ENERGY AUDIT

STUDY PERIOD (TWO YEARS) 2020-2021 AND 2021-2022

Sustainability study

AUDIT REPORT

Studied for

Shri Yogeshwari Education Society's

Swami Ramanand Teerth Mahavidyalaya

Parli Road, Ambajogai,

District Beed, Maharashtra – 431517

Studied in the capacity of

An accredited & Certified Green Building Professional

Studied by

Greenvio Solutions

Valid till January 2024

Background reference image Janko Ferlic on pexels

Disclaimer

The Audit Team has prepared this report for the **Shri Yogeshwari Education Society's Swami Ramanand Teerth Mahavidyalaya** located at *Parli Road, Ambajogai, District Beed, Maharashtra – 431517* based on input data submitted by the Institute and analyzed 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 a 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.

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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 is an Accredited and Certified Green Building Professional-Architect; I.A.(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 incapacity of an 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

Acknowledgment

The Audit Assessment Team thanks the **Shri Yogeshwari Education Society's Swami Ramanand Teerth Mahavidyalaya, Maharashtra, India** 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 **Dr. S.T. Khursale,** Chairman; **Adv. S.T. Karhad**, Vice-Chairman; **Mr.K.S. Chousalkar**, Vice-Chairman; **Mr. G.B. Vyas**, Secretary; **Mr. M.S. Lomte**, Treasurer; **Adv.V.K. Chousalkar**, Sr. Advisor and everyone from the Management.

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

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Cycle	First	Second	Third
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Table 1: NAAC Accreditation details of the Institute

The College is due to enter its Third cycle of NAAC.

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The College has participated in the National Institute's Ranking Framework (NIRF) rankings.

1.4 Academic status of the College

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- **Graduation**
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2. Institution overview

2.1 Populace analysis for the Academic year 2021-22

2.1.1 Students data

The student data (shared by the Institute) shows there were **a total of 502 Boys and 284 Girl students thus a total of 786 students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	04	00	**04**
Teaching Staff	21	07	**28**
Non-Teaching Staff	09	00	**09**
Total Staff Members	**34**	**07**	**41**

Table 2: Staff data of the Institution for 2021-22

The staff data shows the premises had a total of **41** Staff Members.

2.2 Populace analysis for the Academic year 2020-21

2.2.1 Students data

The student data (shared by the Institute) shows there were **a total of 609 Boys and 313 Girl students thus a total of 922 students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	03	00	**3**
Teaching Staff	23	9	**32**
Non-Teaching Staff	09	00	**9**
Total Staff Members	**35**	**09**	**44**

Table 3: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **44** Staff Members.

2.3 Total Institute Area & Institute Building Spread Area

The **total site area is 9.6 acres** and the **total Built-up area of the Institute is 29,988 sq. ft.** for **a total of 827 footfalls.**

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in 1972.

2.4.2 Spatial Organisation

There are provisions for staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc. The Institute is located pretty close to nature and hence has a very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building.

2.5 Operation and Maintenance of the premises

The interview session was held with the staff regarding the operation and working hours. The Institution is open from Monday to Saturday with the timings being 9:00 am to 4:00 pm.

3. Green Building Study as a Research based technical 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 of 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 premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Rainwater harvesting and Wastewater treatment on the premises.
- 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 the premises
- Analysis of the flora and fauna of the premises
- 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 the admin department, actual inventory, investigation to check the operation and maintenance, analysis of the data collection, and preparation of the Report.

3.4 Activities undertaken for the Green Building Study Audit

- 21 December 2022 - Allotment and Initiation by the Institute
- 22 December 2022 - Process of data collection initiated
- 26 December 2022 - Site visit at the Institute
- 13 January 2023 - Submission of the files

Discussion with the Core Team

On-site review with the team for site management, green wall and other features

Group photo with the Team

4. Energy Audit

4.1 Sources of Energy consumption

The sources of energy consumption in a building comprise Lighting, Refrigeration, Ventilation, Cooling, Computers, Office equipment, cooking, space-eating, water heating, and others. For study purposes, the sources are divided into primary and secondary sources, where the primary is considered for the generation and consumption purposes and secondary sources are additional sources used as an alternative backup. The study emphasizes the consumption patterns, strategies adopted at present, and recommendations that can be implemented to improve the power consumption and utilization pattern. The following mentioned are sources of consumption and production.

4.1.1 Primary sources

- **Electrical (Metered)** – This source studies the elements which are connected through a metered system of electrical consumption. Light, fans, air conditioners, equipment, and pumps are the consumers that comprise this category.
- **Renewable (Solar)** – There are sources of renewable energy available at present in the form of solar hot water heaters system.

4.1.2 Secondary sources

UPS and Batteries– These are utilized in the administrative and academic areas; these are used a backup system.

4.2 Site investigation analysis

The data investigated and collected through interviews are summarised below:

- The **Maintenance Staff, Lab Attendants switches off all equipment** regularly after their appropriate usage.
- All the **computers are shut off after use** and also put on power-saving mode.

4.3 Utility bill audit

4.3.1 General observations as per discussion

The solar panels are installed near the hostel areas; however very minimum energy usage facility is availed by the College. Certain measures should be taken for improvement in future.

4.3.2 Documentation of the data

The admin department had shared the bills for Meter which is connected to all Buildings and is main source of energy supply. The details of meter wise unit consumption of the electricity generated showed that around Rs. 66,000/- is spent annually as an expense.

4.4 Survey Results

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

4.4.1 Participation

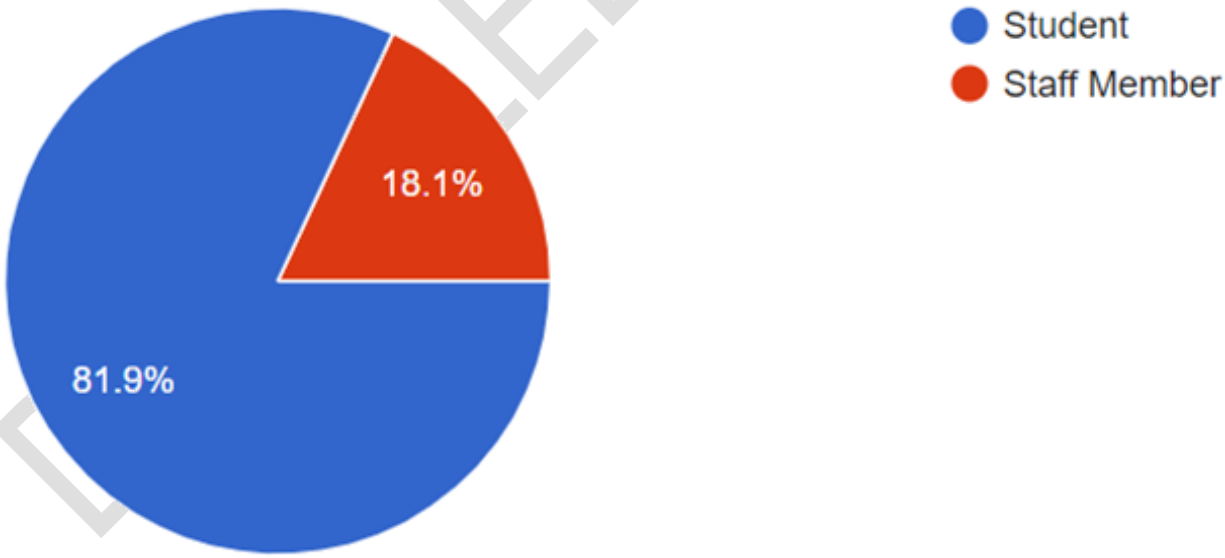


Figure 1: Participation analysis in the survey

A total of **72 responses** were received out of which 82% 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 the graph depict the Number of participant's responses in numerical (Percentage of the participant response) – For example 101 responses (44.5%)

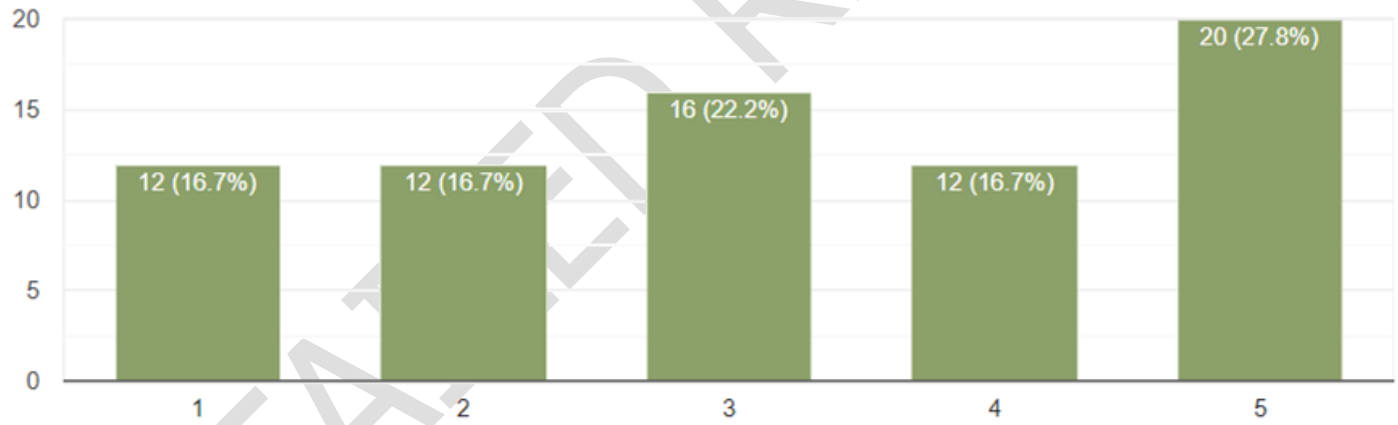


Figure 2: Energy management practices in Institute

Observation: The students and staff *almost 28% of the respondents* found the practices to be Excellent (Rating of 5); whereas *almost 17% of the respondents* found the practices to be Very Good (Rating of 4); and *22% of the respondents found the practices to be Good (Rating of 3).*

Inference: Though the majority responses received is less than 50% which has been given to 'Rating of 5' thus given the populace of the Institute this section requires a lot of improvement.

4.5 Calculated Electrical Consumption as per study

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 collection 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, air conditioners, and equipment. The inventory and data collection for sources of energy consumed in the premise are summarised in the following sections.

Note: The following analysis is combined for the entire premise taking into consideration the duration before the pandemic to understand the consumption pattern on a regular day.

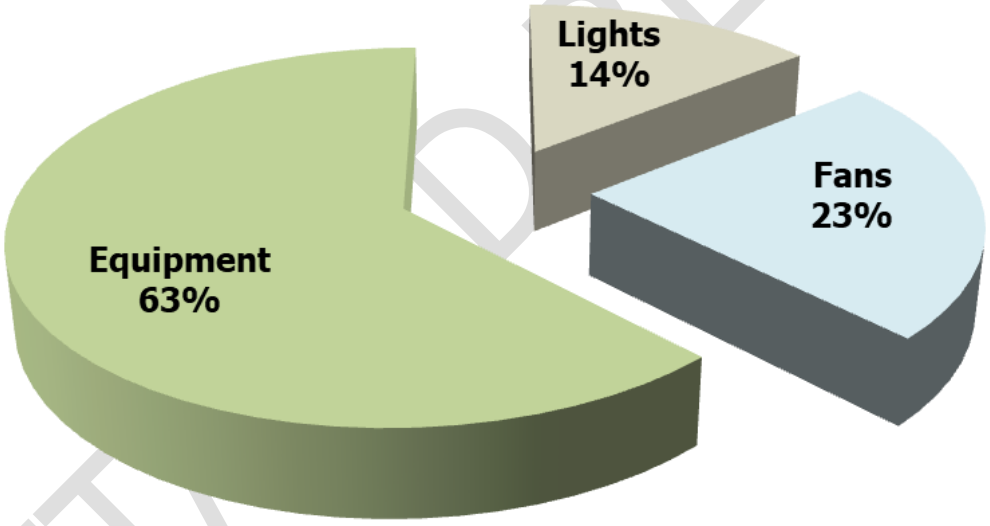


Figure 3: Summary of the calculated electrical consumption as per inventory

The above graph shows that equipment consumes 63% while the fans consume 23% and the lights consume 14% of the total calculated electrical energy.

4.6 Electromechanical systems – Lights

4.6.1 Types of lights based on the numbers

There are a total of **460 LED lights on the premises;** the following table shows the various types of lights on the premises.

4.6.2 Types of lights based on the power consumption

The energy consumption of lights is **24,987 kWh** of energy and the **LED lights consume 100%** of the same.

4.6.3 Requirement of NAAC

4.6.3.1 Alternative energy initiative

Percentage of power requirement met by renewable energy sources – The College's Hostel areas have solar hot water heaters systems as an alternative source of energy. The College is shared by multiple colleges and thus the decision should be taken by the Management to improvise the current energy management practices. Currently, zero percentage of power requirement is met by renewable energy sources.

4.6.3.2 Percentage of lighting power requirement met through LED lights

The premise has LED Lights to contribute to 100% in terms of number and **100% of the power requirement** is met through the same. As per our study, we could conclude that both of these are the highest contributions among all the types of lights.

4.6.4 Site investigation observations

- All lights are in working conditions.
- There was no fuse defect observed.

4.6.5 Section-wise recommendation related to 'lights'

Since all the lights are LED, the recommendations are excluded for this section.

4.7 Electromechanical systems – Fans

4.7.1 Types of fans based on the numbers

There are a total of **282 fans** on the premises as follows:

S. No.	Type	Nos.
1	Ceiling fans	278
2	Table fans	4

Table 4: Summary of the types of fans in the premises

4.7.2 Types of fans based on the power consumption

The energy consumption of fans is **40,695 kWh** of the energy.

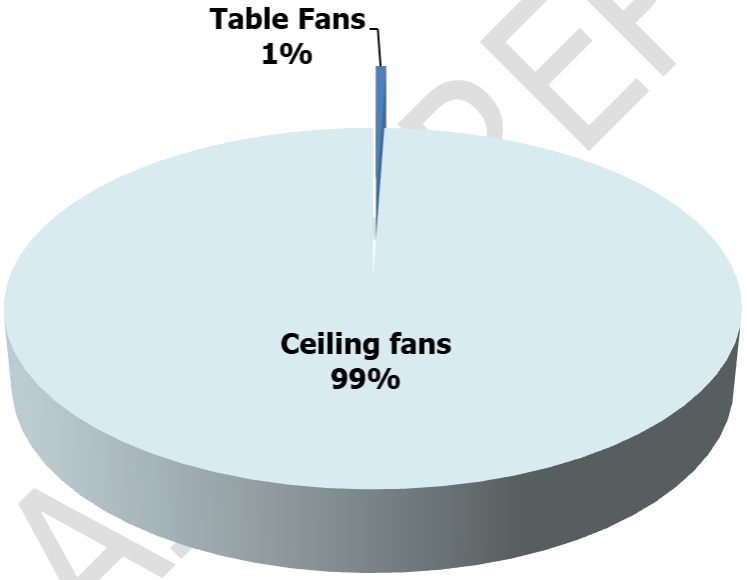


Figure 4: Types of fans based on power consumption

The above analysis shows the **Ceiling fans consume 99%** whereas the **Table fans consume 1%** of the total power.

4.7.3 Space-wise consumption analysis

4.7.3.1 Observations

- The maximum types of fans in terms of numbers and power consumption are ceiling fans.
- All fans are in working conditions.
- Windows do not have cracks and are caulked appropriately.

- Space wise the maximum energy is consumed by Main Academic building, Girls and Boys hostels the reason is numbers of fans is more in these spaces.

4.7.3.2 Inferences

- The recommendations shall be checked as follows.
- Since the building is very oriented climatically and geographically there is very fresh air inside the premises and hence there are fewer requirements of fans in the spaces.

4.7.4 Section-wise recommendation related to 'Fans'

*To be considered as **first priority but first in sequence** for implementation under section wise study.*

Our detailed study states that is all the **ceiling fans in all spaces** 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.

4.9 Electromechanical systems – Equipment

The equipment study plays an important role in the analysis of the electrical consumption. These when considered from the Green building perspective are essential to understand their consumption patterns, in order to determine their inputs towards the power generation contribution.

As an educational institute, it has general equipment with a regular power contribution pattern. During the visit it was observes that utmost measures are taken for the safety and proper handling of the equipment.

4.9.1 Types of equipment based on the numbers

There are **160 nos. of equipment** in the Educational sector.

4.9.2 Types of equipment as per their energy contribution

The energy consumption of equipment is **1,08,979 kWh** of energy.

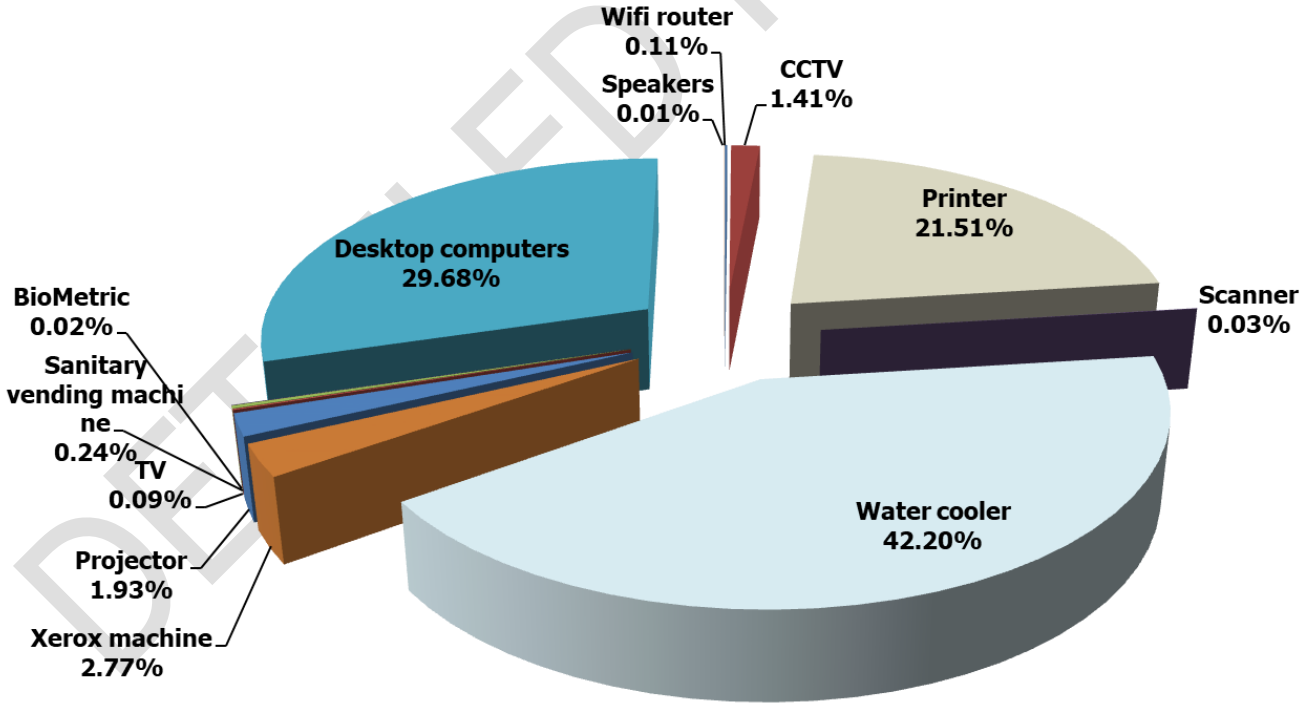


Figure 5: Energy consumed by types of equipment in the educational sector based on the usage study

The above summary shows that the **water cooler consumes more energy at 42.20%** while the **desktop computers consumes 29.68%** the **printer consumes 21.51%** and the **Xerox machine consumes 2.77%** these are the maximum consumers as compared to other equipment.

4.9.3 Site investigation observations

Some of the points noticed are as follows:

1. No unnecessary electronic devices are plugged in.
2. During vacations all electrical devices unplugged.
3. All types of equipment are in working conditions and daily monitoring and check are done by the maintenance staff and admin staff skilfully.
4. No defect was found in any equipment of electrical consumption.

4.9.4 Section-wise recommendation related to 'Equipment'

*To be considered as **first priority but first in sequence** for implementation under section wise study*

4.9.4.1 Desktop computers to laptops

Among all equipment, it suggested replacing the desktop computers with laptops as this would be energy efficient. A normal desktop computer consumes an average of 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 that lasts up to 4 hours.

There is **an average 84% reduction** in energy consumption if replaced with an energy-efficient appliance which is a laptop in all the areas. This replacement is however dependent on a variety of factors as follows.

- **Some of the senior staff** members may be more convenient with computers; replacement with a 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.
- **Depending on the recent pandemic situation** in case it might be possible due to irregular usage the device might have issues while functioning.

Thus the Institute should analyze the above points and then devise a strategy for the replacement, when the devices get damaged or are not in working condition.

4.9.4.2 Other equipment

The following recommendations are for the other equipment in the premises.

- Replace the Non-LED (Regular) TV Monitors with LED equipment.
- Backup computer files during vacations.
- Refrigerators and all electronic equipments should be cleaned out completely including system check up with AMC during vacations, this should be a periodic activity and the same should be documented every year.

4.10 Consolidated study recommendations related to 'entire Institute'

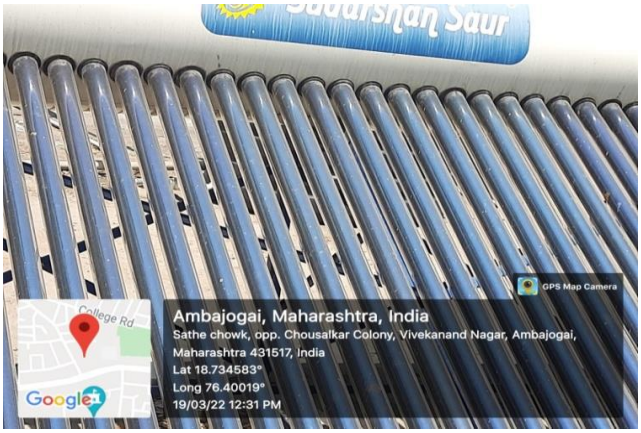
(Based on the site visit)

These are to be considered as ***second priority*** for implementation, once the section wise recommendations are implemented. The following recommendations should be ***implemented within the next 2.5 – 3.5 years from the date of the Report submission.*** The Institute can execute a plan of action after discussion with Project Head.

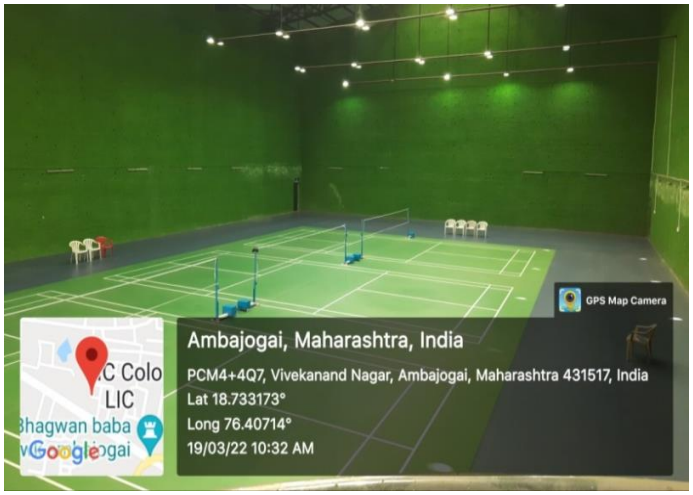
- **Solar farms -** This option can be explored with due discussion with the surrounding and adjacent farmland owners. This will serve as a noble project being one of its kind in the locality and will provide dual benefits to the farm land and the College w.r.t to electricity bill power reduction.
- **Solar tree** – Since there are certain space and structural constraints the option of providing an aesthetic beauty to the premises and benefit w.r.t to energy reduction can be provided with installation of solar tree in multiple places in the site.
- **Structural audit** – There is scope for undertaking structural audits in a few blocks to identify the structural stability as the premises is more than 50 years old.
- **Roofing study** – The roofs of certain blocks will have to be redesigned in such a manner that either they are converted into sloping roofs with better stability or flat roofs with better sunlight feasibility. The volume and height of the building will have to be worked upon. A sample of solar panels on sloping roofs is attached below, this can be shown to local municipality for approval, the redesign project can be undertaken by the project head and solar consultant in a joint manner.

Plate 1: Understanding the lighting concepts

Source: https://www.archiexpo.com/prod/sunset-energietechnik-gmbh/product-74430-1179445.html



Energy management initiative at the College



Aspects related to energy usage in the College

5. References

The study is based on the data collected, analyzed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyze and study the data collected.

Specific references for study related to energy

- https://www.energy.gov/eere/buildings/zero-energy-buildings
- https://www.dsaarch.com/zero-net-positive-energy
- U.S. Energy Information Administration
- Energy efficiency measures in buildings, Energy efficiency in electrical utilities, Bureau of energy efficiency, India.
- Energy Efficient lighting for sustainable development, Writing team: Carmen Dienst, Willington Ortiz, Julia Pfaff, Dieter Seifried. Wuppertal Institute for Climate, Environment and Energy

  https://seors.unfccc.int/applications/seors/attachments/get_attachment?code=NG125PFE4WHMWSYAK8TCAKIHMWX0F4QD

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The student data (shared by the Institute) shows there were **a total of 502 Boys and 284 Girl students thus a total of 786 students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	04	00	**04**
Teaching Staff	21	07	**28**
Non-Teaching Staff	09	00	**09**
Total Staff Members	**34**	**07**	**41**

Table 2: Staff data of the Institution for 2021-22

The staff data shows the premises had a total of **41** Staff Members.

2.2 Populace analysis for the Academic year 2020-21

2.2.1 Students data

The student data (shared by the Institute) shows there were **a total of 609 Boys and 313 Girl students thus a total of 922 students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	03	00	**3**
Teaching Staff	23	9	**32**
Non-Teaching Staff	09	00	**9**
Total Staff Members	**35**	**09**	**44**

Table 3: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **44** Staff Members.

2.3 Total Institute Area & Institute Building Spread Area

The **total site area is 9.6 acres** and the **total Built-up area of the Institute is 29,988 sq. ft.** for **a total of 827 footfalls.**

2.4 Institute Infrastructure

2.4.1 Establishment

The Institute was established in 1972.

2.4.2 Spatial Organisation

There are provisions for staircase for accessibility on the premises, whereas there are amenities such as CCTV, a first aid room, etc. The Institute is located pretty close to nature and hence has a very fresh environment which is absolutely pollution free and healthy. The Building is a Reinforced Cement Concrete (RCC) framework building.

2.5 Operation and Maintenance of the premises

The interview session was held with the staff regarding the operation and working hours. The Institution is open from Monday to Saturday with the timings being 9:00 am to 4:00 pm.

3. Green Building Study as a Research based technical 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 of 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 premises

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Rainwater harvesting and Wastewater treatment on the premises.
- 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 the premises
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- Strategies adopted at present to enhance vegetation
- Measures that can be adopted for ecological improvement of the premises.

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

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- 21 December 2022 - Allotment and Initiation by the Institute
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- 13 January 2023 - Submission of the files

On-site investigation and physical verification
Audit Team during the visit on 26 December 2022

Discussion with the Core Team

On-site review with the team for site management, green wall and other features

Group photo with the Team

4. Site Study

4.1 On-site observations 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 Shri Yogeshwari Education Society's Swami Ramanand Teerth Mahavidyalaya is located at Parli Road, Ambajogai, District Beed, Maharashtra – 431517 and falls under Ambajogai Municipal Council.

- **Neighbourhood context -** The premises is surrounding by Residential and Educational areas on the immediate surroundings of the site.

- **Natural physical features –** The premises lacks good biodiversity features; however it is very close to the Juhu beach and the climate is generally cooler owing to close proximity to the sea. Since the College is located in an urban area in the heart of the city; site does not have major difference in the land levels (contours).

- **Manmade features –** The premises is situated in an urban area amidst residential areas with appropriate proximity to necessary amenities. The materials used for construction are RCC and the landscaping includes few 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; however the parking facilities should be improved but since it is a shared campus this decision should be taken by the Management.

- **Climate** – The climate here is tropical. In winter, there is much less rainfall than in summer. The Köppen-Geiger climate classification is Aw. The temperature here averages 25.7 °C | 78.3 °F. The rainfall here is around 843 mm | 33.2 inch per year.

(Source: https://en.climate-data.org/asia/india/maharashtra/ambajogai-24315/)

4.2 Positive site features as per our study

4.2.1 Actual positive points based on the site visit

The following points are based on the site visit observations:

- Availability of courtyards in the premises.
- Plantation activities and innumerable numbers of plants in premises.
- Availability of natural water pond for water management.
- For safety concern there are CCTV at multiple locations in the premises.
- Greenhouse in the premises.
- Self-sustaining premises with farm products used for daily use.

4.2.2 General positive points

The following points are based on the general observations of discussions:

- **User friendly movability in premises -** There are provisions of Kerb Ramp in the Building premises, also low height hand rail for ease of access.
- **OPAC system -** The system in the library is beneficial for the students.
- **Paperless technologies -** The College has gone technology-friendly and paperless in the functioning of the Premises.
- **Resting places -** There are provisions for resting places on-premises outdoor and indoors.
- **Universally accessible premises -** In addition to availability of ramps, there are provisions for lifts, universal toilets, and braille name plates.

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.

5.1 Open Spaces

There is an open space in the premises used by students at present for sports and cultural gatherings. **There are provisions for natural plantations which have enhanced the beauty of the space.**

5.2 Flora audit – Research study

A flora survey was carried out to identify the total number 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, and office staff on several occasions and also during the plantation drives. **Some of them have grown naturally and have been conserved at their respective locations to maintain the beauty of the premises.** The detailed study is as follows.

S. No.	Plant name	Type	Nos.
1	*Wad*	Tree	36
2	*Pimple*	Tree	29
3	*Umber*	Tree	5
4	*Sonchafa*	Plant	0
5	*Sonmohar*	Plant	1
6	*Gulmohar*	Tree	5
7	*Nilmohar*	Tree	3

8	*Palas*	Tree	1
9	*Pangara*	Tree	5
10	*Saptparni*	Tree	9
11	*Pichkari*	Tree	5
12	*Badam*	Tree	3
13	*Ashok*	Tree	14
14	*Aasupllav*	Tree	14
15	*Faykas*	Plant	7
16	*Shisam*	Tree	28
17	*Shivli*	Tree	24
18	*Chinch*	Tree	28
19	*Firangichinch*	Tree	51
20	*Kanchan*	Tree	9
21	*Kadulimb*	Tree	3
22	*Mhalimb*	Tree	34
23	*Bhabhul*	Tree	6
24	*Subabhul*	Tree	1
25	*Gulabi Shirish*	Tree	28
26	*Ram Phal*	Tree	
27	*Bkul*	Tree	22
28	*Kandb*	Tree	2
29	*Parijatk*	Tree	13
30	*Karanj*	Tree	7
31	*Bel*	Tree	10
32	*Avala*	Tree	7
33	*Amba*	Tree	7
34	*Boar*	Tree	8
35	*Bahava*	Plant	1
36	*Nilgiri*	Tree	3
37	*Peru*	Tree	9
38	*Apta*	Tree	
39	*Chiqu*	Tree	34

40	*Jabhul*	Tree	7
41	*Shevga*	Tree	8
42	*Hada*	Tree	
43	*Cheri*	Tree	1
44	*Fanas*	Tree	8
45	*Arjun*	Tree	2
46	*Buch*	Tree	11
47	*Parosa Pimple*	Tree	27
48	*Sagwan*	Tree	2
49	*Kashid*	Tree	1
50	*Nandurki*	Tree	22
51	*Rabar*	Tree	4
52	*Sons*	Tree	24
53	*Bambu*	Tree	6
54	*Pam*	Tree	9
55	*Ghant Ful*	Tree	
56	*Kadhipata*	Tree	2
57	*Naral*	Tree	2
58	*Kordiya*	Tree	1
59	*Lasoda*	Tree	1
60	*Papai*	Tree	1
61	*Undirmari*	Tree	1
62	*Silki Ok*	Tree	1
63	*Vedi Babhul*	Tree	1
64	*Sitaphal*	Tree	2
65	*Chandan*	Tree	6
66	*Bitti*	Tree	3
67	*Jaswand*	Tree	1
68	*Baitl Brush*	Tree	2
69	*Mosambi*	Tree	2
70	*Saru*	Tree	2
71	*Bhokar*	Tree	1

72	*Shivani*	Tree	7
73	*Pimpri*	Tree	4
74	*Thuja/Morpankhi*	Tree	5
75	*Wood Flower*	Tree	5
76	*Junipers*	Tree	2

Table 4: Details of the Flora in the premises

At present, there are 76types and 656+ plantations on the premises.

5.3.1 Macro level

On a macro level the College being an educational institute falls under silent zone and thus **there is no negative effect related to noise felt by the students / staff in the premises.**

5.3.2 Micro level

The College has ample vegetation trees. These act as a noise barriers. There are no particular equipments which cause any noise effect. **Overall the noise levels inside the premises are low that 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.

5.4.2 Heat Island Reduction

The Institution is geographically located in a rural area with appropriate climatic and architectural design parameters in place; the Institute does not face any 'Urban heat island effect'

5.4.3 Outdoor Light Pollution Study

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

5.5 Universally accessible premises

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

The following facilities are available on the premises for the specially-abled as part of universally accessible premises initiatives.

- **Wheelchair availability.**
- **Ramps at the entrance area**
- **Handrails along the staircase and Low height risers in the staircases**
- **Toilets for the disabled friendly**

5.6 Fire Safety

Only fire extinguishers are available as a Fire and life safety measure.

6. Inferences as Consolidated study

6.1 General suggestions based on the site visit

The following suggestions are to be considered as a ***first priority*** for implementation. These **should be executed within the next 2.5 years from the date of the Report submission.** The Institute can execute a plan after discussion with Project Head.

- Increase the zoning activities for eco-zone, orange zone, green zone – Although this has to be undertaken on an entire premises basis; since the College is a shared campus this will have to be undertaken after discussion with Management.
- The toilet areas have a stinking and odour issue; initiatives such as potpourri/ camphor tablets, exhaust fans should be undertaken.
- The areas near the toilets should be renovated for interior and safety concern (Location – Ground floor)
- Ramp should be constructed near the computer department.
- There should be an increase in the frequency of cleanliness and odour related issues in premises.

6.2 Section-wise suggestions based on general study

The following suggestions are to be considered as a ***second priority*** for implementation. These **should be executed within the next 3.5 years from the date of the Report submission.** The Institute can execute a plan after discussion with Project Head.

6.2.1 Site beautification

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

6.2.2 Pollution Control

- **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 spaces along with battery charge points, this would inspire students to change their mode of transportation and adopt sustainable practices.

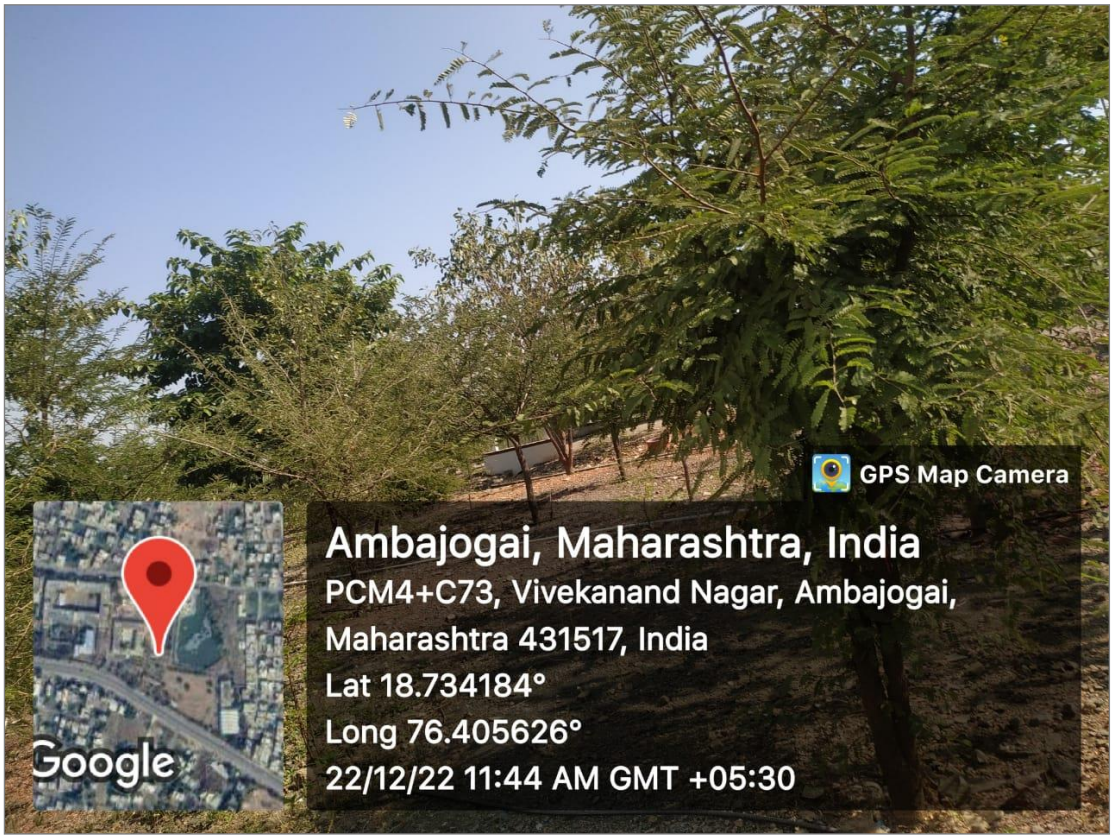
- **Bicycles as a gift -** As an appreciation gesture maybe the student's toppers/ staff best performers can be awarded a bicycle occasionally.

6.2.4 Fire and life safety

- Every space which has a gas cylinder or combustible equipment should have a provision for additional safety including the barricade around the gas cylinders, appropriate safety boards.
- Regular seminars/ webinars by experts such as Architects, Govt. Fire department on subjects related to fire and life safety should be organized and the outputs should be adopted and documented.

6.2.5 Sustainable features

- **Signages –** In addition to the signages being in regular language there can be additional signages in braille language for the especially abled students.
- **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.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Maharashtra 431517, India
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7. References

The study is based on the data collected, analyzed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyze and study the data collected.

- **Local references**
  - ⇒ Climate data https://en.climate-data.org/asia/india/maharashtra/ambajogai-24315/

- **National references**
  - ⇒ Uniform Plumbing Code – India, 2008
  - ⇒ IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
  - ⇒ IGBC Green Landscape Rating system, March 2013

- **International references**
  - ⇒ BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
  - ⇒ Used only for understanding Universal design - Universal Accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National center for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation and www.umassd.edu
  - ⇒ The city of Cheyenne, Streetscape/ Urban Design elements - Wyoming Planning Association, Gillette, Wyoming, United States
  - ⇒ Streetscape elements – Chapter 6 on San Francisco
  - ⇒ American lung association https://www.lung.org/
  - ⇒ Study related to air pollution https://www.airgle.com/
  - ⇒ Exploring the light pollution https://education.nationalgeographic.org/
  - ⇒ Accessibility study https://www.washington.edu/

Urban heat island effect https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands

GREEN AUDIT

STUDY PERIOD (TWO YEARS) 2020-2021 AND 2021-2022

Sustainability study

AUDIT REPORT

Studied for

Shri Yogeshwari Education Society's

Swami Ramanand Teerth Mahavidyalaya

Parli Road, Ambajogai,

District Beed, Maharashtra – 431517

Studied in the capacity of

An accredited & Certified Green Building Professional

Studied by

Greenvio Solutions

Valid till January 2024

Background reference image Sasin Tipchai on unsplash

Disclaimer

The Audit Team has prepared this report for the **Shri Yogeshwari Education Society's Swami Ramanand Teerth Mahavidyalaya** located at *Parli Road, Ambajogai, District Beed, Maharashtra – 431517* based on input data submitted by the Institute and analyzed 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 a 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 Institute. 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 while 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 is an Accredited and Certified Green Building Professional-Architect; I.A.(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 incapacity of an 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

Acknowledgment

The Audit Assessment Team thanks the **Shri Yogeshwari Education Society's Swami Ramanand Teerth Mahavidyalaya, Maharashtra, India** 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 **Dr. S.T. Khursale,** Chairman; **Adv. S.T. Karhad**, Vice-Chairman; **Mr.K.S. Chousalkar**, Vice-Chairman; **Mr. G.B. Vyas**, Secretary; **Mr. M.S. Lomte**, Treasurer; **Adv.V.K. Chousalkar**, Sr. Advisor and everyone from the Management.

Our heartfelt thanks to the Chairperson of the entire process **Dr. P.R. Tharkar**, Principal, for the valuable input.

We are also thankful to **Institute's Taskforce** who have been instrumental in the data collection – **Dr. R.S. Sontakke**, Vice Principal; Associate Professors – **Mr. B.P. Ruddewad; Dr. Smt. S.B. Barure; Dr. B.P. Ruddewad;** Assistant Professors - **Dr. K.B. Chakre; Dr. R.S. Bade; Dr Smt. S.S. Kulkarni; Mr. R.S. Sonwalkar.**

We highly appreciate the assistance of **Mr. S.K. Ramdasi**, Office Superintendent; **Mr. M.H. Tandale**, Senior Clerk 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 the Management

The main objective of the institution has been Patriotism, Nation building, Education, Democracy, Secularism and Upliftment of the poor sections of the society. The institution has grown into a large banyan tree during the last eighty years due to the honest, sincere and tireless hardwork.

1.2 Mission Statement of the Institute

1.2.1 Vision

The College proposes *"To make the students able for the nation building."*

1.2.2 Mission

The College adheres and focuses

- *Overall development of the student's personality.*
- *To inculcate the enshrined in the constitution of India to create a new social order based on justice, equality & fraternity.*

1.2.3 Aim

The College has channelizes its efforts "*To prepare the students to shoulder the responsibilities in various capacities as accountable & efficient citizens."*

1.2.4 Objective

It is the objective of the College is *"To make the students responsible citizens."*

1.2.5 Motto

It is the motto of the College is *"To provide overall development of students."*

1.3 Assessment of the Institute

1.3.1 Affiliations

The Institute is affiliated to **Dr. Babasaheb Ambedkar Marathwada University,** Aurangabad has been making a major contribution to the field of education for many decades and today it has a world class reputation for research, for teacher education and for its Masters and doctoral programmes.

1.3.2 Accreditation

The following are details of the accreditation awarded by the National Assessment & Accreditation Council (NAAC) to the College.

Cycle	First	Second	Third
CGPA	-	2.57	2.68
Grade	B++	B	B+
Year	2004	2013	2018

Table 1: NAAC Accreditation details of the Institute

The College is due to enter its Third cycle of NAAC.

1.3.3 Certifications

The College has participated in the National Institute's Ranking Framework (NIRF) rankings.

1.4 Academic status of the College

The College provides a wide range of courses in following sections:

- **Graduation**
- **Post-Graduation**
- **Certificate Programmes and Courses**

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

2. Institution overview

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2.1.1 Students data

The student data (shared by the Institute) shows there were **a total of 502 Boys and 284 Girl students thus a total of 786 students** on the premises.

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Discussion with the Core Team

On-site review with the team for site management, green wall and other features

Group photo with the Team

Green practices

Background reference image Free photos on pixabay

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.

- ***Plants as a gift** - As a kind gesture, the guests visiting the premise are asked to plant a small sapling on the premise itself, this is a special feature adopted by the Institute.*

- ***Self-sustaining premises** – The College has a dedicated farm area and the fresh vegetables produced in an organic manner are used in canteen and hostel for children.*

- **Social awareness** - *The College has taken up awareness drives on various social issues for rural upliftment and regeneration in a village.*

- **Cleanliness Campaign -** *The Swachha Bharat Abhiyan is carried out on college premises as well as off-premises.*

- **Universal design** – *The College premises has special provisions such as ramps, lifts for the specially abled.*

- **Hygiene committee -** *The College has a hygiene committee which undertakes multiple programs and necessary actions towards the maintenance of cleanliness in the premises.*

4.2 Community Development

The College has undertaken certain social initiatives for one local village; it has applied for NSS and similar social initiatives and informed during the discussion that it shall proceed with multiple activities in future. Currently it has dedicated 'Outreach committee' which undertakes certain activities.

4.3 Eco-friendly initiatives undertaken

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

Name of the activity	Organising unit/	Name of the scheme	Year of the activity
Mission Yuva Swasthya Lasikaran Shibir(Vaccination Camp under Youth Health Scheme)	NSS & S.R.T. Rural Government Medical College and Hospital, Ambajogai	Mission Yuva Swasthya	27-10-2021
Mask and Sanitiser Distribution in Swami Ramanand Teerth Government Hospital, Ambajogai	NSS	Azadi ka Amrutmahotsav	07-10-2021
Nivadnuk Saksharta Abhiyan (Election Awareness Campaign)	NSS	Election Awareness Campaign	27-11-2021
Organisation of different Compititions such as Essay, Mime, Short Film, Elocution, Drawing, and Singing as a part of Election Literacy Campaign.	NSS & Election Literacy Association	Election Aareness Campaign	1 to 10/10/2022
A Lecture on Gender Equality	NSS & ICC	Women Empowerment	08-03-2022
Cleaning Campaign at kumbephal	NSS and Grampanchayat Kumbephal	NSS Annual Camp & Swatch Bharat Abhiyan	20 to 23-03-2022
Tree Plantation at Kumbephal Village	NSS and Grampanchayat Kumbephal	NSS Camp	22-03-2022
Arogya Swasan Vikar (A lecture on Health and Respiraratory Dieseases for villagers of Kumbephal)	NSS and Grampanchayat Kumbephal	NSS Annual Camp	22-03-2022

Cleaning Campaign at Yogeshwari and Polytechnic College, Ambajogai	NSS	Swatch Bharat Abhiyan	
A Survay on Problems faced by Sugarcane Labours at Kumbephal	NSS and Grampanchayat Kumbephal	NSS Camp	23-03-2022
Knowing the sufferings of Brick Kiln Labours at Kumbephal through conducting Survey	NSS and Grampanchayat Kumbephal	NSS Camp	24-03-2022
Orientation of Good Manners and Ettiquates for School Stuednts at Kumbephal by College Students	NSS and Grampanchayat Kumbephal	NSS Camp	23-03-2022
The Zero Point Meditation Workshop for Villagers of Kumbephal	NSS and Grampanchayat Kumbephal	NSS Camp	23-03-2022
An Awareness programme on Eradication of Superstition among villagers at Kumbephal (Andhshradhha Nirmulan)	NSS and Grampanchayat Kumbephal	NSS Camp	24-03-2022
Awareness Campaign on Health, Hygiene and nutrition in ZP School Kumbephal	NSS and Grampanchayat Kumbephal	NSS Camp	24-03-2022
Water Conservation Work at Kumbephal	NSS and Grampanchayat Kumbephal	NSS Camp	25-03-2022
Blood Donation Camp and HIV/ AIDS Awareness Programme at Kumbephal	NSS & Swami Ramanand Teerth Rural Government Medical College and Hospital, Ambajogai	NSS Camp	25-03-2022
1000 Tree Plantation in different villages under Green Earth Campaign (One cadet One Tree Mission)	NCC	International Day of Forests (One Cadet One Tree Mission)	05-06-2022
Yoga with Family Members Campaign	NCC	International Yoga Day	21-Jun-22
A Study on Problems faced by Sugarcane Labours in Beed District	NCC	Sugarcane Labours Survey	
Jagar Jalsakshrtecha, Aapna Sarwancha (Awareness Campaign on Water Conservation and Plastic Eradication)	NCC	Puneet Sagar Abhiyan	22-Mar-22
Felicitation of Soldiers of Indian Army	NCC	Azadi ka Amrutmahotsav	15 August 2021 & 26 January 2022

Mission Oxigen Park	NCC	My Earth My Duty	05 January to 17 Sept. 2021
Tree Plantation in the Name of Captain Vikram Batra, Captain Manoj Pande, Captain Yogendrasinh Yadav and Captain Sanjay Kumar martyers of Kargil War	NCC	Tree Plantation on Kargil Din	5 June 26 July 2021
Participation in Tree Plantation Movement of Yogeshwari Education Society	NCC	Tree Plantation	
Tree Plantation in nearby Farmers' Farms	NCC	Tree Plantation in nearby farmers' farm	
Cleaning Campaign of Traditional Water Resources	NCC	Conservation of Traditional Waterbodies	
tree Plantation of 1947 Trees in the name of Martyrs in Indian Army	NCC	Azadi ka Amrutmahotsav	09 August to 15 August 2021
Participation as Volunteers in Pulse Polio Immunization Program	NCC	Pulse Polio Immunization Program	24-Oct-21
Save Sparrow and Other Common Birds on the Ocassion of World's Sparrow Day(Jagatik chimany Divas)	NCC	Save Sparrow and other Comman Birds	20-Mar-22
Survey of Traditional Water Bodies(Sources) in 18 Villages of Ambajogai Region	NCC	Conservation of Traditional Water Bodies & Water Literacy Campaign(Water Conservation Bank)	05 to 11 September (World Water week)
Construction of Bandhara and Dam/Barrage in Hilly Area for Water and Soil Conservation	NCC	Water and Soil Conservation Campaign	
Fruit Trees Plantation in the farms of Farmers by NCC Cadets	NCC	Shetkari Sanwad Abhiyan(Dialogue with Farmers campaign)	
Performed Street Plays on Women Empowerment at Kumbephal Village	Dramatics Department	Women Empowerment	

Table 4: Details of the activities undertaken through virtual mode

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

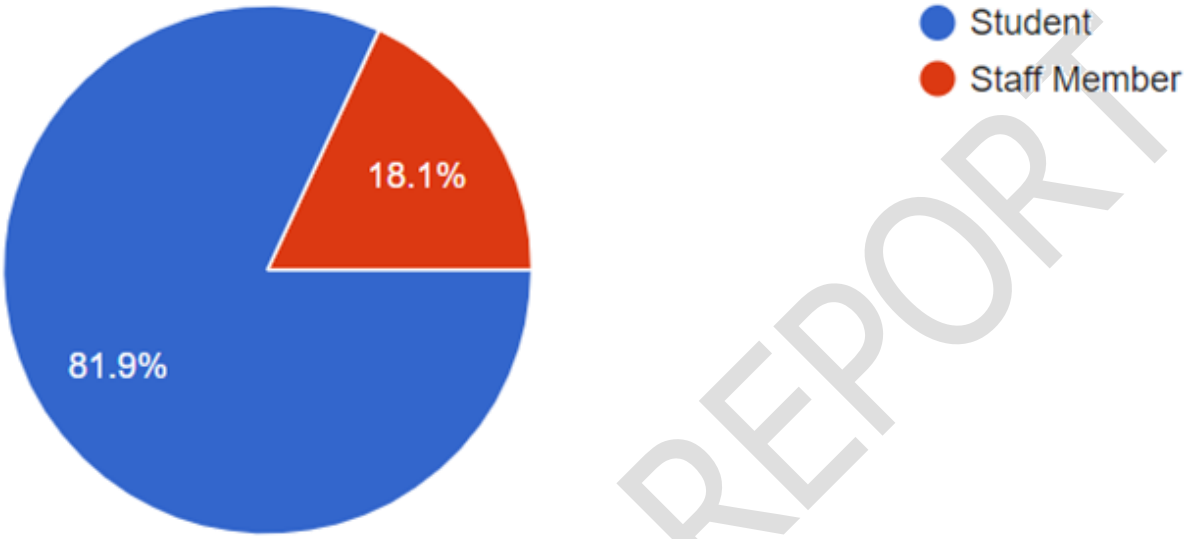


Figure 1: Participation analysis in the survey

A total of **72 responses** were received out of which 82% 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

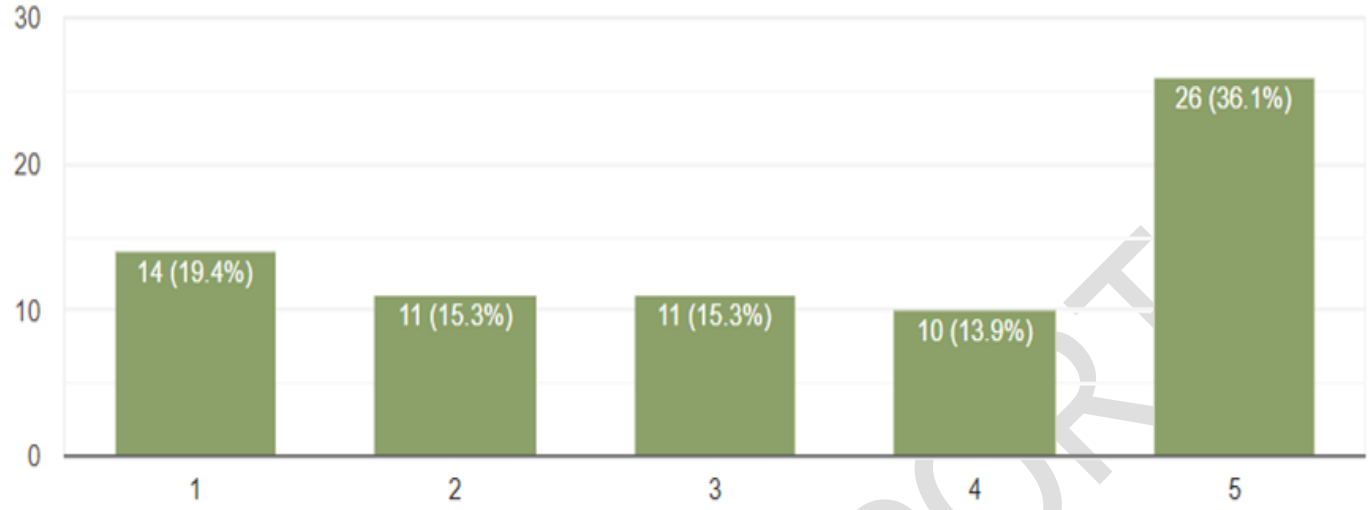


Figure 2: Green awareness practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 36%** followed by **14% for rating 4 (Very good).**

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

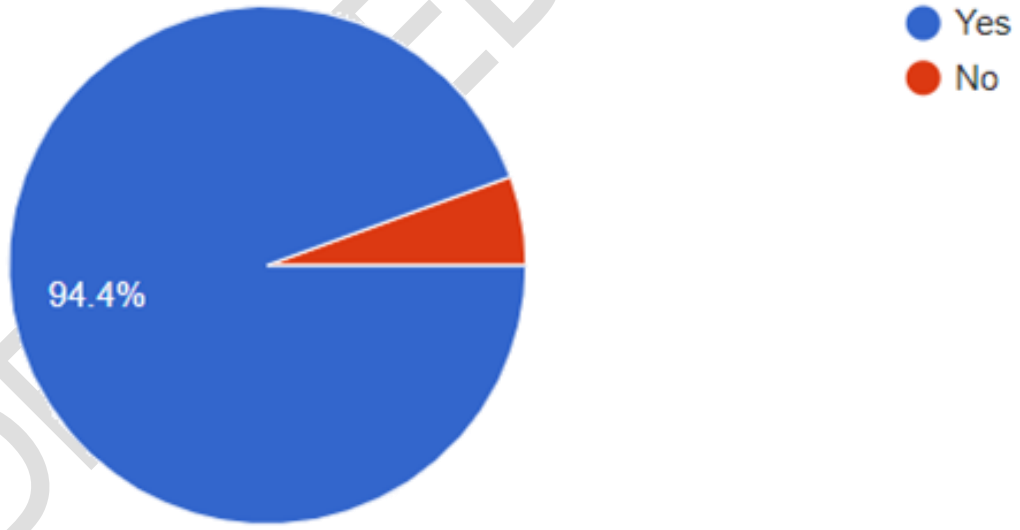


Figure 3: Confirmation of the environment awareness programs/ webinars/ plantations/ cleanliness or similar programs conducted by the College

The students, staff **94%** of responses confirmed activities are conducted which is very excellent.

4.4.4 Do you participate is such events?

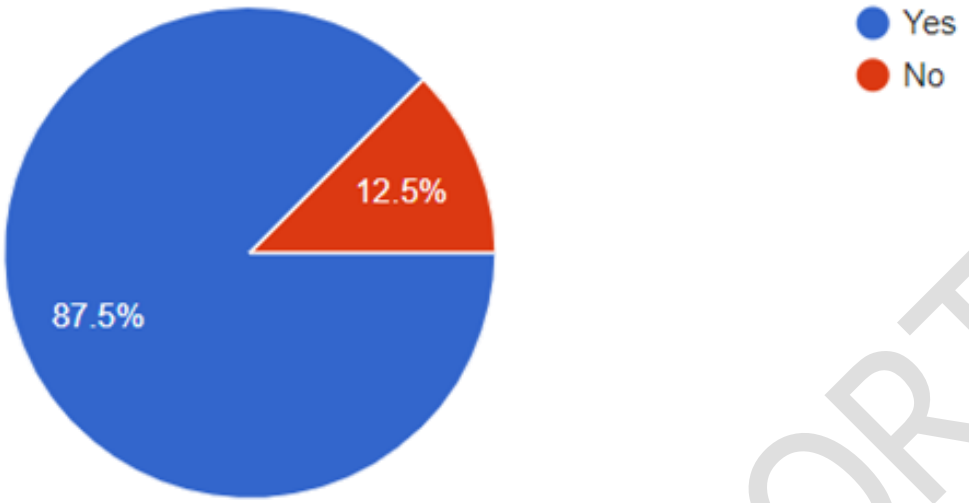


Figure 4: Participation in the environment awareness programs/ webinars/ plantations/ cleanliness or similar programs conducted by the College

The students, staff **almost 88%** of the responses confirmed their participation, **this is an excellent response.**

4.5 Recommendations related to section 'Green practices audit'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

4.5.1 Specific inferences

The following inferences should be undertaken by the College as per its suitability.

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

4.5.2 General inferences

The following inferences should be undertaken after due consideration and discussion with Management since it is a shared premises.

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

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

S. No.	Type of waste	Source and quantity	Current Disposal method	Can be treated/ recycled?	Methodology
1	Solid waste	Toilets–Biodegradable waste	Handed to local municipality	Yes	TREATED – Organic composting undertaken
2	Paper waste	Newspaper and other paper	Given to vendor	Yes	TREATED – Adopt a Paper recycling unit
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	Handed to local municipality	Yes	TREATED – Organic composting can be undertaken
5	Liquid waste	Toilets, washbasins – Around 100 – 120 litres per week during general times and 50 litres at present	Led in to storm water drain	Yes	TREATED – A water treatment plant can be proposed
6	Organic regular waste	Dust, dirt usually dry waste from Canteen and all sources – approx. 10 to 15 kg	Handed to local municipality	Yes	TREATED – Organic composting undertaken

Table 5: Summary of the types of waste produced in the premises

5.1.2 Bins summary

There are 85 Dustbins in the indoors and 15 in outdoors with volume of 7 litres (small), 15 litres (medium) and 30 litres (large); these are made up of plastic material.

5.2 Waste management

There is an adequate nos. of dustbins in premises. No smell problem or health related issues due to the waste are there. The College should undertake an appropriate waste management program along with Management for all Colleges in premises as currently no emphasis is given to this aspect.

5.3 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.

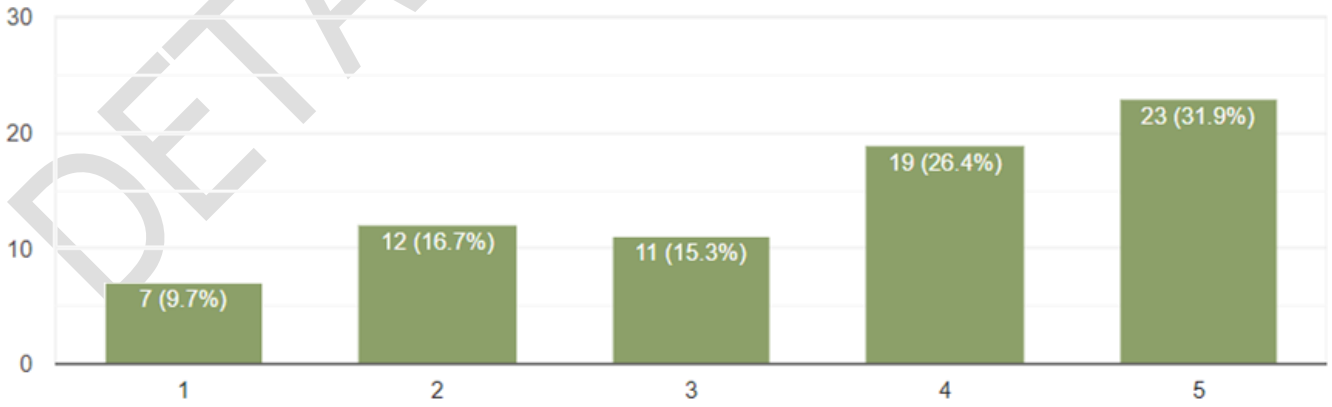


Figure 5: Waste management practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 32%** followed by **26% for rating 4 (Very good).**

5.4 Recommendations related to section 'Waste Audit'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

5.4.1 Specific inferences

The following inferences should be undertaken by the College as per its suitability.

- **Include better plastic/ E-waste management measures** - The College can celebrate one day of every month as a 'Plastic/ E-waste awareness day' The stakeholders (Students and staff members) can be asked to bring plastic/ E-waste which can be further given to an NGO for recycling or better purpose.

- **Plastic management for localities –** The can be frequent cloth/ paper bags distribution in local schools, slums, colleges, medical, police stations.

- **Documentation** – Improve and increase the documentation and visibility/ reflectance of the environment related events on the website, social media handles

5.4.2 General inferences

The following inferences should be undertaken after due consideration and discussion with Management since it is a shared premises.

- **Dustbins at every 100m -** There should be a dustbin at every 50-100 in the open spaces
- **Material of the dustbin -** The current plastic dustbins should be replaced with eco-friendly material.

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 primary water supply refers to the drinking water. The main source of water is the Local Municipality. The water received is stored in water tanks at various locations. These are periodically cleaned and well maintained for hygiene purpose. **At present there are 9 tanks with a total capacity of 15,500 litres available in the premises for drinking water purpose.**

6.1.2 Sources of Secondary water supply

The College is located in a rural village; hence it does not have any secondary source of water supply in terms of well/ bore well/ tube well.

6.1.3 Sources of Tertiary water supply

The College is located in shared premises in a locality of where there is water shortage; however the College has taken the initiative of water recharging with rain water harvesting pipes connected through the terraces to the pond in the premises; in such a scenario there is ample water availability and no water shortage.

However, we would suggest connecting the overflow pipe of the pond to the wells/ bore wells for additional water storage during monsoon.

6.2 Water requirement

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

- **Drinking water –** Consumption of around 850-950 litres of water through Aquaguard like system available in the premise, the taps and water cooler.
- **Toilet blocks**– General usage by occupants in toilets, urinals, bathrooms, wash basins using approx. 400-600 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.

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 – 7 Nos.
- Toilets – 6 Nos.
- Wash basins – 7 Nos.
- Taps (Indoors) – 9 Nos.
- Taps (Outdoors) – 9 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.** There are sufficient numbers 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.

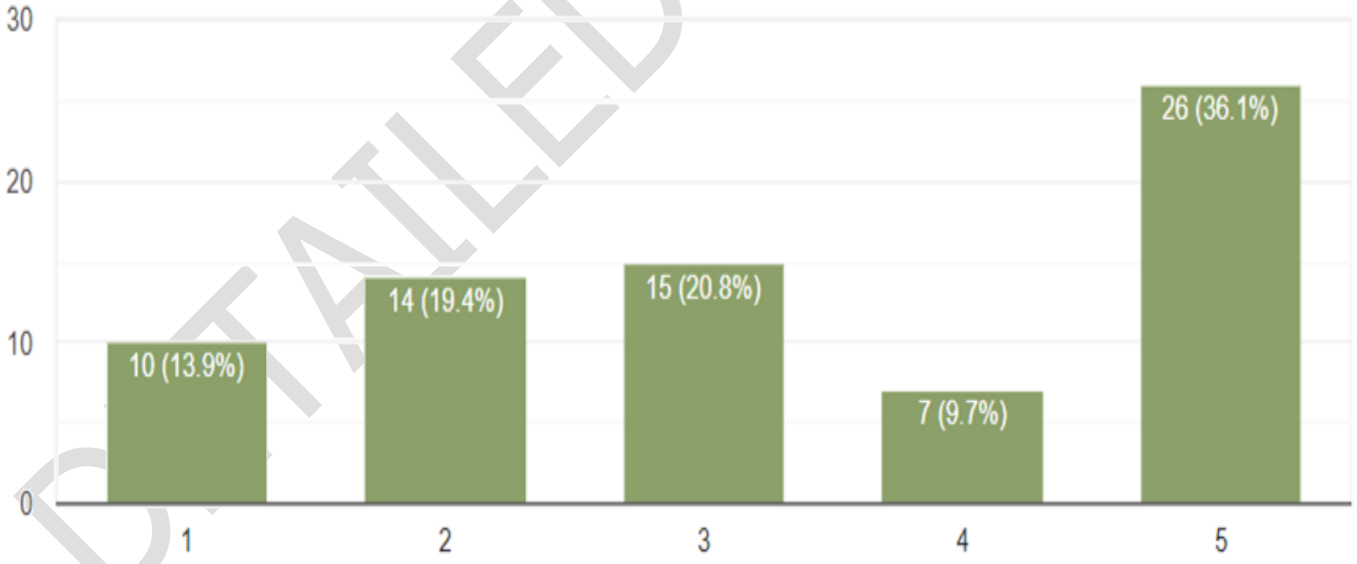


Figure 6: Water management practices in College

There were mixed responses received the highest was for **rating 5 (Excellent) at 36%** and around **10% for rating 4 (Very good).**

6.6 Recommendations related to section Water audit'

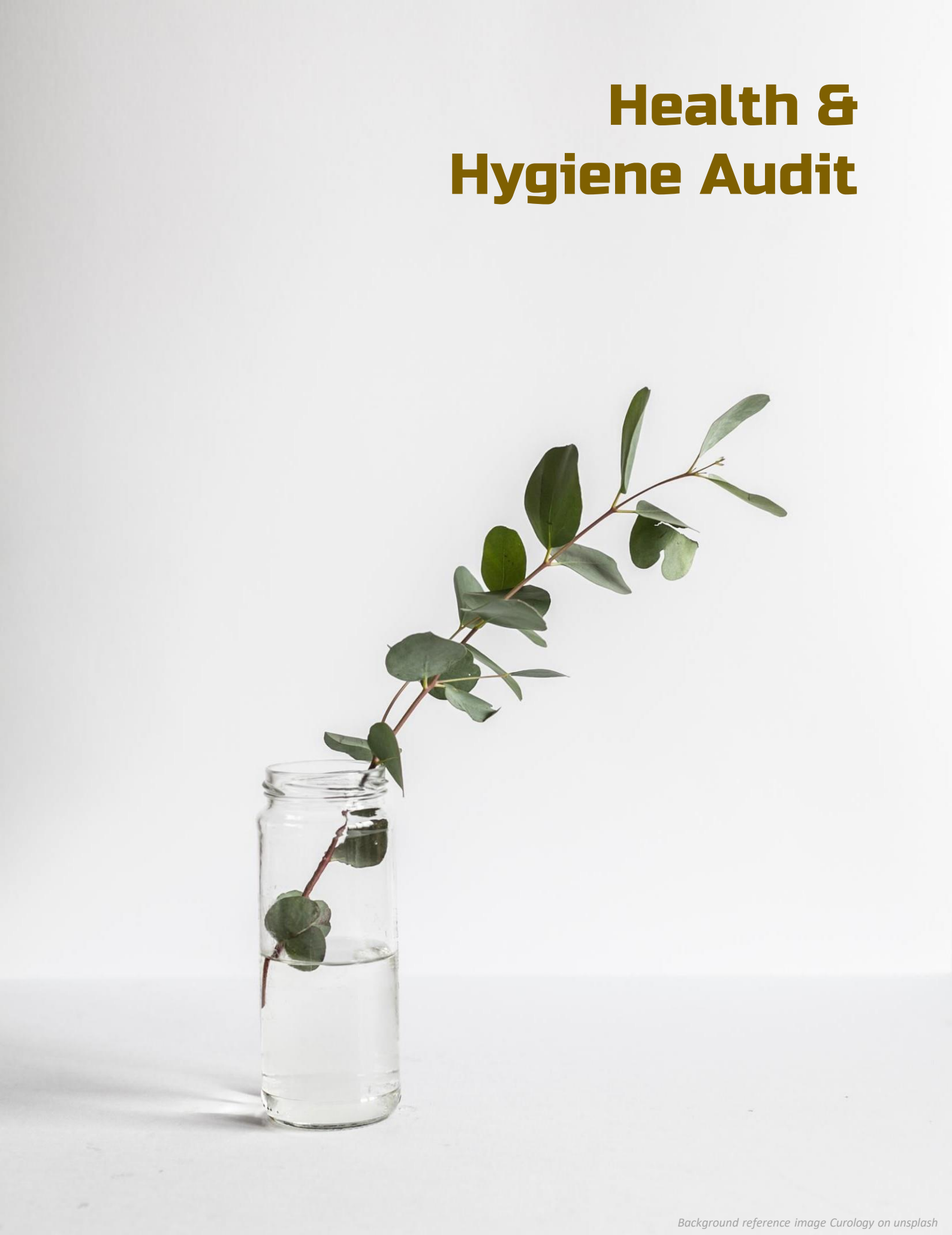
The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

6.6.1 General inferences

The following inferences should be undertaken after due consideration and discussion with Management since it is a shared premise.

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

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 Observations

The following were specific observations.

- Courtyard area requires a major beautification in terms of green cover as this will lead to improvisation in the current hygiene.
- The setback and backyard areas have scope to increase the green cover with vertical gardens as this will lead to improvisation in the current hygiene.
- 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 are pest controls program practiced with appropriate sanitation facilities and Annual Maintenance Contract for pest control is done once a year by professional Pest control units.
- 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.

7.3 Recommendations related to section 'Health and Hygiene'

The following points are listed as value addition to the existing premises, are should be considered as ***first priority*** for implementation under section wise study. These have to be **implemented in the next 1 year of the submission of the Report.**

7.3.1 Specific inferences

The following inferences should be undertaken by the College as per its suitability.

- **Sanitary vending and incinerator** – There should be provision for sanitary vending, incinerator machine and incinerator in every ladies' common room, and toilet on the premises.
- **Signboards** – The College should have multiple signboards about 'No smoking' and 'Healthy premises' at every nook and corner of the College.
- **Programmes** - As part of cleanliness programme the initiative of Swachh Bharat Abhiyan of Govt. of India is undertaken during various occasions.
- **Odour - The existing facilities need a lot of improvement as far as 'Health is concerned, the following steps can be undertaken.**
  - ⇒ An appropriate AMC with a pest control agency should be undertaken.
  - ⇒ Alternatively since it is a pharmacy College, regular and routine cleaning should be undertaken.
  - ⇒ There should be facilities such as potpourri, camphor tablets.

7.3.2 General inferences

The following inferences should be undertaken after due consideration and discussion with Management since it is a shared premises.

- **Courtyards and duct areas** – These are located in the internal and setback should have vertical gardens for beautification.
- **Compound wall** – The compound wall should have awareness messages about 'No Smoking' and 'No Tobacco'

8. Inferences as Consolidated study

These are to be considered as ***second priority*** for implementation, once the section wise recommendations are implemented. The following recommendations should be **implemented within the next 3.5 years from the date of the Report submission.** The Institute can execute a plan of action after discussion with Project Head.

- **Signing of a MoU for improvement w.r.t. to Green Building aspects of premises** – The same was suggested before the visit and has been undertaken with immediate action. **It can be undertaken through a MoU with the team who has conducted the audit.**
- **Articles and Documentation** – The premises has multiple features which add to the beauty of the nature and improve the environment in the premises, it is thus suggested to have an article written every month as guided by the Team based on the MoU. **It can be undertaken through a MoU with the team who has conducted the audit.**
- **Development of smart eco-villages** – This is a pilot project that can be undertaken for any 1 of the NSS or UBA villages as a prototype based on the study in coordination with all departments, this scope and detailed plan of action provided as per MoU. **It can be undertaken through a MoU with the team who has conducted the audit.**

Ecological management practices through farm in the College

Water management practices in the College; including a book on by the department

9. References

The study is based on the data collected, analyzed, rechecked, and confirmed through multiple modes. For the quality study, some standards/ notes have been referred to. These are listed and noted below. However, no direct references have been used anywhere. These are used as a base to analyze and study the data collected.

- **National references**
  - ⇒ Uniform Plumbing Code – India, 2008
  - ⇒ IGBC Green Existing Buildings – Operation & Maintenance (O&M) Rating system, Pilot version, Abridged Reference Guide, April 2013
  - ⇒ IGBC Green Landscape Rating system, March 2013

- **International references**
  - ⇒ BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST – Canada
  - ⇒ Used only for understanding Universal design - Universal Accessibility Guidelines for Pedestrian, Non-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National center for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation and www.umassd.edu
  - ⇒ The city of Cheyenne, Streetscape/ Urban Design elements - Wyoming Planning Association, Gillette, Wyoming, United States
  - ⇒ Streetscape elements – Chapter 6 on San Francisco
  - ⇒ American lung association https://www.lung.org/
  - ⇒ Study related to air pollution https://www.airgle.com/
  - ⇒ Exploring the light pollution https://education.nationalgeographic.org/
  - ⇒ Accessibility study https://www.washington.edu/

Urban heat island effect https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands