



Green Audit Report
Chandrakanti Ramawati Devi Arya Mahila P.G.
College, Gorakhpur (U.P.)
Year-2022-23



GREEN AUDIT REPORT



CHANDRAKANTI RAMAWATI DEVI ARYA MAHILA PG COLLEGE,
Diwan Bazar, Gorakhpur,
Uttar Pradesh 273001

PREPARED BY



EMPIRICAL EXERGY PRIVATE LIMITED

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(2022-23)

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|  | Green Audit Report Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur (U.P.) Year-2022-23 |  |
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|  | <p style="text-align: center;">Green Audit Report Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur (U.P.) Year-2022-23</p> |  |
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ACKNOWLEDGEMENT



Empirical Exergy Private Limited (EEPL), Indore (M.P) takes this opportunity to appreciate & thank the management of **Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur** for giving us an opportunity to conduct green audit for the college.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.



Rajesh Kumar Singadiya
(Director)

M.Tech (Energy Management),
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
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Chartered Engineer [M-1699118], The Institution of Engineers (India)
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About EEPL

Empirical Exergy Private Limited (EEPL), incorporated under the Companies Act 2013 is an ISO 9001:2015 certified company based in Indore, Madhya Pradesh.

Empirical Exergy Private Limited (EEPL) is Empanelled as an accredited energy auditing firm with the Bureau of energy efficiency (BEE), Ministry of Power, and Government of India for Mandatory Energy Audit as per Energy Conservation Act 2001.



EEPL is registered with the “National Small Industries Corporation (NSIC) A Government of India Enterprise under Micro Small Enterprises (MSEs) is notified by the Govt. of India.

EEPL is managed by highly qualified experienced professionals “Accredited Energy Auditor (AEA), Certified Energy Auditor (CEA), and Certified Energy Managers (CEM) from the Bureau of Energy Efficiency (BEE) and the team of engineers to assured quality services for our valuable customers.

The Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited**.

- **Mr. Rakesh Pathak** [Director]
- **Mr. Rajesh Kumar Singadiya** [Director & Accredited Energy Auditor]
- **Mr. Hemendra Khedekar** [Reviewer]
- **Mrs. Laxmi Raikwar Singadiya** [Energy Engineer]
- **Mr. Ajay Nahra** [Sr. Project Manager]
- **Mr. Praveen Punasiya** [Asst. project Engineer]

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EXECUTIVE SUMMARY

GREEN INITIATIVE TAKEN BY COLLEGE

❖ CAMPAIGN OF PLANTATION AND GREEN CAMPUS

College has around **667** trees in the campus. With 94 medicinal plants its good initiative taken by management for green campus under the campaign of plantation. **It's appreciable.**

❖ 10 KWp SOLAR PHOTOVOLTAIC ROOFTOP INSTALLATION

College has installed 10 KWp solar photovoltaic roof top grid connected system on College building.

❖ VERMICOMPOST UNIT

College has installed 01 no of Vermicompost pit. All type of agriculture waste decomposes in the pit and prepares good quality environmentally friendly manure is formed from the compost and it is to be used for agricultural purposes in the college campus. **It's Appreciable.**

❖ QR CODE SYSTEM ON TREE

College has adopted QR code system on trees for identification and nature of the tree. **It's Appreciable.**

❖ 5 DUST BIN SYSTEM

College has adopted 5 Dust bin System for various type of waste generated in college campus it's Appreciable.



RECOMMENDATION

❖ SOLID WASTE MANAGEMENT

The basic principle of goods waste management practice is based on the concept of 3R, namely, reduce, recycle, and reuse. All the degradable and non-degradable waste material are collected and processed in eco-friendly way in the College campus.

❖ ORGANIC CONVERTER

There are good potential of installation of organic converter in the college for all type of kitchen and vegetable waste which are generated from Hostels and mess.

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CHAPTER-1 **INTRODUCTION**

About College

Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur in the holy land of Guru Gorakhpur, located in Diwan bajar in Gorakhpur city was, established by Smt. Chandrakanti Devi Arya Mahila Sans than on the day of Kartik Shukla Navami in 1990.

The aim of this institution is to promote conserve and encourage the Arya culture, science and literature language, civilization while working for the multi faceted development of the students along with the educational, social and economical revival of women in which the organization is constantly engaged.

On graduation level B.A, B.Sc. (Home Science), and B.Com and on Post-Graduation level Home Science, Visual Art, Education and Political Science under M.A are being run by this college. B.Ed. and M.Ed. program are also being run for teacher-training by the faculty of Education. A study center has also been approved by the Uttar Pradesh Rajarshi Tandon University Prayagraj which is to be operated from session 2019-20.

Since the beginning this college is continuously working for the all round development of women- students. Co-curricular activities and cultural programs are run in regular form for the spiritual and intellectual development of women-students. The college students have so far received the highest marks in the university examination and have received gold medal at the university level. Various students have been selected for the National Camp and Pre RD Parade by the units of NCC and NSS, run in the college which is a milestone in fulfilling the purpose of the establishment of this college.

The college is fully active for the promotion of Arya culture and the goal of women education and multifaceted development which was set at the time of the establishment of this college.

❖ **Mission**

To provide women a wider access towards education of excellence, Excellence of Education, knowledge, Skill, through our wider access of Exposure. Empowerment of Human Values and Indian Culture by Self Responsibility. Enhancing Potential through the way of Curricular Actions.

❖ **Vision**

To Promote the Efficiency of Society by Women Education Creation of Security and Ability on Student. Provision of Positive Energy and Self dependency for the Progress of the Nation

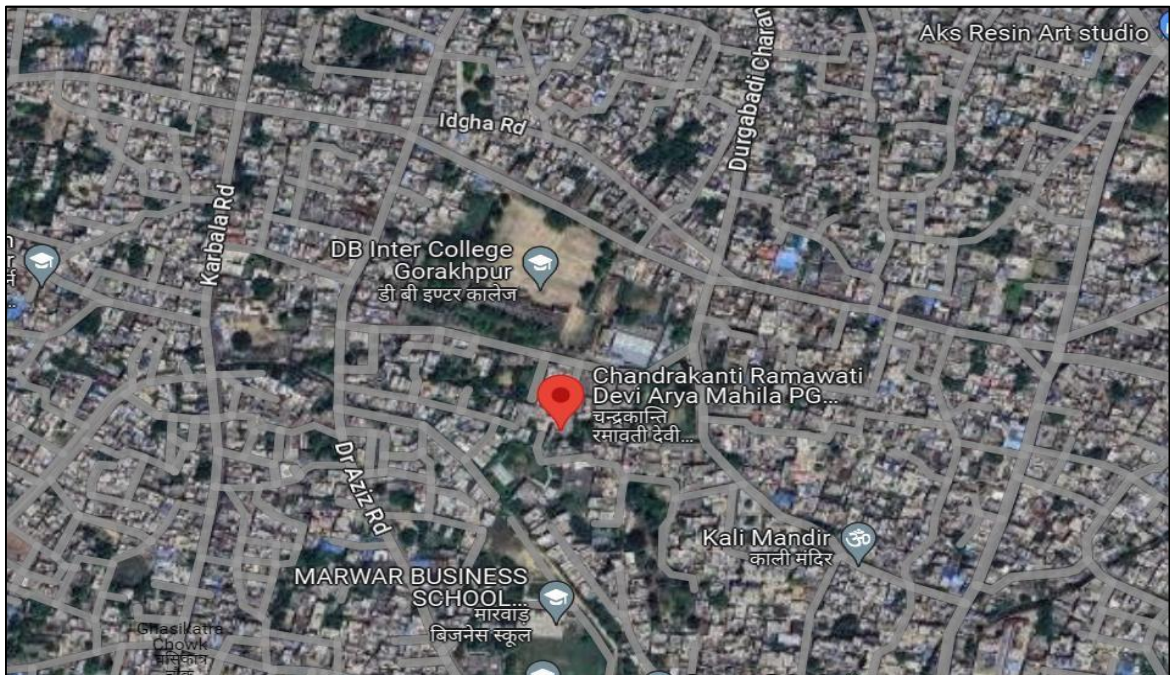


Figure 1.1 Satellite Image of College from Google map

About Campus

Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur total campus area is 7159.85 Sq

Table 1.1 Details are total build up area given in the table

| Name of Buildings in campus & Built-up area of Buildings | |
|--|------------------|
| Floor wise Built-up area in Sq. | |
| Floor | Proposed |
| Ground floor | 918.9708 |
| First floor | 918.9736 |
| Second floor | 918.9717 |
| Third floor | 918.9717 |
| Total Built-up Area | 3675.8878 |

College Layout of Various Buildings



Figure. Layout map of College



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Green Monitoring Committee

Estb. Year 1990

Chandrakanti Ramawati Devi Arya Mahila P.G. College
 Gorakhpur, U.P.
NAAC ACCREDITED
 Website-www.crdpccollege.edu.in
 Mob. : 7275618230

(Affiliated to D.D.U. Gorakhpur University, Gkp. U.P.)

Ref. 2284/K.RD/2022 Date 07/07/2022

Energy, Water, Green & Environmental Audit Committee

Energy, Water, Green & Environmental Audit Committee will consist of the following faculty members.

| S.No. | Name | Designation | Department |
|-------|--------------------------|-----------------------|-----------------------|
| 01 | Mr. Anant Kumar Pathak | Assistant Professor | D.Ed. |
| 02 | Dr. Rekha Srivastava | Assistant Professor | M.Ed. |
| 03 | Dr. Aparna Mishra | Assistant Professor | B.Ed. |
| 04 | Dr. Virendra Kumar Gupta | Assistant Professor | M.Ed. |
| 05 | Dr. Sarika Jaiswal | Assistant Professor | Home Science |
| 06 | Miss Ankita Upadhyay | Assistant Professor | Commerce |
| 07 | Miss Priya Kumari | Assistant Professor | Sociology |
| 08 | Dr. Rekha Rani Sharma | Assistant Professor | Fine Art |
| 09 | Mr. Narendra Singh Rawat | Office Superintendent | Administration Office |

Time duration of this committee is 03 years up to June 2025, after which the committee will be reconstituted.

Principal
 सुनील
 लक्ष्मीनारायण स्वामीनाथन उपाधि संयोजक
 आर्य महिला महाविद्यालय, गोरखपुर




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Green Monitoring Policy

Estb. Year 1990

 **Chandrakanti Ramawati Devi Arya Mahila P.G. College** 

Gorakhpur, U.P.
NAAC ACCREDITED
Website-www.crdpgcollege.edu.in
Mob. : 7275618230

(Affiliated to D.D.U. Gorakhpur University, Gkp. U.P.)

Ref. 2284/K-11-8/2022 Date 07/07/2022

Integrated Energy, Environment & Green Policy



Management of our institution is committed to go green for making our nation Atma-Nirbhar (i.e. Self-sustainable) in the Area of energy and environment.

Our emphasis is to-

1. Create awareness regarding necessity of energy conservation and making environment pollution free to all staff and students on a regular basis by arranging training workshop, seminars quiz, competitions etc.
2. Continuously monitoring the energy consumption pattern through periodic reviews and using latest informative system.
3. Use of energy efficient methods.
4. Have efficient waste management system.
5. Ensure water conservation methods.
6. Ensure participation of students and teachers in local environmental issues.
7. Increasing recycle education on campus.

Principal

प्रिन्सिपल
चन्द्रकान्ति रामावती देवी आर्य महिला प.ग. कॉलेज
गोरखपुर

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About Green Auditing

Eco campus is concepts implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge in to the environment.

Green audit means to identify opportunities to sustainable development practices, enhance environmental quality, improve health, hygiene and safety, reduce liabilities achieve values of virtue. Green audit also provides a basis for calculating the economic benefits of resource conservation projects by establishing the current rates of resource use and their associated costs.



Green auditing of College enables to assess the life style, action and its impact on the environment. This green audit was mainly focused on greening indicators like utilization of green energy (solar energy) and optimum use of secondary energy sources (petrol and diesel) in the college campus, vegetation, and carbon foot print of the campus etc. The aim of green auditing is to help the institution to apply sustainable development practices and to set examples before the community and young learners

Objectives of Green Auditing

The general objective of green audit is to prepare a baseline report on “Green campus” and alternative energy sources (solar energy), measures to mitigate resource wastage and improve sustainable practices.

The specific objectives are

- ❖ To inculcate values of sustainable development practices through green audit mechanism.
- ❖ Providing a database for corrective actions and future plans.
- ❖ To identify the gap areas and suggest recommendations to improve the green campus status of the College.

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CHAPTER- 2

GREEN CAMPUS & SUSTAINABLE DEVELOPMENT

Green Audit

In the survey, focus has been given on assessment of present status of plants and tree in the college campus and efforts made by the college authorities for nature conservation. Campus is in the vicinity of approximately more than **667** trees/ medicinal herbs/ ornamental plants. The detail is given below

List of plants in college camps

| Sr.No. | Name of Tree | Quantity |
|--------|---------------------|----------|
| 1 | Ashoka Tree | 30 |
| 2 | Moses in the cradle | 3 |
| 3 | Arabian Jasmine | 1 |
| 4 | Mimosa | 1 |
| 5 | Persian Liliac | 1 |
| 6 | Leechee | 2 |
| 7 | Shami | 3 |
| 8 | Chinese fan palm | 1 |
| 9 | Jonauba | 1 |
| 10 | Yellow bells | 1 |
| 11 | Red frangipani | 1 |
| 12 | Lemon Grass | 2 |
| 13 | Veriegated Croton | 6 |
| 14 | Indian laurel | 3 |
| 15 | West Indian Jasmine | 1 |
| 16 | Dumb Cane | 11 |
| 17 | Bich Spierlili | 1 |
| 18 | Sadabahar | 5 |
| 19 | Arrow head vine | 13 |
| 20 | China Rose | 7 |
| 21 | Karoo cycad | 13 |
| 22 | Paper flower | 6 |
| 23 | Yellow Kaner | 8 |
| 24 | Rose | 3 |
| 25 | Siberian Dog wood | 1 |
| 26 | sliper flower | 1 |
| 27 | Areca palm | 16 |
| 28 | Neem | 4 |



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| Sr.No. | Name of Tree | Quantity |
|--------|---------------------|----------|
| 29 | Meetha Neem | 1 |
| 30 | Spider Plant | 2 |
| 31 | Mimosa | 2 |
| 32 | Guava | 4 |
| 33 | Mango | 7 |
| 34 | Mogra | 4 |
| 35 | Teak wood | 29 |
| 36 | Amla | 3 |
| 37 | cycas | 2 |
| 38 | Red Casiya | 2 |
| 39 | Peepal | 1 |
| 40 | Aloe Vera | 14 |
| 41 | Tora siekle Pod | 1 |
| 42 | Gulmohar | 3 |
| 43 | Iron Wood Cassia | 1 |
| 44 | Pin wheel Flower | 7 |
| 45 | Cuban oregano | 7 |
| 46 | Coleus | 5 |
| 47 | Balsam | 64 |
| 48 | Snake plant | 3 |
| 49 | White Orchid tree | 1 |
| 50 | Dwarf Umbrella tree | 1 |
| 51 | Norfolk island Pine | 1 |
| 52 | Zephyr lili | 13 |
| 53 | Song of india | 1 |
| 54 | Ladder fern | 1 |
| 55 | Butterfly pea | 3 |
| 56 | White Water Lili | 1 |
| 57 | Canna lili | 4 |
| 58 | American Wishteria | 1 |
| 59 | Harsingar | 4 |
| 60 | Gurmar | 2 |
| 61 | Insulin | 1 |
| 62 | Kalmegh | 2 |
| 63 | Sharifa | 1 |
| 64 | Sarpgandha | 2 |
| 65 | Brahmi | 4 |
| 66 | Ashvgandha | 3 |



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| Sr.No. | Name of Tree | Quantity |
|--------|---------------------|------------|
| 67 | Black Pepper | 2 |
| 68 | Gladiolus | 25 |
| 69 | Straberry | 4 |
| 70 | Lilium | 5 |
| 71 | Lucky bamboo | 1 |
| 72 | Supari | 2 |
| 73 | Guldaudi | 80 |
| 74 | Arjun | 4 |
| 75 | Cactus | 2 |
| 76 | Jamun | 2 |
| 77 | Araucaria | 5 |
| 78 | Brodleaf Palm Lili | 3 |
| 79 | Cordyline Fruticosa | 17 |
| 80 | Peace lili | 6 |
| 81 | Borassus | 9 |
| 82 | Dhatura | 1 |
| 83 | Marigold | 102 |
| 84 | Yucca | 2 |
| 85 | Bauhini | 2 |
| 86 | Banana | 2 |
| 87 | Colocasia | 6 |
| 88 | Garam Masala | 2 |
| 89 | Cinnaman | 2 |
| 90 | Pomegranate | 2 |
| 91 | Lemon | 2 |
| 92 | Cardamom | 2 |
| 93 | Kapoor | 2 |
| 94 | Harjod | 2 |
| 95 | Karonda | 1 |
| 96 | Shreefal | 1 |
| 97 | Rudraksh | 2 |
| 98 | Tejpatta | 2 |
| 99 | Satavar | 2 |
| 100 | Aprajita | 2 |
| 101 | Ajwain | 3 |
| 102 | Paan | 2 |
| 103 | Giloyi | 2 |
| | Total | 667 |



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Green Campus Photograph





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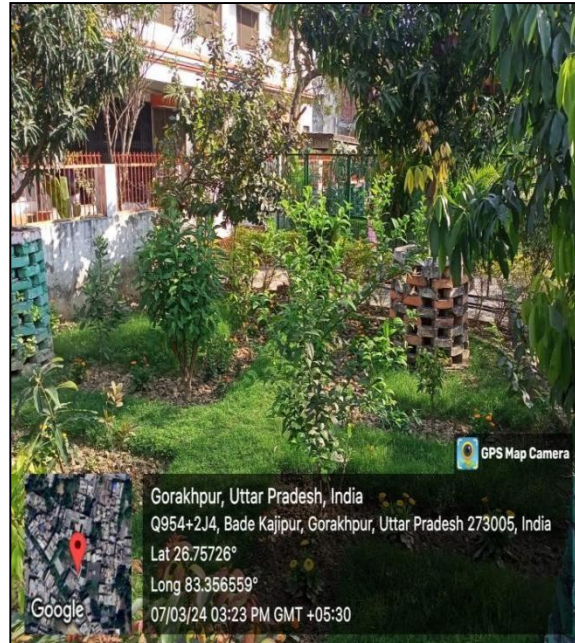




Fig.2.2 – Tree plantation and Biodiversity in the campus



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College has **667 trees** in the campus. This is good initiative taken by management for green campus under the campaign of plantation. **It's appreciable.**

CHAPTER- 3

RENEWABLE ENERGY AND SUSTAINABLE DEVELOPMENT

3.1 Grid Connected Solar Photovoltaic System (10 KWp)

There is 10 KWp solar photovoltaic roof top grid connected systems installed on main building.

System details are given below

Table: -3.1 solar plants detailed

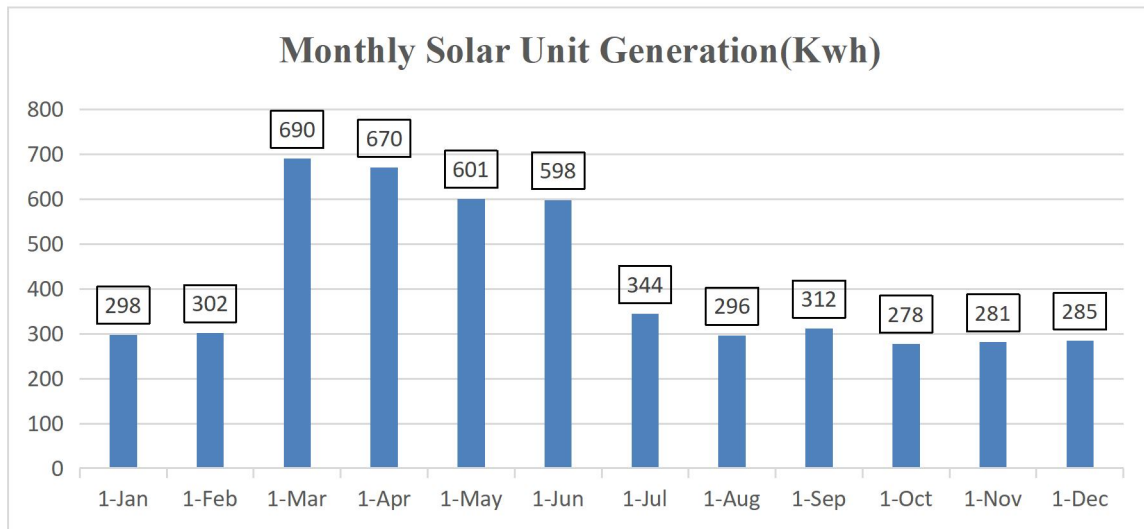
| Sr.No. | Description | Technical Specification |
|----------|-----------------------------|-------------------------|
| 1 | Plant Information | |
| 1.1 | Brand Name | NEOSOL |
| 1.2 | Plant Capacity | 10KW |
| 1.3 | Location | Main Building |
| 2 | PV Panel Details | |
| 2.1 | Modal | NS72P6-420 |
| 2.2 | Panel Wattage | 420 WATT |
| 2.3 | No. Of PV Panel | 24 |
| 2.4 | Panel Tilt Angle | 23 DEGREE |
| 3 | Inverter Information | |
| 3.1 | Model Name | POLYCAB |
| 3.2 | Model Number | PSIT-10K |
| 3.3 | Capacity | 11000 WATT |
| 3.4 | No. Of Inverter | 1 |



Total Solar unit generation

Table 2.7 Total solar unit generation July-2022 to Jun-2023

| Sr. No. | Month /year | Unit Generation (kWh) |
|---------|--------------|-----------------------|
| 1 | 22-Jul | 344 |
| 2 | 22-Aug | 296 |
| 3 | 22-Sep | 312 |
| 4 | 22-Oct | 278 |
| 5 | 22-Nov | 281 |
| 6 | 22-Dec | 285 |
| 7 | 23-Jan | 298 |
| 8 | 23-Feb | 302 |
| 9 | 23-Mar | 690 |
| 10 | 23-Apr | 670 |
| 11 | 23-May | 601 |
| 12 | 23-Jun | 598 |
| | Total | 4955 |



Graphical presentation of solar unit generation

Observation

Total unit generation from installation from solar system is 4955 unit.

Chapter-04 Carbon Foot print

About carbon foot print.

Climate change is one of the biggest challenges facing by world, nations, governments, institutions, business and mankind today.

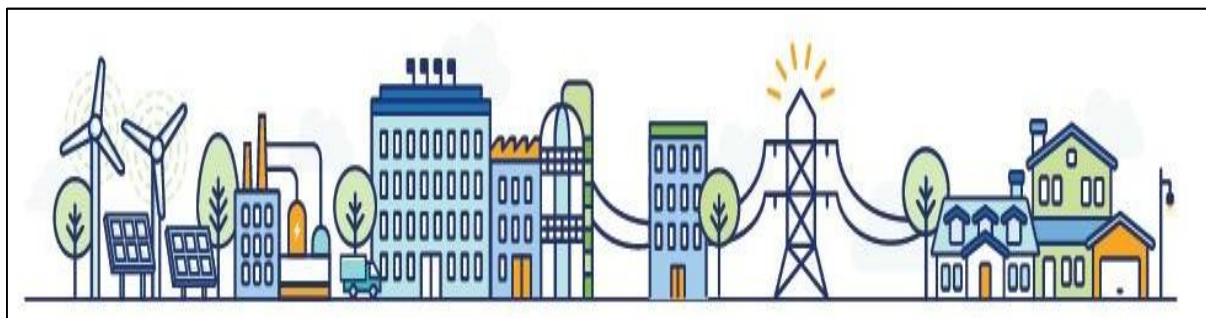
Carbon footprint is a measure of the impact of your activities have on the amount of carbon dioxide (CO₂) produced through the burning of fossil fuels and is expressed as a weight of CO₂ emissions produced in tones.



We focus on consumption in each of our five major categories: housing, travel, food, products and services. In addition to these we also estimate the share of national emissions over which we have little control, government purchases and capital investment.

For simplicity and clarity all our calculations follow one basic method. We multiply a use input by an emissions factor to calculate each footprint. All use inputs are per individual and include things like fuel use, distance, calorie consumption and expenditure. Working out your inputs is a matter of estimating them from your home, travel, diet and spending behavior.

Although working out you inputs can take some investigation on your part the much more challenging aspect of carbon calculations is estimating the appropriate emissions factor to use in your calculation. Where possible you want this emissions factor to account for as much of the relevant life cycle as possible.

We all have a carbon footprint...



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Methodology and Scope

The carbon footprint gives a general overview of the college greenhouse gas emissions, converted into CO₂ -equivalents and it is based on reported data from internal and external systems. The purposes of the carbon indicators are to measure the carbon intensity per unit of product, in addition to showing environmental transparency towards external stakeholders. The carbon footprint reporting approach undertaken in this study follows the guidelines and principles set out in the “Greenhouse Gas Protocol Corporate Accounting and Reporting Standard” (hereafter referred to as the GHG Protocol) developed by the Greenhouse Gas Protocol Initiative and international standard for the quantification and reporting of greenhouse gas emissions -ISO 14064. This is the most widely used and accepted methodology for conducting corporate carbon footprints. The study has assessed carbon emissions from the College Campus. This involves accounting for, and reporting on, the GHG emissions from all those activities for which the company is directly responsible. The items quantified in this study are as classified under the ISO 14064 standards: The report calculates the greenhouse gas emissions from the College. This includes electricity, as well as emission associated with diesel consumption in the institute vehicle. The emission associated with air travel, waste generation, administration, and marketing related activities has been excluded from the current study. Emissions from business activities are generally classified as scope 1, 2 or 3 areas classified under the ISO 14064 standards.

Carbon emission from electricity

Direct emissions factors are widely published and show the amount of emissions produced by power stations in order to produce an average kilowatt-hour within that grid region

Unlike with other energy sources the carbon intensity of electricity varies greatly depending on how it is produced and transmitted. For most of us, the electricity we use comes from the grid and is produced from a wide variety of sources. Although working out the carbon intensity of this mix is difficult, most of the work is generally done for us.

Electricity used in the site is the significant contributors towards GHGs emission from the unit. Electricity used onsite is the most direct, and typically the most significant, a contributor to a unit's carbon footprint. Thus, using an average fuel mix of generating electricity, carbon dioxide intensity of electricity for national grid is assumed to be 0.9613 Kg Co₂/ kWh

(Reference: Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database http://cea.nic.in/reports/others/thermal/tpece/cdm_Co2/database_11.zip). Electricity is purchased from the grid

Table: - Electricity Purchased from the grid and Emissions from the electricity Import

| Sr. no | Year | Total unit Consumption by AVVNL | Unit | Emission Factor kg Co ₂ e/kWh | Emission ton Co ₂ e/year |
|--------|--------------|---------------------------------|------|--|-------------------------------------|
| 1 | 2022-23 | 29,428 | kWh | 0.9613 | 28.29 |
| | Total | | | Total | 28.29 |

Observation

Total Co₂ Emission by indirectly from electricity is 28.29 ton Co₂ e/year in 2022-23

Carbon neutralize by solar system

College has 10 kWp solar system and the Co₂ neutralize by the solar system . The details is given below

| Sr. no | Year | Total unit Consumption by AVVNL | Unit | Neutralize Factor kg | Neutralize tonCo ₂ e/ year |
|--------|--------------|---------------------------------|------|----------------------|---------------------------------------|
| 1 | 2022-23 | 4955 | kWh | 0.9613 | 4.67 |
| | Total | | | Total | 4.67 |



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Calculation of Co₂ Sequestration

| Sr. No. | Common Name | Average Diameter cm (25 to 100) | AGB | BGB | Total | Carbon Storage | Amount of Co ₂ Sequestered | No of Tree | Total Amount of Co ₂ Sequestered | Annually Co ₂ Sequestered amount |
|---------|---------------------|----------------------------------|------|-----|-------|----------------|---------------------------------------|------------|---|---|
| 1 | Ashoka Tree | 75 | 3248 | 487 | 3735 | 1868 | 6847 | 30 | 205415 | 2.80 |
| 2 | Moses in the cradle | 60 | 1994 | 299 | 2294 | 1147 | 4204 | 3 | 12613 | 0.17 |
| 3 | Arabian Jasmine | 50 | 1328 | 199 | 1528 | 764 | 2800 | 1 | 2800 | 0.04 |
| 4 | Mimosa | 50 | 1328 | 199 | 1528 | 764 | 2800 | 1 | 2800 | 0.04 |
| 5 | Persian Liliac | 40 | 798 | 120 | 918 | 459 | 1682 | 1 | 1682 | 0.02 |
| 6 | Leechee | 55 | 1644 | 247 | 1891 | 946 | 3466 | 2 | 6933 | 0.09 |
| 7 | Shami | 40 | 798 | 120 | 918 | 459 | 1682 | 3 | 5047 | 0.07 |
| 8 | Chinese fan palm | 65 | 2378 | 357 | 2735 | 1368 | 5014 | 1 | 5014 | 0.07 |
| 9 | Jonauba | 30 | 403 | 61 | 464 | 232 | 850 | 1 | 850 | 0.01 |
| 10 | Yellow bells | 30 | 403 | 61 | 464 | 232 | 850 | 1 | 850 | 0.01 |
| 11 | Red frangipani | 30 | 403 | 61 | 464 | 232 | 850 | 1 | 850 | 0.01 |
| 12 | Lemon Grass | 35 | 584 | 88 | 671 | 336 | 1231 | 2 | 2461 | 0.03 |
| 13 | Veriegated Croton | 45 | 1046 | 157 | 1203 | 602 | 2205 | 6 | 13232 | 0.18 |
| 14 | Indian laurel | 50 | 1328 | 199 | 1528 | 764 | 2800 | 3 | 8400 | 0.11 |
| 15 | West Indian Jasmine | 36 | 624 | 94 | 717 | 359 | 1315 | 1 | 1315 | 0.02 |
| 16 | Dumb Cane | 35 | 584 | 88 | 671 | 336 | 1231 | 11 | 13536 | 0.18 |
| 17 | Bich Spierlili | 45 | 1046 | 157 | 1203 | 602 | 2205 | 1 | 2205 | 0.03 |
| 18 | Sadabahr | 60 | 1994 | 299 | 2294 | 1147 | 4204 | 5 | 21021 | 0.29 |
| 19 | Arrow head vine | 45 | 1046 | 157 | 1203 | 602 | 2205 | 13 | 28670 | 0.39 |
| 20 | China Rose | 40 | 798 | 120 | 918 | 459 | 1682 | 7 | 11775 | 0.16 |



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| Sr. No. | Common Name | Average Diameter CM (25 to 100) | AGB | BGB | Total | Carbon Storage | Amount of CO ₂ Sequestered | No of Tree | Total Amount of Co ₂ Sequestered | Annually Co ₂ Sequestered amount |
|---------|-------------------|----------------------------------|------|-----|-------|----------------|---------------------------------------|------------|---|---|
| 21 | Karoo cycad | 30 | 403 | 61 | 464 | 232 | 850 | 13 | 11056 | 0.15 |
| 22 | Paper flower | 65 | 2378 | 357 | 2735 | 1368 | 5014 | 6 | 30082 | 0.41 |
| 23 | Yellow Kaner | 65 | 2378 | 357 | 2735 | 1368 | 5014 | 8 | 40110 | 0.55 |
| 24 | Rose | 25 | 257 | 39 | 296 | 148 | 542 | 3 | 1626 | 0.02 |
| 25 | Siberian Dog wood | 35 | 584 | 88 | 671 | 336 | 1231 | 1 | 1231 | 0.02 |
| 26 | sliper flower | 36 | 624 | 94 | 717 | 359 | 1315 | 1 | 1315 | 0.02 |
| 27 | Areca palm | 30 | 403 | 61 | 464 | 232 | 850 | 16 | 13608 | 0.19 |
| 28 | Neem | 27 | 312 | 47 | 358 | 179 | 657 | 4 | 2627 | 0.04 |
| 29 | Meetha Neem | 28 | 341 | 51 | 392 | 196 | 718 | 1 | 718 | 0.01 |
| 30 | Spider Plant | 30 | 403 | 61 | 464 | 232 | 850 | 2 | 1701 | 0.02 |
| 31 | Mimosa | 54 | 1579 | 237 | 1815 | 908 | 3327 | 2 | 6655 | 0.09 |
| 32 | Guava | 35 | 584 | 88 | 671 | 336 | 1231 | 4 | 4922 | 0.07 |
| 33 | Mango | 37 | 665 | 100 | 765 | 383 | 1403 | 7 | 9818 | 0.13 |
| 34 | Mogra | 45 | 1046 | 157 | 1203 | 602 | 2205 | 4 | 8822 | 0.12 |
| 35 | Teak wood | 85 | 4254 | 638 | 4892 | 2446 | 8967 | 29 | 260039 | 3.55 |
| 36 | Amla | 26 | 284 | 43 | 326 | 163 | 598 | 3 | 1794 | 0.02 |
| 37 | cycas | 75 | 3248 | 487 | 3735 | 1868 | 6847 | 2 | 13694 | 0.19 |
| 38 | Red Casiya | 45 | 1046 | 157 | 1203 | 602 | 2205 | 2 | 4411 | 0.06 |
| 39 | Peepal | 30 | 403 | 61 | 464 | 232 | 850 | 1 | 850 | 0.01 |
| 40 | Aloe Vera | 30 | 403 | 61 | 464 | 232 | 850 | 14 | 11907 | 0.16 |
| 41 | Tora siekle Pod | 25 | 257 | 39 | 296 | 148 | 542 | 1 | 542 | 0.01 |
| 42 | Gulmohar | 46 | 1100 | 165 | 1265 | 632 | 2319 | 3 | 6956 | 0.09 |
| 43 | Iron Wood Cassia | 54 | 1579 | 237 | 1815 | 908 | 3327 | 1 | 3327 | 0.05 |
| 44 | Pin wheel Flower | 28 | 341 | 51 | 392 | 196 | 718 | 7 | 5029 | 0.07 |
| 45 | Cuban oregano | 50 | 1328 | 199 | 1528 | 764 | 2800 | 7 | 19601 | 0.27 |
| 46 | Coleus | 36 | 624 | 94 | 717 | 359 | 1315 | 5 | 6576 | 0.09 |



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| Sr. No. | Common Name | Average Diameter CM (25 to 100) | AGB | BGB | Total | Carbon Storage | Amount of CO ₂ Sequestered | No of Tree | Total Amount of CO ₂ Sequestered | Annually CO ₂ Sequestered amount |
|---------|---------------------|----------------------------------|------|-----|-------|----------------|---------------------------------------|------------|---|---|
| 47 | Balsam | 39 | 752 | 113 | 865 | 433 | 1586 | 64 | 101514 | 1.38 |
| 48 | Snake plant | 36 | 624 | 94 | 717 | 359 | 1315 | 3 | 3946 | 0.05 |
| 49 | White Orchid tree | 45 | 1046 | 157 | 1203 | 602 | 2205 | 1 | 2205 | 0.03 |
| 50 | Dwarf Umbrella tree | 46 | 1100 | 165 | 1265 | 632 | 2319 | 1 | 2319 | 0.03 |
| 51 | Norfolk island Pine | 35 | 584 | 88 | 671 | 336 | 1231 | 1 | 1231 | 0.02 |
| 52 | Zephyr lili | 26 | 284 | 43 | 326 | 163 | 598 | 13 | 7773 | 0.11 |
| 53 | Song of india | 80 | 3734 | 560 | 4294 | 2147 | 7871 | 1 | 7871 | 0.11 |
| 54 | Ladder fern | 75 | 3248 | 487 | 3735 | 1868 | 6847 | 1 | 6847 | 0.09 |
| 55 | Butterfly pea | 36 | 624 | 94 | 717 | 359 | 1315 | 3 | 3946 | 0.05 |
| 56 | White Water Lili | 37 | 665 | 100 | 765 | 383 | 1403 | 1 | 1403 | 0.02 |
| 57 | Canna lili | 57 | 1780 | 267 | 2047 | 1024 | 3753 | 4 | 15012 | 0.20 |
| 58 | American Wishteria | 50 | 1328 | 199 | 1528 | 764 | 2800 | 1 | 2800 | 0.04 |
| 59 | Harsingar | 46 | 1100 | 165 | 1265 | 632 | 2319 | 4 | 9274 | 0.13 |
| 60 | Gurmar | 37 | 665 | 100 | 765 | 383 | 1403 | 2 | 2805 | 0.04 |
| 61 | Insulin | 30 | 403 | 61 | 464 | 232 | 850 | 1 | 850 | 0.01 |
| 62 | Kalmegh | 28 | 341 | 51 | 392 | 196 | 718 | 2 | 1437 | 0.02 |
| 63 | Sharifa | 32 | 472 | 71 | 542 | 271 | 994 | 1 | 994 | 0.01 |
| 64 | Sarpghandha | 35 | 584 | 88 | 671 | 336 | 1231 | 2 | 2461 | 0.03 |
| 65 | Brahmi | 30 | 403 | 61 | 464 | 232 | 850 | 4 | 3402 | 0.05 |
| 66 | Ashvgandha | 28 | 341 | 51 | 392 | 196 | 718 | 3 | 2155 | 0.03 |
| 67 | Black Pepper | 30 | 403 | 61 | 464 | 232 | 850 | 2 | 1701 | 0.02 |
| 68 | Gladiolus | 23 | 208 | 31 | 239 | 120 | 439 | 25 | 10965 | 0.15 |
| 69 | Straberry | 46 | 1100 | 165 | 1265 | 632 | 2319 | 4 | 9274 | 0.13 |
| 70 | Lilium | 25 | 257 | 39 | 296 | 148 | 542 | 5 | 2710 | 0.04 |
| 71 | Lucky bamboo | 35 | 584 | 88 | 671 | 336 | 1231 | 1 | 1231 | 0.02 |
| 72 | Supari | 30 | 403 | 61 | 464 | 232 | 850 | 2 | 1701 | 0.02 |



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| Sr. No. | Common Name | Average Diameter CM (25 to 100) | AGB | BGB | Total | Carbon Storage | Amount of CO ₂ Sequestered | No of Tree | Total Amount of CO ₂ Sequestered | Annually CO ₂ Sequestered amount |
|---------|---------------------|----------------------------------|------|-----|-------|----------------|---------------------------------------|------------|---|---|
| 73 | Guldaudi | 35 | 584 | 88 | 671 | 336 | 1231 | 80 | 98446 | 1.34 |
| 74 | Arjun | 45 | 1046 | 157 | 1203 | 602 | 2205 | 4 | 8822 | 0.12 |
| 75 | Cactus | 67 | 2542 | 381 | 2923 | 1461 | 5357 | 2 | 10715 | 0.15 |
| 76 | Jamun | 45 | 1046 | 157 | 1203 | 602 | 2205 | 2 | 4411 | 0.06 |
| 77 | Araucaria | 40 | 798 | 120 | 918 | 459 | 1682 | 5 | 8411 | 0.11 |
| 78 | Brodleaf Palm Lili | 32 | 472 | 71 | 542 | 271 | 994 | 3 | 2982 | 0.04 |
| 79 | Cordyline Fruticosa | 64 | 2299 | 345 | 2644 | 1322 | 4846 | 17 | 82383 | 1.12 |
| 80 | Peace lili | 25 | 257 | 39 | 296 | 148 | 542 | 6 | 3252 | 0.04 |
| 81 | Borassus | 29 | 371 | 56 | 427 | 214 | 783 | 9 | 7048 | 0.10 |
| 82 | Dhatura | 25 | 257 | 39 | 296 | 148 | 542 | 1 | 542 | 0.01 |
| 83 | Marigold | 60 | 1994 | 299 | 2294 | 1147 | 4204 | 102 | 428837 | 5.85 |
| 84 | Yucca | 26 | 284 | 43 | 326 | 163 | 598 | 2 | 1196 | 0.02 |
| 85 | Bauhini | 24 | 232 | 35 | 267 | 133 | 489 | 2 | 978 | 0.01 |
| 86 | Banana | 30 | 403 | 61 | 464 | 232 | 850 | 2 | 1701 | 0.02 |
| 87 | Colocasia | 30 | 403 | 61 | 464 | 232 | 850 | 6 | 5103 | 0.07 |
| 88 | Garam Masala | 32 | 472 | 71 | 542 | 271 | 994 | 2 | 1988 | 0.03 |
| 89 | Cinnaman | 26 | 284 | 43 | 326 | 163 | 598 | 2 | 1196 | 0.02 |
| 90 | Pomegranate | 43 | 943 | 141 | 1084 | 542 | 1988 | 2 | 3975 | 0.05 |
| 91 | Lemon | 45 | 1046 | 157 | 1203 | 602 | 2205 | 2 | 4411 | 0.06 |
| 92 | Cardamom | 35 | 584 | 88 | 671 | 336 | 1231 | 2 | 2461 | 0.03 |
| 93 | Kapoor | 32 | 472 | 71 | 542 | 271 | 994 | 2 | 1988 | 0.03 |
| 94 | Harjod | 45 | 1046 | 157 | 1203 | 602 | 2205 | 2 | 4411 | 0.06 |
| 95 | Karonda | 54 | 1579 | 237 | 1815 | 908 | 3327 | 1 | 3327 | 0.05 |
| 96 | Shreefal | 33 | 508 | 76 | 584 | 292 | 1070 | 1 | 1070 | 0.01 |
| 97 | Rudraksh | 36 | 624 | 94 | 717 | 359 | 1315 | 2 | 2630 | 0.04 |



| | | |
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|  | Green Audit Report Chandrakanti Ramawati Devi Arya Mahila P.G. College, Gorakhpur (U.P.) Year-2022-23 |  |
|---|--|---|

| Sr. No. | Common Name | Average Diameter CM (25 to 100) | AGB | BGB | Total | Carbon Storage | Amount of CO ₂ Sequestered | No of Tree | Total Amount of CO ₂ Sequestered | Annually CO ₂ Sequestered amount |
|--------------|-------------|----------------------------------|------|-----|-------|----------------|---------------------------------------|------------|---|---|
| 98 | Tejpatta | 46 | 1100 | 165 | 1265 | 632 | 2319 | 2 | 4637 | 0.06 |
| 99 | Satavar | 34 | 545 | 82 | 627 | 313 | 1149 | 2 | 2298 | 0.03 |
| 100 | Aprajita | 54 | 1579 | 237 | 1815 | 908 | 3327 | 2 | 6655 | 0.09 |
| 101 | Ajwain | 45 | 1046 | 157 | 1203 | 602 | 2205 | 3 | 6616 | 0.09 |
| 102 | Paan | 33 | 508 | 76 | 584 | 292 | 1070 | 2 | 2140 | 0.03 |
| 103 | Giloyi | 54 | 1579 | 237 | 1815 | 908 | 3327 | 2 | 6655 | 0.09 |
| Total | | | | | | | | 667 | 1745602 | 23.80 |

College has **667 trees** in the campus. This is good initiative taken by management for green campus under the campaign of plantation.

It's Appreciable.

There are total CO₂ sequestered 1754602 **Kg /year or 23.80 Tons /Year.**

| | | |
|---|--|---|
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Calculation of Co₂ Emission of College Campus

| Sr.no | CO ₂ Emission by | Annually Co ₂ Sequestered amount (Ton /Year) |
|---|--------------------------------|---|
| 1 | Electricity | 28.29 |
| | Total | 28.29 |
| Sr.no | CO ₂ Neutralized by | Annually Co ₂ Sequestered amount (Ton /Year) |
| 1 | Trees | 23.08 |
| 2 | Solar system | 4.67 |
| | Total | 27.75 |
| Total Co₂ Emission by college | | 0.54 |

Observation:- Total yearly College **Co₂ Emission is 0.54 (Ton/year)**

Recommendation

There are required for more plantation and installation of solar energy to reduce carbon emission share by college

Other Emissions Excluded

This study did not evaluate the carbon sequestration potential of existing plantation activities and emission from the staff commuting, food supply, official flights, paper products, water supply, and waste disposal and recycling due to limited data availability. The current study identifies areas where data monitoring, recording and archiving need to be developed for enlarging the scope of mapping of GHGs emission in the future years. Accordingly, a set of tools and record keeping procedure will be developed for improving the quality of data collection for the next year carbon footprint studies.



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CHAPTER-05
WASTE MANAGEMENT

About Waste

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health waste management is important for an eco-friendly campus. In college different types of wastes are generated, its collection and management are very challenging.

Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. A bio-degradable waste includes food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. 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

Table 5.1 Different types of waste generated in the college Campus

| Sr. No. | Types of Waste | Particulars |
|---------|-------------------|--|
| 1 | Solid wastes | Damaged furniture, paper waste, paper plates, food wastes etc. |
| 2 | Plastic waste | Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc. |
| 3 | E-Waste | Computers, electrical and electronic parts etc. |
| 4 | Glass waste | Broken glass wares from the labs etc. |
| 5 | Bio-medical Waste | Sanitary Napkin etc. |

Waste management Practices adopted by the College



College is implemented “Five dust bin” waste collection system. It’s appreciable. Vegetable waste and other leaf litters were used to feed in the “Vermicompost pit” and the resulting vermin-cast is used as manure in the garden. All kind of waste generated from various activity is collected

College has adopted 5 color system of dustbin recently

| Sr. No. | Color of dustbin | Use |
|---------|------------------|----------------------------------|
| 1 | Green | For green waste |
| 2 | Red | For plastics |
| 3 | Blue | Paper and paper products |
| 4 | Yellow | Sanitary napkin masks gloves |
| 5 | Black | For metals and glasses batteries |



Figure: - 5.1 Dust bin in college campus

| | | |
|---|--|---|
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|---|--|---|

Waste Collection Points

Audit team also visited various departments, college building, Hostel building to find out waste generation area and waste collection points for further improvement. Details are given in the table

Table: 5.2 Detailed of Waste collection Dust bin system

| Sr. no. | Rooms / Area | No. of Dustbin / Size | Types of Garbage |
|---------|--------------------------------|-----------------------|-------------------|
| 1 | Store Room-01 (Ground Floor) | 1 Small | Dry |
| 2 | Computer Lab-02 | 1 Small | Dry |
| 3 | Lecture Room-03 | 1 Small | Dry |
| 4 | Lecture Room-04 | 1 Small | Dry |
| 5 | Lecture Room-05 | 1 Small | Dry |
| 6 | Smart Room-06 | 1 Small | Dry |
| 7 | ICT Lab-07 | 1 Small | Dry |
| 8 | Health Care Room | 1 Small | Dry |
| 9 | Staff Room Basement-8 | 2 Small | Dry, wet |
| 10 | Server Room-9 | 1 Small | Dry |
| 11 | Home Science Room | 2 Small | Dry, wet |
| 12 | Home Science Lab | 1 Medium | General, Dry, wet |
| 13 | B.Ed. Staff Room | 2 Small | Dry, wet |
| 14 | I.Q.A.C. | 3 Small | General, Dry, wet |
| 15 | Principal Office | 1 Medium | General, Dry |
| 16 | Principal washroom | 1 Small | Dry, wet |
| 17 | EDP Office-016 | 1 Small | General, Dry |
| 18 | Office-017 | 1 Small | General |
| 19 | Reception | 1 Small | General |
| 20 | Vice-Principal | 1 Small | Dry |
| 21 | NCC Office | 1 Small | Dry |
| 22 | Founder Room-21 | 1 Small | Dry |
| 23 | Specially Able Room-22 | 1 Small | General |
| 24 | Rovers & Rangers-23 | 1 Small | General |
| 25 | Ladies washroom (Ground Floor) | 1 Medium | General |
| 26 | Gents washroom | 1 Medium | Dry, wet |



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| 1 st Floor | | | |
|-----------------------|--------------------------------|----------|----------|
| 27 | Store Room-101 | 1 Small | Dry |
| 28 | Music Room-102 | 1 Small | Dry |
| 29 | Lecture Room-103 | 1 Small | Dry |
| 30 | Fine Art Lab-104 | 1 Medium | Dry, wet |
| 31 | Fine Art Lab-105 | 1 Medium | Dry, wet |
| 32 | Lecture Room-6 | 1 Small | Dry |
| 33 | Lecture Room-7 | 1 Small | Dry |
| 34 | Lecture Room-8 | 1 Small | Dry |
| 35 | Lecture Room-9 | 1 Small | Dry |
| 36 | Lecture Room-10 | 1 Small | Dry |
| 37 | Lecture Room-11 | 1 Small | Dry |
| 38 | Science Lab (Home Science)-112 | 1 Medium | Dry |
| 39 | Lecture Room-113 | 1 Small | Dry |
| 40 | Lecture Room-114 | 1 Small | Dry |
| 41 | Lecture Room-115 | 1 Small | Dry |



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| 2nd Floor | | | |
|-----------------------------|-------------------------------------|----------|----------|
| 42 | Store Room-201 | 1 Small | Dry |
| 43 | Textile Lab (Fashion Designing)-202 | 1 Medium | Dry |
| 44 | Lecture Room-203 | 1 Small | Dry |
| 45 | Lecture Room-204 | 1 Small | Dry |
| 46 | Lecture Room-205 | 1 Small | Dry |
| 47 | Lecture Room-206 | 1 Small | Dry |
| 48 | Common Hall-207 | 1 Medium | Dry |
| 49 | Library-208 | 1 Medium | Dry |
| 50 | Library Central-209 | 1 Small | Dry |
| 51 | Lecture Room-210 | 1 Medium | Dry |
| 52 | Lecture Room-211 | 1 Small | Dry |
| 53 | Lecture Room-212 | 1 Small | Dry |
| 54 | Psychological Room-213 | 1 Small | Dry |
| 55 | Dr. R.R.P. Memorial Hall | 2 Medium | Dry |
| 56 | Manager Room | 1 Medium | Dry |
| 57 | M.Ed. Staff Room | 6 Small | Dry |
| 58 | M.Ed. Office | 1 Small | Dry |
| 59 | M.Ed. Corridor | 1 Small | Dry |
| 60 | M.Ed. Lecture Room-101, 102 | 2 small | Dry |
| 61 | M.Ed. washroom | 2 Small | Dry, wet |
| 62 | Ground floor Corridor | 1 Big | Dry |
| 63 | First floor Corridor | 1 Big | Dry |
| 64 | Second Floor Corridor | 1 Big | Dry |
| 65 | Main Ground | 2 Big | Dry, wet |
| 66 | Garden | 2 Medium | Dry, wet |
| 67 | Canteen | 2 Big | Dry, wet |
| 68 | Parking Area | 2 Medium | Dry, wet |



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Vermicompost pit

College has installed Vermicompost pit for all type of agriculture waste and generated manure are utilized in College garden. It's Appreciable



Organic Waste Generation in College

Audit Team also visited in hostel mess and discussion with concern officer about the waste collection process. College has approx. 10 Kg per day waste generated.

Recommended - Install organic waste composting Machine in college.

An organic waste composting machine is an independent unit that facilitates the composting process and provides better composts. It takes waste as its input and provides manure as its output. Composting without an organic waste composting machine will take a considerable amount of time.



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About Composting Process

Highly compact composting machine, which uses special microorganisms to break down and decompose all kinds of organic waste into compost within 24 hrs with a volume reduction of 85-90%. When organic waste is added to it, moisture is sensed by the humidity sensor, heater, mixing blades and an exhaust system.



❖ Recommendation

College has a good potential to install organic converter.