i>Zizeeria karsandra</i> (Moore)	Dark Grass Blue	

Sl.	Scientific Name	Common Name	Photograph
18	<i>Euchrysops cnejus</i> (Fabricius)	Gram Blue	
19	<i>Borbo cinnara</i> (Wallace)	Rice Swift	



Avian diversity in the campus

3.4.2 Green Campus Initiatives

Swachh Bharat Abhiyan

A cleanliness programme was organized at the premises of New Science building of Rammohan College and the Rammohan Sarani every year. On that day, all the NSS volunteers participated to clean the adjacent path of the college and the nearby street. They picked up the junk from the campus, along the streets and also swept the whole surrounding. Then they spread bleaching powder. This programme was arranged to make the students understand the importance of cleanliness, how they can keep their surrounding clean and also to make them aware of their duty as a responsible member of the community.



Cleanliness Drive in the Campus



Tree plantation programme in the Campus

3.4.3 Sustainable Practices

- Restricted entry of automobiles
- Walking is encouraged for internal transport.
- Institute has initiated banning plastic in the campus.
- Email/ electronic communication mode is preferred to save papers.
- Both side printing is being adopted to save paper and trees.
- The premises have fire extinguishers installed at required locations which are regularly checked and maintained.
- The campus has established lift and ramp for easy movement of disabled persons.

3.4.4 Green Mindset

- Minimization of waste and proper disposal of e waste
- Composting of leaf litters and use of the compost in gardens
- Utilization of renewable energy resources like solar energy
- Maintenance of the local vegetation and fauna
- Landscaping in the campus to reduce the ambient temperature in the campus

3.5 Carbon Foot Print Analysis

Table 19: Carbon Foot Print Analysis

Sl. No.	Parameter	Numbers	Annual CO ₂ emission
1	Total no. of vehicles used by the stakeholders (per day)	5bikes+10car	(4680 +1903) = 6583 kg CO ₂ (considering 10 km distance travelled in 6 days a week)
2	No. of Cycles used.	5	-
3	No. of two wheelers used		
3a	Average distance travelled (per day)	Within 5km	
3b	Quantity of Fuel Used (per day)		
4	No. of four wheelers used		
4a	Average distance travelled (per day)		
4b	Quantity of Fuel Used (per day)		
5	No. of persons using public transportation	Most	
6	No. of persons using college conveyance		
7	No. of generators used per day		
7a	Amount of fuel used		
8	No. of LPG cylinders used in canteens	6 commercial cylinders	170.4 kg CO ₂
9	No. of LPG cylinders used in labs	14.2 kg X2 (Chemistry Lab), 5 kgX2 (Zoology lab)	43.5 + 15 = 58.5 kg CO ₂
10	Reams of paper used		
11	Paperless works to reduce paper usage		
12	Use of any other fossil fuels in the college		
13	Any efforts to reduce the use of fuels		

As per the estimates from the Central Electricity Authority, the weighted average emission factor for the Indian power grid stands at 0.79 kg CO₂/kWh. Hence, the total CO₂emission in a year from electricity consumption of the New Science Building is equivalent to 30575Kg CO₂ and 13372 kg CO₂ in the hostel.

Carbon Credit



Parties that have ratified the Kyoto Protocol and made commitments (Annex B Parties, of which India is one) have set goals for restricting or lowering emissions. The levels of permitted emissions, or assigned amounts, for the 2008–2012 commitment period are used to express these aims. Units of allocated amount (AAUs) are used to categorize the permitted emissions. According to Article 17 of the Kyoto Protocol, nations with spare emission units—that is, emissions that are allowed but not "used"—can sell their excess capacity to other countries that have exceeded their targets through the mechanism of emissions trading. As a result, emission removals or reductions became a new product. Since the main greenhouse gas is carbon dioxide, trade in carbon is the term used. These days, carbon is traded and tracked. As a result, emission removals or reductions became a new product. Since the main greenhouse gas is carbon dioxide, trade in carbon is the term used. These days, carbon is traded and tracked just like any other commodity. We refer to this as the "carbon market or carbon credit."

A country having an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) may carry out an emission-reduction project in developing nations under the Clean Development Mechanism (CDM), as outlined in Article 12 of the Protocol. These initiatives have the potential to generate marketable certified emission reduction (CER) credits, which are worth one tonne of CO₂ apiece and can be applied toward reaching the Kyoto targets. An example of a CDM project activity would be installing more energy-efficient lights or bulbs or doing a solar-powered electrification project in an area. While providing industrialized nations with considerable leeway in meeting their carbon reduction or limitation targets, the mechanism promotes sustainable development and emission reductions. Rammohan

College always abide by the rules or article 17 of Kyoto Protocol as “Law abiding College of India” and also try to generate awareness in the society.

A carbon credit can be calculated as a unit of exchange that individuals and firms alike use to offset their greenhouse gas (GHG) emissions. One carbon credit, or offset in the voluntary carbon market (VCM), is equal to one metric tonne of Green House Gas reduced or avoided from entering the atmosphere. In other words, a carbon credit is worth one tonne of CO₂ equivalent (tCO₂e) emissions which is equivalent to 556.2m³ of volume. “Carbon dioxide equivalent (tCO₂e)” is the standard unit for counting greenhouse gas emissions whether they're from CO₂ or another GHG.

In Rammohan College campus, 135 tubes (40 watts) have been replaced with LED (20 watts) resulting savings of 3369 kWh electricity annually. The calculation is made considering operation time of 6 hours daily for 8 months. The average carbon intensity for electricity generation in India is around 0.82 kilograms of CO₂ per kilowatt-hour (kgCO₂/kWh). Hence, the installation of LED lights have resulted in a reduction in CO₂ emission by 2763 Kg every year equivalent to 2.76 carbon credit.

The College has successfully installed 2 sets of 5 KWp Roof Top Solar PV Power Plant on the rooftop. In general, a 10 kW solar system produces about 40 units of electricity per day on average leading to 9600 kWh annually (considering 8 months operation time). This step has made a reduction in CO₂ emission by 7872 Kg every year equivalent to 7.87 carbon credit. All together on an average the carbon credit score becomes 10.63.

4. Suggestions and Recommendations

4.1 Water Management

- Expansion of the present Rain Water Harvesting is very essential to ensure efficient water conservation. The roof top area can be used to harness rain water especially in monsoon season which can be used for daily routine work or ground water recharging after careful monitoring.
- Monitoring of water consumption will be required for ensuring water efficiency. Water meter to be installed to monitor the consumption. The water meter readings to be recorded every day or every week at a fixed time.
- It is recommended to check water quality from water source for dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, and conductivity, total dissolved solids and E-coli/ coliform.
- The wash basin taps may be equipped with water saving fixtures.
- The flush tanks of the toilets may be fitted with dual volume system.
- Awareness campaigns and signboards need to be displayed on every floor.
- A detailed water use and management plan should be prepared and displayed.

4.2 Energy Management

- The energy audit recommends to avoid the use of more energy consuming electrical appliances and to replace with more environment friendly and energy efficient appliances (for example five stars rated Air conditioner, star rated fans) in the college.
- Ceiling fans have a very good scope for reducing power consumed using a technology called Brushless DC Motor or simply BLDC motor. BLDC technology, in general, has been in the market for a couple of decades. The traditional fan uses an induction motor and typically consumes 70- 90 watts. But BLDC fan, on the other hand, can reduce power consumption up to 65%.
- Prominent advantages of BLDC motor over induction motor are Lower Electricity Consumption, Longer backup on Inverters (even on Solar), improved reliability, Noise reduction, longer lifetime.

- The Hostel and other facilities may use solar heating units to reduce electricity consumption.
- College may adopt sensor-based (occupancy sensors) energy conservation approach for offices, classrooms and washrooms as well.
- College may also replace all existing tube lights with LEDs.
- To increase the carbon offset, it is recommended to extend the Solar PV for not just college building but also for hostel.
- More frequent awareness campaigns to be organized and signboards need to be displayed on every floor.

4.3 Waste Management

- College must arrange color coded, covered and separate waste bin for efficient segregation and disposal of waste at accessible location on each and every floor.
- Workshops need to be conducted regarding stages of waste management and 3R scheme.
- College may undertake feasibility study to install sewage water treatment in the campus to recycle waste water and use it in flush or for gardening purpose.
- Leaf litter from the campus can be effectively used for aerobic/ vermi composting, so that the composted material can also be used as good manure.
- Laboratory waste may be managed efficiently to reduce any scope of contamination.
- Try to completely ban the use of plastic in the campus, and to encourage the use of biodegradable materials as alternatives. Try to achieve the goal of plastic free campus.
- Annual agreement with recyclers/ vendors for all kind of scraps and e waste needs to be followed up.
- Important and confidential reports/ papers can be sent for pulping and recycling after completion of their preservation period.
- Metal waste, wooden waste, unused equipments and scraps should be sent to authorized scrap agents for further processing
- Awareness signboards/ posters need to be displayed on every floor.

4.4 Green Campus

- Maintenance of biodiversity is needed.
- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records.
- Nature Club may assign scientific and common name tags on the plants to spread awareness among students.
- College may consider planting tree on the land, away from city, managed by college to offset the carbon footprint.
- Emphasis may be given to develop kitchen garden and roof top garden giving emphasis on indoor and Bonsai plants.
- Students may be encouraged to engage in preparing People's Biodiversity Register (PBR) in and around the campus.
- Environment friendly lifestyles to be encouraged among students, teachers and non teaching staffs.

5. Green Audit Checklist

I. Water Efficiency & Wastewater Management			
Sl.No.	Measures	Status	Remarks
1	RO based water purifiers for drinking water	Yes	
2	Aerators to water taps	No	
3	Automatic toilet faucets	No	
4	Drip irrigation/ Sprinklers (for plant watering system)	No	
5	Dual flush toilet with cistern	No	
6	Dry mopping/ cleaning methods adopted	Yes	
7	Sewage treatment plant for sewage recycle	No	
8	Rain water harvesting		Going to install
9	Regular maintenance for leakage free plumbing system	Yes	
10	Use of low flow/ flow control water equipment or gadget	No	Manually controlled by the supervisor
11	Water balance diagram and water consumption monitoring at each Consumption level	No	Manually controlled by the supervisor
12	Routine monitoring of water quality		Internal assessment by the laboratories
13	Awareness signs displayed for promoting water conservation		
II. Energy Efficiency and On-site Energy Generation Mechanism			
Sl.No.	Measures	Status	Remarks
1	Maintaining correct lux levels (70-300 lux) to avoid excessive light	Yes	
2	Computerized monitoring of electrical system	No	
3	On-site energy generation (Diesel generators, LPG)	No	
4	Use of renewable energy (Solar, biogas)	No	
5	Photocell occupancy sensor for automatic light control		In animal house
7	Regular maintenance of electrical system	Yes	

8	Use of energy efficient equipment like VFDs, maximum star rated equipment.	Yes	
9	Use of energy saving bulbs (Compact florescent light/LED lights)	Yes	
10	Awareness signage on electricity conservation	Yes	

III. Solid Waste Management

Sl.No.	Measures	Status	Remarks
1	Waste segregation practices and supporting hardware for waste segregation (Dry recyclable, organic, plastic, hazardous and E-waste)	Yes	Through proper process
2	Setting up recycling/ composting/ bio gas generation facility	No	Going to install
3	Minimize use of paper through digitalization	Yes	
4	Printing on both sides of paper/ Reuse of printed paper/ envelops	Yes	
5	Mechanism for collection & disposal of E-waste as applicable regulation	Yes	Through authorized vendor
6	Single use plastic free campus	Yes	
7	Inventories of waste generation and records of waste disposal		Yet to develop
8	Recycle/ archiving of paper waste		
9	Segregation of dry and wet waste		As per KMC regulation
10	Purchase of electronic products from companies which have service for disposal of product with buy back policy?	Yes	As per Government regulation
11	Recreating into new sustainable products	No	

IV. Good Day light Design

Sl.No.	Design Feature	Status	Remarks
1	Wide corridors open to daylight	Yes	
2	Broad doors and windows allowing daylight	Yes	
3	Building architecture which allows sunlight within buildings	Yes	

4	Presence of Skylight/ Rooflight	Yes	
5	Enough natural illumination in classrooms/ seminar halls/ laboratories	Yes	
6	Ultraviolet (UV) filtering windows/ Use of exterior louvers or light coloured fabric or blinds for windows to control glare	Yes	Only in the auditorium
7	Operable/ openable windows.	Yes	
8	Use of glass as facilitator of natural light	Yes	
9	Use of insulated and tinted glass to filter heat gain		In smart class room, auditorium and linguistic laboratory.

V. Ventilation

Sr. No.	Design Feature	Status	Remarks
1	Good ceiling height which allows internal air circulation	Yes	
2	Self-movement ventilators in the roof	No	
3	Wide windows and doors for classrooms, laboratories, seminar halls	Yes	
4	Wide corridors	Yes	
5	Operable louvers		
6	Exhaust fans in kitchen/ toilets	Yes	

VI. Temperature and Acoustic Control

Sl.No.	Design Feature	Status	Remarks
1	Roof design & type (Double/ False ceiling with plaster of paris etc.)	Yes	Auditorium, Principal's chamber and meeting room
2	Sand stone cladding/ tiling outside the walls	No	
3	Specially designed walls for temperature control, Sound noise barriers for windows/ walls		Auditorium and Linguistics Lab
4	Building construction allows diffused sunlight but not the heat. Specially designed glass walls/ windows with better U value/ factor depending upon climate conditions	Yes	Main campus (old building)

5	Use of insulation material (e.g. autoclaved aerated blocks, hollow blocks, Thermocrete etc.)	No	
6	Use of water bodies/ fountain to maintain temperature within campus	Yes	
7	Climbing creepers on the walls	No	
8	Retro fitting the existing roofs with cool roof technology	No	
9	Use of landscaping gas sound barrier	No	
10	Water free urinals (No flush urinals/ Zero flush urinals/ water less urinals/ air-based flushing system)	No	
11	Water balance diagram and water consumption monitoring at each consumption level	No	Manually maintained by supervisor
12	Routine monitoring of water quality	Yes	Internally monitored by laboratories
13	Awareness signs displayed for promoting water conservation	Yes	

VII. Environmental Audit

Sl.No.	Type of audit	Status	Remarks
1	Energy audit (includes energy consumption, thermal comfort, visual comfort)	Yes	
2	Sound/ Noise and lux level monitoring (including indoor noise level, outdoor noise level)	Yes	
3	Water and waste audit (including water consumption, quality, solid waste generation, solid waste disposal process)	Yes	
4	Safety Audit	Yes	

VIII. Universal Access and Efficient Operation and Maintenance of Building

Sl.No.	Design feature	Status	Remarks
1	Easy access to the main entrance of the building and minimum two exits	Yes	
2	Energy efficient elevator	Yes	
3	Car pooling by staff and students/ use of Public transport/ Use of bicycles and battery-operated vehicles within campus		

4	Preferred car park spaces for differently abled	Yes	New building
5	Ramp/ stairs with handrails on at least one side	Yes	New building
6	Restrooms (toilets) in common areas/ Restroom for differently abled	Yes	New building
7	Braille assistance for differently abled	No	Going to procure
8	Availability of wheelchair	Yes	
9	Emergency response plan for natural and manmade emergencies	Yes	
10	Fire exits, assembly points, first aids, firefighting systems	Yes	
11	Regular maintenance of building	yes	

IX. Green Program

Sl.No.	Green program	Status	Remarks
1	Upcycling of waste. Recycling beyond books i.e. paper, aluminium, plastic, e-waste	Yes	By authorized vendor
2	Creation of “GreenTeam” in the institution/ library	Yes	BASUDHA
3	Awareness programs on environment, energy management & safety (external Sessions and academic courses)	Yes	NSS
4	Outreach, activities, green programs (Tree plantation, waste segregation, plastic waste collection, cleaning etc.) records/ photos of programs	Yes	NSS
5	Presence of system/ methodology available for implementation of green initiatives and green projects (long term system-based continuity and not an isolated/ stand alone activity)	Yes	NSS
6	Mindset for reduction, recycle of waste (Green mindsets)	Yes	
5	Digitization	Yes	
6	E-archiving	Yes	
7	E-resources: E-books, Online Journals, membership of consortium		Departmental library
8	Maintaining green campus/ Greening of campus	Yes	

1. Introduction

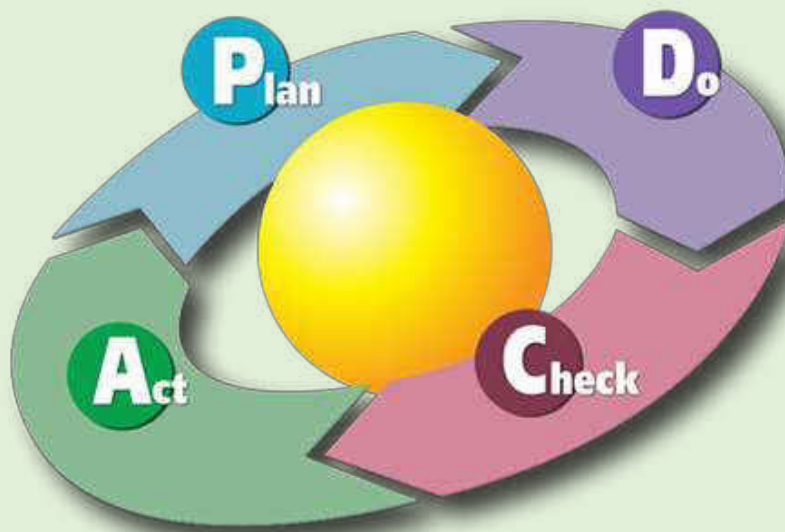
Green Audit is a stage wise review process of systematic identification, quantification, recording, reporting, analysis and documentation of components of environmental diversity of the institute or organization. It is a systematic assessment of day-to-day activity with reference to the utilization of resources as well as waste management. It aims to analyze environmental practices within and outside of the concerned place; leading to an eco-friendly atmosphere. It helps to determine how and where the energy, water or other resources are being used, based on which the institution can design effective management policies and implement changes towards sustainable use of resources. It can create health consciousness and promote environmental awareness, values and ethics. It also helps to enlighten staff and students of the institution for better understanding of Green impact on campus. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for environmental sustainability. Especially in colleges and universities where young minds dwell, ensuring an ecosystem with endurable qualities is the need of the hour. The green influence on the campus is vital to guarantee the best learning environment and healthy ecosystem for everyone associated with the site. The green audit report determines the greenery quotient on the campus and covers other influential environmental aspects. It includes the consumption and management of energy resources and environmental components.

National Assessment and Accreditation Council (NAAC) was introduced by the University Grants Commission or UGC in September 1994. NAAC was established for reviewing the performance and operational quality of Indian universities and colleges. The National Assessment and Accreditation Council have made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the mitigation of global warming through enforcement of carbon footprint reduction measures and improved management steps.

- **Self-assessment** – It allows the universities and colleges to review the ideal steps and implement them for the campus. The audit assists in self-assessment and the decision-making process.

- **Awareness** – It develops awareness among everyone associated with the campus with conscious and consistent efforts.
- **Improved scopes** – By complying with the norms, universities can ensure higher scopes of getting the best grade from NAAC. It is vital to follow the systematic way and implement the best steps for green audits on the campus under professional guidance.

The PDCA cycle audit is a systematic way of checking and improving the quality and performance and it involves four phases: planning the improvement, implementing the change, measuring the results, and acting on the feedback.



PDCA Cycle of Green Audit

1.1 Need for Green Audit

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that accredits the institution according to the scores assigned at the time of accreditation.

The Audit report helps to understand the current practices of sustainability with regard to the use of water and energy, generation of wastes, transportation, purchase of goods, etc; establishing a baseline of existing environmental conditions with focus on natural and physical environment and create awareness among students and staff concerning real issues of environment and its

sustainability. Based on the audit report, the college can make the best strategies to make the campus ideal for students, teachers, and anyone associated. It also helps the college acknowledge the wastage volume and consider different recycling projects for developing a sustainable ecosystem for the learners. Simply put, it is a way to minimize wastage and create a more suitable place for learning with improved NAAC grades.

1.2 Objectives of Green Audit

The main aim of this green audit is to assess the environmental quality and the sustainable management strategies being implemented in Rammohan College.

The objectives of Green Audit include:

- Documentation of baseline data of good practices, strategies and action plans towards improving environmental quality for future along with corrective actions and future plans.
- Maintain conformity with the norms and standards in the environmental management system and to design ideal protocols that develop a sustainable ecosystem on the campus.
- Assessment of water use, waste management, energy consumption, health and environmental quality in the campus.
- Identification of the gap areas and suggest recommendations to improve the Green Campus status of the College.
- Generation of awareness among the students, teaching and non teaching members of the institution.

1.3 About the Institution

Rammohan College owes its origin to City College, Calcutta which is one of the oldest first grades College in West Bengal. It was founded in 1881 by a band of patriotic and selfless Brahma leaders like Ananda Mohan Bose, Pandit Sivnath Sastri and Umesh Chandra Dutta. Rastraguru Surendranath Banerjee later joined the College as teacher. Up to 1961 City College had a women's Department in morning which has separately affiliated in 1961 to the Calcutta University and renamed as Rammohan College. The Geo coordinates of old building are 22.581023°N and 88.370149°E and Geo coordinates of new building are 22.582952°N and 88.370997°E.

The aim of College according to the founders, is to promote the cause of education in its highest and widest sense, to make education a comprehensive training of the mind, heart and body, and founded on theistic basis conducive to the good of man and glory of God.

The College is open to all female students irrespective of race, creed or caste. It has record of brilliant result. The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

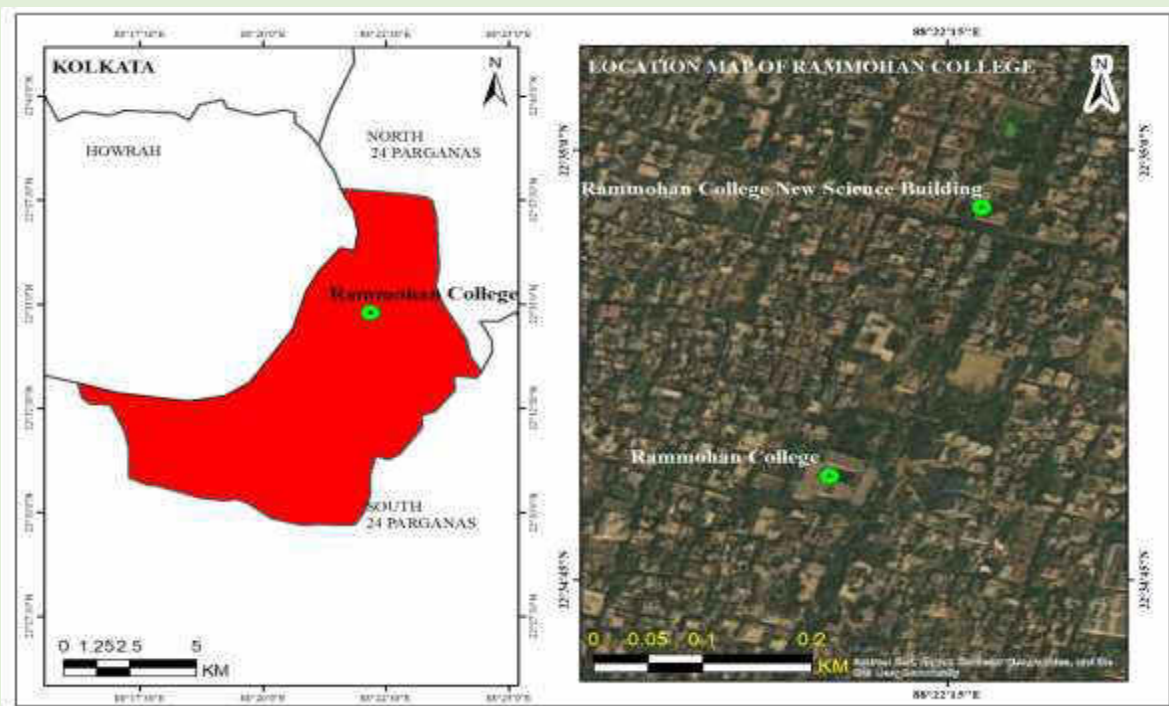


Figure 1: Location Map

1.3.1 Vision of the College

The Vision of the college is "Sradhaban Lavate Gyanam" or "Wisdom Belongth to Reverence". The goal of the college is to make a comprehensive training of mind, body and soul for girl students of all strata of society. Relentless effort is there to ensure an environment conducive for attaining self-respect for the students to trigger their inner strength to attain independence in thought to be aware of their rights so that in time they would be able to make an identity of themselves.

1.3.2 Mission of the College

The Mission of the institution is reflected in its policies. Principal and committed faculty members and non-teaching staff render their utmost efforts to ensure transparency in the functioning of the college and to maintain core values of the institution. If Vision is the Goal, Mission is the road-map. That pathway is not mere imparting of syllabus oriented lectures in class rooms. The College aspires to train students to be responsible citizens having a wider and positive vision of life.

1.3.3 Physical Structure of the College

Rammohan College in North Kolkata is famed for its immensity. With around 2500 students and nearly 140 teaching and non-teaching staff, it is one of the few colleges in West Bengal running in morning shift and catering to all three streams of Science, Arts and Commerce at undergraduate level along with post graduation in Bengali and Human Physiology.

The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

Rammohan College has recently acquired the heritage building at 85A, 85B, 85C and 85D Raja Rammohan Sarani which was once the family residence of Raja Rammohan Roy, and his descendants. A memorial courses especially for women will be housed here under autonomous body of management at the ancestral house. A New 3 storied Science Building (NSB) for Rammohan College is also under construction next to the heritage building. The ground floor

and the first and second floor of this building are complete and both PG and UG classes are being held there. The College has elevator for the teaching, non-teaching members and students. The College received possession of plot nos. 85B, C&D, Raja Rammohan Sarani, Kolkata- 700 009 on the 4th August, 2005 from the First Land Acquisition Collector, Calcutta. Execution and registration of the deed by West Bengal Government in favour of the college will prepare a plan for construction of College building on those premises too.

Rammohan College Central Library is well equipped with books on each subject and with periodicals, magazines of generalized and specialized interest. Teachers and students equally benefit from the library. At present the library has a huge collection of 40000 books (approx.), among which 24962 are purchased books and rests [14582 Approx] are presented. Along with the central library, seminar libraries are also maintained by the various departments. The college infrastructure, strength of student, teaching and non teaching members and departments have been presented in Table 1, 2 and 3.

Infrastructure elements such as wall textures, ceiling heights, window positioning, air flow, lighting, fan designs, and other factors can produce stressful environment. The phrase "environmental stress" is used to characterize the physical, chemical, and biological constraints on the diversification of organisms and ecosystems. Air temperature (dry bulb temperature, wet bulb temperature, and dew point temperature), relative humidity, direct solar radiation and air flow are the four major variables of human thermal comfort which is defined as "condition of mind which express satisfaction with thermal environment". College teachers and other stakeholders may experience professional burnout as a result of the environment's stress. A study by Acharjee et al, 2023, conducted in the classrooms at Rammohan College in two separate buildings showed that the indoor classroom environment of the New Building is consistently within the "Partial Discomfort" range (lowest and highest Thermo hygrometric index (THI) values 75.86 & 79.20). According to the reference range, the indoor classroom atmosphere of the old building runs from "Comfortable to Partial Discomfort" (74.15 & 77.56).

Table 1: College Infrastructure

Campus Area			
Old Campus	Old Building 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 0K – 2CH – 32 Sq.ft. (≈ 0.3333 Acre)	
New Campus	New Science Building & Museum 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	2B – 6K – 0CH – 43 Sq.ft. (≈ 0.7613 Acre)	
	85B, 85C & 85D Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 10K – 6CH – 15 Sq.ft. (≈ 0.5024 Acre)	
Sadhana Sarkar Memorial Hostel	35 Abhedananda Road, Kolkata-6, W.B.	10K – 5CH – 27 Sq.ft. (≈ 0.171 Acre)	
Total Campus Area		5B – 6K – 15CH – 27 Sq.ft. (≈ 1.768 Acre)	
Campus Built Up Area			
Campus	Building Type	Floor	Area in sq. mtr.
Old Campus 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	Old Building	G+4 floor	7364
NEW CAMPUS 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	New Science Building	Ground (502.93 sq.m)	2514.65
		First (502.93 sq.m)	
		Second (502.93 sq.m)	
		Third (502.93 sq.m)	
		Fourth (502.93 sq.m)	
	Raja Rammohan Roy Memorial Museum	Ground (537.78 sq.m)	1246.78
		First (537.78 sq.m)	
Second (171.37 sq.m)			
Sadhana Sarkar	Hostel Building	Ground Floor (432.58 sq.m.)	1481.92

Memorial Hostel 35, Abhedananda Road, Kolkata-6, W.B.	First Floor (349.78 sq.m.)	
	Second (349.78 sq.m)	
	Third (349.78 sq.m)	
Total Built Up Area		12607.35
No. of Buildings	2	
No. of Departments	17	
Teachers' Room	8	
Principal's Room	2	
Class Rooms	30	
Smart Class Rooms	4	
Dry Laboratories	14	
Wet Laboratories	17	
Library	2 (Central Library along with Departmental Seminar Libraries) + PG Library	
Auditorium	1	
Seminar Hall	3	
Canteen	4	
Common Room	1 (300sq ft) for students	
Office Room	3	
Hostel	1	
Gymnasium	1	
Staff Quarter	-----	

Table 2: Total Strength of Students, Teachers & Non-teaching Staff

No. of Teachers			No. of Students			No. of Non Teaching Staffs		
Male	Female	Others	Male	Female	Others	Male	Female	Others
39	60	0	07 (PG)	2295 (UG) + 66 (PG) = 2361		16 (permanent) + 19 (contractual) = 35	02 (permanent) + 04 (contractual) = 06	0

Table 3: Academic Departments

Undergraduate		
Science	Humanities	Commerce
Botany	Bengali	
Chemistry	English	
Mathematics	Economics	
Physics	Education	
Physiology	Geography	
Zoology	Hindi	
	History	
	Philosophy	
	Political Science	
	Sanskrit	
Post Graduation		
Human Physiology	Bengali	



Old campus of Rammohan college



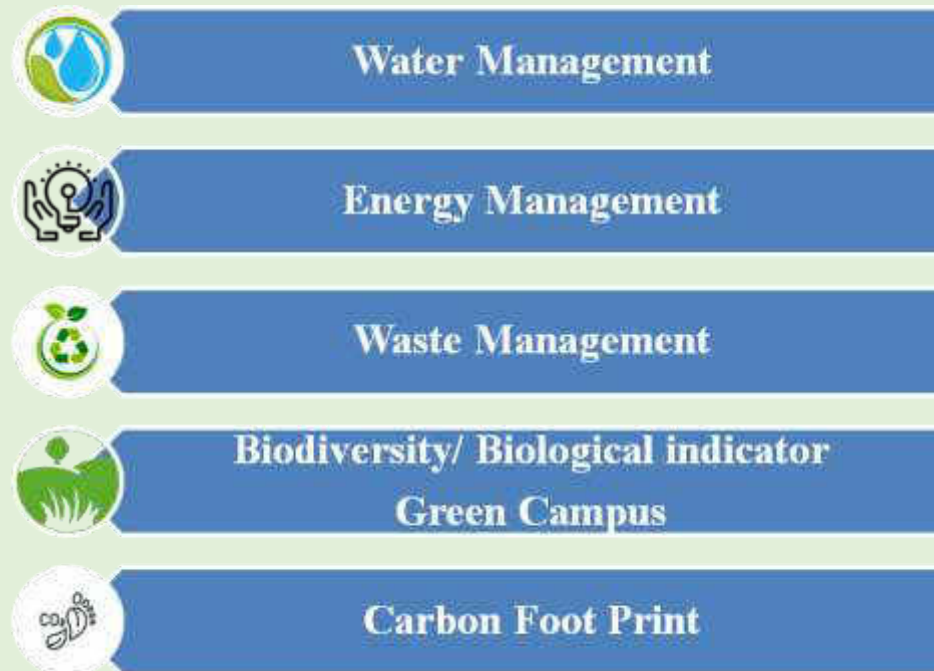
Snippets of the Campus



New campus of Rammohan college

2. Methodology

In order to perform green audit, the methodology that included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations was adapted.



Target Areas of Green Audit

2.1 Target Areas of Green Audit

Green audit aims to evaluate the efficient use of energy and water; minimize waste generation or pollution, biodiversity status and also efficiency in resource utilization. These indicators are assessed focusing on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, biodiversity and carbon footprint.

2.1.1 Water Management Auditing

Water is a natural resource which is required for sustenance of all living creatures. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Hence it is essential to examine the quality and usage of water in the Institutions or organizations. Water auditing is conducted for the evaluation of facilities of water intake, water usage and facilities for water treatment &/or reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

2.1.2 Energy Management Auditing

Energy conservation is an important aspect of campus sustainability which is also linked with carbon foot print of the campus. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices and incorporate alternative energy resources wherever possible. The energy signature method has been used in to extract the total heat loss coefficient of the building.

2.1.3 Waste Management Auditing

Human activities create waste; and unsustainable ways of waste handling, storage, collection, transport and disposal may pose risks to the environment and public health. Solid waste generated in the campus can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste.

1. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc.
2. Non-biodegradable wastes include plastic, tins and glass bottles etc.
3. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college.

Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid

waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

2.1.4 Biodiversity/ Green Campus Management Auditing

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus. Campus biodiversity is reflection of the ecological health of the campus. A sustainable strategy is required for adopting environment friendly viable way outs for a green campus. Ecological indicator species like butterflies can be used to assess the environmental quality of the campus.

2.1.5 Carbon Footprint Auditing

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence to assess the method of transportation that is practiced in the college is important.

2.2 Methods Adopted

The methodology adopted to conduct the Green Audit of the Institution had the following components.

2.2.1 Onsite Data Collection

Both Physical and virtual tour of the college campus was organized by the Green Audit Team. The data samples and relevant photographs were collected through geo-tagged photographs. The key focus of the audit was on assessing the status of the green cover of the Institution, species biodiversity, their waste management practices and energy conservation strategies etc.

2.2.2 Focus Group Discussion

The Focus Group discussions were held with the staff members and the management focusing various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

2.2.3 Water, Energy, Waste, Biodiversity and Carbon Foot Print Analysis Survey

With the help of teachers and staff, the audit team has assessed the energy consumption pattern, heat signature, waste generation, disposal and treatment facilities of the college. The monitoring was conducted with a detailed questionnaire survey method.

2.3 Audit Team

A Team comprised of the Faculty members, non teaching staff and student representative of Rammohan College named **BASUDHA** has been formed. The team along with the representatives from the RSP Green Development & Laboratories Pvt. Ltd. (ISO Certified and QCI - NABET Accredited Environmental Consultant Organization) conducted the Green Audit.

Members of BASUDHA (Green Team) of Rammohan College

- Dr. Saswati Sanyal, Principal, Rammohan College
- Dr. Krishnendu Sarkar (Teaching Staff)
- Dr. Samarendra Nath Banerjee (Teaching Staff)
- Dr. Santi Ranjan Dey (Teaching Staff)
- Dr. Kaustav Dutta Chowdhury (Teaching Staff)
- Dr. Ashesh Garai (Teaching Staff)
- Dr. Samiran Mondal (Teaching Staff)
- Dr. Md. Ahmadullah (Teaching Staff)
- Smt. Priti Prava Dutta (Teaching Staff)
- Mr. Tapas Narayan Ray (Teaching Staff)
- Smt. Jayanti Sen (Teaching Staff)
- Smt. Anima Roy (Teaching Staff)
- Mr. Amitava Mahapatra (Non Teaching Staff)
- Ms. Shreyasi Sarkar (Student)

Members from RSP Green Development & Laboratories Pvt. Ltd.

- Ms. Sreerupa Chatterjee (Jr. Environmentalist)
- Ms. Madhumanti Bag (Jr. Environmentalist)

2.4 Audit Stages

Green auditing in Rammohan College, Kolkata began with the assessment of the status of the green cover of the Institution followed by waste management practices and energy conservation strategies etc. The team monitored different facilities at the college, determined different types of appliances and utilities (lights, taps, toilets, air conditioners, etc.) as well as measuring the usage per item (Watts indicated on the appliance, etc.) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified several times to clarify the data received through survey and discussions.

3. Observations & Findings

The findings and observations after campus visit, group interactions, survey and review have been analyzed and represented below.

3.1. Water Management

3.1.1 Source of water and its uses

The major source of water used in the College is supplied by Kolkata Municipal Corporation at free of cost. The amount of water supplied is sufficient for the daily college activities and hence no additional tanker water is needed to meet its demand. No ground water is used in the campus by means of well or any other activities.

Total 4 numbers of water tanks are available in the New Science Building (NSB) with capacity of 4000 L each. One tank with 5000 L capacity and another with 3000 L capacity is also installed in the old building and hostel respectively. A total of 9000 L of water is pumped every day using 5 hp (NSB), 5 hp old building, 4.5 hp (hostel) motors. Water consumption meter is not installed and hence no record is maintained for daily water consumption. An average of 2,34,000 L of water is used by the College per month. Water is used for drinking purpose, toilets, canteen, laboratories, hostel and gardening. RO based water purifier units and coolers have been installed in different floors of the campus to treat the water for drinking purpose. Distilled water requirement in laboratories are by the distillation unit set in the college itself. College has displayed signboards for spreading awareness regarding water conservation. Dry mopping/cleaning methods are adopted to ensure water conservation. Uses of low flow/flow control water equipment or gadgets are manually controlled by supervisor. There is no formal water management plan available with the institute. Water consumption at each consumption level is monitored manually. There are two small rain water storage at the New campus in front side of the campus. The stored rain water is used for gardening and plantation. There is no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained to main drainage system of the city. Details of water consumption in hostel could not be procured during audit process.

3.1.2 Water Quality Analysis

As the water is primarily supplied by the Municipal Corporation, it can be assumed that the water is properly treated and meets the requisite norms of BIS standards. The routine parameters

of drinking water available in the campus (eg. pH, conductivity, salinity, DO etc.) are regularly checked in college laboratory by the students (data attached below).



Rain water storage



Water lily plantation in Rain water storage

Phone : 2350-5687
2354-3853
Fax : (033) 2350-5687



RAMMOHAN COLLEGE

(Formerly City College W. Dept.)
102/1, Raja Rammohan Sarani, Kolkata - 700 009
E-mail : rmc.tic85b@yahoo.in, rmc.principal@gmail.com
Accredited B++ Grade by NAAC

Ref.

Date 01-03-2022

Water parameter analysis of drinking water-2021-2022

At New Science Building

(85A, Raja Rammohan Sarani, Kolkata-700009)

(Data are average of three independent observations)

Name of the parameter	Dates			
	20.08.2021	17.09.2021	05.11.2021	21.02.2022
pH	6.79	6.78	6.9	6.6
Dissolved oxygen (mg/dl)	0.57	0.51	0.5	0.52
Free dissolved carbon di oxide (mg/l)	3.7	3.4	3.5	3.9
Salinity (ppt)	0.0023	0.0029	0.0027	0.0032
TDS (ppm)	138	135	151	147



S Sanyal
Principal
Rammohan College
01/03/2022

Test report of water quality parameters in college laboratory

3.2 Energy Audit

Energy conservation plays a pivotal role in promoting campus sustainability and is intricately connected to the carbon footprint of the institution. Energy auditing is the process of managing and diminishing energy consumption, with a keen focus on minimizing carbon foot print. Consequently, it is imperative for any environmentally-conscious institution to scrutinize its energy utilization practices and embrace alternative energy sources wherever feasible.

3.2.1 Electrical Bill Analysis

Electricity is supplied by Calcutta Electricity Supply Corporation. All the electrical appliances in the old and new college building and hostel run on three different meters. Electricity consumption in last 12 months has been depicted below. An average consumption of 1665.75kWh/month is estimated in New Science Building during normal operating scenario (Table 4) whereas 7840 kWh/month is the average consumption of Ram Mohan college old building (Table 6) and 617.36 kWh/ month in hostel as assessed in the season 2021-2022 (Table 8).

Table 4: New Science Building electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	37038446004
Meter No.	2354905 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	23.5
50% of Con. Demand (KVA)	11.75
Sanctioned load (KW)	23.5

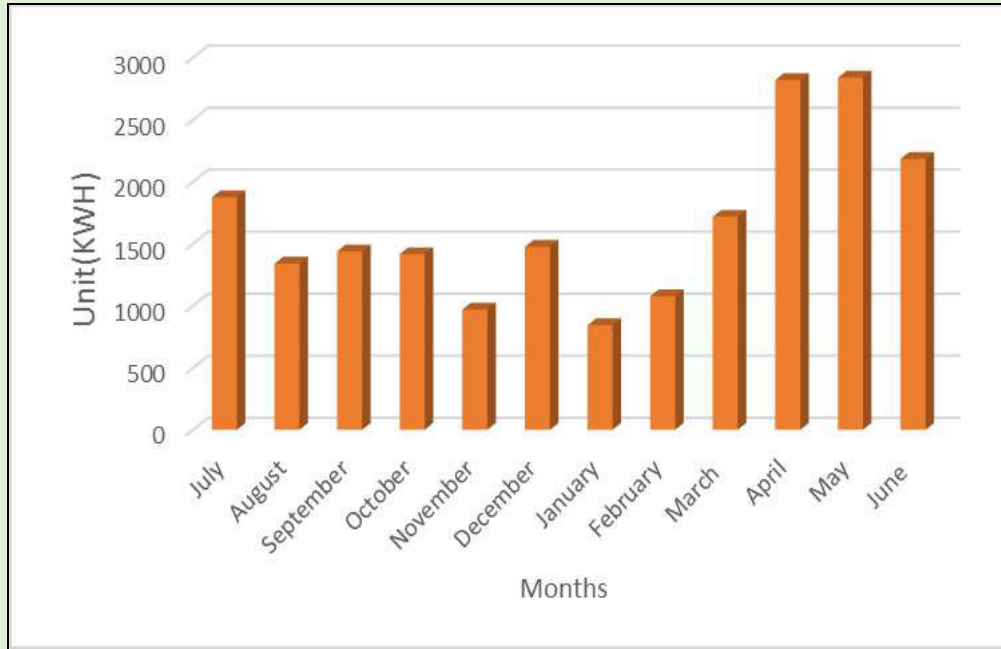


Fig-2: New Science Building electricity consumption during 2021-2022

Table 5: New Science Building electricity consumption during 2021-2022

Sl. No.	Months	Unit(KWH)
1	July	1875
2	August	1339
3	September	1438
4	October	1415
5	November	969
6	December	1475
7	January	843
8	February	1076
9	March	1717
10	April	2819
11	May	2839
12	June	2184
Average unit		1665.75

Table 6: Electricity consumption in Old Building

Consumer Name	Principal, City College
Consumer No.	85305001041
Meter No.	2869308 01
Electricity Supply Company	CESC
Tariff Category	P/3 Ph
Contract Demand (kVA)	70.6
50% of Con. Demand (KVA)	35.3
Sanctioned load (KW)	70.6

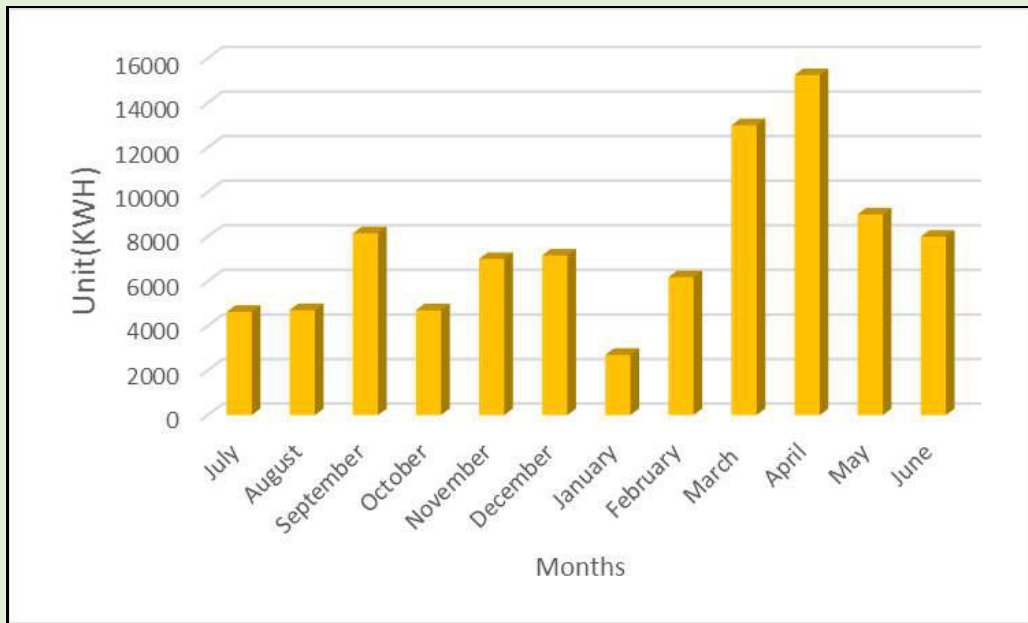


Fig-3: Old Building electricity consumption during 2021-2022

Table 7: Old Building electricity consumption during 2021-2022

Sl. No.	Months	Unit(KWH)
1	July	4630
2	August	4708
3	September	8150
4	October	4700
5	November	7002
6	December	7160

7	January	2700
8	February	6180
9	March	13000
10	April	15250
11	May	9000
12	June	8000
Average unit		7540

Table 8: Hostel electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	38038091001
Meter No.	2154477 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	14.2
50% of Con. Demand (KVA)	7.1
Sanctioned load (KW)	14.2

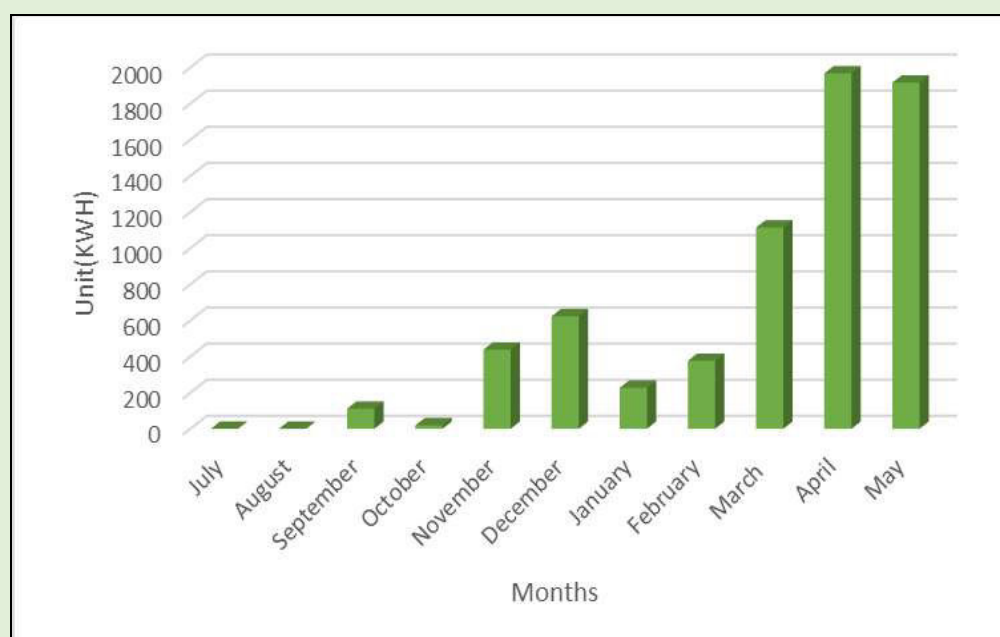


Fig-3: Electricity Consumption in Hostel during 2021-2022

Table 9: Electricity Consumption in Hostel during 2021-2022

Sl.No	Months	Unit(KWH)
1	July	0
2	August	0
3	September	111
4	October	19
5	November	438
6	December	623
7	January	227
8	February	376
9	March	1114
10	April	1967
11	May	1916
Average unit		617.36

3.2.2 Electrical Appliances

The commonly used electrical appliances in the College include tube lights, CFL lights, Ceiling fans, refrigerators, water purifier, hot air oven, air conditioners, computers, pump, UPS and other power back-ups etc. The average numbers of these appliances have been enlisted in the following table. The correct lux levels (70-300 lux) is maintained to avoid excessive light. Most of the ACs are 3 starred and the temperature is kept between 22-24 degree Celsius for efficient energy consumption. The switching and operation is manual in nature. The Information Technology Lab has 12 computers in total. The animal house used for Zoology and Physiology Department provides Photocell occupancy sensor for automatic light control. The College has one lift which is regularly maintained and checked. Numbers of different types of electrical devices and their average running time have been presented in Table 10 - 14.

Table 10: Electrical Appliances in the College

Sl. No.	Name of Appliances	No. of Units	KWH
1	Tube Light	335 (135 LED+200 Tube)	
2	Compact Fluorescent Lamps (CFL)	1+1+1+36	
3	Ceiling Fans	301	
4	Water Purifiers	7	
5	Refrigerators	5+5	
6	Hot air Ovens	4	
7	Air-conditioners	8 (1.5 tones split)	
8	Grinders	56	
9	Computers	Total 140 including 12 in IT Lab	
10	Pumping Machines	3	
11	UPS and Other Power Back-up	140	
12	Heater	3	

Table 11: Distribution of Electrical appliances (New Science Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation	
		Light	Fan	Hrs/Day	Days/Month
401	Lights, Fans	5 LED	3	12	26
402	Lights, Fans	6 LED	5	12	26
403(Library)	Lights, Fans	16 LED	6	12	26
404	Light, Fans	12 LED	8	12	26
405	Lights, Fan	8 LED	6	12	26
406(Auditorium)	Lights, Fan	14 LED	9	-	-
4 th Floor Corridor	Lights, Fan	4 Double	5	12	26
307	Lights, Fan	4 LED	2	12	26
306	Lights, Fan	16 LED	7	12	26
3 rd Floor Corridor	Lights, Fan	6 Single, 4	6	12	26

		Double			
305 (IQAC room)	Lights, Fan	2 LED	2	12	26
303	Lights, Fan	12 LED	6		
101(Principal Room)	Lights, Fan	2 Single Tube	2	12	26
102 (IT)	Lights, Fan	2 Single Tube, 1 Double Tube	3	12	26
103 (Office)	Lights, Fan	1 Single Tube	2	12	26
Canteen	Lights, Fan	5 LED Tubes	4	12	26

Table 12: Distribution of Electrical appliances (Old Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation	
		Light	Fan	Hrs/Day	Days/Month
Accounts	Light and Fan	20 LED	4+1 Stand	12	26
Office		8LED	10		
Principal Room					
Front Room					
5		8	5	12	26
6		8	5	12	26
7A		6	5	12	26
16		5	5	12	26
17		7	6	12	26
19A		6	5	12	26
20		7	7	12	26
22		4	5	12	26
23		4	2	12	26
26		3	3	12	26
27		3	5	12	26
28		2	1	12	26
28A		2	1	12	26
29		5	5	12	26

30		6	6	12	26
32B		5	6	12	26
32A		4	6	12	26
33		4	6	12	26
33A		3	4	12	26
32		4	4	12	26
N1		4	4	12	26
N2		4	4	12	26
N3		4	4	12	26
N4		4	4	12	26
N5		4	4	12	26
N6		5	5	12	26
N7		5	4	12	26
Commerce Room		2	3	12	26
Geography Room		6 (Normal Tube) + 7(LED)	20	12	26
Teachers' Room		4	6	12	26
Bursar Room		2	1	12	26
NCC Room		3	1	12	26
Rector Room		3	2	12	26
Staff Canteen		2+1 Heater	1+ 1 Fridge	12	26
Teachers Canteen		10+1 Heater	5+ 1 Fridge	12	26
Student Canteen		10+1 Heater	7+ 2 Fridge	12	26

Table 13: Distribution of Electrical appliances (Hostel)

	Room No. / Name	Type of Electrical Device	Quantity Nos	Operation		
			Light	Fan	Hrs/Day	Days/Month
1.	Hostel	Light and Fan	43 Tube light	49 + 2 table fan	24	30
			37 LED			
			56 CFL			

Table 14: Air Conditioning System in the Campus

Air Conditioners							
Room No. / Name	Type	Capacity	Quantity	Power	Operation		Star Rating
		TR	Nos.	Watt/Unit	Hrs/Day	Days/Month	
	Split/Window AC						3 Star
Old Building	Split AC	1.5	3	1500	12	26	✓
New Science Building	Split AC	1	2	1000	12	26	✓
		1.5	3	1500			✓



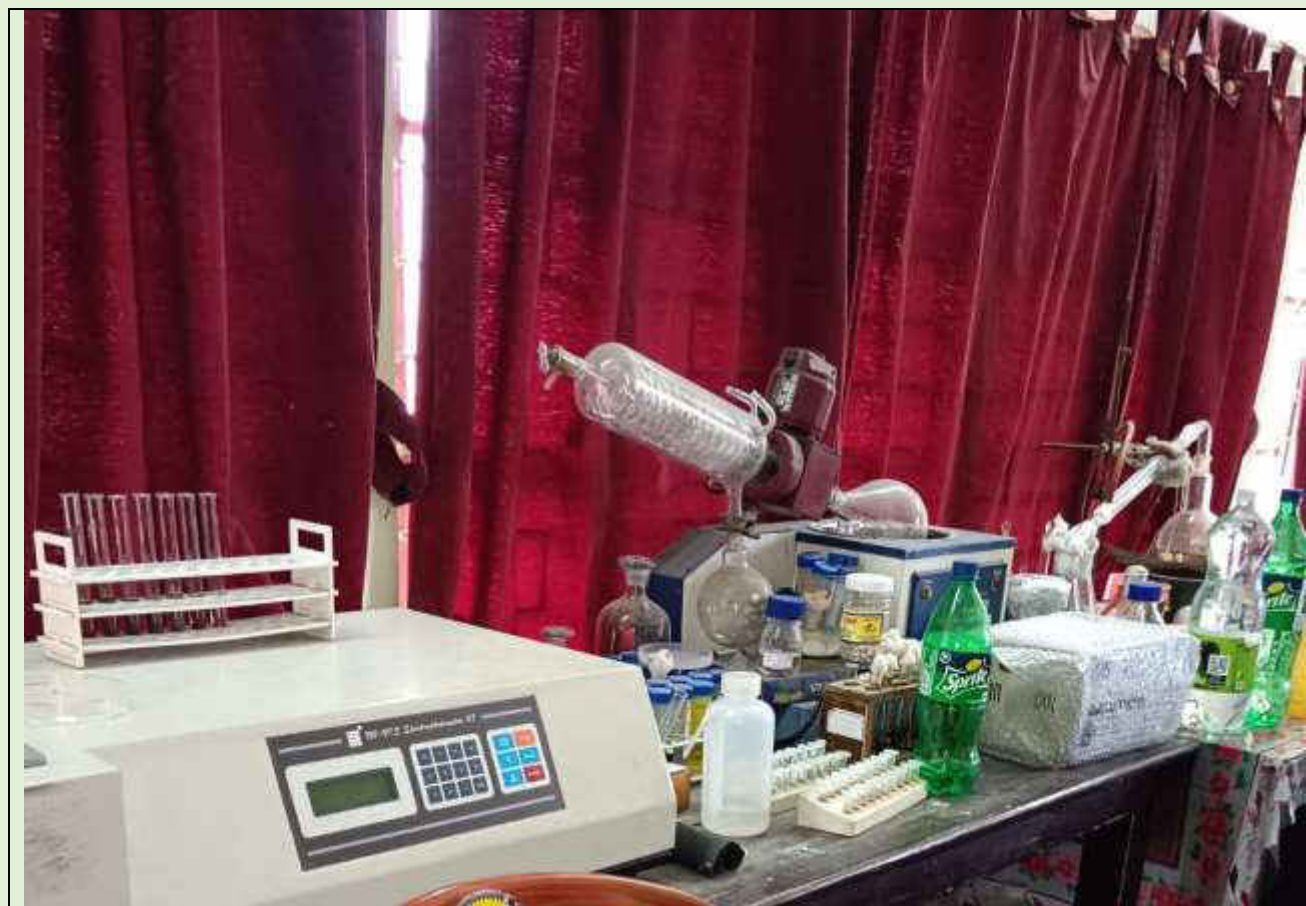
Air conditioner (2 star)



Classroom



Laboratory Instruments



Laboratory Instruments

3.2.3 Efficient Energy Management Practices

All electrical appliances are regular maintained for sustainable energy management. The college is gradually shifting towards LED lights by replacing existing lighting fixtures with LEDs and other energy efficient lighting fixtures to conserve energy. Correct lux levels (70-300 lux) are maintained to avoid excessive light. All ACs are 3 star rated and the temperature is kept between 22-24 degree Celsius. The switching and operation is manual in nature. Servicing of the electrical appliances is done at regular intervals to ensure energy efficiency. Institute is utilizing the natural light to its maximum. The classroom and laboratories are designed in such a way that it allows maximum sun light and reduces requirement of artificial lights. The classrooms and offices in the premises are well ventilated and the wide corridors are open to daylight. The operable glass windows are useful to facilitate natural light. The smart class room, auditorium and linguistic laboratory have insulated and tinted glass to filter heat gain. The fans are operational and adequately placed to affect the sufficient air changes. Fans installed are not star-

rated. College has done indoor plantation to provide fresh air inside the premises. LED monitors and Email/ electronic communication mode is preferred to save energy. Awareness posters regarding energy conservation is being displayed in the premises. The canteen uses LPG gas for cooking purpose. However, the Institute has not adapted to any sensor-based energy conservation technique. Since there is limited facility in hostel and canteen, no solar water heating system is installed. Since the biodegradable waste generation is low, there is no Bio-gas plant.

3.2.4 Alternative Energy Resource

Solar energy installation: nonrenewable to renewable energy transformation

Solar energy is one of the most environment friendly renewable and clean sources of energy. The College has successfully installed two sets of 5 KWp Roof Top Solar PV Power Plant by Imperial Solar Solutions under aegis of Directorate of Rashtriya Uchchhata Siksha Abhiyan (RUSA) to reduce dependency on fossil fuel based electricity. The system is made by HR Solar Solutions Pvt. Ltd. with 2 sets of 15 Nos. 335 Wp. It has 2 Nos. 5 KW Single Phase On Grid Solar Inverter made by Power One Microsystems Pvt. Ltd. with grid voltage 230 V, 50 Hz.

Solar water heater is also installed in students' hostel.

Through installation of solar PV power, the college has been benefitted both financially and environmentally. It has enhanced the institutional overall quality and upgrading knowledge of faculty members and students regarding renewable energy and environmental sustainability. Solar panels also help to reduce pollution and carbon footprint and makes the institute independently electrified campus. All stakeholders of the campus including the students, teachers and staffs are also made aware about its relevance and advantage.

Table 15: Solar Power

Solar PV	
Status	Installed
Capacity	2 No 5 KWp10(5+5) kVA (35kVA required)
Future Plans-Capacity &Target Date	25kV; 31.03.2025
Net-Metering Available/N.A.	NA
Sanction Load/Demand(kW)	NA
Rooftop Area (Sq.ft.)	5413.5
Avg. Electricity Consumption(kWh)	2.5kVA
Solar Water Heater	
Status	Installed: 1000LPD Future plan: 5000LPD; 31.03.2025



Installed Roof Top Solar Panel

Imperial Solar Solutions

An ISO 9001:2015 Certified Company - Our every stride is for a *Green Initiative*

Govt. Licensed Electrical Contractor and Solar System Integrator
Registered office: Plot No. Y3, Zonal Centre, J. P. Avenue, Durgapur 713211, W. B.
Tel.: 9800393296, 9434072971, 8918594997
Website: www.imperialsolarsolutions.in
Email: isolarsolutions@gmail.com, imperialsolar2012@gmail.com

Ref : ISS/RMC/CS/21-22

Date: 12.01.2022

To

The Principal

Rammohan College (Formerly City College W.Dept)

102/1, Raja Rammohan Sarani,

Amherst Street, Kolkata, West Bengal,

Pin - 700009

Sub.: Completion Certificate against Memo No : 1733/RMC/2021, Date : 26.03.2021

Respected Sir,

We are pleased to inform you that, we have successfully completed the job of "Supply and Installation of Two Nos 5 KWp Roof Top Solar PV Power Plant at Rammohan College, Kolkata – 700009 under aegis of Directorate of Rashtriya Uchchatar Siksha Abhiyan (RUSA), Government of West Bengal" at your premises.

The details of the main component of the solar power plant are as follows :

1. The capacity of Solar Power Plant installed 5 KW (DC) X 2 sets;
2. Make and Quantity of Modules : HR Solar Solutions Pvt. Ltd. And Qty : 15 Nos 335 Wp X 2 Sets;
3. Details of String Inverter Installed :
 - a. 5 KW Single Phase On Grid Solar Inverter – 2 nos.;
 - b. Make : Power One Microsystems Pvt. Ltd;
 - c. Rated grid voltage : 230 V, 50 HZ

Thanking You and assuring you of our services at all times,

Your sincerely,

For Imperial Solar Solutions



I. Banerjee

(Project Manager)



Page 1 of 1

Solar Panel Installation Completion Certificate

3.3 Waste Management

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is one of the most challenging issues in academic institutions. Unscientific handling of solid waste can pose threat to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

3.3.1 Types of waste generated in the campus

The campus generates different types of biodegradable (paper, food waste etc.) and non-biodegradable (plastic, packaging product etc.) waste in the office, classrooms, canteen, and hostel. The wet and dry laboratories generate biodegradable (tissue, blood, animal and plant parts), chemical waste as well as e waste.

Table 16: Approximate quantity of waste generated per day (in kg)

Office	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic		
> 10 kg	Paper			
Classrooms	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Paper	Food wrapper	NA	NA
2 - 10 kg				
> 10 kg				
Labs	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Animal and plant parts	Broken glassware, plastic waste	Chemical	E-Waste
2 - 10 kg				
> 10 kg				

Canteen	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic, Other Packaging Product		
> 10 kg	Vegetable peel, Food waste			

3.3.2 Waste Disposal Practices Adopted by the College

The source of wastewater is Domestic Waste Water i.e., Sewage water. The Sewage water mainly comes from toilets and canteen. The wet laboratories also generate waste water. There is no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained through internal drainage system and carried to main drainage system of the city. The everyday solid waste is collected by Kolkata Municipal Corporation for necessary disposal. The College has color coded waste bins are visibly available in the college. The segregation of waste needs to be done more efficiently. There is no biomedical or radioactive waste getting generated in the college. Old instruments, waste paper, cartons discarded tools, gadgets, computer parts, chemical bottles are discarded following administrative protocol through authorized vendors.



Waste Bin

3.3.3 Reduce, Reuse, Recycle

The office and departments follow both sided printing to save energy and reduce waste. Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Broken furniture, appliance or computers are repaired and reused in terms of minimize waste. Examination related documents are stored for a fixed period and disposed as per the University guideline. Waste glass bottles are partially reused in the laboratories. Waste papers, cartons and scraps are occasionally sent to unorganized recyclers and scrap dealers. Dry leaves are used for composting in the garden area. There is a ban on use of single use plastic in the campus area. Very less plastic waste is generated by some departments, office, garden etc. Awareness regarding plastic pollution is spread in the campus.

Discarded electronic products produce electronic garbage, or e-waste. In the last several decades, there has been a notable surge in the production of electronic trash. The rising rate of e-waste generation worldwide is close to 2 metric tons (Mt) annually. The projected amount of e-waste created in 2030 is 74 million tons. E-waste can therefore pose a serious risk to the environment. E-waste releases toxic metals into the environment, including as lead, mercury, nickel, and cadmium, which eventually find their way into surface water, groundwater, soil, and sediment. The health of people, aquatic life, and plants are all negatively impacted when harmful metals are released into the environment. As a result, effective e-waste management is crucial and has become a global issue. According to a survey, home and office electrical appliances account for over half of all e-waste produced, making them the main source of the garbage. The combination of biological, physical, and chemical processes exhibits relatively high removal efficiency among remediation technologies, and it has several advantages over other remediation technologies. Recycling is among the most effective e-waste management techniques. The College emphasizes on proper disposal of e-waste and use of recycled goods to decrease pollution load in the environment, as a part of social responsibility. E-waste generated in the campus is managed, keeping in mind the environmental hazards that may arise if not disposed properly. The cartridges of laser printers are refilled outside the college campus. Purchase of electronic products from companies which have service for disposal of product with buyback policy or exchange is encouraged by the college. The E- wastes and defective items from computer laboratories are being stored properly and recycled in effective manner. The dismantled electronic spare parts are immediately sold for reuse.

3.4 Green Campus

3.4.1 Campus Biodiversity

Approximately 2000 sq m free space is available in the institution in the form of garden and backyard. There is moderate vegetation in the campus along with some indoor plants. The campus premises have also presence of common birds like crow, sparrow, Myna, Sun bird, Nightingale and squirrel, domestic cat and dogs.

More than 50 medicinal plants have been cultivated in the Medicinal Plants Garden in the new campus at 85A, Raja Rammohan Sarani, Kol-9. The campus also has presence of ornamental trees & shrubs. Some of them are listed in Table 17. More than 70 weed species have been documented in the campus and enlisted in Table 18.

The campus is also a habitat of numbers of butterflies which is a crucial component of the environment due to their role in pollination. It can be used as a tool for management and conservation choices involving butterflies. Institutional campuses with undisturbed natural flora and seasonal flowering plantations provide suitable habitat for butterfly populations since they are frequently free of any development operations and pollutants. They are also regarded as reliable ecological indicators because to their sensitivity to climatic and environmental changes. The species richness, abundance or mortality rate of butterfly species can shed light on the surrounding environmental quality. In Rammohan College campus 21 species of butterflies (Table 17) belonging to 4 families, 8 subfamilies were found more or less throughout the year, but there is no significant correlation between butterfly species richness and Air Quality Index (PM_{2.5}, PM₁₀, O₃ ect.) (Mitra et al. 2023 a,b)

Table 17: Plant species in the campus

Medicinal Plants		
Amlaki/Amla	<i>Emblica officinalis</i>	Fruits are good source of vitamin C
Nayantara/Periwinkle	<i>Catharanthus roseus</i>	Roots contain vincristine & vinblastine which are used to treat cancer,
Lemon Grass	<i>Cymbopogon citratus</i>	Leaves contain terpenoids, ethereal oils, used as antispasmodic, hypotensive, antirheumatic etc.
Berela	<i>Sida rhombifolia</i>	Leaves contain antibacterial properties & antioxidants. It is used in diarrhoea, malarial fever, asthma etc.
Ornamental trees & shrubs		
Swarna Champa Tree.	<i>Michelia champaca</i>	Flowers intensely fragrant.
Parijat	<i>Magnolia grandiflora</i>	Small tree. Flowers white, fragrant.
Lobster lily	<i>Heliconia rostrata</i>	Rhizomatous plant, flowers throughout the year.
Rangan	<i>Ixora coccinea</i>	Shrub
Sheuli	<i>Nyctanthes arbor-tristis</i>	Shrub or small tree
Wild plants		
Barmuda grass	<i>Cynodon dactylon</i>	
Kyllinga	<i>Kylling abbrevistylis</i>	



Floral biodiversity of the College

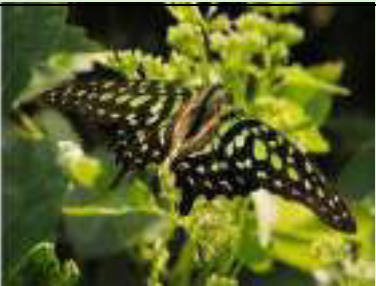
Table 18: Weed flora of New Campus, Rammohan College







Sl. No.	Scientific Name	Family	Comment
1	<i>Solanum nigrum</i>	Solanaceae	Annual herb
2	<i>Eragrostis tenella</i>	Poaceae	Perennial herb with rhizome
3	<i>Eleusine indica</i>	Poaceae	Perennial herb with rhizome
4	<i>Cynodon dactylon</i>	Poaceae	Perennial herb with wiry rhizome
5	<i>Oldenlandi acorymbosa</i>	Rubiaceae	Annual herb
6	<i>Oldenlandi apaniculata</i>	Rubiaceae	Annual herb
7	<i>Dactyloctenium aegyptium</i>	Poaceae	Perennial rhizomatous herb
8	<i>Ageratum conyzoides</i>	Asteraceae	Annual herb







Sl. No.	Scientific Name	Family	Comment
9	<i>Vernonia cineria</i>	Asteraceae	Perennial herb
10	<i>Blumea lacera</i>	Asteraceae	Annual herb
11	<i>Lindenbergia indica</i>	Scrophulariaceae	Annual herb
12	<i>Mazus rugosus</i>	Scrophulariaceae	Annual tiny herb
13	<i>Vandellia crustacea</i>	Scrophulariaceae	Annual herb
14	<i>Lindernia parviflora</i>	Scrophulariaceae	Annual herb
15	<i>Vandelliahirsuta</i>	Scrophulariaceae	Annual prostrate herb
16	<i>Phylla nodiflora</i>	Verbenaceae	Perennial prostrate herb
17	<i>Rungia parviflora</i>	Acanthaceae	Annual herb
18	<i>Desmodium triflorum</i>	Fabaceae	Perennial prostrate herb
19	<i>Alternanthera sessilis</i>	Amaranthaceae	Perennial herb
20	<i>Alternanthera paronychioides</i>	Amaranthaceae	Perennial herb
21	<i>Alternanthera ficoides</i>	Amaranthaceae	Perennial herb
22	<i>Amaranthus viridis</i>	Amaranthaceae	Annual herb
23	<i>Amaranthus spinosus</i>	Amaranthaceae	Annual prickly herb
24	<i>Tillanthera philoxeroides</i>	Amaranthaceae	Annual herb
25	<i>Aerva lanata</i>	Amaranthaceae	Perennial herb with somewhat woody rootstock
26	<i>Nasturtium indicum</i>	Brassicaceae	Annual herb
27	<i>Mecardonia procumbens</i>	Scrophulariaceae	Annual prostrate herb
28	<i>Pilea microphylla</i>	Urticaceae	Tiny annual herb
29	<i>Laportia interrupta</i>	Urticaceae	Annual herb with stinging hairs
30	<i>Nicotiana plumbaginifolia</i>	Solanaceae	Annual herb
31	<i>Cyperus rotundus</i>	Cyperaceae	Perennial herb with corm
32	<i>Cyperus iria</i>	Cyperaceae	Annual herb
33	<i>Kyllinga brevistylis</i>	Cyperaceae	Perennial rhizomatous herb
34	<i>Andrographis paniculata</i>	Acanthaceae	Annual/perennial herb
35	<i>Andropogon aciculatus</i>	Poaceae	Perennial rhizomatous herb
36	<i>Dentella repens</i>	Rubiaceae	Annual prostrate herb
37	<i>Oplismenus burmannii</i>	Poaceae	Perennial herb
38	<i>Digitaria ciliaris</i>	Poaceae	Annual herb
39	<i>Digitaria sanguinalis</i>	Poaceae	Annual herb
40	<i>Chloris barbata</i>	Poaceae	Annual herb
41	<i>Sida rhombifolia</i>	Malvaceae	Perennial undershrub
42	<i>Sida acuta</i>	Malvaceae	Perennial undershrub
43	<i>Sida cordifolia</i>	Malvaceae	Perennial undershrub
44	<i>Crotalaria pallida</i>	Fabaceae	Annual herb
45	<i>Euphorbia hirta</i>	Euphorbiaceae	Perennial herb







Sl. No.	Scientific Name	Family	Comment
46	<i>Euphorbia parviflora</i>	Euphorbiaceae	Annual herb
47	<i>Euphorbia microphylla</i>	Euphorbiaceae	Annual prostrate herb
48	<i>Phyllanthus urinaria</i>	Euphorbiaceae	annual herb
49	<i>Phyllanthus fraternus</i>	Euphorbiaceae	Annual herb
50	<i>Tribulus terrestris</i>	Zygophyllaceae	Prostrate herb
51	<i>Centella asiatica</i>	Apiaceae	Perennial herb with runner
52	<i>Physalis minima</i>	Solanaceae	Annual herb
53	<i>Solanum sisymbriifolium</i>	Solanaceae	Perennial prickly herb
54	<i>Evolvulus nummularius</i>	Convolvulaceae	Perennial prostrate herb
55	<i>Evolvulus nummularius</i>	Convolvulaceae	Annual prostrate herb
56	<i>Heliotropium indicum</i>	Boraginaceae	Annual herb
57	<i>Leucas aspera</i>	Lamiaceae	Annual aromatic herb
58	<i>Leucas cephalotes</i>	Lamiaceae	Annual herb
59	<i>Leonurus japonicus</i>	Lamiaceae	Annual herb
60	<i>Scoparia dulcis</i>	Scrophulariaceae	Annual herb
61	<i>Cleome viscosa</i>	Capparidaceae	Annual herb
62	<i>Cleome rutidosperma</i>	Capparidaceae	Annual herb
63	<i>Cleome gynandra</i>	Capparidaceae	Annual herb
64	<i>Bulbostylis densa</i>	Cyperaceae	Annual herb
65	<i>Brachiaria reptans</i>	Poaceae	Perennial herb
66	<i>Brachiaria distachya</i>	Poaceae	Perennial herb
67	<i>Dichanthium annulatum</i>	Poaceae	Annual herb
68	<i>Echinochloa stagnina</i>	Poaceae	Annual herb
69	<i>Leptochloa chinensis</i>	Poaceae	Annual herb
70	<i>Hybanthus enneaspermus</i>	Violaceae	Annual herb


Table 19: Butterfly species in the campus

Sl.	Scientific Name	Common Name	Photograph
1	<i>Graphium agamemnon</i> (Linnaeus)	Tailed Jay	

Sl.	Scientific Name	Common Name	Photograph
2	<i>Papilio polytes</i> (Linnaeus)	Common Mormon	
3	<i>Atrophaneura aristolochiae</i> (Fabricius)	Common Rose	
4	<i>Eurema hecabe</i> (Linnaeus)	Common Grass Yellow	
5	<i>Catopsilia pyranthe</i> (Linnaeus)	Mottled Emigrant	
6	<i>Cepora nerissa</i> (Fabricius)	Common Gull	
7	<i>Appias libythea</i> (Fabricius)	Striped Albatross	

Sl.	Scientific Name	Common Name	Photograph
8	<i>Leptosia nina</i> (Fabricius)	Psyche	
9	<i>Danaus chrysippus</i> (Linnaeus)	Plain Tiger	
10	<i>Euploea core</i> (Cramer)	Common Crow	
11	<i>Melanitis leda</i> (Linnaeus)	Common Evening Brown	
12	<i>Mycalesis perseus</i> (Fabricius)	Common Bushbrown	
13	<i>Ypthima huebneri</i> Kirby	Common Four-ring	

Sl.	Scientific Name	Common Name	Photograph
14	<i>Ariadne ariadne</i> (Linnaeus)	Angled Castor	
15	<i>Ariadne merione</i> (Cramer)	Common Castor	
16	<i>Junonia atlites</i> (Linnaeus)	Grey Pansy	
17	<i>Tarucusnara</i> Kollar	Rounded Pierrot	
18	<i>Zizeeria karsandra</i> (Moore)	Dark Grass Blue	
19	<i>Euchrysops cnejus</i> (Fabricius)	Gram Blue	

Sl.	Scientific Name	Common Name	Photograph
20	<i>Borbo cinnara</i> (Wallace)	Rice Swift	





Students having lesson on biodiversity

3.4.2 Green Campus Initiatives

Swachh Bharat Abhiyan

A cleanliness programme was organized at the premises of New Science building of Rammohan College and the Rammohan Sarani every year. On that day, all the NSS volunteers participated to clean the adjacent path of the college and the nearby street. They picked up the junk from the

campus, along the streets and also swept the whole surrounding. Then they spread bleaching powder. This programme was arranged to make the students understand the importance of cleanliness, how they can keep their surrounding clean and also to make them aware of their duty as a responsible member of the community.



Cleanliness Drive in the Campus

3.4.3 Sustainable Practices

- Restricted entry of automobiles
- Walking is encouraged for internal transport.
- Institute has initiated banning plastic in the campus.
- Email/ electronic communication mode is preferred to save papers.
- Both side printing is being adopted to save paper and trees.
- The premises have fire extinguishers installed at required locations which are regularly checked and maintained.
- The campus has established lift and ramp for easy movement of disabled persons.

3.4.4 Green Mindset

- Minimization of waste and proper disposal of e waste
- Composting of leaf litters and use of the compost in gardens
- Utilization of renewable energy resources like solar energy
- Maintenance of the local vegetation and fauna
- Landscaping in the campus to reduce the ambient temperature in the campus

3.5 Carbon Foot Print Analysis

Table 20: Carbon Foot Print Analysis

Sl. No.	Parameter	Numbers	Annual CO ₂ emission
1	Total no. of vehicles used by the stakeholders (per day)	5bikes+10car	(4680 +1903) = 6583 kg CO ₂ (considering 10 km distance travelled in 6 days a week)
2	No. of Cycles used.	5	-
3	No. of two wheelers used		
3a	Average distance travelled (per day)	Within 5km	
3b	Quantity of Fuel Used (per day)		
4	No. of four wheelers used		
4a	Average distance travelled (per day)		
4b	Quantity of Fuel Used (per day)		
5	No. of persons using public transportation	Most	
6	No. of persons using college conveyance		
7	No. of generators used per day		
7a	Amount of fuel used		
8	No. of LPG cylinders used in canteens	6 commercial cylinders	170.4 kg CO ₂
9	No. of LPG cylinders used in labs	14.2 kg X2 (Chemistry Lab), 5 kgX2 (Zoology lab)	43.5 + 15 = 58.5 kg CO ₂
10	Reams of paper used		
11	Paperless works to reduce paper usage		
12	Use of any other fossil fuels in the college		
13	Any efforts to reduce the use of fuels		

As per the estimates from the Central Electricity Authority, the weighted average emission factor for the Indian power grid stands at 0.79 kg CO₂/kWh. Hence, the total CO₂emission in a year from electricity consumption of the New Science Building is equivalent to 30575Kg CO₂ and 13372 kg CO₂ in the hostel.

Carbon Credit



Parties that have ratified the Kyoto Protocol and made commitments (Annex B Parties, of which India is one) have set goals for restricting or lowering emissions. The levels of permitted emissions, or assigned amounts, for the 2008–2012 commitment period are used to express these aims. Units of allocated amount (AAUs) are used to categorize the permitted emissions. According to Article 17 of the Kyoto Protocol, nations with spare emission units—that is, emissions that are allowed but not "used"—can sell their excess capacity to other countries that have exceeded their targets through the mechanism of emissions trading. As a result, emission removals or reductions became a new product. Since the main greenhouse gas is carbon dioxide, trade in carbon is the term used. These days, carbon is traded and tracked. As a result, emission removals or reductions became a new product. Since the main greenhouse gas is carbon dioxide, trade in carbon is the term used. These days, carbon is traded and tracked just like any other commodity. We refer to this as the "carbon market or carbon credit."

A country having an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) may carry out an emission-reduction project in developing nations under the Clean Development Mechanism (CDM), as outlined in Article 12 of the Protocol. These initiatives have the potential to generate marketable certified emission reduction (CER) credits, which are worth one tonne of CO₂ apiece and can be applied toward reaching the Kyoto targets. An example of a CDM project activity would be installing more energy-efficient lights or bulbs or doing a solar-powered electrification project in an area. While providing industrialized nations with considerable leeway in meeting their carbon reduction or limitation targets, the mechanism promotes sustainable development and emission reductions. Rammohan

College always abide by the rules or article 17 of Kyoto Protocol as “Law abiding College of India” and also try to generate awareness in the society.

A carbon credit can be calculated as a unit of exchange that individuals and firms alike use to offset their greenhouse gas (GHG) emissions. One carbon credit, or offset in the voluntary carbon market (VCM), is equal to one metric tonne of Green House Gas reduced or avoided from entering the atmosphere. In other words, a carbon credit is worth one tonne of CO₂ equivalent (tCO₂e) emissions which is equivalent to 556.2m³ of volume. “Carbon dioxide equivalent (tCO₂e)” is the standard unit for counting greenhouse gas emissions whether they're from CO₂ or another GHG.

In Rammohan College campus, 135 tubes (40 watts) have been replaced with LED (20 watts) resulting savings of 3369 kWh electricity annually. The calculation is made considering operation time of 6 hours daily for 8 months. The average carbon intensity for electricity generation in India is around 0.82 kilograms of CO₂ per kilowatt-hour (kgCO₂/kWh). Hence, the installation of LED lights have resulted in a reduction in CO₂ emission by 2763 Kg every year equivalent to 2.76 carbon credit.

The College has successfully installed 2 sets of 5 KWp Roof Top Solar PV Power Plant on the rooftop. In general, a 10 kW solar system produces about 40 units of electricity per day on average leading to 9600 kWh annually (considering 8 months operation time). This step has made a reduction in CO₂ emission by 7872 Kg every year equivalent to 7.87 carbon credit. All together on an average the carbon credit score becomes 10.63.

4. Suggestions and Recommendations

4.1 Water Management

- Expansion of the present Rain Water Harvesting is very essential to ensure efficient water conservation. The roof top area can be used to harness rain water especially in monsoon season which can be used for daily routine work or ground water recharging after careful monitoring.
- Monitoring of water consumption will be required for ensuring water efficiency. Water meter to be installed to monitor the consumption. The water meter readings to be recorded every day or every week at a fixed time.
- It is recommended to check water quality from water source for dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, and conductivity, total dissolved solids and E-coli/ coliform.
- The wash basin taps may be equipped with water saving fixtures.
- The flush tanks of the toilets may be fitted with dual volume system.
- Awareness campaigns and signboards need to be displayed on every floor.
- A detailed water use and management plan should be prepared and displayed.

4.2 Energy Management

- The energy audit recommends to avoid the use of more energy consuming electrical appliances and to replace with more environment friendly and energy efficient appliances (for example five stars rated Air conditioner, star rated fans) in the college.
- Ceiling fans have a very good scope for reducing power consumed using a technology called Brushless DC Motor or simply BLDC motor. BLDC technology, in general, has been in the market for a couple of decades. The traditional fan uses an induction motor and typically consumes 70- 90 watts. But BLDC fan, on the other hand, can reduce power consumption up to 65%.
- Prominent advantages of BLDC motor over induction motor are Lower Electricity Consumption, Longer backup on Inverters (even on Solar), improved reliability, Noise reduction, longer lifetime.

- The Hostel and other facilities may use solar heating units to reduce electricity consumption.
- College may adopt sensor-based (occupancy sensors) energy conservation approach for offices, classrooms and washrooms as well.
- College may also replace all existing tube lights with LEDs.
- To increase the carbon offset, it is recommended to extend the Solar PV for not just college building but also for hostel.
- More frequent awareness campaigns to be organized and signboards need to be displayed on every floor.

4.3 Waste Management

- College must arrange color coded, covered and separate waste bin for efficient segregation and disposal of waste at accessible location on each and every floor.
- Workshops need to be conducted regarding stages of waste management and 3R scheme.
- College may undertake feasibility study to install sewage water treatment in the campus to recycle waste water and use it in flush or for gardening purpose.
- Leaf litter from the campus can be effectively used for aerobic/ vermi composting, so that the composted material can also be used as good manure.
- Laboratory waste may be managed efficiently to reduce any scope of contamination.
- Try to completely ban the use of plastic in the campus, and to encourage the use of biodegradable materials as alternatives. Try to achieve the goal of plastic free campus.
- Annual agreement with recyclers/ vendors for all kind of scraps and e waste needs to be followed up.
- Important and confidential reports/ papers can be sent for pulping and recycling after completion of their preservation period.
- Metal waste, wooden waste, unused equipments and scraps should be sent to authorized scrap agents for further processing
- Awareness signboards/ posters need to be displayed on every floor.

4.4 Green Campus

- Maintenance of biodiversity is needed.
- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records.
- Nature Club may assign scientific and common name tags on the plants to spread awareness among students.
- College may consider planting tree on the land, away from city, managed by college to offset the carbon footprint.
- Emphasis may be given to develop kitchen garden and roof top garden giving emphasis on indoor and Bonsai plants.
- Students may be encouraged to engage in preparing People's Biodiversity Register (PBR) in and around the campus.
- Environment friendly lifestyles to be encouraged among students, teachers and non teaching staffs.

5. Green Audit Checklist

I. Water Efficiency & Wastewater Management			
Sl. No.	Measures	Status	Remarks
1	RO based water purifiers for drinking water	Yes	
2	Aerators to water taps	No	
3	Automatic toilet faucets	No	
4	Drip irrigation/ Sprinklers (for plant watering system)	No	
5	Dual flush toilet with cistern	No	
6	Dry mopping/ cleaning methods adopted	Yes	
7	Sewage treatment plant for sewage recycle	No	
8	Rain water harvesting		Going to install
9	Regular maintenance for leakage free plumbing system	Yes	
10	Use of low flow/ flow control water equipment or gadget	No	Manually controlled by the supervisor
11	Water balance diagram and water consumption monitoring at each Consumption level	No	Manually controlled by the supervisor
12	Routine monitoring of water quality		Internal assessment by the laboratories
13	Awareness signs displayed for promoting water conservation		
II. Energy Efficiency and On-site Energy Generation Mechanism			
Sl. No.	Measures	Status	Remarks
1	Maintaining correct lux levels (70-300 lux) to avoid excessive light	Yes	
2	Computerized monitoring of electrical system	No	
3	On-site energy generation (Diesel generators, LPG)	No	
4	Use of renewable energy (Solar, biogas)	Yes	Solar energy
5	Photocell occupancy sensor for automatic light control		In animal house
7	Regular maintenance of electrical system	Yes	

8	Use of energy efficient equipment like VFDs, maximum star rated equipment.	Yes	
9	Use of energy saving bulbs (Compact florescent light/LED lights)	Yes	
10	Awareness signage on electricity conservation	Yes	

III. Solid Waste Management

Sl. No.	Measures	Status	Remarks
1	Waste segregation practices and supporting hardware for waste segregation (Dry recyclable, organic, plastic, hazardous and E-waste)	Yes	Through proper process
2	Setting up recycling/ composting/ bio gas generation facility	No	Going to install
3	Minimize use of paper through digitalization	Yes	
4	Printing on both sides of paper/ Reuse of printed paper/ envelops	Yes	
5	Mechanism for collection & disposal of E-waste as applicable regulation	Yes	Through authorized vendor
6	Single use plastic free campus	Yes	
7	Inventories of waste generation and records of waste disposal		Yet to develop
8	Recycle/ archiving of paper waste		
9	Segregation of dry and wet waste		As per KMC regulation
10	Purchase of electronic products from companies which have service for disposal of product with buy back policy?	Yes	As per Government regulation
11	Recreating into new sustainable products	No	

IV. Good Day light Design

Sl. No.	Design Feature	Status	Remarks
1	Wide corridors open to daylight	Yes	
2	Broad doors and windows allowing daylight	Yes	
3	Building architecture which allows sunlight within buildings	Yes	

4	Presence of Skylight/ Rooflight	Yes	
5	Enough natural illumination in classrooms/ seminar halls/ laboratories	Yes	
6	Ultraviolet (UV) filtering windows/ Use of exterior louvers or light coloured fabric or blinds for windows to control glare	Yes	Only in the auditorium
7	Operable/ openable windows.	Yes	
8	Use of glass as facilitator of natural light	Yes	
9	Use of insulated and tinted glass to filter heat gain		In smart class room, auditorium and linguistic laboratory.

V. Ventilation

Sl. No.	Design Feature	Status	Remarks
1	Good ceiling height which allows internal air circulation	Yes	
2	Self-movement ventilators in the roof	No	
3	Wide windows and doors for classrooms, laboratories, seminar halls	Yes	
4	Wide corridors	Yes	
5	Operable louvers		
6	Exhaust fans in kitchen/ toilets	Yes	

VI. Temperature and Acoustic Control

Sl. No.	Design Feature	Status	Remarks
1	Roof design & type (Double/ False ceiling with plaster of paris etc.)	Yes	Auditorium, Principal's chamber and meeting room
2	Sand stone cladding/ tiling outside the walls	No	
3	Specially designed walls for temperature control, Sound noise barriers for windows/ walls		Auditorium and Linguistics Lab
4	Building construction allows diffused sunlight but not the heat. Specially designed glass walls/ windows with better U value/ factor depending upon climate conditions	Yes	Main campus (old building)

5	Use of insulation material (e.g. autoclaved aerated blocks, hollow blocks, Thermocrete etc.)	No	
6	Use of water bodies/ fountain to maintain temperature within campus	Yes	
7	Climbing creepers on the walls	No	
8	Retro fitting the existing roofs with cool roof technology		Shadow effect of solar panel
9	Use of landscaping gas sound barrier	No	
10	Water free urinals (No flush urinals/ Zero flush urinals/ water less urinals/ air-based flushing system)	No	
11	Water balance diagram and water consumption monitoring at each consumption level	No	Manually maintained by supervisor
12	Routine monitoring of water quality	Yes	Internally monitored by laboratories
13	Awareness signs displayed for promoting water conservation	Yes	

VII. Environmental Audit

Sl. No.	Type of audit	Status	Remarks
1	Energy audit (includes energy consumption, thermal comfort, visual comfort)	Yes	
2	Sound/ Noise and lux level monitoring (including indoor noise level, outdoor noise level)	Yes	
3	Water and waste audit (including water consumption, quality, solid waste generation, solid waste disposal process)	Yes	
4	Safety Audit	Yes	In case of elevator installation

VIII. Universal Access and Efficient Operation and Maintenance of Building

Sl. No.	Design feature	Status	Remarks
1	Easy access to the main entrance of the building and minimum two exits	Yes	
2	Energy efficient elevator	Yes	
3	Car pooling by staff and students/ use of Public transport/ Use of bicycles and battery-operated vehicles within		

	campus		
4	Preferred car park spaces for differently abled	Yes	New building
5	Ramp/ stairs with handrails on at least one side	Yes	New building
6	Restrooms (toilets) in common areas/ Restroom for differently abled	Yes	New building
7	Braille assistance for differently abled	No	Going to procure
8	Availability of wheelchair	Yes	
9	Emergency response plan for natural and manmade emergencies	Yes	
10	Fire exits, assembly points, first aids, firefighting systems	Yes	
11	Regular maintenance of building	yes	

IX. Green Program

Sl. No.	Green program	Status	Remarks
1	Upcycling of waste. Recycling beyond books i.e. paper, aluminium, plastic, e-waste	Yes	By authorized vendor
2	Creation of "GreenTeam" in the institution/ library	Yes	BASUDHA
3	Awareness programs on environment, energy management & safety (external Sessions and academic courses)	Yes	NSS
4	Outreach, activities, green programs (Tree plantation, waste segregation, plastic waste collection, cleaning etc.) records/ photos of programs	Yes	NSS
5	Presence of system/ methodology available for implementation of green initiatives and green projects (long term system-based continuity and not an isolated/ stand alone activity)	Yes	NSS
6	Mindset for reduction, recycle of waste (Green mindsets)	Yes	
5	Digitization	Yes	
6	E-archiving	Yes	
7	E-resources: E-books, Online Journals, membership of consortium		Departmental library
8	Maintaining green campus/ Greening of campus	Yes	



Rammohan College

102/1, 85A, 85B, 85C & 85D, Raja Rammohan Sarani, Kolkata, West Bengal 700009

Green, Environmental and Energy Audit Report

2022-2023



Prepared by

Rammohan College

In association with

RSP Green Development & laboratories Pvt. Ltd.

(ISO Certified and QCI - NABET Accredited Environmental Consultant Organization)





RSP Green Development & Laboratories Pvt. Ltd.

An ISO 9001: 2015 & ISO 14001: 2015 Certified Company

QCI-NABET ACCREDITED ENVIRONMENTAL CONSULTANT

CIN NO: U74999WB2017PTC219565



To
The Principal
Rammohan College
102/1, Raja Rammohan Sarani,
Kolkata-700009

Sub: Submission of the Green Audit Report Conducted by Rammohan College, 102/1, 85A, 85B, 85C & 85D, Raja Rammohan Sarani, Kolkata-700009 in association with RSP Green Development & Laboratories Pvt. Ltd.

Respected Madam,

On behalf of RSP Green Development & Laboratories Pvt. Ltd., it has been certified that the assigned **Green Audit Programme**, comprising **Energy Audit, Water Audit, Biodiversity Audit, Green Campus Management Audit, Plastic Waste Management, Carbon Foot Print Audit** and **Carbon Credit**, had been successfully completed by Rammohan College, 102/1, 85A, 85B, 85C & 85D, Raja Rammohan Sarani, Kolkata-700009 in association with RSP Green Development & Laboratories Pvt. Ltd. on 15.03.2023. After completion of the work, **Final Report** has been submitted to you. The report is compiled with **Work-sheets, Comparative Assessment** through analyses and suggestions for your Institution at the end.

The organization is thankful for your necessary support and adequate cooperation by providing needful information, requisite documents and sharing your institutional activities. We are further thankful to your humble hospitality for our staff and volunteers at the time of work.

Yours sincerely

Pinaki Roy
Managing Director
RSP Green Development & Laboratory Pvt. Ltd.



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1. Introduction

Green Audit is a stage wise review process of systematic identification, quantification, recording, reporting, analysis and documentation of components of environmental diversity of the institute or organization. It is a systematic assessment of day-to-day activity with reference to the utilization of resources as well as waste management. It aims to analyze environmental practices within and outside of the concerned place; leading to an eco-friendly atmosphere. It helps to determine how and where the energy, water or other resources are being used, based on which the institution can design effective management policies and implement changes towards sustainable use of resources. It can create health consciousness and promote environmental awareness, values and ethics. It also helps to enlighten staff and students of the institution for better understanding of Green impact on campus. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for environmental sustainability. Especially in colleges and universities where young minds dwell, ensuring an ecosystem with endurable qualities is the need of the hour. The green influence on the campus is vital to guarantee the best learning environment and healthy ecosystem for everyone associated with the site. The green audit report determines the greenery quotient on the campus and covers other influential environmental aspects. It includes the consumption and management of energy resources and environmental components.

National Assessment and Accreditation Council (NAAC) was introduced by the University Grants Commission or UGC in September 1994. NAAC was established for reviewing the performance and operational quality of Indian universities and colleges. The National Assessment and Accreditation Council have made it mandatory that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the mitigation of global warming through enforcement of carbon footprint reduction measures and improved management steps.

- **Self-assessment** – It allows the universities and colleges to review the ideal steps and implement them for the campus. The audit assists in self-assessment and the decision-making process.

- **Awareness** – It develops awareness among everyone associated with the campus with conscious and consistent efforts.
- **Improved scopes** – By complying with the norms, universities can ensure higher scopes of getting the best grade from NAAC. It is vital to follow the systematic way and implement the best steps for green audits on the campus under professional guidance.

The PDCA cycle audit is a systematic way of checking and improving the quality and performance and it involves four phases: planning the improvement, implementing the change, measuring the results, and acting on the feedback.



PDCA Cycle of Green Audit

1.1 Need for Green Audit

Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that accredits the institution according to the scores assigned at the time of accreditation.

The Audit report helps to understand the current practices of sustainability with regard to the use of water and energy, generation of wastes, transportation, purchase of goods, etc; establishing a baseline of existing environmental conditions with focus on natural and physical environment

and create awareness among students and staff concerning real issues of environment and its sustainability. Based on the audit report, the college can make the best strategies to make the campus ideal for students, teachers, and anyone associated. It also helps the college acknowledge the wastage volume and consider different recycling projects for developing a sustainable ecosystem for the learners. Simply put, it is a way to minimize wastage and create a more suitable place for learning with improved NAAC grades.

1.2 Objectives of Green Audit

The main aim of this green audit is to assess the environmental quality and the sustainable management strategies being implemented in Rammohan College.

The objectives of Green Audit include:

- Documentation of baseline data of good practices, strategies and action plans towards improving environmental quality for future along with corrective actions and future plans.
- Maintain conformity with the norms and standards in the environmental management system and to design ideal protocols that develop a sustainable ecosystem on the campus.
- Assessment of water use, waste management, energy consumption, health and environmental quality in the campus.
- Identification of the gap areas and suggest recommendations to improve the Green Campus status of the College.
- Generation of awareness among the students, teaching and non teaching members of the institution.

1.3 About the Institution

Rammohan College owes its origin to City College, Calcutta which is one of the oldest first grades College in West Bengal. It was founded in 1881 by a band of patriotic and selfless Brahma leaders like Ananda Mohan Bose, Pandit Sivnath Sastri and Umesh Chandra Dutta. Rastraguru Surendranath Banerjee later joined the College as teacher. Up to 1961 City College had a women's Department in morning which has separately affiliated in 1961 to the Calcutta University and renamed as Rammohan College. The Geo coordinates of old building are 22.5810230N and 88.3701490E and Geo coordinates of new building are 22.5829520N and 88.3709970E.

The aim of College according to the founders, is to promote the cause of education in its highest and widest sense, to make education a comprehensive training of the mind, heart and body, and founded on theistic basis conducive to the good of man and glory of God.

The College is open to all female students irrespective of race, creed or caste. It has record of brilliant result. The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

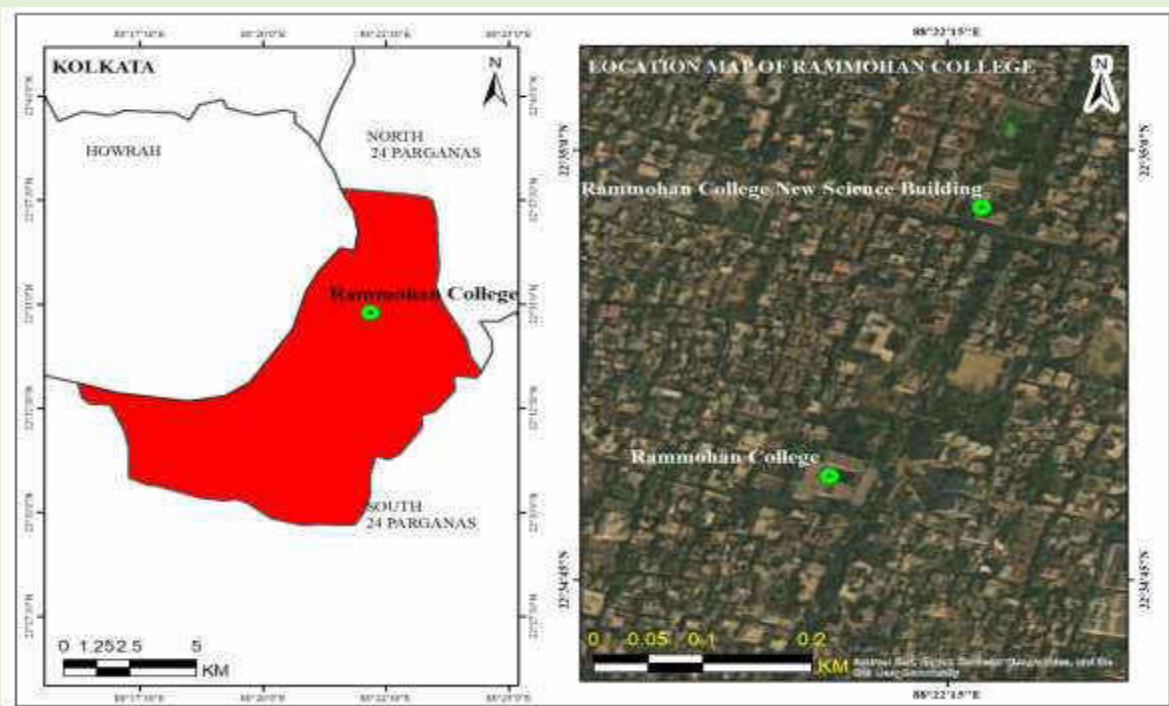


Figure 1: Location Map

1.3.1 Vision of the College

The Vision of the college is "Sradhaban Lavate Gyanam" or "Wisdom Belongth to Reverence". The goal of the college is to make a comprehensive training of mind, body and soul for girl students of all strata of society. Relentless effort is there to ensure an environment conducive for attaining self-respect for the students to trigger their inner strength to attain independence in thought to be aware of their rights so that in time they would be able to make an identity of themselves.

1.3.2 Mission of the College

The Mission of the institution is reflected in its policies. Principal and committed faculty members and non-teaching staff render their utmost efforts to ensure transparency in the functioning of the college and to maintain core values of the institution. If Vision is the Goal, Mission is the road-map. That pathway is not mere imparting of syllabus oriented lectures in class rooms. The College aspires to train students to be responsible citizens having a wider and positive vision of life.

1.3.3 Physical Structure of the College

Rammohan College in North Kolkata is famed for its immensity. With around 2500 students and nearly 140 teaching and non-teaching staff, it is one of the few colleges in West Bengal running in morning shift and catering to all three streams of Science, Arts and Commerce at undergraduate level along with post graduation in Bengali and Human Physiology.

The college located at 102/1, Raja Rammohan Sarani, Kolkata-700 009. It is one of the city group College administered by Brahma Samaj Society, a registered Society, constituted by the Sadharan Brahma Samaj, Calcutta.

Rammohan College has recently acquired the heritage building at 85A, 85B, 85C and 85D Raja Rammohan Sarani which was once the family residence of Raja Rammohan Roy, and his descendants. A memorial courses especially for women will be housed here under autonomous body of management at the ancestral house. A New 5 storied Science Building (NSB) for Rammohan College is also under construction next to the heritage building. The ground floor

and the first and second floor of this building are complete and both PG and UG classes are being held there. The College has elevator for the teaching, non-teaching members and students. The College received possession of plot nos. 85B, C&D, Raja Rammohan Sarani, Kolkata- 700 009 on the 4th August, 2005 from the First Land Acquisition Collector, Calcutta. Execution and registration of the deed by West Bengal Government in favour of the college will prepare a plan for construction of College building on those premises too. Rammohan College has also signed a MoU with *Victoria Institution* to enhance its academic and research capabilities and to provide its students with new opportunities to learn and grow.

Rammohan College Central Library is well equipped with books on each subject and with periodicals, magazines of generalized and specialized interest. Teachers and students equally benefit from the library. At present the library has a huge collection of 40000 books (approx.), among which 24962 are purchased books and rests [14582 Approx] are presented. Along with the central library, seminar libraries are also maintained by the various departments. The college infrastructure, strength of student, teaching and non teaching members and departments have been presented in Table 1, 2 and 3.

Infrastructure elements such as wall textures, ceiling heights, window positioning, air flow, lighting, fan designs, and other factors can produce stressful environment. The phrase "environmental stress" is used to characterize the physical, chemical, and biological constraints on the diversification of organisms and ecosystems. Air temperature (dry bulb temperature, wet bulb temperature, and dew point temperature), relative humidity, direct solar radiation and air flow are the four major variables of human thermal comfort which is defined as "condition of mind which express satisfaction with thermal environment". College teachers and other stakeholders may experience professional burnout as a result of the environment's stress. A study by Acharjee et al, 2023, conducted in the classrooms at Rammohan College in two separate buildings showed that the indoor classroom environment of the New Building is consistently within the "Partial Discomfort" range (lowest and highest Thermo hygrometric index (THI) values 75.86 & 79.20). According to the reference range, the indoor classroom atmosphere of the old building runs from "Comfortable to Partial Discomfort" (74.15 & 77.56).

Table 1: College Infrastructure

Campus Area			
Old Campus	Old Building 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 0K – 2CH – 32 Sq.ft. (≈ 0.3333 Acre)	
New Campus	New Science Building & Museum 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	2B – 6K – 0CH – 43 Sq.ft. (≈ 0.7613 Acre)	
	85B, 85C & 85D Raja Rammohan Sarani, Kolkata-9, W.B.	1B – 10K – 6CH – 15 Sq.ft. (≈ 0.5024 Acre)	
Sadhana Sarkar Memorial Hostel	35 Abhedananda Road, Kolkata-6, W.B.	10K – 5CH – 27 Sq.ft. (≈ 0.171 Acre)	
Total Campus Area		5B – 6K – 15CH – 27 Sq.ft. (≈ 1.768 Acre)	
Campus Built Up Area			
Campus	Building Type	Floor	Area in sq. mtr.
Old Campus 102/1, Raja Rammohan Sarani, Kolkata-9, W.B.	Old Building	G+4 floor	7364
NEW CAMPUS 85A, Raja Rammohan Sarani, Kolkata-9, W.B.	New Science Building	Ground (502.93 sq.m)	2514.65
		First (502.93 sq.m)	
		Second (502.93 sq.m.)	
		Third (502.93 sq.m)	
	Raja Rammohan Roy Memorial Museum	Ground (537.78 sq.m)	1246.78
		First (537.78 sq.m)	
		Second (171.37 sq.m)	

Sadhana Sarkar Memorial Hostel 35, Abhedananda Road, Kolkata-6, W.B.	Hostel Building	Ground Floor (432.58 sq.m.)	1481.92
		First Floor (349.78 sq.m.)	
		Second (349.78 sq.m.)	
		Third (349.78 sq.m.)	
Total Built Up Area			12607.35
No. of Buildings	2		
No. of Departments	17		
Teachers' Room	8		
Principal's Room	2		
Class Rooms	30		
Smart Class Rooms	4		
Dry Laboratories	14		
Wet Laboratories	17		
Library	2 (Central Library along with Departmental Seminar Libraries) + PG Library		
Auditorium	1		
Seminar Hall	3		
Canteen	4		
Common Room	1 (300sq ft) for students		
Office Room	3		
Hostel	1		
Gymnasium	1		
Staff Quarter	-----		

Table 2: Total Strength of Students, Teachers & Non-teaching Staff

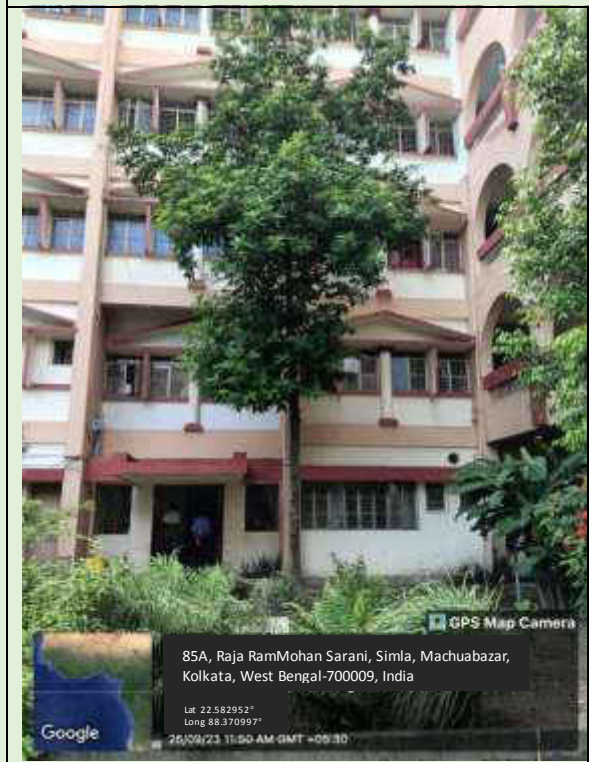
No. of Teachers			No. of Students			No. of Non Teaching Staffs		
Male	Female	Others	Male	Female	Others	Male	Female	Others
39	60	0	07 (PG)	2295 (UG) + 66 (PG) = 2361		16 (permanent) + 19 (contractual) = 35	02 (permanent) + 04 (contractual) = 06	0

Table 3: Academic Departments

Undergraduate		
Science	Humanities	Commerce
Botany	Bengali	
Chemistry	English	
Mathematics	Economics	
Physics	Education	
Physiology	Geography	
Zoology	Hindi	
	History	
	Philosophy	
	Political Science	
	Sanskrit	
Post Graduation		
Human Physiology	Bengali	



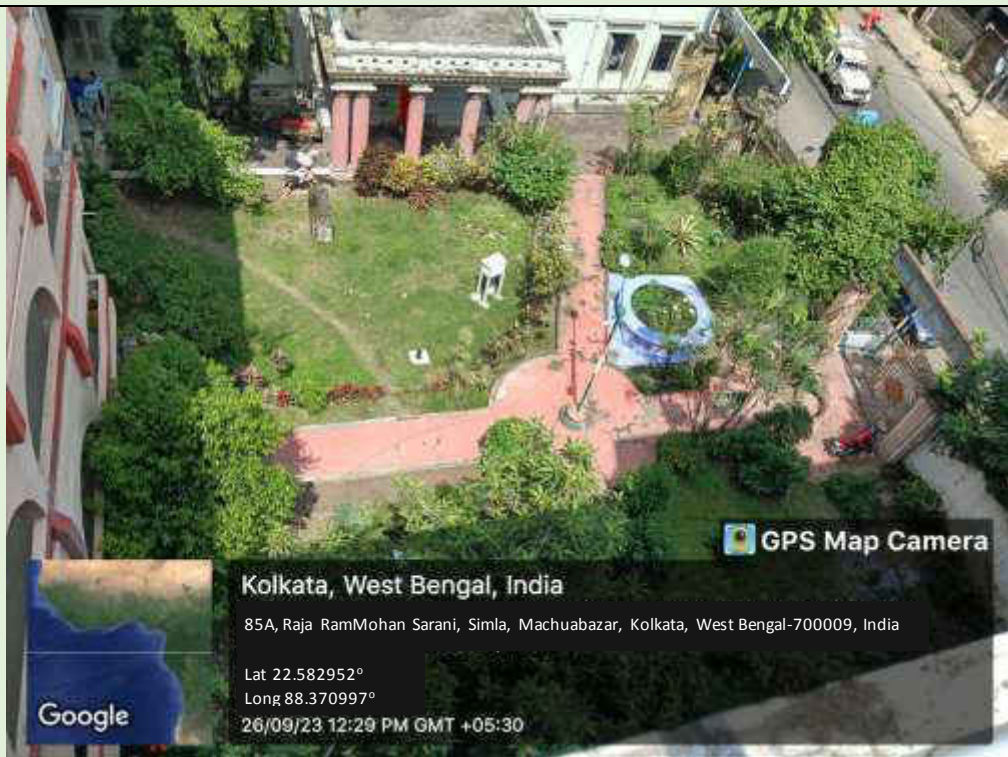
College Gate



Snippet of the Campus



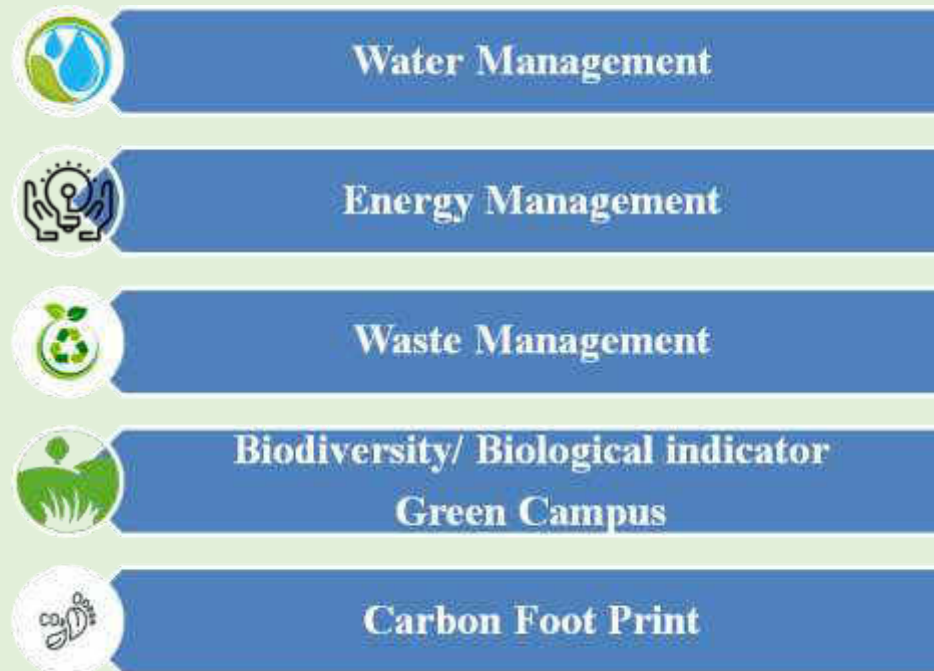
Library



Snippets of the Campus

2. Methodology

In order to perform green audit, the methodology that included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations was adapted.



Target Areas of Green Audit

2.1 Target Areas of Green Audit

Green audit aims to evaluate the efficient use of energy and water; minimize waste generation or pollution, biodiversity status and also efficiency in resource utilization. These indicators are assessed focusing on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, biodiversity and carbon footprint.

2.1.1 Water Management Auditing

Water is a natural resource which is required for sustenance of all living creatures. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Hence it is essential to examine the quality and usage of water in the Institutions or organizations. Water auditing is conducted for the evaluation of facilities of water intake, water usage and facilities for water treatment &/or reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

2.1.2 Energy Management Auditing

Energy conservation is an important aspect of campus sustainability which is also linked with carbon foot print of the campus. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices and incorporate alternative energy resources wherever possible. The energy signature method has been used in to extract the total heat loss coefficient of the building.

2.1.3 Waste Management Auditing

Human activities create waste; and unsustainable ways of waste handling, storage, collection, transport and disposal may pose risks to the environment and public health. Solid waste generated in the campus can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste.

1. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc.
2. Non-biodegradable wastes include plastic, tins and glass bottles etc.
3. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college.

Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-

biodegradable waste can be utilized through recycling and reuse. Thus the minimization of solid waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

2.1.4 Biodiversity/ Green Campus Management Auditing

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus. Campus biodiversity is reflection of the ecological health of the campus. A sustainable strategy is required for adopting environment friendly viable way outs for a green campus. Ecological indicator species like butterflies can be used to assess the environmental quality of the campus.

2.1.5 Carbon Footprint Auditing

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence to assess the method of transportation that is practiced in the college is important.

2.2 Methods Adopted

The methodology adopted to conduct the Green Audit of the Institution had the following components.

2.2.1 Onsite Data Collection

Both Physical and virtual tour of the college campus was organized by the Green Audit Team. The data samples and relevant photographs were collected through geo-tagged photographs. The key focus of the audit was on assessing the status of the green cover of the Institution, species biodiversity, their waste management practices and energy conservation strategies etc.

2.2.2 Focus Group Discussion

The Focus Group discussions were held with the staff members and the management focusing various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

2.2.3 Water, Energy, Waste, Biodiversity and Carbon Foot Print Analysis Survey

With the help of teachers and staff, the audit team has assessed the energy consumption pattern, heat signature, waste generation, disposal and treatment facilities of the college. The monitoring was conducted with a detailed questionnaire survey method.

2.3 Audit Team

A Team comprised of the Faculty members, non teaching staff and student representative of Rammohan College named **BASUDHA** has been formed. The team along with the representatives from the RSP Green Development & Laboratories Pvt. Ltd. (ISO Certified and QCI - NABET Accredited Environmental Consultant Organization) conducted the Green Audit.

Members of BASUDHA (Green Team) of Rammohan College

- Dr. Saswati Sanyal, Principal, Rammohan College
- Dr. Krishnendu Sarkar (Teaching Staff)
- Dr. Samarendra Nath Banerjee (Teaching Staff)
- Dr. Santi Ranjan Dey (Teaching Staff)
- Dr. Kaustav Dutta Chowdhury (Teaching Staff)
- Dr. Ashesh Garai (Teaching Staff)
- Dr. Samiran Mondal (Teaching Staff)
- Smt. Priti Prava Dutta (Teaching Staff)
- Mr. Tapan Narayan Dey (Teaching Staff)
- Smt. Jayanti Sen (Teaching Staff)
- Smt. Anima Roy (Teaching Staff)
- Mr. Amitava Mahapatra (Non Teaching Staff)
- Ms. Shreyasi Sarkar (Student)

Members from RSP Green Development & Laboratories Pvt. Ltd.

- Ms. Sreerupa Chatterjee (Jr. Environmentalist)
- Ms. Madhumanti Bag (Jr. Environmentalist)



Part of Audit Team



Audit Process

2.4 Audit Stages

Green auditing in Rammohan College, Kolkata began with the assessment of the status of the green cover of the Institution followed by waste management practices and energy conservation strategies etc. The team monitored different facilities at the college, determined different types of appliances and utilities (lights, taps, toilets, air conditioners, etc.) as well as measuring the usage per item (Watts indicated on the appliance, etc.) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified several times to clarify the data received through survey and discussions.

3. Observations & Findings

The findings and observations after campus visit, group interactions, survey and review have been analyzed and represented below.

3.1. Water Management

3.1.1 Source of water and its uses

The major source of water used in the College is supplied by Kolkata Municipal Corporation at free of cost. The amount of water supplied is sufficient for the daily college activities and hence no additional tanker water is needed to meet its demand. No ground water is used in the campus by means of well or any other activities.

Total 4 numbers of water tanks are available in the New Science Building (NSB) with capacity of 4000 L each. One tank with 5000 L capacity and another with 3000 L capacity is also installed in the old building and hostel respectively. A total of 9000 L of water is pumped every day using 5 hp (NSB), 5 hp old building, 4.5 hp (hostel) motors. Water consumption meter is not installed and hence no record is maintained for daily water consumption. An average of 2,34,000 L of water is used by the College per month. Water is used for drinking purpose, toilets, canteen, laboratories, hostel and gardening. RO based water purifier units and coolers have been installed in different floors of the campus to treat the water for drinking purpose. Distilled water requirement in laboratories are by the distillation unit set in the college itself. College has displayed signboards for spreading awareness regarding water conservation. Dry mopping/cleaning methods are adopted to ensure water conservation. Uses of low flow/flow control water equipment or gadgets are manually controlled by supervisor. There is no formal water management plan available with the institute. Water consumption at each consumption level is monitored manually. A modified tank with capacity of 13500 cubic liters has been installed in the backyard. The front side of the set up is used as fish tank while the back side is utilized for filtering and storing rain water. This system is a good example of multipurpose use for rain water harvesting and aquaculture needed for laboratory use. There is ample scope in the campus to expand this Rain Water Harvesting System for efficient water management and water conservation. There is no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained to main drainage

system of the city. Details of water consumption in hostel could not be procured during audit process.

3.1.2 Water Quality Analysis

As the water is primarily supplied by the Municipal Corporation, it can be assumed that the water is properly treated and meets the requisite norms of BIS standards. The routine parameters of drinking water available in the campus (eg. pH, conductivity, salinity, DO etc.) are regularly checked in college laboratory by the students (data attached below).



Water Tanks

Water Purifier



Commercial RO plant in laboratory

Modified Rain Water Harvesting System



Internal drainage



Water Quality Testing

Awareness campaign on water

Phone : 2350-5687
2354-3853
Fax : (033) 2350-5687



RAMMOHAN COLLEGE

(Formerly City College W. Dept.)
102/1, Raja Rammohan Sarani, Kolkata-700 009
E-mail : rmc.tic85b@yahoo.in
Accredited B++Grade by NAAC

Ref:

Date 28.02.2023

Water parameter analysis of drinking water-2022-2023

At New Science Building

(85A, Raja Rammohan Sarani, Kolkata-700009)

(Data are average of three independent observations)

Name of the parameter	Dates			
	16.08.2022	27.09.2022	15.11.2022	25.02.2023
pH	6.9	6.88	6.87	6.8
Dissolved oxygen (mg/dl)	0.58	0.5	0.49	0.53
Free dissolved carbon di oxide (mg/lit)	3.8	3.5	3.4	4
Salinity (ppt)	0.0025	0.003	0.0028	0.0031
TDS (ppm)	140	130	150	146



S. Sangal
28/02/2023
Principal
Rammohan College
Kolkata-9

Test report of water quality parameters in college laboratory

3.2 Energy Audit

Energy conservation plays a pivotal role in promoting campus sustainability and is intricately connected to the carbon footprint of the institution. Energy auditing is the process of managing and diminishing energy consumption, with a keen focus on minimizing carbon foot print. Consequently, it is imperative for any environmentally-conscious institution to scrutinize its energy utilization practices and embrace alternative energy sources wherever feasible.

3.2.1 Electrical Bill Analysis

Electricity is supplied by Calcutta Electricity Supply Corporation. All the electrical appliances in the old and new college building and hostel run on three different meters. Electricity consumption in last 12 months has been depicted below. An average consumption of 3225 kWh/month is estimated in New Science Building during normal operating scenario (Table 4) and 1411 kWh/ month in hostel as assessed in the year 2022 (Table 6).

Table 4: New Science Building electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	37038446004
Meter No.	2354905 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	23.5
50% of Con. Demand (KVA)	11.75
Sanctioned load (KW)	23.5

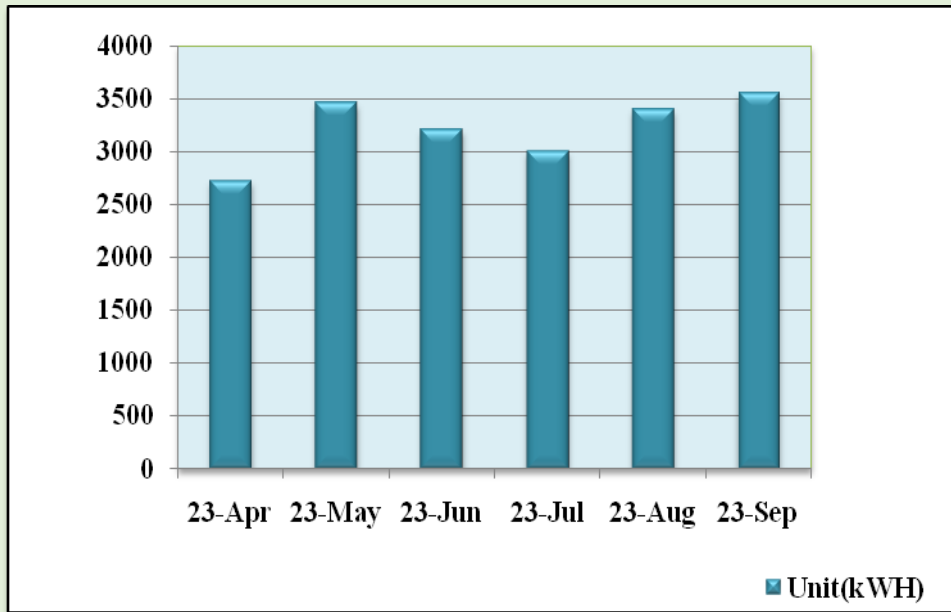


Fig-2: New Science Building electricity consumption in last 6 months

Table 5: New Science Building electricity consumption in last 6 months

Sl. No.	Date	Unit(KWH)
1	23-Apr	2727
2	23-May	3459
3	23-Jun	3209
4	23-Jul	3006
5	23-Aug	3402
6	23-Sep	3548
Average unit		3225.16

Table 6: Hostel electricity consumption

Consumer Name	Teacher in Charge, Rammohan College
Consumer No.	38038091001
MeterNo.	2154477 01
Electricity Supply Company	CESC
Tariff Category	G/3 Ph
Contract Demand (kVA)	14.2
50% of Con. Demand (KVA)	7.1
Sanctioned load (KW)	14.2

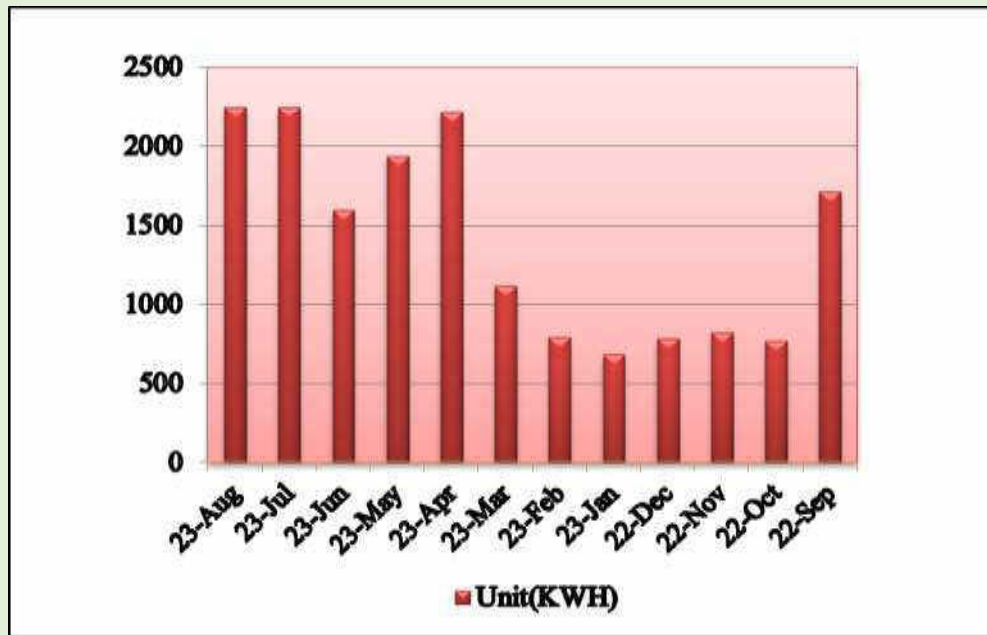


Fig-3: Electricity Consumption in Hostel in last 12 Months

Table 7: Electricity Consumption in Hostel in last 12 Months

Sl.No	Date	Unit(KWH)	DATE2
1	23/08/2023	2249	23-Aug
2	24/07/2023	2250	23-Jul

3	23/06/2023	1594	23-Jun
4	24/05/2023	1934	23-May
5	24/04/2023	2217	23-Apr
6	23/03/2023	1114	23-Mar
7	22/02/2023	794	23-Feb
8	21/01/2023	681	23-Jan
9	21/12/2022	787	22-Dec
10	21/11/2022	826	22-Nov
11	21/10/2022	769	22-Oct
12	19/09/2022	1712	22-Sep
Average unit		1410.58	

3.2.2 Electrical Appliances

The commonly used electrical appliances in the College include tube lights, CFL lights, Ceiling fans, refrigerators, water purifier, hot air oven, air conditioners, computers, pump, UPS and other power back-ups etc. The average numbers of these appliances have been enlisted in the following table. The correct lux levels (70-300 lux) is maintained to avoid excessive light. Most of the ACs are 3 starred and the temperature is kept between 22-24 degree Celsius for efficient energy consumption. The switching and operation is manual in nature. The Information Technology Lab has 12 computers in total. The animal house used for Zoology and Physiology Department provides Photocell occupancy sensor for automatic light control. The College has one lift which is regularly maintained and checked. Numbers of different types of electrical devices and their average running time have been presented in Table 8 - 12.

Table 8: Electrical Appliances in the College

Sl. No.	Name of Appliances	No. of Units	KWH
1	Tube Light	335 (135 LED+200 Tube)	
2	Compact Fluorescent Lamps (CFL)	1+1+1+36	
3	Ceiling Fans	301	
4	Water Purifiers	7	
5	Refrigerators	5+5	
6	Hot air Ovens	4	
7	Air-conditioners	8 (1.5 tones split)	
8	Grinders	56	
9	Computers	Total 140 including 12 in IT Lab	
10	Pumping Machines	3	
11	UPS and Other Power Back-up	140	
12	Heater	3	

Table 9: Distribution of Electrical appliances (New Science Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation		
				Light	Fan	Hrs/Day
401	Lights, Fans	2 Double Tube, 1 Single Tube	3		12	26
402	Lights, Fans	5 Single Tube	5		12	26
403(Library)	Lights, Fans	8 Double Tube	6		12	26
404	Light, Fans	7 Double Tube	8		12	26
405	Lights, Fan	3 Double, 2 Single Tube	6		12	26
406(Auditorium)	Lights, Fan	12 Double	9		-	-
4 th Floor Corridor	Lights, Fan	4 Double	5		12	26
307	Lights, Fan	6 Double	2		12	26
306	Lights, Fan	8 Double	7		12	26
3 rd Floor Corridor	Lights, Fan	6 Single, 4 Double	6		12	26
305 (IQAC)	Lights, Fan	2 Single Tube	2		12	26

room)					
303	Lights, Fan	7 Double Tube	6		
101(Principal Room)	Lights, Fan	2 Single Tube	2	12	26
102 (IT)	Lights, Fan	2 Single Tube, 1 Double Tube	3	12	26
103 (Office)	Lights, Fan	2 Single Tube	2	12	26
Canteen	Lights, Fan	5 LED Tubes	4	12	26

Table 10: Distribution of Electrical appliances (Old Building)

Room No. / Name	Type of Electrical Device	Quantity Nos		Operation	
		Light	Fan	Hrs/Day	Days/Month
Accounts	Light and Fan	20 LED	4+1 Stand	12	26
Office		8LED	10		
Principal Room					
Front Room					
5		8	5	12	26
6		8	5	12	26
7A		6	5	12	26
16		5	5	12	26
17		7	6	12	26
19A		6	5	12	26
20		7	7	12	26
22		4	5	12	26
23		4	2	12	26
26		3	3	12	26
27		3	5	12	26
28		2	1	12	26
28A		2	1	12	26
29		5	5	12	26
30		6	6	12	26

32B		5	6	12	26
32A		4	6	12	26
33		4	6	12	26
33A		3	4	12	26
32		4	4	12	26
N1		4	4	12	26
N2		4	4	12	26
N3		4	4	12	26
N4		4	4	12	26
N5		4	4	12	26
N6		5	5	12	26
N7		5	4	12	26
Commerce Room		2	3	12	26
Geography Room		6 (Normal Tube) + 7(LED)	20	12	26
Teachers' Room		4	6	12	26
Bursar Room		2	1	12	26
NCC Room		3	1	12	26
Rector Room		3	2	12	26
Staff Canteen		2+1 Heater	1+ 1 Fridge	12	26
Teachers Canteen		10+1 Heater	5+ 1 Fridge	12	26
Student Canteen		10+1 Heater	7+ 2 Fridge	12	26

Table 11: Distribution of Electrical appliances (Hostel)

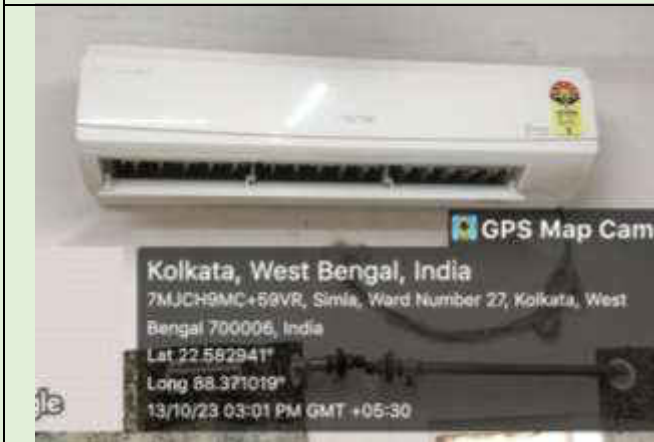
	Room No. / Name	Type of Electrical Device	Quantity Nos	Operation		
			Light	Fan	Hrs/Day	Days/Month
1.	Hostel	Light and Fan	43 Tube light	49 + 2 table fan	24	30
			37 LED			
			56 CFL			

Table 12: Air Conditioning System in the Campus

Air Conditioners							
Room No. / Name	Type	Capacity	Quantity	Power	Operation		Star Rating
		TR	Nos.	Watt/Unit	Hrs/Day	Days/Month	
	Split/Window AC						3 Star
Old Building	Split AC	1.5	3	1500	12	26	✓
New Science Building	Split AC	1	2	1000	12	26	✓
		1.5	3	1500			✓



Electrical Panel



Air conditioner (3 star)



Lift



Natural light in class room



LED lights



Natural Light and Ventilation in the Classrooms



Awareness Campaign regarding Energy Conservation



Laboratory Instruments



Laboratory Instruments



Wet Laboratory



Computer Lab

3.2.3 Efficient Energy Management Practices

All electrical appliances are regular maintained for sustainable energy management. The college is gradually shifting towards LED lights by replacing existing lighting fixtures with LEDs and other energy efficient lighting fixtures to conserve energy. Correct lux levels (70-300 lux) are maintained to avoid excessive light. All ACs are 3 star rated and the temperature is kept between 22-24 degree Celsius. The switching and operation is manual in nature. Servicing of the

electrical appliances is done at regular intervals to ensure energy efficiency. Institute is utilizing the natural light to its maximum. The classroom and laboratories are designed in such a way that it allows maximum sun light and reduces requirement of artificial lights. The classrooms and offices in the premises are well ventilated and the wide corridors are open to daylight. The operable glass windows are useful to facilitate natural light. The smart class room, auditorium and linguistic laboratory have insulated and tinted glass to filter heat gain. The fans are operational and adequately placed to affect the sufficient air changes. Fans installed are not star-rated. College has done indoor plantation to provide fresh air inside the premises. LED monitors and Email/ electronic communication mode is preferred to save energy. Awareness posters regarding energy conservation is being displayed in the premises. The canteen uses LPG gas for cooking purpose. However, the Institute has not adapted to any sensor-based energy conservation technique. Since there is limited facility in hostel and canteen, no solar water heating system is installed. Since the biodegradable waste generation is low, there is no Bio-gas plant.

3.2.4 Alternative Energy Resource

Solar energy installation: nonrenewable to renewable energy transformation

Solar energy is one of the most environment friendly renewable and clean sources of energy. The College has successfully installed two sets of 5 KWp Roof Top Solar PV Power Plant by Imperial Solar Solutions under aegis of Directorate of Rashtriya Uchchhata Siksha Abhiyan (RUSA) to reduce dependency on fossil fuel based electricity. The system is made by HR Solar Solutions Pvt. Ltd. with 2 sets of 15 Nos 335 Wp. It has 2 Nos. 5 KW Single Phase On Grid Solar Inverter made by Power One Microsystems Pvt. Ltd. with grid voltage 230 V, 50 Hz.

Solar water heater is also installed in students' hostel.

Through installation of solar PV power, the college has been benefitted both financially and environmentally. It has enhanced the institutional overall quality and upgrading knowledge of faculty members and students regarding renewable energy and environmental sustainability. Solar panels also help to reduce pollution and carbon footprint and makes the institute independently electrified campus. All stakeholders of the campus including the students, teachers and staffs are also made aware about its relevance and advantage.

Table 13: Solar Power

Solar PV	
Status	Installed
Capacity	2 No 5 KWp 10(5+5) kVA (35kVA required)
Future Plans-Capacity & Target Date	25kV; 31.03.2025
Net-Metering Available/N.A.	NA
Sanction Load/Demand(kW)	NA
Rooftop Area (Sq.ft.)	5413.5
Avg. Electricity Consumption(kWh)	2.5kVA
Solar Water Heater	
Status	Installed: 1000LPD Future plan: 5000LPD; 31.03.2025



Installed Roof Top Solar Panel



CCTV surveillance

Imperial Solar Solutions

An ISO 9001:2015 Certified Company - Our every stride is for a Green Initiative

Govt. Licensed Electrical Contractor and Solar System Integrator
Registered office: Plot No. Y3, Zonal Centre, J. P. Avenue, Durgapur 713211, W. B.
Tel.: 9800393296, 9434072971, 8918594997
Website: www.imperialsolarsolutions.in
Email: isolarsolutions@gmail.com, imperialsolar2012@gmail.com

Ref : ISS/RMC/CS/21-22

Date: 12.01.2022

To

The Principal

Rammohan College (Formerly City College W.Dept)

102/1, Raja Rammohan Sarani,

Amherst Street, Kolkata, West Bengal,

Pin - 700009

Sub.: Completion Certificate against Memo No : 1733/RMC/2021, Date : 26.03.2021

Respected Sir,

We are pleased to inform you that, we have successfully completed the job of "Supply and Installation of Two Nos 5 KWp Roof Top Solar PV Power Plant at Rammohan College, Kolkata – 700009 under aegis of Directorate of Rashtriya Uchchatarata Siksha Abhiyan (RUSA), Government of West Bengal" at your premises.

The details of the main component of the solar power plant are as follows :

1. The capacity of Solar Power Plant installed 5 KW (DC) X 2 sets;
2. Make and Quantity of Modules : HR Solar Solutions Pvt. Ltd. And Qty : 15 Nos 335 Wp X 2 Sets;
3. Details of String Inverter Installed :
 - a. 5 KW Single Phase On Grid Solar Inverter – 2 nos.;
 - b. Make : Power One Microsystems Pvt. Ltd;
 - c. Rated grid voltage : 230 V, 50 HZ

Thanking You and assuring you of our services at all times,

Your sincerely,

For Imperial Solar Solutions



I. Banerjee

(Project Manager)



Solar Panel Installation Completion Certificate

3.3 Waste Management

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair, and reuse. Solid waste generation and management is one of the most challenging issues in academic institutions. Unscientific handling of solid waste can pose threat to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus.

3.3.1 Types of waste generated in the campus

The campus generates different types of biodegradable (paper, food waste etc.) and non-biodegradable (plastic, packaging product etc.) waste in the office, classrooms, canteen, and hostel. The wet and dry laboratories generate biodegradable (tissue, blood, animal and plant parts), chemical waste as well as e waste.

Table 14: Approximate quantity of waste generated per day (in kg)

Office	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic		
> 10 kg	Paper			
Classrooms	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Paper	Food wrapper	NA	NA
2 - 10 kg				
> 10 kg				
Labs	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg	Animal and plant parts	Broken glassware, plastic waste	Chemical	E-Waste
2 - 10 kg				

> 10 kg				
Canteen	Type of Waste			
Quantity	Biodegradable	Non-Biodegradable	Hazardous	Others
< 1kg			NA	NA
2 - 10 kg		Plastic, Other Packaging Product		
> 10 kg	Vegetable peel, Food waste			

3.3.2 Waste Disposal Practices Adopted by the College

The source of wastewater is Domestic Waste Water i.e., Sewage water. The Sewage water mainly comes from toilets and canteen. The wet laboratories also generate waste water. There is no Sewage Water Treatment plant in the campus to recycle the waste water for the use of flushing and gardening. The waste water is being drained through internal drainage system and carried to main drainage system of the city. The everyday solid waste is collected by Kolkata Municipal Corporation for necessary disposal. The College has color coded waste bins are visibly available in the college. The segregation of waste needs to be done more efficiently. There is no biomedical or radioactive waste getting generated in the college. Old instruments, waste paper, cartons discarded tools, gadgets, computer parts, chemical bottles are discarded following administrative protocol through authorized vendors.



Color coded waste bin



Waste Bin



Waste Bin



Waste Bin

3.3.3 Reduce, Reuse, Recycle

The office and departments follow both sided printing to save energy and reduce waste. Single sided used papers are reused for writing and printing in all the departments to minimize the usage of papers. Broken furniture, appliance or computers are repaired and reused in terms of minimize waste. Examination related documents are stored for a fixed period and disposed as per the University guideline. Waste glass bottles are partially reused in the laboratories. Waste papers, cartons and scraps are occasionally sent to unorganized recyclers and scrap dealers. Dry leaves are used for composting in the garden area. There is a ban on use of single use plastic in the campus area. Very less plastic waste is generated by some departments, office, garden etc. Awareness regarding plastic pollution is spread in the campus.

Discarded electronic products produce electronic garbage, or e-waste. In the last several decades, there has been a notable surge in the production of electronic trash. The rising rate of e-waste generation worldwide is close to 2 metric tons (Mt) annually. The projected amount of e-waste created in 2030 is 74 million tons. E-waste can therefore pose a serious risk to the environment. E-waste releases toxic metals into the environment, including as lead, mercury, nickel, and cadmium, which eventually find their way into surface water, groundwater, soil, and sediment. The health of people, aquatic life, and plants are all negatively impacted when harmful metals are released into the environment. As a result, effective e-waste management is crucial and has become a global issue. According to a survey, home and office electrical appliances account for over half of all e-waste produced, making them the main source of the garbage. The combination of biological, physical, and chemical processes exhibits relatively high removal efficiency among remediation technologies, and it has several advantages over other remediation technologies. Recycling is among the most effective e-waste management techniques. The College emphasizes on proper disposal of e-waste and use of recycled goods to decrease pollution load in the environment, as a part of social responsibility. E-waste generated in the campus is managed, keeping in mind the environmental hazards that may arise if not disposed properly. The cartridges of laser printers are refilled outside the college campus. Purchase of electronic products from companies which have service for disposal of product with buyback policy or exchange is encouraged by the college. The E- wastes and defective items from computer laboratories are being stored properly and recycled in effective manner. The dismantled electronic spare parts are immediately sold for reuse. But, there is lack of efficient system to dispose off these waste for recycling. Authorized vendor or scrap dealer has been engaged for sustainable reduce, reuse and recycle processes.



U.S. E-WASTE RECYCLING

11/11/1, MIRZA GHALIB STREET, KOLKATA - 700016
WEST BENGAL INDIA

WPCB/CPCB Authorized E-Waste Disposal Facility

WPCB Consent No. Consent WPCB/MCO/16w/11QJ10/CPCB028

GREEN CERTIFICATE

For E-Waste Disposal

Certificate Sr. No.:

This is to certify that electronic & Hazardous waste listed below has been received by M/S U.S E-Waste Recycling On The date Show and has been disposal of in an environmental safe manner in accordance with the Authorized agency as will us our company secure disposal policy

M/s. Ram Mohan College

Address: 102/1, Raja Barmohan Sarani, Kolkata 700017

Road name : _____

City: Kolkata, State: West Bengal

Pin Code 700007, country INDIA has disposed 500/- Kg (In figures)

five hundred only Kg (In Word)

Of Electronic/Electrical Waste with M/S U.S E-Waste Recycling

Authorized Signatory



M/S 16/5/23

3.4 Green Campus

3.4.1 Campus Biodiversity

Approximately 2000 sq m free space is available in the institution in the form of garden and backyard. There is moderate vegetation in the campus along with some indoor plants. The campus premises have also presence of common birds like crow, sparrow, Myna, Sun bird, Nightingale and squirrel, domestic cat and dogs.

More than 50 medicinal plants have been cultivated in the Medicinal Plants Garden in the new campus at 85A, Raja Rammohan Sarani, Kol-9. The campus also has presence of ornamental trees & shrubs. Some of them are listed in Table 13. More than 70 weed species have been documented in the campus and enlisted in Table 14.

The campus is also a habitat of numbers of butterflies which is a crucial component of the environment due to their role in pollination. It can be used as a tool for management and conservation choices involving butterflies. Institutional campuses with undisturbed natural flora and seasonal flowering plantations provide suitable habitat for butterfly populations since they are frequently free of any development operations and pollutants. They are also regarded as reliable ecological indicators because to their sensitivity to climatic and environmental changes. The species richness, abundance or mortality rate of butterfly species can shed light on the surrounding environmental quality. In Rammohan College campus 21 species of butterflies (Table 17) belonging to 4 families, 8 subfamilies were found more or less throughout the year, but there is no significant correlation between butterfly species richness and Air Quality Index (PM_{2.5}, PM₁₀, O₃ ect.) (Mitra et al. 2023 a,b)

Table 15: Plant species in the campus

Medicinal Plants		
Amlaki/Amla	<i>Emblica officinalis</i>	Fruits are good source of vitamin C
Nayantara/Periwinkle	<i>Catharanthus roseus</i>	Roots contain vincristine & vinblastine which are used to treat cancer,
Lemon Grass	<i>Cymbopogon citratus</i>	Leaves contain terpenoids, ethereal oils, used as antispasmodic, hypotensive, antirheumatic etc.
Berela	<i>Sida rhombifolia</i>	Leaves contain antibacterial properties & antioxidants. It is used in diarrhoea, malarial fever, asthma etc.
Ornamental trees & shrubs		
Swarna Champa Tree.	<i>Michelia champaca</i>	Flowers intensely fragrant.
Parijat	<i>Magnolia grandiflora</i>	Small tree. Flowers white, fragrant.
Lobster lily	<i>Heliconia rostrata</i>	Rhizomatous plant, flowers throughout the year.
Rangan	<i>Ixora coccinea</i>	Shrub
Sheuli	<i>Nyctanthes arbor-tristis</i>	Shrub or small tree
Wild plants		
Barmuda grass	<i>Cynodon dactylon</i>	
Kyllinga	<i>Kylling abbrevistylis</i>	
Tridaksha	<i>Tridax procumbens</i>	
Uchanti	<i>Ageratum conyzoides</i>	



Floral diversity in the campus

Table 16: Weed flora of New Campus, Rammohan College






Sl. No.	Scientific Name	Family	Comment
1	<i>Solanum nigrum</i>	Solanaceae	Annual herb
2	<i>Eragrostis tenella</i>	Poaceae	Perennial herb with rhizome
3	<i>Eleusine indica</i>	Poaceae	Perennial herb with rhizome
4	<i>Cynodon dactylon</i>	Poaceae	Perennial herb with wiry rhizome
5	<i>Oldenlandi acorymbosa</i>	Rubiaceae	Annual herb
6	<i>Oldenlandi apaniculata</i>	Rubiaceae	Annual herb
7	<i>Dactyloctenium aegyptium</i>	Poaceae	Perennial rhizomatous herb
8	<i>Ageratum conyzoides</i>	Asteraceae	Annual herb
9	<i>Vernonia cineria</i>	Asteraceae	Perennial herb
10	<i>Blumea lacera</i>	Asteraceae	Annual herb
11	<i>Lindenbergia indica</i>	Scrophulariaceae	Annual herb
12	<i>Mazus rugosus</i>	Scrophulariaceae	Annual tiny herb
13	<i>Vandellia crustacea</i>	Scrophulariaceae	Annual herb
14	<i>Lindernia parviflora</i>	Scrophulariaceae	Annual herb
15	<i>Vandelliahirsuta</i>	Scrophulariaceae	Annual prostrate herb
16	<i>Phylla nodiflora</i>	Verbenaceae	Perennial prostrate herb
17	<i>Rungia parviflora</i>	Acanthaceae	Annual herb
18	<i>Desmodium triflorum</i>	Fabaceae	Perennial prostrate herb
19	<i>Alternanthera sessilis</i>	Amaranthaceae	Perennial herb
20	<i>Alternanthera paronychioides</i>	Amaranthaceae	Perennial herb
21	<i>Alternanthera ficoides</i>	Amaranthaceae	Perennial herb
22	<i>Amaranthus viridis</i>	Amaranthaceae	Annual herb
23	<i>Amaranthus spinosus</i>	Amaranthaceae	Annual prickly herb
24	<i>Tillanthera philoxeroides</i>	Amaranthaceae	Annual herb
25	<i>Aerva lanata</i>	Amaranthaceae	Perennial herb with somewhat woody rootstock
26	<i>Nasturtium indicum</i>	Brassicaceae	Annual herb
27	<i>Mecardonia procumbens</i>	Scrophulariaceae	Annual prostrate herb
28	<i>Pilea microphylla</i>	Urticaceae	Tiny annual herb
29	<i>Laportia interrupta</i>	Urticaceae	Annual herb with stinging hairs
30	<i>Nicotiana plumbaginifolia</i>	Solanaceae	Annual herb
31	<i>Cyperus rotundus</i>	Cyperaceae	Perennial herb with corm
32	<i>Cyperus iria</i>	Cyperaceae	Annual herb
33	<i>Kyllinga brevistylis</i>	Cyperaceae	Perennial rhizomatous herb
34	<i>Andrographis paniculata</i>	Acanthaceae	Annual/perennial herb
35	<i>Andropogon aciculatus</i>	Poaceae	Perennial rhizomatous herb






Sl. No.	Scientific Name	Family	Comment
36	<i>Dentella repens</i>	Rubiaceae	Annual prostrate herb
37	<i>Dentella serpyllifolia</i>	Rubiaceae	Annual prostrate herb
38	<i>Oplismenus burmannii</i>	Poaceae	Perennial herb
39	<i>Digitaria ciliaris</i>	Poaceae	Annual herb
40	<i>Digitaria sanguinalis</i>	Poaceae	Annual herb
41	<i>Chloris barbata</i>	Poaceae	Annual herb
42	<i>Sida rhombifolia</i>	Malvaceae	Perennial undershrub
43	<i>Sida acuta</i>	Malvaceae	Perennial undershrub
44	<i>Sida cordifolia</i>	Malvaceae	Perennial undershrub
45	<i>Crotalaria pallida</i>	Fabaceae	Annual herb
46	<i>Euphorbia hirta</i>	Euphorbiaceae	Perennial herb
47	<i>Euphorbia parviflora</i>	Euphorbiaceae	Annual herb
48	<i>Euphorbia microphylla</i>	Euphorbiaceae	Annual prostrate herb
49	<i>Phyllanthus urinaria</i>	Euphorbiaceae	annual herb
50	<i>Phyllanthus fraternus</i>	Euphorbiaceae	Annual herb
51	<i>Tribulus terrestris</i>	Zygophyllaceae	Prostrate herb
52	<i>Centella asiatica</i>	Apiaceae	Perennial herb with runner
53	<i>Physalis minima</i>	Solanaceae	Annual herb
54	<i>Solanum sisymbriifolium</i>	Solanaceae	Perennial prickly herb
55	<i>Evolvulus nummularius</i>	Convolvulaceae	Perennial prostrate herb
56	<i>Evolvulus nummularius</i>	Convolvulaceae	Annual prostrate herb
57	<i>Coldenia procumbens</i>	Boraginaceae	Perennial herb
58	<i>Heliotropium indicum</i>	Boraginaceae	Annual herb
59	<i>Leucas aspera</i>	Lamiaceae	Annual aromatic herb
60	<i>Leucas cephalotes</i>	Lamiaceae	Annual herb
61	<i>Leonurus japonicus</i>	Lamiaceae	Annual herb
62	<i>Scoparia dulcis</i>	Scrophulariaceae	Annual herb
63	<i>Cleome viscosa</i>	Capparidaceae	Annual herb
64	<i>Cleome rutidosperma</i>	Capparidaceae	Annual herb
65	<i>Cleome gynandra</i>	Capparidaceae	Annual herb
66	<i>Bulbostylis densa</i>	Cyperaceae	Annual herb
67	<i>Brachiara reptans</i>	Poaceae	Perennial herb
68	<i>Brachiaria distachya</i>	Poaceae	Perennial herb
69	<i>Dichanthium annulatum</i>	Poaceae	Annual herb
70	<i>Echinochloa stagnina</i>	Poaceae	Annual herb
71	<i>Leptochloa chinensis</i>	Poaceae	Annual herb
72	<i>Hybanthus enneaspermus</i>	Violaceae	Annual herb






Name	Photographs	Name	Photographs
<i>Alternanthera ficoides</i>		<i>Mikania scandens</i>	
<i>Basella alba</i>		<i>Oxalis corniculata</i>	
<i>Coccinia cordifolia</i>		<i>Peperomia pellucida</i>	
<i>Dentella repens</i>		<i>Sida rhombifolia</i>	
<i>Eclipta prostrata</i>		<i>Wedelia trilobata</i>	






Selected photographs of the weeds found in the campus


Table 17: Butterfly species in the campus

Sl.	Scientific Name	Common Name	Photograph
1	<i>Graphium agamemnon</i> (Linnaeus)	Tailed Jay	
2	<i>Papilio polytes</i> (Linnaeus)	Common Mormon	
3	<i>Atrophaneura aristolochiae</i> (Fabricius)	Common Rose	
4	<i>Eurema hecabe</i> (Linnaeus)	Common Grass Yellow	
5	<i>Catopsilia pyranthe</i> (Linnaeus)	Mottled Emigrant	

Sl.	Scientific Name	Common Name	Photograph
6	<i>Cepora nerissa</i> (Fabricius)	Common Gull	
7	<i>Appias libythea</i> (Fabricius)	Striped Albatross	
8	<i>Leptosia nina</i> (Fabricius)	Psyche	
9	<i>Danaus chrysippus</i> (Linnaeus)	Plain Tiger	
10	<i>Euploea core</i> (Cramer)	Common Crow	

Sl.	Scientific Name	Common Name	Photograph
11	<i>Melanitis leda</i> (Linnaeus)	Common Evening Brown	
12	<i>Mycalesis perseus</i> (Fabricius)	Common Bushbrown	
13	<i>Ypthima huebneri</i> Kirby	Common Four-ring	
14	<i>Ariadne ariadne</i> (Linnaeus)	Angled Castor	
15	<i>Ariadne merione</i> (Cramer)	Common Castor	

Sl.	Scientific Name	Common Name	Photograph
16	<i>Junonia atlites</i> (Linnaeus)	Grey Pansy	
17	<i>Tarucusnara</i> Kollar	Rounded Pierrot	
18	<i>Zizeeria karsandra</i> (Moore)	Dark Grass Blue	
19	<i>Euchrysops cnejus</i> (Fabricius)	Gram Blue	
20	<i>Chilades lajus</i> (Stoll)	Lime Blue	

Sl.	Scientific Name	Common Name	Photograph
21	<i>Borbo cinnara</i> (Wallace)	Rice Swift	





Avian diversity in the campus



Mammal biodiversity in the campus

3.4.2 Green Campus Initiatives

Swachh Bharat Abhiyan

A cleanliness programme was organized on 16th December, 2022 at 3.30 pm at the premises of New Science building of Rammohan College and the Rammohan Sarani. Total 44 volunteers and 3 teachers attended the campaign. On that day, all the NSS volunteers participated to clean the adjacent path of the college and the nearby street. They picked up the junk from the campus, along the streets and also swept the whole surrounding. Then they spread bleaching powder. This programme was arranged to make the students understand the importance of cleanliness, how they can keep their surrounding clean and also to make them aware of their duty as a responsible member of the community.



Cleanliness Drive in the Campus

3.4.3 Sustainable Practices

- Restricted entry of automobiles
- Walking is encouraged for internal transport.
- Institute has initiated banning plastic in the campus.
- Email/ electronic communication mode is preferred to save papers.
- Both side printing is being adopted to save paper and trees.
- The premises have fire extinguishers installed at required locations which are regularly checked and maintained.
- The campus has established lift and ramp for easy movement of disabled persons.

3.4.4 Green Mindset

- Minimization of waste and proper disposal of e waste
- Composting of leaf litters and use of the compost in gardens
- Utilization of renewable energy resources like solar energy
- Maintenance of the local vegetation and fauna
- Landscaping in the campus to reduce the ambient temperature in the campus

3.5 Carbon Foot Print Analysis

Table 18: Carbon Foot Print Analysis

Sl. No.	Parameter	Numbers	Annual CO ₂ emission
1	Total no. of vehicles used by the stakeholders (per day)	5bikes+10car	(4680 +1903) = 6583 kg CO ₂ (considering 10 km distance travelled in 6 days a week)
2	No. of Cycles used.	5	-
3	No. of two wheelers used		
3a	Average distance travelled (per day)	Within 5km	
3b	Quantity of Fuel Used (per day)		
4	No. of four wheelers used		
4a	Average distance travelled (per day)		
4b	Quantity of Fuel Used (per day)		
5	No. of persons using public transportation	Most	
6	No. of persons using college conveyance		
7	No. of generators used per day		
7a	Amount of fuel used		
8	No. of LPG cylinders used in canteens	6 commercial cylinders	170.4 kg CO ₂
9	No. of LPG cylinders used in labs	14.2 kg X2 (Chemistry Lab), 5 kgX2 (Zoology lab)	43.5 + 15 = 58.5 kg CO ₂
10	Reams of paper used		
11	Paperless works to reduce paper usage		
12	Use of any other fossil fuels in the college		
13	Any efforts to reduce the use of fuels		

As per the estimates from the Central Electricity Authority, the weighted average emission factor for the Indian power grid stands at 0.79 kg CO₂/kWh. Hence, the total CO₂emission in a year from electricity consumption of the New Science Building is equivalent to 30575Kg CO₂ and 13372 kg CO₂ in the hostel.

Carbon Credit



Parties that have ratified the Kyoto Protocol and made commitments (Annex B Parties, of which India is one) have set goals for restricting or lowering emissions. The levels of permitted emissions, or assigned amounts, for the 2008–2012 commitment period are used to express these aims. Units of allocated amount (AAUs) are used to categorize the permitted emissions. According to Article 17 of the Kyoto Protocol, nations with spare emission units—that is, emissions that are allowed but not "used"—can sell their excess capacity to other countries that have exceeded their targets through the mechanism of emissions trading. As a result, emission removals or reductions became a new product. Since the main greenhouse gas is carbon dioxide, trade in carbon is the term used. These days, carbon is traded and tracked. As a result, emission removals or reductions became a new product. Since the main greenhouse gas is carbon dioxide, trade in carbon is the term used. These days, carbon is traded and tracked just like any other commodity. We refer to this as the "carbon market or carbon credit."

A country having an emission-reduction or emission-limitation commitment under the Kyoto Protocol (Annex B Party) may carry out an emission-reduction project in developing nations under the Clean Development Mechanism (CDM), as outlined in Article 12 of the Protocol. These initiatives have the potential to generate marketable certified emission reduction (CER) credits, which are worth one tonne of CO₂ apiece and can be applied toward reaching the Kyoto targets. An example of a CDM project activity would be installing more energy-efficient lights or bulbs or doing a solar-powered electrification project in an area. While providing industrialized nations with considerable leeway in meeting their carbon reduction or limitation targets, the mechanism promotes sustainable development and emission reductions. Rammohan

College always abide by the rules or article 17 of Kyoto Protocol as “Law abiding College of India” and also try to generate awareness in the society.

A carbon credit can be calculated as a unit of exchange that individuals and firms alike use to offset their greenhouse gas (GHG) emissions. One carbon credit, or offset in the voluntary carbon market (VCM), is equal to one metric tonne of Green House Gas reduced or avoided from entering the atmosphere. In other words, a carbon credit is worth one tonne of CO₂ equivalent (tCO₂e) emissions which is equivalent to 556.2m³ of volume. “Carbon dioxide equivalent (tCO₂e)” is the standard unit for counting greenhouse gas emissions whether they're from CO₂ or another GHG.

In Rammohan College campus, 135 tubes (40 watts) have been replaced with LED (20 watts) resulting savings of 3369 kWh electricity annually. The calculation is made considering operation time of 6 hours daily for 8 months. The average carbon intensity for electricity generation in India is around 0.82 kilograms of CO₂ per kilowatt-hour (kgCO₂/kWh). Hence, the installation of LED lights have resulted in a reduction in CO₂ emission by 2763 Kg every year equivalent to 2.76 carbon credit.

The College has successfully installed 2 sets of 5 KWp Roof Top Solar PV Power Plant on the rooftop. In general, a 10 kW solar system produces about 40 units of electricity per day on average leading to 9600 kWh annually (considering 8 months operation time). This step has made a reduction in CO₂ emission by 7872 Kg every year equivalent to 7.87 carbon credit. All together on an average the carbon credit score becomes 10.63.

4. Suggestions and Recommendations

4.1 Water Management

- Expansion of the present Rain Water Harvesting is very essential to ensure efficient water conservation. The roof top area can be used to harness rain water especially in monsoon season which can be used for daily routine work or ground water recharging after careful monitoring.
- Monitoring of water consumption will be required for ensuring water efficiency. Water meter to be installed to monitor the consumption. The water meter readings to be recorded every day or every week at a fixed time.
- It is recommended to check water quality from water source for dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, and conductivity, total dissolved solids and E-coli/ coliform.
- The wash basin taps may be equipped with water saving fixtures.
- The flush tanks of the toilets may be fitted with dual volume system.
- Awareness campaigns and signboards need to be displayed on every floor.
- A detailed water use and management plan should be prepared and displayed.

4.2 Energy Management

- The energy audit recommends to avoid the use of more energy consuming electrical appliances and to replace with more environment friendly and energy efficient appliances (for example five stars rated Air conditioner, star rated fans) in the college.
- Ceiling fans have a very good scope for reducing power consumed using a technology called Brushless DC Motor or simply BLDC motor. BLDC technology, in general, has been in the market for a couple of decades. The traditional fan uses an induction motor and typically consumes 70- 90 watts. But BLDC fan, on the other hand, can reduce power consumption up to 65%.
- Prominent advantages of BLDC motor over induction motor are Lower Electricity Consumption, Longer backup on Inverters (even on Solar), improved reliability, Noise reduction, longer lifetime.

- The Hostel and other facilities may use solar heating units to reduce electricity consumption.
- College may adopt sensor-based (occupancy sensors) energy conservation approach for offices, classrooms and washrooms as well.
- College may also replace all existing tube lights with LEDs.
- To increase the carbon offset, it is recommended to extend the Solar PV for not just college building but also for hostel.
- More frequent awareness campaigns to be organized and signboards need to be displayed on every floor.

4.3 Waste Management

- College must arrange color coded, covered and separate waste bin for efficient segregation and disposal of waste at accessible location on each and every floor.
- Workshops need to be conducted regarding stages of waste management and 3R scheme.
- College may undertake feasibility study to install sewage water treatment in the campus to recycle waste water and use it in flush or for gardening purpose.
- Leaf litter from the campus can be effectively used for aerobic/ vermi composting, so that the composted material can also be used as good manure.
- Laboratory waste may be managed efficiently to reduce any scope of contamination.
- Try to completely ban the use of plastic in the campus, and to encourage the use of biodegradable materials as alternatives. Try to achieve the goal of plastic free campus.
- Annual agreement with recyclers/ vendors for all kind of scraps and e waste needs to be followed up.
- Important and confidential reports/ papers can be sent for pulping and recycling after completion of their preservation period.
- Metal waste, wooden waste, unused equipments and scraps should be sent to authorized scrap agents for further processing
- Awareness signboards/ posters need to be displayed on every floor.

4.4 Green Campus

- Maintenance of biodiversity is needed.
- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records.
- Nature Club may assign scientific and common name tags on the plants to spread awareness among students.
- College may consider planting tree on the land, away from city, managed by college to offset the carbon footprint.
- Emphasis may be given to develop kitchen garden and roof top garden giving emphasis on indoor and Bonsai plants.
- Students may be encouraged to engage in preparing People's Biodiversity Register (PBR) in and around the campus.
- Environment friendly lifestyles to be encouraged among students, teachers and non teaching staffs.

5. Green Audit Checklist

I. Water Efficiency & Wastewater Management			
Sl.No.	Measures	Status	Remarks
1	RO based water purifiers for drinking water	Yes	
2	Aerators to water taps	No	
3	Automatic toilet faucets	No	
4	Drip irrigation/ Sprinklers (for plant watering system)	No	
5	Dual flush toilet with cistern	No	
6	Dry mopping/ cleaning methods adopted	Yes	
7	Sewage treatment plant for sewage recycle	No	
8	Rain water harvesting		Going to install
9	Regular maintenance for leakage free plumbing system	Yes	
10	Use of low flow/ flow control water equipment or gadget	No	Manually controlled by the supervisor
11	Water balance diagram and water consumption monitoring at each Consumption level	No	Manually controlled by the supervisor
12	Routine monitoring of water quality		Internal assessment by the laboratories
13	Awareness signs displayed for promoting water conservation		
II. Energy Efficiency and On-site Energy Generation Mechanism			
Sl.No.	Measures	Status	Remarks
1	Maintaining correct lux levels (70-300 lux) to avoid excessive light	Yes	
2	Computerized monitoring of electrical system	No	
3	On-site energy generation (Diesel generators, LPG)	No	
4	Use of renewable energy (Solar, biogas)	Yes	Solar energy
5	Photocell occupancy sensor for automatic light control		In animal house

7	Regular maintenance of electrical system	Yes	
8	Use of energy efficient equipment like VFDs, maximum star rated equipment.	Yes	
9	Use of energy saving bulbs (Compact florescent light/LED lights)	Yes	
10	Awareness signage on electricity conservation	Yes	

III. Solid Waste Management

Sl.No.	Measures	Status	Remarks
1	Waste segregation practices and supporting hardware for waste segregation (Dry recyclable, organic, plastic, hazardous and E-waste)	Yes	Through proper process
2	Setting up recycling/ composting/ bio gas generation facility	No	Going to install
3	Minimize use of paper through digitalization	Yes	
4	Printing on both sides of paper/ Reuse of printed paper/ envelops	Yes	
5	Mechanism for collection & disposal of E-waste as applicable regulation	Yes	Through authorized vendor
6	Single use plastic free campus	Yes	
7	Inventories of waste generation and records of waste disposal		Yet to develop
8	Recycle/ archiving of paper waste		
9	Segregation of dry and wet waste		As per KMC regulation
10	Purchase of electronic products from companies which have service for disposal of product with buy back policy?	Yes	As per Government regulation
11	Recreating into new sustainable products	No	

IV. Good Day light Design

Sl.No.	Design Feature	Status	Remarks
1	Wide corridors open to daylight	Yes	
2	Broad doors and windows allowing daylight	Yes	

3	Building architecture which allows sunlight within buildings	Yes	
4	Presence of Skylight/ Rooflight	Yes	
5	Enough natural illumination in classrooms/ seminar halls/ laboratories	Yes	
6	Ultraviolet (UV) filtering windows/ Use of exterior louvers or light coloured fabric or blinds for windows to control glare	Yes	Only in the auditorium
7	Operable/ openable windows.	Yes	
8	Use of glass as facilitator of natural light	Yes	
9	Use of insulated and tinted glass to filter heat gain		In smart class room, auditorium and linguistic laboratory.

V. Ventilation

Sr. No.	Design Feature	Status	Remarks
1	Good ceiling height which allows internal air circulation	Yes	
2	Self-movement ventilators in the roof	No	
3	Wide windows and doors for classrooms, laboratories, seminar halls	Yes	
4	Wide corridors	Yes	
5	Operable louvers		
6	Exhaust fans in kitchen/ toilets	Yes	

VI. Temperature and Acoustic Control

Sl.No.	Design Feature	Status	Remarks
1	Roof design & type (Double/ False ceiling with plaster of paris etc.)	Yes	Auditorium, Principal's chamber and meeting room
2	Sand stone cladding/ tiling outside the walls	No	
3	Specially designed walls for temperature control, Sound noise barriers for windows/ walls		Auditorium and Linguistics Lab

4	Building construction allows diffused sunlight but not the heat. Specially designed glass walls/ windows with better U value/ factor depending upon climate conditions	Yes	Main campus (old building)
5	Use of insulation material (e.g. autoclaved aerated blocks, hollow blocks, Thermocrete etc.)	No	
6	Use of water bodies/ fountain to maintain temperature within campus	Yes	
7	Climbing creepers on the walls	No	
8	Retro fitting the existing roofs with cool roof technology		Shadow effect of solar panel
9	Use of landscaping gas sound barrier	No	
10	Water free urinals (No flush urinals/ Zero flush urinals/ water less urinals/ air-based flushing system)	No	
11	Water balance diagram and water consumption monitoring at each consumption level	No	Manually maintained by supervisor
12	Routine monitoring of water quality	Yes	Internally monitored by laboratories
13	Awareness signs displayed for promoting water conservation	Yes	

VII. Environmental Audit

Sl.No.	Type of audit	Status	Remarks
1	Energy audit (includes energy consumption, thermal comfort, visual comfort)	Yes	
2	Sound/ Noise and lux level monitoring (including indoor noise level, outdoor noise level)	Yes	
3	Water and waste audit (including water consumption, quality, solid waste generation, solid waste disposal process)	Yes	
4	Safety Audit	Yes	In case of elevator installation

VIII. Universal Access and Efficient Operation and Maintenance of Building

Sl.No.	Design feature	Status	Remarks
1	Easy access to the main entrance of the building and minimum two	Yes	

	exits		
2	Energy efficient elevator	Yes	
3	Car pooling by staff and students/ use of Public transport/ Use of bicycles and battery-operated vehicles within campus		
4	Preferred car park spaces for differently abled	Yes	New building
5	Ramp/ stairs with handrails on at least one side	Yes	New building
6	Restrooms (toilets) in common areas/ Restroom for differently abled	Yes	New building
7	Braille assistance for differently abled	No	Going to procure
8	Availability of wheelchair	Yes	
9	Emergency response plan for natural and manmade emergencies	Yes	
10	Fire exits, assembly points, first aids, firefighting systems	Yes	
11	Regular maintenance of building	yes	

IX. Green Program

Sl.No.	Green program	Status	Remarks
1	Upcycling of waste. Recycling beyond books i.e. paper, aluminium, plastic, e-waste	Yes	By authorized vendor
2	Creation of “GreenTeam” in the institution/ library	Yes	BASUDHA
3	Awareness programs on environment, energy management & safety (external Sessions and academic courses)	Yes	NSS
4	Outreach, activities, green programs (Tree plantation, waste segregation, plastic waste collection, cleaning etc.) records/ photos of programs	Yes	NSS
5	Presence of system/ methodology available for implementation of green initiatives and green projects (long term system-based continuity and not an isolated/ stand alone activity)	Yes	NSS
6	Mindset for reduction, recycle of waste (Green mindsets)	Yes	KS
5	Digitization	Yes	

6	E-archiving	Yes	
7	E-resources: E-books, Online Journals, membership of consortium		Departmental library
8	Maintaining green campus/ Greening of campus	Yes	

References

- Mitra, S., Barik, M. Biswas, A. & Dey, S.R. (2023a) Butterfly Richness of Rammohan College, Kolkata, India: An Approach towards Environmental Audit. *International Journal for Research in Applied Science & Engineering Technology*, 11(5), 6297-6304.
- Mitra, S., De, M. Chowdhury, K. D., & Dey, S.R. (2023b). Relation between Air Quality Index (AQI) and Butterfly richness: a study from environmental audit of Rammohan College. *International Advanced Research Journal in Science, Engineering and Technology*, 10(5), 778-782.
- Acharjee, S., Ghosh, S., Paul, S. K., Chowdhury, K. D., & Dey, S. R. (2023). Comparison of environmental stress in relation to infrastructure of old and new building of Rammohan College, Kolkata, West Bengal. *International Journal of Research and Analytical Reviews*, 10(2), 759-764.

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Ref.

Date 03.05.2023

INTERNAL GENDER AUDIT 2018-2019

INTERNAL GENDER AUDIT 2019-2020

INTERNAL GENDER AUDIT 2020-2021

INTERNAL GENDER AUDIT 2021-2022

Konishendu Sengupta 05/23
Co-ordinator
IQAC
Rammohan College
Kolkata

S Sanyal
03/05/2023

Principal
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Kolkata-9





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Ref.

Date 10.05.2019

INTERNAL GENDER AUDIT 2018-2019

Rammohan College takes special pride in its efforts to gender sensitize its students, teaching and non-teaching staff. Gender Audit became an integral part of assessing a College's holistic development in the "Saksham Measures for ensuring the Safety of Women and Programmes for Gender Sensitisation on Campuses" Guidelines of 2013. In keeping with the UGC Saksham Guidelines, the College has undertaken an internal gender audit to annually assess the measures taken by the College to establish a gender equal, gender equitable campus. The College is committed to raising gender awareness among her students.

The members of the Internal Gender Audit Team are the same as the members of the Women's Cell of the College.

The Internal Complaints Committee was constituted in the year 2018. Members have a three year term. As per the GSCASH Guidelines the ICC functions as a redressal as well as awareness gender sensitizing platform. Rammohan College has delegated the task of gender sensitization to the Women's Cell of the College.

The College has a well functioning Women's Cell which is a requirement under Saksham Measures for ensuring the Safety of Women and Programmes for Gender Sensitisation on Campuses" Guidelines of 2013. The members have a term of three years, after which the body will be re-constituted by the Governing Body of the College. The Women's Cell was re-constituted in the year 2018 after following the *due process*.

The members of the Women's Cell 2018- 2021 are –

Convenor –

Prof. Shakuntala Bhaduri

Prof. Manisha Mukherjee

Krishnendu Sanyal
Co-ordinator 10/05/19
I Q A C
Rammohan College
Kolkata



S Sanyal
10/05/2019

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Date 10.05.2019

Members –

Prof. Uttama Ray

Prof. Kakali Chatterjee

Prof. Manjusree Mukherjee

Prof. Jayanti Sen

Internal Complaints Committee (ICC) members are –

- | | |
|-------------------------------------|-------------------|
| 1. Prof. Manisha Mukherjee | Presiding officer |
| 2. Prof. Uttama Ray | member |
| 3. Prof. Manjusree Bandopadhyay | member |
| 4. Prof. Kakali Chatterjee | member |
| 5. Prof. Sayonti Mitra | member |
| 6. Prof. Tapas Narayan Ray | member |
| 7. Librarian Ms. Adwitiya Chowdhury | member (NTS) |

As early as 1983 the College authorities realized that to truly fulfill Raja Rammohan Roy's vision of educating the girl child, they would have to provide hostel facilities for women studying in their college. A hostel would provide a safe and secure environment to women coming from far way places to study in Kolkata. Thus Rammohan College began a hostel facility in a rented place in 1983. Later in 1988 it would buy a land, which is the site of the current hostel, for ensuring a protected environment for those who came to her college for studies. We are proud to mention that Rammohan College is among the handful of colleges in the city that provide for such a facility to its students. As one step closer to bridging the gender gap in education, Rammohan College is proud of its hostel facility.

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Kolkata



SSanyal
10/05/2019
Principal
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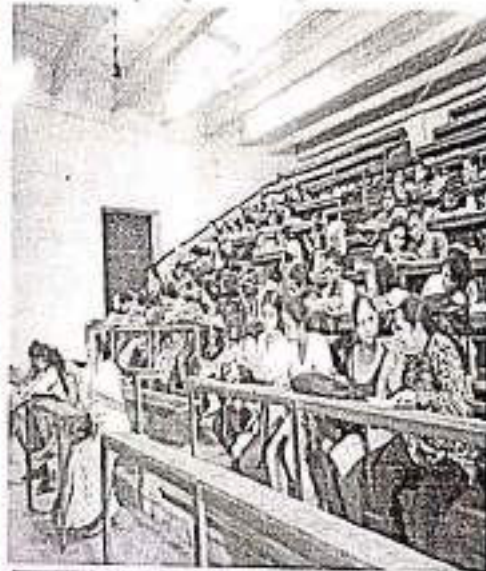
Ref.
Gender Awareness Activities 2018-2019

Date 10.05 2019

1. Event: Personal Health and Hygiene of Women. Visit to Chaltabagan slum.

Date: 04.09.2018.

Awareness in health and hygiene in slum areas is critical for a safe and healthy society. Students engaged with slum dwellers of the Chaltabagan slum area and spread awareness reading the same



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S Sanyal
10/05/2019
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Ref.2.... Event: AIDS Awareness Programme (NSS)

Date10.05.2019

Date 01.12.2018

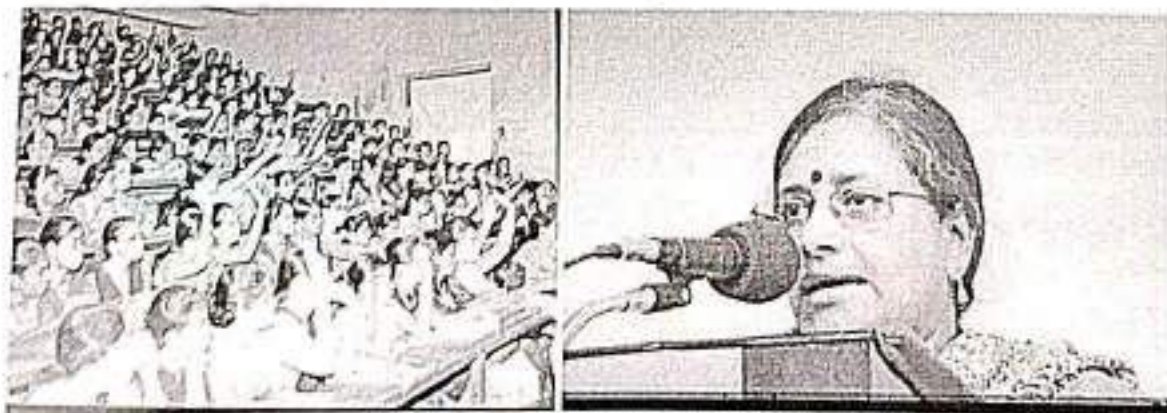
AIDS spread, precaution and misconceptions surrounding the disease.



3. Dr. Ishita Mukherjee – Gender sensitization talk (President AIWS)

Date 16.03.2019

Educational institutes need gender sensitization on campus. This was emphasized in the talk.



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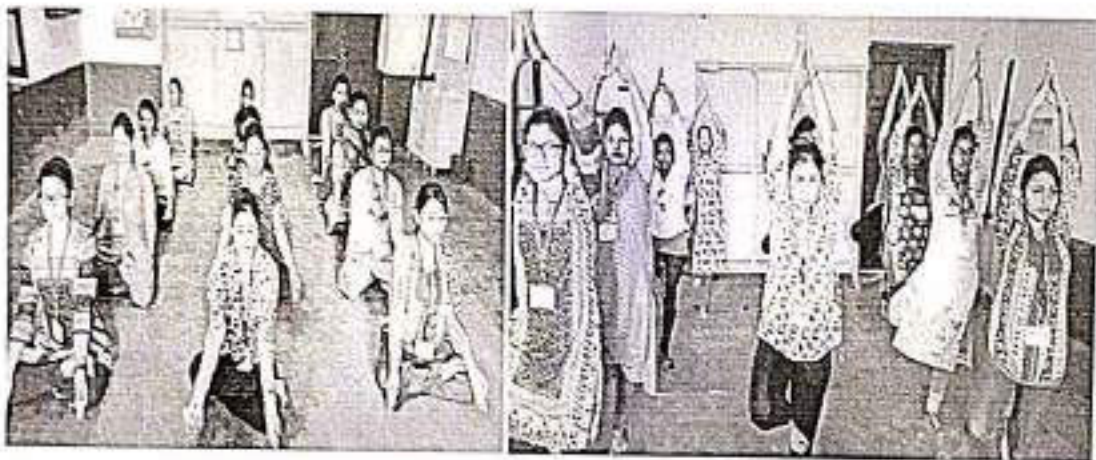
Ref.

Date 10.05, 2019

4. Event: International Yoga Day.

Date: 21.06.2019

Yoga is a matter of fitness and health for all. This was highlighted in the fitness camp.



Internal Gender Audit Team Findings –

1. The Team is pleased to note that there were no complaints with respect to gender harassment, sexual harassment as per the law or any form of gender abuse felt by any of the graduate/post graduate students, teaching and non-teaching staff of the college.
2. The Team recommends conducting more awareness camps on gender and health of students.
3. New students need to be made aware of the functioning of the Women's Cell through flyers and softcopy of the Saksham Guidelines 2013.

Conclusion

The College seeks to ensure a safe and secure campus environment to all its students and staff. In that measure much has been done through camps, seminars and other programmes. The ICC takes note of the fact that more such awareness generating programmes need to be conducted in the following years.

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Ref.

Date 12.05.2020

INTERNAL GENDER AUDIT 2019-2020

Rammohan College is committed to the cause of gender equality, gender equity and gender sensitization among its students and staff. It has undertaken special measures to sensitize its students, teaching and non-teaching staff even as the college is under lockdown due to the pandemic. Nevertheless, the college has kept up its practice of engaging with the students in the online mode. In keeping with the UGC Saksham Guidelines, the College has undertaken an internal gender audit to annually assess the measures taken by the College to establish a gender equal, gender equitable campus. Due to the lockdown it was not possible to physically conduct the audit. However, the members of the Audit team conducted an online assessment of the College.

The members of the Internal Gender Audit Team are the same as the members of the Women's Cell of the College.

The Internal Complaints Committee was constituted in the year 2018. Members have a three year term. As per the GSCASH Guidelines the ICC functions as a redressal as well as awareness gender sensitizing platform. Rammohan College has delegated the task of gender sensitization to the Women's Cell of the College.

The College has a well functioning Women's Cell which is a requirement under Saksham Measures for ensuring the Safety of Women and Programmes for Gender Sensitisation on Campuses" Guidelines of 2013. The members have a term of three years, after which the body will be re-constituted by the Governing Body of the College. The Women's Cell was re-constituted in the year 2018 after following the *due process*.

The members of the Women's Cell 2018- 2021 are –

Convenor –

Prof. Shakuntala Bhaduri

Prof. Manisha Mukherjee

Members –

Prof. Uttama Ray

Krishanu Saran
Co-ordinator
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S Saran
12/05/2020

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Ref.

Date 12.05.2020

Prof. Kakali Chatterjee

Prof. Manjusree Mukherjee

Prof. Jayanti Sen

Internal Complaints Committee (ICC) members are –

- | | |
|-------------------------------------|-------------------|
| 1. Prof. Manisha Mukherjee | Presiding officer |
| 2. Prof. Uttama Ray | member |
| 3. Prof. Manjusree Bandopadhyay | member |
| 4. Prof. Kakali Chatterjee | member |
| 5. Prof. Sayonti Mitra | member |
| 6. Prof. Tapas Narayan Ray | member |
| 7. Librarian Ms. Adwitiya Chowdhury | member (NTS) |

To further our commitment to mass education as envisioned by our mentor Raja Rammohan Roy, the College authorities realized that they would have to provide hostel facilities for women studying in their college. Hostel provision is a must for those who come from rural areas facing many challenges to study in the city. Women students face even more challenges in acquiring education. A hostel would provide a safe and secure environment to women coming from far way places to study in Kolkata. Thus Rammohan College began a hostel facility in a rented place in 1983. Later in 1988 it would buy a land, which is the site of the current hostel, for ensuring a protected environment for those who came to her college for studies. It is a matter of great pride that Rammohan College is among the few colleges in the city that has a hostel facility for its students. We take this as our special effort to ensure that no girl child is left behind in her pursuit of knowledge.

Kamishendu Sanyal 12/05/20
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S. Sanyal
12/05/2020

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Date 12.05.2020

Internal Gender Audit Team Findings –

1. The Team is pleased to note that there were no complaints with respect to gender harassment, sexual harassment as per the law or any form of gender abuse felt by any of the graduate/post graduate students, teaching and non-teaching staff of the college.
2. The Team recommends conducting more awareness camps on gender and health of students. Especially in the wake of the lockdown, many students may require counseling. The ICC can look into this matter.
3. In the light of the lockdown, students can be given online information on the functioning of the Women's Cell through flyers and softcopy of the Saksham Guidelines 2013.

Conclusion

The College seeks to ensure a safe and secure campus environment to all its students and staff. In that measure much has been done through camps, seminars and other programmes. The ICC takes note of the fact that students under lockdown need special care for their mental and physical health. While the ICC has addressed its students on mental health, it acknowledges that more needs to be done. ICC also notes that it has received no complaints with regards to harassment from any of its students.

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12/05/20



S. Sanjal
12/05/2020
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Date 05.05.2021

INTERNAL GENDER AUDIT 2020-2021

In the wake of the COVID pandemic which caused colleges and schools to shut down for all of 2020 and up to the filing of this report in June 2021, the College has tried its best to keep the needs of its students in the core of its functioning. Rammohan College remains committed to the cause of gender equality, gender equity and gender sensitization among its students and staff. In keeping with the UGC Saksham Guidelines, the College has undertaken an internal gender audit to annually assess the measures taken by the College to establish a gender equal, gender equitable campus. Due to the lockdown it was not possible to physically conduct the audit. However, the members of the Audit team conducted an online assessment of the College.

The members of the Internal Gender Audit Team are the same as the members of the Women's Cell of the College.

The Internal Complaints Committee was constituted in the year 2018. Members have a three year term. As per the GSCASH Guidelines the ICC functions as a redressal as well as awareness gender sensitizing platform. Rammohan College has delegated the task of gender sensitization to the Women's Cell of the College.

The College has a well functioning Women's Cell which is a requirement under Saksham Measures for ensuring the Safety of Women and Programmes for Gender Sensitisation on Campuses" Guidelines of 2013. The members have a term of three years, after which the body will be re-constituted by the Governing Body of the College. The Women's Cell was re-constituted in the year 2018 after following the *due process*.

The members of the Women's Cell 2018- 2021 are –

Convener –

1. Prof. Shakuntala Bhaduri
2. Prof. Manisha Mukherjee

Members –

1. Prof. Uttama Ray
2. Prof. Kakali Chatterjee

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05/05/2021
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Date 05.05.2021

3. Prof. Manjusree Mukherjee
4. Prof. Jayanti Sen

Internal Complaints Committee (ICC) members are –
Presiding officer

1. Prof. Manisha Mukherjee

Members

2. Prof. Uttama Ray
3. Prof. Manjusree Bandopadhyay
4. Prof. Kakali Chatterjee
5. Prof. Sayonti Mitra
6. Prof. Tapas Narayan Ray
7. Librarian Ms. Adwitiya Chowdhury

(NTS Representative)

As early as 1983 the College authorities realized that to truly fulfill Raja Rammohan Roy's vision of educating the girl child, they would have to provide hostel facilities for women studying in their college. Thus Rammohan College began a hostel facility in a rented place in 1983. Later in 1988 it would buy a land, which is the site of the current hostel, for ensuring a protected environment for those who came to her college for studies. We are proud to mention that Rammohan College is among the handful of colleges in the city that provide for such a facility to its students. However with the pandemic there are fewer students willing to risk studying in colleges far away from their homes. Thus the demand for hostel seat has fallen greatly. It is hoped that there will be a reversal of this worrying trend in future. After all, the College seeks to mitigate the challenges COVID has posed on women specifically.

Gender Awareness Activities 2020-2021 are –

1. Online talk on Vishakha Guidelines and the ICC. Speaker Dr. Basabi Chakraborty
Dept. of Sociology, RBU
Talk was organized during the pandemic COVID period. This talk informed students of the sexual harassment laws that are provided in the Vishakha Guidelines and the importance of the ICC.

Date: 13.01.2021

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05/05/2021

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Ref.

Date 05.05.2021

RAMMOHAN COLLEGE
102/1, 85A, 85B, 85C & 85D-RAJA
RAMMOHAN SARANI, KOLKATA-700009

ORGANIZED BY
IQAC IN COLLABORATION WITH WOMEN'S CELL
AND INTERNAL COMPLAINTS COMMITTEE

Date: 13th January, 2021 Time: 9:30 am onwards

ONLINE TALK: ON VISHAKHA SUBSIDIARIES AND ICC

Speaker
Prof. Haathi Chakrabarty
Department of Zoology
Rabindra Bharati University
Kolkata

ALL ARE CORDIALLY INVITED

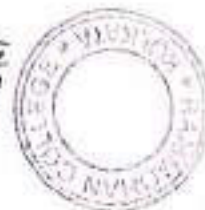
Internal Gender Audit Team Findings –

1. The Team is pleased to note that there were no complaints with respect to gender harassment, sexual harassment as per the law or any form of gender abuse felt by any of the graduate/post graduate students, teaching and non-teaching staff of the college.
2. More Online gender awareness seminars can be held for the betterment of the students and staff.

Conclusion

The College seeks to ensure a safe and secure campus environment to all its students and staff. Due to the Lockdown it has been a bit tough to conduct gender sensitization programmes for students and staff in full measure. The ICC seeks to rectify that. ICC also notes that it has received no complaints with regards to harassment from any of its students.

Korishmendu Sarcar 05/05/21
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05/05/2021
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Date 11.05.2022

INTERNAL GENDER AUDIT 2021-2022

Rammohan College is committed to the cause of gender equality, gender equity and gender sensitization among its students and staff. The college has kept up its practice of engaging with the students in the hybrid mode of online and offline interaction. In keeping with the UGC Saksham Guidelines, the College has undertaken an internal gender audit to annually assess the measures taken by the College to establish a gender equal, gender equitable campus. This year the ICC body as well as the Women's Cell was reconstituted.

The members of the Internal Gender Audit Team are the same as the members of the Women's Cell of the College.

The Internal Complaints Committee was reconstituted in the year 2022 (meeting following the lifting of the lockdown). Members have a three year term. As per the GSCASH Guidelines the ICC functions as a redressal as well as awareness gender sensitizing platform. Rammohan College has delegated the task of gender sensitization to the Women's Cell of the College.

The College has a well-functioning Women's Cell which is a requirement under Saksham Measures for ensuring the Safety of Women and Programmes for Gender Sensitisation on Campuses" Guidelines of 2013. The members have a term of three years, after which the body will be re-constituted by the Governing Body of the College. The Women's Cell was re-constituted in the year 2022(meeting following the lifting of the lockdown) after following the *due process*.

The members of the Women's Cell 2022- 2025 are –

Women's Cell – Joint Conveners

1. Prof. Uttama Ray
2. Prof. Kakali Chatterjee

Members:

3. Prof. Suratna Ganguly
4. Prof. Jayanti Sen
5. Prof. Shrabani Sen
6. Prof. Moumita Datta

Konidwartha Saha 11/05/22
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S. Sanyal
11/05/2022
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Date ...11.05.2022

Members of the ICC are – 2022-2025

Presiding Officer

Prof. Uttama Ray

Members:

1. Prof. Kakali Chatterjee
2. Prof. Debjanee Ganguly
3. Librarian Ms. Gargi Das
4. Student- Jhanjhar Gupta
5. Student- Juhi Seth
6. Non-Teaching Staff- Surajit Murmu
7. Ms. Sharmista Mukherjee, President, State-level Human Rights Council of India (Rammohan Alumnus)

Committed to mass education and specifically the education of women, the College undertook the arduous task of establishing a hostel for its students. Rammohan College began a hostel facility in a rented place in 1983. Later in 1988 it would buy a land, which is the site of the current hostel, for ensuring a protected environment for those who came to her college for studies. We are proud to mention that Rammohan College is among the handful of colleges in the city that provide for such a facility to its students. However with the pandemic there are fewer students willing to risk studying in colleges far away from their homes. Thus the demand for hostel seat has fallen greatly. It is hoped that there will be a reversal of this worrying trend in future. After all, the College seeks to mitigate the challenges COVID has posed on women specifically.

Konishnuade Sarma 11/05/22

Co-ordinator
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Kolkata



S. Sanyal
11/05/2022

Principal
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Date 11.05 2022

Gender Awareness Activities 2021-2022

1. **Event:** Health check-up camp. Organized by the NSS in collaboration with the Women's Cell and the ICC.

Date: 10.01.2022

Women's health is critical for them to be economically and socially independent. This camp emphasized on the need to keep health and fitness as priority in our daily routine.



2. **Event:** Awareness programme on 'mental health issues of adolescent girls'.

Date: 19.01.2022

Adolescent girls face specific challenges that need to be addressed. This awareness programme highlighted the importance of taking care of the mental health of adolescent girls.



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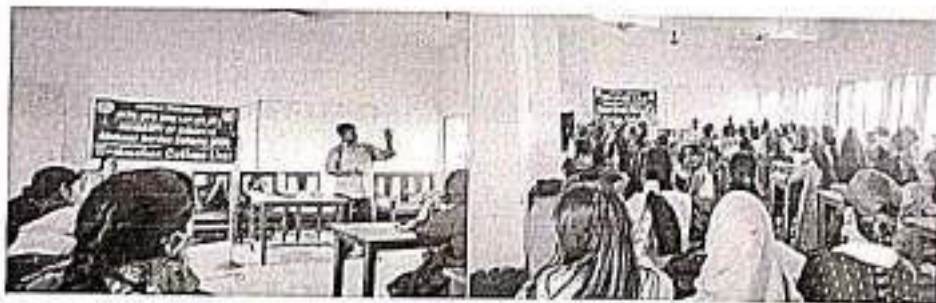
Ref.

Date 11.05 2022

3. **Event:** Awareness programme on 'Gender Inequality'.

Date: 25.02.2022

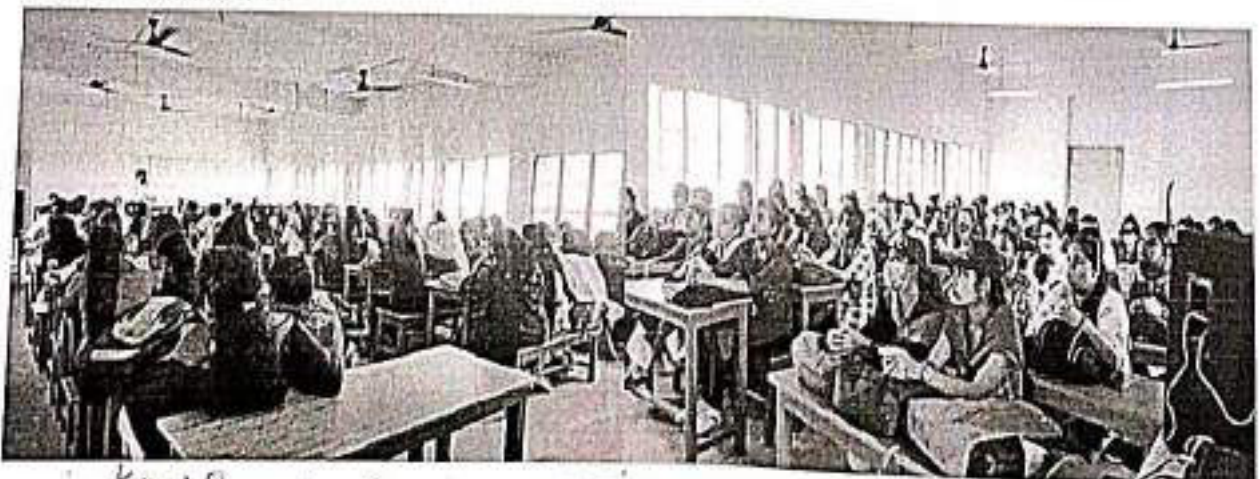
Gender inequality is present in every aspect of life. This was highlighted in the talk. This was appreciated by students.



4. **Event:** Talk on Domestic Violence talk by Dr. Rajiv Shah

Date: 28.02.2022

Domestic Violence is very common in India but not spoken about. There are laws to protect against domestic violence. The speaker spoke at length about the laws related to domestic violence.



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Co-ordinator
IQAC
Rammohan College
Kolkata



S. Sanyal
11/05/2022
Principal
Rammohan College
Kolkata-9



RAMMOHAN COLLEGE

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Date 11.05.2022

5. Event: AIDS Awareness by NSS

Date: 15.03.2022

AIDS awareness is extremely essential for our society. The camp ensured that such awareness regarding the spread of the disease and misconceptions around it was cleared.



6. Event: Women's education by NSS in collaboration with the ICC

Date: 22.03.2022

Educating a woman is educating a family. It is our responsibility to spread education to the furthest point for the betterment of the country. This was an awareness camp regarding the same.



Konkhendu Achary
Co-ordinator
IQAC
Rammohan College
Kolkata
11/05/22

S. Sanyal
Principal
Rammohan College
Kolkata-9
11/05/2022



ब्रह्मचर्यं सर्वस्य शिखरम्

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Date 11.05 : 2022

7. Event: Special Lecture – Topic – PrasangaNari: Rammohan o Vidyasagar – Shadrishya o Baishadrishya. Speaker: Prof.Tapati Mukherjee Vice-President, The Asiatic Society, Kolkata

Date: 03.05.2023

 **RAMMOHAN COLLEGE**
102/1 Raja Rammohan Sarani
Kolkata-700009

THE RAMMOHAN ROY MEMORIAL LECTURE SERIES
EVENT INAUGURATION
BY
PROF. SASWATI SANYAL, PRINCIPAL, RMC (PATRON)

SPECIAL LECTURE
ব্রহ্মচর্য: রামমোহন ও বিদ্যাসাগর - মানুষের ও কৈলনুশে
Speaker: PROF. TAPATI MUKHERJEE
Vice-President, The Asiatic Society, Kolkata
Date & Time: 03.05.2023 (Wednesday), New Science Building (Smart Class Room)
Time: 09:30 am
Organized By
Secretary and Publication Committee And IQAC, RMC



This lecture informed the audience regarding the similarities and dissimilarities between Ishwarchandra Vidyasagar and Rammohan Roy's thought on women. Their contribution to women's reform and the impact of these reforms on society was highlighted.

Internal Gender Audit Team Findings –

1. The Team is pleased to note that there were no complaints with respect to gender harassment, sexual harassment as per the law or any form of gender abuse felt by any of the graduate/post graduate students, teaching and non-teaching staff of the college.
2. Student's participation in gender seminars or debates is recommended.
3. Conducting a gender workshop is recommended.
4. Students can be given online and offline information on the functioning of the Women's Cell through flyers and softcopy of the Saksham Guidelines 2013. This can be done through flyers, standees and flex in public spaces that are accessible to all.

Conclusion

The College seeks to ensure a safe and secure campus environment to all its students and staff. The college has done this through camps, seminars and other programmes. The ICC takes note of the fact that student's active participation in gender discussions and workshops is required. Spreading awareness through flyers and posters is taken note of. ICC also notes that it has received no complaints with regards to harassment from any of its students.

Konishmunda Sanyal, 11/05/22
Co-ordinator
IQAC
Rammohan College
Kolkata



Principal 11/05/2022 6
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EXTERNAL GENDER AUDIT 2022-2023

Gender audit of educational institutions is a process for organizational assessment and a tool of action planning from a gender perspective. It examines the capacity and willingness of the institution to ensure a 'safe and secure' environment for women and girl students, faculty and administrative staff. The participatory audit process helps to identify institutional strengths and challenges to integrating gender, as well as gender equity in the institution's systems and operations and in programmes and activities. Moreover, gender audit encourages a dialogue between all stake holders in an educational institution from a positive, gender-oriented angle.

ABOUT THE COLLEGE

Named after one of the frontrunners of fighting for gender equality back in 19th century India, Rammohan College seeks to live up to the high standards set by its ideological mentor, Raja Rammohan Roy. Rammohan College, which is an all women's college, has contributed to the on-going process of nation building by instilling values of respect, responsibility and dignity among its students in the under-graduate level.

Rammohan College owes its origin to City College, Calcutta which is one of the oldest first grade Colleges in West Bengal. It was founded in 1881 by a band of patriotic and selfless Brahmo leaders like Ananda Mohan Bose, Pandit Sivnath Sastri and Umesh Chandra Dutta. Rastraguru Surendranath Banerjee later joined the College as teacher. Up to 1961 City College had a Women's Department in morning which has separately affiliated in 1961 to the Calcutta University and renamed as Rammohan College.

The aim of College according to the founders, is to promote the cause of education in its highest and widest sense, to make education a comprehensive training of the mind, heart and body, and founded on theistic basis conducive to the good of man and glory of God.

The College is open to all female students irrespective of race, creed or caste. It has a record of brilliant results. The College has a thriving Post-Graduate section in Bengali and Human Physiology. The Co-ed Human Physiology PG facility began in 2006-2007 and the co-ed Bengali PG facility began in 2014-2015. Rammohan College, an old and revered institution for women in Kolkata encourages annual gender audit and provides equal opportunities to



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girl students. The institution has zero tolerance for ragging and sexual harassment. The Grievance Redressal and Anti-Ragging cell and the Internal Complaints Committee (ICC) along with the Women's cell work in unison to keep the campus free from all discrimination and harassment.

The College has a multifaceted gender policy that tackles complaints as well as engages positively with its students and staff to raise awareness related to gender issues.

Gender Policy of the College –

- Promote an environment of gender equity in and through the institutions culture, ideology, practices and programmes.
- Ensure that the campus is a safe and secure for all genders, with no threat of abuse or harassment from peer, seniors or authority.
- Support equal pay for equal work.
- Ensure women have a good representation in all committees and decision making positions.
- Periodically hold gender awareness camps for students, teachers and the non-teaching staff to ensure that the campus and its people remain sensitive to issues pertaining to gender.
- Support those facing gender harassment on campus. Be accessible to all.
- Before induction, ensure all new recruits are made aware of gender issues.
- Orientation of all new students on gender related issues. Inform them of the working of the ICC and the Women's Cell.

WHAT IS A GENDER AUDIT?

A gender audit has been recently co-opted as a compulsory part of assessment of any organisation. The purpose of a gender audit is to assess an organisation's progress in institutionalizing gender equality in its practices, projects, budget and infrastructure among other things. The underlying sentiment behind an emphasis on a gender audit is the acknowledgment that institutional policy, practice, structure impact men and women differently. It is critical to progress of an organization and society at large to commit to gender equality and gender equity.



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It is in the home and school/college that young minds are molded to be the responsible, respectful and self-aware citizens. Therefore it is on the educational institutions to provide such an environment to its students. Rammohan College believes in providing a gender sensitive space to its students and staff where young minds are nurtured in an open, democratic and healthy environment.

In a measure to improve and give the best to its students and staff, Rammohan College, with the initiative of the Women's Cell and the IQAC, has conducted annual internal gender audits over the past few years. In a break from the past, in the year 2022-23 the College undertook an external gender audit to objectively assess its progress.

The main purpose of the audit is:-

1. To understand the gender equity, gender equality status in the College.
2. To identify the lacunae, if any, in gender equity measures taken by the College.
3. To envision a path for the future of the College which is even further committed to gender equality and gender equity on campus.

Rammohan College stands firm against any sort of gender discrimination and sexual harassment. The College actively promotes gender equality, gender equity through its practices, provisions of services, infrastructure and programmes. The College has a Psychological Counseling facility accessible to all students and staff. The College boasts of a Women's Hostel that hosts a number of students.

GENDER RELATED COMMITTEES

Women's Cell (For Sensitization, Policy Implementation, Monitoring And Grievance Redressal) in Higher Educational Institutions is an integral part of the NEP 2020. In that measure the College has a well functioning Women's Cell that looks into gender sensitization programmes, raising gender awareness, organizing talks and discussions and screening movies related to gender issues.

The Women's Cell comprises of the following members in accordance to the "Saksham Measures for ensuring the Safety of Women and Programmes for Gender Sensitisation on Campuses" Guidelines of 2013.



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Women's Cell – Joint Conveners

1. Prof.Uttama Ray
2. Prof.Kakali Chatterjee

Members:

3. Prof. Suratna Ganguly
4. Prof. Jayanti Sen
5. Prof. Shrabani Sen
6. Prof. Moumita Datta

The Women's Cell works closely with the Internal Complaints Committee which is a complaint redressal mechanism of the College. With the enactment of the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal Act 2013, (Sexual Harassment Act) in April 2013, sexual harassment is now considered as a violation of the fundamental right of a woman to equality as guaranteed under Article 14 and 15 of the Constitution of India and her right to life and to live with dignity as per Article 21 of the Constitution. The Internal Complaints Committee is a requirement under the Sexual harassment Act 2013.

The Internal Complaints Committee comprises of –

Presiding Officer

Prof.Uttama Ray

Members:

Prof. Kakali Chatterjee

Prof. Debjanee Ganguly

Prof. Mehfuz Alam (Invitee)

Prof. Nandini Neogi (Invitee)



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Librarian

Ms.Gargi Das

Student Representatives

Ms. Jhanjhar Gupta

Ms. Juhi Seth

Non-Teaching Representative

Surajit Murmu

NGO Activist

Ms. Sharmista Mukherjee (Rammohan College Alumnus)

President State-Level, Human Rights Council of India

External Expert

Dr. Ruchira Goswami

West Bengal National University of Juridical Science Kolkata

OBJECTIVES OF THE GENDER AUDIT EXERCISE

- The audit seeks to assess the measures undertaken by the College to spread gender equity and gender equality in campus.
- The audit will identify the strengths of the College and also highlight the areas which need further strengthening.
- Study the impact of gender policy of the College on its students and staff.
- Inculcate the need for further strengthening gender positive practices of the College.



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GENDER BALANCE IN STRUCTURE AND PRACTICE

What truly defines the commitment towards gender equity and closing the gender gap in society is the hostel facility provided by the College. The College authorities realized that to truly fulfill Raja Rammohan Roy's vision of educating the girl child, they would have to provide hostel facilities for women studying in their college. Thus Rammohan College began a hostel facility in a rented place in 1983. Later in 1988 it would buy a land, which is the site of the current hostel, for ensuring a protected environment for those who came to her college for studies. We are proud to mention that Rammohan College is among the handful of colleges in the city that provide for such a facility to its students. However with the pandemic there are fewer students willing to risk studying in colleges far away from their homes. Thus the demand for hostel seat has fallen greatly. It is hoped that there will be a reversal of this worrying trend in future.

In the year 2022 Rammhoan College started a counseling cell of the College to enable students who are facing challenges to mental health, to address them. This initiative shows the dedication of the College to give its best to its students and takes mental health care as seriously as physical health care. This Cell has received a good response from among the students. It is a matter of pride that the College looks after the well being of its students in a holistic manner.

This is an all-women's college at the graduate level. However, let us look at some charts that will show the gender distribution among staff, and post-graduate students.



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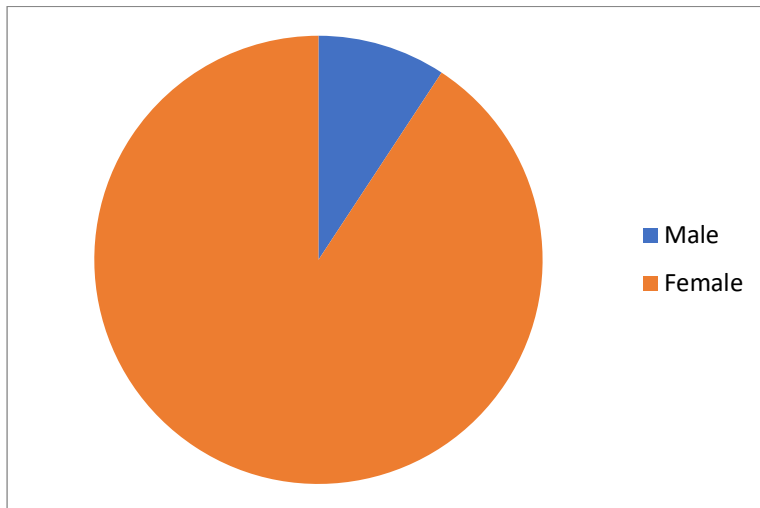
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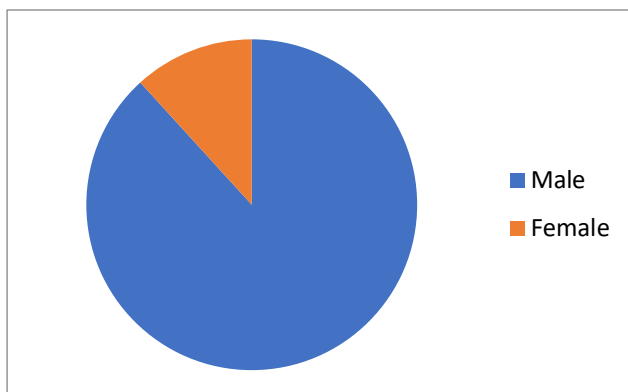
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Post Graduate (M.A. /M/Sc.) Male Female ratio



Male / female ratio NTS



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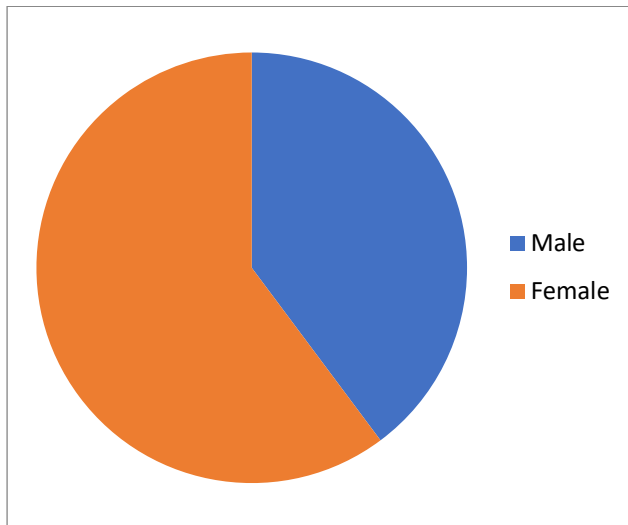
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Male / female ratio Teaching Staff



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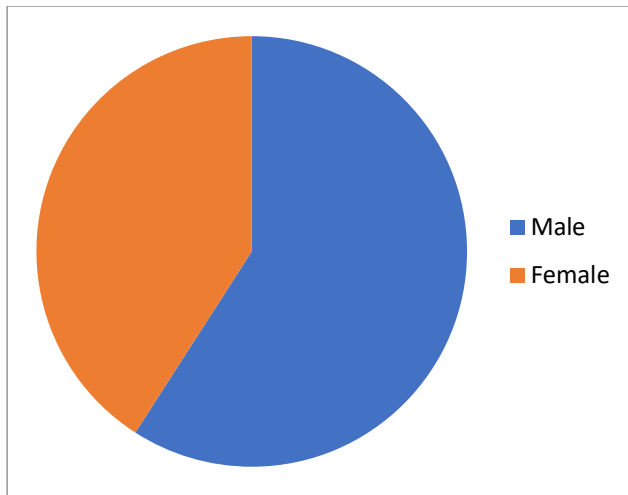
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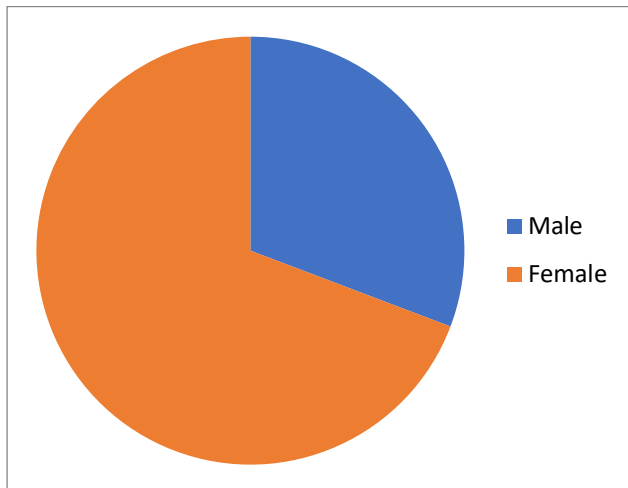
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College Sub-Committees

Academic Sub Committee Male Female ratio



Library Sub Committee Male Female ratio



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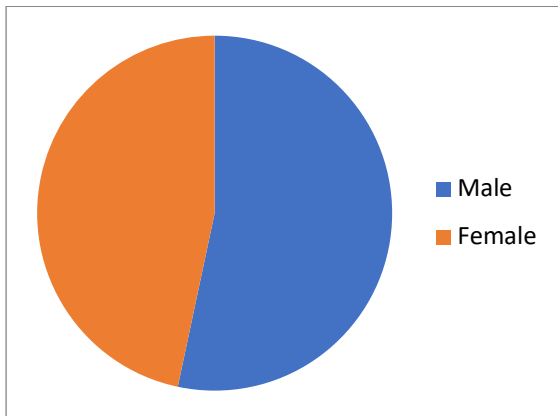
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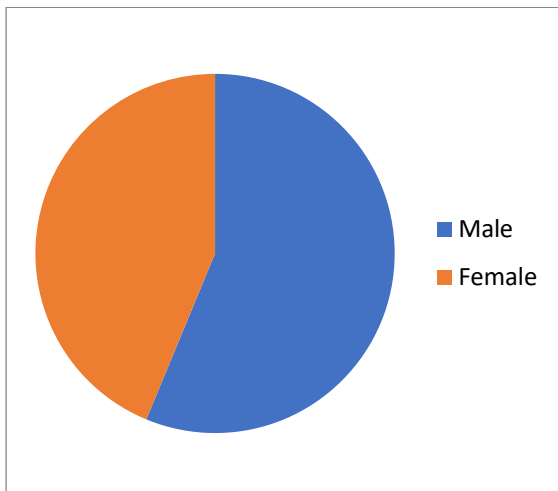
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UGC Sub-Committee Male Female ratio



Seminar and Publication Sub-Committee Male Female ratio



As is evident from the graphs above, there is equal representation of genders across varied committees.



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Following activities have been in collaboration with the ICC, IQAC and the Women's Cell of the College along with varied departments of the College.

1. **Event name:** Awareness programme on 'Human Rights' by Dr. Mehfuz Alam.

Date: 03.11.2022

This awareness programme on Human Rights was appreciated by students. It informed them of their legal rights as given to them by citizens.



2. **Event:** Awareness programme on Cancer-Breast, Uterine and Cervical By Prof. Samarendranath Banerjee

Date: 08.12.2022

Cancer awareness is critical for society. Women specific cancer awareness is less spoken of. This talk enlightened students regarding the women specific cancer.



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3. **Event name:** Awareness programme on 'Mental Health' by Dr. Mohit Ranadip.

Date: 13.12.2022

Mental health is neglected by society. This awareness programme addressed the need to take our mental health seriously especially among students.



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4. **Event:** Health Check-up Camp by NSS

Date: 17.12.2022



The health check-up camp addressed the need to take our health and fitness seriously. Students were made aware of the need to keep their health as priority.

5. **Event:** Film Screening- Bandit Queen, 12 Years a Slave

Date: 11.03.2023

Films have a visual impact that is a better way of educating students than text-book learning. Students appreciated the film screening.



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6. **Event:** Seminar on “Right to Say NO” (Women’s Cell in collaboration with ICC) by Ms. Mounie Banerjee

Date: 13.05.2023

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ORGANIZED BY
IQAC, NSS IN COLLABORATION WITH WOMEN'S CELL
AND INTERNAL COMPLAINTS COMMITTEE

Date: 13th May, 2023 Time: 10:30 am onwards

LECTURE TOPIC: RIGHT TO SAY 'NO'

Speaker:
PROF. MOUMIE BANERJEE
ASSISTANT PROFESSOR
DEPT. OF HISTORY
SRERAMPUR COLLEGE

VENUE: SMART CLASS ROOM, NEW SCIENCE BUILDING.
ALL ARE CORDIALLY INVITED



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Understanding consent is critical for a healthy and safe society. Women and girls too should be aware of their right to say NO.

- Event:** Rammohan College signed a Memorandum of Understanding with the Women’s College, Calcutta. On the occasion, Dr. Anupama Choudhury, Principal of Women’s College was invited to give a talk on ‘Sex, Gender and Politics of Identity in Contemporary India’ visited Rammohan College. Dr. Anupama Choudhury, Principal Women’s College, Kolkata, visited Rammohan College on 12/06/2023 and delivered an invited lecture on “SEX GENDER AND POLITICS OF IDENTITY IN CONTEMPORARY INDIA”. The Programme was conducted under the memorandum of understanding between Women’s College, Calcutta and Rammohan College, Kolkata.

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ORGANIZED BY
IQAC IN COLLABORATION WITH WOMEN'S CELL
AND INTERNAL COMPLAINTS COMMITTEE

Date: 13th May, 2023 Time: 10:30 am onwards

LECTURE TOPIC: SEX GENDER AND POLITICS
OF IDENTITY IN CONTEMPORARY INDIA

Speaker:
PROF. ANUPAMA CHOUDHURY
PRINCIPAL
WOMEN'S COLLEGE
KOLKATA
VENUE: ROOM NO.6

ALL ARE CORDIALLY INVITED



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8. Event: Talk on 'Psychology in Everyday Life'

Date: 01.02.2022.



9. Event: Talk on 'Stress And Trauma of Student Life'

Date: 06.02.2023



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- 10. Event:** Talk on ‘Mental Health and the Need for Psychological Counselling ’
Date: 02.02.2024



- 11. Event:** International Webinar on Agro-forestry and environment with emphasis on the Gender dimensions, Organised by Department of Geography, Rammohan College.
Date:24.09.2021

INTERNATIONAL WEBINAR ON "AGROFORESTRY"
ORGANIZED BY
DEPARTMENT OF GEOGRAPHY IN COLLABORATION WITH IQAC
RAMMOHAN COLLEGE
102/1-RAJA RAMMOHAN SARANI, KOLKATA-700009

Date: 24th September, 2021 (Friday); Time: 7.00 PM onwards

All are cordially invited

Inauguration by:  **DR. SASWATI SANJAL,**
Principal
Rammohan College, Kolkata
West Bengal, India

Lecture topic:
Agroforestry for sustainable crop production,
Income generation and climate change mitigation.

Distinguished speaker:  **DR. MD. ASLAM RAHMAN**
Professor
Dept. of Agroforestry and Environment,
Faculty of Agriculture
Bangabandhu Sheikh Mujibur Rahman
Agricultural University, Bangladesh

Google meet link: <https://meet.google.com/ijv-zhse-ash>

Organizing Committee:
Patron: Dr. Saswati Sanyal, Principal, Rammohan College, Kolkata
Chairman: Dr. Sibash Sarkar, Head of the Dept., Dept. of Geography
Convener(s): Dr. Chandrina Sen, Associate Professor, Dept. of Geography
Dr. Krishendu Sarkar, Associate Professor of Botany & IQAC Coordinator
Organizing Secretary:
Dr. Sobina Mondol, Assistant Professor of Chemistry & Secretary, Teachers' Council



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12. Event: State level Seminar on CPR and Women’s Health Related Issues, Organised by Department of Geography, IQAC, Rammohan College and ESI Institute of Pain Management, Kolkata.

Date: 31.03.2023



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RAMMOHAN COLLEGE

(Formerly City College W.Dept.)

102/1, Raja Rammohan Sarani, Kolkata – 700009

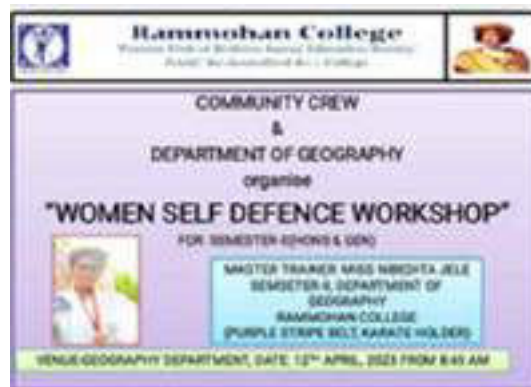
E-mail : rmc.tic85b@yahoo.in, rmc.principal@gmail.com

Accredited B++ Grade by NAAC

Ref.

Date.....20

- 13. Event:** Workshop on Self-Defense arrange by the Community Crew of Geography Department, Rammohan College.
Date: 31.03.2023.



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14. Event: Seminar-“Buddhirupen Sangstitha: Empowering Women, Enlightening the Society”

Theatrical performance related to the theme of the seminar.

Date: 12.10.2023.



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POLICY RECOMMENDATIONS

- 1) Have a tentative schedule of the activities to be held by the Women's Cell on the website so that students and staff are kept informed.
- 2) Maintain proper documentation. Need for keeping all records of activities in a more systematic manner.
- 3) Publish a Newsletter annually or have wall magazine which showcases student's participation through write ups, debates and discussions on gender related issues.

CONCLUSION

The Gender Audit Team assessed the college in its gender practices, structure and programmes. It noted that the institute is committed towards gender equality, gender equity and spreading gender awareness. The College has an environment which encourages students to be confident, responsible and self-aware citizens through its gender balanced staff, gender balanced distribution of responsibilities and an accessible/approachable teaching staff.

The College displays a steadfast commitment to gender issues and displays a willingness to increase its role and responsibility towards its students in spreading gender awareness, gender equality and gender equity. Towards that end the College has taken note of the Gender Audit Team's recommendations and pledges to go ahead with it in future.



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Rammohan College
102/1, R5A, R5B, R5C & R5D-Raja Rammohan Sarani
Kolkata-700009
West Bengal, India
GENDER AUDIT REPORT 2022-23

Audit Team:

Member of Audit Team	Signature
Dr. Saswati Saranyal, Principal, Rammohan College, Kolkata	 20/06/2023 Principal Rammohan College Kolkata-9
Dr. Krishnendu Sarkar, IQAC Co-ordinator, Rammohan College, Kolkata	 Co-ordinator IQAC Rammohan College Kolkata
Dr. Anupama Chowdhury, Principal, Women's College, Calcutta	 20.06.23 Principal Women's College Calcutta
Dr Indrani Basu Associate Professor, Berhampore College, Murshidabad.	 19.06.2023 COORDINATOR IQAC BERHAMPORE COLLEGE BERHAMPORE, MURSHIDABAD
Dr. Ishita Sirc Associate Professor, Scottish Church College, Kolkata	 20.06.2023



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Rammohan College
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Kolkata-700009
West Bengal, India
GENDER AUDIT REPORT 2022-23

Audit Team:

Member of Audit Team	Signature
Dr. Saswati Sanyal, Principal, Rammohan College, Kolkata	<i>Saswati Sanyal</i> Principal Rammohan College Kolkata-9
Dr. Krishendu Sarkar, IQAC Co-ordinator, Rammohan College, Kolkata	<i>Krishendu Sarkar</i> Co-ordinator IQAC Rammohan College Kolkata
Dr. Anupama Chowdhury, Principal, Women's College, Calcutta	<i>Anupama Chowdhury</i> Principal 20.06.2023 Women's College Calcutta
Dr. Indrani Basu Associate Professor, Berhampore College, Murshidabad.	<i>Indrani Basu</i> 19.06.2023 COORDINATOR IQAC BERHAMPORE COLLEGE MURSHIDABAD
Dr. Ishita Sur Associate Professor, Scottish Church College, Kolkata	<i>Ishita Sur</i> 20.06.2023 



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