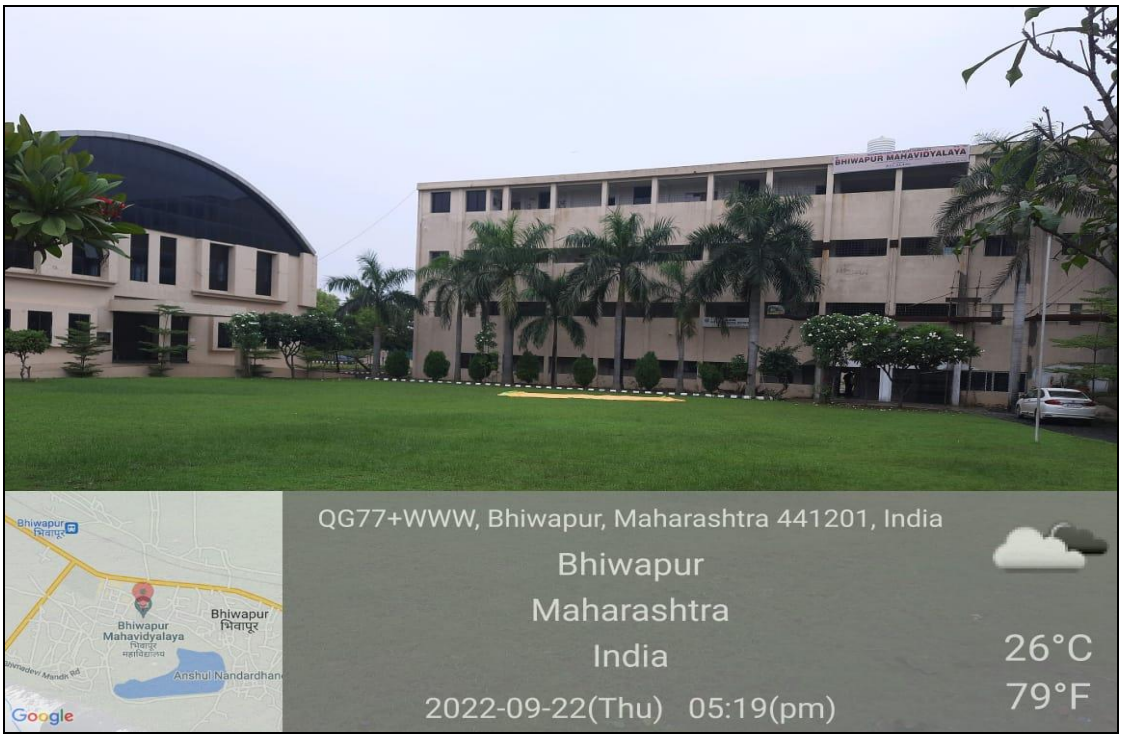
GREEN AUDIT REPORT

CONSULTATION REPORT



Bhiwapur Mahavidyalaya
Bhimadevi Temple Road, Near Telephone Exchange Office,
At Post Taluka: BHIWAPUR
Dist: Nagpur (M.S.) India- 441201

PREPARED BY

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(2020-21)

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ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management **Bhiwapur Mahavidyalaya, Bhiwapur Dist. Nagpur, Maharashtra.** 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), PhD (Research Scholar)
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.
Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Charted Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]

EXECUTIVE SUMMARY

Green Initiative Taken by College

- **CAMPAIGN OF PLANTATION AND GREEN CAMPUS:**
  - College has around **586** trees in the campus. Its good initiative taken by management for green campus under the campaign of plantation. **It's APPRECIABLE.**
- **VERMI COMPOST PIT**
  - College has installed vermicompost pit in college premises for treatment all type organic waste. **It's APPRECIABLE**

AREAS FOR IMPROVEMENT

- **5 DUST BIN WASTE MANAGEMENT SYSTEM:**
  - It was observed that college has applied 5 dust bin system for waste management in campus. Waste management system help to implement 3R concept (Recovery, Reuse and Recycling) of different type of waste generated in the college campus.
- **QR Code System on Tree:**
  - While the world seems to be going digital, people lack the time to read books and process the information they contain. Hence, college can be provided QR codes on the trees for its information and to exploit the rapidly growing platform for a unique purpose.

CHAPTER-1
INTRODUCTION

1.1 About College

Bhiwapur Mahavidyalaya stands as a synonym today for quality education as envisioned by its Founder, Heavenly Bhausaheb Govindrao Mulak in the mufassil area of Bhiwapur tehsil, Nagpur District. As on today, the Institution has blossomed into a full -grown tree catering to professional and conventional schooling to the rural masses.

At a time, when there were no educational institutions in the vicinity, a visionary Late Bahusaheb Govindraoji Mulak pioneered the noble cause of providing edification to the rural folks and under the tutelage of a Charitable Trust named Backward Class Youth Relief Committee in 1974, which initiated a beginning of new epoch in Higher Education in Vidarbha region of Maharashtra State. The stride of the Trust began by establishing Colleges all over with an Engineering College named KDK College of Engineering in 1981. The beacon of light of education dispersed throughout Vidarbha with seventeen institutions imparting learning in almost all the branches of Higher Education.

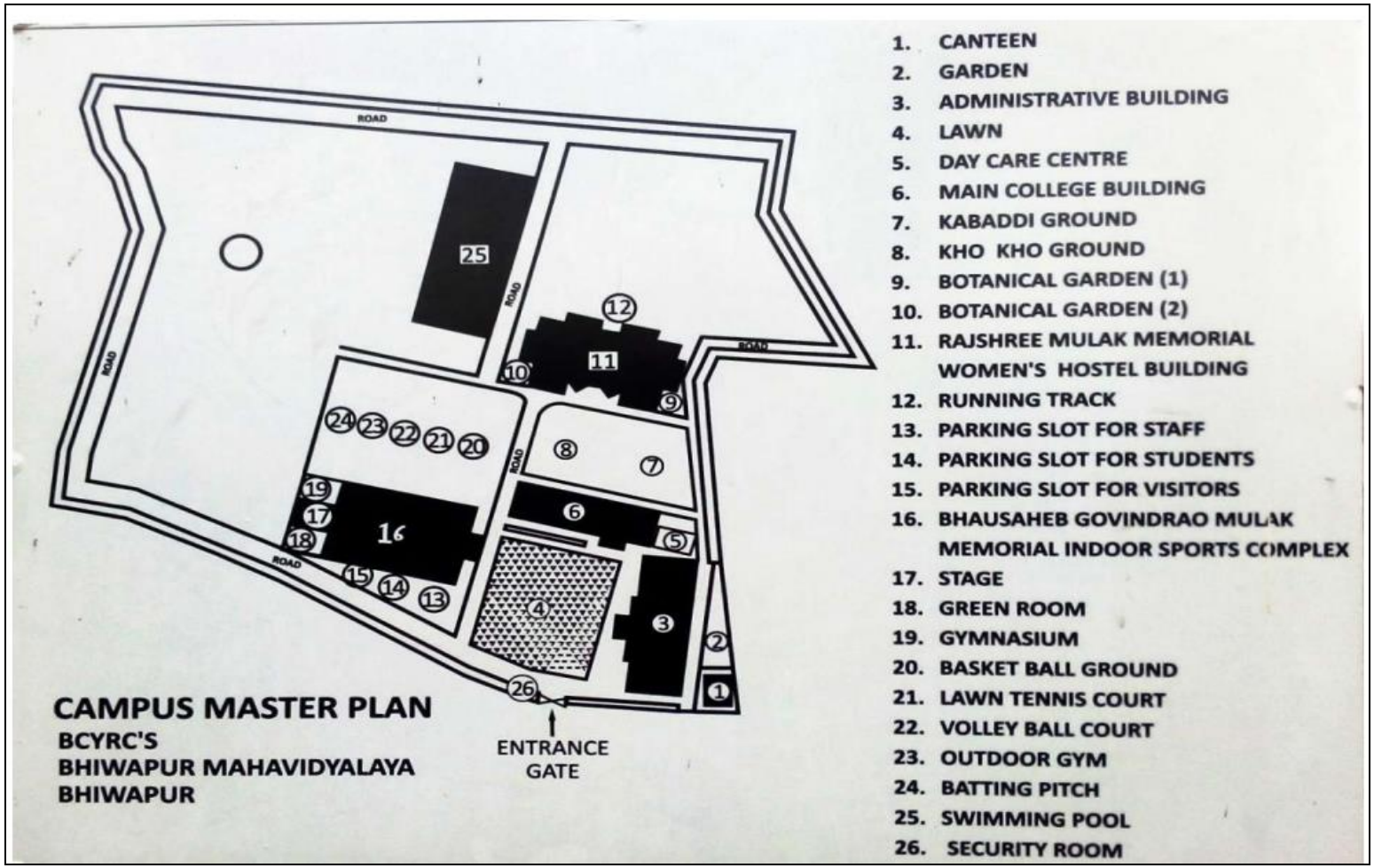
Bhiwapur Mahavidyalaya is located in Bhiwapur, a rural place with 137 small villages and is very close to the tribal dominated belt of forest area. Located in the serene natural environment with lush green forests and agriculture as the basic occupation, Bhiwapur a small flourishing town is 72 K.M. away from Nagpur. Bhiwapur Mahavidyalaya affiliated to Nagpur University, now Rashtrasant Tukadoji Maharaj Nagpur University was established in 1990 with Arts faculty with the sole objective of imparting education in the field of Higher Studies to enable the rural youth to learn locally and flourish globally despite the tribulations and dearth of abundance.

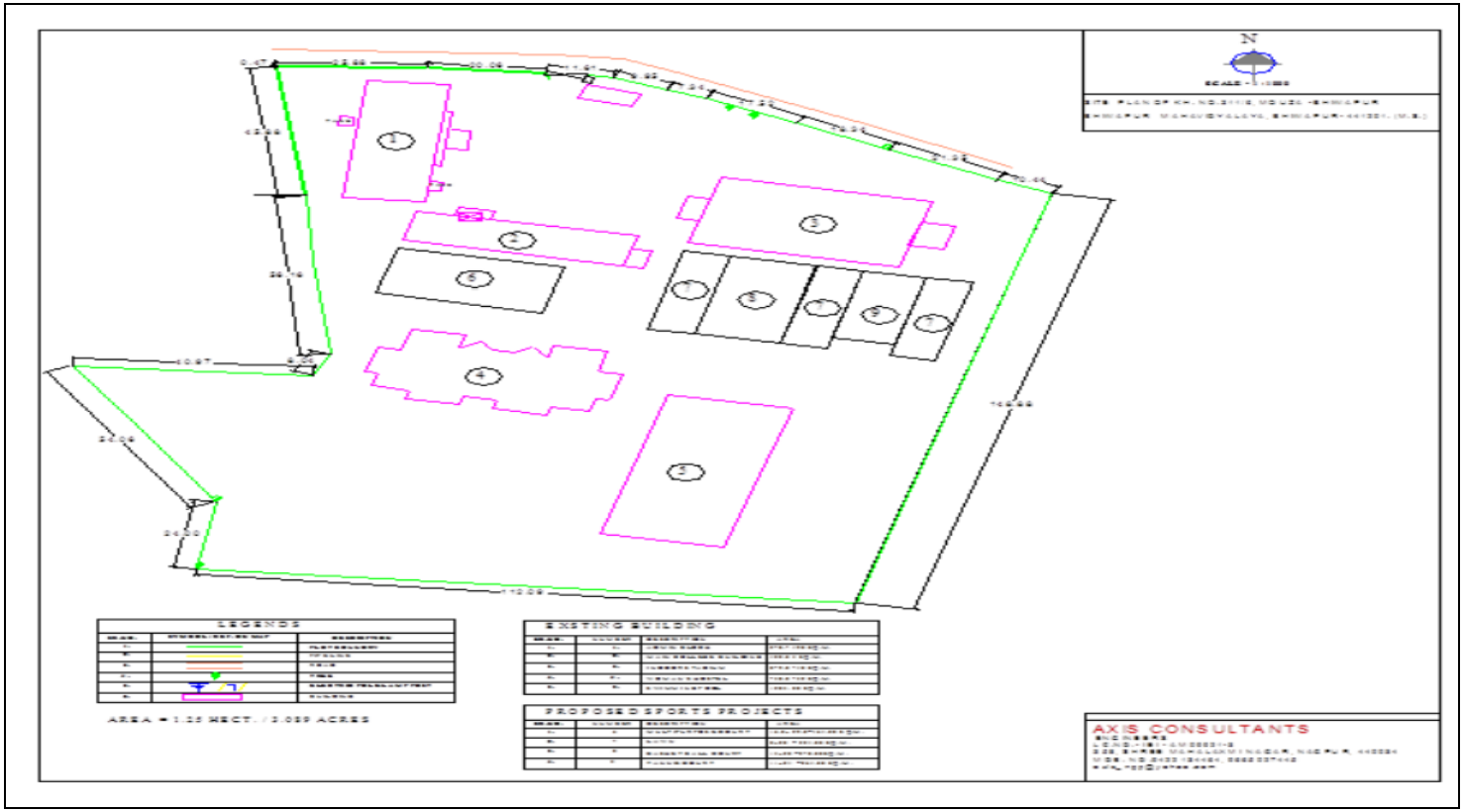
The journey of elevating the youth continued with the initiation of Commerce Faculty in 2002, B.Sc. in 2012 and B. Voc. in 2019. The stride and vision of the Founder strengthened in its conceptualization with the introduction of Post Graduate courses in Economics, Political Science and Sociology in 2004. Over the years, the noble vision manifested and carved a niche for itself and earned the recognition for the Institution as one of the premier co-educational Institutions in Nagpur region imparting quality education with the strong support of highly competent and skilled teaching and non-teaching staff.

Keeping up with pace of the dynamic changes in the field of education, the Institution has kept itself abreast with ICT enabled classrooms, independent Departments; E.T.N.L software supported English Language Lab, state-of-the-art Computer Lab, fully automated Central Administrative Office and Central Library with spacious reading room and UGC Network Resource Centre. Today, the Institution is transforming its envisioned objectives into a reality through quality knowledge dissemination.

Over the years, the Institution has taken strides to fulfill its vision, mission and quality initiatives. It is proud moment in the history of the Institute to apprise all its stakeholders of the elevation and up gradation of its infrastructural facilities like multi-purpose Auditorium, Conference Hall, Common rooms for girls and boys, canteen, Gymnasium, playgrounds. The Institutions avowals the presence of International Level Swimming Pool and Indoor Stadium to strengthen the learners of the rural areas to compete unabashedly with zest in the world outside Bhiwapur. Gender equity and sensitization are an integral part of the institution's policy of empowering women's education. The Women's Hostel Building enables the girl students to accomplish their dreams of getting quality education. The Institution surpasses in rendering requisite facilities for the students to grow and live a dignified life

COLLEGE LAYOUT OF VARIOUS FLOORS




N
LEGENDS
EXISTING BUILDING
PROPOSED SPORTS PROJECTS
AXIS CONSULTANTS

1.2 Energy Monitoring Committee

Backward Class Youth Relief Committee's

BHIWAPUR MAHAVIDYALAYA

Arts, Commerce & Science Faculties (Junior and Senior)
At. Po. Bhiwapur, Distt. Nagpur (MS) -441201
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Dr. Jobi George	**Smt. Sumanmala B. Mulak**	**Shri. Rajendra Mulak**
M.A. (Eng.) M.Phil, Ph.D Principal	President B.C.Y.R.C. B.M.C.T. Khamla, Nagpur	M.Com. L.L.B. Ex. Minister of State Finance & Planning, Water Resources, Excise, Energy & Parliamentary Affairs (M.S.) Secretary B.C.Y.R.C., B.M.C.T. Khamla, Nagpur

Ref. No./BMV/2021-22/EWGEA C/6649 Date 22/11/2021

ENERGY, WATER, GREEN AND ENVIRONMENT AUDIT COMMITTEE

Energy, Water, Green and Environment audit committee will consist of following members.

Sr. No.	Name of the Member	Designation	Department
01	Dr. Jobi George	Principal	Chairman
02	Dr. Mangesh V. Kadu	IQAC Co-ordinator	Political Science
03	Dr. Motiraj R. Chavhan	Asst. Professor	History
04	Shri. Somehwar Wasekar	Asst. Professor	English
05	Shri. Sagar M. Yadav	Jr. Lecturer	Botany
06	Shri. Sanjay Meshram	Sr. Clerk	Administrative Work
07	Shri. Gulab R. Gedekar	Peon	Gardener

Bhiwapur Mahavidyalaya * Bhiwapur Distt. Nagpur *

PRINCIPAL
Bhiwapur Mahavidyalay
Bhiwapur, Dist. Nagpu

1. 3 Green Audit Team

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

- **Mr. Rakesh Pathak**, [Director & Electrical Expert]
- **Mr. Rajesh Kumar Singadiya** [Director & Accredited Energy Auditor AEA-0284]
- **Mrs. Laxmi Raikwar Singadiya** [Energy & Chemical Engineer]
- **Mr. Sachin Kumawat** [Sr. Project Engineer]
- **Mr. Ajay Nahra** [Engineer]
- **Mr. Charchit Pathak** [Mechanical Engineer]
- **Mr. Aakash Kumawat** [Assistant Jr. Engineer]

1.4 About Green Auditing

Eco campus is concepts implemented in many educational institutions, all over the worldto 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 **"Bhiwapur Mahavidyalaya"** enables to assess the life style, action and its impact on the environment. This green audit was mainly focused on greening indicators like utilisation 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.

1.5 Objectives of Green Auditing

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

The specific objectives are:

- To suggest measures to make the college campus biodiversity rich
- To demarcate areas within the institute campus which have potential for restoration of biodiversity
- To make recommendations for the conservation, protection and rejuvenation of the natural vegetation and animal life by involving students and faculty members
- 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.

1.6 Target Areas of Green Auditing

Green audit forms part of a resource management process. Although they are individual events, the real value of green audit is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time.

Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency. Target areas included in this green auditing is biodiversity, green energy and carbon foot print.

1.7 Audit for Biodiversity

India is mega-biodiversity hottest hot-spot in the world with tremendous diversity in plants and animals. Such biotic forms are endemic to the different bio-geographic habitats in urban and in forest areas of the country as well. Biodiversity is defined as genetic, species and ecosystem diversity, which offers variability and therefore added values to bio-resources.

The most serious and rapidly accelerating of all the global environmental problems is the loss of biodiversity through deforestation and biodiversity cover depletion. Over the past 300 years, many species of organisms, including mammals, birds, butterflies and plants, have been lost due to many anthropogenic activities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen.

1.8 Audit of Green Energy:

According to the **Environmental Protection Agency (EPA)**, green energy provides the highest environmental benefit and includes power produced by solar, wind, geothermal, biogas, low-impact hydroelectric, and certain eligible biomass sources. Green energy can also reduce your carbon footprint and achieve a sustainable lifestyle.

CHAPTER- 2
GREEN CAMPUS & SUSTAINABLE DEVELOPMENT

2.1 Green Audit

In the survey, focus has been given on assessment of present status of diversity in form of plants, in college campus and efforts made by the college authorities for nature conservation. Campus is located in the vicinity of approximately more than 586 trees/ medicinal herbs/ ornamental plants. The detail is given below:

Figure 2.1 :- Green Campus

2.2 List of plants in college campus

Sr. No	Name of Tree	Quantity
1	Nag Chafa	126
2	Chafa (white and red)	13
3	Seasonal Plants	31
4	Yellow trumpet bush	19
5	White Kanher	4
6	Saptparni	3
7	Bakul	3
8	Vidya	10
9	Royal Palm	9
10	pink periwinkle	5
11	Boganvel (red)	2
12	Zandu	30
13	Peru	3
14	Lemon	4
15	Chiku	1
16	Mango	12
17	Amla	1
18	Chandan	1
19	Imli	1
20	Fanas	1
21	Mullberry	1
22	Tulsi	2
23	Nagfani	3
24	Kanher	4
25	Nilgiri	2
26	Adulsa	2
27	Aloe Vera	3
28	Apta	8
29	Sisum	11
30	Gulmohar	11
31	Babhool	6
32	Kadamba	1
33	Vasant Rani	32
34	Pithodia	38
35	Bahawa	30

36	Shishir	30
37	Saptapadi	32
38	Shankasur	1
39	Jambhul	3
40	Tamhan	2
41	Bakul	1
42	Bamboo	19
43	Mosambi	2
44	Orange	11
45	Sitafal	1
46	Madagascar Almond	33
47	Dagdipala	9
48	Purple heart	9

Glimpse of some appreciable initiative by the college

CHAPTER- 3

GREEN ENERGY AND SUSTAINABLE DEVELOPMENT

3.1 Photovoltaic System (4 Kwp)

There is 4KWp solar photovoltaic roof systems installed on college building. System details are given below:

Sr. No	Description	Technical Specification
1	**Plant Information**	
1.1	Plant capacity	4.0KWp
1.2	Location	Bhiwapur Mahavidhyalaya Terris
1.3	Latitude & Longitude	20.764 &79.51
2	**PV Panel Details**	
2.1	Make	Kotak Urja Pvt. Ltd.
2.2	Panel Type	Polycristline
2.3	Panel Wattage	17v
2.4	Panel Tilt Angle	25
3	**Inverter Information**	
3.1	Make	Microtek
3.2	Model	UPS MEB 1400
3.3	Capacity of Inverter	4.8
3.4	No of Inverter	1

Figure 3.1 : - Solar Plant KWp and Inverter System

Chapter-04
Carbon Foot print

4.1 About carbon foot print.

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

Carbon footprint is a measure of the impact your activities have on the amount of carbon dioxide (CO_2) produced through the burning of fossil fuels and is expressed as a weight of CO_2emissions produced in tonnes.

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 behaviour.

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…

4.2 Methodology and Scope

The carbon footprint gives a general overview of the College greenhouse gas emissions, converted into CO_2 -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.

4.3 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 KgCO2/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 Purchased from the grid

Sr. No	Parameter	Unit	Value	Emission Factor kg CO2e/kWh	Emission ton CO2e/year
1	Electricity	12060	kWh	0.9613	11.59

4.4 Biomass Calculation and CO^2 Sequestration of the Trees: -

1. Estimation of above ground biomass (AGB)

$$K= 34.4703 – 8.0671D + 0.6589 D^2$$

Where = K is above ground biomass.
D is Breast height diameter in (cm)

2. Estimation of below ground biomass (BGD)

BGB = AGB x 0.15

3. Total Biomass (TB)

TB = AGB + BGB

4. Calculation of carbon dioxide Weight sequestered in the tree in kg.

C = W x 0.50

5. Calculate the weight of Co2 Sequestered in the tree per year in kg.Co2 = C x 3.666

Where: -

AGB = Above ground biomass.
D = Diameter of tree breast height
BGB = Below Ground Biomass.
C = Carbon
TB = Total Biomass.

4.5 Biomass Calculation of Trees

Sr. no.	Tree Name	Botanical and Family name	Average Daimeter CM (10 to 100)	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	Total	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount (Ton/year)
1	Nag Chafa	Mangoliachampaca	26	283.7	42.5	326.2	163.1	598.0	126	75342	1.03
2	Chafa (white and red)	Plumeriaobtusa	19	126.3	18.9	145.2	72.6	266.2	13	3460	0.05
3	Seasonal Plants	Seasonal Plants	30	403.5	60.5	464.0	232.0	850.5	31	26365	0.36
4	Yellow trumpet bush	Tecomastan	22	185.6	27.8	213.4	106.7	391.2	19	7433	0.10
5	White Kanher	Nerium oleander	20	144.7	21.7	166.4	83.2	305.0	4	1220	0.02
6	Saptparni	Alstoniascholaris	34	545.0	81.8	626.8	313.4	1148.8	3	3447	0.05
7	Bakul	Mimusopselengi	48	1211.4	181.7	1393.2	696.6	2553.7	3	7661	0.10
8	Vidya	Thuja	29	371.5	55.7	427.2	213.6	783.1	10	7831	0.11
9	Royal Palm	Roystonearegia	32	471.5	70.7	542.2	271.1	993.9	9	8945	0.12
10	pink periwinkle	Vincacatharanthsroseus	18	109.2	16.4	125.6	62.8	230.2	5	1151	0.02
11	Boganvel (red)	Bougainvillea glabra	30	403.5	60.5	464.0	232.0	850.5	2	1701	0.02
12	Zandu	Tagetus	34	545.0	81.8	626.8	313.4	1148.8	30	34465	0.47
13	Peru	Psidiaumguajava	56	1711.7	256.8	1968.5	984.3	3608.3	3	10825	0.15
14	Lemon	Ctrus	19	126.3	18.9	145.2	72.6	266.2	4	1065	0.01
15	Chiku	ManikaraZopota	37	665.4	99.8	765.2	382.6	1402.6	1	1403	0.02
16	Mango	Magniferaindica	48	1211.4	181.7	1393.2	696.6	2553.7	12	30644	0.42

17	Amla	Phyllanthusemblica	29	371.5	55.7	427.2	213.6	783.1	1	783	0.01
18	Chandan	Santalum album	44	993.9	149.1	1143.0	571.5	2095.0	1	2095	0.03
19	Imli	Tamarindusindiaca	26	283.7	42.5	326.2	163.1	598.0	1	598	0.01
20	Fanas	Artocarpushererophyllus	47	1155.0	173.3	1328.3	664.1	2434.7	1	2435	0.03
21	Mullberry	Morus	37	665.4	99.8	765.2	382.6	1402.6	1	1403	0.02
22	Tulsi	Ocimum sanctum	13	44.3	6.6	51.0	25.5	93.5	2	187	0.00
23	Nagfani	Opuntia	27	311.6	46.7	358.3	179.2	656.8	3	1970	0.03
24	Kanher	Nerium Oleander	19	126.3	18.9	145.2	72.6	266.2	4	1065	0.01
25	Nilgiri	Eucalyptus	21	164.5	24.7	189.1	94.6	346.7	2	693	0.01
26	Adulsa	Justiciaadhatoda	18	109.2	16.4	125.6	62.8	230.2	2	460	0.01
27	Aloe Vera	Asphodelaceae	24	231.9	34.8	266.7	133.3	488.9	3	1467	0.02
28	Apta	Bauhinia recemosa	27	311.6	46.7	358.3	179.2	656.8	8	5254	0.07
29	Sisum	DalbergiaSissoo	56	1711.7	256.8	1968.5	984.3	3608.3	11	39691	0.54
30	Gulmohar	Caesalpinia	39	752.5	112.9	865.3	432.7	1586.2	11	17448	0.24
31	Babhool	Acacia auriculiformis	48	1211.4	181.7	1393.2	696.6	2553.7	6	15322	0.21
32	Kadamba	Neolamrckiacadamba	52	1450.7	217.6	1668.3	834.2	3058.1	1	3058	0.04
33	Vasant Rani	Tubebuiarosea	60	1994.5	299.2	2293.7	1146.8	4204.3	32	134537	1.83
34	Pithodia	Diospyrosmelanoxylon	47	1155.0	173.3	1328.3	664.1	2434.7	38	92519	1.26
35	Bahawa	Cassia Fustula	32	471.5	70.7	542.2	271.1	993.9	30	29818	0.41
36	Shishir	SamaneaSaman	26	283.7	42.5	326.2	163.1	598.0	30	17939	0.24
37	Saptapadi	AstoniaScholaris	51	1388.9	208.3	1597.2	798.6	2927.7	32	93686	1.28
38	Shankasur	Caesalppinia	29	371.5	55.7	427.2	213.6	783.1	1	783	0.01
39	Jambhul	Syzygiumcumini	38	708.3	106.2	814.5	407.2	1493.0	3	4479	0.06
40	Tamhan	Legarstroemiaspeciosa	29	371.5	55.7	427.2	213.6	783.1	2	1566	0.02
41	Bakul	Mimusopselengi	21	164.5	24.7	189.1	94.6	346.7	1	347	0.00

42	Bamboo	Bambusoideae	29	371.5	55.7	427.2	213.6	783.1	19	14878	0.20
43	Mosambi	Citrus Limetta	16	79.2	11.9	91.1	45.5	166.9	2	334	0.00
44	Orange	Citrus x sinensis	24	231.9	34.8	266.7	133.3	488.9	11	5377	0.07
45	Sitafal	Annonasquamosa	19	126.3	18.9	145.2	72.6	266.2	1	266	0.00
46	Madagascar Almond	Termaliamantaly	17	93.5	14.0	107.6	53.8	197.2	33	6506	0.09
47	Dagdipala	Asreaceae	32	471.5	70.7	542.2	271.1	993.9	9	8945	0.12
48	Purple heart	Tradescantiapallida	27	311.6	46.7	358.3	179.2	656.8	9	5911	0.08
Total Co2 Emission neutralize by the trees											10.02

4.5 Calculation of CO2 Emission of college: -

Total Carbon Footprint generated by the campus = Carbon footprint by electricity - Carbon Neutralize by tree

Total Carbon Foot print by campus: **11.59 - 10.02= 1.57 tons/year**

4.6 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.

CHAPTER- 5
WASTE MANAGEMENT

5.1 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.

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	Chemical wastes	Laboratory waste etc
6	Bio-medical Waste	Sanitary Napkin etc

5.2 Waste management Practices adopted by the College

College has a different type of waste generated like paper, Plastic, dust and wet waste. The college provided dustbin near classroom, office, laboratories, staff room, and collect the waste material at the end of the day. The waste (Especially dry material) is collected in a big dustbin which are provided at every floor and the next day collected municipal corporation for further processing.

Recommendation:

Adopted 5 Bin Waste Collection System for collect different type of waste generated in college premises.

Figure: - 5 Dust Bin waste collection System

5.3 Waste Collection Points:

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

Name of Building: Admin Building

Sr. No.	Location	No. of Dust Bin & Colors	Type of Waste (Dry/Wet/Organic etc)
1	Office	06 Blue	Dry
2	Principal Office	1	Dry
3	Conference Room	0	Dry
4	Board Room	0	Dry
5	Poarch	1	Dry

Name of Building: Academic Block

Sr. No.	Location	No. of Dust Bin & Colors	Type of Waste (Dry/Wet/Organic etc)
1	Ground Floor	5	Dry
2	First Floor	5	Dry
3	Second Floor	2	Dry
4	Third Floor	4	Dry

Name of Building: Indoor Stadium

Sr. No.	Location	No of Dust Bin & Colors	Type of Waste (Dry/Wet/Organic etc)
1	Indoor Stadium	01(Blue)	Dry
2	NCC Room	02 (Blue)	Dry
3	Department of Physical Education	01 (Blue)	Dry

Name of Building: Hostel

Sr. No.	Location	No of Dust Bin & Colors	Type of Waste (Dry/Wet/Organic etc)
1	Poarch	02 Blue (1) Red (1)	Dry / Wet

Name of Building: Swimming Pool

Sr. No.	Location	No of Dust Bin & Colors	Type of Waste (Dry/Wet/Organic etc)
1	Pool side	01 (Blue)	Dry

Name of Building: Canteen

Sr. No.	Location	No of Dust Bin & Colors	Type of Waste (Dry/Wet/Organic etc)
1	Poarch	02 Blue (1) Red (1)	Dry / Wet

CHAPTER- 6
RECOMMENDATIONS AND SUGGESTIONS

6.1 QR Code System and Biodiversity:

While the world seems to be going digital, people lack the time to read books and process the information they contain. Hence, College can be provided QR codes on the trees for its information and to exploit the rapidly growing platform for a unique purpose.

Figure :- QR Code System for plants

These codes can give students all the information they need to know about the tree — from its scientific name to its medicinal value. They only need to put their smart-phones to use. QR codes to them, making it easier for everybody to learn about a plant or a tree at the tip of their fingers," If any app generating a QR code, which is available for free on the online stores, can be used to avail the information of the trees.

- **Eco-restoration programmes**
  - Frame long-term eco-restoration programmes for replacing exotic Acacia plantations with indigenous trees and need of the hour is to frame a holistic campus development plan.

6.2 Other Suggestions

Some of the very important suggestions are:-

- Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.
- Increase recycling education on campus.
- Increase Awareness of Environmentally Sustainable Development in college campus.
- Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.
- Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development.
- Collaborate for Interdisciplinary Approaches- To develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- Increase reduce, reuse, and recycle education on campus.
- Develop a butterfly garden that arouses appreciation towards flora and fauna diversity.
- Name all the trees and plants (Plant DNA barcodes) with its common name and scientific name.
- Arrange training programmes on environmental management system and nature conservation.
- Renovation of cooking system in the canteen to save gas by installation solar water heater system with heat pump.
- Establish a procurement policy that is energy saving and eco-friendly.