



Maratha Vidya Prasarak Samaj's  
KRT Arts, BH Commerce and AM Science  
(KTHM) College, Nashik, (MS), India  
**Department of Environmental Science**  
(Reg. No. ID No. PU/NS/ASC/012(1969))

## CERTIFICATE

# Green Campus Audit

This is to certify that the Department of Environmental Science conducted "GREEN AUDIT" for Maratha Vidya Prasarak Samaj's *Guruvarya Mamasaheb Dandekar Arts, Bhagwantrao Waje Commerce and Science College, Sinnar, Dist : Nashik, M.S., India* for the year **2021-22**. The audit focused on assessment of the green initiatives, planning and implementation of the college campus that consisted of "Green Campus Management, Plantation, Waste Management, Water and Waste Water Generation, Rainwater harvesting and Conservation of Energy, etc.". We appreciate the efforts of the college and issue the certificate of Green Audit for the year 2021-22.

Place : Nashik

Date : 30<sup>th</sup> NOV 2022

**Dr. P. M. Nalawade**

Lead Auditor

ISO 14001:2015

(Certification No. IN/14019/144609)

**Dr. V. B. Gaikwad**

Principal

KTHM College, Nashik



Maratha Vidya Prasarak Samajs  
**Guruvarya Mamasahab Dandekar Arts,  
Bhagwantrao Waje Commerce and  
Science College, Sinnar**

**GREEN AUDIT REPORT**





## GREEN AUDIT TEAM

**ENVIRONMENT MANAGEMENT SYSTEM AUDIT TEAM,  
KRT ARTS, BH COMMERCE AND AM SCIENCE COLLEGE, NASHIK – 02  
Email: arc@kthmcollege.ac.in**

### A) MEMBERS OF EXTERNAL AUDIT TEAM:


Sr. No.	Name of Member	Certification No.	Audit
1	<b>Dr. Pravin M. Nalawade</b>	IN/14019/144609	Coordinator
2	<b>Dr. Jagruti R. Chavan</b>	IN/14019/144775	Member
3	<b>Smt. Vishakha R. Wagh</b>	IN/14019/144777	Member
4.	<b>Mr. Kailas D. Ahire</b>	-	Member

### B) INTERNAL AUDIT TEAM: Sinnar College

Sr. No.	Name of Member	Designation	Title in Committee
1	Dr. D.M. Jadhav	Associate Professor	Coordinator
2	Mr. A.V. More	Assistant Professor	Member
3	Mr. V.S. Varape	Assistant Professor	Member
4	Mrs. Sapana Bhamare	Assistant Professor	Member

# Contents

<b>1. INTRODUCTION</b> .....	5
1.1 About Parent Institution.....	5
1.2. About the College .....	5
1.3 Highlighting Features.....	6
1.4. Environmental Conservation Committee.....	7
1.5. Functions of Environmental Conservation Committee.....	7
1.6 Objectives of study.....	7
1.7. Methodology.....	8
1.8. Steps in Green Audit.....	8
1.9. Scope of Work.....	8
1.10 Courses Offered.....	9
1.11. Total Population of Campus.....	10
<b>2. WATER AUDIT</b> .....	11
2.1 Calculation of Water Requirement: .....	12
2.2 Waste Water Management: .....	13
2.3 Quality of Water in the Campus: .....	14
2.4 Rainwater Harvesting Potential: .....	16
2.5 Waste Quantification and Management:.....	17
<b>3. SOLID WASTE AUDIT</b> .....	18
3.1 Generation of Solid Waste: .....	16
3.2 Manuare Preparation- Vermicomposting .....	19
<b>4. HAZARDOUS WASTE AUDIT</b> .....	20
4.1 Chemical waste: .....	20
4.2 Hazardous Waste Generated at departments.....	20
<b>5. E-WASTE</b> .....	20



<b>6. ENVIRONMENTAL QUALITY AUDIT</b> .....	22
6.1 Air Quality Audit.....	22
6.2 Causes of Air Pollution in Sinnar .....	22
6.3 Noise Quality Audit: .....	23
<b>7. GREEN COVER OF COLLEGE CAMPUS</b> .....	25
7.1. List of Plants available in the College campus.....	30
7.2. Special gardens developed in College campus.....	32
<b>8. OTHER ACTIVITIES</b> .....	37
<b>8. RECOMMENDATIONS</b> .....	41
<b>9. CONCLUSION</b> .....	46

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## 1. INTRODUCTION

### 1.1. About Parent Institution

The Maratha Vidya Prasarak Samaj is one of the most prestigious centers of learning in the State of Maharashtra. It manages 477 educational institutes and it is one of the premier organizations in the jurisdiction of Savitribai Phule Pune University. At present total strength of student is around 2,00,000. The credit for the birth of M. V. P. Samaj goes to the young, enthusiastic and devoted team of social workers and educationists, Karmaveer Raosaheb Thorat, Bhausaheb Hire, Kakasaheb Wagh, Annasaheb Murkute & Ganpat Dada More who laid the foundation of the Samaj. Adv. B. G. Thakare, Adv. Vitthalrao Hande & Dr. Vasant Rao Pawar are major contributors of Samaj. They were the devotees who envisioned a culture and knowledge centric society. The motto of the Samaj is “Bahujan Hitay Bahujan Sukhay”, for the wellbeing and happiness of the masses to kindle the social cause.

### 1.2. About College

Guruwarya Mamasahab Dandekar Arts, Bhagwantrao Waje Commerce and Science College, Sinnar was established in June 1969. It is NAAC reaccredited ‘A’ grade college having four faculties’ Arts, Commerce and Science and Computer Science. College offers undergraduate and post graduate and even doctorate programmes for the students of the area and considered as the premier center of learning in the Sinnar region. College is affiliated to Savitribai Phule Pune University, Pune. College is awarded as the Best College Award (Rural) from the University. College occupied 14.5 Acres of land on which main College building, Library, MCVC building, Gymkhana, and wide playground etc. are available. The gymkhana of the College is well equipped and highly self-sufficient for indoor and outdoor games for the College students. The College is imparting quality education in 17 undergraduate, 10 postgraduate and one research Centre. Also, it is recognized learning center of Yashwantrao Chavan Open University which provides distance education to needy people of the region. The College has well equipped laboratories. College has well facilitated girl’s hostel in the campus with the intake capacity of 90 girl students. College also has staff quarters which provides residence to the teaching and nonteaching staff of the College. Entire college is covered under CCTV surveillance. College has well developed and rich resource library possesses books, periodicals, newspapers and other facilities for teachers and students. The college has adopted ‘Green Campus and Clean campus’ motto for environmental conservation and sustainability. College has a ecosystem pond in which many phytoplanktons and zooplanktons along with other hydrophytes have been conserved.

### 1.3 Highlighting Features

- Grant-in-Aid Co-Education College.
- Affiliated to Savitribai Phule Pune University, Pune.
- Certified 2F and 12 B enabling UGC assistance.
- Situated in Rural Area.
- Campus of 14.5 acres.
- Significant girl students.
- Reaccredited previously 'A' grade
- Best College Awardee from SPPU



MAP OF COLLEGE CAMPUS








## 1.4. Environmental Conservation Committee

Table 1. Environmental Conservation Committee

Sr. No.	Name of Member	Designation	Title in Committee
1	Prin. Dr. P. V. Rasal	Principal	Chairman
2.	Dr. D. M. Jadhav	Associate Professor	Coordinator
3	Mr. S.T. Pekhale	Associate Professor	Member

## 1.5 Functions of Environmental Conservation Committee

The College has established an Environmental Cell to educate students and teachers about environmental issues and challenges, as well as to motivate them to spread information and educate school children and the general public about these issues.

-  To raise awareness among student and teachers about the Institute and environmental issues.
-  To implant a sense of responsibility for the development of planet Earth, as well as for its beauty, by giving chances to gain knowledge, skills, attitudes, and dedication to environmental preservation.
-  To teach students about the interconnectedness of economic, social, and environmental concerns.
-  To prepare students and teachers about environmental education.
-  To improve the college campus's environment aesthetically.
-  To raise awareness of the importance of environmental preservation among students and society.
-  To handle the College's solid trash, liquid waste, and e-waste.

## 1.6 Objectives of study

The major goal green audit is to encourage environmental management and conservation in the college campus. It also aims to identify, measure, explain, and prioritize a framework for environmental sustainability that adheres to all applicable legislation, policies, and standards. The following are the major goals of a Green Audit:

- To introduce and make students aware of real concerns of environment and its



sustainability.

- To secure the environment and cut down the threats posed to human health by analyzing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections require high cost.
- To bring out a status report on environmental compliance.

### **1.7. Methodology**

The approach for doing a green audit comprised several instruments such as questionnaire development, physical inspection of the campus, observation and study of paperwork, interviewing key people, data analysis, measurements, and suggestions.

### **1.8. Steps in Green Audit**

#### Pre-Audit

1. Make a plan for the audit.
2. Form an auditing team
3. Schedule for an audit.
4. Gather the necessary background information.
5. On Site Visit

#### ✚ On Site

1. Understand the scope of audit
2. Analyze the strengths and weaknesses of the internal controls
3. Conduct the audit
4. Evaluate the observations of audit program
5. Prepare a report of the observations side by side

#### ✚ Post-Audit

1. Produce a draft report of the data collected
2. Produce a final report of the observations and the inference with accuracy
3. Distribute the final report to the management
4. Prepare an action plan to overcome the defects
5. Keep a watch on the action plan

### **1.9. Scope of Work**

The following Environmental Issues were studied for the above-mentioned campus Area.

- Water Environment including rain water harvesting potential of the campus.

- Plant diversity.
- Noise Environment.
- Solid Waste Management Practices.
- Air Environment.

This study has been created based on the available data, samples, and information supplied by the G.M.D. Arts and B.W. Commerce and Science College, Sinnar and recommendations for improving the campus environment have been made by college officials.

## 1.10. Courses Offered

**Table-2. Course Offered**

Sr. No.	Name of Faculty	Name of Program	Name of Subject
1	Faculty of Arts	BA	English
2			Marathi
3			Defense and Strategic studies
4			Economics
5			Geography
6			History
7			Political Science
8		M.A.	Marathi
9			English
10			Defense and Strategic studies
11			Economics
12			Geography
13			Political Science
13	Faculty of Commerce	B.Com	Banking
14			Business Administration
15			Business Economics
16			Business Entrepreneurship
17			Marketing
18		M.Com	Business Administration
19	Faculty of Science	B.Sc.	Advanced Accounting
20			Taxation
21			Botany
22			Chemistry
23			Electronics
24			Mathematics
25			Physics
26			Zoology
27		Computer Science	
28		Microbiology	
29		M. Sc.	Chemistry
30	Physics		
31	Zoology		
32	Interdisciplinary	Research Centre	Chemistry
32		Interdisciplinary	Library
			Physical Education

33			B.Voc (FPP)
34			B.Voc. (LPM)

### 1.11. Total Population of Campus

**Table-3. Total Population of Campus (2021-22)**

Sr.No.	Particulars	Total number
1	College Staff (Teaching & Non-Teaching)	139
2	College Students (Girls and Boys)	3229
	<b>Total</b>	<b>3368</b>
3	Residential Students	11
4	Residential Staff	20
	<b>Total</b>	<b>31</b>

## 2. WATER AUDIT

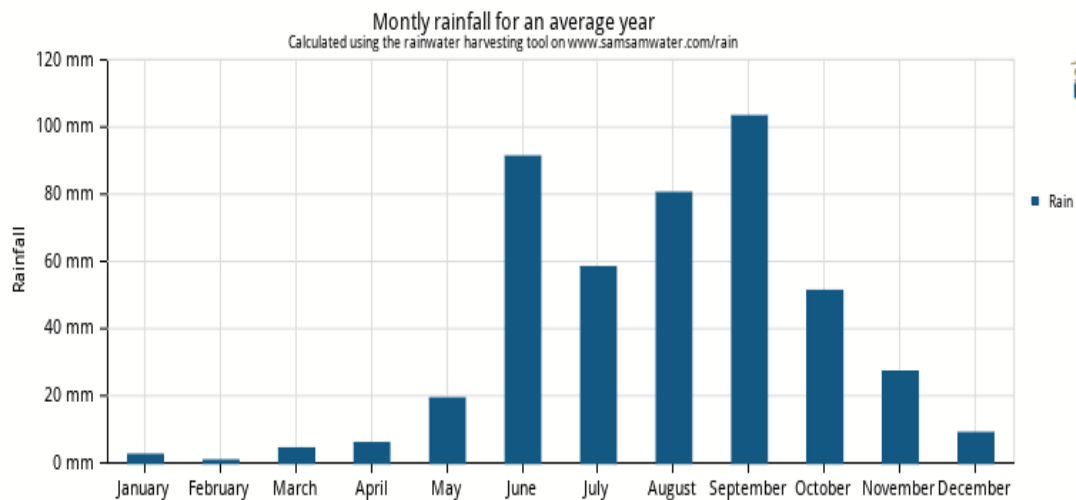


Water benefits biodiversity, agriculture, the human population, and the economy. Water scarcity and security are becoming increasingly important issues as a result of recent events in India and around the world. In recent years, Maharashtra has also been severely affected by water scarcity. As a result, water management has been included as a critical component of achieving sustainable development in the Sustainable Development Goals (SDGs).

Unprecedented strains on natural resources, particularly water, have resulted from unplanned urban growth, Industrial and economic development. The growing demand for water in places like Sinnar that have high amount of dissolved solids and hardness in underground water underscores the significance of total water management. According to the National Water Mission standards, metro cities should have a water supply of 150 lpcd, smaller cities/towns with sewage systems should have 135 lpcd, and cities/towns without sewage systems should have 70 lpcd.

### **Rainfall**

The average rainfall at this location varies between 0.7 mm in the driest month (February) and 103.2 mm in the wettest month (September). The total annual rainfall in an average year is 453 mm.



## 2.1 Calculation of Water Requirement:

In the investigation, one well which is about 500 meter away from the college campus was identified as important source of water. The well bears water throughout the year and fulfills need of water for toilets, laboratories and gardening. Drinking water in the hostels and college premises were obtained through the water connection from Sinnar Municipal council. Well water is used in the canteen, bathrooms, laboratories, hostels, staff quarters and on the grounds. There were no leaks or overflows of water from above tanks throughout the survey, thus there was no water loss. A small artificial pond is also providing some water for trees planted in the college campus. In monsoon water from main building and hostel building is released in the pond as a part of rain water harvesting. Pond is also becomes home for many phytoplanktons, zooplanktons, fishes and various hydrophytes.

The following water sources was identified in the college campus:

1. Well 500 meters away from college campus.
2. Pond in the College campus

**Table 4. Source of water**

Sr. No.	Source of water	Number of times the water is uplifted from the source	Average quantity of water uplifted. (Lit)
1	Well 500 meters away from college campus	2 times a day (total 5 hrs)	40000
2	Pond in the College campus	1 time a day (total 5 hrs)	30000
<b>Total Water uplifted in the campus:</b>			<b>70,000</b>



## Major Water Source in the College Campus



Well as a water resource



Pond in College campus

**Table 5 Total Average requirement of water in campus**

Sr. No.	Particulars	Total population	Required Water Supply (liter per person per day)	Water Requirement (liter per day)
1	College Staff (Teaching and Non-Teaching)	139	20	2,780
2	College Students (Girls and Boys)	3229	20	64,580
3	Residential Students	11	45	495
4	Residential Staff	20	45	900
5	Floating Population (Visitors)	25	20	500
<b>Total</b>		<b>5498</b>	<b>-</b>	<b>69,255</b>

The data gathered from all departments is double-checked and verified. The college uses 69,255 L/day on average, with 2,780 L/day for staff and 64,580 L/day for students. While the residential staff uses total 900 L water per day. Residential students use 495 L/day. That means the water demand for whole year is 2,52,78,075 Liters.

### 2.2 Waste Water Management:

Water usage can be described as the amount of water consumed on campus for all activities from various water sources. This applies to all residences, academic buildings, on-campus, and on-grounds usage. Water that is moved off campus is referred to as wastewater. Based on data on water usage and the fact that around 80% of the water supplied is converted to waste water via washrooms, chemical laboratories, and other means, the campus created

approximately 56,000 liters of waste water every day.

As was revealed, there is no separate drainage system for collecting and transferring sewage and liquids from laboratories. There is currently a combined drainage system in place that carries all liquid effluent to a sewage system. It is necessary to collect grey and black water. After minimal treatment, grey water must be used for plant irrigation, and black water must be effectively treated with a simple septic system and soak pits.



Drainage system of Chemistry department



Sewer for wastewater from toilet at Main building



Septic tank near toilet of main building

### 2.3 Quality of Water in the Campus:

The water of well and pond is used for all purposes except drinking. The water is used to flush toilets, water gardens, hostels and laboratories. Water provided by Municipal council is used for the purpose of drinking. Four Water purifiers are installed in various places in the college campus. The water is treated with a purification system before being made available for drinking. Water coolers are also placed at various places in the College campus. It is assured to provide clean and fresh water to hostel, staff quarters, library and to the main



building. Frequently, hardness of water is checked for the assessment of water quality.

**Table. 6. Water Quality assessment Results of both water sources**

Sr. No.	TESTS	Pond Water Sample	Well Water Sample
1.	Description	A clear, colourless, and odourless	A clear, colourless, liq. odourless
2.	pH	5.6 at 25 <sup>0</sup> C	5.7 at 25 <sup>0</sup> C
3.	Conductivity	4.9 $\mu\text{S cm}^{-1}$ at 25 <sup>0</sup> C	3.5 $\mu\text{S cm}^{-1}$ at 25 <sup>0</sup> C
4.	Acidity or alkalinity	455 mg/L	410 mg/L
5.	Total Dissolved Solids	3782. mg/L	2100 mg/L
6.	Calcium and Magnesium	140 mg/L	100 mg/L
7.	Chloride	411 mg/L	320 mg/L
8.	Total Hardness	862 mg/L	530 mg/L
9.	E. Coli	Absent	Absent



1. Water Cooler in Girls Hostel



2. Water cooler system near Library



**3. Water Purifier System in College campus**



**4. Drinking water source for students**

### **2.4 Rainwater Harvesting Potential:**

There are four adjacent buildings possess large terrace areas and paved surface. All of the buildings had Rain Water Harvesting (RWH) System implementation. But as construction is in progress, RWH are not in working. But, after completion of construction work RWH will be reinstalled. The harvested water is released in the pond available in the college campus. The water harvested in the pond is utilized for the purpose of gardening in the college campus.



**Rain Water Harvesting Installation unit (Work in progress)**

## **2.5 Waste Quantification and Management:**

This indicator considers the creation and disposal of a variety of wastes, including paper, food, plastic, biodegradables, construction, glass, dust, and other materials, as well as recycling. Furthermore, solid waste often contains wasted material resources that may be better utilized through recycling, repair, and reuse. Solid waste generation and management is a hot problem. Solid waste management that isn't based on science can put everyone in danger. The survey sought information on the volume, kind, and current management of solid waste generated on campus. Various solid wastes were collected, as previously stated.



### 3. SOLID WASTE AUDIT

Solid waste generation and management has been a major issue in recent years. The rate of solid waste generation is extremely significant, but we lack adequate technologies to manage the garbage generated. All non-liquid garbage is classified as solid waste. If solid trash is not properly disposed of, it can cause serious health problems as well as an unpleasant living environment. As a result, it is critical to properly manage solid waste in order to lessen the pressure on waste management systems. The goal of this inventory is to determine the amount, volume, type, and present management practice of solid waste generated on G.M.D. Arts, B.W. Commerce and Science College campus. This study will aid in the continued management of solid waste and the construction of a green campus.

#### 3.1 Generation of Solid Waste:

##### Category wise solid waste generation (kg / month)

Table 7. Category wise solid waste generation (kg /month)

Category of waste	Paper waste	Plastic	Biodegradable waste	Construction waste	Glass waste	Total solid waste
Quantity	675 kg	250 kg	900 kg	500 kg	25 kg	2250 kg

Throughout the study period 2850.00 kg of solid waste was generated. On the basis of obtained results in which highest quantity of solid waste is Biodegradable-waste and is about 900.0 kg/month. Paper waste is at second place amounting 675.00 kg/month and Construction waste is 500.0 kg/month as there is construction in progress.

Table 8. Segregation of solid waste

Sr. No.	Specification (Y/N)	Segregated (Y/N)	Recycled (Y/N)	Reuse (Y/N)	Other (specify)
1.	Paper	Y	Y	N	NA
2.	Cardboard	Y	Y	N	NA
3.	Plastic	Y	N	N	NA
4.	Food waste	Y	Y	Y	NA
5.	E Waste	Y	Y	N	NA
6.	Hazardous waste	Y	Y	N	NA
7.	Glass	Y	N	N	NA
8.	Laboratory Rags	Y	N	N	NA
9.	Metals	Y	Y	N	NA
10.	Plant waste	Y	Y	Y	NA

### 3.2 MANURE PREPARATION:

Manure is prepared from plant litter of the college campus. This manure is used for plants of college garden. Manure is a key ingredient in organic farming. At the simplest level, the process of composting simply requires making a heap of wet organic matter and waiting for the materials to break down into humus after a period of three months. Manure is rich in nutrients. The manure itself is beneficial for the land in many ways, including as a soil conditioner, a fertilizer, addition of vital humus or humic acids, and as a natural pesticide for soil.

In ecosystem, manure is useful for erosion control, land and stream reclamation, wetland construction, and as landfill cover. The decomposition process is done by shredding the plant matter, adding water, and ensuring proper aeration by regularly turning the mixture. Worms and fungi further break up the material. Aerobic bacteria manage the chemical process by converting the inputs into heat, carbon dioxide and ammonium. The ammonium is further converted by bacteria into plant-nourishing nitrites and nitrates through the process of nitrification

#### VERMICOMPOSTING

College has made the manure and used for plant situated around college. The institution has implemented vermiculture composting unit of size 25 x 25 feet consists of 10 beds with plant capacity of 1000 Kg. The major goal is to limit the amount of disposable garbage on campus. The species used for Vermicomposting is *Eisenia foetida*. It is utilized as manure in the garden and lawns when the vermicomposting process is completed.



Vermicompost unit in College Campus

## 4. HAZARDOUS WASTE AUDIT

### 4.1 Chemical waste:

A hazardous waste is a solid, liquid, or gaseous item with a "Hazardous Characteristic" or that is officially "designated" as a hazardous waste by name. Despite the fact that characteristic wastes are not specified by their chemical name, they are controlled as hazardous wastes because they exhibit one or more harmful features. Ignitability, Corrosivity, Reactivity, and Toxicity are the four traits.

Various compounds created in science departments' laboratories are classified as hazardous waste. It exists as a liquid as well as a solid state. Because only a small portion of the population generates hazardous waste, only roughly 5 departments have been included.

### 4.2 Hazardous Waste Generated at departments

Chemistry Department generated maximum amount of chemical and hazardous solid waste from laboratories and other sources. Very negligible hazardous waste is generated by other science departments. Arts and Commerce faculty departments are free of hazardous waste.


## 5. E-WASTE

E-waste generation is evident in every educational institution. Particularly at the college level, there are less equipment and instruments in use for administrative and scientific purposes. In administrative work, computers, printers, and Xerox machines are required. The wire necessary for connecting is likewise thrown away with the e trash. Similarly, numerous scientific instruments and equipment from science laboratories deteriorate over time. These, too, contribute to the e-waste problem.

**Table-9. Number of not working electrical equipment's**

Sr. No	Department	E-waste (kg/year)	E-waste treated and disposed (kg/year)
1	Office	5	5
2	B.Sc. (entire Computer Science)	3	3
3	Chemistry Department	2	2
4	Physics	10	10
<b>Total</b>		<b>20</b>	<b>20</b>

Major source of e-waste generation is the Science Departments of the College. Department of Physics generated highest amount of e-waste i.e. 10 kg as compared to other



Science Departments. It is followed by Office which generated 5 kgs of e- waste. Chemistry Department generated about 2 kg. The E-waste and malfunctioning items from the computer lab are appropriately kept. In order to dispose of E-waste in a scientific way, the parent institution Maratha Vidya Prasarak Samaj, Nashik has opted to contact an approved E-waste management and disposal facilities unit.

The audit team observed that the technical life time / service life of most electronic instruments has not yet expired, resulting in little waste creation. However, the College must device a long-term and consistent e-waste disposal strategy.

## 6. ENVIRONMENTAL QUALITY AUDIT

### 6.1 Air Quality Audit

Air pollution has also become a critical issue in India. Most of the urban conglomerations in India are highly polluted with recent case of Delhi air pollution. In 2014, the World Health Organization (WHO) had assessed 1,622 cities worldwide for PM<sub>2.5</sub> and found that 13 of the 20 cities in India that WHO assessed are with the most polluted air.

The air pollution is mainly caused by vehicle emissions, fuel, industrial activities, and coal fired power plants. The WHO further suggests that most Indians breathe unsafe air. Air pollution causes asthma, which is now soaring, even amongst the children. PM<sub>2.5</sub> contributes to cancer, and it kills by triggering heart attacks and strokes.

Air quality in the academic institute is very important for health of the students, faculty, and staff of the institute. The air pollution sources in the college campus are windstorm, pollen grains, natural dust, vehicular emissions, generators, fires and laboratory fumes etc. The air pollutants monitored on regular basis are Sulphur dioxide (SO<sub>2</sub>), Oxides of Nitrogen as NO<sub>2</sub>, Suspended Particulate Matter (SPM) and Repairable Suspended Particulate Matter (RSPM) etc.


The health of the students, instructors, and staff at the academic institute is dependent on the air quality. Windstorms, pollen grains, natural dust, traffic emissions, generators, fires, and laboratory smells, among other things, are all causes of air pollution on the college campus. But in the present study whole city is considered and the data is extracted from nearby government air quality monitoring stations.

### 6.2 CAUSES OF AIR POLLUTION IN SINNAR

- (i) Sinnar is an Industrial area which is surrounded by hundreds of small- and large-scale industries. Machine operations in these industries releases various toxic gases in the air which mainly cause air pollution in the city.
- (ii) The other causes of outdoor air pollution are solid, liquid particles called aerosols & gas from vehicles emissions, construction activities, factories, burning stubble & fossil fuels and wildfire, etc.
- (iii) Main causes of indoor air pollution are harmful gases from cooking fuels (such as wood, crop wastes, charcoal, coal and dung), damp, smoke, chemicals from cleaning materials, etc.

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### **6.3 Noise Quality Audit:**

One of India's most critical environmental issues is noise pollution, although most of us are unaware of the harm it brings. We are all exposed to loud noises for lengthy periods of time in India, both on a daily basis and during festival seasons such as Ganesh Festival, Diwali, and others throughout the year. Uninvited noises like horns, other traffic noise, loudspeakers, and, of course, residential noise like television and music system sounds are inevitable on a daily basis. There is a common idea in our country that happiness can only be shown by making loud noises.

Being located on the highway, the faces regular noise problem in the forms of Unwarranted sounds such as honking, other vehicular noise; the loudspeakers on daily basis are inevitable. In our country it's a major perception that happiness can only be expressed by creating loud noises. The following table shows implications of Noise on Human Body.

Exposure to high levels of noise may cause permanent hearing loss. The repeated exposures to loud noise can lead to permanent tinnitus and/or hearing loss. Furthermore, it may create physical and psychological stress, reduce productivity, and interfere with communication and concentration. The effects of noise induced hearing loss can be profound & can be limiting your ability to hear high frequency sounds, understand speech, and seriously impairing your ability to communicate.

**Table 10-Noise Level of the Campus**

Sr. No.	Location	Minimum	Maximum	Average
1	Play Ground	67	90	80
2	Staff Quarters	60	72	69
3	Canteen	66	88	78
4	1 <sup>st</sup> Floor Porch	63	83	71
6	Garden Area	48	88	67
7	Main gate	68	87	66
8	Girl's hostel	65	75	68
9	Administrative Office	60	70	64

\*Note: Ambient Air Quality Standards in respect of Noise dB (A), in accordance with Noise Pollution Regulation and Control) amendment rules, 2000 Silent Zone

The institution has explored a variety of methods to eliminate sound pollution on campus or to avoid producing noise. The campus has been designated as a Silent Zone, and pupils have been educated using silent zone signs. Students have been instructed to use their cellphones in silent mode, particularly in the library and theatre. So that sound pollution is decreased, suggestion boards for no honking have been placed across the campus. The majority of trees have been planted on the college campus to minimize the intensity of noise pollution; thus, sound pollution levels will be lower in the future.

**SOUND (NOISE) POLLUTION MANAGMENT:**

To avoid sound pollution in the college campus, or to avoid causing noise, the college has tried various means to prevent sound pollution.

**a. Silent Zone:**

The campus has been declared as Silent Zone and the students have been instructed with the help of boards of silence zone.

**b. Use of Mobile phone in Silent Mode:** An instruction has been given to students and teachers to operate mobile phones in silent mode, especially at the library and auditorium hall.



## 7. GREEN COVER OF THE COLLEGE CAMPUS

As we face increasing climate and environmental issues, green campuses are becoming increasingly important. Through both practical reforms and the teaching they give, larger institutions have the ability to positively contribute to the climate change movement. A green area is defined as any place with grass, trees, or horticulture. Tree canopy analysis is a good way to estimate how much green cover there is in a given area. Canopy cover is the covering created by the branches and crowns of plants or trees (green cover). Green cover refers to the percentage of a given area of the ground that is covered by tree crowns. According to earlier national forest policy and the National Mission for Green India (GIM), one of eight missions under the National Action Plan on Climate Change (NAPCC), 33 percent of total accessible land should be covered by vegetation. Because plants and trees are the best carbon sinks, it will aid in the decrease of greenhouse gas emissions. Green cover of the college campus is calculated by using following formula

$$\text{Green Cover (\%)} = \frac{\text{Total Green Cover in sq. meter}}{\text{Total area of campus in sq. meter}} \times 100$$

**Table 11 Green Cover Calculations**

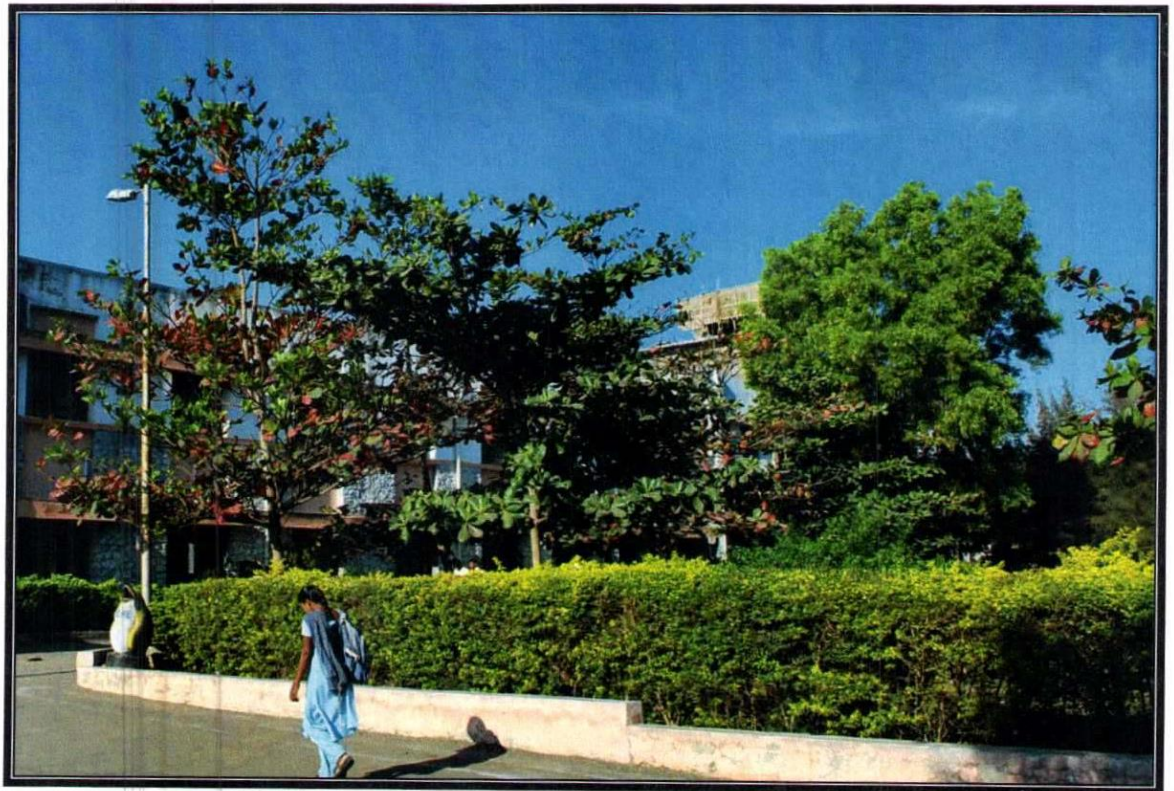
<b>Sr.No.</b>	<b>Total Area of Campus (sq. meter)</b>	<b>Total Green Cover (sq. meter)</b>	<b>Percent Green Cover</b>
<b>1.</b>	58680	28328	48.27

The college campus has a total size of 58680 square metres, according to information acquired during the site visit. The tree canopy cover is predicted to be 28328 square metres, which comprises about 48.27 percent of the total open space. Total green cover in the GMD College campus is far better than the prescribed levels.









Green Area of College Campus





Green Area of College Campus



Trees are not only important, but they are also essential for survival. They produce oxygen, filter CO<sub>2</sub>, prevent soil erosion, and maintain ecological equilibrium, among other things. They also give us with food, housing, and a variety of other necessities. The tree selection is critical while plating trees on campus. Increased canopy coverage from trees helpsto reduce the urban heat island effect. Pedestrians will benefit from the shade provided by trees,which will provide relief from the heat. They will also provide shade to surrounding buildings, decreasing the need for air conditioning.



Flower Diversitv in Colleee camous

## 7.1. List of available plants on college campus

Table12. List of available trees on college campus

Sr. No.	Botanical Name	Common/ Local Name	Family	No. of individuals
1	<i>Acacia Auriculiformis</i>	Australia Babhul	Mimosaceae	42
2	<i>Acacia catechu</i>	Khair	Mimosaceae	01
3	<i>Acacia nilotica</i>	Babhul	Mimosaceae	02
4	<i>Acalypha wilkesiana (various)</i>	Copper leaf	Euphorbiaceae	40
5	<i>Aegle marmelos</i>	Bel	Rutaceae	01
6	<i>Aglonema crispum (Pot plant)</i>	Aglonema	Araceae	01
7	<i>Albizia lebback</i>	Shiris	Mimosaceae	14
8	<i>Aloe barbadensis</i>	Korphad	Liliaceae	10
9	<i>Alstonia scholaris</i>	Satvin	Bignoniaceae	08
10	<i>Annona squamosa</i>	Sitaphal	Annonaceae	04
11	<i>Araucaria cookii</i>	Christmas tree	Auracariaceae	02
12	<i>Archontophenix purpurea</i>	Palm	Arecaceae	13
13	<i>Artocarpus heterophyllus</i>	Jackfruit (Fanas)	Moraceae	04
14	<i>Azadirachta indica</i>	Kaduneem	Meliaceae	22
15	<i>Bambusa Vulgaris</i>	Bamboo	Poaceae	90
16	<i>Bauhinia racemosa</i>	Apta	Caesalpiniaceae	02
17	<i>Bauhinia variegata</i>	Raktchandan	Caesalpiniaceae	17
18	<i>Bombax ceiba</i>	Katesawar	Bombacaceae	02
20	<i>Bougainvillea spectabilis</i>	Boganvel	Nyctaginaceae	06
21	<i>Bryophyllum pinnatum</i>	Panphuti	Crassulaceae	01
22	<i>Butea monosperma</i>	Palas	Fabaceae	01
23	<i>Caesalipinia pulcherrima</i>	Shankhasur	Caesalpiniaceae	182
25	<i>Callindra emerginata</i>	Powderpuff	Mimosaceae	03
26	<i>Callistemon acuminatus</i>	Bottle brush	Myrtaceae	10
27	<i>Calotropis gigantia</i>	Akand rui	Asclepiadaceae	03
28	<i>Calotropis procera</i>	Rui	Asclepiadaceae	02
29	<i>Canna indica</i>	Kardal	Cannaceae	02
30	<i>Cassia fistula</i>	Bahava	Caesalapiaceae	01
31	<i>Cassia siamia</i>	Tarawat	Caesalpiniaceae	25
32	<i>Casuarina equisetifolia</i>	Suru	Casuarinaceae	05
33	<i>Chlorophytum comosum</i>	Chlorophytum	Asparagaceae	01
34	<i>Clitoria ternatea</i>	Gokharn	Papilionaceae	05
35	<i>Cocos nucifera</i>	Naral	Arecaceae	28
36	<i>Coleus blumei</i>	Coleus	Lamiaceae	06
37	<i>Crinum asiaticum</i>	Spider lily	Amarallydiceae	25
38	<i>Cycus revoluta</i>	Cycas	Cycadaceae	02
39	<i>Delbergia sisso</i>	Shisam	Papillionaceae	27
40	<i>Delonix regia</i>	Gulmohar	Caesalpiniaceae	60
41	<i>Dodonaea viscosa</i>	Badh	Sapindaceae	-
42	<i>Dracaena mahatma</i>	Dracaena	Asparagaceae	01
43	<i>Dracaena marginata 'Tricolor'</i>	Dracaena	Asparagaceae	01
44	<i>Dracaena reflexa</i>	Song of India	Asparagaceae	01
45	<i>Duranta repens</i>	Golden duranta	Verbenaceae	105

46	<i>Dyopsis lutescens</i>	Areca palm	Arecaceae	06
47	<i>Eucalyptus globulus</i>	Nilgiri	Myrtaceae	15
48	<i>Ficus benghalensis</i>	Wad	Moraceae	15
49	<i>Ficus benjamina</i>	Ficus	Moraceae	06
50	<i>Ficus elastica</i>	Rubber tree	Moraceae	01
51	<i>Ficus glomerata</i>	Audumbar	Moraceae	12
52	<i>Ficus religiosa</i>	Pipal	Moraceae	14
53	<i>Gliricidia muculata</i>	Giripushpa	Papillionaceae	32
54	<i>Gmelina arborea</i>	Shivan	Verbenaceae	05
56	<i>Grevillia robusta</i>	Silver Oak	Proteaceae	04
57	<i>Hamelia patens</i>	Fire bush	Rubiaceae	40
58	<i>Hibiscus rosa-sinensis</i>	Jaswand	Malvaceae	05
59	<i>Hyophorbe lagenicaulis</i>	Bottle palm	Arecaceae	08
60	<i>Ixora coccinia</i>	Ixora	Rubiaceae	05
61	<i>Jasminum sambac</i>	Mogra	Oleaceae	03
62	<i>Juniperus chinensis</i>	Juniper	Cupressaceae	02
63	<i>Lantana camara</i>	Lantana	Verbenaceae	05
64	<i>Leucaena leucocephala</i>	Subabhul	Mimosaceae	26
65	<i>Livistona chinensis</i>	Fan palm	Palmae	01
66	<i>Magnolia champaca</i>	Sonchafa	Magnoliaceae	03
67	<i>Mangifera indica</i>	Mango	Anacardiaceae	72
68	<i>Manilkara zapota</i>	Chiku	Sapotaceae	01
69	<i>Melia azadirach</i>	Bakam	Meliaceae	07
70	<i>Millingtonia hortensis</i>	Kawal Nimb	Bignoniaceae	06
71	<i>Mimusops elengi</i>	Bakul	Sapotaceae	02
72	<i>Moringa oleifera</i>	Shevaga	Morngaceae	04
73	<i>Morus alba</i>	Tuti	Moraceae	02
74	<i>Murraya koinigii</i>	Kadipatta	Rutaceae	02
75	<i>Nephrolepis biserrata</i>	Fern	Nephrolepidaceae	01
76	<i>Nerium indicum</i>	Kanher	Apocynaceae	01
77	<i>Ocimum bacillicum</i>	Sabja	Lamiaceae	02
78	<i>Ocimum gratissimum</i>	Clove basil	Lamiaceae	02
79	<i>Ocimum sanctum</i>	Tulsi	Lamiaceae	10
80	<i>Opuntia elatier</i>	Nivdung	Cactaceae	01
81	<i>Peltoforum pterocarpum</i>	Pivli Gulmohar	Fabaceae	10
82	<i>Phoenix sylvestris</i>	Sindhi	Arecaceae	02
83	<i>Phyllanthus emblica</i>	Awla	Euphorbiaceae	06
84	<i>Pithecellobium dulce</i>	Wilayti chinch	Leguminoceae	12
85	<i>Plumeria alba</i>	chafa	Apocynaceae	05
86	<i>Plumeria pudica</i>	Chafa	Apocynaceae	02
87	<i>Polyalthia longifolia</i>	Ashok	Annonaceae	30
88	<i>Pongamia pinnata</i>	Karanj	Papillionaceae	14
89	<i>Prosopis cineraria</i>	Shami tree	Mimosaceae	01
90	<i>Psidium guavajava</i>	Peru	Myrtaceae	04
91	<i>Putranjiva roxburghii</i>	Putrajivi	Euphorbiaceae	01
92	<i>Rosa demascena</i>	Gulab	Rosaceae	06
93	<i>Santalum album</i>	Chandan	Santalaceae	12
94	<i>Saraca indica</i>	Sitaashok	Fabaceae	01

95	<i>Sensvieria trifasciata</i>	Snake plant	Asparagaceae	04
97	<i>Spathodea campanulata</i>	Spathodea	Bignoniaceae	02
98	<i>Swietenia macrophylla</i>	Mahogani	Meliaceae	01
99	<i>Syzygium cumini</i>	Jamun	Myrtaaceae	18
100	<i>Tabernaemontana coronaria</i>	Chandani	Apocynaceae	40
101	<i>Tamarindus indica</i>	Chinch	Caesalpiniaceae	20
102	<i>Tecoma stans</i>	Tecoma	Bignoniaceae	40
103	<i>Terminalia bellerica</i>	Behda	Combretaceae	01
104	<i>Terminalia catappa</i>	Indian Almond	Combretaceae	38
105	<i>Terminalia chebula</i>	Hirda	Combretaceae	04
106	<i>Terminalia arjuna</i>	Arjun	Combretaceae	01
107	<i>Thevetia peruviana</i>	Pivli kanher	Apocynaceae	150
108	<i>Thuja occidentalis</i>	Morpankhi	Cupressaceae	23
109	<i>Vitex negundo</i>	Nirgudi	Verbenaceae	01
110	<i>Ziziphus jujuba</i>	Ber	Rhamnaceae	07
<b>Total</b>				<b>1555</b>

## SPECIAL GARDENS DEVELOPED IN COLLEGE CAMPUS

Department of Botany developed four special plant gardens on the basis of Vedic Science guidelines.

1. Rashi van
2. Nakshatra van
3. Sarasvati van
4. Vrunda van

1. **Rashi Van-** On the basis of Zodiac signs of a person, there is a specific tree is connected with each zodiac sign. In this specific garden all those tresses have been planted. The trees planted in this garden as per zodiac sign are.

**Table 13.-List of Plants in Rashi Garden**

Sr. No.	Name of plant	Zodiac Sign
1	<i>Artocarpus heterophyllus</i>	Gemini
2	<i>Butea Monosperma</i>	Cancer
3	<i>Acacia catechu</i>	Scorpio
4	<i>Mimusops elengi</i>	Libra
5	<i>Alstonia scholaris</i>	Taurus
6	<i>Mangifera indica</i>	Virgo
7	<i>Bauhinia variegata</i>	Aries



8	<i>Stereospermum suaveolens</i>	Leo
9	<i>Ficus benghalensis</i>	Pisces
10	<i>Prosopis cineraria</i>	Aquarius
11	<i>Dalbergia sisso</i>	Capricorn
12	<i>Ficus religiosa</i>	Sagittarius



2. **Saraswati van**-This specific garden has been developed as per the relation of human brain with plants. According to Vedic science such garden is developed for to enhance concentration and brain capacity of pupils. This garden contains five trees are each planted five times. Hence this garden would consist 25 plants.

**Table 14.-List of Plants in Saraswati Garden**

Sr. No.	Name of plant	No of plants
1	<i>Ficus religiosa</i>	5
2	<i>Phyllanthus emblica</i>	5
3	<i>Terminalia chebulla</i>	5
4	<i>Cocus nucifera</i>	5
5	<i>Terminalia catappa</i>	5





3. **Nakshatra van-** According to vedic science, there are total 27 nakshatras (stars). Each nakshatra do have one specific sacred tree. In the Nakshatra van 27 trees are planted in a circular manner as per the 27 nakshatras. These plants are planted as follows.

**Table 15.-List of Plants in Nakshtra Garden**

Sr. No.	Name of plant	Nakshatra (Stars)
1	<i>Adhatoda vasica</i>	Ashwin
2	<i>Phyllanthus emblica</i>	Bharni
3	<i>Ficus glomerata</i>	Krutika
4	<i>Syzygium cumini</i>	Rohini
5	<i>Acacia catechu</i>	Mrug
6	<i>Terminalia bellarica</i>	Arda
7	<i>Bambusa Vulgaris</i>	Punarvasu
8	<i>Ficus religiosa</i>	Pushya
9	<i>Mesua ferrea</i>	Ashlesha
10	<i>Ficus benghalensis</i>	Magha
11	<i>Butea monosperma</i>	Purva
12	<i>Ficus arnottiana</i>	Uttara

13	<i>Jasminum officinale</i>	Hasta
14	<i>Aegle marmelos</i>	Chitra
15	<i>Terminalia arjuna</i>	Swati
16	<i>Limonium acidissimum</i>	Vishakha
17	<i>Mimusops elengi</i>	Anuradha
18	<i>Bombax ceiba</i>	Jeshtha
19	<i>Canarium strictum</i>	Moola
20	<i>Saraca indica</i>	Purvashadha
21	<i>Artocarpus heterophyllus</i>	Uttarashadha
22	<i>Calotropis gigantia</i>	Shravan
23	<i>Prosopis cineraria</i>	Dhanishtha
24	<i>Anthocephalus cadamba</i>	Shatataraka
25	<i>Mangifera indica</i>	Purva Bhadrapada
26	<i>Azadirachta indica</i>	Neem
27	<i>Madhuca indica</i>	Revati

**गुरुवर्य मामासाहेब दांडेकर कला, भगवंतराव वाजे वाणिज्य आणि विज्ञान महाविद्यालय, सिन्नर**

मराठा विद्यार्थी प्रसारक समाजाचे.

**\* राशी वन \***

१	२	३	४
५			६
७			८
९	१०	११	१२

१) फणस = मिथुन राशी  
 २) पळस = कर्क राशी  
 ३) खैर = वृश्चिक राशी  
 ४) बकुळ = तुळ राशी  
 ५) सप्तपर्णी = वृषभ राशी  
 ६) आंबा = कन्या राशी  
 ७) रक्तचंदन = मेष राशी  
 ८) पाडळ = सिंह राशी  
 ९) वड = मीन राशी  
 १०) शमी = कुंभ राशी  
 ११) शिसम = मकर राशी  
 १२) पिंपळ = धनु राशी

संकल्पना : वैदिक शास्त्रानुसार प्रत्येक राशीचा एक ठराविक वृक्ष असतो. व तो वृक्ष त्या राशीच्या माणसाला लाभदायक असतो  
 रचना : या वनामध्ये १२ राशींच्या १२ वेगवेगळ्या वृक्षांची लागवड आकृतीत दाखविल्याप्रमाणे विशिष्ट प्रकारे केलेली आहे.  
 महत्व : वैदिक शास्त्रानुसार ज्या त्या राशीची व्यक्ती त्या त्या राशीच्या वृक्षाखाली बसल्यास त्याला मन:शांती मिळते, चित्त एकाग्र होते, चिंता मिटते व आरोग्य लाभते.

4. **Vrunda van-** In this garden different seven species of tulsi grown in an area, which forms 'Vrundavan'. This contains following species of tulsi.



**Table 16.-List of Plants in Vrindavan Garden**

Sr. No.	Name of plant	Common name
1	<i>Ocimum sanctum</i>	Ramtulas
2	<i>Ocimum tenuiflorum</i>	Krushna tulas
3	<i>Ocimum sanctum</i>	Kapuri tulas
4	<i>Ocimum americanum</i>	American tulas
5	<i>Ocimum grattisum</i>	Vaijayanta tulas
6	<i>Ocimum sanctum</i>	Triguni tulas
7	<i>Ocimum tenuiflorum</i>	Pandharpuri tulas



## 8. OTHER ACTIVITIES

### HEALTH AND SAFETY

The college has given special priority for human health and safety. The following various factors help to manage human health and safety.

#### a. Regular Health Check-up:

The college arrange regular Health check-up camp for students and faculty.



#### b. Separate Toilet facility:

Separate toilets are available for students and staff in the college.



#### c. First AID Box:

In case of any accidental injury, first aid boxes are available in the college.



### e. Fire Extinguisher:

Fire Extinguishers have been set up in various places in the college so as not to cause the loss of life and financial loss through fire.



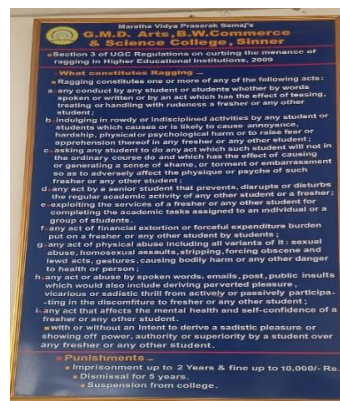
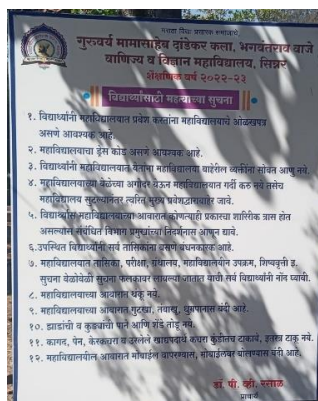
### d. No Smoking, No Tobacco in the Campus Area:

Smoking and chewing of tobacco is strictly prohibited in the college campus.



### f. Flexes for students discipline:

In order to create awareness among students and society, the college has setup flex boards / banners to spread awareness about the discipline related information in the college campus.



## PUBLIC AWARENESS ABOUT ENVIRONMENTAL CONVERSATION:

Environment will not prevail if public awareness is not spread, keeping this thing in mind, the college has tried to aware students towards environmental conservation.

The college campus has put up banners / flex boards to create awareness about environmental conservation. Through this, the college tried its best to create awareness about environmental conservation.



### a. Individual Role Related to Environmental Conservation.

#### - पर्यावरण संवर्धनासाठी व्यक्तिगत भूमिका -

- \* सर्व सजीवांविषयी आदर ठेवा.
- \* लाकूड व कागद यांचा कमीत कमी वापर करावा.
- \* झाडे लावा व त्यांचे मुलांप्रमाणे संगोपन करा.
- \* रासायनिक खते व किटकनाशक यांचा वापर टाळण्याचा प्रयत्न करावा.
- \* सेंट्रीय श्रेतीचा प्रचार व प्रसार करावा.
- \* सेंट्रीय उत्पादने खरेदी करण्यावर भर द्या.
- \* आपल्या वाहनाचा आवश्यक असेल तेव्हाच वापर करा.
- \* गरज नसेल तेव्हा दिवे व पंखे बंद करा.
- \* प्रवासासाठी जास्तीत जास्त वेळा सार्वजनिक वाहनांचा वापर करा.
- \* किटकनाशके व विषारी रसायने, रंग पाण्यात अथवा जमिनीवर फेकु नका.
- \* प्लास्टिक पिशव्या ऐवजी कापडी पिशव्यांचा वापर करा.
- \* ई-कचरा संबंधीत यंत्रणेतच जमा करा.
- \* कंपोस्ट खताच्या वापरावर भर द्या.
- \* कचराकुंडीचा कचरा टाकण्यासाठी कटाक्षणे उपयोग करा.
- \* सार्वजनिक ठिकाणी स्वच्छता राखण्यास मदत करा.
- \* आपल्या टी.व्ही., रेडिओ, होम थियटर अथवा या सारख्या इतर संगीत माध्यमाचा आवाज मर्यादीत ठेवा.
- \* ओला कचरा व सुखा कचरा वेगळा साठवून त्यांचे शास्त्रीय पद्धतीने व्यवस्थापन करा.
- \* अपारंपारिक ऊर्जेच्या वापरावर भर द्या.
- \* वृक्षतोड रोखण्यासाठी कायम दक्ष रहा.
- \* पारंपारिक वन औषधी वनस्पतींचे जतन व संवर्धन करा.
- \* फटाके मुक्त दिवाळी साजरी करा.
- \* सण-उत्सव, नवरात्र उत्सव प्रसंगी शाडूच्या मूर्ती वापरा.
- \* चांगल्या बदलांची सुरवात स्वतःपासून होते ही जाणीव कायम मनात ठेऊन आपली व्यक्तिगत भूमिका पार पाडा.

पर्यावरणाचे संवर्धन करण्याचा निर्धार करूया,  
आरोग्यदायी जीवनासाठी पर्यावरणाचा आधार घेवूया...!

### b. Importance of Trees:



### - झाडांचे महत्त्व -

- \* झाडे हवेतील कार्बनडाय ऑक्साइड सोपून घेवून ऑक्सिजन म्हणजे शुद्ध हवा वातावरणात सोडतात.
- \* एका व्यक्तीला पूर्ण आयुष्यात लागणारा ऑक्सिजन मिळविण्यासाठी कमीत कमी १८ झाडांची आवश्यकता असते.
- \* एक पूर्ण वाढलेले झाड पन्नास वर्षांपर्यंत सुमारे ६ लाख रुपयांचा ऑक्सिजन पुरवते.
- \* बचोवठे दुर्लभ प्राणी, बनावडीची वनस्पती यांचे जतन होते.
- \* हवेत धंद्यास राखला जातो.
- \* तापमान वाढ रोखली जाते.
- \* पावसाचे प्रमाण वाढते.
- \* भू-गर्भातील पाण्याच्या साठ्यात वाढ होते.
- \* जमिनीची धूष बांधते, सुविक्ता काचम राहते.
- \* हवेतील प्रदूषण कमी होण्यास मदत होते.
- \* पशू-पक्षी यांना आरवस्थान व निवास मिळतो.
- \* ध्वनी प्रदूषणाची तीव्रता कमी होण्यास मदत होते.
- \* झाड आपणास फळे व फुले पुरवतात.
- \* विविध पक्षांमध्ये ओषधी गुणधर्म असतात.

झाडे लावा, झाडे जगवा,  
पर्यावरण आणि जीवन सुंदर बनवा...!

चला सर्वजण एक शपथ घेऊ

पर्यावरण संवर्धनासाठी आपण सर्व योगदान देऊ...!

## a. Anti-ragging Law

College has an active anti-ragging cells. Laws regarding anti-ragging have been displayed in the College campus as well as in the hostel for the betterment of the college. If any such incidence occurs, strict action is taken towards the victim.



## e. Paperless Office

Deliberate efforts are made to use least amount of paper in administrative work, and academic work. The college prefers information technology like the website, em ail, WhatsApp, phone instead of the paperwork. E-sources are available for Faculty as teaching aids. Wi-Fi facility enables to create paperless activities.



## f. Plastic Free Campus

The Government of Maharashtra has banned uses of plastic material. An initiative is taken to ban plastic bags in the college premises and promote to use paper bags.

## 9. RECOMMENDATIONS

### Water harvesting, usage and waste water treatment

The college campus with more than 5 buildings has a high potential for the Rainwater Harvesting due to large terrace areas as well as the open surfaces (paved & unpaved areas). Based on the geotechnical survey of the campus area, the college should emphasize on recharging the ground water table with the rainwater. The college has already have a small pond for the storage of rainwater. Some more water storage tanks can be built in the College campus. This would satisfy part requirement of the campus in the monsoon season (i.e., about 80 – 90 days in a year) and thus reducing freshwater intake during rainy days).

It is recommended to install water efficient faucets and flushing systems across the campus which would reduce the freshwater requirement of the campus. Even though all the drain lines of the campus are connected to the common drain line, it is suggested that if the management is looking forward to overall environmental sustainability, then an Effluent Treatment Plant (ETP) may be installed. This would treat & recycle the wastewater within the campus and this treated wastewater can further be used either for flushing or landscaping, thus further reducing freshwater requirement of the campus by 50 – 60 % of the total. Such modular treatment plant can be used for environmental science student's practical course as well. To use the treated wastewater for flushing a separate plumbing system is required.

It is recommended that liquid chemical waste from the laboratories should not be disposed of without any treatment.

### Noise Environment

1. In order make campus friendly for educational purposes, the noise levels need to be reduced as directed by Noise Pollution (Regulation and Control) amendment rules, 2000 and certain disciplinary measures need to be taken.
2. It is observed that due to the proximity of the campus to the main road, the noise pollution is high. It ranges from minimum of 50.0 dB (A) to maximum 73.6 dB (A) which is 23.6 dB (A) over the stipulated standard. This would mean students are getting exposed to high noise pollution levels within the campus due to either internal activities or external activities. This would create hurdle in learning and their overall health.
3. It is recommended that the campus to have noise barriers along the fence line either in terms of natural barriers such as trees or artificial barriers such as acoustic fence. A combination of both can also be used at appropriate locations.
4. It is recommended that parking lots within the campus to be made strictly as no honking zones and vehicles with unwarranted vehicle silencers (mufflers) not be allowed.

**Fig. 4: Types of noise barriers**



Biological noise barrier structure - trees



Acoustic Fence

## Plant diversity

To maintain the college campus green and eco-friendly, more trees need to be planted. A thick green belt (of *Ficus benjamina*) development along the fence is strongly recommended. The plant diversity shall be maintained by avoiding the plantation of exotic plant species. A tree monitoring committee is to be established; if not present currently. The college authorities should ensure frequent meetings with the tree monitoring committee.

Carbon neutrality can be maintained on the campus by developing more greenery. The plant species that are found suitable are suggested for plantation and greenbelt development. In addition to above some flowering plants, shrubs, herbs, and climber plants species will also be planted for beautification in the campus.

### Criteria for selection of tree species

The choice of species is based on the adaptability to the site, early returns, multiple uses, complimentary role to the system and its possible role during the lean/critical periods. The key factor contributing to the success of tree planting is selection of suitable tree species. Some of the considerations for selection of tree species are:

- Species adapted to local soil and agro-climate condition.
- Drought resistant species that can survive long dry periods.
- Multipurpose use species.
- Species that can serve for soil and water conservation.
- Species that help in building up soil fertility.
- Species that have good coppicing ability.

For the purpose of landscaping, following eight categories are recommended.

1. Avenues – Trees to shade roads or create avenues in the college campus.
2. Parking - Shade giving trees for open parking lots.
3. Ornamentals – the purpose indicates:

- a. Thicket – To be grown in groups to form a thick vegetated corner, center or pocket.
  - b. Isolation - To be planted singly either in corners or as central attraction.
  - c. Scattered - To be planted at random to be able to appreciate its ornamental nature.
  - d. Groups – To be grown in groups of 3 to 4.
4. Hedges/Edges/Screens. –
- a. Hedges for property hedges, for demarcating areas etc.
  - b. Edges for edging of small flower patches, for setting boundaries, for layering etc.
  - c. Screens - Provide privacy, as screens from pollution from adjoining road or to provide shadow from south sun.
5. Ground covers – These include native lawn varieties and plant species that spread laterally and can be used to cover soil below trees etc.
6. Temple plants – Trees normally associated with religious areas e.g. *Ficus benghalensis*.
7. Climbers – Plants that can be used for forming trellis, etc.
8. Aquatic plants – For ponds or water bodies.

Some of these plants need to be maintained by regular pruning to prevent excessive growth. The plant species suggested for green belt development in addition to the present one layer of vegetation on the boundary would be helpful for mitigating gases and particulate matter. It can also help in reducing noise from the heavy traffic road close to the campus will serve for long time.

**Table 11: List of suggested plants (an appropriate few plants can be used)**

Botanical Name	Local Name	Family	Habit	Flower Color
<b>First Row-trees (outermost)</b>				
<i>Drypetes roxburghii</i>	Putranjiva	Euphorbiaceae	Tree	Greenish Yellow
<i>Holoptelea integrifolia</i>	Wavli	Ulmaceae	Tree	Greenish
<i>Terminalia cuneata</i>	Arjun	Combrataceae	Tree	Yellow
<i>Terminalia paniculata</i>	Kinjal	Combrataceae	Tree	Greenish-white
<i>Terminalia tomentosa</i>	Ain	Combrataceae	Tree	White
<i>Bambusa arundinacea</i>	Bamboo	Poaceae	Bamboo	White, greenish
<i>Dendrocalamus strictus</i>	Velu	Poaceae	Bamboo	Blackish
<i>Cordia dichotoma</i>	Bhokar	Boraginaceae	Tree	White
<i>Dalbergia latifolia</i>	Shisam	Fabaceae	Tree	White
<i>Diospyros peregrine</i>	Tembhurni	Ebenaceae	Tree	White creamy
<i>Garcinia indica</i>	Kokam	Clusiaceae	Tree	Yellowish
<i>Haldina cordifolia</i>	Hedu	Rubiaceae	Tree	Red yellowish
<i>Ficus benghalensis</i>	vad	Moraceae	Tree	Green and Red

Botanical Name	Local Name	Family	Habit	Flower Color
<b>Shrub Layer</b>				
<i>Gardenia gummifera</i>	Dikemali	Rubiaceae	Shrub	White
<i>Ixora coccinea</i>	Bakara	Rubiaceae	Shrub	Orange / Red
<i>Ixora nigricans</i>	Kat-kuda	Rubiaceae	Shrub	White
<i>Justicia adhatoda</i>	Adulsa	Acanthaceae	Shrub	White
<i>Helicteres isora</i>	Murudsheng	Sterculiaceae	Shrub	Red bright
<i>Murraya koenigii</i>	Kadhipatta	Rutaceae	Shrub	Greenish White
<i>Murraya paniculata</i>	Kunti	Rutaceae	Shrub	White
<i>Hiptage benghalensis</i>	Madhvilata	Malpighiaceae	Climber	White
<i>Ehretia laevis</i>	Ajan	Ehratiaceae	Tree	White
<i>Vitex negundo</i>	Nirgudi	Verbenaceae	Shrub	Bluish - Purple
<i>Woodfordia fruticosa</i>	Dhyati	Lythraceae	Shrub	Red
<i>Gardenia resinifera</i>	Dikemali	Rubiaceae	Shrub	White
<i>Cassia auriculata</i>	Tarwad	Caesalpiniaceae	Shrub	Yellow
<b>Second Row (from outside)</b>				
<i>Artocarpus heterophyllus</i>	Phanas	Moraceae	Tree	Green
<i>Azadirachta indica</i>	Neem	Meliaceae	Tree	White
<i>Bauhinia recemosa</i>	Apta	Caesalpiniaceae	Tree	White
<i>Butea monosperma</i>	Palas	Fabaceae	Tree	Orange-red
<i>Lagerstroemia microcarpa</i>	Nana-bondara	Lythraceae	Tree	White
<i>Lagerstroemia reginae</i>	Taman	Lythraceae	Tree	Pink
<i>Kydia calycina</i>	Warung	Malvaceae	Tree	White
<b>Along the paths</b>				
<i>Caryota urens</i>	Bherali mad	Arecaceae	Tree	Red & green
<i>Cassia fistula</i>	Bava	Caesalpiniaceae	Tree	Yellow
<i>Mammea surgia</i>	Surungi	Clusiaceae	Tree	White
<i>Phoenix sylvestris</i>	Shindi	Arecaceae	Tree	White
<i>Nyctanthes arbor- tristis</i>	Parijatak	Oleaceae	Tree	White
<i>Nerium indicum</i>	Kanher	Apocynaceae	Small/ Tree	Pink/white
<b>Other Suggested Plants</b>				
<i>Madhuca latifolia</i>	Moha	Sapotaceae	Tree	White
<i>Mallotus philippensis</i>	Kumkum	Euphorbiaceae	Tree	Yellow
<i>Manilkara hexandra</i>	Khirni	Sapotaceae	Tree	White
<i>Memecylon umbellatum</i>	Anjani	Melastamaceae	Tree	Bluish - Purple



<b>Botanical Name</b>	<b>Local Name</b>	<b>Family</b>	<b>Habit</b>	<b>Flower Color</b>
<i>Michelia champaca</i>	Sonchafa	Magnoliaceae	Tree	Yellow
<i>Mimusops elengi</i>	Bakul	Sapotaceae	Tree	White
<i>Mitragyna parvifolia</i>	Kadamb	Rubiaceae	Tree	Red yellow
<i>Morinda pubescens</i>	Bartondi	Rubiaceae	Tree	White
<i>Neolamarckia cadamba</i>	Kadamb	Rubiaceae	Tree	White creamy
<i>Pandanus odoratissimus</i>	Kewada	Pandanceae	Tree	Yellow golden
<i>Pongamia pinnata</i>	Karanj	Fabaceae	Tree	Pinkish white
<i>Santalum album</i>	Chandan	Santalaceae	Tree	Brownish red
<i>Sapindus laurifolius</i>	Ritha	Sapindaceae	Tree	White
<i>Semecarpus anacardium</i>	Bibba	Anacardiaceae	Tree	Greenish white
<i>Syzygium cumini</i>	Jambhul	Myrtaceae	Tree	White
<i>Thespesia populnea</i>	ParasBhendi	Malvaceae	Tree	Yellow
<i>Trema orientalis</i>	Gol	Ulmaceae	Tree	White cremy

### **Waste Management**

1. E - waste to be segregated and handed over only to the dealer / facility authorised by Maharashtra Pollution Control Board (MPCB);
2. Batteries' waste to segregated and handed over only to the dealer authorised by Maharashtra Pollution Control Board;
3. It is recommended that the wet garbage to be segregated appropriately which further can be processed and treated within the campus either by using vermicomposting or biomethanation process.
4. The fertilizer from either of the methods can further be used as manure for the landscaping within the campus. If the biomethanation is to be used to treat the wet garbage, the biogas generated from the process can be used for the canteen either for common canteen / hostel canteens.
5. Chemical waste (solid/ semisolid) from the laboratories not to be disposed in municipal solid waste. Based on the physico-chemical properties of the waste, it should be handed over to the MPCB authorised chemical/ hazardous waste management facility only.
6. Recycling of papers to be used for day today printing and other activities.

### ***Air Environment***

It is recommended that only Pollution under Control (PUC) certificate holding vehicles to be allowed in the campus.

Trees tolerant to air pollution to be planted along the fence line.

It is suggested that, a detailed air pollution study of the institute campus to be carried out to identify the exact source of the air pollution and appropriate measures to be taken.

### ***Safety Aspects***

Teaching and non-teaching staff to be trained for emergency situations.

Emergency exits to be established for the spaces including laboratories.

Eye wash systems to be installed in chemistry laboratory. Periodic mock drills to be conducted.

Personal Protective Equipment's (PPEs) to be used at locations including chemistry laboratories to avoid any accident.

Parking safety to be followed.

Special safety features to be followed at Day school and primary school.

## **10. CONCLUSION**

Considering the fact that the institution is predominantly an undergraduate college, there is significant environmental research both by faculty and students. The environmental awareness initiatives are substantial. The Vermin Compost plant and paperless work system practices are noteworthy. Besides, Tree Plantation Programs initiated by the administration shows how the campus is going green. Few recommendations are added for green campus, minimize noise pollution and to curb the menace of waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus & thus sustainable environment and community development. As part of green audit of campus, we carried out the environmental monitoring of campus includes Illumination, Ventilation and Indoor Air quality of the class room. It was observed that Illumination and Ventilation is adequate considering natural light and air velocity present. Being located isolated from the residential and market area of the city, the college gets fresh and pure air in the classrooms.

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Other Activities



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