GREEN AUDIT

2019-20 & 2020-21

AUDIT REPORT

Includes Environment, Energy and Green Audit

Studied for

Bahujan Hitay Jagat Shikshan Sanstha, Gondia's

Jagat Arts, Commerce and Indiraben Hariharbhai Patel Science College

Goregaon District- Gondia (Maharashtra) 441801

Analysed by

Greenvio Solutions

24 December 2021

Background reference image Nic Y C Gua on unsplash

Disclaimer

Green Audit Team has prepared this report for **Bahujan Hitay Jagat Shikshan Sanstha, Gondia's Jagat Arts, Commerce & Indiraben Hariharbhai Patel Science College, Goregaon District- Gondia (Maharashtra) 441801** based on input data submitted by the College analysed by the team to the best of their abilities.

The details have been consolidated and thoroughly studied as per the various guidelines for Green Buildings available in National Standards, the report has thereby been generated based on comparative analysis of the existing facilities and the benchmarks. The suggestions derived as a result of the inspection and research as per inputs which would further enhance and develop a Healthy and Sustainable Institution.

These can be implemented phase wise or as a whole warranty or undertaking, express 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 inventory and on-site investigation of data collected over a period of time and should not be used for any legal action. This is the property of Greenvio Solutions and should not be copied.

The Report is prepared by the Team of Greenvio Solutions under their brand and department – Sustainable Academe as Consultancy firm along with Ar. Nahida Shaikh as an Accredited Green Building Professional.

Greenvio Solutions

Developing Healthy and Sustainable Environments

We are an Environmental and Architectural Design Consultancy firm

Sustainable Academe is our department for conducting Audits

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Acknowledgement

Green Audit Assessment Team thanks the **Bahujan Hitay Jagat Shikshan Sanstha, Gondia's Jagat Arts, Commerce & Indiraben Hariharbhai Patel Science College, Goregaon District- Gondia (Maharashtra)** for assigning this important work of Green Audit. We appreciate the cooperation extended to our team during the entire process.

Our special thanks are due to **Hon'ble Mr. Jagatram Rahangdale, President; Hon'ble Dr. Sachin Rahangdale, Vice President; Hon'ble Mr. Nayanrao Yede, Secretary; Hon'ble Mrs. Vimaltai Rahangdale, Join-Secretary; Hon'ble Mrs. Chandrakala Yede, Treasurer** and everyone from the Management.

Our heartfelt thanks to Principal and Chairman of the entire process **Dr. Nilkantha Lanje, Principal** for the valuable inputs.

We are also thankful to College's Task force the faculty members who have collected data required for green audit **Dr. V. I. Rane, IQAC Co-ordinator; Dr. Wasudha Meshram; Incharge (Special mention for the excellent co-operation by Madam in entire process); Dr. C. T. Rahule, Member** and **the Admin staff** for the inventory and data collection.

We highly appreciate the assistance of **the entire Teaching and Non-teaching staff** for their support while collecting the data.

Sustainable Academe

Brand of Greenvio Solutions, Palghar District, Maharashtra- 401208

Contents

1. Introduction

1.1 About Bahujan Hitay Jagat Shikshan Sanstha

Jagat Arts, Commerce & Indiraben Hariharbhai Patel Science College, Goregaon is run by Bahujan Hitay Jagat Education Society, Gondia. The great **visionary Jagatramji Rahangdale,** the founder of our society had a dream to make the people of economically backward region educated. Out of his vision, the college was established in the year 1992. Since then the college is striving hard to educate the students, to make them to achieve their goal.

The College is committed to the unprivileged section of the society and strives to achieve excellence in education. It is a thing of great proud that the college is marching towards its goal with distinctive features. Jagat college is rendering more and more fruitful service in the field of education and serving the society in economically backward area by uplifting them in the field of education to withstand in modern era.

1.2 Vision and Mission Statement of College

Our Vision - To educate the rural people, spread up literacy to the endpoint of rural area and remove superstitions from the society to build up the strong nation.

Our Mission

- *Education as a mission for village folk -* To educate the rural people who astray from education due to lack of educational facility in the neighboring area.
- *Dissemination of education to grass root -* Effective planning should begin from the bottom for the eradication of social evils. To create consciousness and awareness among the village mass, being completely illiterate and distant from the benefit of education, management takes creative and constructive initiatives in this direction.
- *Socio-economic, moral and cultural amelioration of society -* Education in any free and complex society is influenced by socio-economic and cultural circumstances. To boost up such structure among the villagers, the higher education plays a significant role. Our institution defiantly enhance in this direction successfully.

- *To encourage co-education for removal of backwardness of women cadre -* As the problem of illiteracy among the women in the rural area is obviously immense, the education of girls, mothers of the future, is the most significant factor in reducing the illiteracy and superstitions in the society. To achieve higher level of literacy and upgrading status of women's cadre in the rural area and to bring about radical changes in their lives, a drastic attempt is made to encourage co-education through the esteemed institution.
- *To serve and co-operate the community -* Providing the student with self-sufficient comprehensive and dependable source would enable him to prepare for various fields of life. Our college extends better educational service to community and society overall.
- *Approach to quality improvement in learning -* For the betterment of students through dedication, teaching is the sole mission of our college. The institution strives for improvement in the quality of education. Students satisfaction being the aim, institution tries its best to achieve this goal with co-ordinated endeavour and contribution by devoted, experienced and skilled teacher.
- *To equip the new generation to meet and beat crucial challenges of modern era* - The strategies and approach of the college is to prepare students to face the challenges of modern era. We believe that the student in turn will serve society. As educated men & women they would make their contribution in their chosen careers and as responsible citizens they will be capable of meeting the challenges in time ahead. The college is well equipped and seeks to impart a new spirit among youth.
- *To stimulate interest in minds of the students for learning and developing mental intellectual status* - At the time of admission, the admission committee and the principal communicate with the students. It also communicates with the staff and stakeholders through parent-teacher meeting and NSS program organized by the college every year.

1.3 Institutions in the premises

The Premises is situated amidst the landscape serene village of Gondia district with close proximity recreational and amenities such Hospital, Fire Station and much more. During the entire day schedule with smooth transition of internal student traffic management which is highly commendable.

It was established in 1992 as a single building, over the time it has grown into multiple blocks prevailing in the premise and has undergone multiple expansion activities.

The institution is committed to offer quality education which fulfil the requirements of its students and help them in pursuing their future goals. The institution designs curricular and co-curricular programs to develop the qualities of hard work, honesty, integrity and socialism among the students. The competitive environment helps students to attain their full intellectual and personal potential through passion for excellence, making them globally competent. The institution is always ready to take care of the students by providing following opportunities. The objectives of college are as follows:

- Providing students with an environment for the all-round development of their intellectual, physical, moral, aesthetic, scientific temperament and social potential.
- Promoting academic excellence through well-resourced quality teaching.
- Identifying the skills and intellectual capabilities of students and developing a spirit of inquiry, research and creativity.
- Guiding the students to attend different competitive examinations.
- Developing positive attitude through extracurricular activities such as field visits, NSS camp and other activities.
- Availing favorable environment to build self-esteem, self-confidence to become a supportive member of the society.
- Boosting qualities of leadership, responsibility, tolerance and respect for others, thus, fostering positive relationships.
- Preparing students to interact positively, efficiently and effectively with the society.

The aim of the college is to continuously enhance the teaching methods in order to provide students with an opportunity for their all-round development. It also strives for excellence in academics and makes an effort to induce passion for learning along with the inspiration for decisive thinking and assessment, thereby helping them to become the best professionals in their chosen careers.

The institution offers the following courses affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur.

- **Graduation**
- **Post-Graduation**
- **Short term courses -** The College has introduced Industry linked courses.

The College has the **Chemistry, Physics, Botany, Zoology, English, Mathematics, Marathi, History, Geography, Political Science, Economics, Commerce and Physical education departments** as part of its Educational programmes.

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

1.4 Assessment of the College

University - The institution is affiliated to Rashtrasant Tukadoji Maharaj Nagpur University.

NAAC - The following are details of the reaccreditation of the Jagat Arts, Commerce & Indiraben Hariharbhai Patel Science College, Goregaon.

Cycle	Grade	CGPA	Year
First	C+	-	16 February 2004
Second	B	2.11	8 January 2011
Third	B	2.31	16 September 2016

Table 1: Details of NAAC Accreditation

The College is going to enter its Fourth cycle of NAAC soon.

ISO – The College is ISO 9000:2015 Certified by Otabu Certification Limited (UK)

राष्ट्रीय मूल्यांकन एवं प्रत्यायन परिषद

विश्वविद्यालय अनुदान आयोग का स्वायत्त संस्थान

NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL

An Autonomous Institution of the University Grants Commission

Certificate of Accreditation

The Executive Committee of the
National Assessment and Accreditation Council
on the recommendation of the duly appointed
Peer Team is pleased to declare the
Bahujan Hitay Jagat Shikshan Sanstha Gondia's
Jagat Arts, Commerce and
Indiraben Hariharbhai Patel Science College
Goregaon, Gondia, affiliated to Rashtrasant Tukadoji Maharaj Nagpur University,
Maharashtra as
Accredited
with CGPA of 2.31 on seven point scale
at B grade
valid up to September 15, 2021

Date : September 16, 2016

Director

EC(SC)/17/A&A/34.3

Certificate

Otabu

Certificate of Registration

This is to certify that

JAGAT ARTS, COMMERCE AND INDIRABEN HARIHARBHAI PATEL SCIENCE COLLEGE

DURGA CHOUK, RAILWAY STATION ROAD, GOREGAON, DISTRICT -GONDIA, MAHARASHTRA- 441801, INDIA

has been assessed and certified by Otabu Certification Limited as meeting the requirements of

ISO 9001:2015
Quality Management System

For the following activities

PROVIDING U.G. COURSES – B.A. (MARATHI MEDIUM), B.COM. (MARATHI AND ENGLISH MEDIUM) & B.SC. (ENGLISH MEDIUM) P.G. COURSES – M.A. (MARATHI), M.A. (GEOGRAPHY) & M.A. (HISTORY)

Date of Registration	: 05 August 2021
1st Surveillance Due	: 04 August 2022
2nd Surveillance Due	: 04 August 2023
Certificate Expiry (subject to the company maintaining its system to the required standard)	: 04 August 2024

Certificate No:- 210805606

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Authorised Signatory

Otabu Certification Limited (UK)

Validity of this Certificate is subject to Annual Surveillance audits done successfully

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2. Institution overview

2.1 Populace analysis for Academic year 2019-20

2.1.1 Students data

The student data (shared by the College) shows there are total of **815 Girl and 343 Boys** students.

2.1.2 Staff data

Type	Male	Female	Total
Teaching staff	21	3	24
Non-Teaching staff	15	1	16
Total	**36**	**4**	**40**

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

The staff data shows the premise has a total of **40** staff members.

2.2 Populace analysis for Academic year 2020-21

2.2.1 Students data

The student data (shared by the College) shows there are total of **870 Girl and 339 Boys** students.

2.2.2 Staff data

Type	Male	Female	Total
Admin staff	21	3	24
Teaching staff	15	1	16
Total	**36**	**4**	**40**

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

The staff data shows the premise has a total of **40** staff members.

2.2 Site analysis

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 Bahujan Hitay Jagat Shikshan Sanstha, Gondia's Jagat Arts, Commerce & Indiraben Hariharbhai Patel Science College, Goregaon District-Gondia (Maharashtra) 441801 is close to the Gondia Kohmara Road and falls under the Goregaon town a Tehsil in Gondia subdivision of Gondia district in Nagpur Division(Berar region) in the state of Maharashtra.
- **Neighbourhood context -** The premise is surrounding by open areas on the immediate surroundings of the site. The premise is situated amidst the lush greens of village areas and is surrounded by huge jungles on all sides.
- **Natural physical features –** The premise includes a rich biodiversity and huge number of plants in the adjacent open space.
- **Manmade features –** The premise is situated in an rural area amidst huge open land areas with close proximity to all necessary amenities. The materials used for construction are RCC and the landscaping includes natural trees as well as potted plants.
- **Circulation –** There is a smooth transition of pedestrian traffic inside the premises due to the large entrance gate and the huge open space where vehicles of students and staff is parked.
- **Climate –** Gondia District experiences extreme variations in temperature with very hot Summers and very cold Winters and an average relative humidity of 62 percent. Gondia district receives rainfall from South- Western winds mainly in the months of June, July, August and September. July and August are the months during which the maximum rainfall as well as maximum continuous rainfall occurs.

(Source: https://gondia.gov.in/en/climate-and-rainfall/)

2.3 Total Institute Area & College Building Spread Area

The total site area is 3.9 acres and total built-up area is 32,831 sq. ft. for approx. 1,249 footfalls.

S. No.	Area Type	Area
1	Site Area -	3.9 acres
2	Built up Area Main Building –	Ground Floor = 652.90 sq. m First Floor = 652.90 sq. m
3	Built up Area New Building –	Library Ground Floor = 374.72 sq. m Library First Floor = 374.72 sq. m
4	Built up Area Hostel Building –	Hostel Ground Floor = 331.98 sq. m Hostel First Floor = 331.98 sq. m iii) Hostel Second Floor = 331.98 sq. m

Table 4: Details of Site and Built-up area of College

2.4 Institute Infrastructure

2.4.1 Establishment

The building was established in 1992. The Building is a Reinforced Cement Concrete (RCC) framework building. **Overall the Infrastructure of the Building is excellent in terms of the Architecture Design and Green Building Design. The Premise covers almost all the requirements for a Green Habitat and is one of its kind set up pretty close to nature.**

2.4.2 Spatial Organisation

The overall ambience of the College is warm and inviting. The classrooms and other spaces have ample natural ventilation in the form of clear glass windows with fresh air ventilation. The architecture of the building is quite well designed. The colour palette not just helps the building to stand out but also provides an Institutional arena. It balances with the local architecture with the natural landscapes of huge coconut trees all around. The design emphasis on providing calmness to the built form and

gradually merges with the serene landscape.

There are no false ceilings in the premise. The floor to floor height is 14 feet and of 3m or 10 feet. There are no lifts in the premise. There are provisions for amenities such as library and Hostel. The room-wise details are mentioned below:

S. No	Room No.	Room Name	Floor	Building
1	1	IQAC	Ground floor	College Building
2	2	Administrative Office	Ground floor	College Building
3	3	Principal Office	Ground floor	College Building
4	4	Class Room	Ground floor	College Building
5	5	Class Room	Ground floor	College Building
6	6	Class Room	Ground floor	College Building
7	7	Class Room	Ground floor	College Building
8	8	Chemistry Lab	Ground floor	College Building
9	9	Chemistry Lab	Ground floor	College Building
10	10	Chemistry Lab	Ground floor	College Building
11	11	Chemistry	Ground floor	College Building
12	12	Maths Staff Room	Ground floor	College Building
13	13	Instruments Room (Bot)	First floor	College Building
14	14	Botany Lab	First floor	College Building
15	15	Botany Lab	First floor	College Building
16	16	Physics Lab	First floor	College Building
17	17	Physics Staff Room	First floor	College Building
18	18	Geography Lab	First floor	College Building
19	19	Geography Staff Room	First floor	College Building
20	20	Botany Staff Room	First floor	College Building
21	21	Marathi Staff Room	First floor	College Building
22	22	Class Room	First floor	College Building
23	23	Class Room	First floor	College Building
24	24	Class Room	First floor	College Building
25	25	English Language Lab + Staff Room	First floor	College Building
26	26	Girls Common Room	First floor	College Building
27	27	Commerce Room	First floor	College Building

28	28	Exam Control Room	First floor	College Building
29	29	Class Room	First floor	College Building
30	30	Class Room	First floor	College Building
31	31	History Dept.	First floor	College Building
32	32	Boy's Common Room	Ground floor	College Building
33	33	Library 1+ Reading Room	Ground floor	College Building
34	34	Library 2	Ground floor	College Building
35	35	Class Room	Ground floor	College Building
36	36	Girls Common Room	First floor	College Building
37	37	Staff Wash Room	First floor	College Building
38	38	Zoo. Lab	First floor	College Building
39	39	Zoo. Staff Room	First floor	College Building
40	40	Pol. Sci.+ Conti.Edu. & Extension Dept.	First floor	College Building
41	41	Class Room	First floor	College Building
42		Conf. Hall	Ground floor	College Building
43		Verandah Main Building	Ground floor	College Building
44		VerandahMain Building	First floor	College Building
45		Staircase		College Building
46		Staircase		College Building
47		Verandah New Building	Ground floor	College Building
48		Verandah New Building	First floor	College Building
49	1	Gymnasium	Ground floor	Girls Hostel Building
50	2	NSS Room	Ground floor	Girls Hostel Building
51	3	Physical Dept.	Ground floor	Girls Hostel Building
52	4	Kitchen + Dining	Ground floor	Girls Hostel Building
53		Warden's Room	Ground floor	Girls Hostel Building
54		Wash Area	Ground floor	Girls Hostel Building
55		Verandah	Ground floor	Girls Hostel Building
56		Staircase	Ground floor	Girls Hostel Building
57	5	G.Living Room	First floor	Girls Hostel Building
58	6	G.Living Room	First floor	Girls Hostel Building
59	7	G.Living Room	First floor	Girls Hostel Building
60	8	Store Room	First floor	Girls Hostel Building

61	9	G.Living Room	First floor	Girls Hostel Building
62	10	G.Living Room	First floor	Girls Hostel Building
63	11	G.Living Room	First floor	Girls Hostel Building
64		Wash Area	First floor	Girls Hostel Building
65		Staircase	First floor	Girls Hostel Building
66		Verandah	First floor	Girls Hostel Building
67	12	G.Living Room	Second floor	Girls Hostel Building
68	13	G.Living Room	Second floor	Girls Hostel Building
69	14	G.Living Room	Second floor	Girls Hostel Building
70	15	Store Room	Second floor	Girls Hostel Building
71	16	G.Living Room	Second floor	Girls Hostel Building
72	17	G.Living Room	Second floor	Girls Hostel Building
73	18	G.Living Room	Second floor	Girls Hostel Building
74		Wash Area	Second floor	Girls Hostel Building
75		Verandah	Second floor	Girls Hostel Building
76		Staircase	Second floor	Girls Hostel Building

Table 5: Room-wise space details

2.4.3 Fire Safety

When the building was constructed Fire fighting norms and permission from Chief Fire Officer was not in practice. However, the Institution has taken care for adequate fire safety measures to be adopted. Each floor has an open staircase without any barriers for fire safety measures. These staircases are free of any kind of storage or combustible material. The windows in each classroom are at a low height with fresh air and natural light thereby adding to ample ventilation throughout the day. The college should adopt additional fire safety practices such as fire hydrant and others. The current facilities are quite well maintained.

S. No.	Location	Qty.	Fire Alarm
1	Ground Floor Chemistry Laboratory	2	1
2	New Build Library	1	1
3	Outside Principal's Cabin	1	1

4	Outside Physics Lab.	1	1
5	Outside Computer Lab.	1	-
6	Conference Hall	2	-
7	In front of class room 6	1	-
Total		**9**	**4**

Table 6: Details of the Fire extinguishers in premise

2.4.4 Operation and Maintenance of the premises

The interview session with the staff regarding the operation and working hours is summarised in the table. The Institutions are open Monday to Saturday for full day except every Saturday is half day only for Science laboratory and admin. Sunday is an off for all. The operating hours and days are as follows as the College runs in two shifts.

- **For teaching staff**
  - Shift 1 from 7:30 hours to 14:10 hours
  - Shift 2 from 10:30 hours to 17:10 hours
- **For Non-teaching staff**
  - Monday to Friday from 10:30 hours to 17:30 hours
  - On Saturday from 10:30 hours to 14:30 hours

View of Main Building and Entrance

Class Rooms In New Building

Girl's Hostel Building

Back side view of main building

View of main building and library

Sports Ground on Backside of Main Building

3. Green Audit

3.1 About the Green Audit

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

3.2 Analysis for the Green 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

Water Audit

- Analysis of the current water consumption of campus
- Scope to include Rain water harvesting and Waste water treatment in campus

Waste Audit

- Current waste produced, its segregation and usage
- Strategies to be adopted for waste management and awareness

Environmental Audit

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

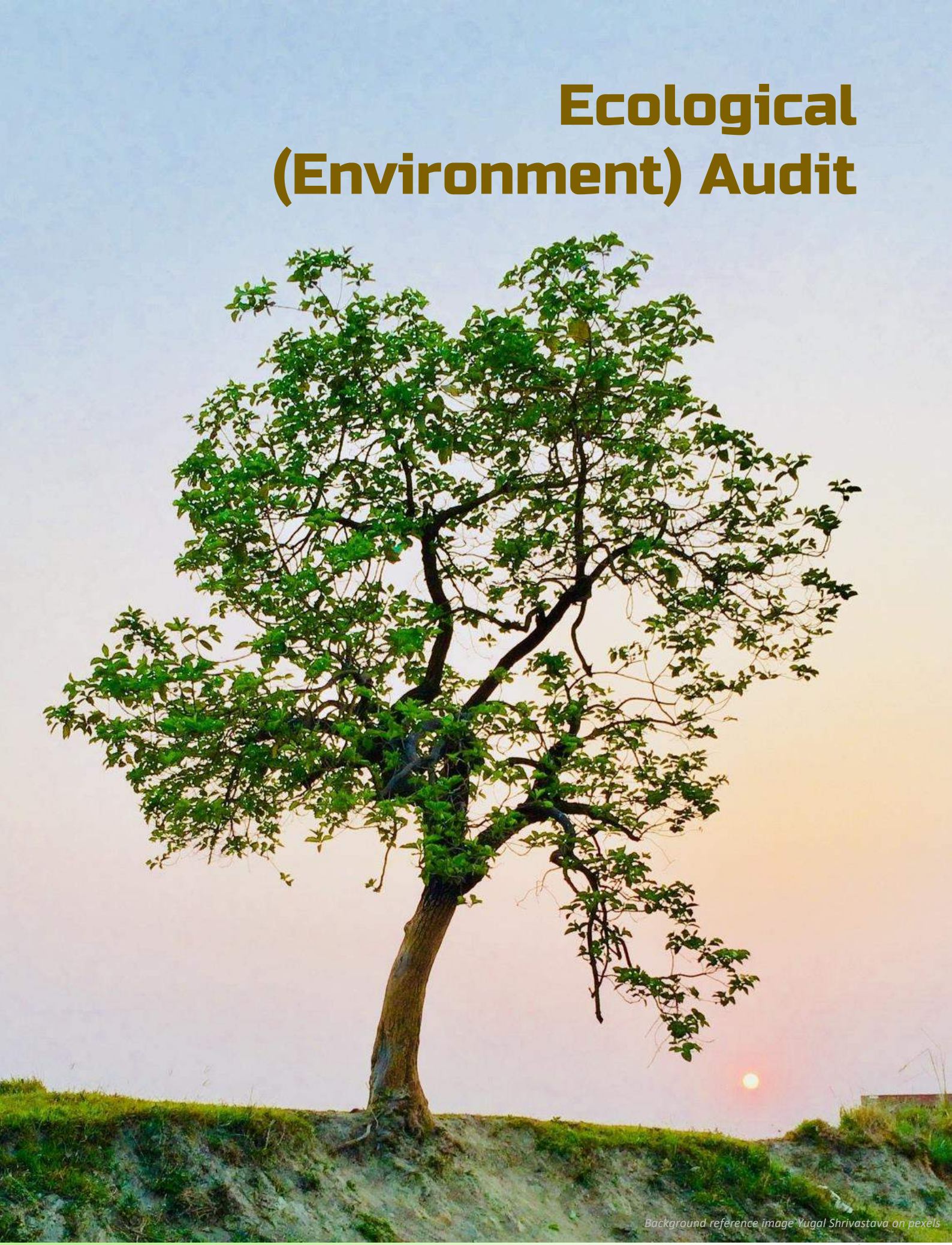
3.3 Strategy adopted for conducting Green Audit

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

3.4 Timeline of the activities for Green Audit

- 23 July 2021 – Discussion with the College
- 28 August 2021 – Student and Staff survey by College
- 1 November – Data collection submitted by College
- 9 December 2021 – Submission of draft Report
- 24 December 2021 – Submission of Main Report

Ecological (Environment) Audit



Background reference image Yugal Shrivastava on pexels

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4. 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 premise. 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. The premise needs to have facilities for students who are specially abled alike.

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 and in the beautiful area of Gondia district the appreciation space towards the main entrance provide a welcoming approach to the College. It has an equal balance of landscape and built space thus providing an enriching arena to the students.

The college has huge open space used by all. The students use it for as a leisure place for study and college ground is used for sports activities. The open auditorium is used for co-curricular and extra-curricular spaces, it also given for marriage functions. There are ample resting spaces as part of building design which provide a resting and warm welcoming approach in the premise.

4.1 Open Spaces

General playground used for sport activity and private function like cricket matches and Marriage functions. Around 400 sq. m of area is allocated for tree plantation in the premise. The college has a Botanical Garden facility with a coordinating team.

There is an appropriate coordinating team in charge for open spaces, its activities and maintenance. The college follows an appropriate irrigation system wherein water is supplied through pipe line to botanical garden, playground and landscaping.

4.1.1 Flora analysis

A) Plants and Trees

The trees constitute the maximum percentage out of all the varieties of plantations in premise and available in a **total of 170 varieties of Trees**. The list is as follows:

S.No	Botanical Name	Vernacular name	Family	Description
1	*Abitulon indicum*	Petari	*Malvaceae*	Medicinal
2	*Acacia auriculiformis*	Australian Acacia	*Fabaceae*	Tree
3	*Acacia nilotica*	Babool	*Meliaceae*	Medicinal
4	*Acalypha wikesiana*	Copper Leaf	*Euphorbiaceae*	Ornamental
5	*Acatoceros tetragonus*	Castle cactus	*Cactaceae*	Ornamental
6	*Acorus calamus*	Vekhand	*Asparagaceae*	Medicinal
7	*Adnium obesum*	Adnium Obesum	*Apocynaceae*	Ornamental
8	*Aegle marmelos*	Belpatra	*Rutaceae*	Medicinal
9	*Aeruva lanata*	Gorakhbuti	*Amaranthaceae*	Medicinal
10	*Agave americana*	American Aloe	*Agavaceae*	Medicinal
11	*Ageratum conizoides*	Goatweed	*Asteraceae*	Medicinal
12	*Albizia julibrissin*	Pink Siris/ Silk Tree	*Mimosaceae*	Ornamental
13	*Allamanda blanchetti*	Purple Allamanda	*Apocynaceae*	Ornamental
14	*Allamanda cathartica*	Golden Trumpet	*Apocynaceae*	Ornamental
15	*Aloe vera*	Khorpad	*Liliaceae*	Medicinal
16	*Alstonia scholaris*	Saptparni/ Tree of Ghost	*Apocynaceae*	Tree
17	*Alternanthera paronichoides*	Matikaduri	*Amaranthaceae*	Weed
18	*Ammania bacifera*	Blistering Ammannia	*Lythraceae*	Weed
19	*Amorpha fruticosa*	False Indigo Bush	*Fabaceae*	Tree
20	*Amorphophallus paeoniifolius*	Suran/ Elephant Foot	*Araceae*	Medicinal
21	*Ampelopteris prolifera*	Marshi Fern	*Thelypteridaceae*	Ornamental
22	*Anacardium occidentale*	Kaju	*Anacardiaceae*	Tree
23	*Annona squamosa*	Sitafal	*Annonaceae*	Medicinal
24	*Araucaria columnaris*	Chritmastree	*Araucaraceae*	Ornamental
25	*Areca catechu*	Areca Palm/Nut	*Aracaceae*	Ornamental
26	*Argemone maxicana*	Mexican Poppy	*Papaveraceae*	Medicinal

27	*Asperagus recemosus*	Satawar	*Liliaceae*	Medicinal
28	*Astercantha longifolia*	Talimakhana	*Acantheceae*	Medicinal
29	*Azadirachta indica*	Neem	*Meliaceae*	Medicinal
30	*Azolla pinnata*	Masquetofern	*Azollaceae*	Biofertilizer
31	*Bahunia acuminata*	Kanchan	*Fabaceae*	Ornamental
32	*Blumea bifoliata*	Janglimuli	*Asteraceae*	Weed
34	*Boerhavia diffusa*	Punarnava	*Nyctaginaceae*	Weed/ Ranbhaji
35	*Bouganvillea glabra*	Paperflower	*Nyctaginaceae*	Ornamental
36	*Bryophyllum pinnatum*	Miracle Leaf/ Panfuti	*Crassulaceae*	Medicinal
37	*Butea monosperma*	Palas	*Fabaceae*	Medicinal
38	*Caesulia axillaries*	Maka	*Asteraceae*	Medicinal
39	*Caladium bicolor*	Elephant Ear/ Rnangitkochai	*Araceae*	Medicinal/Orna.
40	*Callistemon acuminatus*	Bottle Brush	*Myrtaceae*	Ornamental Tree
41	*Calotropis procera*	Rui	*Asclepiadaceae*	Medicinal
42	*Canna indica*	Cana Lily/Kardali	*Cannaceae*	Ornamental
43	*Carica papaya*	Papita	*Caricaceae*	Medicinalt
44	*Cassia fistula*	Amaltas/Bahva	*Fabaceae*	Medi./Ornam.Tree
45	*Cassia glauca*	Smooth sena	*Fabaceae*	Medi./Ornam.Tree
46	*Cassia tora*	Tarota	*Fabaceae*	Weed
47	*Casuarina equisetifolia*	Saru	*Casuarinaceae*	Medicinal/Tree
48	*Catharanthus roseus*	Periwinkle/Sadafuli	*Apocynaceae*	Medicinal
49	*Chamaedorea seifrizii*	Bomboo Palm	*Aracaceae*	Ornamental
50	*Chrysanthemum indicum*	Sewanti	*Asteraceae*	Ornamental
51	*Cinnamomum verum*	Dalchini	*Louraceae*	Medicinal
52	*Cissus quandrangularis*	Harjor	*Vitaceae*	Medicinal
53	*Citrus limon*	Lemon	*Rutaceae*	Fruit Tree
54	*Cleistanthus collinus*	Garari	*Euphorbiaceae*	Medicinal
55	*Clerodendrum chinense*	Hajari Mogra	*Verbanaceae*	Medicinal
56	*Codiaeum variegatum*	Garden Croton	*Euphorbiaceae*	Ornamental
57	*Combretum indicum*	Rangoon Creeper	*Combretaceae*	Ornamental

58	*Corchorus capsularis*	White Jute	*Tiliaceae*	Medicinal, Fibre
59	*Cordiline fruticosa*	Ti Plant	*Asparagaceae*	Ornamental
60	*Costus speciosus*	Kevkand	*Zingiberaceae*	Medicinal
61	*Croton bonplandianum*	Bantulsi	*Euphorbiaceae*	Weed
62	*Cuprussus semiperviens*	Cypress	*Cupressaceae*	Ornamental
63	*Cutalpa bibnoniodes*	Indian Bean Tree	*Bibnoniaceae*	Timber Tree
64	*Cycas circinales*	Sago	*Cycadaceae*	Ornamental
65	*Cycas revolata*	Sago	*Cycadaceae*	Ornamental
66	*Cymbopogon nardus*	Citronella	*Poaceae*	Ornamental
67	*Cynodon dactylon*	Doob Grass	*Poaceae*	Weed
68	*Dalbergia sissoo*	Shisham	*Fabaceae*	Shade Tree
69	*Datura stramonium*	Datura	*Solanaceae*	Medicinal
70	*Delonix regia*	Goldmohor	*Caesalpinaceae*	Ornamental Tree
71	*Desmodium velutinum*	Desmodium	*Fabaceae*	Medicinal
72	*Dracaena trifasciata*	Snake Plant	*Asparagaceae*	Ornamental
73	*Draceana fragrans*	*Corn Plant*	*Asparagaceae*	Ornamental
74	*Duranta erecta*	*Golden dewdrop*	*Verbanaceae*	Ornamental
75	*Dypsis lutescens*	Areca Palm	*Aracaceae*	Ornamental
76	*Emblica officinales*	Amla	*euphorbiaceae*	Fruit Tree
78	*Eugenia jambolana*	Jamun	*Myrtaceae*	Medicinal
79	*Euphorbia hirta*	Dudhani	*Euphorbiaceae*	Medicinal
80	*Euphorbia lactea*	White ghost	*Euphorbiaceae*	Medicinal
81	*Euphorbia milii*	Crown of Thorn	*Euphorbiaceae*	Ornamental
82	*Euphorbia tithymaloides*	Thron Tree	*Euphorbiaceae*	Medicinal
83	*Euphorbia triangularis*	African Milk Tree	*Euphorbiaceae*	Medicinal
84	*Ficus elastica*	Rubber Tree	*Moraceae*	Ornamental
85	*Gaillardia grandiflora*	*Blanket Flower*	*Asteraceae*	Ornamental
86	*Galpinia glauca*	Pili Ratrani	*Malpighiaceae*	Ornamental
87	*Gloriosa superba*	Flame lily	*Liliaceae*	Medicinal
88	*Heliconium rostrata*	Heliconia	*Heliconiaceae*	Ornamental
89	*Hibiscus rosasinensis*	Jaswand	*Malvaceae*	Medicinal
90	*Hippeastrum striatum*	April flower	*Amarilidaceae*	Ornamental
91	*Hydrila verticilata*	Water thymes	*Hydrocharitaceae*	Aquatic

92	*Hyptis suaveolens*	Vilaiti Tulsi	*Lamiaceae*	Medicinal
93	*Ixora coccinea*	Jungle Geranium	*Rubiaceae*	Ornamental
94	*Jasminum auricalatum*	Jasmin	*Oleaceae*	Ornamental
95	*Jasminum sambac*	Jamin	*Oleaceae*	Ornamental
96	*Jatropha gossypifolia*	Chandrajyoti	*Euphorbiaceae*	Medicinal
97	*Juniper chinensis*	Chinese Juniper	*Cupressaceae*	Ornamental
98	*Kigelia pinnata*	Balam Khira	*Bignoniaceae*	Shade Tree
99	*Lantana camara*	Lantana	*Verbanaceae*	Medicinal
100	*Limonia accidissima*	Elephant Apple	*Rutaceae*	Fruit Tree
101	*Livistona chinensis*	Fan Palm	*Arecaceae*	Ornamental
102	*Lowsonia inermis*	Henna	*Lythraceae*	Medicinal
103	*Malvastrum tricuspidatum*	False Mallow	*Malvaceae*	Medicinal
104	*Mangifera indica*	Mango	*Anacardiaceae*	Fruit Tree
105	*Manilkara zapota*	Chikoo	*Sapotaceae*	Fruit Tree
106	*Martynia annua*	Tiger's claw	*Martyniaceae*	Medicinal
107	*Melia azadiracta*	Neem	*Meliaceae*	Medicinal
108	*Mirabilis jalapa*	4'O' Clock Plant	*Nyctginaceae*	Ornamental
109	*Moringa oliefera*	Drumstick	*Moringaceae*	Medicinal
110	*Morus alba*	Mulbery	*Moraceae*	Medicinal
111	*Murraya koenigii*	Meethaneem	*Rutaceae*	Curry leaves
112	*Murraya paniculata*	Madhumalti	*Rutaceae*	Ornamental
113	*Musanda frondosa*	Mussaenda /Dhobi Tree	*Apocynaceae*	Ornamental
114				
115	*Nerium indicum*	Kanher/IndianOleander	*Apocynaceae*	Ornamental
116	*Nyctanthes arbor-tristis*	Parijat	*Oleaceae*	Medicinal
117	*Ocimum sanctum*	Tulsi	*Lamiacea*	Medicinal
118	*Opuntia elator*	Nagfani	*Cactaceae*	Medicinal
119	*Oxalis articulate*	Sleeping Beauty	*Oxalidaceae*	Medicinal
120	*Pandanus Amaryllifolius*	Basmati	*Pandanaceae*	Flavouring
121	*Parthenium hysterophorus*	Congress Grass	*Asteraceae*	Weed
122	*Passiflora foetida*	Krishna Kamal	*Passifloraceae*	Ornamental

123	*Peltaforum inermis*	Peela Gulmohar	*Caesalpinaceae*	Ornamental Tree
124	*Pentas lanceolata*	Star Cluster	*Rubiaceae*	Ornamental
125	*Phaseolus trilobus*	Ran Moong	*Fabaceae*	Weed
126	*Phyllanthus nirurii*	Stonebreaker	*Euphorbiaceae*	Medicinal
127	*Pilea microphylla*	Artillery Plant	*Urticaceae*	Ornamental
128	*Pinus trifoliate*	Chir Pine	*Pinaceae*	Ornamental
129	*Pistia stratiotes*	Water Letuce	*Araceae*	Aquatic
130	*Plumeria rubra*	Champa	*Apocynaceae*	Ornamental
131	*Polyanthia longifolia*	Ashoka	*Annonaceae*	Shade Tree
132	*Polyscias fruticosa*	*Ming Aralia/ Small Sage*	*Araliaceae*	Ornamental
133	*Pongamia pinnata*	Karanj	*Fabaceae*	Medicinal
134	*Portulaca grandiflora*	11'O' Clock	*Portulacaceae*	Ornamental
135	*Portulaca oleracea*	Duckweed	*Portulacaceae*	Medicinal
136	*Prosopis cineraria*	Sami Patra	*Fabaceae*	Medicinal Tree
137	*Psidium guajava*	Amrood	*Myrtaceae*	Fruit Tree
138	*Pteris vittata*	Pteris	*Pteridaceae*	Ornamental
139	*Raphis excels*	Rabbis Palm	*Arecaceae*	Ornamental
140	*Ravenala madagascariensis*	Traveller's Palm	*Strelitziaceae*	Ornamental
141	*Rosa damascene*	Gulab	*Rosaceae*	Ornamental
142	*Roystonea regia*	Royal Palm	*Arecaceae*	Ornamental
143	*Rungia pectinata*	Mashi	*Acanthaceae*	Weed
144	*Santalum album*	Chandan	*Santalaceae*	Medicinal Tree
145	*Saraca ashoka*	Seta Ashok	*Fabaceae*	Ornamental Tree
146	*Salix nigra*	Black willow	*Acanthaceae*	Ornamental Tree
147	*Saraca indica*	Rocket Ashok	*Fabaceae*	Ornamental Tree
148	*Scadoxus multiflorus*	Blood lily	*Amarilidaceae*	Ornamental
149	*Sida cordata*	Heart-Leaf Sida	*Malvaceae*	Medicinal
150	*Sida rhombastrum*	Arrowleaf Sida	*Malvaceae*	Weed
151	*Solanum nigrum*	Kamuni/ Blackberry	*Solanaceae*	Medicinal

152	*Solenostemon scutellarioides*	Coleus	*Lamiaceae*	Ornamental Tree
153	*Spathodia campanulata*	African Tulip	*Bignoniaceae*	Ornamental Tree
154	*Sturculia foetida*	Wild Almond	*Sterculiaceae*	Ornamental Tree
155	*Tabernaemontana divaricata*	Chandani	*Apocynaceae*	Ornamental
156	*Talinum cuneifolium*	Palak	*Portulacaceae*	Medicinal
157	*Tamarindus indica*	Imli	*Fabaceae*	Fruit Tree
158	*Tectona grandis*	Teak	*Verbanaceae*	Timber Tree
159	*Tekoma stans*	Pillia	*Bignoniaceae*	Ornamental
160	*Tephrosia purpuria*	Sharpunkha	*Fabaceae*	Weed
161	*Terminalia arjuna*	Anjan	*Combrataceae*	Medicinal Tree
162	*Terminalia catappa*	Indian Almond	*Combrataceae*	Ornamental Tree
163	*Terminalia elliptica*	Yen	*Combrataceae*	Medicinal Tree
164	*Thuja occidentalis*	Morpankhi	*Cupressaceae*	Ornamental
165	*Tinospora cordifolia*	Gurwel	*Menispermaceae*	Medicinal
166	*Tradescantia spathacea*	Boat Lily	*Commelinaceae*	Ornamental
167	*Tridax procumbance*	Kanbarmodi	*Asteraceae*	Medicinal
168	*Wodyetia bifurcate*	Fox Tail Palm	*Arecaceae*	Ornamental
169	*Zamia furfuracea*	*Cardboard Palm*	*Zamiaceae*	Ornamental
170	*Zizipus jujuba*	Ber	*Rhamnaceae*	Fruit/Tree

Table 7: List of Trees available in premise

B) Medicinal Plants

The trees constitute one of the maximum percentage out of all the varieties of plantations in premise and available in a **total of 66 varieties** as follows.

S.No	Botanical Name	Vernacular name	Family
1	*Abitulon indicum*	Petari	*Malvaceae*
2	*Acacia nilotica*	Babool	*Meliaceae*
3	*Acorus calamus*	Vekhand	*Asparagaceae*
4	*Aegle marmelos*	Belpatra	*Rutaceae*
5	*Aeruva lanata*	Gorakhbuti	*Amaranthaceae*

6	*Agave americana*	American Aloe	*Agavaceae*
7	*Ageratum conizoides*	Goatweed	*Asteraceae*
8	*Aloe vera*	Khorpad	*Liliaceae*
9	*Amorphophallus paeoniifolius*	Suran/ Elephant Foot	*Araceae*
10	*Annona squamosa*	Sitafal	*Annonaceae*
11	*Argemone maxicana*	Mexican Poppy	*Papaveraceae*
12	*Asparagus recemosus*	Satawar	*Liliaceae*
13	*Astercantha longifolia*	Talimakhana	*Acantheceae*
14	*Azadirachta indica*	Neem	*Meliaceae*
15	*Bryophyllum pinnatum*	Miracle Leaf/ Panfuti	*Crassulaceae*
16	*Butea monosperma*	Palas	*Fabaceae*
17	*Caesulia axillaries*	Maka	*Asteraceae*
18	*Caladium bicolor*	Elephant Ear/ Rnangitkochai	*Araceae*
19	*Calotropis procera*	Rui	*Asclepiadaceae*
20	*Carica papaya*	Papita	*Caricaceae*
21	*Cassia fistula*	Amaltas/Bahva	*Fabaceae*
22	*Cassia glauca*	Smooth sena	*Fabaceae*
23	*Casuarina equisetifolia*	Saru	*Casuarinaceae*
24	*Catharanthus roseus*	Periwinkle/Sadafuli	*Apocynaceae*
25	*Cinnamomum verum*	Dalchini	*Louraceae*
26	*Cissus quandrangularis*	Harjor	*Vitaceae*
27	*Cleistanthus collinus*	Garari	*Euphorbiaceae*
28	*Clerodendrum chinense*	Hajari Mogra	*Verbanaceae*
29	*Corchorus capsularis*	White Jute	*Tiliaceae*
30	*Costus speciosus*	Kevkand	*Zingiberaceae*
31	*Datura stramonium*	Datura	*Solanaceae*
32	*Desmodium velutinum*	Desmodium	*Fabaceae*
34	*Eugenia jambolana*	Jamun	*Myrtaceae*
35	*Euphorbia hirta*	Dudhani	*Euphorbiaceae*
36	*Euphorbia lactea*	White ghost	*Euphorbiaceae*
37	*Euphorbia tithymaloides*	Thron Tree	*Euphorbiaceae*
38	*Euphorbia triangularis*	African Milk Tree	*Euphorbiaceae*
39	*Gloriosa superba*	Flame lily	*Liliaceae*

40	*Hibiscus rosasinensis*	Jaswand	*Malvaceae*
41	*Hyptis suaveolens*	Vilaiti Tulsi	*Lamiaceae*
42	*Jatropha gossypifolia*	Chandrajyoti	*Euphorbiaceae*
43	*Lantana camara*	Lantana	*Verbanaceae*
44	*Lowsonia inermis*	Henna	*Lythraceae*
45	*Malvastrum tricuspidatum*	False Mallow	*Malvaceae*
46	*Martynia annua*	Tiger's claw	*Martyniaceae*
47	*Melia azadiracta*	Neem	*Meliaceae*
48	*Moringa oliefera*	Drumstick	*Moringaceae*
49	*Morus alba*	Mulbery	*Moraceae*
50	*Nyctanthes arbor-tristis*	Parijat	*Oleaceae*
51	*Ocimum sanctum*	Tulsi	*Lamiacea*
52	*Opuntia elator*	Nagfani	*Cactaceae*
53	*Oxalis articulate*	Sleeping Beauty	*Oxalidaceae*
54	*Phyllanthus nirurii*	Stonebreaker	*Euphorbiaceae*
55	*Pongamia pinnata*	Karanj	*Fabaceae*
56	*Portulaca oleracea*	Duckweed	*Portulacaceae*
57	*Prosopis cineraria*	Sami Patra	*Fabaceae*
58	*Psidium guajava*	Amrood	*Myrtaceae*
59	*Santalum album*	Chandan	*Santalaceae*
60	*Sida cordata*	Heart-Leaf Sida	*Malvaceae*
61	*Solanum nigrum*	Kamuni/ Blackberry	*Solanaceae*
62	*Talinum cuneifolium*	Palak	*Portulacaceae*
63	*Terminalia arjuna*	Anjan	*Combrataceae*
64	*Terminalia elliptica*	Yen	*Combrataceae*
65	*Tinospora cordifolia*	Gurwel	*Menispermaceae*
66	*Tridax procumbance*	Kanbarmodi	*Asteraceae*

Table 8: List of Medicinal plants available in premise

4.1.3 Green practices

We observed the following points during the Site investigation:

- There is availability of open space in the premise in addition to the provision of the Botanical garden.
- There is Compost pit in which process is carried out for decomposition of organic matter of plants and it is used as an organic fertilizer.
- The Institution uses fertilisers thereby making efforts to maintain and increase ecology. The ample vegetation provides shade thereby benefiting the users. The College has compost pits available in campus which are used to make manure and organic slurry which are used for the plantation. The quantity generated is sufficient and the use of chemical fertilizers is avoided.
- There are adequate Maintenance staff who manage the entire campus.
- Every plant and tree is named with **a signage for awareness** of the plantation knowledge; **the college has taken special efforts for the same.**

4.1.4 Eco-friendly initiatives undertaken

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

S.No	Activity/Programs/ Events	Date	Place	No. of Participants
1.	Plantation program	16 July 2019	College Campus	50
2.	National Ozone Day	16 Sept. 2019	Conference Hall	150
3.	'Plastic Ban' Oath and Rally organized on occasion of 'Swachha Bharat' Pandharwada	24 Sept. 2019 to 02 Oct. 2019	Collaboration of NSS with Nagarpanchayat, Goregaon	55
4.	National Geography Day	14 Jan. 2020	Conference Hall	125
5.	'Swachha Bharat wa Hagandari Mukt Gram Abhiyan'karita yuva shaktiche Yogdan	28 Jan. 2020 to 01 Feb. 2020	NSS Camp Gram, Satwa	105

6.	National webinar on 'Climate Change & its Impact'	10 June 2020	Virtual	192
7.	Plantation Program	25 July 2020	College Campus	20
8.	National Ozone Day	16 Sept. 2020	Virtual	300

Table 9: Details of the environment related events undertaken by College

4.2 Noise Audit

4.2.1 Macro level

On a macro level there are zero settlements or any other type of built form close to the site. The approach road too has balanced traffic. As the college is oriented between the jungle there is bare minimum noise from the surrounding areas. **Overall the noise level is low and less noise Pollution as College falls under silent zone as per our analysis.**

4.2.2 Micro level

The college has huge open space covered with greens which absorb the sound and help in keeping noise levels low and students, staff do not have any disturbance in academics majorly. However there is provision for staff parking which causes some noise. There are no particular equipments which cause any effect. **Overall the noise levels inside the premises are low which is a good approach.**

4.3 Carbon Footprint Audit

4.3.1 Eco-friendly Commuting Practices

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

- **Ease of commuting –** Owing to close proximity to public transport the access is very feasible and walk able.
- **Parent's commute -** There are 2 Parent-teacher meetings held in a year and the turn-out is around 65%
- **Student vehicles** – The provision provided by College includes 500 cycles, 50 bikes, 8 four-wheeler. Most of the students come to College by bicycles.
- **Visitors vehicles –** Approximately 30 visitors with vehicles visit the campus

daily, but visitors vehicles are not parked in the campus.

Sr. No.	Micro list of villages within 15 km.	Km.	Sr. No.	Macro list of villages more than 15 km.	Km.
1	Akotola	13 k.m.	1	Bamhani	16 k.m.
2	Ambetalao .	12 k.m	2	Chopa	16 k.m.
3	Asalpani	15k.m.	3	Gawaritola	18 k.m.
4	Babai	5 k.m.	4	Gowaritola	18 k.m.
5	Bagadbandh	9 k.m.	5	Hiratola	22 k.m.
6	Bagholi	10 k.m.	6	Lendezari	18 k.m.
7	Bajartola	12 k.m.	7	Pathantola .	16 k.m
8	Bhadanga	5 k.m.	8	Telankhedi	16 k.m.
9	Bodunda	12 k.m.	9	Tilli	16 k.m.
10	Borgaon	10 km.	10	Gongle	18 k.m.
11	Bote	3 k.m.	11	Pandhari	19 k.m
12	Chanditola	8 k.m.	12	Rengepar	20 k.m.
13	Changotola	15 k.m.	13	Murpar Ram.	20 k.m.
14	Chichgaon	4 k.m.	14	Dunda	20 k.m.
15	Chichgaontola	4 k.m.			
16	Chichtola	9 k.m.			
17	Chilhati	6 k.m.			
18	Dawdipar	7 k.m.			
19	Dawwa	6 k.m.			
20	Deutola	6 k.m.			
21	Dhundatola	7 k.m.			
22	Dongarutola	8 k.m.			
23	Gahalatola	5k.m.			
24	Gankhaira .	12 k.m			
25	Garada	8 k.m.			
26	Ghoti	2 k.m.			
27	Ghumarra	14 k.m.			
28	Gidhadi	10 k.m.			
29	Gondekhari	10 k.m.			
30	Goregaon	0 k.m.			
31	Halbitola	2 k.m.			
32	Hausitola	10 k.m.			
33	Hirapur	10 k.m.			
34	Hirdamali	5 k.m.			
35		9 k.m.			
36		13 k.m.			

37	Isatola	15 k.m.			
38	Jambhulpani	10 k.m.			
39	Kalimati	10 k.m.			
40	Kalpathari	9 k.m.			
41	Kamargaon	15 k.m.			
42	Kanhartola	3 k.m.			
43	Kanhartola Chopa	10 k.m.			
44	Katangi	10 k.m.			
45	Kawaditola	8 k.m			
46	Kawalewada	9 k.m			
47	Khadipar .	12 k.m.			
48	Khadipartola .	7 k.m.			
49	Khosetola	12 k.m.			
50	Kurhadi	6 k.m.			
51	Malpuri	5 k.m.			
52	Meghatola	8 km			
53	Mhasgaon	5km			
54	Mohadi	6 k.m.			
55	Mohagaon	8 k.m.			
56	Mohagaon Bk	5 k.m.			
57	Mundharitola	12 k.m.			
58	Mundipar	15 k.m.			
59	Murdoli	12 k.m.			
60	Nawargaon	12 k.m.			
61	Nimba	5 k.m.			
62	Nimba	6 k.m.			
63	Nonitola	9 k.m.			
64	Palewada	4km.			
65	Palkheda	3 k.m.			
66	Pathari	10 k.m.			
67	Pindakepar	4 k.m.			
68	Pipartola	7 k.m.			
69	Purgaon	7 k.m.			
70	Ramatola	6 k.m.			
71	Saitola	4 k.m.			
72	Salangtola	5 k.m.			
73	Sarvatola	10 k.m.			
74		4 k.m.			
75		10 k.m.			
76		15 k.m.			

77	Satwa	12 k.m.			
78	Shaharwani	4 k.m.			
79	Silegaon	6 k.m			
80	Sonartola	15 k.m.			
81	Sondlagondi	8 k.m.			
82	Sonegaon	8 k.m.			
83	Soni	15 k.m.			
84	Sukhapur	5 k.m.			
85	Tedha				
86	Timezari				
87	Tumkheda Bk.				
88	Tumsar				
89	Zanjiya				
90					

Table 10: Details of location from premise

4.3.2 Heat Island Reduction

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

Exposed roof areas – The terrace of the Buildings are flat roof. One of the Buildings has solar panels.

Exposed non-roof hardscape areas - There is a pathway on all sides of the premises. There are huge open spaces with lush greens these help in maintaining the micro climate of the surrounding to a major extent in addition the courtyards are provided with grass pavers.

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

4.3.3 No Outdoor Light Pollution

The college compound lights are not upward looking there not causing light pollution.

4.4 Health & Hygiene Audit

4.4.1 Smoke Exposure

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

- The college has No Smoking on its compound wall as part of the awareness. Canteen uses Gas cylinders for cooking, there is no utilisation of fire wood. Thus there is no smoke from burning of fire wood and any health issues related to the same.
- The garbage in campus is not burnt and there is not air pollution because of it. The Institution is a tobacco and smoke free campus which helps in adapting to a Healthy Institution
- There is a huge open space in campus which is allowed for social gathering among students. It is also used for sports, outdoor games, annual days, cultural functions and also used for physical activities by the students.
- There is parking provision inside the campus there is slight issue of dust owing to the same but it is balanced with the thick vegetation in the premise.

4.4.2 Hygiene

- For overall hygiene of the students and staff there are facilities such as Washroom facility on ground floor, napkin disposal, waterless urinals, hand wash, Sanitary vending machines, drinking water facility as Aquaguard.
- The hygiene of toilet areas is well maintained.
- **The entire campus is cleaned on daily basis, it is very appreciating that there are only few Maintenance staff who strive their best to take care of the entire premise in the most excellent way possible.**
- There are designated Hygiene specialist and Maintenance staff who keep a regular check about the operation and maintenance of the toilet areas and the equipments, lights and all facilities on each floor.
- Water management initiative with appropriate hygiene is undertaken. The areas of water tanks in site on ground floor are clean and no mosquito breeding spots are there.
- The food premises and equipments are cleaned as per schedule with special

care taken to avoid any water stagnation.

- The food waste and other refuse is removed periodically from food handling areas to avoid accumulation.
- As part of Tree Plantation programme the initiative of **Swachh Bharat Abhiyan of Govt. of India** is undertaken during Environment Day Celebrations.

4.5 Universal Campus

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

The college has provisions of ramps for main access to the Institutional Building, Library and Hostel Building.

There are Handrails along corridors or near staircase main building, library, indoor stadium, outdoor stadium and provision of wheelchair as part of universal campus initiatives.

The college has resting places (seating areas) in the premises outdoors, thereby making it user friendly for the specially abled students. The design of the premises is appropriate for access with passages and corridors being wide.

The single loaded corridors are safe from fire safety as there are staircases and fire extinguishers provided. There is a provision of ramp in premise.

4.6 Survey Results

An online survey was conducted to analyse the student and staff views about the premise, following are some of the reviews.

4.6.1 Participation

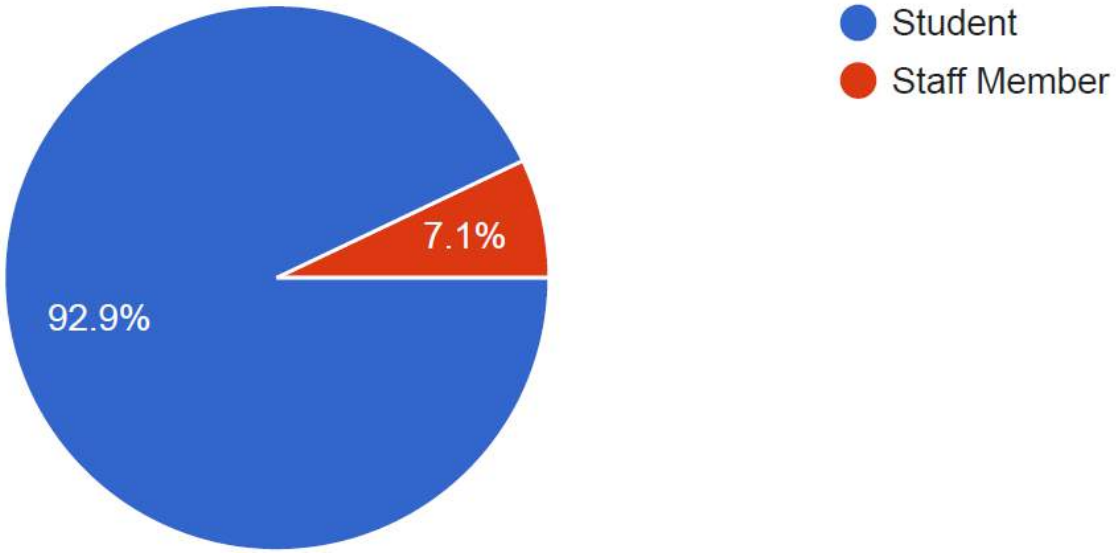


Figure 1: Participation analysis in the survey

A total of **326 responses** were received out of which 93% were students.

4.6.2 Rate the Green awareness practices in College

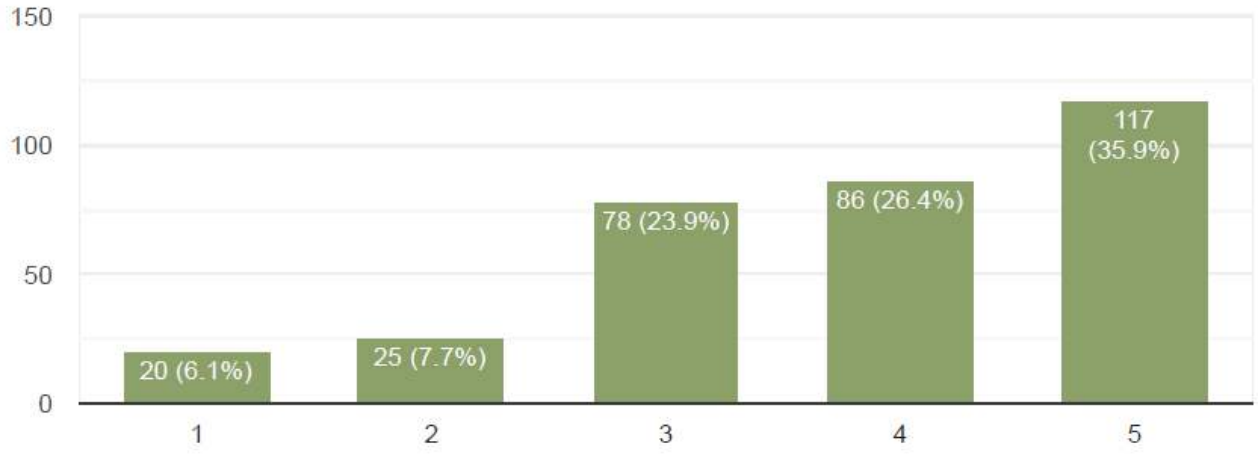


Figure 2: Green awareness practices in College

The students, staff **(almost 36%)** of responses found the practices to be excellent.

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

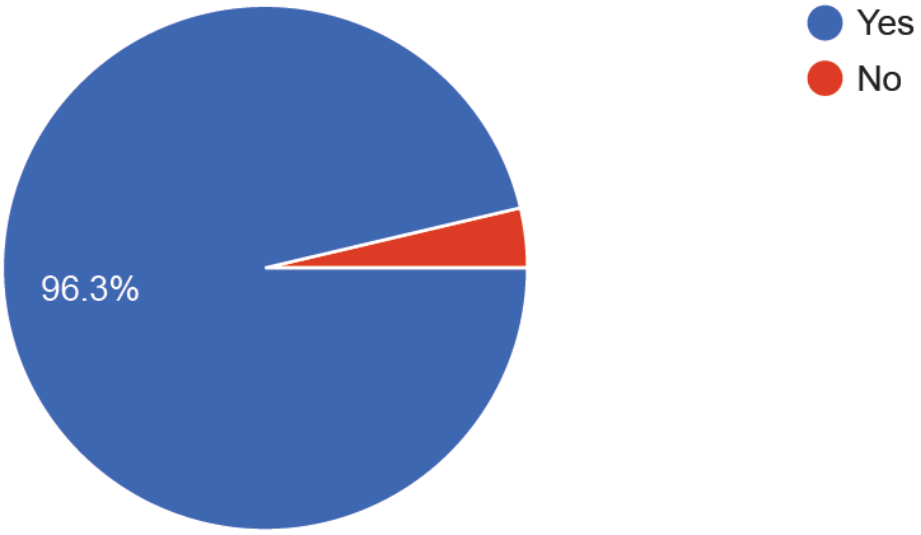


Figure 3: Green awareness practices in College

The students, staff **(almost 96%)** of responses confirmed activities are conducted.

4.6.4 Do you participate is such events?

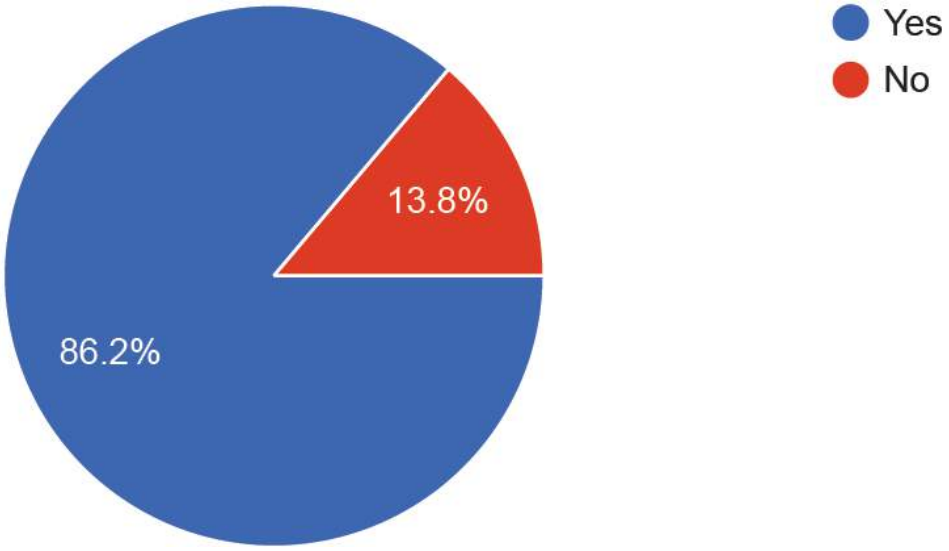


Figure 4: Green awareness practices in College

The students, staff **(almost 86%)** of the responses confirmed their participation.

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

We have listed some of the key responses below.

- Good. **Excellent. Plantation of botanical gardens.**
- **This program is beneficial for everyone. Due to this program we know the more factors which we can use in our daily life.**
- **Our college always supports for cleanliness, plantation & environment awareness programs.**
- **It's an awesome experience to attend such programs and happy to be gain a lot of knowledge from it.**
- Good experience program. **About cleanliness and green environment.**
- **Very Nice. More fun. It's a great initiative to get the students in touch with current environmental situations and on remedies of how to help the earth with these upcoming dangers.**
- Programs are informative and it does help a person to take an initiative to save and grow our environment.
- **Very nicely organized and informative programs.**
- College tried to aware not only student but also people in College areas.
- I have enjoyed and learned so many things. Very good. Brilliant. My experience was good and many things that we are learn. Very good program has held in our college and it gives good information to us.
- Very good experience. The program is celebrated with very good type and we also happy to participate in the program and enjoy it
- I got so much information about green awareness in seminars through our college. Environmental awareness is to understand the fragility of our environment and the importance of its protection.
- The program conduct by our College is very beneficial to us that it tells about how we could save our environment their aspect of environment.

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

We have listed some of the key responses below.

- Plantation is done in big quantity. In Institute planting in ground and there is beautiful botanical gardens.
- It's benefit for economic & environmental & have shown been to bring positive social impact. Proper waste disposal, regular planting of tress, keeping a check on running taps.

4.7 Recommendations for a Sustainable Habitat

a) Promote the use of Eco-friendly vehicles

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

b) Low VOC Paints and Adhesives

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

c) Environmental awareness

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

d) Water and food facility for birds

As there are large numbers of fauna present in the premise, small bird houses designed with organic materials can be implemented.

e) Environmental Hygiene clubs

There can be provision of environmental hygiene clubs formed jointly with students and staff to ensure additional hygiene of premise and promote student participation.

Plantation Programme in College premises

Plantation Programme in College premises

'Plastic Ban' Rally on occasion of Swacchha Bharat Pandharwada

'Plastic Ban' Rally organized collaboration with Nagar Panchayat, Goregaon and NSS unit of college

Oath is taken by the students on the occasion of Swacchha Bharat Abhiyan

Students collecting Plastics and wastes from nearby areas of Goregaon

On-site investigation and physical verification

The ecologically friendly ambience in the premises


Latitude: 21.340723
Longitude: 80.200632
Elevation: 389.42±3 m
Accuracy: 1.8 m
Time: 25-10-2021 15:56


Croton
Latitude: 21.340602
Longitude: 80.200645
Elevation: 397.59±4 m
Accuracy: 1.8 m
Time: 25-10-2021 15:32


Latitude: 21.340675
Longitude: 80.200721
Elevation: 393.32±4 m
Accuracy: 3.0 m
Time: 25-10-2021 15:35


Pistia stratiotes
Araceae
Latitude: 21.340638
Longitude: 80.200673
Elevation: 397.91±4 m
Accuracy: 1.9 m
Time: 25-10-2021 15:31


Latitude: 21.340666
Longitude: 80.200646
Elevation: 401.47±4 m
Accuracy: 2.7 m
Time: 25-10-2021 15:31


Latitude: 21.340625
Longitude: 80.200686
Elevation: 393.89±4 m
Accuracy: 3.0 m
Time: 25-10-2021 15:37


Ixora coccinea
Rubiaceae
Latitude: 21.340605
Longitude: 80.200668
Elevation: 405.71±4 m
Accuracy: 1.7 m
Time: 25-10-2021 15:30

Sanitary Vending Machine in Girls Common Room

Ramps in Wash Area of Girls Hostel B

Ramp For Chemistry Laboratory and Main Building

Ramp facility For Library

Wheelchair facility

Provision of Universally designed Washroom facilities

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 Premise

The types of waste collected in the campus are as follows, these are separated before processing.

S. No.	Type of waste	Source and quantity	Current Disposal method	Can be treated/ recycled?	Methodology
1	Solid waste	Toilets–Biodegradable waste of 15 kg per week	Led in the storm water drains	Yes	TREATED - Small biogas plant can be proposed in open space
2	Paper waste	Newspaper and other paper	Sold to vendor	Yes	CONTINUE - with the current practice
3	E-waste	Computers - Non-biodegradable waste as per the annual year usage	Given to vendor	Yes	CONTINUE - with the current practice
4	Dry waste in form of leaves	Open space & plantations, papers - Non biodegradable waste of 8-10 kg per week	Bio-Composting in a 10 x 8 x 5 feet	Yes	CONTINUE - with the current practice
5	Liquid waste	Toilets, washbasins – Around 100 – 120 litres per week during general times and 50 litres at present	Led to the storm water drain and garden	Yes	TREATED - Waste water treatment plant a well as continue with current practice of reuse in garden
6	Organic regular waste	Dust, dirt usually dry waste from Canteen and all sources – approx. 3 to 5 kg	Handed over to Municipality	Yes	Bio-Compost to a certain extent

Table 11: Summary of the types of waste produced in the premises

5.1.2 Bins summary

There are 73 Dustbins in the premise with volume of 7 litres (small) and 60 litres (Big) each. The analysis of dustbins is presented below.

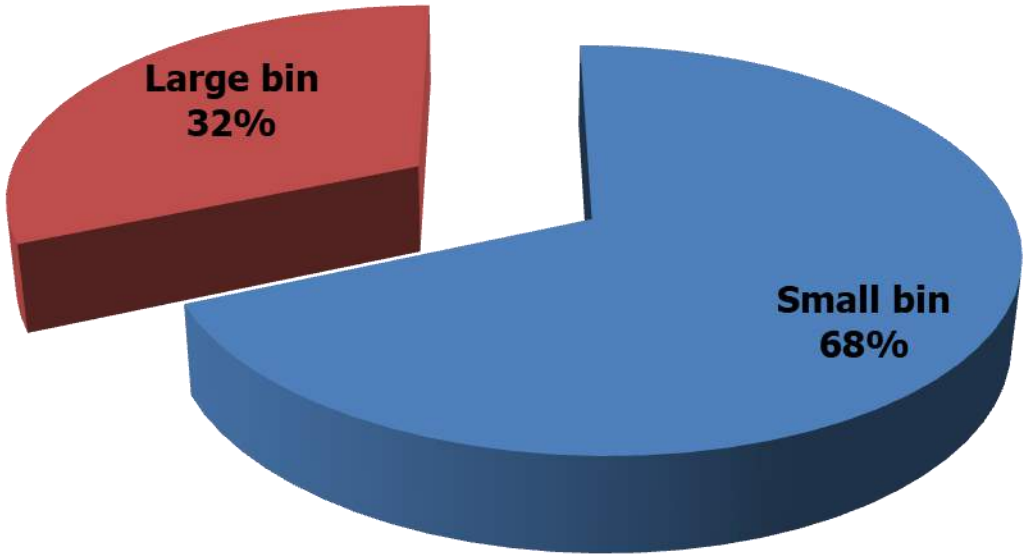


Figure 5: Analysis of dustbins size wise in the premise

The above analysis shows **68% are Small dustbins** and **32% are Big dustbins.**

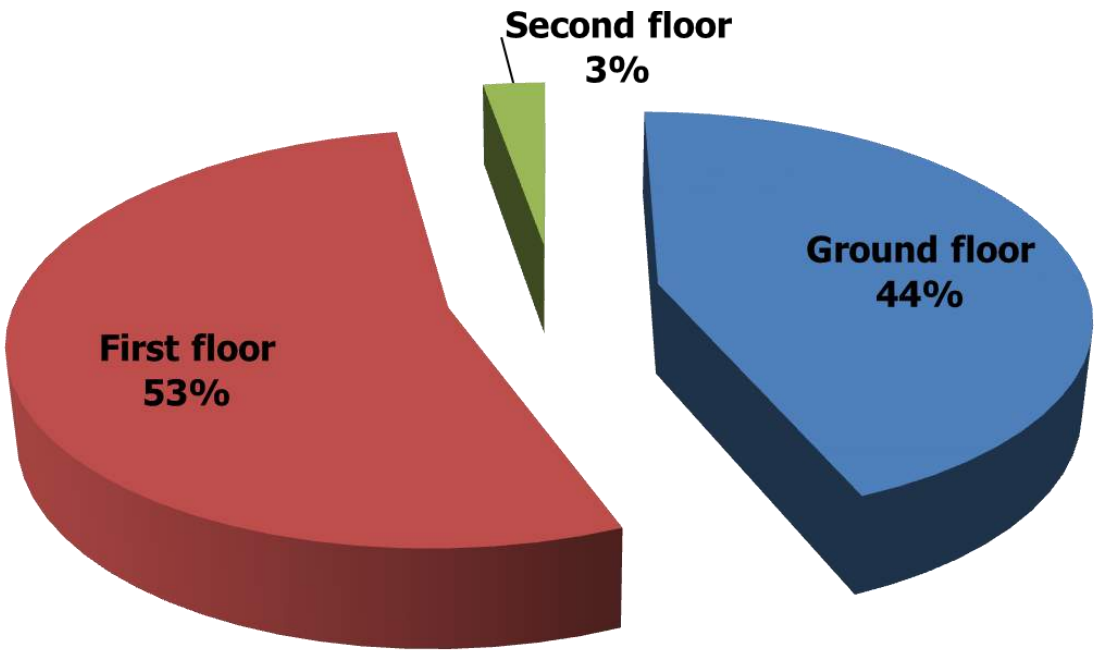


Figure 6: Analysis of dustbins floor wise in the premise

The above analysis shows **53% dustbins are present on First floor, 44% on Ground floor and 3% on Second floor.**

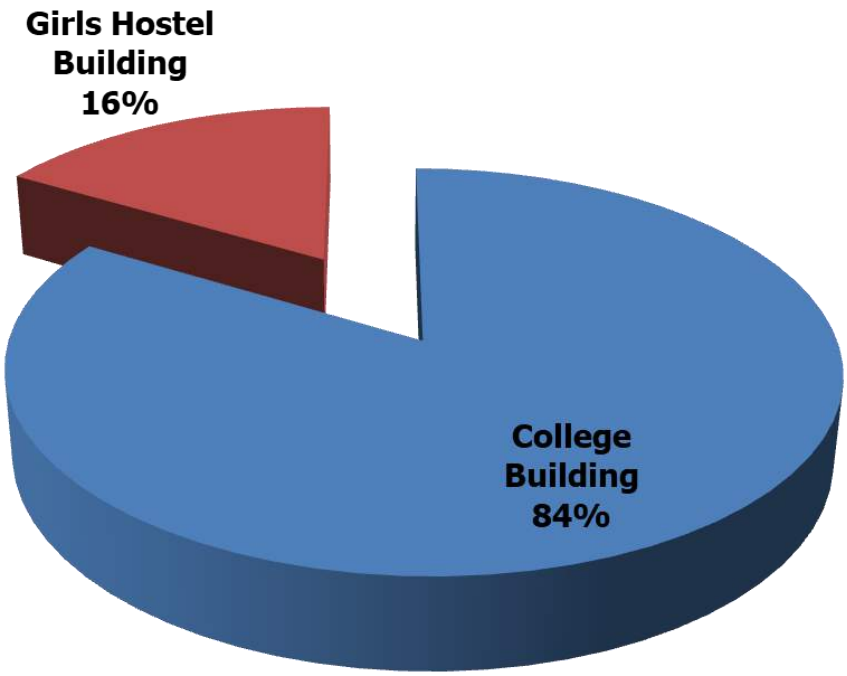


Figure 7: Analysis of dustbins in the premise

The above analysis shows the among the dustbins **84% are in the College Building** (On all floors, classrooms) and **16% in the Girls Hostel Building**.

5.2 Waste handling

Quantification wise as per Interview and survey it was found the following type of waste is Solid, Liquid, Hazardous Waste, Dry leaves, E-Waste, Canteen waste, Unused equipment and Others (Sanitary Napkins) waste is collected. The waste produced on campus is segregated. It is collected on a weekly basis. The waste is not handed over to the local municipality van.

For solid waste management College has set up of organic manure which decomposes the organic waste produces from campus like dried foliage, waste paper, dried leaves and twigs of plants in Botany department and organic waste. These wastages are mixed through organic fermentation process that converts into organic slurry. It is useful as organic manure for the trees and plants in the campus. There is a dumping pit in the garden which should not be there.

5.3 Waste management

The college reuses the papers. Ample measures are taken to maintain hygiene. No smell problem or health related issues due to the waste are there. There are adequate numbers of bins present in all parts of building. The waste does not pollute the ground or surface water. There is no problem of air pollution from waste as informed.

The wastes from toilets are discharged to main drains through underground covered channels (Safety Tanks) thus avoiding any incident. There is provision for Sanitary Napkin Disposal Machine in the premise as one Incineration Unit in Ladies Wash Room for proper & hygienic disposal of sanitary napkins. There are signages in College mentioning awareness about cleanliness.

5.4 Survey Results

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

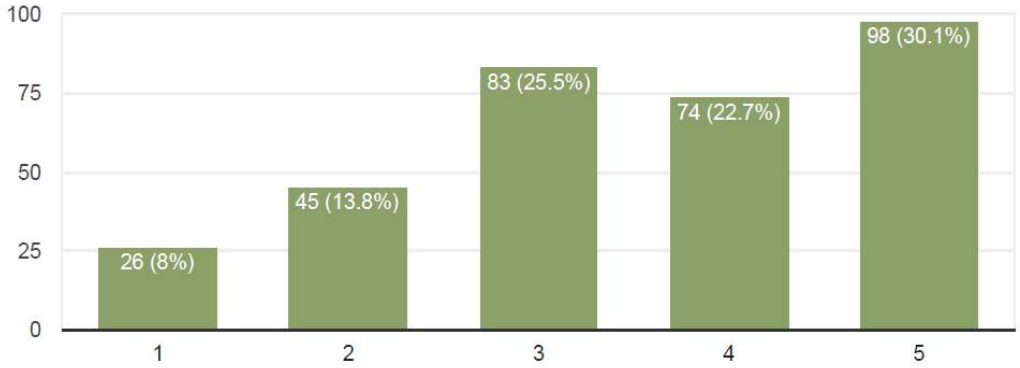


Figure 8: Waste management practices in College

The students, staff **(almost 30%)** of responses found the practices to be excellent.

5.5 Recommendations for a Sustainable Habitat

Zero Organic waste premise

- The food waste generated by the students and staffs are taken by them to their own home so that, minimum waste is generated inside the premises.
- Waste water treatment plant can be set up for the liquid waste so that treated water can be reused for gardening. Additional awareness signages can be setup though the ones at present are quite sufficient.

Waste Disposals carried to the Nagar panchayat

Dustbins are kept in Varanda in front of classrooms

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

Primary Source of water supply

The main source of water is through well and Rain water harvesting. The College does not require water from the Local Municipality. The total water consumption through the tanks on site is as follows:

S. No.	Type of tank	Nos.	Location	Capacity in litres
1	Water Tank (Overhead)	2	Main Building	4,000 litres
2		1	Library	1,000 litres
3		2	Hostel Building	2,000 litres
Total		**5**		**7,000 litres**

Table 12: Tanks in the premise

Secondary Source of water supply

1 Well available on the site for Rainwater Harvesting as underground water facility is available with daily water being pumped for using submersible pump of 1 HP each for 2 hours a day. **The actual depth of the well near the playground** is **40 ft. and 4 feet 9 inch diameter in size. On a daily basis nearly 10,000 litres of water is pumped for usage from the well.**

In summer season it is used for more hours, in rainy & winter season it is used comparatively for lesser duration depending on the quantity of water availability & requirement. The hygiene of this area is well maintained and there are no leakages. **There is an automatic ground water recharge, daily water is pumped for toilets, general usage.**

The system is designed to store and reuse rainwater. The water collected on the roofs of all the buildings in the college is discharged into the ground through appropriate piping system and sanitation system so that bore well benefit from this accumulated rainwater in the future.

The Rain water harvesting is done through the roof water being used for bore well recharging. There is no water scarcity during summer season and the water management, sanitation and supply scheme is well maintained.

6.2 Water requirement

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

- **Drinking water –** General water required for drinking purpose using around 245-260 litres of water through the RO and Aquaguard available in the premise.
- **Toilet blocks and practical laboratories** – General usage by occupants in toilets, urinals, bathrooms, wash basins using approx. 300 litres of water daily and
- **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.
- **Garden and surrounding open space** – Cleaning, watering the plants requires approximately more than 500 litres of water on alternate days in winter season and about 2-3 times a day in summer season on a regular climate day it is watered 3 days a week and in rainy season it is dependent on the monsoon showers.
- **Preparation of solutions in labs –** For experiment purpose in the Practical Laboratories water is utilised, however there is water wastage of about to a certain extent and currently this water is not treated and care is taken that it does not get mixed with the drain.

6.3 Areas of water usage

The following is a summary of the general water usage spaces - toilets, urinals, shower, flush tanks and wash basins/ taps in the premises all of these are available on ground floor.

Based on the inventory done and data shared by the staff it was found that the premise has a total of 36 lavatories (including urinals), 129 taps. As per the data shared by the College, it was noted that there is wastage of water to a certain extent in the form of 1) Toilet 2) Laboratory and the common reason is cleanliness.

Below mentioned is the quantification detail of the water wastage in the premises; **however the College is in process to set up a waste water treatment plant soon as informed by the Staff.**

Water used for water wastage (excluding holidays)

- Laboratory wastage 1,000 litres on Practical days
- Hostel 500 litres per day
- Toilet Wastage 5,000 litres per day

6.4 Site investigation about water management.

- There was no water leakage in the entire premise, the pipes well maintained with adequate hygiene.
- The premise has an efficient water management in terms of operations and maintenance. The toilets were kept very tidy and are cleaned on alternate days.
- The college has rainwater harvesting system which is very useful and the water is used for lab work.
- There is sufficient number of taps in the premise.
- The waste water from Canteen is reused in medicinal garden. Drip irrigation system is used for watering the Garden which is 3 days a week.
- Signages are included with information about avoiding water wastage near taps and wash basins.

6.5 Survey Results

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

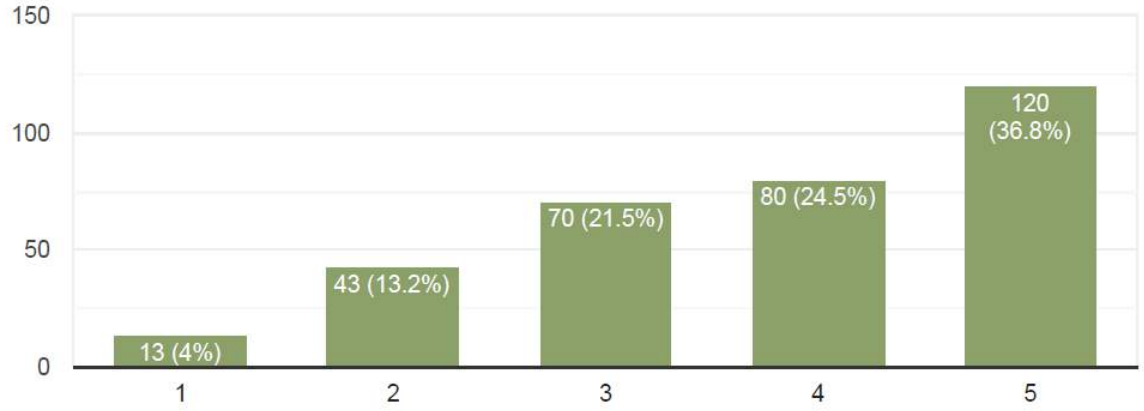


Figure 9: Water management practices in College

The students, staff **(almost 37%)** of the responses found the practices to be excellent.

6.6 Recommendations for a Sustainable Habitat

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

a) Universal Toilet

At least 1 toilet should be made for specially abled as per universal design norms.

b) Toilet flush system

Replace the existing single flush cisterns with dual flush, if possible to include waterless urinals or e-toilets.

c) Waste water from toilets

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

Odyssey Computers

ODYSSEY COMPUTERS
SHOP NO 5,6,&7,MOHNE COMPLEX
SHRI TALKIES ROAD,GONDIA (MH)441601
PH:07182-231530/232601
GST NO :27ABOPH3612A1Z4
BANK DETAILS:PNB BANK AC NO 0182002100042312. IFSC CODE:PUNB0018200

TO, PRINCIPAL,

JAGAT ARTS COMMERCE AND INDIRABEN HARIHARBHI PATEL

SCINCE COLLEGE-GOREGAON

SUBJECT-COLLECTION OF E-WASTE

Respected sir,

We appreciate the initiative taken by the college regarding E-waste collection Through the different Departments and the efforts taken by them towards saving our environment,

We are thankful to you for entrusting us for proper management & disperse of E-waste collected and expecting same in the future.

ODYSSEY COMPUTER GONDIA

Signatures of Authorized

Rain water carried in Well

Valves Controlling the water supply to Different Buildings

Water Tanks on Terrace

Bore well

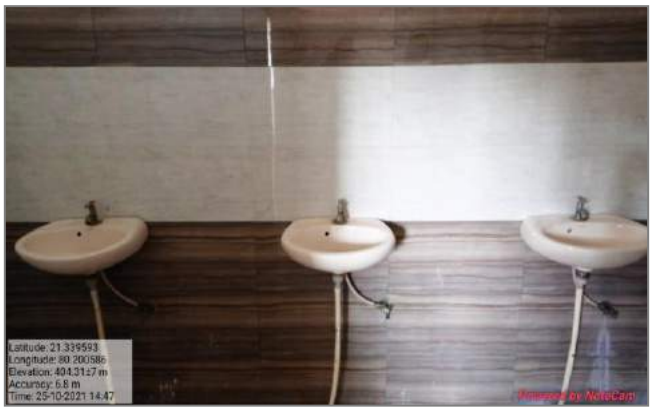
Control panel for water supply

Rain water Harvesting

Wall mounted Toilet for Specially abled

Wash Basin In Girl's Common Room

Sensor System In Water Tank



Wash Basins for Girls in Hostel

Drinking Water facility for all

Provision of Universally designed Washroom facilities

Energy Audit

Background reference image Janko Ferlic on pexels

Greenvio Solutions

7. Energy Audit

7.1 Sources of Energy consumption

The premise uses following sources of energy consumption.

7.1.1 Primary sources

1. **Electrical (Metered) –** Light, Fans, AC, Equipments, Pumps consume approximately 891 units per month for Rs. 8,431/- per month (average). **A net metering device is installed.**
2. **Electricity (Solar - Photovoltaic cells are used for solar energy) –** There are Solar Panels in premise, they generate up to 3.2 kW of energy per month. it is a Solar Rooftop Power Plant of 3.2 kW with grid tied with HP Make Electronic Single Phase Net-metering for PPA with MSEDCL. It consists of 3 kW Grid Tied Inverter (PCU) and 320w x 10 panels, fixtures and minor wiring included. **It was installed at a cost of Rs. 2,30,580/- with 5 years warranty.**

7.1.2 Secondary sources

1. **UPS –** There 1 UPS in the premise.
2. **Inverter –** There are 2 Inverters in the premise.
3. **Fuel oil (Diesel generator) –** As a backup One Diesel Generator is used when electricity is interrupted , an approximate 5 litres of diesel is required per month for Rs. 350/- per month.
4. **LPG –** There are 4 Commercial Gas cylinders used in the premise consume up to 9 kg of Gas per month for Rs. 600 /- per cylinder per month and 2 Domestic Gas cylinders used in the premise consume up to 7 kg of Gas per month for Rs. 450 /- per cylinder per month

7.2 Site investigation analysis

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

- **Diesel Generator is used as a backup** for the annual or large functions held in open ground occasionally.
- The **switch-off drills are practised at present,** the maintenance staff and Lab Attendants put off switches of all equipments regularly.
- All the **computers are shut-off after use** and also put on power saving mode.
- There are **display boards encouraging staff and students to save energy are put up in the classrooms and laboratories**.
- There are **no Ultra-violet lights and any other harmful lights used** in the premise.

7.3 Actual Electrical Consumption as per Bills

The admin department had shared the bills for Meter which is connected to all Buildings and is main source of energy supply. The supplier is Maharashtra State Electricity Distribution Limited. The type of supply is **LT – Low Tension.** The analysis of actual electrical energy consumption is summarised below. The solar panels were installed in recently post which the cost of electricity has been reduced. The details of unit consumption meter wise is as follows.

S. No.	Month	Year	Units	Amount
1	January	2019	337	3,060
2	February	2019	285	2,770
3	March	2019	622	5,870
4	April	2019	1,098	10,950
5	May	2019	1,598	16,240
6	June	2019	1,755	16,740
7	July	2019	1,815	18,390
8	August	2019	1,108	10,940
9	September	2019	1,282	12,260

10	October	2019	1,052	10,270
11	November	2019	44	720
12	December	2019	1,283	13,350
13	January	2020	277	2,670
14	February	2020	440	4,510
15	March	2020	464	4,780
16	April + May + June	2020	973	7,230
17	July + August	2020	1,760	13,710
18	September + October	2020	1,608	15,970
19	November + December	2020	976	7,630
20	January	2021	319	2,850
21	February	2021	264	2,360
22	March	2021	242	2,220
Total			**19,602**	**1,85,490/-**

Table 13: Study of the electricity consumption of the meters in premise

The summary of the above study shows the average consumption varies for each of the meters.

7.4 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.

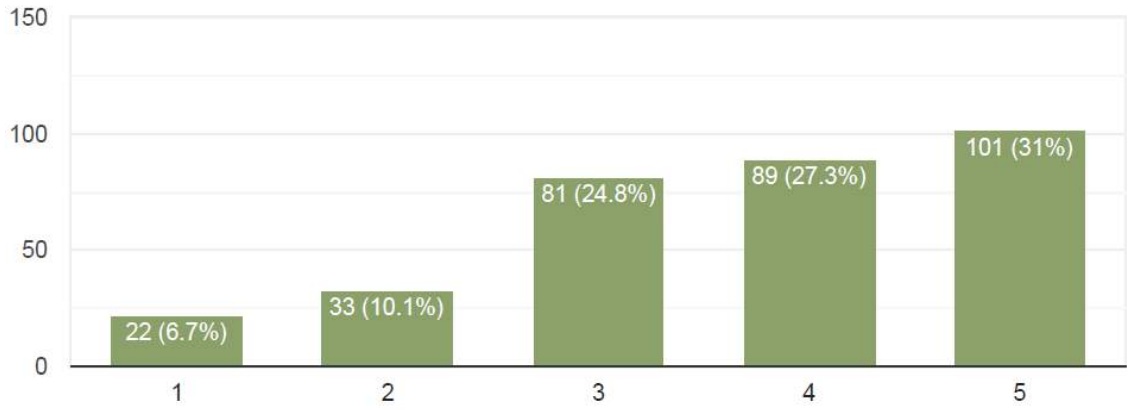


Figure 10: Energy Management practices in College

The students, staff **(almost 31%)** of the responses found the practices to be excellent.

7.5 Calculated Electrical Consumption as per inventory

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

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

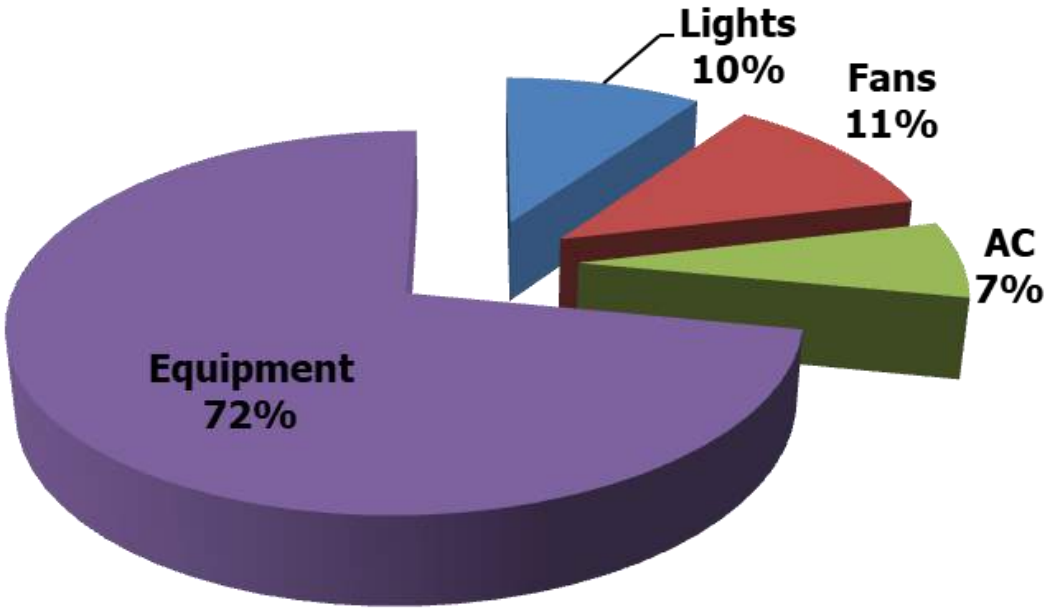


Figure 11: Summary of the Calculated Electrical Consumption as per inventory

The above graph shows that Equipment consumes 72% followed by Fans at 11% Lights at 10% and AC at 7% of the total calculated electrical energy.

7.6 Lights

7.6.1 Types of lights

There are a total of **269 Lights in the premises;** the following table shows the various types of lights in the premises.

S. No.	Type	Nos.
1	CFL	35
2	LED	161
3	Non-LED	73
Total		**269**

Table 14: Summary of the types of Lights in premise

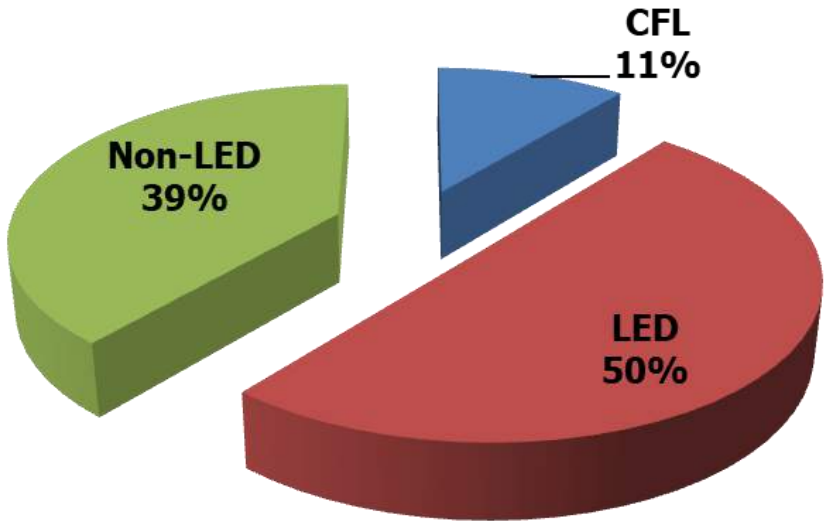


Figure 12: Energy consumed by Types of Lights in the premise based on the usage study

The analysis of the types of Lights in premises shows **LED Tubelights consume 8,689 kWh at 50%** followed by **Non-LED lights consuming 6,749 kWh at 39%** and the **CFL consumes 1,905 kWh at 11%**

7.6.2 Floor-wise consumption analysis

The energy consumption of Lights is **17,343 kWh** of energy; the following graph shows the floor wise consumption. This section analysis constitutes all buildings as a single entity.

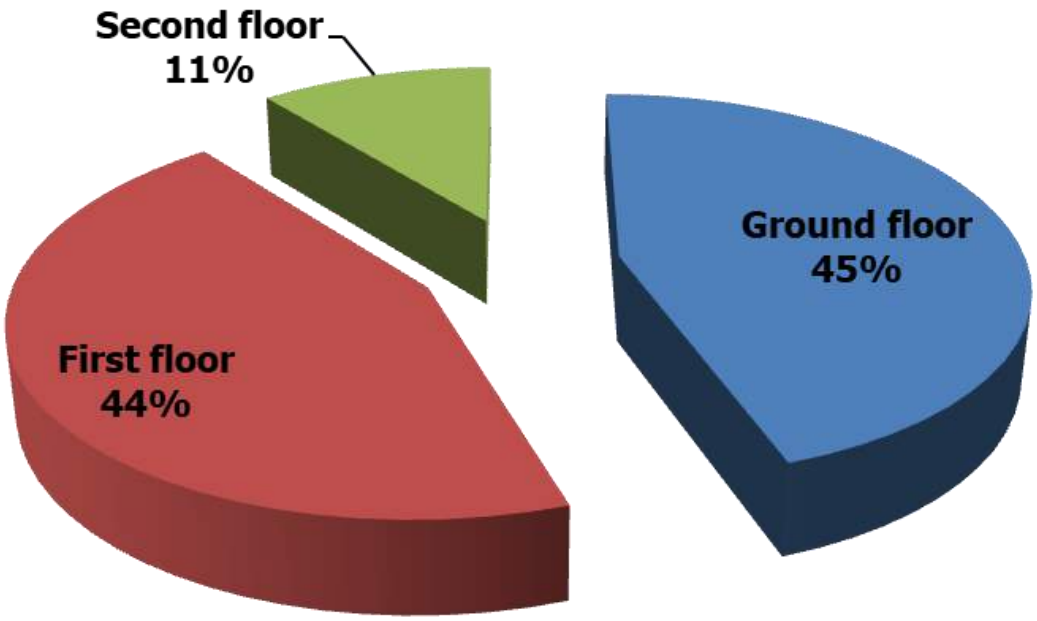


Figure 13: Energy consumed by Lights floor wise

The above analysis shows the Lights in the **Ground floor consumes the highest amount of energy of 7,765 kWh at 45%** while the **First floor consumes 7,697kWh at 44%** and the **Second floor consumes 1,882 kWh at 11%**

7.6.3 Section-wise consumption analysis

The energy consumption of Lights is **17,343 kWh** of energy; the following graph shows the section wise consumption.

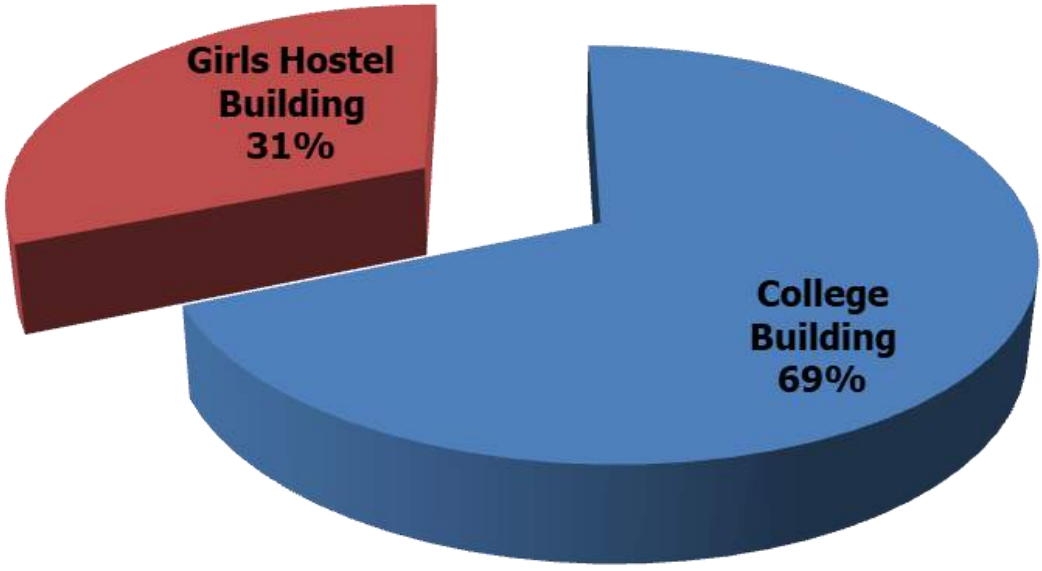


Figure 14: Energy consumed by Lights section wise

The above analysis shows the Lights in the **College Building consumes 11,927 kWh at 69%** while the ones in **Girl's Hostel Building consume 5,416 kWh at 31%**

7.6.4 Requirement of NAAC

7.6.4.1 Alternative Energy Initiative

Percentage of power requirement met by renewable energy sources – There are solar panels available in premise at present. The Solar Rooftop Power Plant is of 3.2 kW, Grid tied with net metering for Purchase power agreement with MSEDCL. The specifications are as follows:

- 3 kW Grid tied Inverter (PCU)
- 320W x 10 = 3.2 kW Solar Panels and Fixtures Installation and minor wiring.
- A with HPL Make Electronic Single Phase net metering device is installed

100% of the energy produced is given back to the grid.

7.6.4.2 Percentage of lighting power requirement met through LED bulbs

The premise has LED Lights contribute to60%in terms of number and **50% of the power requirement** is met through the same. As per our study we could conclude that both of these are highest contributions among all the types of lights.

7.6.5 Site investigation observations

Some of the points noticed are as follows:

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

7.7 Fans

7.7.1 Types of fans

There are a total of **185 fans** in the premise. The following table shows the various types of fans in the premises.

S. No.	Type	Nos.
1	Ceiling fan	160
2	Cooler Fan	6
3	Exhaust fan	19
Total		**185**

Table 15: Summary of the types of fans in premise

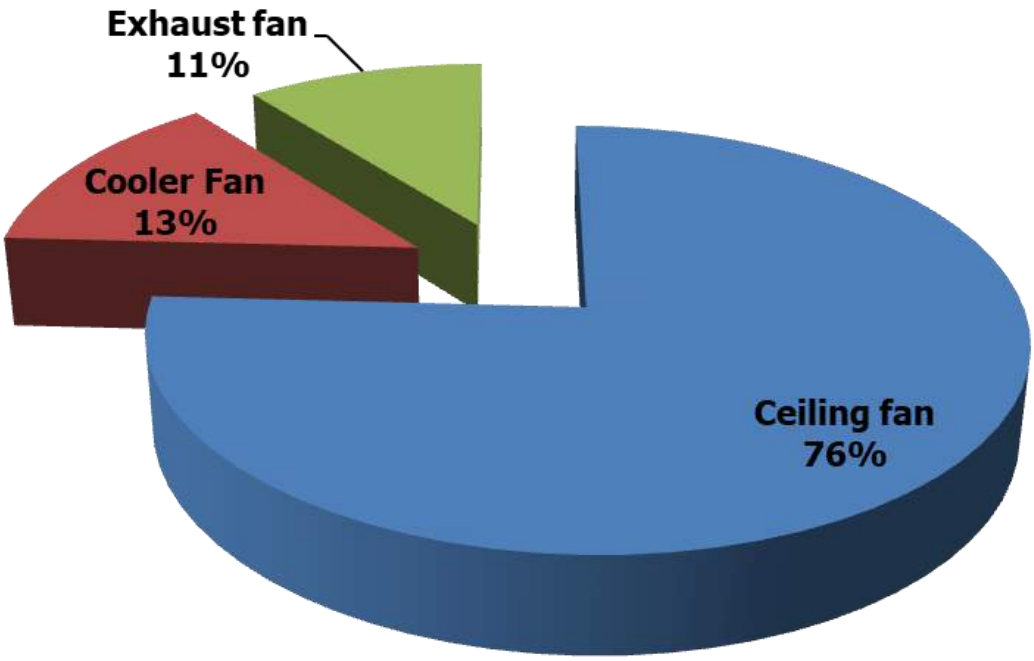


Figure 15: Energy consumed by Types of Fans in the premise based on the usage study

The analysis of the types of fans in premises shows **Ceiling fans consume 15,629 kWh at 76%** the **Cooler fans consume 2,799 kWh at 13%** while the **Exhaust Fan consumes 2,181 kWh at 11%**

7.7.2 Floor-wise consumption analysis

The energy consumption of Fans is **20,608 kWh** of energy; the following graph shows the floor wise consumption. This section analysis constitutes all buildings as a single entity.

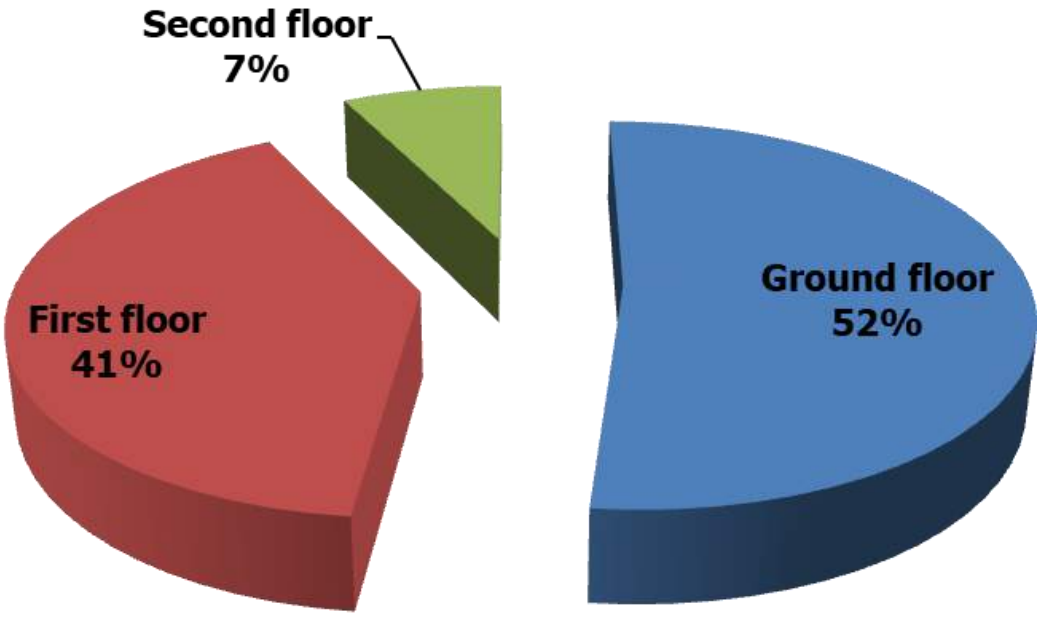


Figure 16: Energy consumed by Fans floor wise

The above analysis shows the Fans in the **Ground floor consumes the highest amount of energy of 11,283 kWh at 52%** while the **First floor consumes 8,900 kWh at 41% and the least amount of energy is consumed by Second floor which is 1,634 kWh at 7%**

7.7.3 Section-wise consumption analysis

The energy consumption of Fans is **20,608 kWh** of energy; the following graph shows the section wise consumption.

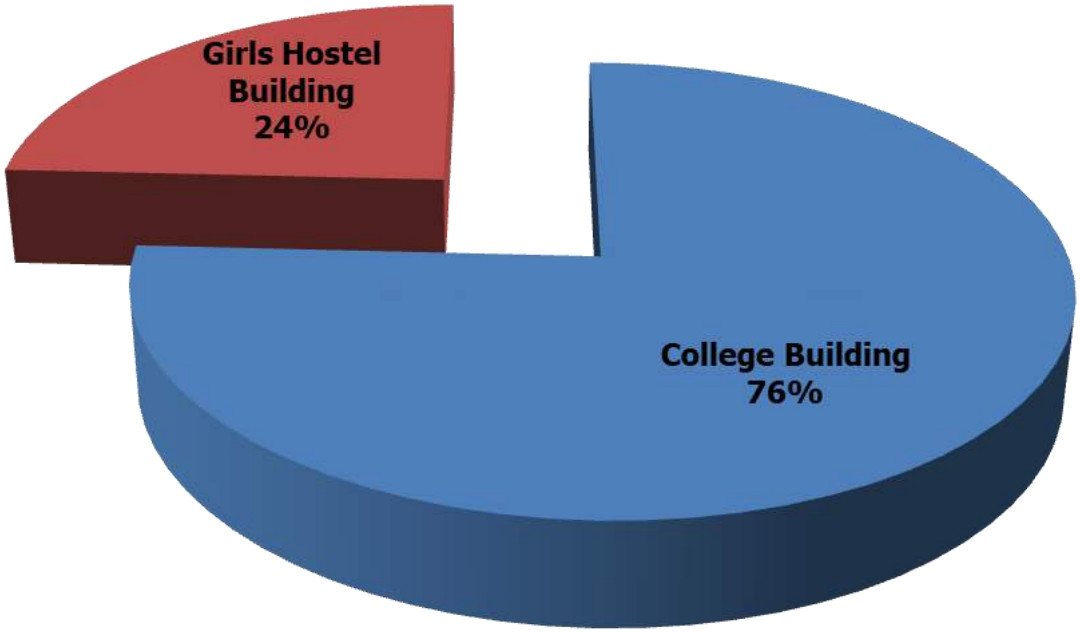


Figure 17: Energy consumed by Fans section wise

The above analysis shows the Fans in the **College Building consumes 15,619 kWh at 76%** while the ones in **Girl's Hostel Building consume 4,989 kWh at 24%**

7.7.4 Site investigation observations

Some of the points noticed are as follows:

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

7.8 AC

7.8.1 Types of AC

There are **5 air conditioners** in the entire premise. All of these are present only in the College Building. The Hostel Building does not have any air conditioner. The details are further studied and mentioned as follows.

Sr. No.	Room Name	Floor	AC. Nos.
1	IQAC	Ground Floor	1
2	Administrative Office	Ground Floor	2
3	Principal Office	Ground Floor	1
4	Exam. Control Room	First Floor	1
Total			**5**

Table 16: Details of the air-conditioner in premise

7.8.2 Floor-wise consumption analysis

The energy consumption of AC is **11,970 kWh** of energy; the following graph shows the floor wise consumption. This section analysis constitutes all buildings as a single entity.

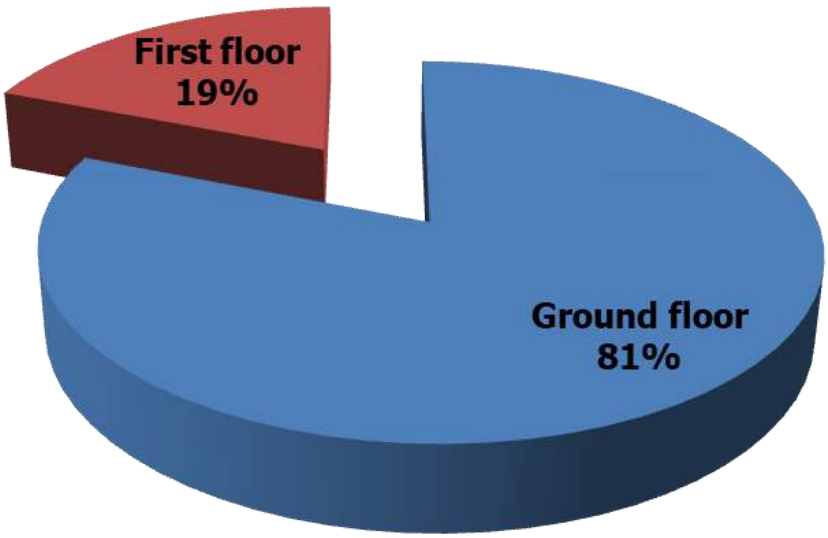


Figure 18: Energy consumed by AC floor wise

The above analysis shows the AC in the **Ground floor consumes the highest amount of energy which is 9,690 kWh at 81%** while the **First floor consumes 2,280 kWh at 19%**

7.8.3 Site investigation observations

Some of the points noticed are as follows:

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

7.8.4 About the replacement of Current AC

The current Air conditioners are well maintained and does not require any replacement.

7.9 Equipment

7.9.1 Types of Equipment

There are a total of **33 types of equipment totalling to 192 in number** in the premise. The various types are mentioned in the table below.

S. No.	Name	Nos.
1	Distillation Plant	1
2	DVR	1
3	Electronic balance	2
4	Hot Plate	1
5	Homogenizer	1
6	Homogenizer with speed control (Remi)	1
7	Hot Air Blower	1
8	Incubator (Biocraft)	1
9	Laptop	2
10	Potentiometer	4
11	Polarimeter	2
12	Projection Microscope	1
13	Oven	3
14	Pump	1
15	Sanitary Vending	1
16	Autoclave	1
17	Bar code Machine	1
18	Bio-metric machine	1
19	Digital balance	2
20	Conducto meter	4
21	Shaking machine	1
22	Tracing Table	4

23	Water bath	9
24	Sound system	1
25	CCTV	35
26	Desktop Computer	78
27	Digital Board	3
28	Printer	13
29	Refrigerator	3
30	RO	4
31	Scanner	3
32	Wifi router	2
33	Xerox machine	4
Total		**192**

Table 17: Types of equipment in the premise

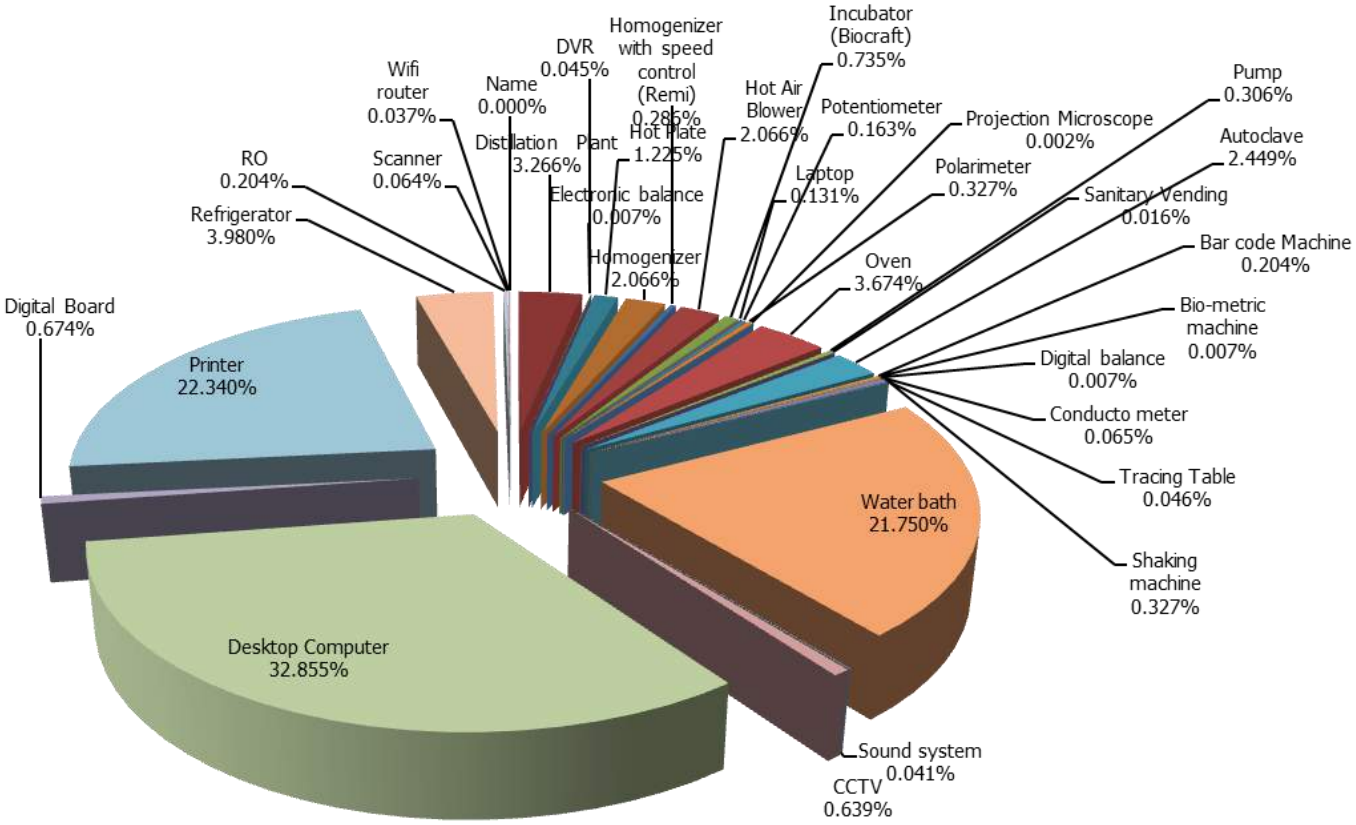


Figure 19: Summary of Energy consumed by Equipment in the premises

The above summary shows that **Desktop computer consumes more energy at 32.85%** while **Printer at 22.34%** the **Water Bath machine consumes 21.75%** and the **Refrigerator consumes 3.98%** these are maximum consumers as compared to other equipment. UPS and Inverter (when used for electrical consumption else it is a battery backup and does not require electricity as an equipment) are also one of the equipment but are excluded in this calculation.

7.9.2 Floor-wise consumption analysis

The energy consumption of Equipment is **1,28,239 kWh** of energy; the following graph shows the floor wise consumption. This section analysis constitutes all buildings as a single entity.

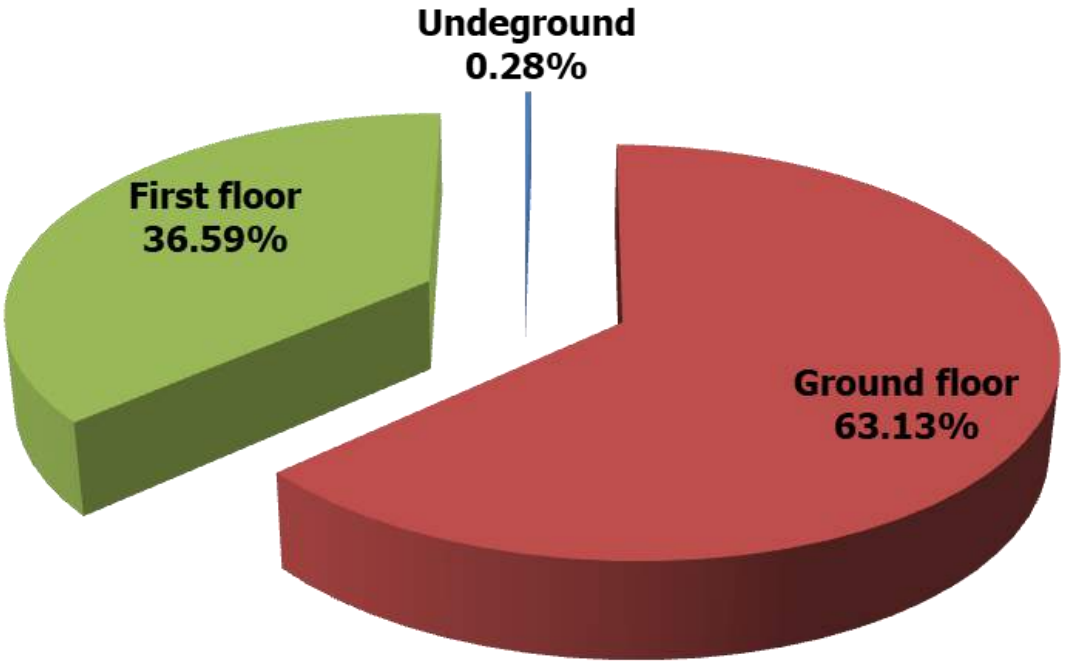


Figure 20: Energy consumed by Equipment floor wise

The above analysis shows the equipment in the **Ground floor consumes 80,954 kWh at 63.13%** while the **First floor consumes 46,924 kWh at 36.59%** and the **Underground floor consumes 360 kWh at 0.28%**

7.9.3 Section-wise consumption analysis

The energy consumption of Equipment is **1,28,239 kWh** of energy; the following graph shows the section wise consumption.

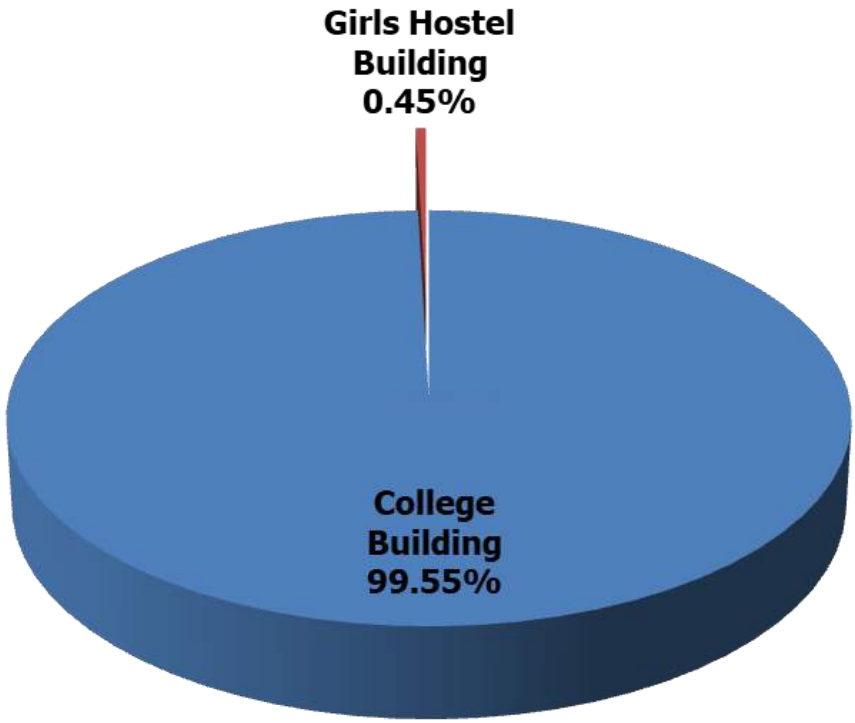


Figure 21: Energy consumed by Equipment section wise

The above analysis shows the equipment in the **College Building consumes 1,27,663 kWh at 99.55%** while the ones in **Girl's Hostel Building consume 576 kWh at 0.45%**

7.9.4 Site investigation observations

Some of the points noticed are as follows:

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

7.10 Recommendations for a Sustainable Habitat

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

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

7.10.1 Non-LED Tubelights

The current light analysis shows that Non-LED Tubelights lights consume anywhere between 24W, 36W and 40W when in use and these should be replaced with LED lights which consume on an average 16-20W when in use.

The following graph shows a comparison of the current consumption and consumption of all **Non-LED Tubelights on all floors** if replaced with LED lights.

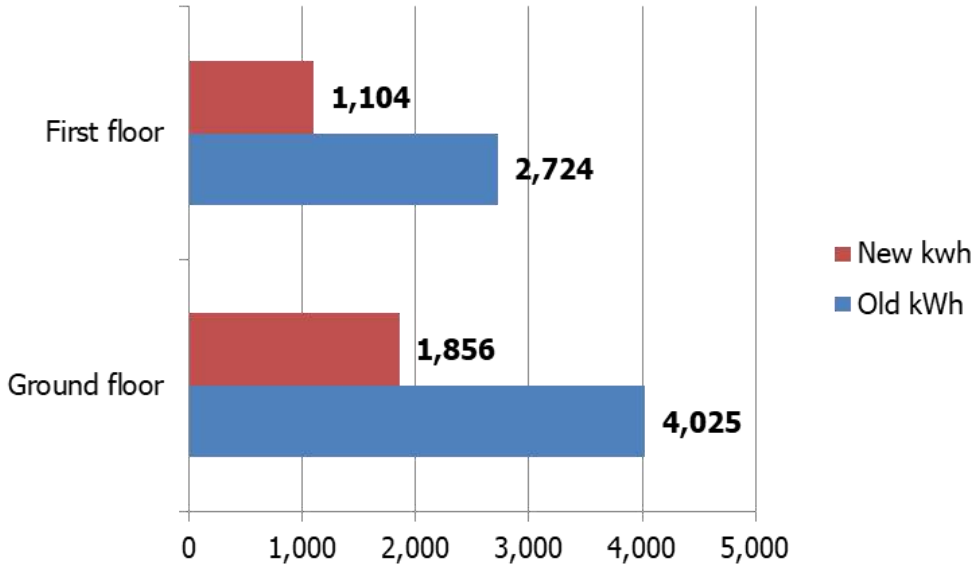


Figure 22: Analysis of current Non-LED and new LED Lights

The above analysis shows reduction of average of **57% reduction** in energy consumption if replaced with energy efficient appliance.

There are moderate numbers of CFL lights these too can be replaced with LED.

7.10.2 Fans

The current Fans are in proper working conditions and maintained well. The ceiling fans are in more quantity and consume at least 60W when in use. These should be replaced with energy efficient fans consuming 32W when in use.

The following graph shows a comparison of the current consumption and consumption of all **ceiling fans on all floors** if replaced with star rated appliance.

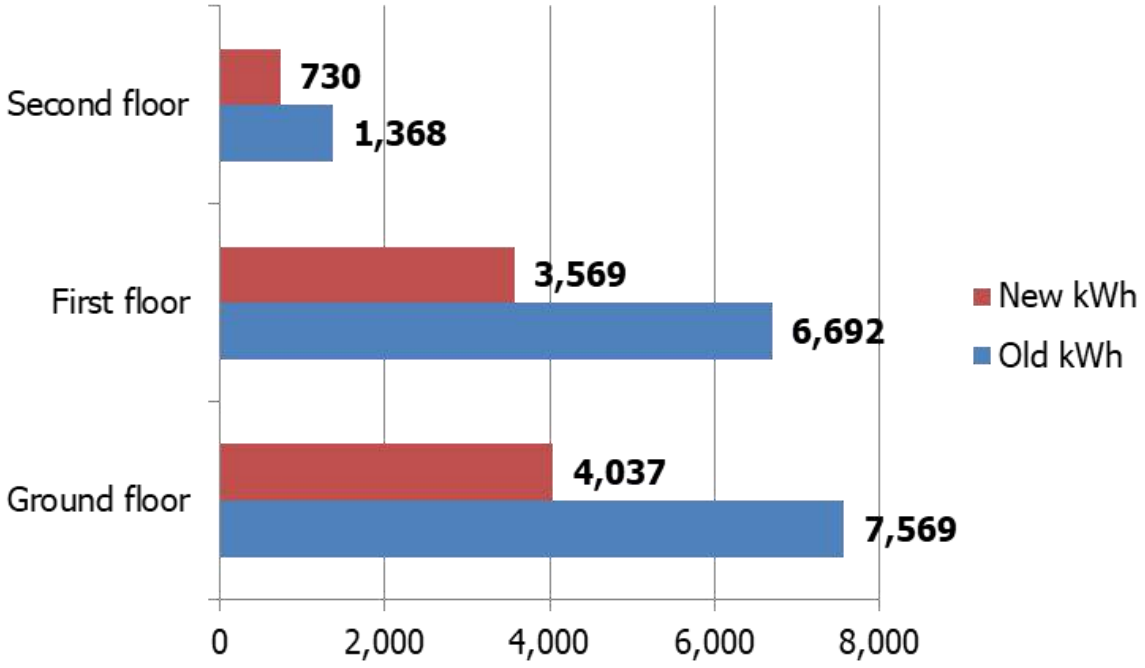


Figure 23: Analysis of current and new fans

The above analysis shows 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.

7.10.3 Equipment

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

The following table shows a comparison of the current consumption and consumption of the **desktop computers** if replaced with laptops.

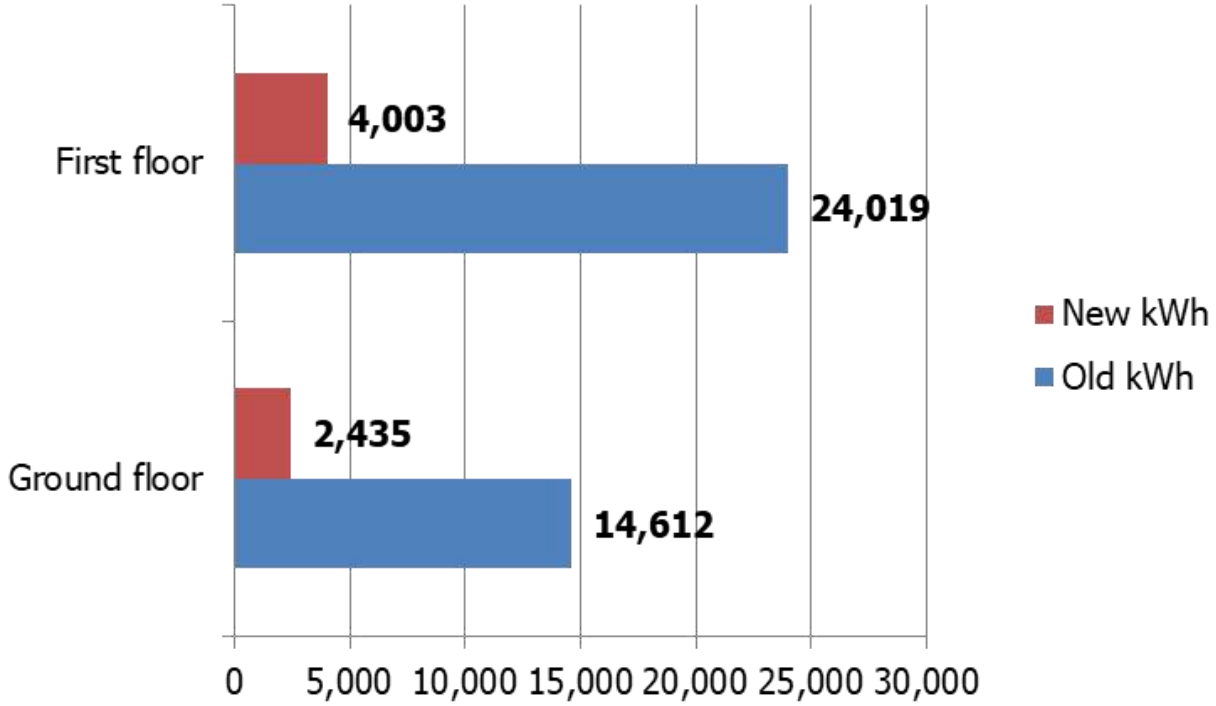


Figure 24: Analysis of current computers and new laptops

The above analysis shows reduction of average of **83% 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 the devices get damaged or are not in working condition.

LED Bulbs In Chemistry Laboratory

Instruments for Botany & Zoology Laboratory

Solar cell apparatus

Ceasefire and Distillation Apparatus in Chemistry Laboratory

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Invoice

Invoice No.:AGREEN/03/121
Purchase Order No.: 01
Delivery: At Site
Name of Purchaser:**Principal,**

Invoice Date: 25/09/2017

Payment: DD / RTGS/Cheque

Address: Jagat Arts, Commerce & Indiraben Hariharbhai Patel Science College,
Goregaon,
Dist. Gondia, M. S.

Sr. No.	Product Description	Quantity	UOM	Rate in Rs.	Amount In Rs.
1.	Solar Rooftop Power Plant – 3.2 Kw, Grid Tied with Net Metering for PPA with MSEDCL. a) 03 Kw Grid Tie Inverter (PCU), b) 320w x 10 = 3.2 Kw Solar Panels & Fixtures. Installation and Minor Wiring is included with 05 years of warranty.	01	Nos.	Rs. 2,10,000/-	Rs.2,10,000/-
2.	HPL MAKE ELECTRONIC SINGLE PHASE NET METER, 10-60 A, SPPB152111100000C01. (IMPORT - EXPORT)			Rs.9600/-	Rs.9600/-
	Subject to Power Purchase Agreement with MSEDCL.				
				Total	Rs.2,19,600/-
	Bank Account Name: Agreen Allied Services Pvt. Ltd. Name of Bank: State Bank of India, Main Branch, Nagpur. M. S. Account No.: 32172929062 IFS Code:-SBIN0000432			GST Central 2.5% State 2.5%	 5490/- 5490/-
				Total Roundoff	Rs.2,30,580/-

Total Of Two Lakh Thirty Thousand Five Hundred & Eighty Rupees Only.

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1. Proper Care of Goods is expected from users.
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6. Out station cheques to include collection charges.
7. Legal matters if any are subject to Nagpur Jurisdiction only.
8. Guarantee is applicable if the product is intended to its proper usage with proper installations procedure.

Installation By :

Received by:

Principal
Jagat Arts, Commerce & Indiraben Hariharbhai Patel Science College, Goregaon Dist. Gondia (M.S.)

For Agreen Allied Services Pvt. Ltd.

25/09/2017

Authorized Signatory

Difference in Units Consumed & Amount Paid Before and After Solar Panel

Months	Without solar panel		With solar Panel		Difference	
	Units consumed	Amount Paid	Units consumed	Amount Paid	Units	Amount In Rs.
May'2017	1672	13690.00				
June'2017	2164	21690.00				
July'2017	1700	16320.00				
August'2017	1336	11770.00				
Sep'2017			1655	15240.00		
Oct'2017			2176	18880.00		
Nov'2017			1140	9710.00		
Dec'2017			404	2620.00		
Total	6872	63470.00	5375	46450.00	1497	17020.00

PRINCIPAL
JAGAT ARTS, COMMERCE AND INDIRABEN
HARIHARBHAI PATEL SCIENCE COLLEGE,
GOREGAON DISTRICT GONDIA (M. S.)

8. Towards a Healthy & Sustainable Institution

8.1 Inputs by Greenvio Solutions

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

a) **Terrace farming -** There can be provision of terrace farming alongside the Canteen on Terrace and kitchen garden practices 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 vegetables grown which would be used in Canteen. It helps in capacity building as well as the smaller steps taken have huge impacts when each student would adopt these practices in their homes or societies and grow kitchen garden, 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, 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.

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

d) **Waste vio –** Stepping up a little further an initiative can be undertaken wherein College can tie up with an organisation and students can be encouraged to collect dry waste and electronic waste such as newspapers, old computers and others and hand over to organisation on a weekly or monthly basis thereby making a waste reduction approach in the community. This has benefits such as awareness, eco-friendly habits in becoming a responsible citizen.

8.2 Survey Results

An online survey was conducted to analyse the student and staff views about what changes according to you can be undertaken for Green audit improvement in College premise and activity, some of the key responses are listed below. Whereas many responses **stated there were no changes requires because the present practices are excellent.**

- Good
- Nothing
- No change
- All things are better
- I think the Institute has taken all the positive steps and no changes are required, the college premises is improving day by day.
- College botanical garden is maintained well. Trees are planted in the campus and the surrounding taking plantation program through NSS.
- According to me, in our college all side we see greenery plants and plants are giving us to very important gas like oxygen, this improvement look in college premise and also my college is very clean.
- The college premises are good.

Some of the changes suggested are as follows

- Useful Important tools for plants and ground clear tools, store for *kuda kachra*.
- Awareness in staff and students.
- Changes like more hygiene in college premises.
- A few more interactive sessions with students that raise awareness on this topic would be really helpful.
- Green revolution programmes should be conducted.

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

9. References

1. Uniform Plumbing Code – India, 2008
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3. IGBC Green Landscape Rating system, March 2013
4. BOMA Canada Waste Auditing Guide, Best Environmental Standards, BOMA BEST - Canada
5. Climate data https://gondia.gov.in/en/climate-and-rainfall/
6. Used only for understanding Universal design - Universal accessibility Guidelines for Pedestrian, Non-motorizes vehicle and Public Transport Infrastructure – Report guidelines by Samarthyam (National centre for Accessible Environments) – an initiative supported by Shakti Sustainable Energy Foundation.


Latitude: 21.339962
Longitude: 80.200938
Elevation: 407.44±3 m
Accuracy: 3.0 m
Time: 25-10-2021 15:22
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