ENERGY AUDIT

2019-20 & 2020-21

AUDIT REPORT

Studied for

Poojya Sane Guruji Vidya Prasarak Mandal's

College of Pharmacy

Shahada, Dist - Nandurbar,

Maharashtra, Pin Code: 425409, India

Analysed by

Greenvio Solutions

05 April 2022

Background reference image Janko Ferlic on pexels

Disclaimer

The Audit Team has prepared this report for the **Poojya Sane Guruji Vidya Prasarak Mandal's College of Pharmacy,** located at *Shahada, Dist - Nandurbar, Maharashtra, Pin Code: 425409, India* based on input data submitted by the College analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the Hon'ble Management and College. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who has completed audits of multiple Institutes including Technical, State University, Private University and Single Faculty Colleges for a total of more than 45 lakhs+ sq. ft. of Built-up area audited till date Pan India as an Accredited and Certified Green Building Professional-Architect; ISO Certified IA (IMS) Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

Palghar District, Maharashtra- 401208

sustainableacademe@gmail.com

Acknowledgement

The Audit Assessment Team thanks the **Poojya Sane Guruji Vidya Prasarak Mandal's College of Pharmacy, Shahada District, Maharashtra** for assigning this important work of Energy Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Shri. Dipak Purushottam Patil,** President; **Shri. Jagdish Girdhar Patil,** Vice President; **Smt. Kamaltai Purushottam Patil,** Hon. Secretary; **Shri. Makarand Nagin Patil,** Coordinator (Academics & Gen.Admin.); **Shri. Pandurang Ramdas Patil,** Coordinator (Finance and Construction) and **everyone from the Management.**

Our heartfelt thanks to Chairperson of the entire process **Dr. Sunil Pandit Pawar,** Principal for the valuable inputs.

We are also thankful to **College's Task force the faculty members - Dr. Ghanshyam Chavan** for the excellent coordination; **Mrs. Sulbha Mahajan, Mr. Yogesh Rokade,** and **Mr. Roshan Chaudhari; Mr. Hasni Sayyed Hamid Yahiya,** Academic Incharge; **Mr. Sandip Amarsing Tadvi,** Exam Incharge and **Mr. D. D. Patil,** Office Superintendent

We highly appreciate the assistance of the Clerks - **Mr. Kalpesh Patil, Mr. Yogesh Patil** and the **entire Teaching, Non-teaching and Admin staff** for their support while collecting the data.

Sustainable Academe
Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About Poojya Sane Guruji Vidya Prasarak Mandal

Established in the year 1969, the Mandal has been serving the sacred cause of education in the remote, mofisil part of the State of Maharashtra. Though the jurisdiction of the Mandal is entire Maharashtra, it has concentrated on the Shahada Tehsil of the State and this tehsil is 450 kilometers away from the state capital (Mumbai), adjoining the confluence of Gujarat to the North side and Madhya Pradesh to the East.

This area is mainly populated with the economically socially backward, poor peasants & the landless adivasis. To educate the young generation of such poor section of society. The Mandal has the privilege to run Colleges of Arts, Commerce, Science, Education, Engineering streams and Polytechnic, Industrial Training Center, Pharmacy are the other units which the Mandal conducts.

The students have an opportunity to secure degrees like M.Phil. and Ph.D. in various subjects, B.A., B.Com., B.Sc., M.A., M.Com., M.Sc., B.E., B.Ed., B.Pharm., B.Sc. (Agri.) etc.

1.2 Statements of the Institution

Vision - To mould young generation to new technology of high order that can meet the challenges in fast developing technological world & to be prepare for the legal civic & moral responsibilities of the profession by shaping discipline, competence & character of the pharmacists.

Mission - To become center of excellence of pharmacy education & research to provide world class professionals & serve humanity at large.

1.3 About the Institution

P. S. G. V. P. Mandal's College of Pharmacy was established in the year 1994 by Honorable Sahakar Maharshi Shri. Annasaheb P. K. Patil with the objective *to educate, motivate and uplift the vocational skills of young generation of peasants and the landless workers.* This helps to upgrade the quality educational facilities in almost all the disciplines.

The College is a premier academic institution in this region, located in 200 acres sprawling

campus absolutely serene such that a student automatically turns himself to learning with full concentration and devoid of diversions.

The College provides for instruction in various under-graduate and post-graduate courses in the faculties of in the faculties of pharmacy. Today more than 400 students registered for pharmacy. The teaching faculty consists of 18 learned faculty members and experts in their own subject discharging their duties with a sense of dedication and devotion.

The aim of the College is *"Not only to prepare the undergraduate and post graduate students for their future success in life through a host of up-to-date courses in Pharmacy."*

The motto of the College is *"To create positive stress-free environment for students as well as for staffs and produce awareness regarding maintenance of pollution free environment."*

The objective of the College is *"To develop good human and moral values and create divine thought of national integrity among students and staffs."*

The College offers the following courses.

- **Diploma in Pharmacy (D. Pharmacy)**
  - Approved by PCI & AICTE, New Delhi,
  - Recognized by DTE & Govt. of Maharashtra
  - Affiliated by MSBTE, Mumbai (Maharashtra)
- **Bachelor of Pharmacy (B. Pharm.) - Departments (Pharmaceutics, Pharmaceutical Chemistry, Pharmacognosy and Pharmacology)**
  - Approved by PCI & AICTE, New Delhi,
  - Recognized by DTE & Govt. of Maharashtra
  - Affiliated by KBC NMU Jalgaon (Maharashtra)
- **Masters of Pharmacy (M. Pharm.)**
  - Approved by PCI & AICTE, New Delhi,
  - Recognized by DTE & Govt. of Maharashtra
  - Affiliated by KBC NMU Jalgaon (Maharashtra)

The College works towards training young men and women to be competent, committed and compassionate, and lead in all walks of life.

1.4 The surrounding premises around the Institution

The Premises is situated amidst the landscape serene of **Shahada district of Maharashtra State** with immense peace and calmness in the surroundings. *The College is locate very close to the Gomati river and has a huge ground adjacent to its location, it is situated amidst the Sister Institutes of the Mandal.*

The College is surrounded by Educational Buildings, huge open areas, Residential and Commercial areas on the macro front from all the sides. There is a frontal approach which provides quite a beautiful appreciation space while approaching the premises; this area is surrounded by huge trees which positively complement the background-foreground aspect in terms of Natural space and built-form Architecture. It also provides ample shade which enhances the micro climate of the region. The location of College is feasible to the nearby essential amenities such as Public Health Center, Fire Station, Civic body-Public administrative buildings, Recreational gardens and Police Station.

1.5 Assessment of the College

1.5.1 Approval

The College has received the relevant approvals from the following:

- **Pharmacy Council of India (P.C.I) -** A statutory body of government of India constituted under the Pharmacy Act, 1948, responsible for regulation of pharmacy education and practice of profession in the country for registration as a pharmacist.
- **All India Council for Technical Education (AICTE) -** A national-level Apex Advisory Body to conduct a survey on the facilities available for technical education and to promote development in the country in a coordinated and integrated manner.

1.5.2 Affiliations

The various courses provided by the College are affiliated to the following bodies:

- **Maharashtra State Board of Technical Education (MSBTE), Mumbai Maharashtra** - An autonomous Board of Government of Maharashtra mandated to regulate matters pertaining to Diploma Level Technical education in the state.
- **Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon,**

Maharashtra - A university situated in Jalgaon, Maharashtra. Formerly North Maharashtra University was established on 15 August 1990 after separating it from the parent University of Pune.

1.5.3 Recognition

The courses provided by the College are recognized by **Directorate of Technical Education (D.T.E.) and Govt. of Maharashtra.**

2. Institution overview

2.1 Populace analysis for Academic year 2019-20

2.1.1 Students data

The student data (shared by the College) shows there were a total of **212 Boys and 195 Girls** students thus **a total of 407 students** in the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	04	00	**04**
Teaching Staff	13	07	**20**
Non-Teaching Staff	16	00	**16**
Total Staff Members	**33**	**07**	**40**

Table 1: Staff data of the Institution for 2019-20

The staff data shows the premises had a total of **40** Staff Members.

2.2 Populace analysis for Academic year 2020-21

2.2.1 Students data

The student data (shared by the College) shows there were a total of **251 Boys and 211 Girls** students thus **a total of 462 students** in the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	04	00	**04**
Teaching Staff	13	06	**19**
Non-Teaching Staff	15	00	**15**
Total Staff Members	**32**	**06**	**38**

Table 2: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **38** Staff Members.

2.3 Total College Area & College Building Spread Area

The **total site area is 8 acres** and the **total Built-up area of College is 1,02,203.30 sq. ft.** for **a total of 500 footfalls.**

2.4 College Infrastructure

2.4.1 Establishment

The College is located pretty close to nature and hence has very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premises covers quite a few of the requirements for a Green Habitat.**

2.4.2 Spatial Organisation

The overall ambience of the College is warm and inviting. The classrooms and other spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the building is quite well designed. The colour palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture with the natural landscapes of huge trees all around. The design emphasis on providing calmness to the built form and gradually merges with the serene landscape. The floor to floor height is more than 10 feet. There is no provision for lifts in the premises, whereas there are amenities such as CCTV, Fire extinguishers, Library and first aid box.

2.4.3 Operation and Maintenance of the premises

The interview session with the staff regarding the operation and working hours is summarized in the table. The Institutions are open Monday to Saturday for full day.. The detail wise timing for each is mentioned below.

S. No.	Section	Spaces	Time	Hours/ day	Days in a year
1	Main Institutional College	Student areas and Teaching faculty	Monday to Saturday (10:00 a.m. to 05:00 p.m.)	7	280
2	General areas	Admin areas and library, Passage, staircase, toilet	Monday to Saturday (09:00 a.m. to 05:00 p.m.)	8	300

Table 3: Schedule of the timings of the premises

3. Green Building Study Audit

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution a sustainable and healthy premises for its inhabitants.

3.2 Analysis for the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the campus

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Scope to include Rain water harvesting and Waste water treatment in campus
- Waste Audit - Current waste produced, its segregation and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of campus
- Analysis of the flora and fauna of campus
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collected and preparation of the Report.

3.4 Timeline of the activities for Green Building Study Audit

- 17 January 2021 – Discussion with the College
- 19 January 2021 – Allotment and Initiation by the College
- 25 January 2022 – Survey of the Student and staff submitted
- 27 February 2022 – Data submitted by College
- 05 April 2022 – Submission of the Report

4. Energy Audit

4.1 Sources of Energy consumption

The premise uses following sources of energy consumption.

4.1.1 Primary sources

Electrical (Metered) – Light, Fans, AC, Equipments, Pumps are major consumers.

4.1.2 Secondary sources

1. **UPS –** There are 2 UPS used in the premises, whenever necessary amount is spent only towards the repairs.
2. **Gas cylinders –** There are 4 gas cylinders required in a year and around Rs. 7,600/- is spent towards the same.

4.2 Site investigation analysis

The Site investigation observations and interviews with the Maintenance staff, Electrical department in charge are summarised below:

- The **switch-off drills are practised at present,** the maintenance staff and Lab Attendants put off switches of all equipments regularly.
- All the **computers are shut-off after use** and also put on power saving mode.
- There are **display boards encouraging staff and students to save energy are put up in the classrooms and laboratories**.
- There are **no Ultra-violet lights and any other harmful lights used** in the premise.

4.3 Actual Electrical Consumption as per Bills

The admin department had shared the bills for Meter which is connected to all Buildings and is main source of energy supply. The supplier is Maharashtra State Electricity Distribution Company Limited (MSEDCL).

4.4 Survey Results

An online survey was conducted to analyse the student and staff views about the Energy management practices adopted in College, following is the result received.

4.4.1 Participation

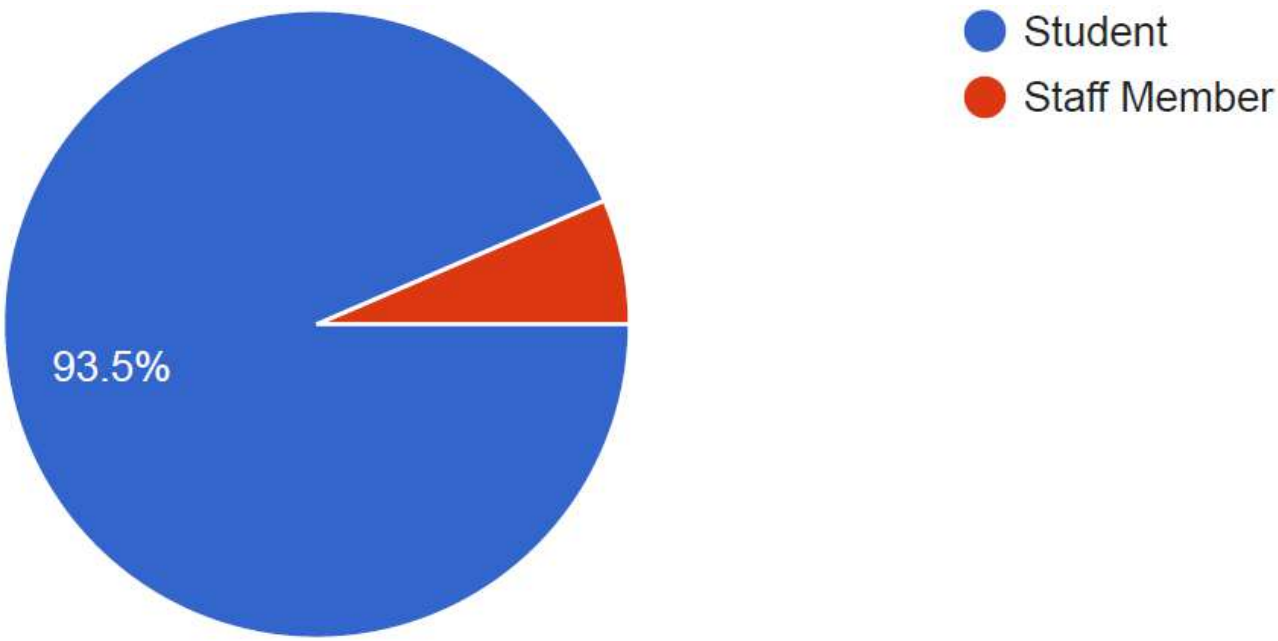

Figure 1: Participation analysis in the survey

A total of **217 responses** were received out of which 94% were students.

4.4.2 Review of the Energy management practices in the premises

Note: The Participants were asked to review the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses

(44.5%)

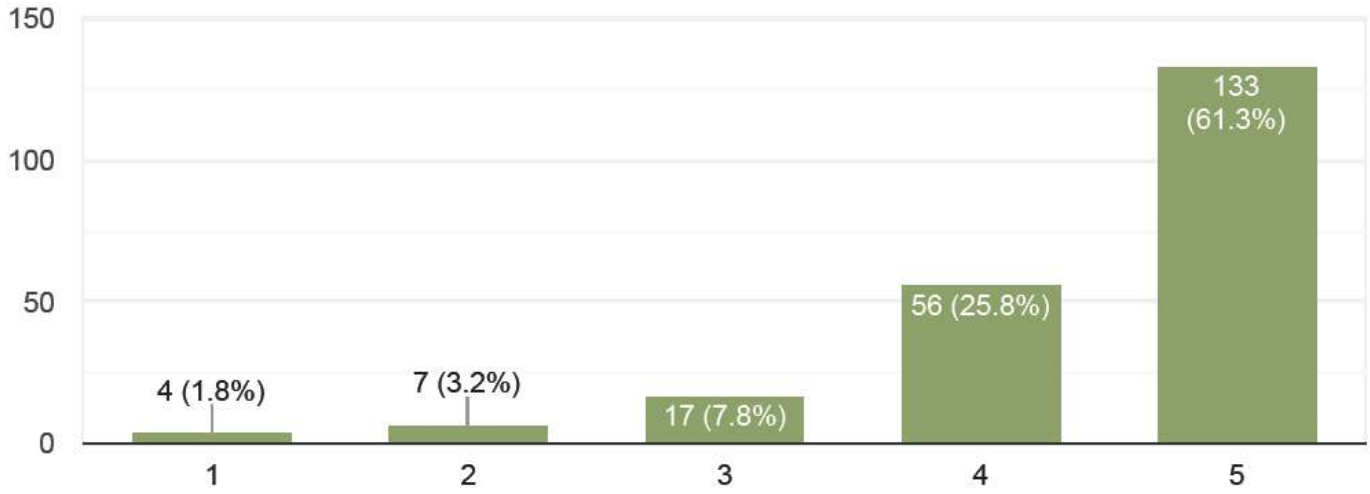

Figure 2: Energy management practices in College

The students, staff **(almost 61%) of the responses found the practices to be excellent** and **26% of the responses found practices to be good.**

4.5 Calculated Electrical Consumption as per inventory

The electricity bills provide actual consumption data. The following is the calculated consumption. It is done to understand the percentage of energy usage in the premises by various applications. It is based on the inventory collected and interviews with the staff. The additional data such as wattage is taken from market research. In terms of electrical consumption, the main sources are lights, fans, ac, equipment. The inventory and data collection for sources of energy consumed in the premise in summarised in the following sections.

Note: The following analysis is combined for entire premise taking into considerations the duration before pandemic to understand the consumption pattern as post pandemic the premise is used only for a few hours.

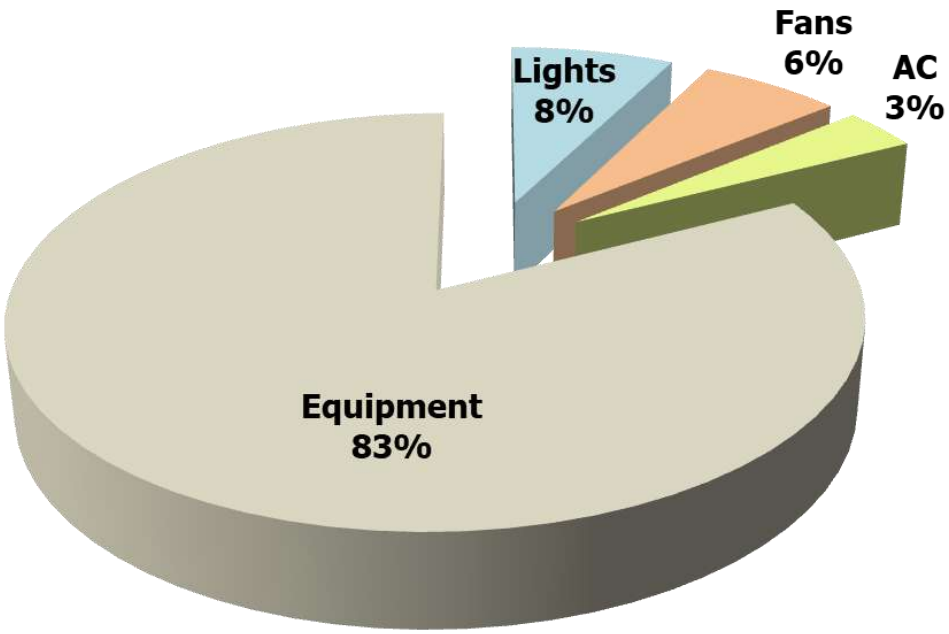

Figure 3: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consume 83% followed by lights at 8% the fans at 6% and the air conditioners consume 3% of the total calculated electrical energy.

4.6 Lights

4.6.1 Types of lights

There are a total of **123 lights in the premises;** the following table shows the various types of lights in the premises.

S. No.	Type	Nos.
1	CFL	4
2	Non-LED	83
3	LED	36
Total		**123**

Table 4: Summary of the types of lights in premise

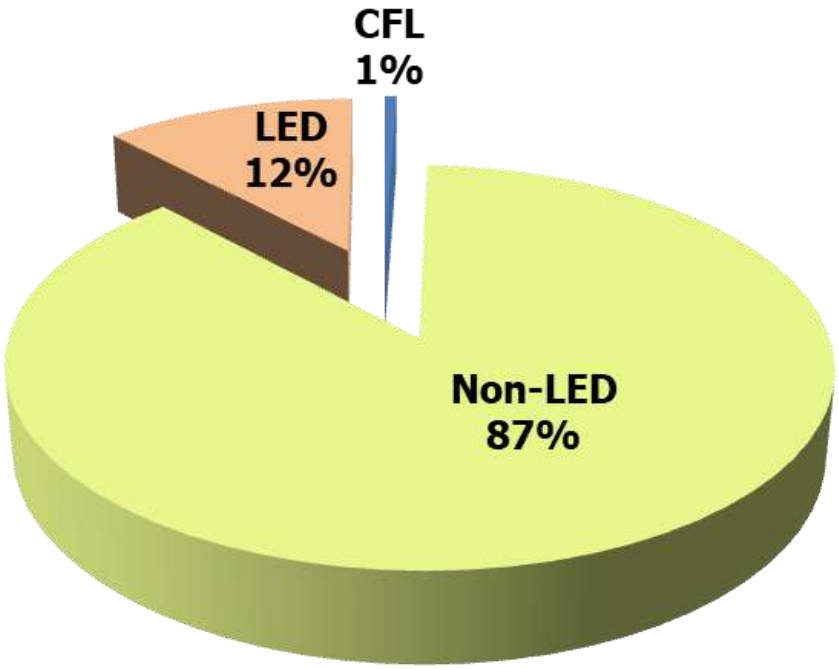

Figure 4: Energy consumed by types of lights in the premise based on the usage study

The analysis of the types of lights in premises shows **Non-LED lights 87%** followed by **LED lights consuming 12%** and **CFL lights consume 1%**

4.6.2 Block-wise consumption analysis

The energy consumption of lights is **3,565 kWh** of energy; the following graph shows the block wise consumption.

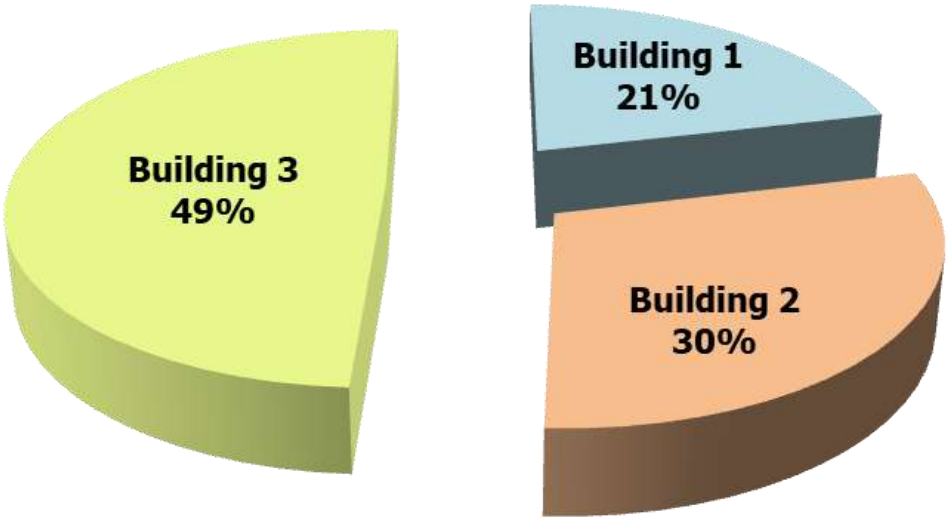

Figure 5: Energy consumed by lights block wise

The above analysis shows the lights in the **Building 3 consumes 49%; Building 2 consumes 30%** and **Building 1 consumes 21%** of the total power consumed by lights.

4.6.3 Requirement of NAAC

4.6.3.1 Alternative Energy Initiative

Percentage of power requirement met by renewable energy sources – There are no solar panels or any renewable energy sources, thus *0% of the power requirement is met and utilized in the premises.*

4.6.3.2 Percentage of lighting power requirement met through LED bulbs

The premise has LED Lights contribute to 29% in terms of number and **12% of the power requirement** is met through the same. As per our study we could conclude that both of these are highest contributions among all the types of lights.

4.6.4 Site investigation observations

Some of the points noticed are as follows:

1. All lights are in working conditions.
2. Daily monitoring and check is done by the maintenance staff.
3. There was no fuse defect observed.

4.7 Fans

4.7.1 Types of fans

There are a total of **100 fans** in the premises.

S. No.	Type	Nos.
1	Large motor exhaust fan	1
2	Small motor exhaust fan	4
3	Wall Mounted fan	1
4	Ceiling Fans	94
Total		**100**

Table 5: Summary of the types of fans in premise

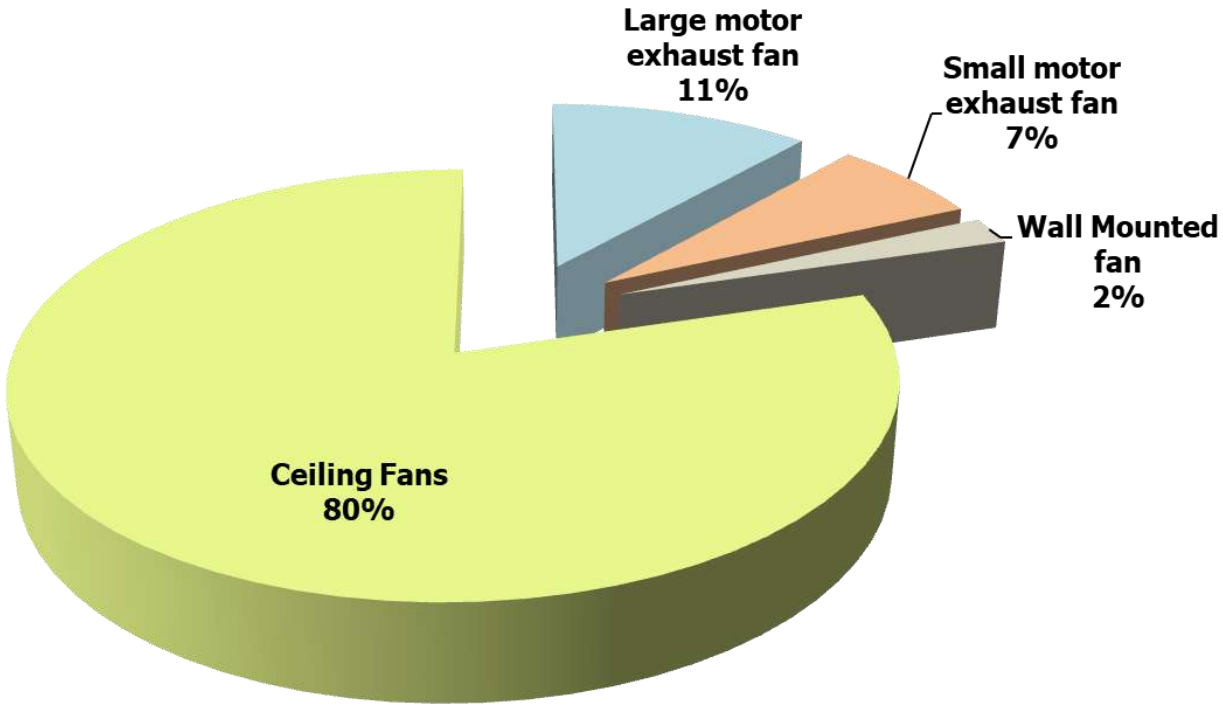

Figure 6: Energy consumed by types of fans in the premise based on the usage study

The analysis of the types of fans in premises shows **Ceiling fans 80%** followed by **Large motor exhaust fan consume 11%;** the **Small motor exhaust fan consume 7%** and the **Wall mounted fans consume 2%**

4.7.2 Block-wise consumption analysis

The energy consumption of fans is **3,084 kWh** of energy; the following graph shows the block wise consumption.

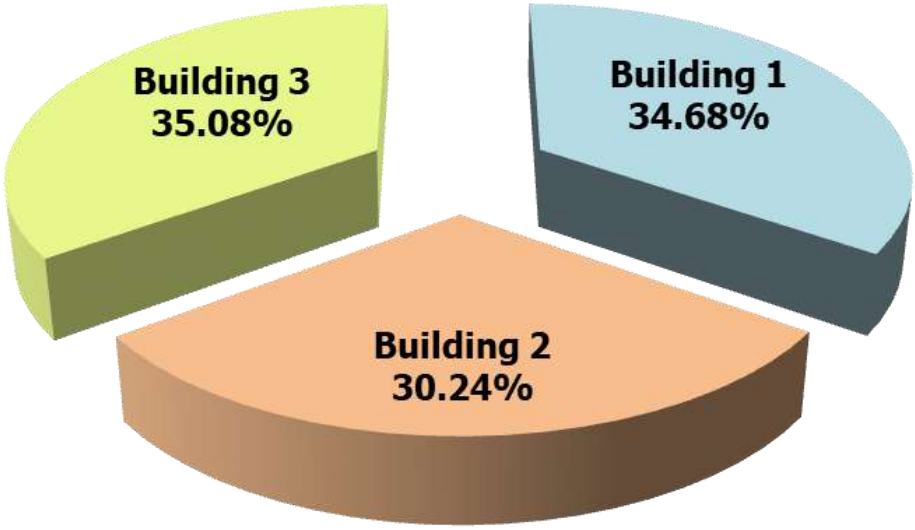

Figure 7: Energy consumed by fans block wise

The above analysis shows the fans in the **Building 3 consumes 35.08%; Building 2 consumes 34.68%** and **Building 1 consumes 30.24%** of the total power consumed by fans.

4.7.3 Site investigation observations

Some of the points noticed are as follows:

1. All fans are in working conditions.
2. Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.

4.8 Air conditioners

4.8.1 General information

There are **4 air conditioners** in the entire premise. two of these are located in Building 1 and two in building 2. The energy consumption of all air conditioners is **1,658 kWh** of energy.

4.8.2 Site investigation observations

Some of the points noticed are as follows:

1. Daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.
2. The Outdoor Unit is properly cleaned and maintained well.
3. The Outdoor Unit does not have any dust collection problem.

4.8.3 About the replacement of Current AC

The current air conditioners are well maintained, through there is not an immediate requirement for replacement however, whenever the College undergoes redevelopment or a new block is constructed there can be provisions for replacement with energy efficient appliances or new air conditioners that require less power consumption.

4.9 Equipment

4.9.1 Types of Equipment

There are a total of **219 equipment** in the premises. The various types are mentioned in the table below.

Sr. No	Floor	Building	Name	Nos
1	Ground floor	Building 1	Air Curtain	2
2	Ground floor	Building 1	Ampoule Filling Machine	6
3	Ground floor	Building 1	Analgesiometer	3
4	Ground floor	Building 1	Audio System (Mike, speakers, Amplifier)	3
5	Ground floor	Building 1	Autoclave	1
6	Ground floor	Building 1	Autoclave	1
7	Ground floor	Building 1	Bacteriological Incubator	1
8	Ground floor	Building 1	Bath Sonicator	1
9	Ground floor	Building 1	Brookfield Viscosity	1
10	Ground floor	Building 1	Centrifuge Machine	1
11	First floor	Building 1	Colony Counter	2
12	Ground floor	Building 2	Desktop Computer	1
13	Ground floor	Building 2	Desktop Computer	1
14	Ground floor	Building 2	Desktop Computer	1
15	Ground floor	Building 2	Desktop Computer	2
16	Ground floor	Building 2	Desktop Computer	1
17	Ground floor	Building 2	Desktop Computer	1
18	Ground floor	Building 2	Desktop Computer	1
19	Ground floor	Building 2	Desktop Computer	1
20	Ground floor	Building 2	Desktop Computer	1
21	Ground floor	Building 2	Conductometer	3
22	Ground floor	Building 2	Desktop Computer	1
23	Ground floor	Building 2	Disintegration appratus	1
24	Ground floor	Building 2	Disolution apparatus	1
25	Ground floor	Building 2	Disolution apparatus	1
26	Ground floor	Building 2	Dissolution Test Machine	1
27	Ground floor	Building 2	Distillation assembly	1
28	Ground floor	Building 2	Distillation unit	1
29	Ground floor	Building 2	Distillation unit	1
30	Ground floor	Building 2	Electric Water Bath	1
31	Ground floor	Building 2	Electric Water Bath	1
32	Ground floor	Building 2	Electrical Kettle	1
33	Ground floor	Building 2	Heating Mantle	1
34	Ground floor	Building 2	Heating mantle	1
35	Ground floor	Building 2	Heating Mantle	2
36	Ground floor	Building 2	Heating Mantle	1
37	Ground floor	Building 2	Heating Mantle	2
38	Ground floor	Building 2	Heating Mantle	1
39	Ground floor	Building 2	Homogeniser	1
40	Ground floor	Building 2	Hot Air Oven	2
41	Ground floor	Building 2	Hot Air Oven	2
42	Ground floor	Building 2	Hot Air Oven	2
43	Ground floor	Building 2	Hot Air Oven	1
44	Ground floor	Building 2	Hot Air Oven	1
45	Ground floor	Building 2	Hot Air Oven	1
46	Ground floor	Building 2	Incubator	1
47	Ground floor	Building 2	Induction Motor	1
48	Ground floor	Building 2	IR Moisture Balance	1

49	Ground floor	Building 2	Wifi router	1
50	Ground floor	Building 2	Wifi router	1
51	Ground floor	Building 2	Wifi router	2
52	Ground floor	Building 2	Wifi router	2
53	Ground floor	Building 2	Wifi router	6
54	Ground floor	Building 2	Wifi router	1
55	Ground floor	Building 2	Laminar Air Flow unit	1
56	Ground floor	Building 2	Laptop	1
57	Ground floor	Building 2	Laptop	1
58	Ground floor	Building 2	Laptop	1
59	Ground floor	Building 2	Laptop	1
60	Ground floor	Building 2	Laptop	1
61	Ground floor	Building 2	LCD Display	1
62	Ground floor	Building 2	Projector	1
63	Ground floor	Building 2	Magnetic Stirrer	1
64	Ground floor	Building 2	Magnetic Stirrer	2
65	Ground floor	Building 2	Magnetic Stirrer	1
66	Ground floor	Building 3	Mechanical Stirrer	1
67	Ground floor	Building 3	Mechanical Stirrer	1
68	Ground floor	Building 3	Microtone Cutter	1
69	Ground floor	Building 3	Microwave oven	1
70	Ground floor	Building 3	Mini Magnetic Stirrer	1
71	Ground floor	Building 3	Muffle furnace	1
72	Ground floor	Building 3	Oven	1
73	Ground floor	Building 3	Projector	1
74	Ground floor	Building 3	Photo Calorimeter	3
75	Ground floor	Building 3	Photo Electric Calorimeter	1
76	First floor	Building 3	PhotoFlorimeter	1
77	First floor	Building 3	Polarimeter	1
78	First floor	Building 3	Printer	1
79	First floor	Building 3	Printer	1
80	First floor	Building 3	Printer	1
81	First floor	Building 3	Projector	1
82	First floor	Building 3	Projector	1
83	First floor	Building 3	Projector	1
84	First floor	Building 3	Projector	1
85	First floor	Building 3	Refrigerator	1
86	First floor	Building 3	RO Water Machine	1
87	First floor	Building 3	Scanner	1
88	First floor	Building 3	Sealing Machine	1
89	First floor	Building 3	Sieve Shaker	39
90	First floor	Building 3	Sodium Vapour Lamp Transformer (Teknik)	1
91	First floor	Building 3	Student Organ Bath	1
92	First floor	Building 3	Student Organ Bath	1
93	Second floor	Building 3	Suction Pump	20
94	Second floor	Building 3	Suction Pump	1
95	Second floor	Building 3	Tablet Disintegration Apparatus	1
96	Second floor	Building 3	Tablet punching machine	1
97	Second floor	Building 3	Telephone	1
98	Second floor	Building 3	Telephone	1
99	Second floor	Building 3	Telthermometer	5
100	Second floor	Building 3	Thermostat	1
101	Second floor	Building 3	UV-spectrophotometer	1
102	Second floor	Building 3	UV-VIS Spectrophotometer	1
103	Second floor	Building 3	Vending Machine	1
104	Second floor	Building 3	Weighing Balance	1
105	Second floor	Building 3	Weighing Balance	1

106	Second floor	Building 3	Weighing Scale	1
107	Second floor	Building 3	Weighing Scale	1
108	Second floor	Building 3	Wifi router	1
109	Second floor	Building 3	Wifi router	1
110	Second floor	Building 3	Wifi router	2
111	Second floor	Building 3	Wifi router	1
112	Second floor	Building 3	Wifi router	1
113	Second floor	Building 3	Wifi router	1
114	Second floor	Building 3	Wifi router	1
115	General usage		CCTV	7
116			Scanner	2
117			RO Machine	1
118			Sanitary vending machine	1
119			Sanitary incinerator machine	1
120			Motor starter	2
Total				**219**

Table 6: Types of equipment in the premise as per the quantity

UPS (when used for electrical consumption else it is a battery backup and does not require electricity as an equipment).

4.9.2 Site investigation observations

Some of the points noticed are as follows:

1. All equipments are in working conditions and daily monitoring and check is done by the maintenance staff and admin staff in an excellent manner.
2. No defect was found in any equipment of electrical consumption.

4.10 Recommendations for a Sustainable Habitat

Over the time energy efficient appliances have been a boon not only to the energy saving parameters they adhere to but also the eco-friendly habits it helps to inculcate. The Institution such as Schools and Colleges are the best way to implement these initiatives. It creates awareness among the students at a young age. The Institutions also act as a symbol and representative of being an energy efficient premise.

Following the analysis we found are some of the suggestions which can be implemented for an energy efficient Institution. This would help in reduction of the current electrical consumption by a major percentage.

4.10.1 Electromechanical systems – Electrical and Lighting

Section 1 – Lights

Non-LED Lights

The current light analysis shows that Non-LED tube lights consume anywhere between 24W, 36W and 40W when in use; similarly the CFL lights consume more than 25 to 28W when is use; these should be replaced with LED lights which consume on an average 16-20W when in use.

Our technical analysis shows that there would be a reduction of an average of **71% reduction** in energy consumption through lights specifically as a part of the electro - mechanical system if all **Non-LED lights on all floors and blocks** are replaced with an energy efficient appliance whenever the College undergoes renovation.

Section 2 – Fans

Ceiling fans

The current Fans are in proper working conditions and maintained well. The ceiling fans are in more quantity and consume at least 60W when in use. These should be replaced with energy efficient fans consuming 32W when in use. Our detailed study states that is all the **ceiling fans in all Buildings** if replaced with star rated appliance results in a reduction of average of **47% reduction** in energy consumption if replaced with energy efficient appliance. It will be suggested to either replace these now if College can have certain plans else the replacement can be done when fans get damaged or are not in working condition.

Section 3 – Equipment

Desktop computers to laptops

Among all equipment it suggested to replace the desktop computers with laptops as this would be energy efficient. A normal desktop computer consumes on an average 250W and it is to be connected all time when it has to be used. On the contrary a laptop consumes 40W and has a battery backup which lasts up to 4 hours.

There is **an average 84% reduction** in energy consumption if replaced with energy efficient appliance which is a laptop in all the areas of Educational and Residential areas.

This replacement is however is dependent on a variety of factors as follows.

- Some of the senior staff members may be more convenient with computers, replacement with laptop might result in a change of the working patterns and hours which may affect the productivity.
- Laptops – in case are not handled with care such as if dropped unintentionally might result in data imbalance.
- Students who are not day scholars can use laptop as per their own convenience, whereas in common areas there can a monitoring about the usage hours hence computers may be a preferable option then laptop in certain spaces.
- Similarly depending on the pandemic situation in case it might be possible due to irregular usage the device might have issues while functioning.

Thus the University should analyse the above points and then devise a strategy about the replacement, essentially when the devices get damaged or are not in working condition they can surely be replaced.

As well as once they are not in working condition the proposed strategy should be linked towards e-waste management as well.


HOT AIR OVEN

5. Towards a Healthy & Sustainable Institution

5.1 Inputs by Greenvio Solutions

Based on the analysis of the study of premises in addition to the recommendations provided in each section of Ecological, Water, Waste and Energy Audit the College can adopt the following strategies towards a Healthy and Sustainable Institution practices.

a) **Cutlery in the Canteen –** The regular plastic and steel plates, spoons used in Canteen can be replaced with eco-friendly and organic leaves, paper straw, disposable plates, edible spoons and tables made out of sugarcane waste or bamboo. This will be first of its kind initiative to be adopted and practiced thus also inculcating the healthy practices in students.

b) **Additional fire safety -** Measures such as Hose reel, signages, fire-fighting tank, fire alarm and sprinkler system should be adopted.

c) **Signages –** In addition to the signages being in regular language there can be additional signages in braille language for the specially abled students.

5.2 Survey Results

An online survey was conducted to analyse the student and staff views about what changes according to you can be undertaken for Green audit improvement in College premise and activity. **Some of the suggestions are listed below:**

- *According to me college is doing a great job to make environment green.*
- Act, dramas have to take in order to enhance Awareness among people boost their enthusiasm for plantation to create wonderful atmosphere.
- Take webinars.
- Projects for planting trees can be taken by teaching staff as well as students & awareness programs can be arranged.

However, it should be noted that the College has taken up multiple initiatives and because of Pandemic the students have not practically visited the campus so many of these points are not mandatory at the moment.

6. References

1. Uniform Plumbing Code – India, 2008
2. IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
3. IGBC Green Landscape Rating system, March 2013
4. BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST - Canada
5. Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorizes vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.

Environment Audit

2019-20 & 2020-21

AUDIT REPORT

Studied for

Poojya Sane Guruji Vidya Prasarak Mandal's

College of Pharmacy

Shahada, Dist - Nandurbar,

Maharashtra, Pin Code: 425409, India

Analysed by

Greenvio Solutions

05 April 2022

Background reference image Nic Y C Gua on unsplash

Disclaimer

The Audit Team has prepared this report for the **Poojya Sane Guruji Vidya Prasarak Mandal's College of Pharmacy,** located at *Shahada, Dist - Nandurbar, Maharashtra, Pin Code: 425409, India* based on input data submitted by the College analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the Hon'ble Management and College. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The audit is a thorough study based on the inspection and investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who has completed audits of multiple Institutes including Technical, State University, Private University and Single Faculty Colleges for a total of more than 45 lakhs+ sq. ft. of Built-up area audited till date Pan India as an Accredited and Certified Green Building Professional-Architect; ISO Certified IA (IMS) Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

Palghar District, Maharashtra- 401208

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Acknowledgement

The Audit Assessment Team thanks the **Poojya Sane Guruji Vidya Prasarak Mandal's College of Pharmacy, Shahada District, Maharashtra** for assigning this important work of Environment Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Shri. Dipak Purushottam Patil,** President; **Shri. Jagdish Girdhar Patil,** Vice President; **Smt. Kamaltai Purushottam Patil,** Hon. Secretary; **Shri. Makarand Nagin Patil,** Coordinator (Academics & Gen.Admin.); **Shri. Pandurang Ramdas Patil,** Coordinator (Finance and Construction) and **everyone from the Management.**

Our heartfelt thanks to Chairperson of the entire process **Dr. Sunil Pandit Pawar,** Principal for the valuable inputs.

We are also thankful to **College's Task force the faculty members - Dr. Ghanshyam Chavan** for the excellent coordination; **Mrs. Sulbha Mahajan, Mr. Yogesh Rokade,** and **Mr. Roshan Chaudhari; Mr. Hasni Sayyed Hamid Yahiya,** Academic Incharge; **Mr. Sandip Amarsing Tadvi,** Exam Incharge and **Mr. D. D. Patil,** Office Superintendent

We highly appreciate the assistance of the Clerks - **Mr. Kalpesh Patil, Mr. Yogesh Patil** and the **entire Teaching, Non-teaching and Admin staff** for their support while collecting the data.

Sustainable Academe
Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About Poojya Sane Guruji Vidya Prasarak Mandal

Established in the year 1969, the Mandal has been serving the sacred cause of education in the remote, mofisil part of the State of Maharashtra. Though the jurisdiction of the Mandal is entire Maharashtra, it has concentrated on the Shahada Tehsil of the State and this tehsil is 450 kilometers away from the state capital (Mumbai), adjoining the confluence of Gujarat to the North side and Madhya Pradesh to the East.

This area is mainly populated with the economically socially backward, poor peasants & the landless adivasis. To educate the young generation of such poor section of society. The Mandal has the privilege to run Colleges of Arts, Commerce, Science, Education, Engineering streams and Polytechnic, Industrial Training Center, Pharmacy are the other units which the Mandal conducts.

The students have an opportunity to secure degrees like M.Phil. and Ph.D. in various subjects, B.A., B.Com., B.Sc., M.A., M.Com., M.Sc., B.E., B.Ed., B.Pharm., B.Sc. (Agri.) etc.

1.2 Statements of the Institution

Vision - To mould young generation to new technology of high order that can meet the challenges in fast developing technological world & to be prepare for the legal civic & moral responsibilities of the profession by shaping discipline, competence & character of the pharmacists.

Mission - To become center of excellence of pharmacy education & research to provide world class professionals & serve humanity at large.

1.3 About the Institution

P. S. G. V. P. Mandal's College of Pharmacy was established in the year 1994 by Honorable Sahakar Maharshi Shri. Annasaheb P. K. Patil with the objective *to educate, motivate and uplift the vocational skills of young generation of peasants and the landless workers.* This helps to upgrade the quality educational facilities in almost all the disciplines.

The College is a premier academic institution in this region, located in 200 acres sprawling

campus absolutely serene such that a student automatically turns himself to learning with full concentration and devoid of diversions.

The College provides for instruction in various under-graduate and post-graduate courses in the faculties of in the faculties of pharmacy. Today more than 400 students registered for pharmacy. The teaching faculty consists of 18 learned faculty members and experts in their own subject discharging their duties with a sense of dedication and devotion.

The aim of the College is *"Not only to prepare the undergraduate and post graduate students for their future success in life through a host of up-to-date courses in Pharmacy."*

The motto of the College is *"To create positive stress-free environment for students as well as for staffs and produce awareness regarding maintenance of pollution free environment."*

The objective of the College is *"To develop good human and moral values and create divine thought of national integrity among students and staffs."*

The College offers the following courses.

- **Diploma in Pharmacy (D. Pharmacy)**
  - Approved by PCI & AICTE, New Delhi,
  - Recognized by DTE & Govt. of Maharashtra
  - Affiliated by MSBTE, Mumbai (Maharashtra)
- **Bachelor of Pharmacy (B. Pharm.) - Departments (Pharmaceutics, Pharmaceutical Chemistry, Pharmacognosy and Pharmacology)**
  - Approved by PCI & AICTE, New Delhi,
  - Recognized by DTE & Govt. of Maharashtra
  - Affiliated by KBC NMU Jalgaon (Maharashtra)
- **Masters of Pharmacy (M. Pharm.)**
  - Approved by PCI & AICTE, New Delhi,
  - Recognized by DTE & Govt. of Maharashtra
  - Affiliated by KBC NMU Jalgaon (Maharashtra)

The College works towards training young men and women to be competent, committed and compassionate, and lead in all walks of life.

1.4 The surrounding premises around the Institution

The Premises is situated amidst the landscape serene of **Shahada district of Maharashtra State** with immense peace and calmness in the surroundings. *The College is locate very close to the Gomati river and has a huge ground adjacent to its location, it is situated amidst the Sister Institutes of the Mandal.*

The College is surrounded by Educational Buildings, huge open areas, Residential and Commercial areas on the macro front from all the sides. There is a frontal approach which provides quite a beautiful appreciation space while approaching the premises; this area is surrounded by huge trees which positively complement the background-foreground aspect in terms of Natural space and built-form Architecture. It also provides ample shade which enhances the micro climate of the region. The location of College is feasible to the nearby essential amenities such as Public Health Center, Fire Station, Civic body-Public administrative buildings, Recreational gardens and Police Station.

1.5 Assessment of the College

1.5.1 Approval

The College has received the relevant approvals from the following:

- **Pharmacy Council of India (P.C.I) -** A statutory body of government of India constituted under the Pharmacy Act, 1948, responsible for regulation of pharmacy education and practice of profession in the country for registration as a pharmacist.
- **All India Council for Technical Education (AICTE) -** A national-level Apex Advisory Body to conduct a survey on the facilities available for technical education and to promote development in the country in a coordinated and integrated manner.

1.5.2 Affiliations

The various courses provided by the College are affiliated to the following bodies:

- **Maharashtra State Board of Technical Education (MSBTE), Mumbai Maharashtra** - An autonomous Board of Government of Maharashtra mandated to regulate matters pertaining to Diploma Level Technical education in the state.
- **Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon,**

Maharashtra - A university situated in Jalgaon, Maharashtra. Formerly North Maharashtra University was established on 15 August 1990 after separating it from the parent University of Pune.

1.5.3 Recognition

The courses provided by the College are recognized by **Directorate of Technical Education (D.T.E.) and Govt. of Maharashtra.**

2. Institution overview

2.1 Populace analysis for Academic year 2019-20

2.1.1 Students data

The student data (shared by the College) shows there were a total of **212 Boys and 195 Girls** students thus **a total of 407 students** in the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	04	00	**04**
Teaching Staff	13	07	**20**
Non-Teaching Staff	16	00	**16**
Total Staff Members	**33**	**07**	**40**

Table 1: Staff data of the Institution for 2019-20

The staff data shows the premises had a total of **40** Staff Members.

2.2 Populace analysis for Academic year 2020-21

2.2.1 Students data

The student data (shared by the College) shows there were a total of **251 Boys and 211 Girls** students thus **a total of 462 students** in the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	04	00	**04**
Teaching Staff	13	06	**19**
Non-Teaching Staff	15	00	**15**
Total Staff Members	**32**	**06**	**38**

Table 2: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **38** Staff Members.

2.3 Total College Area & College Building Spread Area

The **total site area is 8 acres** and the **total Built-up area of College is 1,02,203.30 sq. ft.** for **a total of 500 footfalls.**

2.4 College Infrastructure

2.4.1 Establishment

The College is located pretty close to nature and hence has very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premises covers quite a few of the requirements for a Green Habitat.**

2.4.2 Spatial Organisation

The overall ambience of the College is warm and inviting. The classrooms and other spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the building is quite well designed. The colour palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture with the natural landscapes of huge trees all around. The design emphasis on providing calmness to the built form and gradually merges with the serene landscape. The floor to floor height is more than 10 feet. There is no provision for lifts in the premises, whereas there are amenities such as CCTV, Fire extinguishers, Library and first aid box.

2.4.3 Operation and Maintenance of the premises

The interview session with the staff regarding the operation and working hours is summarized in the table. The Institutions are open Monday to Saturday for full day.. The detail wise timing for each is mentioned below.

S. No.	Section	Spaces	Time	Hours/ day	Days in a year
1	Main Institutional College	Student areas and Teaching faculty	Monday to Saturday (10:00 a.m. to 05:00 p.m.)	7	280
2	General areas	Admin areas and library, Passage, staircase, toilet	Monday to Saturday (09:00 a.m. to 05:00 p.m.)	8	300

Table 3: Schedule of the timings of the premises

3. Green Building Study Audit

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution a sustainable and healthy premises for its inhabitants.

3.2 Analysis for the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the campus

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Scope to include Rain water harvesting and Waste water treatment in campus
- Waste Audit - Current waste produced, its segregation and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of campus
- Analysis of the flora and fauna of campus
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collected and preparation of the Report.

3.4 Timeline of the activities for Green Building Study Audit

- 17 January 2021 – Discussion with the College
- 19 January 2021 – Allotment and Initiation by the College
- 25 January 2022 – Survey of the Student and staff submitted
- 27 February 2022 – Data submitted by College
- 05 April 2022 – Submission of the Report

4. Site Study

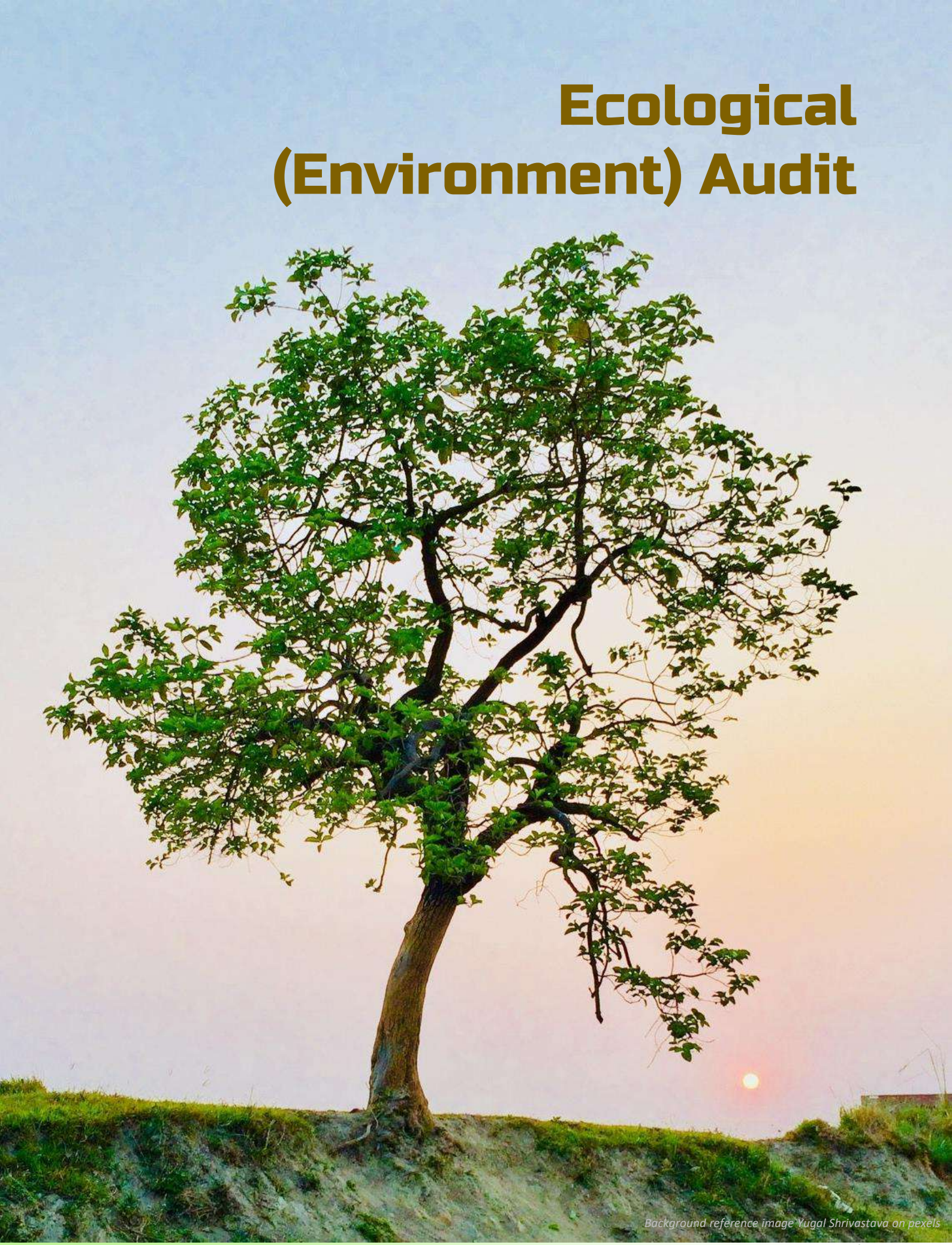
The following listed are some of the positive site elements which are beneficial to the college in terms of tangible and intangible benefits.

- **Location -** The the Poojya Sane Guruji Vidya Prasarak Mandal's College of Pharmacy is located at Shahada, Dist - Nandurbar, Maharashtra, Pin Code: 425409, India and falls under the Mhasala Nagar Panchayat.
- **Neighbourhood context -** The premises is surrounding by open spaces and Residential, Commercial and Educational areas on the immediate surroundings of the site.
- **Natural physical features –** The premises includes a rich biodiversity and huge number of plants in the adjacent open space. The site does not have major different in the land levels (contours).
- **Manmade features –** The premises is situated in a rural area amidst residential areas and open spaces with appropriate proximity to necessary amenities. There is sufficient appreciation space for entrance. The materials used for construction are RCC and the landscaping includes innumerable natural trees as well as potted plants.
- **Circulation –** There is a smooth transition of pedestrian traffic inside the premises due to the large entrance gate and the huge open space where vehicles of students and staff is parked.
- **Climate –** January is the coldest month, with an average high-temperature of 29.1°C (84.4°F) and an average low-temperature of 17.3°C (63.1°F). In Shahada, India, rain does not fall in January, February and December. Throughout the year, there are 107.4 rainfall days, and 515mm (20.28") of precipitation is accumulated. January, July, November and December, with an average maximum UV index of 6, are months with the lowest UV index. The least humid month is March, with an average relative humidity of 23%. March through November are months with rainfall in Shahada. March through May, with an average maximum UV index of 8, are months with the highest UV index in Shahada. The warmest month is May, with an average high-temperature of 40.5°C (104.9°F) and an average low-temperature of 27.3°C (81.1°F). With an average of 11.8h of sunshine, May has the most

sunshine of the year. With an average of 13.4h of daylight, June has the longest days of the year in Shahada. July is the month with the most rainfall. Rain falls for 27.5 days and accumulates 168mm (6.61") of precipitation. The month with the least sunshine in Shahada is July, with an average of 5.9h of sunshine. August is the most humid month in Shahada, India, with an average relative humidity of 81%. The month with the shortest days in Shahada, India, is December, with an average of 10.8h of daylight.

(Source: https://www.weather-atlas.com/en/india/shahada-climate)

Ecological (Environment) Audit



Background reference image Yugal Shrivastava on pexels

Greenvio Solutions

5. Ecological (Environmental) Audit

Environment is an essential part for human survival. We co-exist with the environment and it cannot be termed as a separate entity. The Ecological audit helps to understand the flora, fauna that exists and steps that can be taken to improve the same. To denote if there are problems related to sound in and around the surrounding. In terms of the carbon footprint it helps in keeping a tab on the eco-friendly habits incorporated by the inhabitants of the premises. Health today is the topmost priority, a general understanding of the initiatives undertaken along with sufficient hygiene practices adopted. Universal design is applicable to all built and unbuilt spaces.

As part of our study we could state that the Institution has developed eco-friendly practices and sustainable solutions which are well reflected in the rich biodiversity of the Premises. Being situated near the city the appreciation space towards the main entrance provides a welcoming approach to the College.

The college has huge open space used by all. The students use it as a leisure place for study and college ground is used for sports activities. There are ample resting spaces as part of building design which provide a resting and warm welcoming approach in the premises.

5.1 Open Spaces

There is a beautiful balance of natural and open spaces in the premises and the open/ vegetation spaces are balanced overall. The ground is used by students at present for sports and cultural gatherings. The design on the entire is such that the landscape and softscape spaces are very well oriented and located thus being extremely useful to Institutions in the site. **There are provisions for natural plantations which have enhanced the beauty of the space.**

There are adequate numbers of Maintenance staff allotted for the upgrading the open spaces and they have done an excellence job in terms of the duty allotted. The infrastructure committee too is involved in this process. The traditional tap and pipe facility is adopted for watering and the college has taken special provisions for the same. The spaces are watered daily in summer. T**he efforts to maintain the existing space are commendable.**

5.2 Flora and fauna audit

A flora survey was carried out to identify the total numbers of plants and trees. The landscape area has a variety of plantations constituting hundreds in numbers. Most of the trees have been planted by students, staff, management, Principal non-teaching staff, office staff on several occasions and also during the plantation drives. **A few trees have grown naturally and have been conserved at their respective locations to maintain the beauty of the premises. The flora herbs and shrubs are transient and perish after the life span. However, most of these herbs and shrubs exist in the premises.** The detail study of each type of plantations is as follows.

5.2.1 Trees analysis

S. No.	Plant name	Botanical Name	Planted by	Nos.
1	*Local Guggul*	*Comphora weightii*	Student	1
2	*Maradfali*	*Helicteres isora*	Staff	3
3	*Putrajiri*	*Putranjiva roxburgnii*	Staff	3
4	*Behada*	*Terminalia belerica*	Staff	3
5	*Arjuna*	*Terminalia arjuna*	Student	2
6	*Harada*	*Terminalia chebula*	Staff	2
7	*Nilgiri*	*Eucalyptus globulus*	Student	3
8	*Parijatak*	*Nyctanthes arbor-tristis*	Staff	3
9	*Sandalwood*	*Santalum album*	Staff	2
10	*Neem*	*Azadirachta indica*	Staff and Student	70
11	*Ashok*	*Polyalthia longifolia*	Staff and Student	100
12	*Amla*	*Phyllanthus emblica*	Staff	2
13	*Kumbha*	*Gardenia gummifera*	Staff	1
14	*Gulmohar*	*Delonix Regia*	Staff and Student	10
15	*bamboo*	*Bambusoideae*	Staff and Student	30
16	*Mango*	*Magnifera Indica*	Staff and Student	5
17	*Vad*	*Ficus benghalensis*	Staff and Student	4
18	*Peru*	*Peru balsam*	Staff and Student	4
19	*Sitafal*	*Annona Squamosa*	Staff and Student	4
20	*Pimpal*	*Ficus Relioga*	Staff and Student	10
21	*Royal Palm*	*Roystonea borinquena*	Staff and Student	20

Table 4: Details of the Trees in the premises

At present there are more than 21 types and 282 numbers of trees in the premises. The benefits of having trees in the premises are innumerable, some of the key benefits are providing shade, reduction in noise pollution by acting as noise barriers and maintaining the silence zones, interactive outdoor learning spaces, lowering the stress levels by staying connected with the nature and moreover the use of dried leaves to for organic composting.

5.2.2 Herbs and shrubs analysis

S. No.	Plant name	Botanical Name	Planted by	Nos.
		Herbs		
1	*Adulsa*	*Adhatoda vasika*	Staff	1
2	*Bixa*	*Bixa orellana*	Staff	1
3	*Gudwel*	*Tinospora cordifolia*	Staff	1
4	*Hadga*	*Sesbenia grandiflora*	Staff	1
5	*Jatropa*	*Jatropa carcus*	Staff	1
6	*Panfuti*	*Bryophyllum pinntum*	Staff	5
7	*Kali Nirgudi*	*Vitex negundo*	Student	3
8	*Shatavari*	*Asparagus recemosus*	Staff	2
9	*Sarpagandha*	*Rauwolfia serpentina*	Staff	1
10	*Bel*	*Alegle marmelos*	Naturally	4
11	*Raktaroda*	*Polygonum glabrum*	Staff	2
12	*Ashvagandha*	*Withania somnifera*	Student	1
13	*Kadipatta*	*Curry Leaves*	Student	4
		Plants		
1	*Sadafuli*	*Catharanthus roseus*	Studet	5
2	*Tulas*	*Ocimum sanctum*	Staff	6
3	*Hadjod / Kandwel*	*Cissus quadrangularis*	Staff	3
4	*Guggul*	*Commiphora wightii/ Commiphora mukul*	Staff	1
5	*Rosary pea/ Gunj*	*Abrus precatorius*	Staff	4
6	*Curry leaves*	*Murraya koenigii*	Staff	6
7	*Amaltash*	*Cassia fistula*	Student	1
8	*Shiwan*	*Gmelina asiatica*	Staff	1
9	*Plam lily*	*Cordilyte Fruticosa*	Staff	70
10	*Croton Pictus*	*Cidiaeum Variegatu*	Staff and Student	90

11	*Bottle Palm*	*Hyophorbe Lagenicaucis*	Staff	70
12	*Donsari Teega*	*Cacculus Hirsutus*	Staff	50
13	*Ficus*	*Ficus Benzaminia*	Staff	100
14	*Cycas*	*Cycadease*	Staff	4
15	*Draceana*	*draceana Frgrance*	Staff and Student	50
16	*Milli*	*Euphorbia Milli*	Staff and Student	50
17	*Oleander*	*Nerum Oleander*	Student	50
18	*clehrira*	*Clechira Almiflora*	Staff and Student	40
Shrubs				
1	*Kala Dhatura*	*Datura alba*	Staff	3
2	*Chitrak*	*Plumbago zeylanica*	Staff	3
3	*PendKuli*	*Jora Coccina*	Staff	5
4	*Cedor*	*Thuja Occidenta*	Staff	5

Table 5: Details of the herbs and shrubs in the premises

At present there are more than 13 types and 27 numbers of herbs' 18 types and 601 numbers of plants; 4 types and 16 numbers of shrubs in the premises. They are eco-friendly aesthetically pleasing and add to the landscape architecture of the premises. Timely maintenance with sufficient care has resulted in positive benefits for the surroundings.

5.3 Noise Audit

5.3.1 Macro level

On a macro level there are open grounds in the site. The approach road too has very minimal traffic. As the college is oriented amidst the residential areas with immense vegetation the noise levels do not affect the students and staff in their day to day functioning. The approach road too is pretty away. **Overall the noise level in terms of bad effect is extremely low and there are positive outcomes as per our analysis on macro level.**

5.3.2 Micro level

The college has an adequate open space covered with huge trees prevailing naturally in the premises which act as a noise barrier; in addition the Institution building is surrounded

by Residential Buildings which further act as a benefit in reducing any noise pollution. There are bare minimum parking provisions provided in the premises which causes bare minimum noise as they are situated near the entrance which is a bit away from the College building. The college has a generator which is used as per need arises, but located far away from the mail building, thus there is no inconvenience or sound problem caused due to the same. There are no particular equipments which cause any noise effect. **Overall the noise levels inside the premises are low which is a good approach.**

5.4 Carbon Footprint Audit

5.4.1 Eco-friendly Commuting Practices

Based on data collection and discussion with staff the following points were noted:

- **Ease of commuting –** Owing to close proximity to public transport the access is very feasible and walk able.
- **Parent's commute -** There are 2 Parent-teacher meetings held in a year and the turn-out is around 40-60%
- **Vehicles details** – The provision provided by College includes vehicle parking is allowed at present as follows.

S. No.	Type	Nos.	For (student/ Staff)
1.	Cars	5-8	Staff
2	Bikes	20-25	Staff and Students
3	Cycles	50-60	Students
4	Electric vehicles	0	Staff and Students

Table 6: Details of the Parking in the premises

- **Commute details** – The students and staff commute from multiple places.

5.4.2 Heat Island Reduction

The Institution has **adopted the following practices which are yielding positive results** in terms of Urban Heat Island Effect which refers to increase in temperature of the surrounding because of ineffective strategies.

- **Exposed roof areas –** The terrace is a flat roof which is absolutely clean and well

maintained. The Buildings are covered with white paint and the Maintenance staff along with Management have taken ample measures to maintain the same. **There was no weathering of roof observed.** The current practices are well maintained.

- **Exposed non-roof hardscape areas -** There are pathway on all sides of the premises. These include some natural and potted plantations along the pathways. However, the trees are huge and the canopy is wide spread thus providing ample shade to the outdoor areas of the premises. Hence, there are no direct sunrays or similar effect affecting the students and staff. The college has an open space in the form of lush green carpet which acts as a solution for the urban heat island effect. This huge green space is a very good solution for reducing any harmful health consequences which may arise due to harsh sunlight.

There are adequate measures adopted in the premises to reduce heat island effect of Building roofs and in site.

5.4.3 Outdoor Light Pollution Study

The college compound lights are not upward looking thus, these do not cause light pollution.

5.5 Universal Campus

As per World Report on Disability, 2011 there are 180 million approx. Persons with Disabilities that makes it 15% of total population of India.

There are Ramps, Handrails along staircase and low height risers in the Staircases as part of universal campus initiatives. The design of the premises is appropriate for access with passages and corridors being wide enough in size and naturally ventilated. The doubly and singly loaded corridors are safe from fire safety aspect. The college has resting places (seating areas) in the outdoor along the trees thereby making it user friendly for the especially abled students. **The college can have plans to install lift in future depending on the situation and facilities like addition of universal toilet.**

5.6 Fire Safety

The Institution has undertaken adequate fire safety measures. Each floor has an open staircase without any barriers for fire safety measures. These staircases are free of any kind of storage or combustible material. The windows in each classroom are at a low height with fresh air and natural light thereby adding to ample ventilation throughout the day. The college should adopt additional fire safety practices such as fire hydrant and others whenever the College undergoes further extension or renovation. The current facilities are however quite well maintained. **Our observation was that there are adequate Fire extinguishers in the premises.** Though, there can also be provision for additional fire safety signages.

5.7 Survey Results

An online survey was conducted to analyse the views about the premises, following are some of the reviews.

5.7.1 Participation

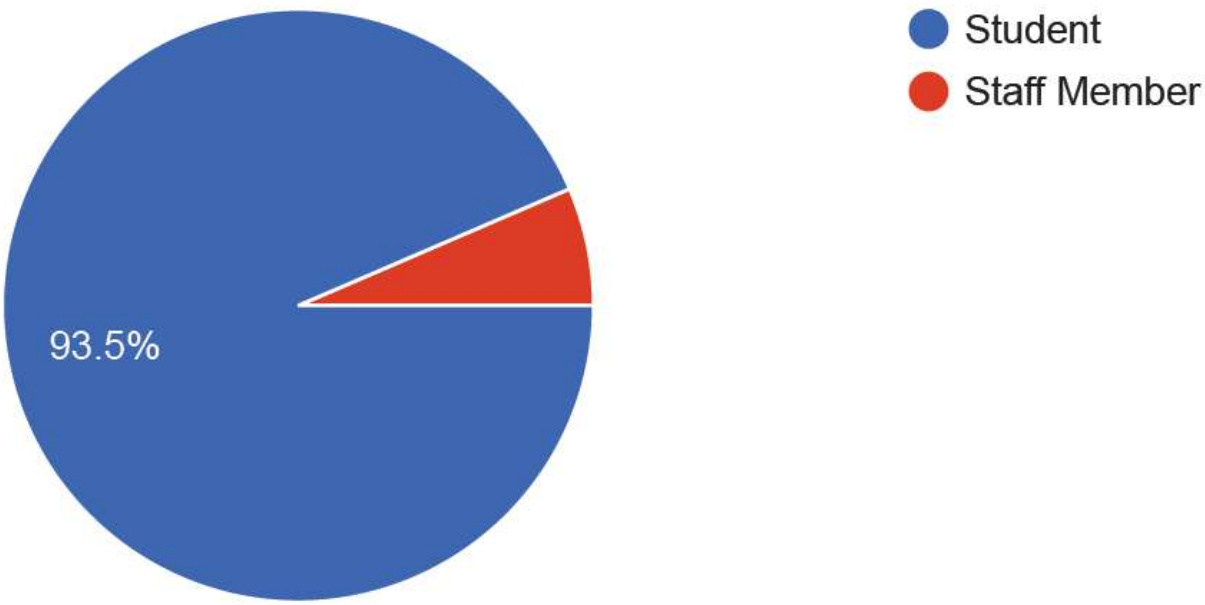


Figure 1: Participation analysis in the survey

A total of **217 responses** were received out of which 94% were students.

5.7.2 What according to you are the positive steps taken by the College towards Green Building/ Good maintenance?

We have listed some of the key responses below.

- Well, it is great to take step toward greenery and well fresh environment we should aware in plant trees.
- A clean premise with lot of greenery and water supply.
- **We are organising various plantation programs in college, teachers are encouraging students to make pollution free, clean, green environment, also emphasize on minimum consumption of electricity.**
- It was good experience that college is organising tree plantation programme
- **Routinely plantation programmes are arranged in our college and those plants are well maintained on daily basis by non-teaching staff of college.**

Trees are provided with good quality of manures and fertilizers.

- Our college maintains greenery also not only plant trees but also takes care of them grow and maintain them.
- **Good maintenance is done by institution.**
- To maintain the on the daily basis.
- Stop using disposable items. Buy second-hand, buy local, and re-sell.
- They should use to run the cleanliness program several times in a year to that we our college will become more beautiful.
- Social activities held by college.
- **According it's like planting more and more saplings and saving water by proper drainage the programs are conducted to aware students for planting more and more trees to prevent the environment.**

5.8 Positive site features as per our study

a) Avoid using plastic in premises

There are provisions for ban on the use of plastic bags or products in the Premises.

b) OPAC system

The system in the library is beneficial for the students.

c) Paperless technologies

The college has gone technology friendly and paperless in the functioning of the Premises.

d) Resting places

There are provisions for resting places in premises in outdoor and indoor.

e) Ample greenery

There are provisions for herbal garden, plenty of lawns with traditional trees and greenhouse in the premises.

a) User friendly movability in premises

There are provisions for Kerb Ramp near the main entrance of the Building premises, also low height hand rail for ease of access.

5.9 Recommendations for a Sustainable Habitat by Greenvio Solutions

Site beautification

a) Additional facilities for birds

There can be provision for drinking water and food facility for birds visiting in the College premise.

b) Nutrition pits

Certain pits can be demarcated as 'Nutrition pits' where the organic food from kitchen and Canteen fruit peels and fruits or vegetables can be degraded for making nutrition rich soil

Universal Campus

a) Universal Toilet

There should be minimum 1 toilet for the specially abled people as per guidelines prescribed by National Building Code 2016 with size being minimum or more than 1.5m x 1.5m

Pollution Control

a) Promote the use of Eco-friendly vehicles

There can be provision for battery operated vehicles/ low emission vehicles such as electrically driven vehicles parking in open space along with battery charge points, this would inspire students to change mode of transportation and adopt sustainable practices.

b) Bicycles as a gift

As an appreciation gesture may be the students toppers/ staff best performers can be awarded with a bicycle occasionally.

c) Avoid paper wastage through books

The College can collect all old semester notebooks; these can either be converted to reusable paper in the premises through a workshop or using shredder machine or handed over to vendor for making fresh paper. Additionally the Students can be motivated to undertake similar practice on an individual note.


Plant Trees

6. Towards a Healthy & Sustainable Institution

6.1 Inputs by Greenvio Solutions

Based on the analysis of the study of premises in addition to the recommendations provided in each section of Ecological, Water, Waste and Energy Audit the College can adopt the following strategies towards a Healthy and Sustainable Institution practices.

a) **Cutlery in the Canteen –** The regular plastic and steel plates, spoons used in Canteen can be replaced with eco-friendly and organic leaves, paper straw, disposable plates, edible spoons and tables made out of sugarcane waste or bamboo. This will be first of its kind initiative to be adopted and practiced thus also inculcating the healthy practices in students.

b) **Additional fire safety -** Measures such as Hose reel, signages, fire-fighting tank, fire alarm and sprinkler system should be adopted.

c) **Signages –** In addition to the signages being in regular language there can be additional signages in braille language for the specially abled students.

6.2 Survey Results

An online survey was conducted to analyse the student and staff views about what changes according to you can be undertaken for Green audit improvement in College premise and activity. **Some of the suggestions are listed below:**

- *According to me college is doing a great job to make environment green.*
- Act, dramas have to take in order to enhance Awareness among people boost their enthusiasm for plantation to create wonderful atmosphere.
- Take webinars.
- Projects for planting trees can be taken by teaching staff as well as students & awareness programs can be arranged.

However, it should be noted that the College has taken up multiple initiatives and because of Pandemic the students have not practically visited the campus so many of these points are not mandatory at the moment.

7. References

1. Uniform Plumbing Code – India, 2008
2. IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
3. IGBC Green Landscape Rating system, March 2013
4. BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
5. Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorizes vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation
6. Climate data https://www.weather-atlas.com/en/india/shahada-climate

Green Audit

2019-20 & 2020-21

AUDIT REPORT

Studied for

Poojya Sane Guruji Vidya Prasarak Mandal's

College of Pharmacy

Shahada, Dist - Nandurbar,

Maharashtra, Pin Code: 425409, India

Analysed by

Greenvio Solutions

05 April 2022

Background reference image Sasin Tipchai on unsplash

Disclaimer

The Audit Team has prepared this report for the **Poojya Sane Guruji Vidya Prasarak Mandal's College of Pharmacy,** located at *Shahada, Dist - Nandurbar, Maharashtra, Pin Code: 425409, India* based on input data submitted by the College analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National and International Standards; the report has been generated based on comparative analysis of the existing facilities and the prerequisites formulated by various standards. The inputs derived are a result of the inspection and research. These will further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole depending on the decision taken by the Hon'ble Management and College. The warranty or undertaking, expressed or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

The audit is a thorough study based on the inspection and investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied or regenerated in any form.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm with the Project Head - Ar. Nahida Shaikh who has completed audits of multiple Institutes including Technical, State University, Private University and Single Faculty Colleges for a total of more than 45 lakhs+ sq. ft. of Built-up area audited till date Pan India as an Accredited and Certified Green Building Professional-Architect; ISO Certified IA (IMS) Green Building consultancy is her forte and she is one of the most sought after names when it comes to providing excellent quality services within the stipulated time frame.

The Study is conducted in capacity of Accredited & Certified Green Building Professional with extensive experience.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

Palghar District, Maharashtra- 401208

sustainableacademe@gmail.com

Acknowledgement

The Audit Assessment Team thanks the **Poojya Sane Guruji Vidya Prasarak Mandal's College of Pharmacy, Shahada District, Maharashtra** for assigning this important work of Green Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Shri. Dipak Purushottam Patil,** President; **Shri. Jagdish Girdhar Patil,** Vice President; **Smt. Kamaltai Purushottam Patil,** Hon. Secretary; **Shri. Makarand Nagin Patil,** Coordinator (Academics & Gen.Admin.); **Shri. Pandurang Ramdas Patil,** Coordinator (Finance and Construction) and **everyone from the Management.**

Our heartfelt thanks to Chairperson of the entire process **Dr. Sunil Pandit Pawar,** Principal for the valuable inputs.

We are also thankful to **College's Task force the faculty members - Dr. Ghanshyam Chavan** for the excellent coordination; **Mrs. Sulbha Mahajan, Mr. Yogesh Rokade,** and **Mr. Roshan Chaudhari; Mr. Hasni Sayyed Hamid Yahiya,** Academic Incharge; **Mr. Sandip Amarsing Tadvi,** Exam Incharge and **Mr. D. D. Patil,** Office Superintendent

We highly appreciate the assistance of the Clerks - **Mr. Kalpesh Patil, Mr. Yogesh Patil** and the **entire Teaching, Non-teaching and Admin staff** for their support while collecting the data.

Sustainable Academe
Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About Poojya Sane Guruji Vidya Prasarak Mandal

Established in the year 1969, the Mandal has been serving the sacred cause of education in the remote, mofisil part of the State of Maharashtra. Though the jurisdiction of the Mandal is entire Maharashtra, it has concentrated on the Shahada Tehsil of the State and this tehsil is 450 kilometers away from the state capital (Mumbai), adjoining the confluence of Gujarat to the North side and Madhya Pradesh to the East.

This area is mainly populated with the economically socially backward, poor peasants & the landless adivasis. To educate the young generation of such poor section of society. The Mandal has the privilege to run Colleges of Arts, Commerce, Science, Education, Engineering streams and Polytechnic, Industrial Training Center, Pharmacy are the other units which the Mandal conducts.

The students have an opportunity to secure degrees like M.Phil. and Ph.D. in various subjects, B.A., B.Com., B.Sc., M.A., M.Com., M.Sc., B.E., B.Ed., B.Pharm., B.Sc. (Agri.) etc.

1.2 Statements of the Institution

Vision - To mould young generation to new technology of high order that can meet the challenges in fast developing technological world & to be prepare for the legal civic & moral responsibilities of the profession by shaping discipline, competence & character of the pharmacists.

Mission - To become center of excellence of pharmacy education & research to provide world class professionals & serve humanity at large.

1.3 About the Institution

P. S. G. V. P. Mandal's College of Pharmacy was established in the year 1994 by Honorable Sahakar Maharshi Shri. Annasaheb P. K. Patil with the objective *to educate, motivate and uplift the vocational skills of young generation of peasants and the landless workers.* This helps to upgrade the quality educational facilities in almost all the disciplines.

The College is a premier academic institution in this region, located in 200 acres sprawling

campus absolutely serene such that a student automatically turns himself to learning with full concentration and devoid of diversions.

The College provides for instruction in various under-graduate and post-graduate courses in the faculties of in the faculties of pharmacy. Today more than 400 students registered for pharmacy. The teaching faculty consists of 18 learned faculty members and experts in their own subject discharging their duties with a sense of dedication and devotion.

The aim of the College is *"Not only to prepare the undergraduate and post graduate students for their future success in life through a host of up-to-date courses in Pharmacy."*

The motto of the College is *"To create positive stress-free environment for students as well as for staffs and produce awareness regarding maintenance of pollution free environment."*

The objective of the College is *"To develop good human and moral values and create divine thought of national integrity among students and staffs."*

The College offers the following courses.

- **Diploma in Pharmacy (D. Pharmacy)**
  - Approved by PCI & AICTE, New Delhi,
  - Recognized by DTE & Govt. of Maharashtra
  - Affiliated by MSBTE, Mumbai (Maharashtra)
- **Bachelor of Pharmacy (B. Pharm.) - Departments (Pharmaceutics, Pharmaceutical Chemistry, Pharmacognosy and Pharmacology)**
  - Approved by PCI & AICTE, New Delhi,
  - Recognized by DTE & Govt. of Maharashtra
  - Affiliated by KBC NMU Jalgaon (Maharashtra)
- **Masters of Pharmacy (M. Pharm.)**
  - Approved by PCI & AICTE, New Delhi,
  - Recognized by DTE & Govt. of Maharashtra
  - Affiliated by KBC NMU Jalgaon (Maharashtra)

The College works towards training young men and women to be competent, committed and compassionate, and lead in all walks of life.

1.4 The surrounding premises around the Institution

The Premises is situated amidst the landscape serene of **Shahada district of Maharashtra State** with immense peace and calmness in the surroundings. *The College is locate very close to the Gomati river and has a huge ground adjacent to its location, it is situated amidst the Sister Institutes of the Mandal.*

The College is surrounded by Educational Buildings, huge open areas, Residential and Commercial areas on the macro front from all the sides. There is a frontal approach which provides quite a beautiful appreciation space while approaching the premises; this area is surrounded by huge trees which positively complement the background-foreground aspect in terms of Natural space and built-form Architecture. It also provides ample shade which enhances the micro climate of the region. The location of College is feasible to the nearby essential amenities such as Public Health Center, Fire Station, Civic body-Public administrative buildings, Recreational gardens and Police Station.

1.5 Assessment of the College

1.5.1 Approval

The College has received the relevant approvals from the following:

- **Pharmacy Council of India (P.C.I) -** A statutory body of government of India constituted under the Pharmacy Act, 1948, responsible for regulation of pharmacy education and practice of profession in the country for registration as a pharmacist.
- **All India Council for Technical Education (AICTE) -** A national-level Apex Advisory Body to conduct a survey on the facilities available for technical education and to promote development in the country in a coordinated and integrated manner.

1.5.2 Affiliations

The various courses provided by the College are affiliated to the following bodies:

- **Maharashtra State Board of Technical Education (MSBTE), Mumbai Maharashtra** - An autonomous Board of Government of Maharashtra mandated to regulate matters pertaining to Diploma Level Technical education in the state.
- **Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon,**

Maharashtra - A university situated in Jalgaon, Maharashtra. Formerly North Maharashtra University was established on 15 August 1990 after separating it from the parent University of Pune.

1.5.3 Recognition

The courses provided by the College are recognized by **Directorate of Technical Education (D.T.E.) and Govt. of Maharashtra.**

2. Institution overview

2.1 Populace analysis for Academic year 2019-20

2.1.1 Students data

The student data (shared by the College) shows there were a total of **212 Boys and 195 Girls** students thus **a total of 407 students** in the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	04	00	**04**
Teaching Staff	13	07	**20**
Non-Teaching Staff	16	00	**16**
Total Staff Members	**33**	**07**	**40**

Table 1: Staff data of the Institution for 2019-20

The staff data shows the premises had a total of **40** Staff Members.

2.2 Populace analysis for Academic year 2020-21

2.2.1 Students data

The student data (shared by the College) shows there were a total of **251 Boys and 211 Girls** students thus **a total of 462 students** in the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	04	00	**04**
Teaching Staff	13	06	**19**
Non-Teaching Staff	15	00	**15**
Total Staff Members	**32**	**06**	**38**

Table 2: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **38** Staff Members.

2.3 Total College Area & College Building Spread Area

The **total site area is 8 acres** and the **total Built-up area of College is 1,02,203.30 sq. ft.** for **a total of 500 footfalls.**

2.4 College Infrastructure

2.4.1 Establishment

The College is located pretty close to nature and hence has very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premises covers quite a few of the requirements for a Green Habitat.**

2.4.2 Spatial Organisation

The overall ambience of the College is warm and inviting. The classrooms and other spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the building is quite well designed. The colour palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture with the natural landscapes of huge trees all around. The design emphasis on providing calmness to the built form and gradually merges with the serene landscape. The floor to floor height is more than 10 feet. There is no provision for lifts in the premises, whereas there are amenities such as CCTV, Fire extinguishers, Library and first aid box.

2.4.3 Operation and Maintenance of the premises

The interview session with the staff regarding the operation and working hours is summarized in the table. The Institutions are open Monday to Saturday for full day.. The detail wise timing for each is mentioned below.

S. No.	Section	Spaces	Time	Hours/ day	Days in a year
1	Main Institutional College	Student areas and Teaching faculty	Monday to Saturday (10:00 a.m. to 05:00 p.m.)	7	280
2	General areas	Admin areas and library, Passage, staircase, toilet	Monday to Saturday (09:00 a.m. to 05:00 p.m.)	8	300

Table 3: Schedule of the timings of the premises

3. Green Building Study Audit

3.1 About the Green Building Study Audit

It is a systematic study of the aspects which make the Institution a sustainable and healthy premises for its inhabitants.

3.2 Analysis for the Green Building Study Audit

The procedure included detailed verification for the following:

Energy Audit

- Analysis of the Lights, Fans, AC, Equipment
- Renewable energy
- Scope for reducing the current energy bills if any
- Improvement in the thermal comfort of the campus

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Scope to include Rain water harvesting and Waste water treatment in campus
- Waste Audit - Current waste produced, its segregation and usage; Strategies to be adopted for waste management and awareness

Environmental Audit

- Analysis of the current landscape + hardscape of campus
- Analysis of the flora and fauna of campus
- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

3.3 Strategy adopted for Green Building Study Audit

The strategies included data collection from admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collected and preparation of the Report.

3.4 Timeline of the activities for Green Building Study Audit

- 17 January 2021 – Discussion with the College
- 19 January 2021 – Allotment and Initiation by the College
- 25 January 2022 – Survey of the Student and staff submitted
- 27 February 2022 – Data submitted by College
- 05 April 2022 – Submission of the Report

Green practices

Background reference image Free photos on pixabay

Greenvio Solutions

4. Green Practices Audit

The increasing global warming and climate change have made us realise that apart from the enormous strategies the individual small efforts need to be taken by individuals and Educational Institutes as the younger generations are the future of the world and once they are taught about these practices only then can we assume a better future.

4.1 Green practices

We observed the following points during the Site investigation and data verification of the premises; these are common for all the Buildings in the premises.

- **Architecturally designed landscaped garden spaces; Waste management.**
- There is **availability of open space in the premise in addition to the provision of the multiple varieties of flora.**
- **Car-pooling, cycling to college practice are observed by the staff and students.**
- There is **composting process carried out for decomposition of organic matter of plants and it is used as an organic fertilizer and increase ecology.**
- The NSS Team, College authorities **jointly conduct initiatives for upgrading of the premises from environmental view.**
- Fresh environment is maintained and upgraded by the presence plants. **These vegetation benefit the users by providing shade.**

4.2 Community Development

The various community development programs conducted include Tree Plantation, Life Learning, Employability Skill program introduced for the youth, Blood Donation Camp, Food Kit Distribution Program to the neighbourhood community, Relief fund programs.

A lot of efforts are involved right from planning to execution. The main motive behind these is social welfare. This kind of a though process is highly admirable. We respect and congratulate the Institute for the same.

4.3 Eco-friendly initiatives undertaken

The Institution has undertaken the following initiatives through **excellent efforts** towards save environment measures before pandemic.

4.3.1 Environment initiatives undertaken by the College

The college has undertaken the following activities:

- **Green army tree plantation programme** on 20 June 2020.
- **Green army tree plantation programme** on 17 July 2019.
- **Green army tree plantation programme** on 20 July 2019.
- **Green army tree plantation programme** on 24 July 2019.

It is very much evident that the College takes full efforts to spread awareness and provide outreach for sections of events such as Gender Equality, Health, Eco-efficiency, National significance. However, due to lockdown more social events could not take place.

4.3.2 General activities Conducted by NSS and NCC unit

There are National Service Scheme units in the College. The N.S.S Programme Officers of the College have been working as a team with dedication for many activities.

- Cleaning campaign in the society.
- Afforestation through tree plantation.
- Creating awareness of such issues as social problems, education and cleanliness.
- Awareness Rallies about environment, cleanliness
- Organization of health camps, Street plays.

4.4 Survey Results

An online survey was conducted to analyse the student and staff views about the Energy management practices adopted in College, following is the result received.

4.4.1 Participation

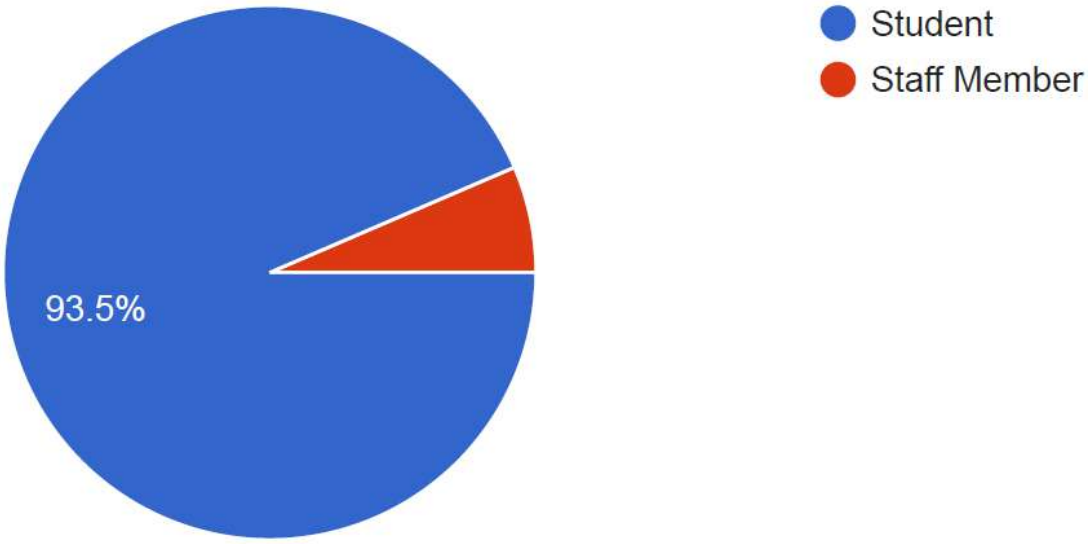


Figure 1: Participation analysis in the survey

A total of **217 responses** were received out of which 94% were students.

Note about the review-rating survey

The Participants were asked to review (Though an online mode) the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

4.4.2 Rate the Green awareness practices in College

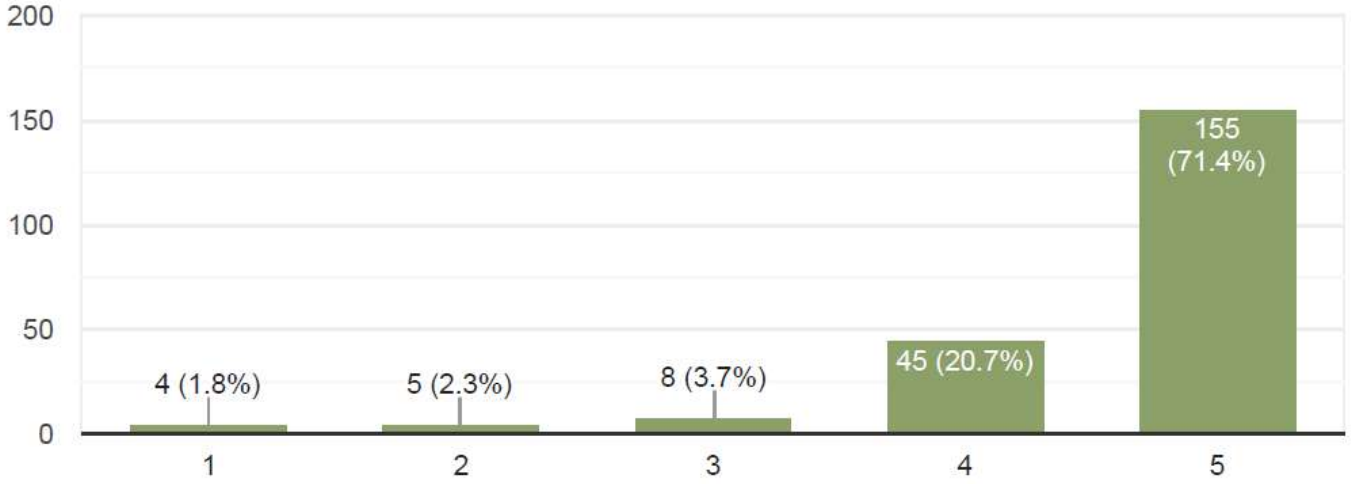


Figure 2: Green awareness practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 71%** followed by **21% for rating 4 (Very good).**

4.4.3 Does your College conduct environment awareness programs/ webinars/ plantations/ cleanliness or similar programs?

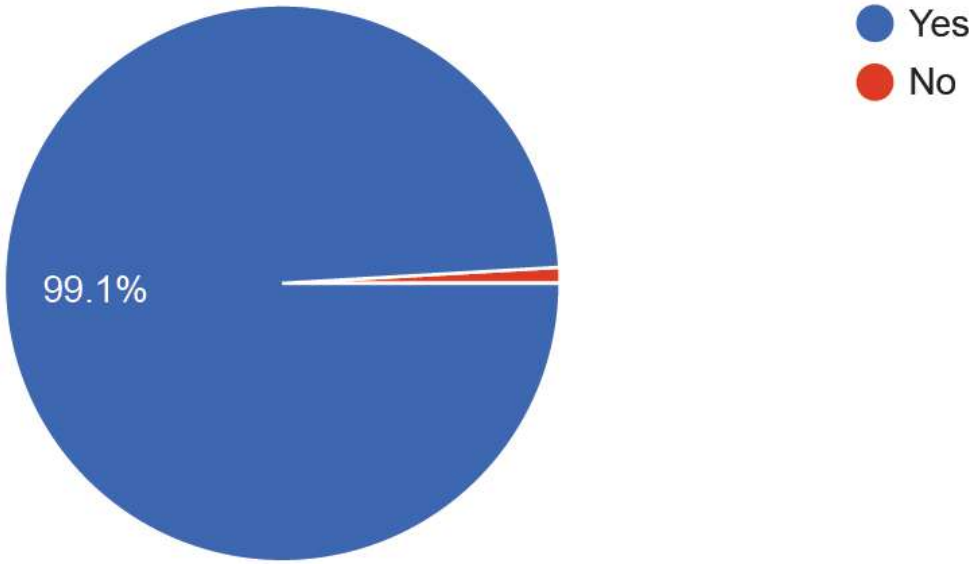


Figure 3: Confirmation of the environment awareness programs/ webinars/ plantations/ cleanliness or similar programs conducted by the College

The students, staff **99%** of responses confirmed activities are conducted, **, this is excellent and the college should continue its efforts.**

4.4.4 Do you participate is such events?

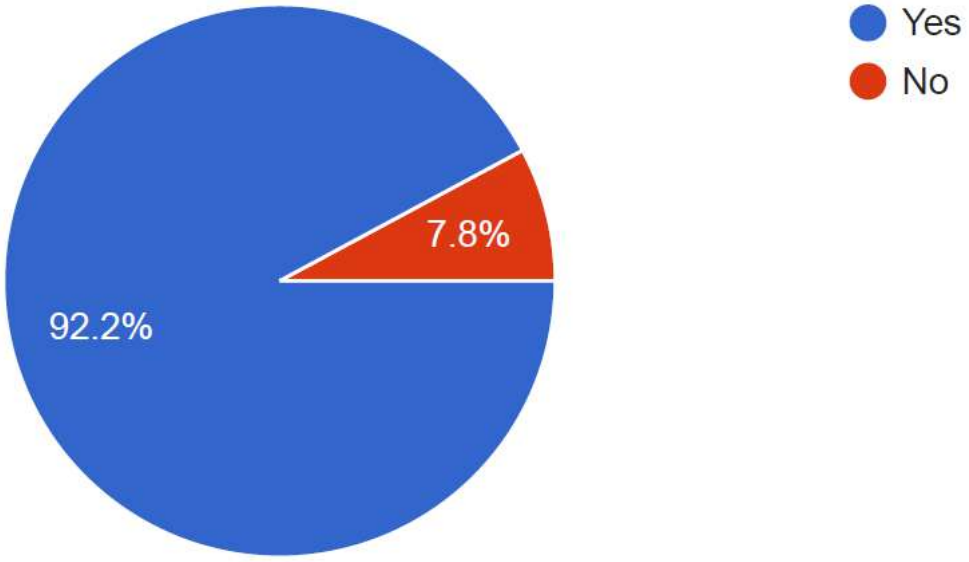


Figure 4: Participation in the environment awareness programs/ webinars/ plantations/ cleanliness or similar programs conducted by the College

The students, staff **almost 92%** of the responses confirmed their participation, **this is excellent and the college should continue its efforts.**

4.4.5 If yes, what has been your experience about the program?

We have listed some of the key responses below.

- Very good programs conducted by the college we get lots of knowledge releted to environmental awareness.
- **It was very good experience. The program organised by college always spread a good massage for everyone, to do better on your level, to save your surrounding and safe environment.**
- Good. Very nice
- Such awesome experienced nature is alway be a greenery.
- It was nice and helpful experience. Felt good by doing such programs.
- **It s been nice being an nature enthusiastic i always want to adore the nature and i must tell that mine college has been up to mark in nature management the seminars and project works bring lot of positiveness among students to consume and save the nature which is the mother earth.**

4.5 Recommendations for a Sustainable Habitat by Greenvio Solutions

a) Plant as a gift

As a kind gesture the guests visiting the premise can be asked to plant a small plant in the premise itself and they can be even given plants/ bouquet from the flowers of the plants in the premise as a gift.

b) Environmental awareness

There can be various artworks on compound wall giving message of saving environment through the joint efforts of the students and staff thereby making the student socially and environmentally responsible citizen.

c) Tree adoption scheme

The college can adopt One Faculty – One tree adoption scheme which is one of its kind practice, this can be very beneficial especially during the summer season.

d) No vehicle day

Once in a while a No vehicle day can be adopted by students and staff to promote the use of eco-friendly vehicles in the premise.

e) Signages on the plants mentioning scientific names

The practice of having the names of each plant and tree will provide awareness among the staff and students.

f) Government initiatives

The college can take up initiatives such as Swachh Bharat Abhiyan, cleanliness drives in college and surrounding villages also activities such as capacity building of locals in surrounding villages by college students.

Waste Audit

Background reference image Polina Tankilevitch on pexels

Greenvio Solutions

5. Waste Audit

Waste is an inevitable part of our lives. Over the years as the awareness about waste management techniques has given a rise to rethink how the waste can be avoided form being sent to the landfills. The audit provides an approximation of the types of waste generated, location of waste collections, disposal techniques used, waste segregation methodologies adopted, waste management strategies that are and implemented in addition to the newer ways the can be adopted aiming to make the premise clean and sustainable. Here sustainable refers to a broader aspect to analyse whether the current techniques are having positive or negative effect on the stakeholders of the premises.

5.1 Waste produced

5.1.1 Types and disposal of waste in Premises

The detailed study with current and proposed methods of disposal are summarised below:

S. No.	Type of waste	Source and quantity	Current Disposal method	Can be treated/ recycled?	Methodology
1	Solid waste	Toilets–Biodegradable waste of 15-20 kg per week	Led in the storm water drains	Yes	TREATED - Small biogas plant can be proposed in open space
2	Paper waste	Newspaper and other paper	Sold to vendor	Yes	CONTINUE - with the current practice
3	E-waste	Computers - Non-biodegradable waste as per the annual year usage	Given to vendor	Yes	CONTINUE - with the current practice
4	Dry waste in form of leaves	Open space & plantations, papers - Non biodegradable waste of 8-10 kg per week	Vermicomposting is under progress	Yes	CONTINUE - with the current practice
5	Liquid waste (Black-grey)	Toilets, washbasins – Around 100 – 120 litres per week during general times and 50 litres at present	Led to the storm water drain and garden	Yes	TREATED - Waste water treatment plant a well as continue with current practice of reuse in garden
6	Labs liquid waste	Waste water from labs	Autoclaved and led into storm water drains	Yes	Can continue with same practice, in future STP can be setup
7	Organic regular waste	Dust, dirt usually dry waste from Canteen and all sources – approx. 3 to 5 kg	Vermicomposting is under progress	Yes	CONTINUE - with the current practice

Table 4: Summary of the types of waste produced in the premises

5.2 Waste handling

Quantification wise as per Interview and survey it was found the following type of waste is Solid, Liquid, Hazardous Waste, Dry leaves, E-Waste, Canteen waste, Unused Equipment and Others (Sanitary Napkins) waste is collected. The waste produced on premises is segregated. It is collected on a weekly basis. The waste is handed over to the local municipality van.

5.3 Waste management

The College reuses the papers. Ample measures are taken to maintain hygiene. No smell problem or health related issues due to the waste are there. There are adequate numbers of bins present in all parts of building. The waste does not pollute the ground or surface water. There is no problem of air pollution from waste as informed. The wastes from toilets are discharged to main drains through underground covered channels (Safety Tanks) thus avoiding any incident. There is provision for Sanitary Napkin Disposal Machine in the premises for proper & hygienic disposal of sanitary napkins.

The information shared by the college stated the following method has been adopted and is in practice at present :

- *Compost has been prepared of size 3X3 meter tank and with depth of 3 meters*
- *The biodegradable waste plants, trees leaves and other biological waste has been collected and stored in the tank,*
- *It is allowed to degrade with the help of biogenic decomposer and maintained routinely*
- *these manually prepared compost fertilizer is utilized for plants and trees of garden.*
- *There is no income from this compost; we are utilizing it for the growth of plants of our College.*

As per our analysis the current practices are good, however there is scope for improvement.

5.4 Survey Results

Note about the review-rating survey

The Participants were asked to review (Though an online mode) the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

Rating for the views regarding the Waste management practices adopted in College, following is the result received.

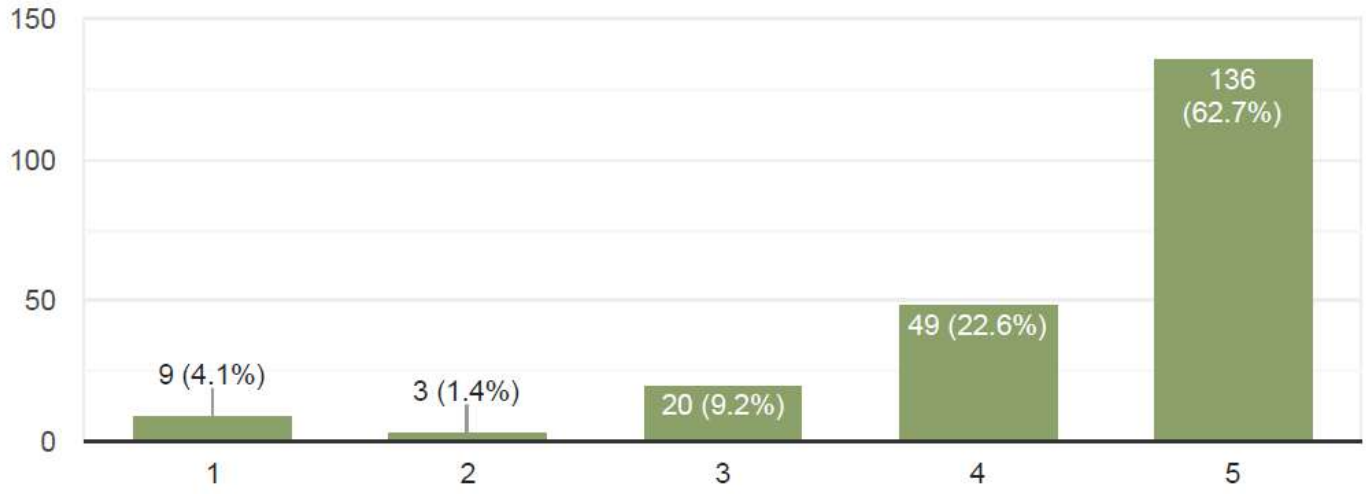


Figure 5: Waste management practices in College

There were mixed responses received the equal also the highest was for **rating 5 (Excellent) for 63% and rating 4 (Very good) at 23%**

5.5 Recommendations for a Sustainable Habitat

The following practice can be adopted for further up gradation.

a) Zero Waste practice adoption

The College can undertake a zero organic waste protocol. The following practices can be adopted as part of the same.

- The food waste generated by the students and staffs are taken by them to their own home, so that, minimum waste is generated inside the premises.
- The organic waste generated in the canteen is used as feed for a biogas plant and the biogas is used as fuel in College canteen.
- Vegetable waste and other leaf litters can be used to fed in the vermi-compost pit and the resulting vermin-cast is used as manure in the garden.
- The chemicals from the laboratories be disposed in a sealed tank along with water, so that the chemicals undergo neutralization with the water.

As part of the above there will be a requirement for a Biogas plant, vermin-compost pit, awareness signages, sealed tank for waste water from chemical laboratory.

b) Twin Dual Litter Dustbin Bins

There should be more number of dual litter dustbins at various locations in areas such as Canteen, open spaces. This would inculcate the awareness of waste segregation among students.

c) Dustbins at every 100m

There should be dustbin at every 50-100 in the open spaces

Water Audit

Background reference image Vlad Chetan on pexels

Greenvio Solutions

6. Water Audit

Water is one of the basic needs. Pure drinking water is a resource which needs to be preserved efficiently. Water audit helps to identify the sources of water consumption, the water requirement by the campus met by these sources. The points and effective usage of without any wastage. Understanding the techniques which are best suited to the site to increase water conservation in terms of awareness and practice.

6.1 Water availability and consumption

6.1.1 Sources of Primary water supply

The main source of water for drinking purpose is through the Local Municipality. These are available as follows:

S. No.	Type	Nos.	Capacity in litres (each)	Total capacity
1	Water Tank on Building no. 3	4	1,000	4,000
2	Water Tank on Building no. 1	1	1,500	1,500
3	Water Tank on Building no. 2	2	500	1,000
Total		**8**	**-**	**6,500 litres**

Table 5: Details of the water tanks in the premise

6.1.2 Sources of Secondary water supply

Bore well and wells – There is 2 Bore well available on the site which are used as underground water facility with daily water being pumped for using submersible pumps. On a daily basis water is pumped from per well for usage depending on the need.

Rain water harvesting – The colleges have rain water harvesting facility at all corners of building. The total rain water percolates to the ground and not in any tanks. In the College premise normal water storage tanks and pump set are available.

6.2 Water requirement

The main areas of water requirement and type of usage is as follows

- **Drinking water –** Consumption of around 1,000 litres of water through RO water plant available in the premise, the taps and water cooler.
- **Toilet blocks**– General usage by occupants in toilets, urinals, bathrooms, wash basins using approx. 500 litres of water daily
- **Cleaning of the premises –** The entire Institution is very well maintained with respect to hygiene and cleaning is one of the major uses of water requirement. The toilet areas are cleaned twice on a daily basis.
- **Garden and surrounding open space** – Cleaning, watering the plants requires approximately more than good amount of water, keeping in mind the scale of the open spaces there is supply system connected directly and the plants, trees are hardly watered regularly. Though, they are watered on alternate days in winter season and about 2-3 times a day in summer season on a regular climate day it is watered 3 days a week and in rainy season it is dependent on the monsoon showers. The regular tap and a pipe system is practiced at present.

6.3 Areas of water usage

Based on the inventory done and data shared by the staff it was found that the premise has the following facilities:

- Urinals – 10 Nos.
- Toilets – 5 Nos.
- Wash basins – 99 Nos.
- Taps (Indoors) – 201 Nos.
- Taps (Outdoors) – 10 Nos.

As per the data shared by the College and on site observation, it was noted that there is no water wastage of water in the form of Cleanliness of toilets.

6.4 Site investigation about water management.

The College has an excellent management system which is very appreciable. We have observed the following points.

- There is **no water leakage in the entire premise;** the pipes are well maintained with adequate hygiene.
- **The premise has an efficient water management in terms of operations and maintenance.**
- The toilets are kept very tidy and are cleaned every day.
- The **waste water does not mix with ground water and gets directed to storm water drains.**
- **The College has natural rainwater harvesting system which is very useful.**
- There are sufficient number of taps in the premise.

6.5 Survey Results

Note about the review-rating survey

The Participants were asked to review (Though an online mode) the practice on a scale of 1-5 with scale components as follows:

- Scale 1 – Poor
- Scale 2 – Satisfactory
- Scale 3 – Good
- Scale 4 – Very good
- Scale 5 – Excellent

The figures in each of the columns of graph depict the Number of participants responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

Rating for the views regarding the Water management practices adopted in College, following is the result received.

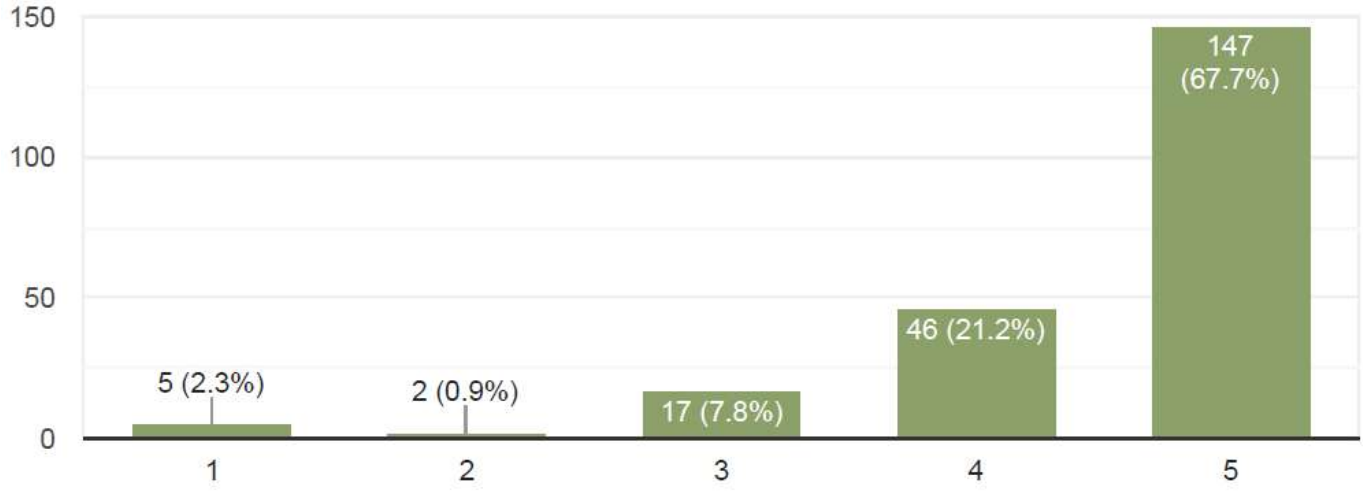


Figure 6: Water management practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 68%** followed by **21% for rating 4 (Very Good).**

6.6 Recommendations for a Sustainable Habitat

Below mentioned are few suggestions for better water management practices in the premise.

a) Waste water from toilets

This should be collected and a waste water treatment plant can be installed in the open space wherein this water can be treated and reused for gardening and toilet flushing.

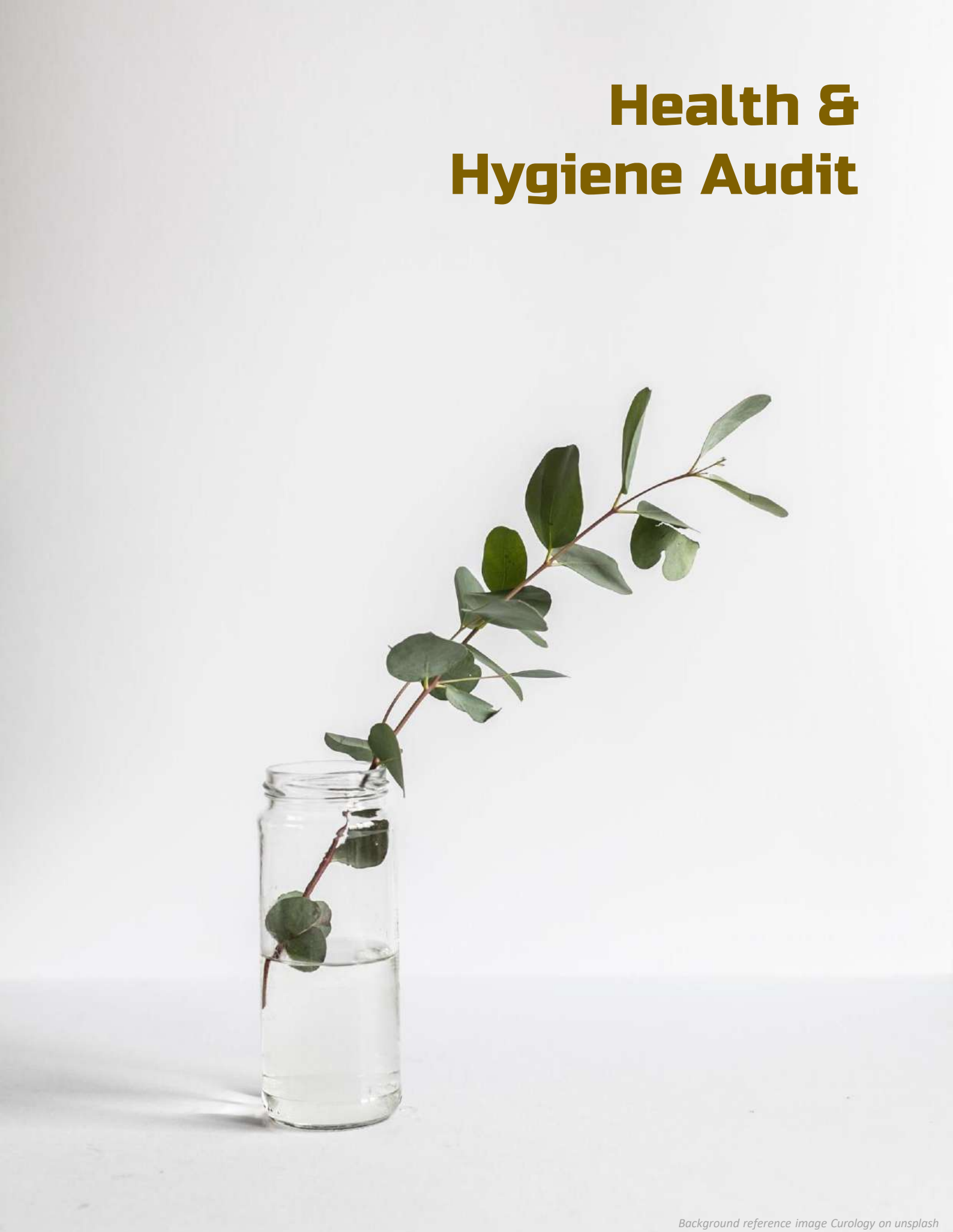
b) Waterless urinals

There can be provision of waterless urinals as a Green Building initiative in the premise, either the existing ones can be replace with such a facility of new toilets can be constructed in this manner.

c) Water flow stopper

The water flow stopper should be installed to avoid overflow and smart use of system. Install water-saving shower heads or flow restrictors. No leakage anywhere in premises. Water lawn only when it needs it.

Health & Hygiene Audit



Background reference image Curology on unsplash

Greenvio Solutions

7. Health and Hygiene Audit

The hygiene is a part and parcel of our daily life. It is extremely essential to keep the surroundings clean in the same manner as we would want our houses to be. Educational Institutes have a bigger role to play in order to affect the young minds in the positive manner through better hygienic practices.

7.1 Facilities available

The Institution has the following facilities as part of the premise.

- Washroom facility in each of the Building.
- Hand wash facility
- Drinking water facility in the form of Water coolers and taps
- Ample number of dustbins in the premise

7.2 Smoke Exposure

As per the Site visit the following analysis **has a positive impact on premises.**

- The College has No Smoking on its compound wall as part of the awareness.
- Canteen uses Gas cylinders for cooking, there is no utilisation of fire wood. Thus **there is no smoke from burning of fire wood and any health issues related to the same.**
- The **garbage in premise is not burnt** and there is not air pollution because of it.
- The Institution is a tobacco and smoke free campus which helps in adapting to a Healthy Institution
- There is parking provision inside the campus there is slight issue of dust owing to the same but it is **balanced with the good vegetation in the premise.**

7.3 Hygiene

As per the Site visit the following analysis **has a positive impact on premises.**

- For overall hygiene of the students and staff there are facilities such as Washroom facility on ground floor, hand wash. The hygiene of toilet areas is well

maintained. **The entire premises is cleaned twice on a daily basis. It is very appreciating that there are only few Maintenance staff who strive their best to take care of the entire premise in the most excellent way possible.**

- The staffs keep a regular check about the operation and maintenance of the equipments each floor.
- Water management initiative with appropriate hygiene is undertaken. The areas of water tanks in site on ground floor are clean and no mosquito breeding spots are there.
- There are pest controls program practiced with appropriate sanitation facilities done by local municipality on seasonal basis to avoid seasonal diseases.
- The food premises and equipments are cleaned as per schedule with special care taken to avoid any water stagnation. The food waste and other refuse are removed periodically from food handling areas to avoid accumulation.
- As part of Tree Plantation programme the initiative of **Swachh Bharat Abhiyan of Govt. of India** is undertaken during various occasions.
- There are appropriate storage areas which are well maintained.

7.4 On-site investigation

During the physical verification of the site, the following points were noted.

- All the facilities are cleaned on a daily basis.
- The Maintenance staffs are allotted the responsibility of the washroom hygiene and they do a very commendable and excellent job to maintain hygiene of the premise.

7.5 Recommendations for a sustainable habitat

As per site verification for this audit the efforts of the College are highly appreciable as they are very well maintained. However, the college should practice pest control programs with appropriate sanitation facilities through an appropriate agency.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8. Towards a Healthy & Sustainable Institution

8.1 Inputs by Greenvio Solutions

Based on the analysis of the study of premises in addition to the recommendations provided in each section of Ecological, Water, Waste and Energy Audit the College can adopt the following strategies towards a Healthy and Sustainable Institution practices.

a) **Cutlery in the Canteen –** The regular plastic and steel plates, spoons used in Canteen can be replaced with eco-friendly and organic leaves, paper straw, disposable plates, edible spoons and tables made out of sugarcane waste or bamboo. This will be first of its kind initiative to be adopted and practiced thus also inculcating the healthy practices in students.

b) **Additional fire safety -** Measures such as Hose reel, signages, fire-fighting tank, fire alarm and sprinkler system should be adopted.

c) **Signages –** In addition to the signages being in regular language there can be additional signages in braille language for the specially abled students.

8.2 Survey Results

An online survey was conducted to analyse the student and staff views about what changes according to you can be undertaken for Green audit improvement in College premise and activity. **Some of the suggestions are listed below:**

- *According to me college is doing a great job to make environment green.*
- Act, dramas have to take in order to enhance Awareness among people boost their enthusiasm for plantation to create wonderful atmosphere.
- Take webinars.
- Projects for planting trees can be taken by teaching staff as well as students & awareness programs can be arranged.

However, it should be noted that the College has taken up multiple initiatives and because of Pandemic the students have not practically visited the campus so many of these points are not mandatory at the moment.

9. References

1. Uniform Plumbing Code – India, 2008
2. IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
3. IGBC Green Landscape Rating system, March 2013
4. BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
5. Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorizes vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.