



**Green Audit Report  
Dyal Singh College Karnal,  
Haryana Year 2021-22**



**GREEN AUDIT REPORT  
CONSULTATION**



**Dyal Singh College  
Karnal-132001, Haryana**

PREPARED BY

**EMPIRICAL EXERGY PRIVATE LIMITED**

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(2021-22)

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## **ACKNOWLEDGEMENT**

**Empirical Exergy Private Limited (EEPL), Indore** takes this opportunity to appreciate & thank the **Dyal Singh College Karnal, Haryana** 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)  
Chartered Engineer [M-1699118], The Institution of Engineers (India)  
Member of ISHRAE [58150]



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**Green Monitoring Committee**



**DYAL SINGH COLLEGE, KARNAL**

NAAC Re-Accredited Grade 'A' and ISO 140001 & 9001 Certified  
Website : dsckarnal.ac.in, e-mail: dsckarnal@gmail.com, Ph.: 0184-2252030/2251087

A committee of the following members has been constituted for the conduction of Energy, Green & Environmental Audit:

1. Sh Sanjay Kumar, Overall Incharge (NAAC)
2. Sh Sushil Kumar, Coordinator (NAAC)
3. Dr Devinder Singh
4. Dr Ritu Sharma (Eng.)
5. Dr Anita Agarwal
6. Dr Shweta Yadav
7. Dr Tejpal
8. Dr Aditi Shreeya Bali
9. Sh Kiran Kumar
10. Dr Omvir Singh, External Expert
11. Ms Meenu Sharma, External Expert

Committee shall submit audit reports to the undersigned. In addition to the above, Sh Azad Singh (Offg. Deputy Supdt.) and Parveen Kumar (Clerk) will be responsible to provide all the required details and documents to the committee as and when required.

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## **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]
- ✦ **Mr. Sachin Kumawat** [Sr. Project Engineer]
- ✦ **Mrs. Laxmi Raikwar Singadiya** [Energy Engineer]
- ✦ **Mr. Charchit Pathak** [Mechanical Engineer]
- ✦ **Mr. Akash Kumawat** [ Jr. Engineer]
- ✦ **Mr. Ajay Nahra**[Sr. Accountant]

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## EXECUTIVE SUMMARY

### Green Initiatives Taken by College

#### ✦ **CAMPAIGN OF PLANTATION AND GREEN CAMPUS:**

College has around **301** trees in the campus. It is good initiative taken by management for green campus under the campaign of plantation. **It is APPRECIABLE.**

#### ✦ **Varmi Compost Pit.**

College has developed varmi compost pit for treatment of all type of agriculture waste. **It's Appreciable**

#### ✦ **QR Code System.**

College has developed QR Code system on trees for identification and awareness for students and faculties. **It's Appreciable.**

### **AREAS FOR IMPROVEMENT**

#### ✦ **3 Dust Bin System**

It is observed that college has adopted two dust bin system for all kind of waste generated in college campus. It is recommended to 3 dust bin system for segregation of all type of waste

#### ✦ **Eco-restoration programmes**

Frame a holistic campus development plan with long-term eco-restoration programmes for replacing exotic acacia plantations with indigenous trees.

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**✚ OTHER SUGGESTIONS & RECOMMENDATION**

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.
- 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.
- 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.
- Renovation of cooking system in the canteen to save gas by installation solar water heater system with heat pump.

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**CHAPTER-1  
INTRODUCTION**

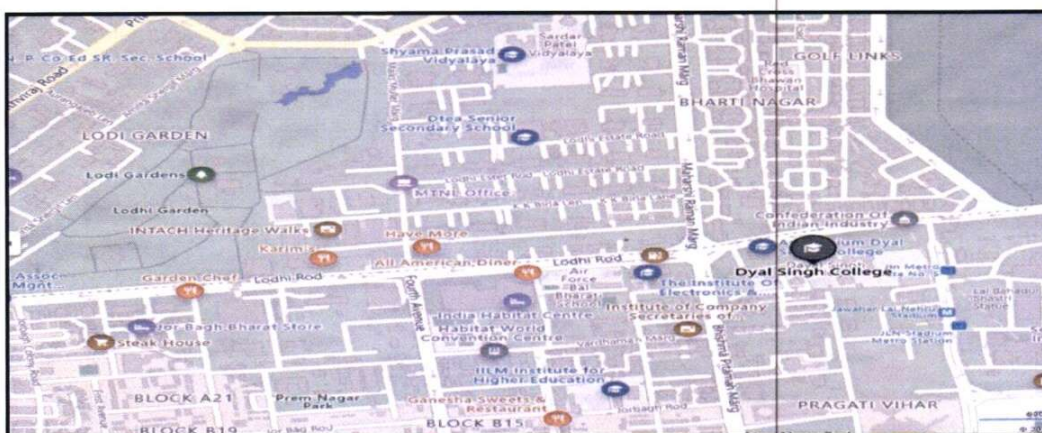


## Green Audit Report Dyal Singh College Karnal, Haryana Year 2021-22



### 1.1 About College

Dyal Singh College, Karnal, as it stands today, is a premier co-educational centre of learning of Northern India. With a strength of 3152 students, the college has all the three streams of learning – Arts, Science and Commerce, with Post Graduate courses in English, Hindi, Political Science, Commerce and Chemistry, along with the add-on and vocational courses. The college also offers a 5-year Integrated Course M.Sc. Forensic Science under innovative programme sponsored by the UGC. The college is making progress under the esteemed guidance of Shri D.K. Raina – an embodiment of rare wisdom, learning and love for academia-President, Dyal Singh College Governing Body, and the dynamic leadership of Vice Admiral (Retd.) Satish Soni, PVSM, AVSM, NM, a man of letters with administrative acumen, who holds the office of the General Secretary. This unique centre of teaching and learning completed hundred years and more than a decade of its birth and turned into a century-old Fortress of Learning and Education... maintaining the tradition of Spirituality and Scientific temper in a world of diminishing human values... inculcating in young minds, a harmonious blend of the “Wisdom of the East and West”. To quote our honourable Ex-President, DewanGajendra Kumar, “The lead word in our motto is Wisdom and Morality and Ethics are not far behind.” True to the Will of our Illustrious Founder, Late Sardar Dyal Singh Majithia, the path of Wisdom, Morality and Ethics has been the kindling force all along.



Source :satellite Image of Dyal Singh College from Google map

### Vision





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1. Excellence is a journey, not an end.....

**Mission**

2. To create top quality human resource by developing the innate talent of our students.
3. To provide conducive environment for holistic development of personality and improve the overall academic performance.
4. To inculcate the spirit of Secularism, Nationalism, Communal Harmony & Rationalism.
5. To inculcate discipline as a value system and motivate youth to render service to the society at large.

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**College build-up area**

Details are the total build-up area given in the table:-





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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 “**Dyal Singh College Karnal, Haryana**” enables to assess the life style, action and its impact on the environment. This green audit was mainly focused on greening indicators like 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.

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### **1.3 Objectives of Green Auditing**



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The general objective of green audit is to prepare a baseline report on “Green campus” and alternative energy sources, 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 Colleges

### 1.4 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.



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### CHAPTER-2 GREEN CAMPUS

#### 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 301 no trees medicinal herbs ornamental plants. The detail is given below





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**2.2 List of plants in College campus**

Sr.No.	Botanical Name	Common Name	Quantity
1.	Psidiumguajava	Guava	12
2.	Livistona sp.	Palm	14
3.	Michelia sp.	Champa	1
4.	Neolamarckiacadamba	Kadam	2
5.	Mimusopselengi	Maulsari	12
6.	Ficusvirens	Pilkhan	2
7.	Polyalthialongifolia	False Ashoka	23
8.	Roystonearegia	Royal Bottle Palm	5
9.	Syzygiumcumini	Jamun	5
10.	Moringaoleifera	Swanjana	2
11.	Madhucalongifolia	Mahua	3
12.	Callistemon viminalis	Bottle Brush	1
13.	Cassia fistula	Amaltas	3
14.	Pinusroxburghii	Chir pine	2
15.	Mangiferaindica	Mango	12
16.	Aeglemarmelos	Bael	3
17.	Cascabelathevetia	Kaner	2
18.	Araucaria	Christmas tree	1
19.	Terminaliamantaly	Madagascar Almond	1
20.	Dalbergiasissoo	Shisham	2
21.	Morus alba	Shahtut	3
22.	Ficusbenghalensis	Bargad	1
23.	Azadirachtaindica	Neem	3
24.	Phyllanthusemblica	Amla	4
25.	Ixorajavanica	Jawanica	4
26.	Buteamonosperma	Dhak	2
27.	Bauhinia variegata	Kachnar	2
28.	Grevillea robusta	Silver Oak	5
29.	Melia azadirach	Drake	2
30.	Kigelia africana	Sausage tree	1
31.	Jacaranda mimosifolia	Jacaranda	1
32.	Sapindus mukorossi	Reetha	1
33.	Juniperus	Juniperus	1
34.	Prunus domestica	Plum	2
35.	Terminalia arjuna	Arjuna	9
36.	Bambusa sp.	Bamboo	1



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S.No.	Botanical Name	Common Name	Quantity
37.	Manilkarazapota	Chikoo	2
38.	Ficus sp.	Ficus	1
39.	Delonixregia	Gulmohar	1
40.	Citrus limetta	Mausami	2
41.	Ficusreligiosa	Peepal	1
42.	Terminaliachebula	Harar	1
43.	Artocarpusheterophyllus	Kathal	2
44.	Alstoniascholaris	Devil's tree	3
45.	Elaeocarpusangustifolius	Rudraksh	1
46.	Toonaciliata	Toon	1
47.	Dracaena	Dracaena	5
48.	Ficus sp.	Ficus	2
49.	Bougainvillea sp.	Baougainvillea	3
50.	Nyctanthes arbor-tristis	Jasmine	1
51.	Ficuscarica	FigP	1
52.	Hibiscus	Hibiscus	12
53.	Platycladusorientalis	Chinese thuja	3
54.	Citrus nobilis variety	Orange	2
55.	Eriobotrya japonica	Loquat	3
56.	Prunuspersica	Peach	2
57.	Croton sp.	Croton	3
58.	Calliandra sp.	Calliandra	2
59.	Ricinuscommunis	Castor bean	3
60.	Citrus limon	Lemon	5
61.	Ficusbenjamina	Weeping fig	2
62.	Cupressus golden	Cupresses	13
63.	Murrayakeonigii	Kadipatta	1
64.	Tabernaemontanadivaricata	Pinwheel flower	4
65.	Rosa indica	Rose	- (Bush)
66.	Withaniasomnifera	Ashwagandha	- (Bush)
67.	Coleus	Coleus	3
68.	Euphorbia splendens	Crown of thorns	- (Bush)
69.	Plumbagozeylanica	Chitrak	- (Bush)
70.	Cycas sp.	Cycas	2
71.	Schleicheraoleosa	Kusum	1
72.	Adhatodavasica	Vasa	- (Bush)
73.	Punicagranatum	Pomegranate	1



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S.No.	Botanical Name	Common Name	Quantity
74.	Catharanthusroseus	Madagascar Periwinkle	5
75.	Curcuma longa	Turmeric	5
76.	Tylophoraindica	Dambel	2
77.	Mentha×piperita	Peppermint	5
78.	Cymbopogoncitratus	Lemon grass	5
79.	Chamaecostuscupidatus	Insulin plant	5
80.	Stevia rebaudiana	Stevia	5
81.	Bacopamonniari	Brahmi	4
82.	Pimentadioica	All spice	5
83.	Barleriapronitis	Kala Bansa	4
84.	Ocimum sanctum	Holy Basil	5
85.	Cinnamomumverum	Cinnamomum	5
86.	Pyrus sp.	Pear	1
87.	Ruscus sp.	Butcher's Broom	- (Bush)
88.	Lantana sp.	Red Sage	- (Bush)
89.	Chlorophytumcomosum	Spinder Plant	- (Bush)
90.	Epipremnumaureum	Money Plant	- (Bush)
91.	Dieffenbachia	Dumb Cane	- (Bush)
92.	Cyperusalternifolius	Umbrella Palm	1
	<b>Total</b>		<b>301</b>

College has **301** trees in the campus. This is good initiative taken by management for green campus under the campaign of plantation. **It's APPRECIABLE.**

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### Green House

The green house of our college houses various herbs that are grown under regulated climatic conditions. The herbs growing in the green house are of great economic importance and are used for research purposes by the students. These herbs are aromatic, evergreen and are widely used

in traditional medicines.

**The following is the list of herbs growing in the green house.**

Sr. No	Botanical Name	Common Name
1	Withaniasomnifera	Ashwagandha
2	Catharanthusroseus	Madagascar Periwinkle
3	Curcuma longa	Turmeric
4	Tylophoraindica	Dambel
5	Mentha×piperita	Peppermint
6	Cymbopogoncitratus	Lemon grass
7	Chamaecostuscuspidatus	Insulin plant
8	Stevia rebaudiana	Stevia
9	Bacopamonneri	Brahmi
10	Pimentadioica	All spice
11	Barleriapronitis	Kala Bansa
12	Ocimum sanctum	Holy Basil
13	Cinnamomumverum	Cinnamomum

### Observation:-

- ✦ During the audit it is observe that total 13 Species herbs growing in the green house in college campus. **Its Appreciable**

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### Botanical Garden

The botanical Garden is an area maintained for the collection of various plant species, their cultivation, preservation and display. The plants are labeled with botanical names and common name so as to impart knowledge to the people. The main aim of setting up of Botanical Garden in the college is to promote research, education, conservation and to spread awareness about our floral heritage among the students. It houses vast variety of trees, shrubs, herbs, ornamentals and climbers that are used during Botany theory and practical classes so that students are able to understand the morphology and anatomy of plants better. Tree species like Guava, Arjun, Maulsari, Gulmohar, Kadam, Mango etc. have been planted along with vast variety of shrubs and Herbs.

**The following is the list of plant species in Botanical Garden:**

Sr. No	Botanical Name	Common Name
1	Psidiumguajava	Guava
2	Juniperus	Juniperus
3	Prunusdomestica	Plum
4	Terminaliaarjuna	Arjun
5	Bambusa sp.	Bamboo
6	Aeglemarmelos	Bael
7	Mimusopselengi	Maulsari
8	Manilkarazapota	Chikoo
9	Ficus sp.	Ficus
10	Azadirachtaindica	Neem
11	Madhucalongifolia	Mahua
12	Neolamarckiacadamba	Kadam
13	Delonixregia	Gulmohar
14	Mangiferaindica	Mango
15	Citrus limetta	Mausami
16	Ricinuscommunis	Castor Bean
17	Withaniasomnifera	Ashwagandha
18	Cupressus	Cupressus
19	Dracaena	Dracaena
20	Hibiscus rosasinensis	Hibiscus
21	Croton sp.	Croton
22	Coleus	Coleus
23	Euphorbia splendens	Crown of thorns
24	Nyctanthes arbor-tristis	Harsingar



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25	Plumbagozeylanica	Chitrak
26	Murrayakeonigii	Kadipatta
27	Cascabelathevetia	Kaner
28	Citrus nobilis variety	Orange
29	Calliandra sp.	Calliandra
30	Prunuspersica	Peach
31	Cycas sp.	Cycas
32	Rosa indica	Rose
33	Schleicheraoleosa	Kusum
34	Adhatodavasica	Vasa
35	Ficuscarica	Fig
36	Punicagranatum	Pomegranate
37	Pyrus sp.	Pear
38	Ruscus sp.	Butcher's Broom
39	Lantana sp.	Red Sage
40	Chlorophytumcomosum	Spinder Plant
41	Epipremnumaureum	Money Plant
42	Dieffenbachia	Dumb Cane
43	Cyperusalternifolius	Umbrella Palm

**Observation:-**

- ✚ Total 43 Species available plat and trees are available in the college campus .Its Appreciable

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### Some Plantation Photograph & Green campus in college campus



  
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## **Chapter-03 Carbon Foot print**

### **3.1 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<sub>2</sub>) produced through the burning of fossil fuels and is expressed as a weight of CO<sub>2</sub> emissions 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 our 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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### 3.2 Methodology and Scope

The carbon footprint gives a general overview of the College greenhouse gas emissions, converted into CO<sub>2</sub> -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.

### 3.3 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.



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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 KgCO<sub>2</sub>/Kwh

Sr. No.	Year	Total Unit Consumption	Unit	Emission Factor kg CO <sub>2</sub> e/kWh	Emission ton CO <sub>2</sub> e/ year
1	2021-22	1,08,544	kVAh	0.9613	104.343

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**3.4 Carbon emission from DG sets: -**

College has 02 no DG sets installed on the campus for emergency power supply in the college


Total diesel consumption in a year in the table: -

Sr.No.	Month& Year	Total Diesel Consumption (Litter)
1	Apr-21	0
2	May-21	29
3	Jun-21	66
4	Jul-21	87
5	Aug-21	73
6	Sep-21	145
7	Oct-21	167
8	Nov-21	38
9	Dec-21	58
10	Jan-22	0
11	Feb-22	0
12	Mar-22	23
<b>Total</b>		<b>686</b>

Every litter of diesel fuel contains 720 grams of pure carbon. It can be assumed that about 99 % of the fuel is Oxidized (It is assumed that somewhat less than 01 % will fail to fully oxidize and will be emitted as a particulate of unburned hydrocarbons instead of CO<sub>2</sub>).

**Calculation of Total CO<sub>2</sub> by DG sets =**

- ❖ CO<sub>2</sub> Emissions from a Litter of diesel: 2689.56 grams CO<sub>2</sub>/ litter.
- ❖ Diesel consumption April-2021 to March-2022 = 686 Litter
- ❖ 686 x 2689 = 1844654 gram. or 1.84 Ton/year

  
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**3.5 Biomass Calculation and CO<sup>2</sup> 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)

- 1 Estimation of below ground biomass (BGB)

$$BGB = AGB \times 0.15$$

- 2 Total Biomass (TB)

$$TB = AGB + BGB$$

- 3 Calculation of carbon dioxide Weight sequestered in the tree in Kg.

$$C = W \times 0.50$$

- 4 Calculate the weight of CO<sub>2</sub> sequestered in the tree per year in Kg.

$$CO_2 = C \times 3.666$$

**Where: -**

AGB = above ground biomass.

D = Diameter of tree breast height.

BGB = Below Ground Biomass.

C = Carbon

TB = Total Biomass.

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**Biomass Calculation of tree**

Sr.No.	Common Name	Average Diameter CM (25 to 100 )	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	No of Tree	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount
1	Guava	75	3248.258	487.24	3735.50	1867.748	6847.164	12	82165.97	1.12
2	Palm	60	1994.490	299.17	2293.66	1146.832	4204.285	14	58859.99	0.80
3	Champa	50	1328.370	199.26	1527.63	763.813	2800.138	1	2800.14	0.04
4	Kadam	50	1328.370	199.26	1527.63	763.813	2800.138	2	5600.28	0.08
5	Maulsari	40	798.030	119.70	917.73	458.867	1682.207	12	20186.49	0.28
6	Pilkhan	55	1644.458	246.67	1891.13	945.563	3466.434	2	6932.87	0.09
7	False Ashoka	40	798.030	119.70	917.73	458.867	1682.207	23	38690.77	0.53
8	Royal Bottle Palm	65	2378.468	356.77	2735.24	1367.619	5013.691	5	25068.45	0.34
9	Jamun	30	403.470	60.52	463.99	231.995	850.495	5	4252.47	0.06
10	Swanjana	30	403.470	60.52	463.99	231.995	850.495	2	1700.99	0.02
11	Mahua	30	403.470	60.52	463.99	231.995	850.495	3	2551.48	0.03
12	Bottle Brush	35	583.778	87.57	671.34	335.672	1230.574	1	1230.57	0.02
13	Amaltas	45	1046.228	156.93	1203.16	601.581	2205.395	3	6616.19	0.09
14	Chir pine	50	1328.370	199.26	1527.63	763.813	2800.138	2	5600.28	0.08
15	Mango	36	623.912	93.59	717.50	358.750	1315.176	12	15782.11	0.22
16	Bael	35	583.778	87.57	671.34	335.672	1230.574	3	3691.72	0.05
17	Kaner	45	1046.228	156.93	1203.16	601.581	2205.395	2	4410.79	0.06
18	Christmas tree	60	1994.490	299.17	2293.66	1146.832	4204.285	1	4204.29	0.06
19	Madagascar Almond	45	1046.228	156.93	1203.16	601.581	2205.395	1	2205.40	0.03



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Sr.No.	Common Name	Average Diameter CM (25 to 100 )	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	No of Tree	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount
20	Shisham	40	798.030	119.70	917.73	458.867	1682.207	2	3364.41	0.05
21	Shahtut	30	403.470	60.52	463.99	231.995	850.495	3	2551.48	0.03
22	Bargad	65	2378.468	356.77	2735.24	1367.619	5013.691	1	5013.69	0.07
23	Neem	65	2378.468	356.77	2735.24	1367.619	5013.691	3	15041.07	0.21
24	Amla	25	257.108	38.57	295.67	147.837	541.970	4	2167.88	0.03
25	Jawonica	35	583.778	87.57	671.34	335.672	1230.574	4	4922.30	0.07
26	Dhak	36	623.912	93.59	717.50	358.750	1315.176	2	2630.35	0.04
27	Kachnar	30	403.470	60.52	463.99	231.995	850.495	2	1700.99	0.02
28	Silver Oak	27	311.579	46.74	358.32	179.158	656.793	5	3283.97	0.04
29	Drake	28	340.852	51.13	391.98	195.990	718.498	2	1437.00	0.02
30	Sausage tree	30	403.470	60.52	463.99	231.995	850.495	1	850.49	0.01
31	Jacaranda	54	1578.524	236.78	1815.30	907.652	3327.451	1	3327.45	0.05
32	Reetha	35	583.778	87.57	671.34	335.672	1230.574	1	1230.57	0.02
33	Juniperus	37	665.405	99.81	765.22	382.608	1402.641	1	1402.64	0.02
34	Plum	45	1046.228	156.93	1203.16	601.581	2205.395	2	4410.79	0.06
35	Arjuna	15	66.218	9.93	76.15	38.075	139.583	9	1256.25	0.02
36	Bamboo	26	283.664	42.55	326.21	163.107	597.950	1	597.95	0.01
37	Chikoo	75	3248.258	487.24	3735.50	1867.748	6847.164	2	13694.33	0.19
38	Ficus	45	1046.228	156.93	1203.16	601.581	2205.395	1	2205.40	0.03
39	Gulmohar	30	403.470	60.52	463.99	231.995	850.495	1	850.49	0.01



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Sr.No.	Common Name	Average Diameter CM (25 to 100 )	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	No of Tree	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount
40	Mausami	30	403.470	60.52	463.99	231.995	850.495	2	1700.99	0.02
41	Peepal	25	257.108	38.57	295.67	147.837	541.970	1	541.97	0.01
42	Harar	46	1099.940	164.99	1264.93	632.466	2318.619	1	2318.62	0.03
43	Kathal	54	1578.524	236.78	1815.30	907.652	3327.451	2	6654.90	0.09
44	Devil's tree	28	340.852	51.13	391.98	195.990	718.498	3	2155.49	0.03
45	Rudraksh	50	1328.370	199.26	1527.63	763.813	2800.138	1	2800.14	0.04
46	Toon	36	623.912	93.59	717.50	358.750	1315.176	1	1315.18	0.02
47	Dracaena	39	752.464	112.87	865.33	432.667	1586.156	5	7930.78	0.11
48	Ficus	36	623.912	93.59	717.50	358.750	1315.176	2	2630.35	0.04
49	Baougainvillea	45	1046.228	156.93	1203.16	601.581	2205.395	3	6616.19	0.09
50	Jasmine	46	1099.940	164.99	1264.93	632.466	2318.619	1	2318.62	0.03
51	Fig	35	583.778	87.57	671.34	335.672	1230.574	1	1230.57	0.02
52	Hibiscus	26	283.664	42.55	326.21	163.107	597.950	12	7175.40	0.10
53	Chinese thuja	80	3734.070	560.11	4294.18	2147.090	7871.233	3	23613.70	0.32
54	Orange	75	3248.258	487.24	3735.50	1867.748	6847.164	2	13694.33	0.19
55	Loquat	36	623.912	93.59	717.50	358.750	1315.176	3	3945.53	0.05
56	Peach	37	665.405	99.81	765.22	382.608	1402.641	2	2805.28	0.04
57	Croton	57	1780.397	267.06	2047.46	1023.728	3752.988	3	11258.96	0.15
58	Calliandra	50	1328.370	199.26	1527.63	763.813	2800.138	2	5600.28	0.08
59	Castor bean	46	1099.940	164.99	1264.93	632.466	2318.619	3	6955.86	0.09



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Sr.No.	Common Name	Average Diameter CM (25 to 100 )	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	No of Tree	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount
60	Lemon	37	665.405	99.81	765.22	382.608	1402.641	5	7013.20	0.10
61	Weeping fig	30	403.470	60.52	463.99	231.995	850.495	2	1700.99	0.02
62	Cupresses	28	340.852	51.13	391.98	195.990	718.498	13	9340.48	0.13
63	Kadipatta	32	471.520	70.73	542.25	271.124	993.940	1	993.94	0.01
64	Pinwheel flower	35	583.778	87.57	671.34	335.672	1230.574	4	4922.30	0.07
65	Pomegranate	30	403.470	60.52	463.99	231.995	850.495	1	850.49	0.01
66	Madagascar Periwinkle	28	340.852	51.13	391.98	195.990	718.498	5	3592.49	0.05
67	Turmeric	30	403.470	60.52	463.99	231.995	850.495	5	4252.47	0.06
68	Dambel	23	208.067	31.21	239.28	119.639	438.595	2	877.19	0.01
69	Peppermint	46	1099.940	164.99	1264.93	632.466	2318.619	5	11593.10	0.16
70	Lemon grass	25	257.108	38.57	295.67	147.837	541.970	5	2709.85	0.04
71	Insulin plant	35	583.778	87.57	671.34	335.672	1230.574	5	6152.87	0.08
72	Stevia	30	403.470	60.52	463.99	231.995	850.495	5	4252.47	0.06
73	Brahmi	35	583.778	87.57	671.34	335.672	1230.574	4	4922.30	0.07
74	All spice	45	1046.228	156.93	1203.16	601.581	2205.395	5	11026.98	0.15
75	Kala Bansa	67	2541.563	381.23	2922.80	1461.399	5357.488	4	21429.95	0.29
76	Holy Basil	45	1046.228	156.93	1203.16	601.581	2205.395	5	11026.98	0.15
77	Cinnamomum	40	798.030	119.70	917.73	458.867	1682.207	5	8411.04	0.11
78	Pear	32	471.520	70.73	542.25	271.124	993.940	1	993.94	0.01



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Sr.No.	Common Name	Average Diameter CM (25 to 100 )	AGB	BGB	Total	Carbon Storage	Amount of Co2 Sequestered	No of Tree	Total Amount of Co2 Sequestered	Annually Co2 Sequestered amount
79	Cycas	64	2298.956	344.84	2643.80	1321.900	4846.085	2	9692.17	0.13
80	Kusum	25	257.108	38.57	295.67	147.837	541.970	1	541.97	0.01
81	Coleus	29	371.482	55.72	427.20	213.602	783.065	2	1566.13	0.02
82	Umbrella Palm	25	257.108	38.57	295.67	147.837	541.970	1	541.97	0.01
				<b>Total</b>				<b>301</b>		<b>8.27</b>

College has **301trees** in the campus. This is good initiative taken by management for green campus under the campaign of plantation. **It's APPRECIABLE.**

There is total CO<sub>2</sub> sequestered **8.27Tons /Year**. There are requirements of more plantations to reduce carbon emission share by college

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### Total CO2 Emission by the college

Sr. NO	CO2 Emission by	Total CO2 Emission
1	Electricity	104.34
2	DG sets	1.84
<b>Total CO2 Emission</b>		106.15
CO2 Emission Neutralized by		
1	Trees	8.27
<b>Total CO2 Emission</b>		97.88

#### Observation:-


- ✦ It is observe that total Co2 emission of college is 97.88 Ton/year. It is higher due to 100 % non-renewable energy used in campus.

#### Recommendation:-

- ✦ There are requirement to used renewable energy sources like Solar system , solar light and Solar pumps .
- ✦ More plantations are required in college premises.

### 3.6 Other Emissions Excluded

This study did not evaluate the carbon sequestration potential of existing 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- 4  
WASTE MANAGEMENT**

**4.1 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.

Table 4.1 Different types of waste generated in the College Campus.

Sr.No.	Types of Waste	Particulars
1	Solid wastes	Damaged furniture, paper waste, paper plates, 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.
7	Bio Degradable waste	Tree leaves , food wastes





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### 4.2 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 dust bins near classroom office, laboratories staffroom and collect the waste material at the end of the day. The waste (Especially dry material) is collected in a big dustbin which is provided at every floor and the next day collected Municipal Corporation for further processing.



Figure 4.2 Waste collection bin in college campus

### Recommendation

It is recommended adopted 3 dust Bin Waste Collection System for collect different type of waste generated in college premises.



Recommended 3 Dust Bin waste collection System



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**4.3 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

Table 4.3 Detailed of waste collection dust bin system

Sr .no	Location	No of Been
1	Arts Block	3
2	Science Block	3
3	Commerce Block	3
4	Library	2
5	Auditorium	2
6	Canteen	2
7	Girls Common Room	2
	<b>Total</b>	<b>16</b>

  
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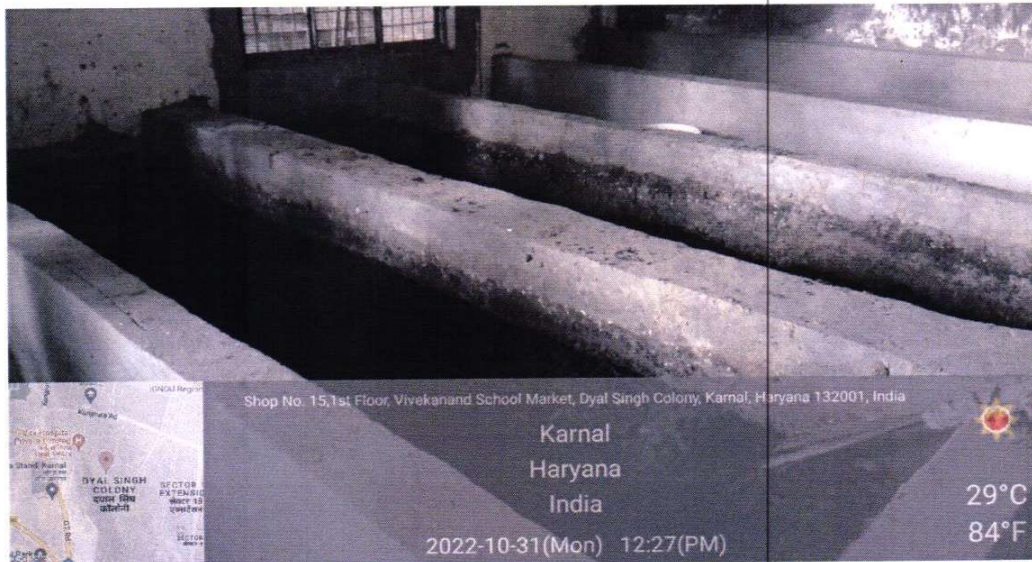
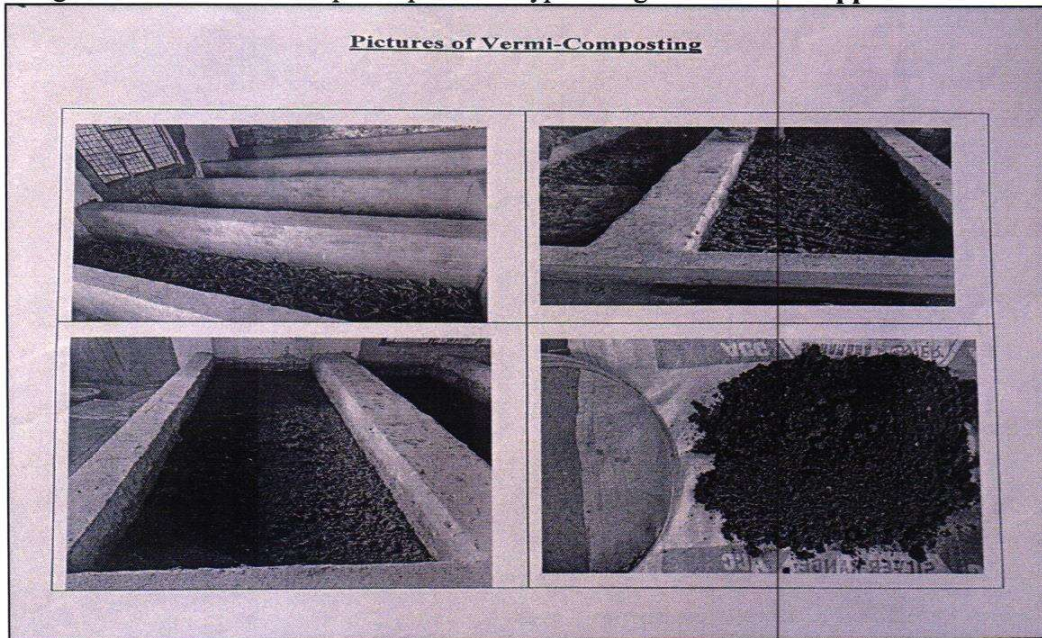


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#### 4.4 Varmi Compost pit

College has install varmi composite pit for all type of organic waste. **Its appreciable.**



#### Observation:-

- College has treated all type of agriculture waste in varmi compost pit And generated manure are utilize in college garden. **Its Appreciable.**



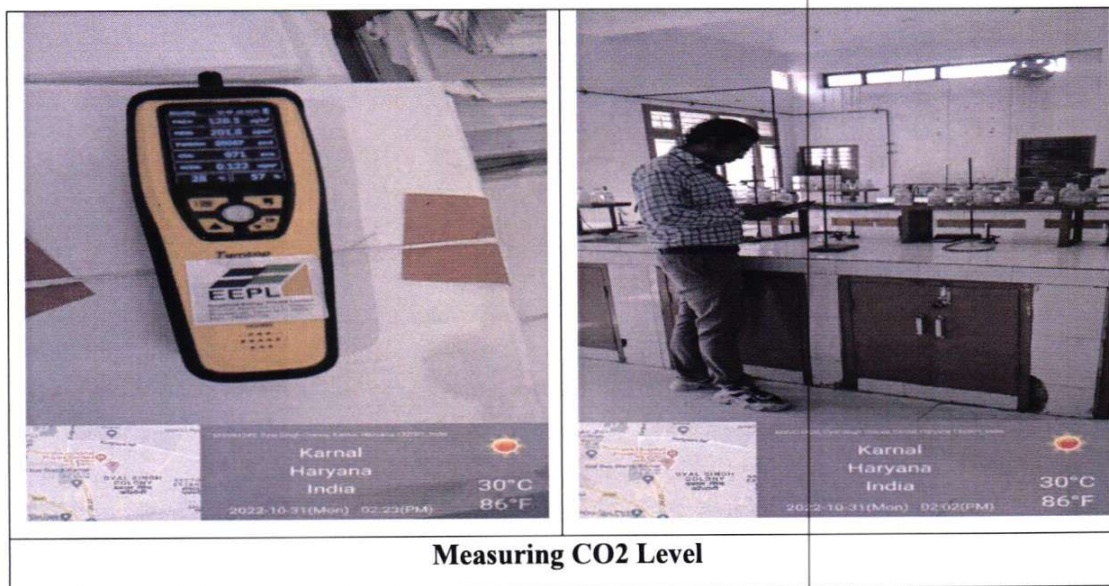
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### CHAPTER- 5 Air Quality Measurement

Energy audit team was conducted air monitoring survey in college campus. Details are given in table.

Sr.No.	Location	PM2.5 ( $\mu\text{g}/\text{m}^3$ )	PM10 ( $\mu\text{g}/\text{m}^3$ )	CO2 (ppm)
1	Principal Office	75	112	501
2	Administration Office	45	115	568
3	IQAC Office	54	154	674
4	Botany Lab	64	132	860
5	Chemistry Lab	42	163	680
6	Physics Lab	65	123	634
7	Zoology Lab	45	113	628
8	Computer Science Lab	56	135	546



#### Observation: -

- ✚ PM<sub>2.5</sub> value is higher Side. The 24-hour concentration of PM<sub>2.5</sub> is considered unhealthy when it rises above 35.4  $\mu\text{g}/\text{m}^3$
- ✚ PM<sub>10</sub> value is higher Side .It should be below 155  $\mu\text{g}/\text{m}^3$
- ✚ CO2 value is acceptable range. It should be below 1000 ppm.



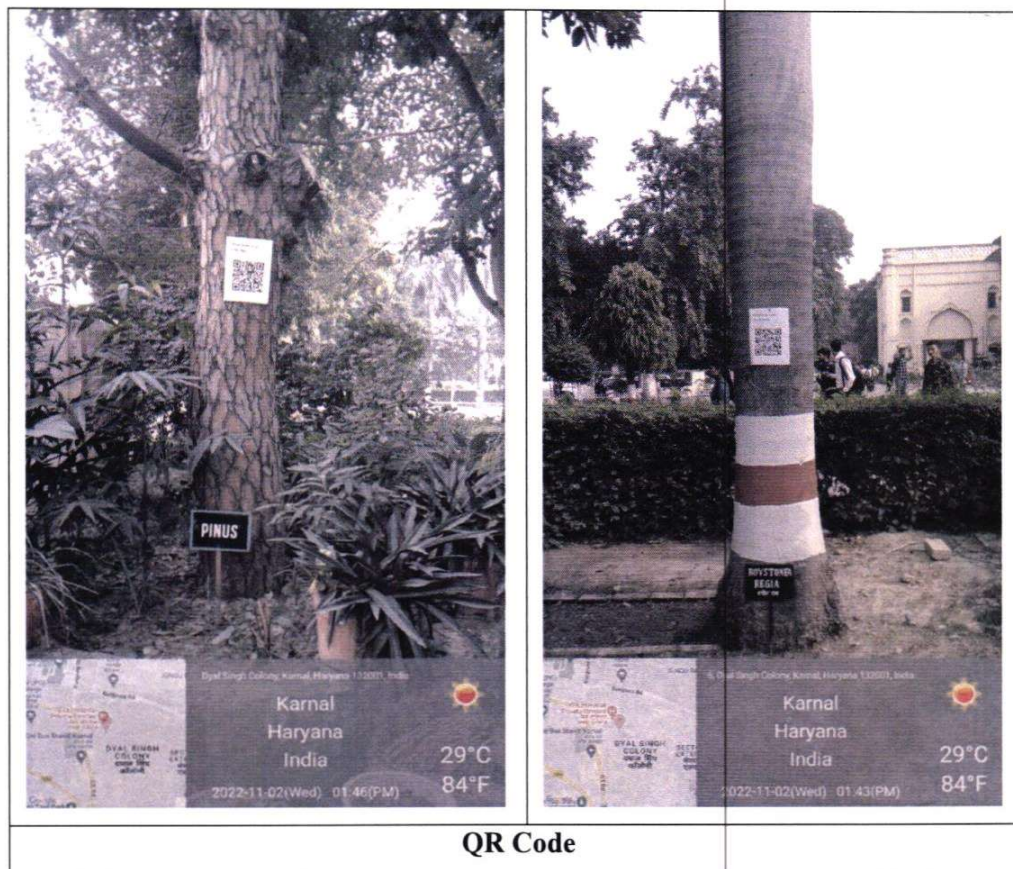
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**CHAPTER- 6  
QR Code System**

**6.1 QR Code Systems**

College Management has installed QR Code System on trees for identification. **It's Appreciable.**




  
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**END OF THE REPORT**  
**THANKS**

  
Principal  
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