

ENVIRONMENT AUDIT

STUDY PERIOD (FIVE YEARS) 2016-21

Sustainability study

AUDIT REPORT

Studied for

Viswambhara Educational Society's

Vaagdevi Pharmacy College

Bollikunta (Village), Khila Warangal (Mandal),
Warangal (Dist.) - 506 005, Telangana, 506005



Studied by

Greenvia
Solutions

Issued on 31 May 2022

Disclaimer

The Audit Team has prepared this report for the **Viswambhara Educational Society's Vaagdevi Pharmacy College** located at Bollikunta (Village), Khila Warangal (Mandal), Warangal (Dist.) - 506 005, Telangana based on input data submitted by the College 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 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 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 **Viswambhara Educational Society's Vaagdevi Pharmacy College** 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 **Sri. C. Janga Reddy**, Chairman; **Sri. Ch. Narsimha Reddy**, Vice President; **Dr. Ch. Devender Reddy**, Secretary & Correspondent; **Sri Ch. Sudharshan Reddy**, Joint Secretary; **Dr. Ch. Rathnakar Reddy**, Treasurer; **Mr. C. Satyapal**, Member, and everyone from the Management.

Our heartfelt thanks to the Chairperson of the entire process **4. Dr. G. Kamal Yadav**, Principal, for the valuable input.

We are also thankful to **College's Taskforce and the faculty members** who have collected the data required by the Assistant Professor **Mr. S. Kumara Swamy** (*Special mention for the excellent coordination*), Associate Professors – **Dr. B. Chandra Shekar Reddy, Dr. T. Ravi Chander, Dr. M. Swapna Reddy, Dr. P. Vivek Sagar, Dr. Ch. Mahesh, Dr. P. Srikanth**, and the Assistant Professors – **Mr. R. Shiva Kumar, Mrs. D. Radhika, Mr. A. Nagaraju, Dr. A. Gouthami, and Mr. R. Vijay Kumar**.

We highly appreciate the assistance of **Mr. K. Thirupathi**, Data Entry Operator; **Mr. Md. Zakir Hussain**, Superintendent & Clerk; **Mr. S. Babu**, Lab. Assistant 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.....	4
2. Institution overview	7
3. Green Building Study Audit.....	11
4. Site Study.....	12
5. Ecological (Environmental) Audit	13
6. Towards a Healthy & Sustainable Institution.....	22
7. References	24

1. Introduction

1.1 About Viswambhara Educational Society

It was established in the year 1993 to provide technical and higher education. This society was formed by dynamic and well-educated persons **to impart standard higher education in the North region of Telangana state.** The society is directed by highly experienced senior citizens, excellent academicians, and dynamic youngsters on the board of directors.

1.2 The surrounding premises around the Institution

The Premises is situated amidst the landscape serene of the **Warangal district of Telangana State** with immense peace and calmness in the surroundings. The College is surrounded by Educational Buildings on the macro front from all sides.

The college is situated in academia with several institutions under the same society. There are multiple shared facilities the colleges possess.

The college is located in serene atmosphere and green surroundings away from the buzz of the city and is feasible of the nearby essential amenities such as Public Health Center, Fire Station, Civic body-Public administrative buildings, Recreational gardens, and Police Station.

1.3 About the Institution

Vaagdevi Pharmacy College is the first Pharmacy College to be started in the Warangal region under JNTU, Hyderabad.

It is one of the pioneered institutions in the region of Telangana to provide a good pharmacy education and to meet the needs of the present-day healthcare system where a pharmacist has to play important role in society. To impart the professional course effectively, the institution is located in a peaceful locality away from a busy, noisy, and pollution-free atmosphere.

The premises are well equipped with a wide range of facilities that make life in academia comfortable and fulfilling. The academic life is vibrant and engaging.

It is affiliated with the Jawaharlal Nehru Technological University Hyderabad and provides the following programs:

- **Graduation** – It offers the Bachelor of Pharmacy (B. Pharm) course.
- **Post Graduation – It offers the following courses as Masters of Pharmacy**
 - M.Pharm - Pharmaceutics
 - M.Pharm - Pharmaceutical Analysis
 - M.Pharm - Pharmaceutical Regulatory Affairs
- **Doctor** – It offers the Doctor of Pharmacy (Pharm.D.) course.

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

1.4 Statements of the Institution

1.4.1 Vision

"The institute envisions ***"To create an educational environment in which students are geared up to meet the challenges of the modern Industry and Society."***

1.4.2 Mission

The College seeks to realize its Vision with a Mission to ***"To leverage the society reputation by an image composing of unique destination for standing out learning processes, success in profession and endow with a foundation towards research and development activities."***

1.5 Assessment of the College

1.5.1 Affiliations and approvals

The College has all its courses approved and is affiliated with the **Jawaharlal Nehru Technological University Hyderabad**, *a public university, located in Hyderabad, Telangana. Founded in 1965 as the Nagarjuna Sagar Engineering College, it was established as a university in 1972 by The Jawaharlal Nehru Technological University Act, 1972.*

1.5.2 Certification

AISHE – The College received the AISHE certification from the Department of Higher Education Statistics Division, New Delhi in 2022 and the code is C-19653-2019.

1.5.3 Approvals

The courses provided by the college are approved by the following bodies:

- **Pharmacy Council of India (PCI), New Delhi**
- **All India Council for Technical Education (AICTE), New Delhi**

2. Institution overview

2.1 Populace analysis for the Academic year 2020-21

2.1.1 Students data

The student data (shared by the College) shows there were a total of **138 Boys and 306 students**, thus there were **a total of 444 students** on the premises.

2.1.2 Staff data

Type	Male	Female	Total
Admin Staff	2	1	3
Teaching Staff	22	24	46
Non-Teaching Staff	11	12	23
Total Staff Members	35	37	72

Table 1: Staff data of the Institution for 2020-21

The staff data shows the premises had a total of **72** Staff Members.

2.2 Populace analysis for the Academic year 2019-20

2.2.1 Students data

The student data (shared by the College) shows there were a total of **107 Boys and 289 Girls students**, thus there were **a total of 396 students** on the premises.

2.2.2 Staff data

Type	Male	Female	Total
Admin Staff	2	1	3
Teaching Staff	21	19	40
Non-Teaching Staff	10	11	21
Total Staff Members	33	31	64

Table 2: Staff data of the Institution for 2019-20

The staff data shows the premises had a total of **64** Staff Members.

2.3 Populace analysis for the Academic year 2018-19

2.3.1 Students data

The student data (shared by the College) shows there were a total of **79 Boys and 235 Girls students**, thus there were **a total of 314 students** on the premises.

2.3.2 Staff data

Type	Male	Female	Total
Admin Staff	2	1	3
Teaching Staff	23	22	45
Non-Teaching Staff	11	11	22
Total Staff Members	36	34	70

Table 3: Staff data of the Institution for 2018-19

The staff data shows the premises had a total of **70** Staff Members.

2.4 Populace analysis for the Academic year 2017-18

2.4.1 Students data

The student data (shared by the College) shows there were a total of **94 Boys and 193 Girls students**, thus there were **a total of 287 students** on the premises.

2.4.2 Staff data

Type	Male	Female	Total
Admin Staff	2	1	3
Teaching Staff	22	20	42
Non-Teaching Staff	10	11	21
Total Staff Members	34	32	66

Table 4: Staff data of the Institution for 2017-18

The staff data shows the premises had a total of **66** Staff Members.

2.5 Populace analysis for the Academic year 2016-17

2.5.1 Students data

The student data (shared by the College) shows there were a total of **90 Boys and 165 Girls students**, thus there were **a total of 255 students** on the premises.

2.5.2 Staff data

Type	Male	Female	Total
Admin Staff	2	1	3
Teaching Staff	22	20	42
Non-Teaching Staff	10	10	20
Total Staff Members	34	31	65

Table 5: Staff data of the Institution for 2016-17

The staff data shows the premises had a total of **65 Staff Members**.

2.6 Total College Area & College Building Spread Area

The **total site area is 2 acres** and the **total Built-up area of the College is 79,068.5 sq. ft.** for **a total of 516 footfalls.**

2.7 College Infrastructure

2.7.1 Establishment

The College was established in 2007. The college 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.

2.7.2 Spatial Organisation

The overall ambiance 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 color palette not just helps the building to stand out but also provides an Institutional arena. There are

provisions for lifts and a staircase for accessibility on the premises, whereas there are amenities such as CCTV, Fire extinguishers, smoke detectors, a first aid box, etc.

2.7.3 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. The first and third Saturdays are off. The schedule is mentioned below.

S. No.	Section	Spaces	Time	Hours/ day	Days in a year
1	Main Institutional College	Student areas and Teaching faculty	09:30 a.m. to 04:30 p.m.	7	280
2	General areas	Admin areas and library, Passage, staircase, toilet	09:00 a.m. to 04:30 p.m.	7.5	300

Table 6: 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 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 campus

Green Audit

- Green initiatives
- Hygiene audit
- Water Audit - Analysis of the current water consumption of campus; Scope to include 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 Timeline of the activities for the Green Building Study Audit

- 05 February 2022 – Discussion with the College
- 12 February 2022 – Allotment and Initiation by the College
- 18 February 2022 – Induction Meeting
- 03 March 2022 – Survey of students and staff completed
- 05 March 2022 – Site visit
- 22 March 2022 – Data submitted by College
- 31 May 2022 – Submission of the Report

On-site investigation and physical verification

Site visit and interaction session



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 Viswambhara Educational Society's Vaagdevi Pharmacy College is located at Bollikunta (Village), Khila Warangal (Mandal), Warangal (Dist.) - 506 005, Warangal, Telangana, 506005 and falls under the Mawal Taluka, Bollikunta Village, Khila Warangal Mandal, Wardhannapet taluka, Warangal district and the Greater Warangal Municipal Corporation(GWMC).
- **About the district** - Warangal, also called Orugallu or Ekasila Nagaram in earlier times is the headquarters of the Warangal district in Telangana. Warangal is at a distance of 145 km to the northeast of Hyderabad.

(Source: <https://telanganatourism.gov.in/partials/destinations/regions/warangal.html>)

- **Neighborhood context** - The premises are surrounded by open spaces and Residential, Commercial, and Educational areas in the immediate surroundings of the site.
- **Natural physical features** – The premises includes rich biodiversity and a good number of plants in the adjacent open space. The site does not have a major difference in the land levels (contours).
- **Manmade features** – The premises are situated in a semi-urban area amidst residential areas and open spaces with appropriate proximity to necessary amenities. There is sufficient appreciation space for the 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 are parked.
- **Climate** – Warangal has a tropical climate. The summers are much rainier than the winters in Warangal. This climate is considered to be Aw according to the Köppen-Geiger climate classification. The average annual temperature in Warangal is 27.2 °C | 80.9 °F. The rainfall here is around 1,020 mm | 40.2 inches per year.

(Source: <https://en.climate-data.org/asia/india/warangal/warangal-968182/>)

Ecological (Environment) Audit



Background reference image Yugal Shrivastava on pexels

5. Ecological (Environmental) Audit

The environment is an essential part of 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, and 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 and a general understanding of the initiatives undertaken along with sufficient hygiene practices adopted. The universal design applies 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 the college ground is used for sports activities. There are ample resting spaces as part of the building design which provide a resting and warm welcoming approach on the premises.

5.1 Open Space

There is a beautiful balance of natural and open spaces on 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 on 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 upgrading the open spaces and they have done an excellent job in terms of the duty allotted. The infrastructure committee 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. **The efforts to maintain the existing space are commendable.**

5.2 Flora and fauna audit

5.2.1 Flora Audit

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. **A few trees 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.	Planted by
1	Amla (<i>Emblica Officinalis</i>)	Tree	3	Dr. G. Kamal Yadav
2	Aloe vera	Herb	10	S. Kumara Swamy
3	Astragalus (<i>Astragalus membranaceus</i>)	Herb	2	R. Shiva Kumar
4	Ashwagandha (<i>Withania somnifera</i>)	Herb	2	Dr. M. Swapna Reddy
5	Arjuna (<i>Terminalis arjuna</i>)	Tree	1	Natural
6	Banana (<i>Musa paradisiaca</i>)	Herb	2	Dr. Ch. Mahesh
7	Bach (<i>Acorus calamus</i>)	Herb	2	G. Chandana
8	Bilva (<i>Aegle marmelos</i>)	Tree	2	Dr. T. Ravichander
9	Cats claw (<i>Uncaria tomentosa</i>)	Herb	2	Natural
10	Coriander (<i>Coriander sativum</i>)	Herb	10	Natural
11	Datura (<i>Datura stramonium</i>)	Herb	4	A. Gouthami
12	Echinacea /Cone flower (<i>Echinacea purpurea</i>)	Herb	2	Natural
13	Giloy (<i>Tinospora cardifolia</i>)	Climbing Shrub	2	A. Nagaraju
14	Garlic (<i>Allium sativum</i>)	Flowering Plant	4	Zakir Hussain
15	Ginger/Adarak (<i>Zingiber officinale</i>)	Rhizome	5	Thirupathi
16	Harsinghar (<i>Nyctanthes arbortristis</i>)	Coral Jasmine	2	Dr. P. Vivek Sager
17	Kamala (<i>Mallotus philippinensis</i>)	Plant	3	Dr. B. Chandra Shekar
18	Kadamba (<i>Neolamarckia Cadamba</i>)	Tree	25	Natural
19	khirayat (<i>Andrographis paniculata</i>)	Plant	2	M. Aishwarya
20	Makoy (<i>Solanum nigrum</i>)	Plant	2	Ch. Uday Kiran
21	Mustard (<i>Brassica campestris</i>)	Plant	4	A. Rakesh

22	MORINGA OLEIFERA	Tree	2	Natural
23	NEEM (<i>Azadirachta indica</i>)	Tree	10	Natural
24	Onion (<i>Allium cepa</i>)	Bulb	5	K. Bhanu
25	Periwinkle (<i>Catharanthus roseus</i>)	Tree	5	Natural
26	Punarnava (<i>Boerhaavia diffusa</i>)	Plant	3	B. Jyoshna
27	Sitaphal (<i>Annona squamosa</i>)	Plant	4	T. Neena
28	Saunf (<i>Foeniculum vulgare</i>)	Plant	2	Natural
29	Satavar (<i>Asparagus racemosus</i>)	Shrub	4	D.Radhika
30	Turmeric (<i>Curcuma longa</i>)	Rhizome	5	P.Raju
31	Tulsi (<i>Ocimum sanctum</i>)	Plant	10	K. Naveen
32	Udumbara (<i>Ficus Racemosa</i>)	Tree	4	Natural

Table 7: Details of the Trees on the premises

At present, there are 32 types and 145 numbers of plantations on the premises.

The benefits of having trees on 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 the use of dried leaves to for organic composting.

5.2.2 Fauna Audit

It is a beautiful site to have the birds chirping around the College premises. It highlights the ecological co-existence concept most beautifully. The surveyed data of the fauna shows that there are Butterflies, Ants, Spiders, *Myna*, Sparrow, Squirrel, and lizards are available on the premises

5.3 Noise Audit

5.3.1 Macro level

On a macro level, there are open grounds on the site. The approach road however has some traffic. As the college is oriented amidst the residential areas with sufficient vegetation the noise levels do not affect the students and staff in their day-to-day functioning. The approach road is pretty away. **Overall the noise level in terms of bad effects is moderate and there are positive outcomes as per our analysis on a macro level.**

5.3.2 Micro-level

The college has an adequate open space covered with huge trees prevailing naturally on the premises which act as a noise barrier; in addition, the Institution building is surrounded by Educational Buildings which further act as a benefit in reducing any noise pollution. There is no particular equipment that causes 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:

- **Parent's commute** - There are 2 Parent-teacher meetings held in a year and the turn-out is around 45%
- **Vehicles details** – The Institute has distinguished two-wheeler and four-wheeler parking spaces for both faculty and students. Apart from this, a closed parking facility is also available for faculty, easily 1,000 two-wheelers and 250 cars can be easily parked on the premises.

S. No.	Type	Nos.	For (student/ Staff)
1.	Cars	08	Staff
2	Bikes	155	Staff and Students
3	Cycles	05	Students
4	Electric vehicles	2-5	Staff and Students

Table 8: Details of the Parking on the premise

- **Commute details** – The students and staff commute from multiple places. The details are summarised below. This includes places where they are coming daily and necessarily less than 10 km.

S. No.	Name of all the places of commute	Distance from College
1	Bollikunta, Ramakrishnapur, Punnal, Mamunoor	Within or less than a 5 km radius
2	Warangal, Hanamkonda, Kazipet, Vardannapet, Thorrur, Inavolu	More than 5 km and up to 10 km radius

Table 9: Details of the places students and staff commute from

5.4.2 Heat Island Reduction

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

- **Exposed roof areas** – The terrace is a flat roof that is absolutely clean and well maintained. *It is painted and covered with white paint which reflects the heat.*
- **Exposed non-roof hardscape areas** – There is the availability of courtyards surrounded by potted plantations on a micro-level. *This helps in maintaining the internal temperatures by reducing the direct heat gain to a certain extent.*

There are adequate measures adopted on the premises to reduce the heat island effect of Building roofs and on the 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 Universally accessible premises

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

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

- **Lifts for vertical circulation**
- **Ramps at the entrance area**
- **Handrails along the staircase**
- **Low height risers in the staircases**

The design of the premises is appropriate for access with passages and corridors being wide enough in size and naturally ventilated and are safe from the fire safety aspect.

5.6 Fire Safety

The Institution has undertaken adequate fire safety measures. Each floor has an open staircase without any barriers and fire extinguishers for fire safety measures. These staircases are free of any kind of storage or combustible material. **Our observation was that there are good measures adopted, however, measures such as sprinkler system, smoke detector, hydrant system, and fire safety specific signages should be present on the premises.**

5.7 Survey Results

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

5.7.1 Participation

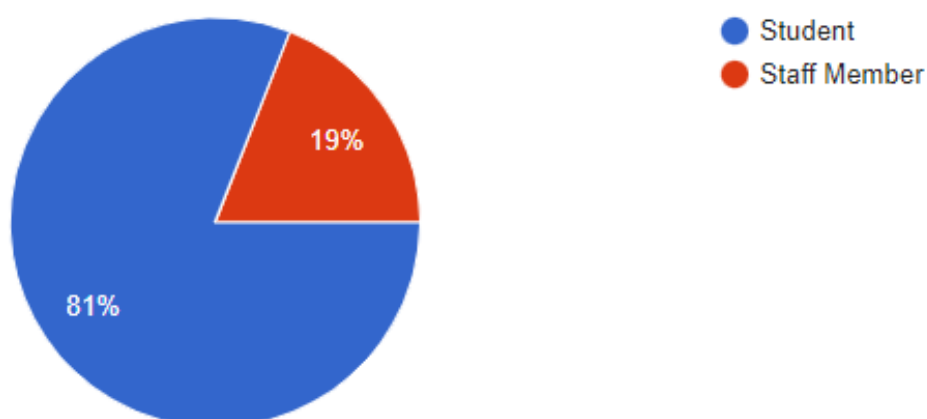


Figure 1: Participation analysis in the survey

A total of **21 responses** were received out of which 81% 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.

- We have conducted the Haritha Haram program and planted some medical, flowering plants, etc.
- We have (a medicinal garden) on college premises with different types of plants
- Programs like haritha haram are conducted every year.
- Maintain cleanliness and conduct plantation program.

5.8 Positive site features as per our study

a) Use of organic fertilizers for the plantations

The college uses organic compost and avoids the use of any chemical fertilizer thus maintaining the practice of organic farming.

b) Beautification of the landscape

The existing landscape is being upgraded with the help of a consultant to change the landscape architecture of the premises.

c) Cool rooftops

The College has its Terrace roofs painted with Cooltop it helps in reducing the temperature of the spaces.

d) User-friendly movability on-premises

There are provisions of a Kerb Ramps near the main entrance of the Building premises, also a low height handrail for ease of access.

e) Resting places

There are provisions for resting places on-premises outdoor and indoors.

f) Avoid using plastic in premise

There are provisions for a ban on the use of plastic bags or products on the premise.

g) Paperless technologies for offices

The college has gone technology-friendly and becomes paperless to a certain extent in the functioning of the premise maybe not fully.

h) Availability of medicinal gardens

There is a provision for the medicinal garden on the premises which is beneficial for health and the environment. It boasts of multiple varieties of plantations and regular activities are conducted towards the same.

5.9 Recommendations for a Sustainable Habitat by Greenvio Solutions

Site beautification

a) Low VOC Paints and Adhesives

Whenever the College undergoes repairs or renovations there should be the use of materials with low emissions to reduce the adverse health impacts on workmen and the students occupying the space thereafter.

b) Additional facilities for birds

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

c) Nutrition pits

Certain pits can be demarcated as 'Nutrition pits' where the organic food from the 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 a minimum of 1 toilet for the specially-abled people as per guidelines prescribed by the National Building Code 2016 with size being a minimum of 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 spaces along with battery charge points, this would inspire students to change their mode of transportation and adopt sustainable practices.

b) Bicycles as a gift

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

c) Vehicle usage

Restricting the speed limit of vehicles on the premises to 10 km per hour, not honking on the premises.

d) Avoid burning waste

The waste produced on the premises should not be burned as it is dangerous to the health of students and staff

Smart and responsible environment systems**a) Smart Gardening System**

The College can undertake a Smart Gardening system using IoT Technology such as an automated watering system. This will result in saving time by scheduling time for watering; Saving money and water as smart irrigation systems have automated water schedules in addition to tracking dampness of soil which helps the irrigation system know when and how much the garden needs. It also helps in healthier plants as with the help of apps, smart irrigation systems, or even smart growing containers, these tasks can be provided evenly and allow the plants to be healthier and more productive.

More information on this system can be checked here

<https://www.happysprout.com/inspiration/what-is-smart-gardening/>

b) Community gardening

There can be provisions for community gardening in addition to allowing the general public to use the parks on the premises for walks and jogging.

On-site investigation and physical verification

The ecologically friendly ambience with facilities such as medicinal gardens, courtyards, ramps, lifts & open spaces



6. Towards a Healthy & Sustainable Institution

6.1 Recommendations based on the study

In addition to the recommendations provided in each section; the College can adopt the following strategies for Healthy and Sustainable Institution practices.

- a) **Terrace farming** - There can be the provision of terrace farming in a designated area of the open space this would enhance the biodiversity and be useful in training students and staff about the healthy practices and food grown which would be used in Canteen. It helps in capacity building as well as the smaller steps are taken have huge impacts when each student would adopt these practices in their homes or societies and grow kitchen garden, and terrace garden there will be a long term benefit for the environment as a whole.
- b) **Cutlery in the Canteen** – The regular plastic and steel plates, and spoons used in the Canteen can be replaced with eco-friendly/ organic leaves, paper straws, disposable plates, and edible spoons made out of sugarcane waste or bamboo.
- c) **Signages** – In addition to the signages being in regular language there can be additional signages in braille language for the specially-abled students.
- d) **Amphitheatre cum open learning space** - The College can create an open space amphitheater in the open area and include open space learning and activities there providing a holistic approach to education and being one of its kind Institute to adopt this practice.
- e) **Waste vio** – College can tie up with our organization and students can be encouraged to collect dry waste and electronic waste such as newspapers, old laptops, and others and hand them over on a weekly or monthly basis thereby making a waste reduction approach in the community. This has benefits such as awareness, and eco-friendly habits in becoming a responsible citizen.
- f) **Eco clubs** – In addition to the NSS, there can be an eco-club with school and college students operating together which will help the collaboration to yield results right from the micro-level.
- g) **Additional fire safety** – The measures such as a Hose reel, signages, fire-fighting

tank, fire alarm, and sprinkler system should be adopted. There should be a fire extinguisher minimum of two per floor on every staircase, immediately outside the lifts, and in every lab with appropriate signages and layouts for exit plans in case of an emergency.

6.2 Survey Results

An online survey was conducted to analyze the student and staff views about changes for Green audit improvement. **Some of the suggestions are listed below:**

- Planting more plants at different places on the premises is required.
- Improvement in plantation and take care of plants every day by watering plants.

However, it should be noted that because of the pandemic the students have not visited the premises physically so some of these points are not mandatory.

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-motorized vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National center for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.
6. Climate data <https://en.climate-data.org/asia/india/warangal/warangal-968182/>
7. District data <https://telanganatourism.gov.in/partials/destinations/regions/warangal.html>

