



2023-2024

ENVIRONMENTAL AUDIT REPORT



PREPARED BY

DEPARTMENT OF BIOSCIENCES

SHRI RAM COLLEGE, MUZAFFARNAGAR

ENVIRONMENTAL AUDIT REPORT
OF
SHRI RAM COLLEGE, MUZAFFARNAGAR

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Executive Summary

The rapid destruction of the local, regional and global environment is driving us into a world of “environmental poverty.” Population stabilization, adoption of environmentally friendly and sustainable technologies, reforestation and ecological restoration are key elements to creating a just and sustainable future where people live in harmony with nature and its resources.

Therefore, educational leaders must initiate and support the mobilization of internal and external resources and knowledge to enable their institutions to respond to environmental challenges. As a college, SRC is deeply convinced and concerned about the urgent need to address the following issues and reverse the trend of environmental destruction.

We believe that humans should be stewards of nature and that we all play a vital role in preserving the planet's resources in the long term. As a College of higher education, SRC is aware of its responsibility towards environmental issues and has therefore decided to play a leading role in the education, research, policy development and knowledge exchange necessary for environmental travel.

This report is based on the approaches and interventions done on part of the College to address the environmental concerns of the SRC campus. The current environmental audit represents the first stage in our efforts to build environmental sustainability on the campus.

The audit was conducted by a team of faculty and students with support from various stake holders of SRC. It is indeed the reflection of SRC's endeavor to exercise leadership in promoting sustainability and an institutional obligation to instill among all students and each of us, and those in the broader community a sense of environmental stewardship.

This commitment of SRC has lead to actions whose reflection is visible remarkably on ground. This environmental audit conducted is not only significant for the institution, but also for the other institutions to emulate and adopt as a model and therefore contribute regionally as well as nationally in this endeavor of sustainable environment for all.



Introduction

1.1 Introduction to Environmental Audit

Environmental audit or environmental audit is a general term that refers to various tests designed to verify environmental compliance and management, the use of deviations and corrective actions. The aim is to identify environmental practices that will affect the eco-climate inside and outside the affected areas. Environmental audits are tools that can be used to determine how much energy or water is used; they can also be used to determine the type and volume of waste that can be used in recycling projects or to improve waste management services. It raises awareness of health and promotes a conscious, productive and ethical environment. Makes teachers, staff and students more aware of the impact of green on college.

1.2 Need for environmental audit

If self enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self enquiry is a natural and necessary outgrowth of a quality educational institution. Thus, it is imperative that SRC evaluates its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background, it becomes imperative to adopt the system of the “**Green Campus**” for the Institutes which will lead to sustainable development and at the same time reduces a sizable amount of atmospheric carbon dioxide from the environment.

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory that all Higher Educational Institutions should submit an annual Environmental audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

1.3 Objectives of environmental audit

Concern about environmental degradation and realization of values of environment are logical consequences of scholarly research, teaching and learning



process. In its pursuit for improving environmental quality and to maintain a pristine environment for the future generations of students, SRC has made a self-inquiry on environmental quality of the campus with the following objectives to achieve:

- i. Establishing a baseline of existing environmental conditions with focus on natural and physical environment;
- ii. Understanding the current practices of sustainability with regard to the use of water and energy, generation of wastes, purchase of goods, transportation, etc;
- iii. Awareness generation among students concerning real issues of environment and its sustainability
- iv. Promotion of environmental awareness through participatory auditing process; and
- v. To create a report that document baseline data of good practices and provide strategies and action plans towards improving environmental quality for future.



1.4 About the College

Shri Ram College, Muzaffarnagar, Uttar Pradesh is a NAAC (A++) Grade 22 years young college having 10 Departments/Faculties with 14 UG and 6 PG courses of various streams. The college is located on a beautiful campus of 25 acres. Accordingly, the College has launched Postgraduate teaching Programmes in Business Management, Financial Management, Computer Sciences, Information Technology, Chemistry, Botany, Zoology, Biotechnology, Computer Science, Physics, Electronics, Agriculture Microbiology, Fine Arts and News Studio etc. The objective identified for the College in the Act is to impart quality education and undertake research in basic and job oriented fields.

The College is located at Muzaffarnagar city NCR, 114 km from Delhi. The region in which the College is located has rich geographic, climatic and cultural diversity. The climate varies from tropical in the northern parts. The average temperature varies from 6-14°C during winters to 37-41°C during summers. The average annual rainfall is 150 mm. The teaching programmes designed by various Academic bodies of the College are interactive, flexible

and hands on; directed towards helping learners to gain the ability to confidence and effectively answer real life challenges. The vision of the College is *"Steady onward march for human development through science and technology on one hand and our national ethos on the other"* and the mission is *"Work towards preparing men and women who are intellectual adventurers and not camp followers; who are architects of the future and not curators of the past"*.



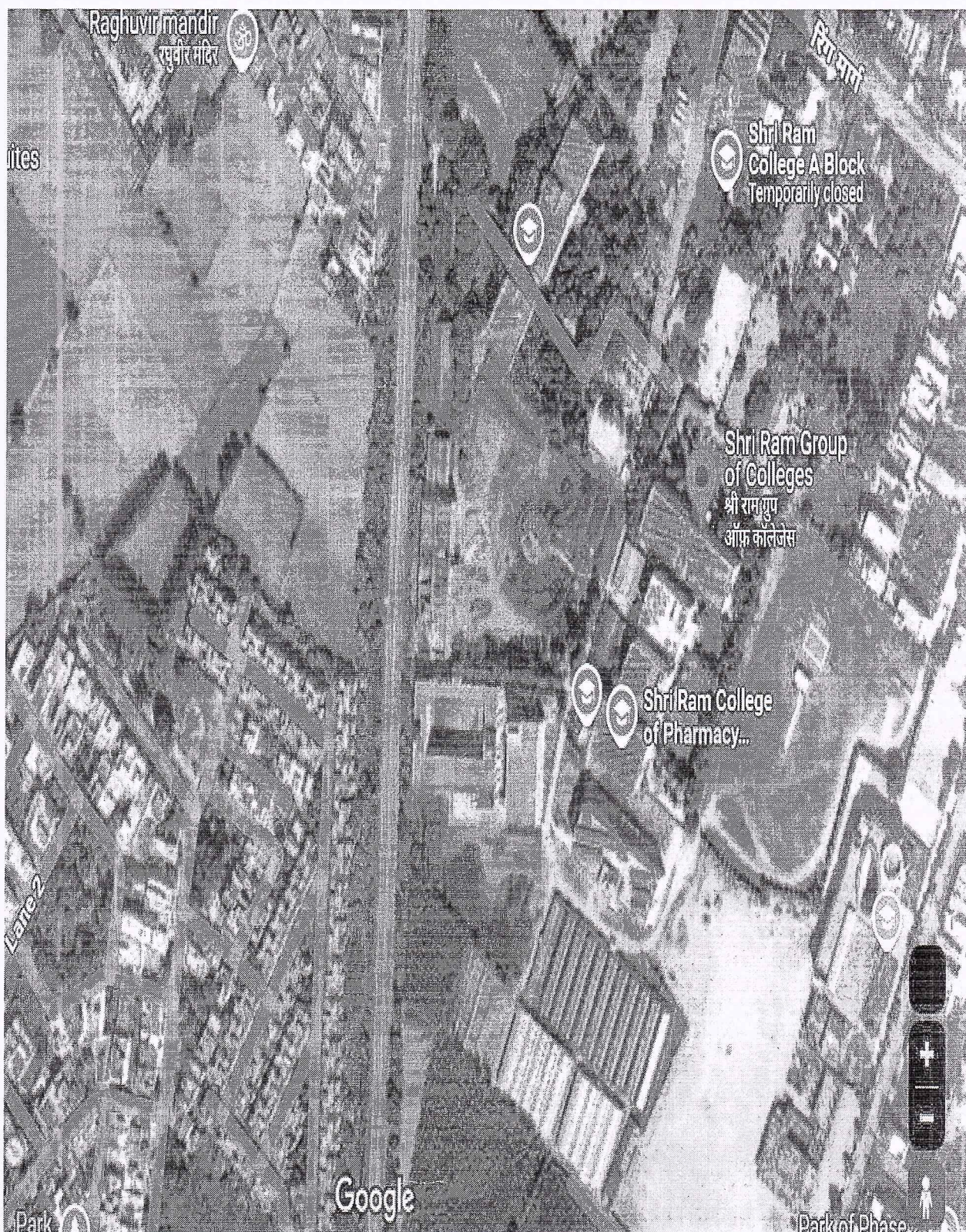


Fig 1. Layout map of Shri Ram College, Muzaffarnagar



Shri Ram College, Muzaffarnagar is a NAAC (A++) Graded college offering Academic and Research facilities to about 6433 students in various Departments. There are 10 Academic Departments in the College.

A total of 236 full time teaching faculty and 117 non- teaching staff are effectively working for the smooth functioning in the College.

College also offers accommodation to about 1004 students. A total of 03 Hostels have been built to accommodate the students, among which 02 are meant for boys and 01 for girls.

Table 1. Total intake capacity of the students at the hostels in the College

Name of the Hostel	Total Number of Rooms	Total Intake Capacity
Block K	121	360
Block L	122	363
Total	243	723

Table 2. Total intake of the students at the hostels in the College

Name of the Hostel	Total Number of Rooms	Total Intake Capacity
Block M	71	281
Total	71	281



Methodology

This compilation is based on the Survey by Questionnaire. The survey was done in the whole campus by dividing it into six sections. On the basis of data requirement, set of questionnaires about electricity consumption, water consumption, waste generation, solid waste collection and transport were prepared.

2.1 Survey by questionnaire

The committee brainstormed and evolved a questionnaire. Questionnaire survey was conducted in the College. The different questionnaire formats were restructured also with different combinations and modifications. The final sets of questionnaires were prepared based on solid waste, energy, fuel, water, hazardous wastes

and E-wastes. The framed questionnaires were distributed among students and staff of the College to fetch the information pertaining to the Environmental audit.

The questionnaires contained the general information of the concerned section, including name of the section, total number of students and employees, number of buildings along with the area under build up. The maintaining of records for handling of solid and hazardous wastes holds much importance in environmental audit. It is quite possible that the loss of water and energy resources can occur due to improper maintenances and therefore their assessment holds importance as far as environmental audit is concerned.

2.2 Data evaluation

The information gathered during the surveys was compiled for the further analysis. It consists of the audit protocol, documentation supplied by the College administration, the auditor's own recordings, results of the sampling and monitoring photographs, records, plans, maps, audit findings and reviewing documentation against standards, policies and action plans and gathering support to the answers of the questions.

2.3 Analysis and reporting

The completed questionnaires were tabulated as per their modules in excel spreadsheets. This tabulated data was used for further analysis. Average and percentage values were determined to avoid complications. With the help of student



volunteers, the major part of the data was compiled, which the committee analyzed. The data regarding the plantation was assessed by the Department of Biosciences and Centre for Biodiversity Studies. Built up map was made by the Engineering Department. Data on energy and water was assessed by the Department of CE, where assessment of data on solid waste generation was carried out by the Department of Botany. The results are depicted graphically to have a quick glance of the status and interpretation of the results of the audit.



Data Analysis

3.1 Land use

SRC is using land for diverse purposes so that facilities are provided to all concerned for the smooth functioning and working. The College covers an area of 22 Acres. After digital image processing of the area, the information about the area occupied by the various land uses from the map is gathered. The data is reflected in Table 3.

Table 3. Area under various land uses in the SRC

Land use	Area (in Square meter)
Built up	26324
Green Spaces	20043
Parks	18160
Playground	9996
Road	14087
Vehicle Parking Spaces	1018
Water Tank	535
Total Area	90163

3.2 Energy audit

Energy audit is the key to systematic approach for decision making in the sphere of energy management. It attempts to balance the total energy inputs with its use, and serves to identify all the energy streams in a facility. It quantifies the energy usage according to its discrete functions. The energy is utilized in the Campus for lighting, space heating and cooling, running of laboratory instruments, appliances, water heating, ground water pumping, cooking and transportation.



The data regarding the energy consumption in the SRC is as following:

Table 4. Total energy consumption of the SRC

SN	Energy Sources		Consumption (annual)
1	Electricity	Solar	184166.066 Units
2	Fuel	LPG	21002.30 Kg
3	Fuel Oil	Petrol	1450.21 Lt
		Diesel	823.34 Lt

The data in Table 4 indicated that the College utilizes renewable as well as non renewable energy sources to meet its energy needs. In terms of monetary value, College spends approximately 71.31 lakhs INR on energy requirement per annum.

Table 5. Monetary resources spend annually in the year 2023 – 2024 on energy requirement

S. No	Energy sources	Monetary Value (annual) INR
1	Electricity	38.84 lacs
2	Fuel oil	20.43 lacs
3	LPG	12.4 lacs
Total expenditures on energy consumption		71.31 lacs



Expenditure on energy

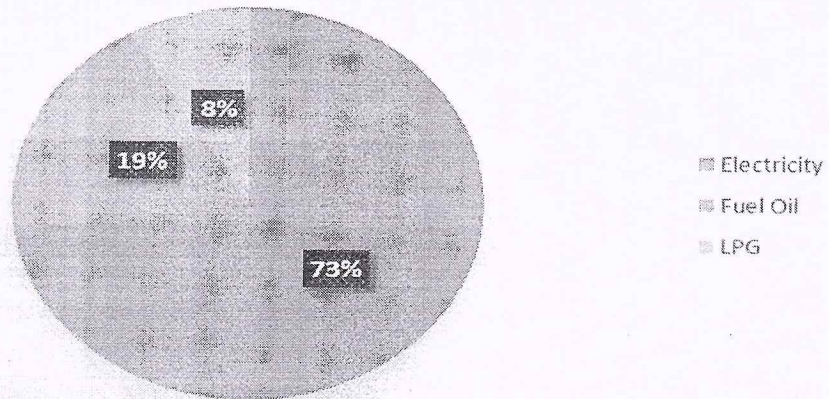


Fig 2. Percentage wise expenditure on energy consumption in terms of monetary values of Shri Ram College

Most of the energy requirement of the College is met by hydropower generated electricity supplied by the State Government. Some amount of energy requirement is met out of the power generated by the Solar Power Plant commissioned in the College.

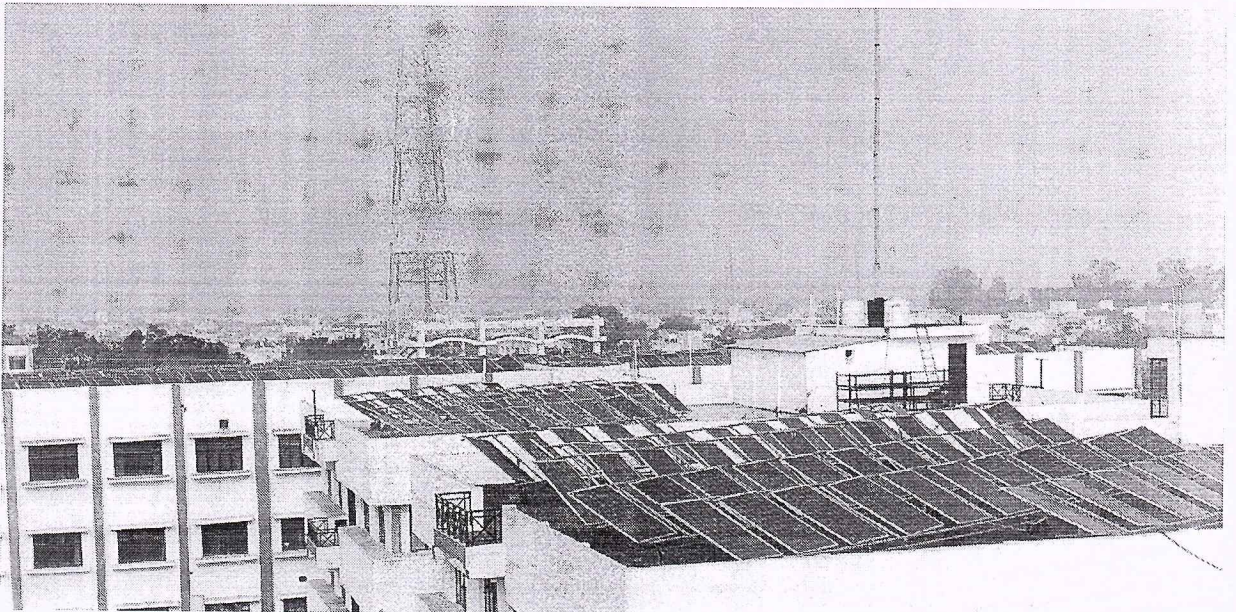


Plate 1. Solar Panels, SRC



A Solar Power Plant in the College is capable of generating 182500 units of electricity a year and it serves as a model for using nonconventional energy sources for future. In addition supplied electricity and diesel generators are also installed as backup in case of power cuts.

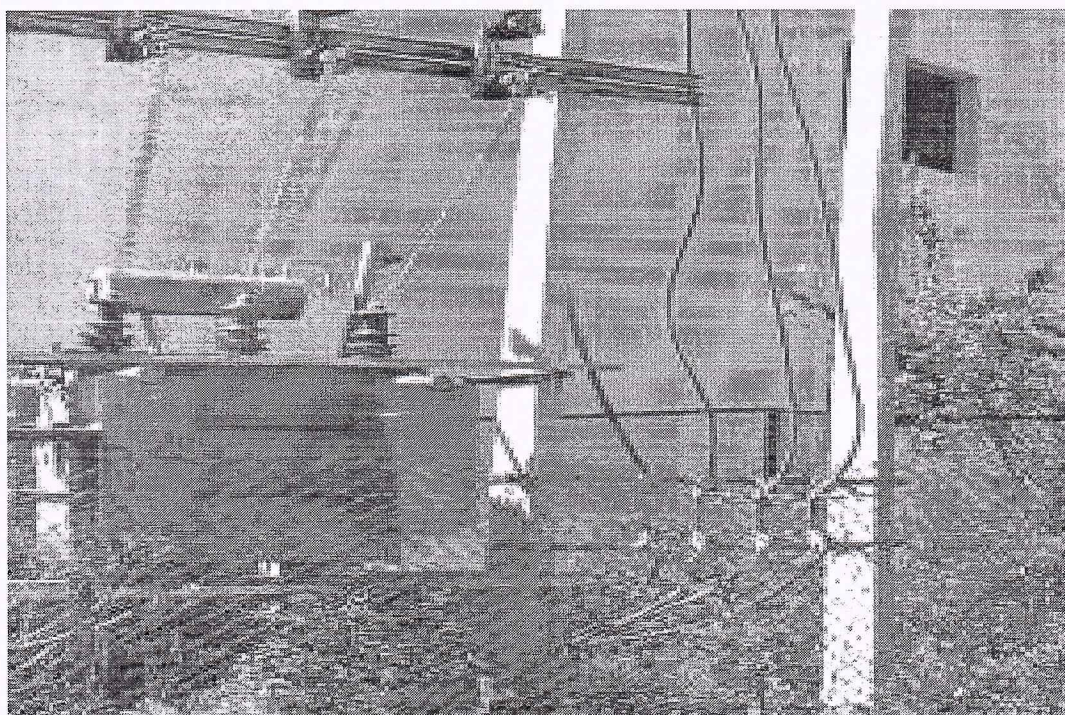


Plate 2. Supplied power transformer

Transportation is an important part of any institution relying on the energy consumption. SRC provides transport facility to both students and staff. So Far College owns 12 Operational vehicles of different capabilities which are being used for pick and drop services to distant areas, field surveys and other purposes. College staff members use personal vehicles and their approximate number goes to 150. Students use public transport, indicating lesser carbon foot print of the student community.



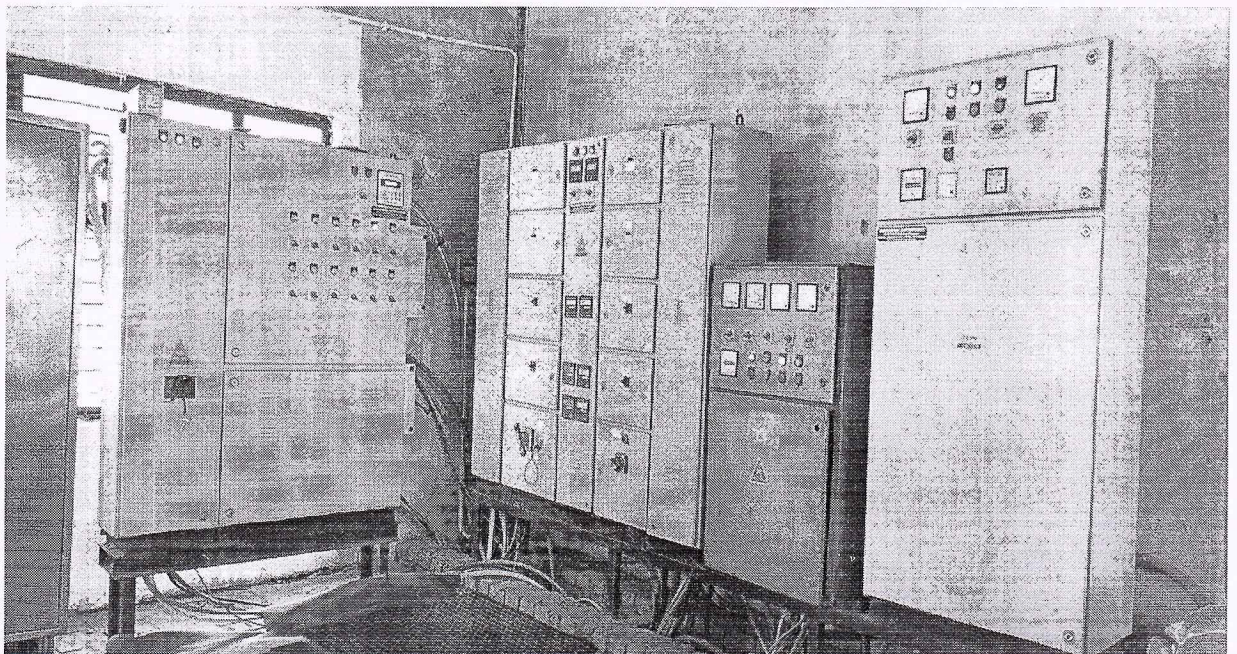
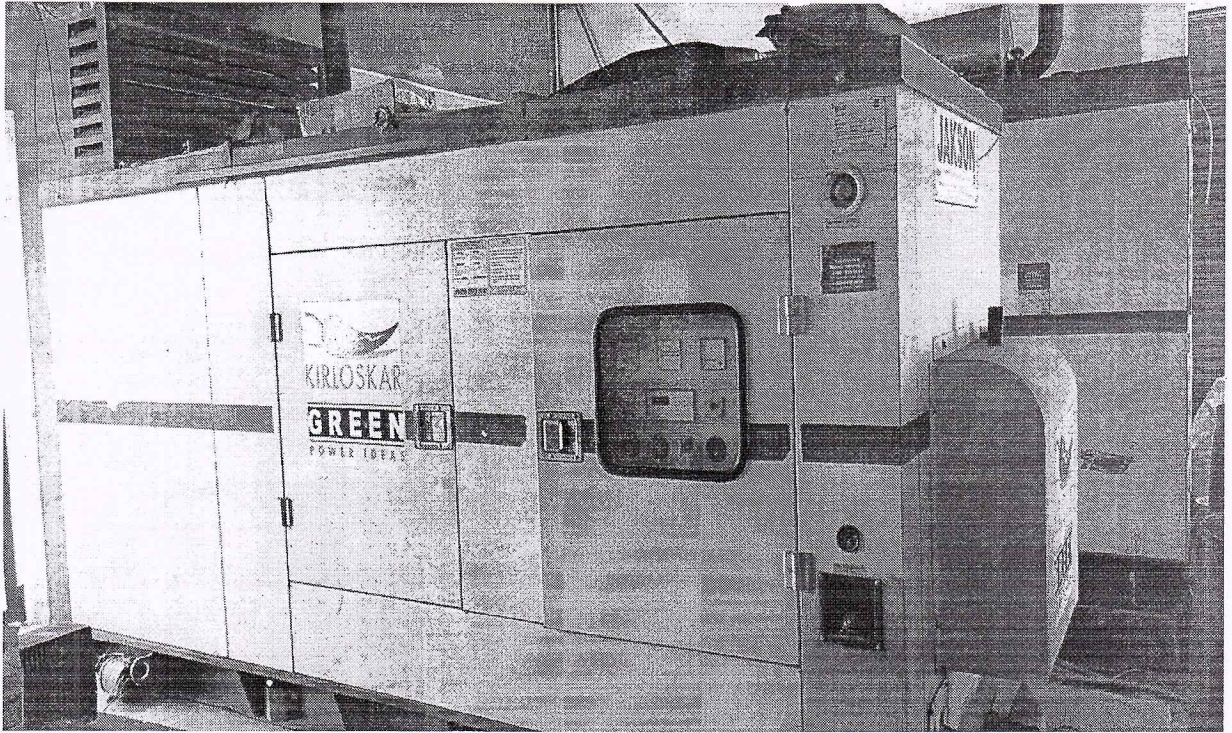


Plate 3. Electricity Generator Room



3.1 Water audit

Water audit is conducted periodically to determine water supplied in the distribution system as well as water lost and/or used within a distribution system. It aims to establish the water consumption pattern in individual sections, so as to realise the consumption levels with respect to exploring various pollution prevention and waste water minimization opportunities. Water audit also helps to establish the existing water distribution system as well as waste water collection and recycling, if any. The water is supplied in the College by municipal supply as well as by the ground water supply. The storage capacity of water in the College is shown in Table 6.

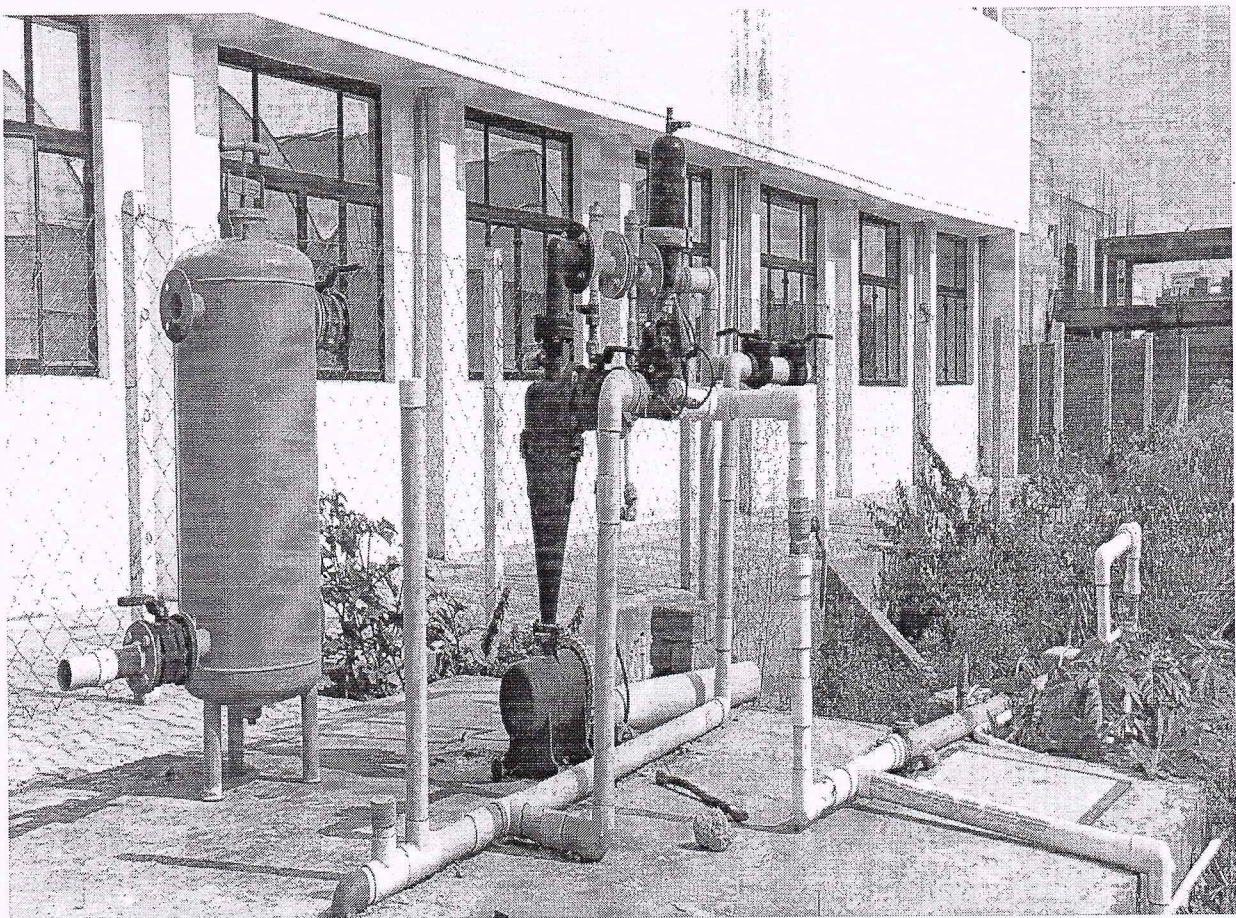


Plate 4. Waste Water Treatment Plant in the College



Table 6. Total water storage capacity in the College

S. No.	Storage Resources	Number	Storage Capacity (in litres)
1	Water Tanks	01	20000
		01	15000
		07	2000
		24	1000
2	Overhead water tanks	01	50000
TOTAL STORAGE CAPACITY			123000

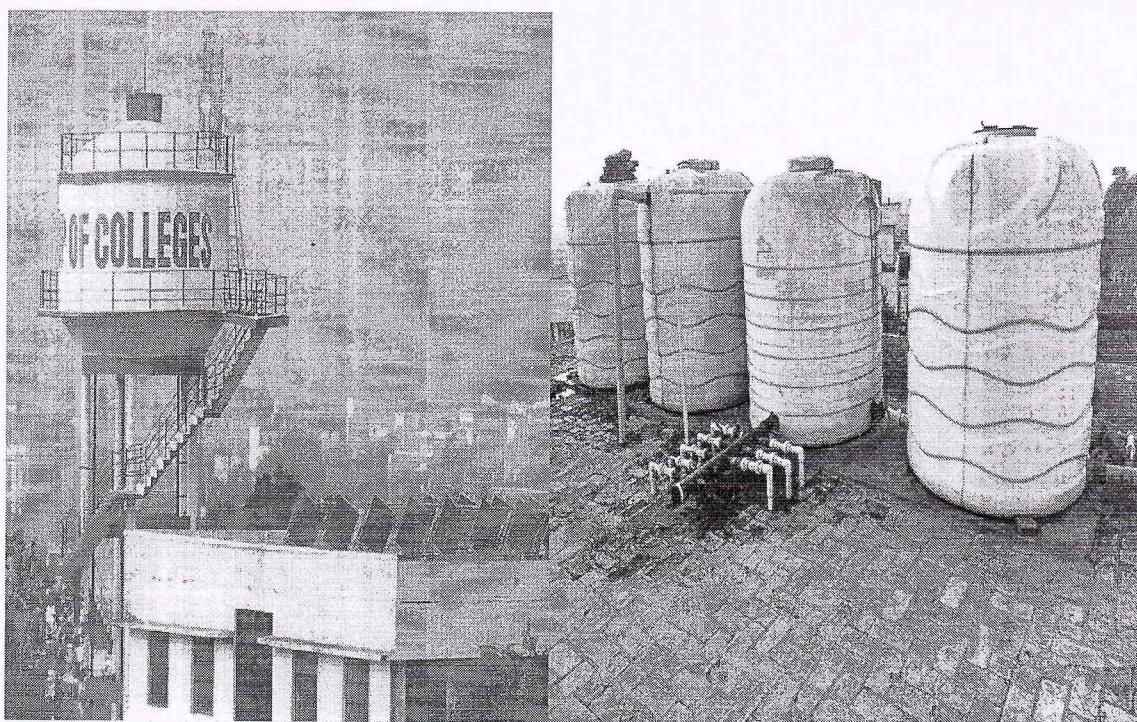


Plate 5. Water tanks in the College



The total water consumption in the Campus is 1.2 lac litres per day. The per capita utilization of the college is 100 Litres per capita per day. The utilizations of such a huge resource of water include usage for drinking, cleaning, laboratory use, garden use, leakages and overflows sometimes. The waste water generated is disposed off into the underground sewage tanks through waste water drainage to municipal server. Besides water tanks the college is sustained by perennial springs dispersed all over in the Campus. 02 ponds of varying dimensions are also laid at the Central Nursery in the Campus. These water bodies have contributed to greening the neighborhood and attracting bird and amphibian life. Water of these ponds is used for nursery irrigation, develop-mental works etc. Moreover, Construction of bunds, terraces and drains has led to collection the run off and thus conserving the rainwater as well.



Plate 6. Pond in the College Campus



3.2 Solid waste audit

The solid waste management is in order with the installation of dust bins and their daily cleaning. The college has its own collection facility that collects the solid wastes daily from Residential complex, Hostels and Departments. This helps in maintaining the cleanliness by providing an efficient, safe and regulated management of solid wastes in the Campus.

However, no segregation of the waste takes place during collection and Land filling is the general waste management strategy adopted by the College. However, there is no management plan for managing inorganic waste, especially plastics. Studies were carried to assess the composition of the waste generated in the college. The data showed that the total generation of solid waste in the Campus is 230 kg per day. Out of which non biodegradable is 26 kg per day while the biodegradable is 204 kg per day.



Table 7. Solid waste Generated in College

Type of waste	Audit Observation
Kitchen Waste	- Waste from Hostel mess and canteen is used to make compost and manure in vermin-composting unit. - Solid waste is used as feed and fodder for cattle in Dairy farm.
Glass Waste	Empty chemical glass bottles are sent as a scrap material
Paper Waste	- One side rough paper is used for the printing of Notices, Time Tables etc. in each department. - Waste papers are sent for shredding to prepare thread and card sheet. - Email and Mobile media communication is used to minimize the use of paper.
Construction Waste	Construction waste is used for land filling and landscaping within the college premises.
Electrical Waste	- Electrical waste like damaged electrical board, switches, cut wires are collected by electrician and replaced with new one and remaining waste is sold as scrap. - Electrical waste related to computer, key boards, and mouse is collected by Computer science department for repairing and replacing the damaged one and remaining waste is sold as scrap.
Laboratory Waste	- Microbiological waste is properly sterilized using Autoclave and then dumped in landfills. - Used chemical waste is dumped in landfills.
Plastic waste	Plastic bottles, caps and other waste material are stored separately at departmental level and sold as a scrap material



It is noteworthy that SRC has adopted an environmentally sound practice of converting biodegradable waste into vermi-compost which is a useful resource. The vermi-compost produced is used in the nurseries and the gardens of the college.

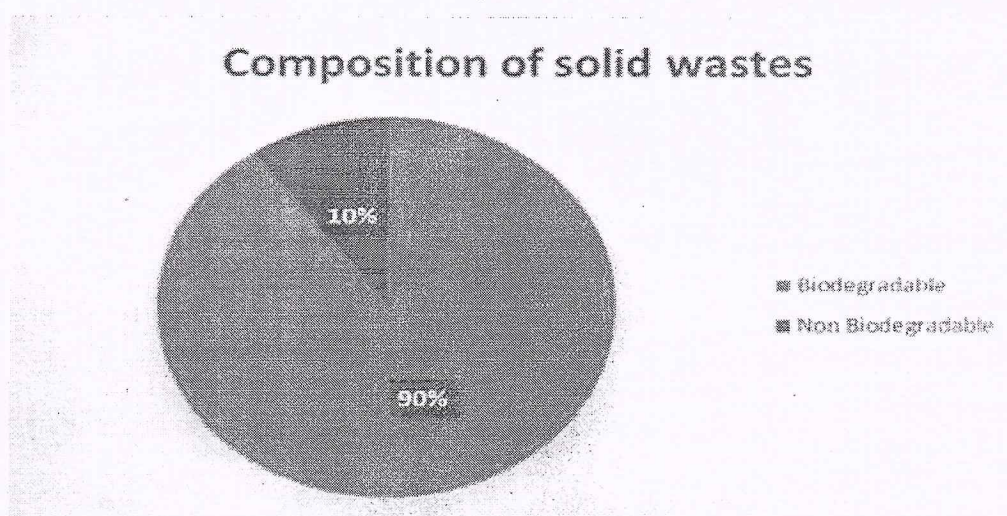


Fig 3. Percentage composition of generated waste in SRC

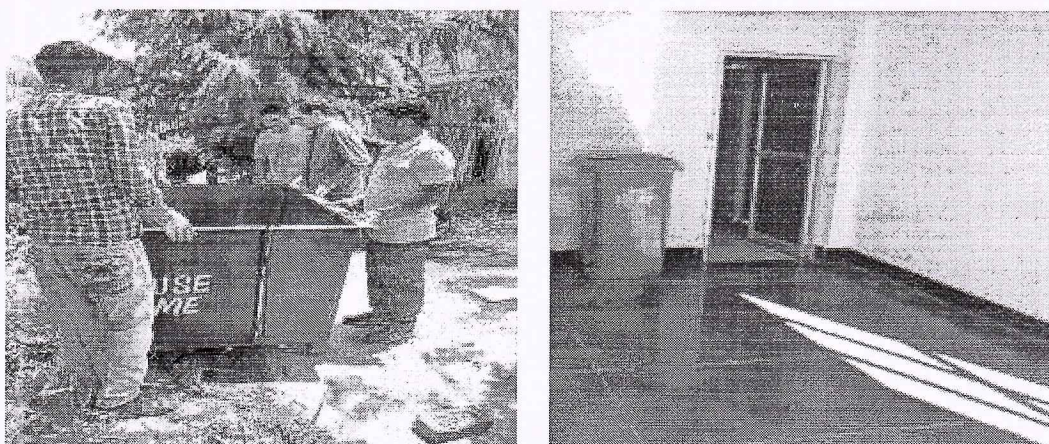


Plate 7. Solid waste collection service with dustbins

The study showed that biodegradable waste constitutes significant component of solid waste in the College. The non biodegradable component of solid waste is recyclable. Among the recyclable materials, paper constitutes the maximum share while glass, cardboard and plastics also make a significant share.





Plate 8. Vermi-compost preparation out of Organic Waste on SRC Campus

3.3 Plantation audit

Many departments of the College maintain their own small gardens. Due to extensive plantation drives the campus is turned into a lush green spot with fair magnitude of biodiversity. Many more saplings planted in the College have assumed a full canopy now and have attracted a lot of faunal diversity including birds, reptiles and small mammals. More the 75% area of the campus is green having different species, broad leaved trees, shrubs, and perennial herbs.



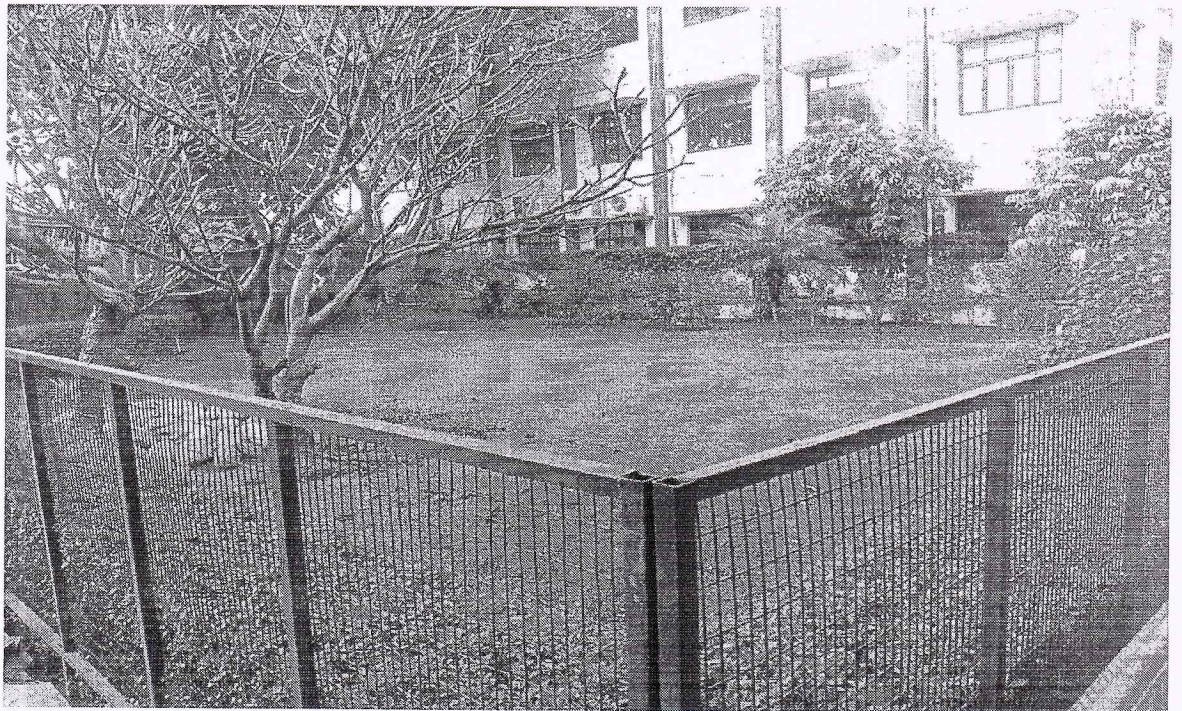
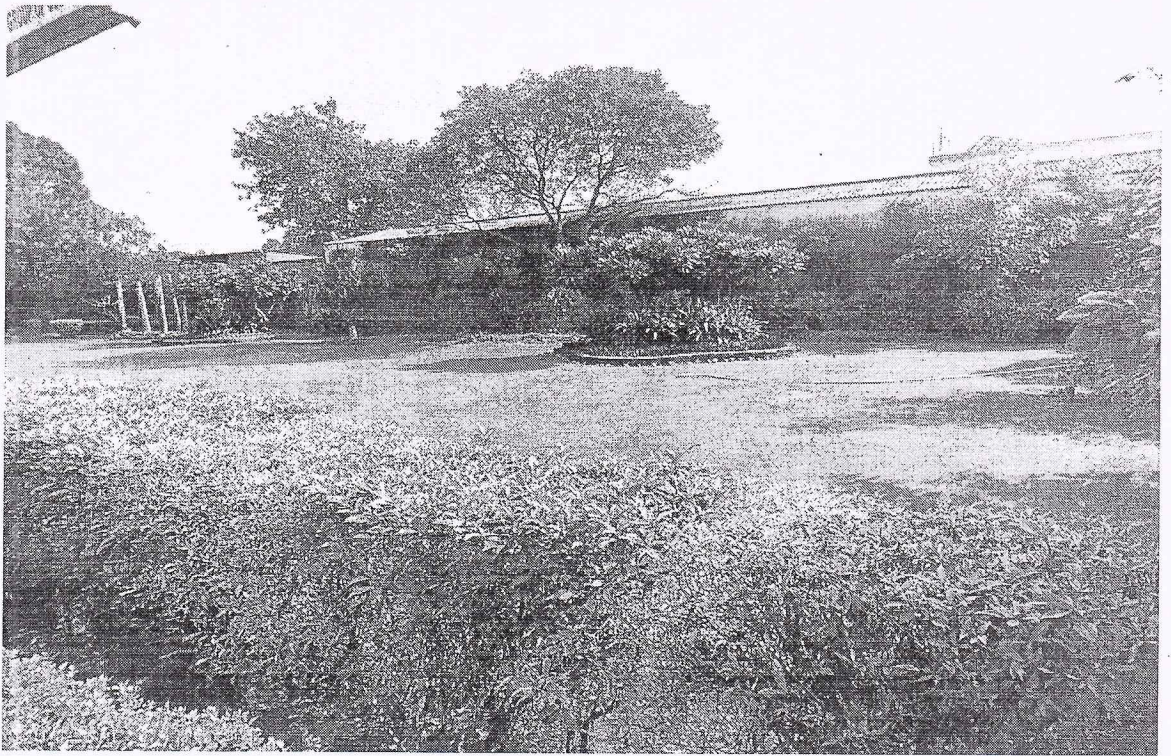




Plate 9. Green Spaces and Parks in SRC



College has established Lead Botanic Garden, Herbal Garden and fernery. The topography and altitudinal gradient of 700 – 1400 m amsl of the SRC campus helps it support diverse vegetation of the tropical and temperate types. Lead Botanic Garden is the conservatory of more than 400 species of angiosperms belonging to families Poaceae, Asteraceae, Fabaceae, Solanaceae, Lamiaceae, Ranunculaceae, Malvaceae, Menispermaceae, Campanulaceae, Zingiberaceae, Liliaceae, etc like *Melia azedarach*, *Populus*, *Neolamarckia kadamba*, *Delonix Regia*, *Tectona grandis*, *Toona ciliata*, *Pine*, *Cycas*, *Maulsari*, *Ficus*, *Eucalyptus*, Jade Plant, *Casaurina*, Pistol Palm, Areca palm, *Platyclusus orientalis* and 12 species of Gymnosperms including *Gingko biloba*, *Zamia* sp., *Podocarpus* sp., *Agathis* sp., *Araucaria* sp., *Pinus rouxburghii*, *P. wallichiana*, *Cedrus deodara*, *Juniparus prostata*, *Thuja orientalis*, *Cupressus* sp, *Cycas revoluta* are also grown in the Lead Garden.

However, Shrubs such as *Carissa ophaca*, *Zanthoxylum armatum*, *Pittospermum eriocarpum*, *Rauvolfia serpentine*, *Hypericum perforatum*, *Berberis lycium*, *Berberis asatica*, *Berberis aristata* etc. Besides Climbers namely *Gloriosa superba*, *Asparagus racemosus*, *Dioscorea deltoidea*, *Dioscorea bulbifera*, *Smilax aspera*, *Rosa moschata*, different species of *Clematis*, *Tinospora cordifolia* etc are also grown in the Garden of the Campus.

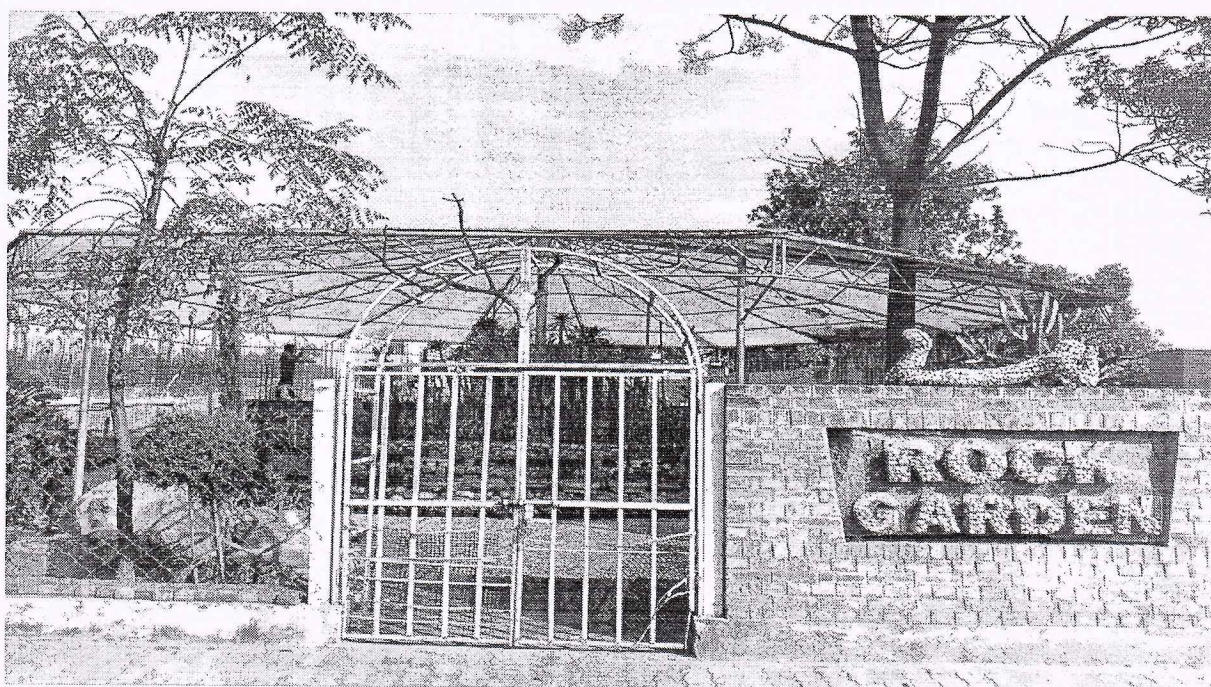




Plate 10. Rock Garden with Xerophytes communities

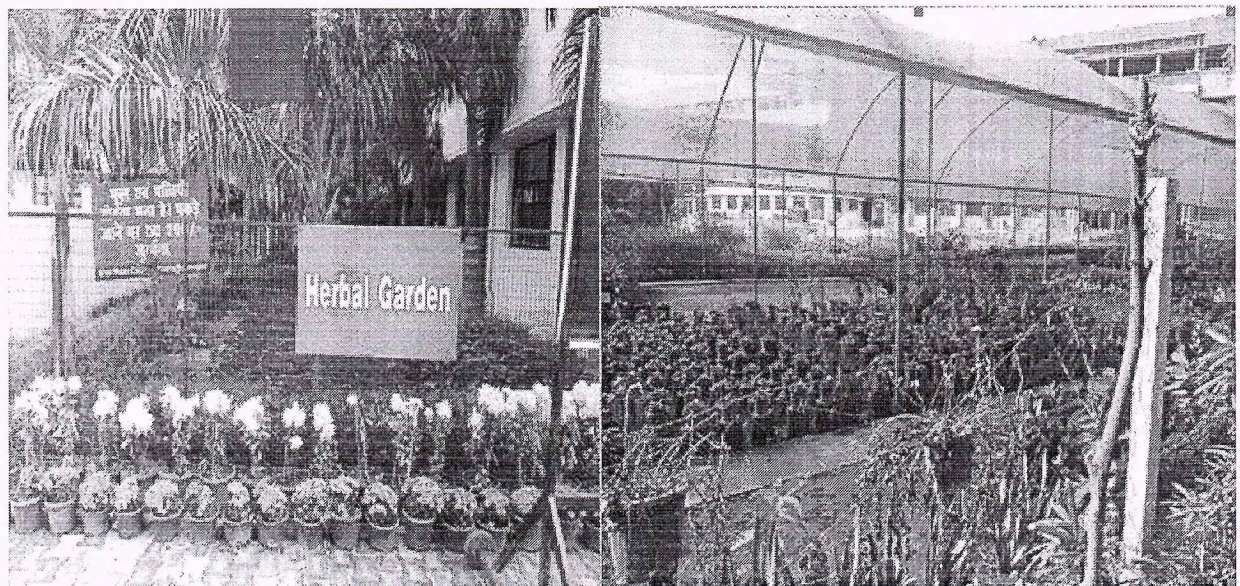


Plate 11. Glimpses of Lead Herbal and Botanical Garden in the College



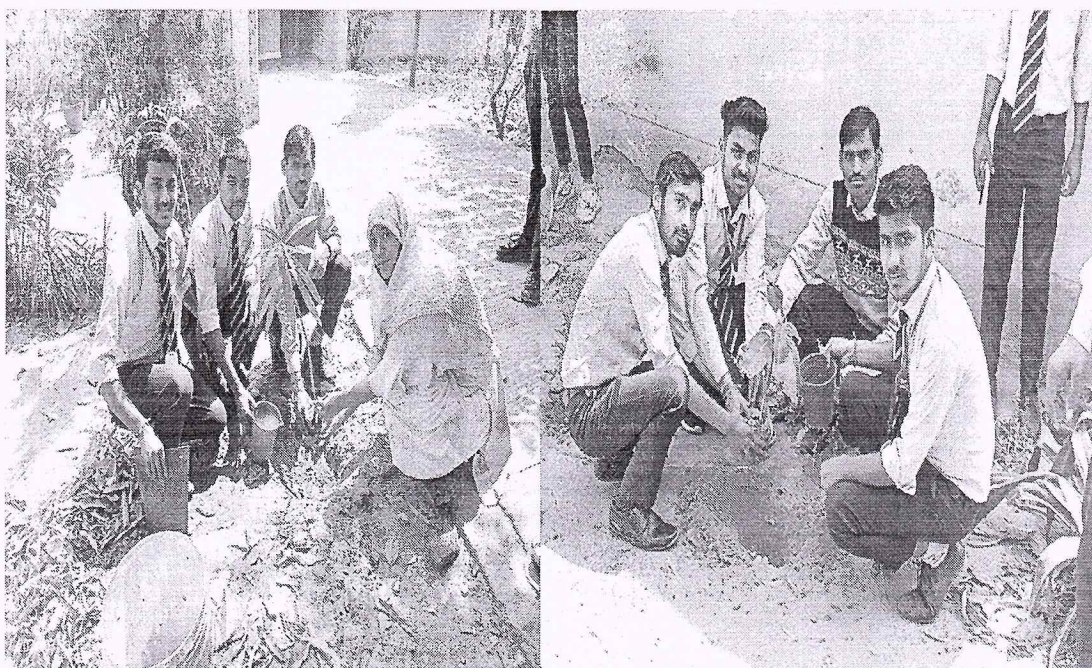


Plate 12. Tree Plantation drive in the College Campus

Table 7. Number of species of different types of vegetation

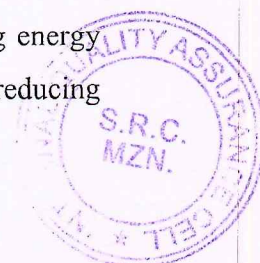
S. No	Plant Types	Number of Plants
1.	Trees	261
2.	Shrubs	92
3.	Grasses	18
4.	Herbs	102



Recommendations

The committee has made short term and long term suggestions to take environment protection to higher levels and it is hoped that this will receive due attention of College authorities and also all stake-holders of the College.

1. Environmental auditing may be conducted by the College in every two years. The College can also offer consultancy projects on environmental auditing for other academic and research institutions.
2. Rainwater harvesting facilities may be established at both administrative and academic campuses, foreseeing future needs of water. Further, rainwater pits can be prepared at appropriate places identified and restoration activities may be initiated to sustain the health of ponds and wetlands in and around the campus.
3. Specific waste management plans should be adopted to manage solid waste in the campus, with the assistance of State Swachhta Mission and use of plastic carry bags, thermocol cup, plate and flex boards should be banned inside the College.
4. Propose a system for collection and disposal of waste sorted out as organic and others on a daily basis, managed by the campus administration. For managing organic wastes, biogas plants may be commissioned at the hostels, canteens, and staff quarters. The wastes generated can be used for promoting organic farming activities within the campus and the products can be used in hostels and canteens, with a plan to ensure the availability of organic food in the canteen and hostels for future. There should be a system for the management of hazardous wastes.
5. The public lights within the campus may be run with solar panels and the replacement of existing lights should be done with LED lamps.
6. Frame a holistic campus development plan to foresee the future developmental needs in tune with green charter adopted by the College.
7. All the blocks in the Campus should develop a garden in front of the building and the expenditure for the same may be met from the Department Development Fund.
8. Green habitat concept should be adopted for all the building construction activities of the College in future, which may help a long way in reducing energy usage, increasing aesthetic appeal of the buildings and class rooms, besides reducing



carbon foot print. Further, more green spaces should be established all around the campus around larger trees and shades for the benefit of the students.

9. Fire safety instruments should be more installed in all the buildings.

10. More public toilets/e-toilets may be established in the campus and in hostels; separate toilets are required for differently abled students.

11. Vehicle pooling should be promoted among both students and faculty and use of bicycles should be promoted as a policy of College.

12. Irrespective of the subjects, environmental education should be part of curriculum and for the post-graduate programmes at least one credit on environmental should be made compulsory. Alternatively, one credit may be given to students participating in environmental conservation/awareness activities.



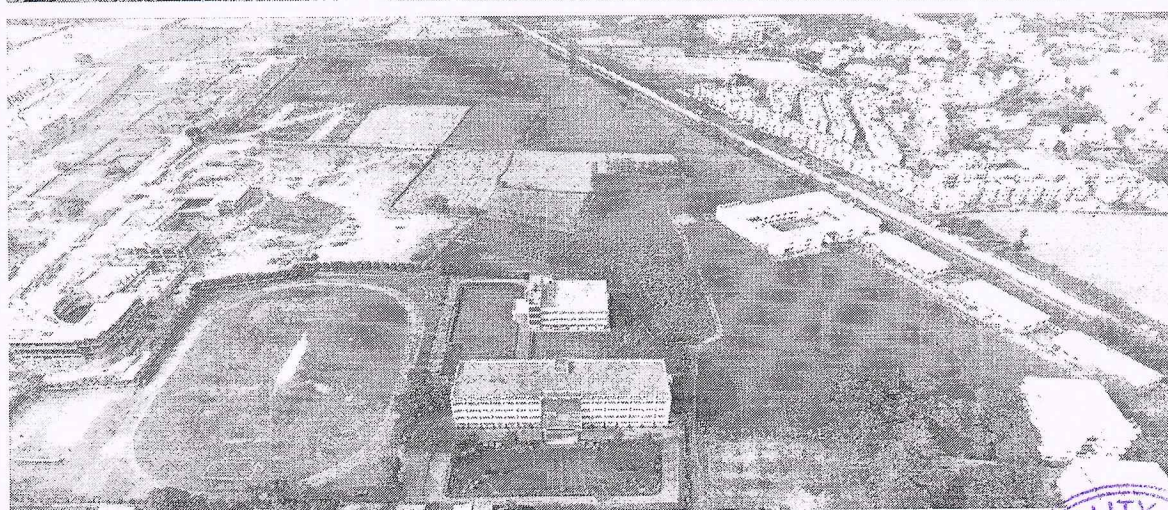
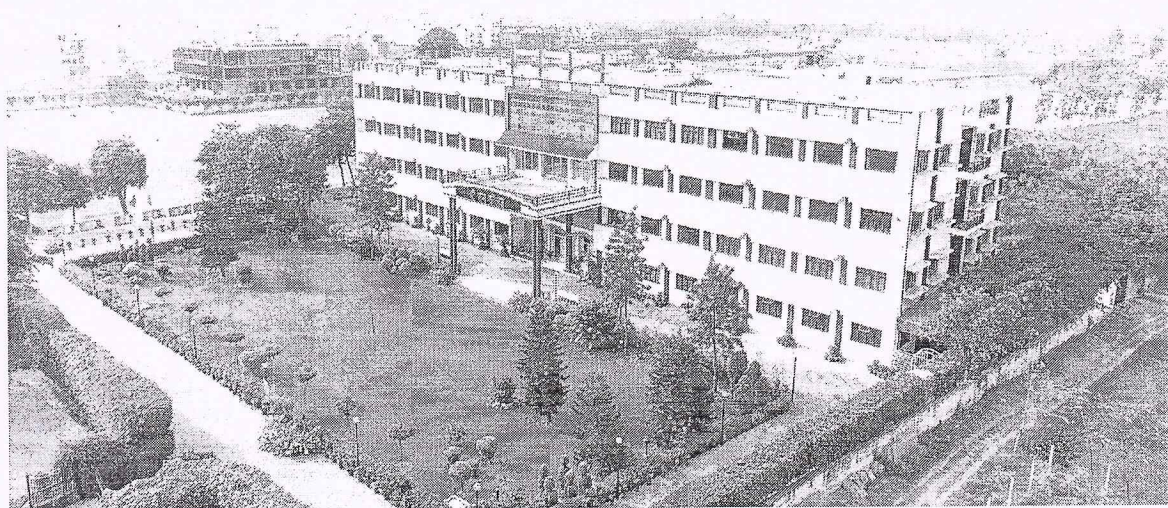
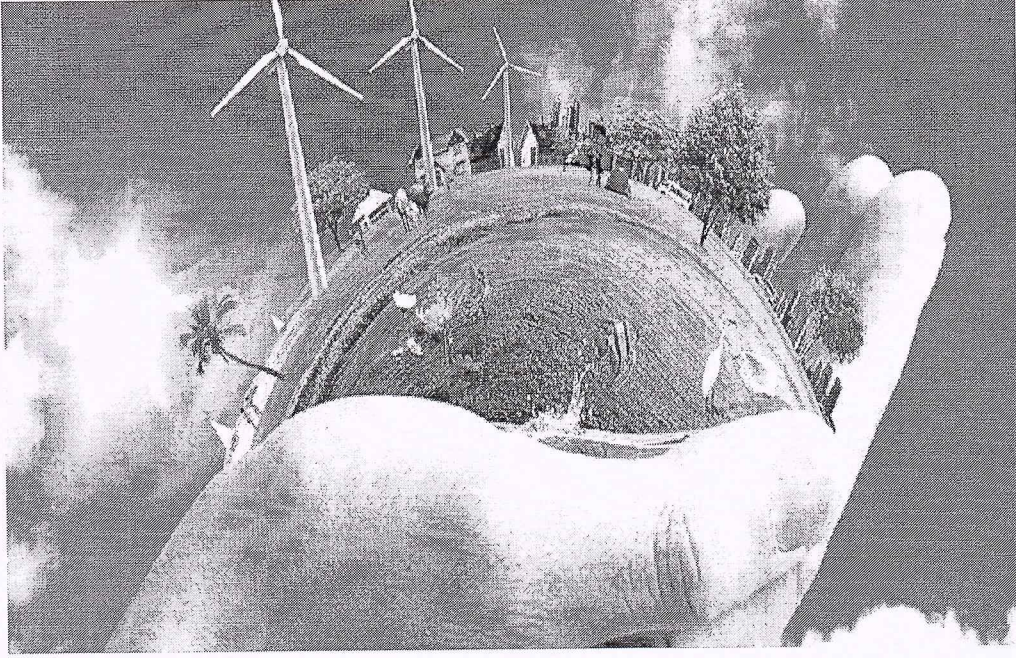


Plate 13. Glimpses of Green Campus





माता भूमि पुत्रोहं पृथिव्या

विश्व पृथ्वी दिवस पर आइए हम सब
मिलकर प्रकृति के संरक्षण एवं
संवर्धन का संकल्प लें

॥ विश्व पृथ्वी दिवस की शुभकामनाएं ॥



