Green and Environmental Audit Report

Dayanand Science College, Latur

Khadgaon Rd, Prakash Nagar, Latur, Maharashtra 413531

By
GREENEX ENVIRONMENTAL
T-71,- 1A/2, Telco Road, General Block, Near Indrayani Corner, above Kotak Mahindra bank, MIDC, Bhosari, Pune – 411026

INDEX

Sr. No.	Content	Page No.
1.0	**Introduction** 1.1 Dayanand Education Society, Latur 1.2 Dayanand Science College 1.3 Vision and Mission of College	1-7
2.0	**Green Audit and Environmental Audit**	8-11
3.0	**Objectives of Green Audit**	12
4.0	**Goals of Green Audit**	13
5.0	**Target Areas of Green Audit**	14
6.0	**Methodology** 6.1 Data Collection 6.2 Survey by Questionnaire 6.3 Data Analysis 6.4 Recommendations and Reporting	15-16
7.0	**Detailed Analysis** 7.1 Waste Management 7.2 Energy Conservation and Management 7.3 Water Quality and Conservation 7.4 Biodiversity Conservation 7.5 Carbon Footprint	17-61
8.0	**Innovative Strides**	62-64
9.0	**Facilities by campus**	65-66
10.0	**Recommendations**	67-69
11.0	**Conclusions**	70

12.0	**References**	71
	Annexures	72-76

1.0 Introduction

1.1 Dayanand Education Society, Latur

Dayanand Education Society was established in the year 1961 in the month of May. Earlier Latur was small town in the Osmanabad District. Facilities for higher education were not available in the Latur so students were left with no option but going to cities like Hyderabad, Pune, Mumbai and so on. Student from middle class and lower-middle-class families were not able to afford the costs of education and other costs arising from the needs to live in the cities like Mumbai, Pune etc. Higher education was rather like a dream for students from poor families. So to make the higher education facilities accessible to children of farmers, agricultural laborers, workers; the dignitaries and business people like Manikrao Sonavane (elder brother of Keshavrao Sonawane), Chandrashekhar Vajpeyi, Ramgopal Rathi and Keshavrao Sonawane established Dayanand Education Society in the May month of year 1961. Manikrao Sonavane, elder brother of Keshavrao and chairman of market committee, convinced the farmers of Latur to contribute to this cause. Keshavrao Sonavane, Co-Operative Minister of the Maharashtra state, contributed to this cause by completing all required formal government procedures. Earlier this college was affiliated to Dr. Babasaheb Ambedkar Marathwada University Aurangabad, but since the formation of a University in Nanded now it's affiliated to Swami Ramanand Teerth Marathwada University.

The Area of whole campus is 22 Acres and has 8 education institutes as follows:

1. Dayanand College of Commerce
2. Dayanand College of Art
3. Dayanand Science College
4. Dayanand College of Law
5. Dayanand College of Pharmacy
6. Dayanand Collage of Animation
7. Dayanand College of fashion designing and interior decoration
8. Dayanand College of Architecture

Figure 1: Dayanand Education Society

1.1.1 Infrastructure

Dayanand Education Society has 14 buildings in the campus namely:

1. Dayanand College of Commerce
2. Dayanand College of Art
3. Dayanand Science College
4. Dayanand College of Law
5. Dayanand College of Pharmacy
6. Dayanand Collage of Animation
7. Dayanand College of fashion designing and interior decoration
8. Dayanand College of Architecture
9. Girl's Hostel
10. Boy's Hostel

11. Library
12. Auditorium
13. Indoor Stadium and Gymnasium
14. Cricket Ground

Figure 2: Google Earth image of Dayanand Education Society

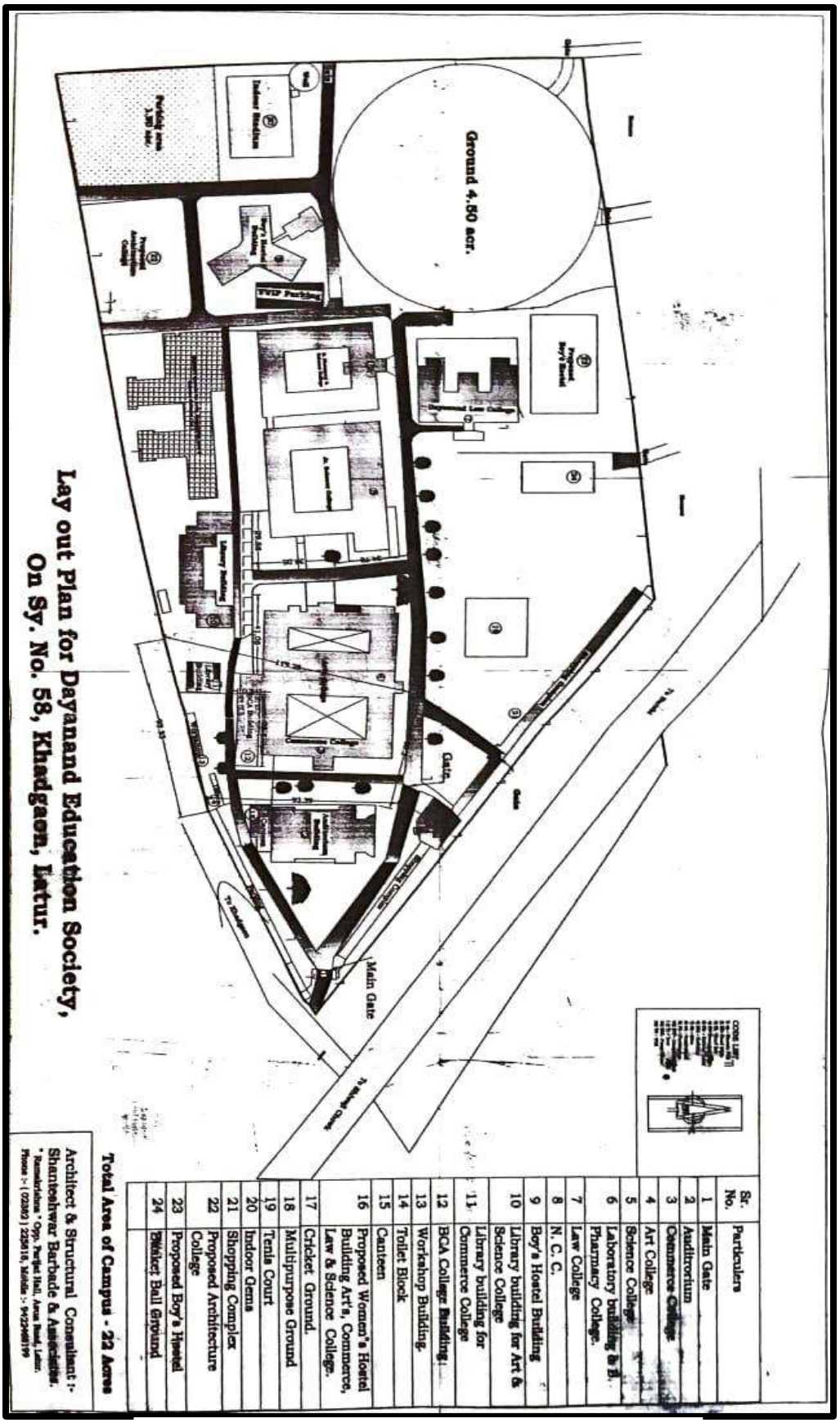


Figure 3: Layout of the Education Society

1.2 Dayanand Science College

Dayanand Science College, Latur, is unique, first oldest and the finest single faculty college in the region of Marathwada, pursing excellence in science education with several branches. Dayanand Science College became independent in 1967. The College not only provides education in basic and applied subjects, but also pays attention to the current innovative approaches towards the higher education. The College has 13 subject combinations for UG programs, 07 PG programs, 05 Research centers and 04 COP Programs. The Research centers have collaboration with the research centers and scientists of the various countries, such as USA, Korea, Switzerland, Poland, Greece, Malaysia, Romania, Oman, Thailand and Singapore etc. Due to the quality education, the college received different National and International awards and schemes. In the year 2012, our institution received Shahu-Phule-Ambedkar Award by Maharashtra State Government. In 2013, the college received DST-FIST recognition. In the year 2014, College had been awarded "A" grade in NAAC Accreditation 2nd cycle with CGPA 3.14 out of 4.00. In the year 2015, College received Best College (Urban) Award from SRTM University, Nanded. In the year 2016, College has been awarded "College with Potential for Excellence Award (CPE)" by UGC and able to receive grant of Rs.5 Crores in three phases. Our Principal Dr. J.S. Dargad has been recently awarded by "Best Principal Award" by SRTM University, Nanded. The college is well known about the development of "Latur pattern of Education" in the state of Maharashtra for the meritorious pattern. In last five years college organized 15 Inspire campuses, 3 refresher courses under the co-ordinatorship of Former Principal R.H. Ladda, College organized 1 International, 14 National, and 11 State / Regional conferences workshops.

Figure 4: Google Earth image of Dayanand Science College

Figure 5: Dayanand Science College

1.3 Vision and Mission of College

Vision

To Enlight Students Of Rural Area And To Contribute Their Services For Universal Development By Promoting Education.

Mission

Let the noble thoughts come to us from all the direction of the universe

" aa no bhadra kratavo yantu vishwatha"

Goals and Objectives of the Institution

1. To impart higher education in science to the students of our rural area of this region.
2. To promote the activities those are necessary for the welfare and overall development of the students.
3. To help the needy and economically weaker students in education.
4. To prepare the students to face the challenges of the competitive world.
5. To inculcate discipline, sincerity and devotion among the students to make them most responsible and respectable citizens of India.

2.0 Green Audit and Environmental Audit:

2.1 Green audit:

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience.

Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students a better understanding of Green impact on campus. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

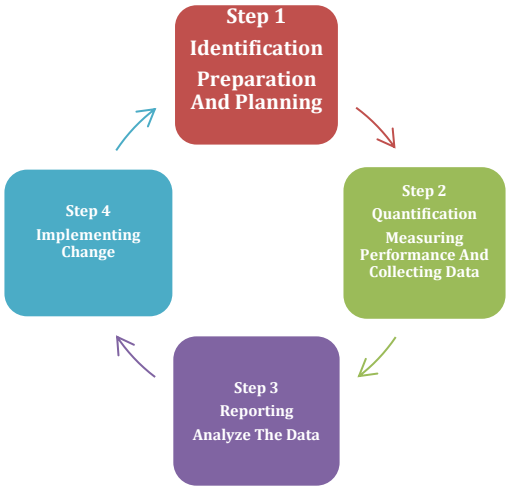


Figure 6: Green Audit

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric carbon-di-oxide from the environment. **Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council** that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. Moreover, it is a part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

Therefore, the purpose of the present green audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

2.1.1 Need for Green Audit

The modernization and industrialization are the two important outputs of twentieth century which have made human life more luxurious and comfortable. Simultaneously, they are responsible for voracious use of natural resources, exploitation of forests and wildlife, producing massive solid waste, polluting the scarce and sacred water resources and finally making our mother Earth ugly and inhospitable. Today, people are getting more familiar to the global issues like global warming, greenhouse effect, ozone depletion and climate change etc. Now, it is considered as a final call by mother Earth to walk on the path of sustainable development. The time has come to wake up, unite and combat together for sustainable environment.

Green Audit is the most efficient ecological tool to solve environmental problems. It is a process of regular identification, quantification, documenting, reporting and monitoring of environmentally important components in a specified area. Through this process the regular environmental activities are monitored within and outside of the concerned sites which have direct and indirect impact on surroundings. Green audit can be one of the initiative for such institutes to account their energy, water resource use as well as wastewater, solid waste, E-

waste, hazardous waste generation. Green Audit process can play an important role in promotion of environmental awareness and sensitization about resource use. It can create consciousness towards ecological values and ethics. Through green audit one can get direction about how to improve the condition of environment.

The major objective of performing Green Audit is controlling the pollution. It also helps in improving the safety and to making sure the prevention and reduction of the waste. It also provides performance reviews of working facilities and its possible impact on the surroundings. Audits enable the management of an organization to see exactly what is happening within the organization and to check the operation (or otherwise) of systems and procedures. Environmental auditing can help to reveal the likely weaknesses of an organization's strategy, therefore reducing the risk of unexpected events. A properly prepared and conducted environmental audit will bring real benefits to an organization committed to act on the results.

2.2 Environmental Audit

An environmental audit is a type of evaluation intended to identify environmental compliance and management system implementation gaps, along with related corrective actions. In this way they perform an analogous (similar) function to financial audits. There are generally two different types of environmental audits: compliance audits and management systems audits.ISO 14001 is a voluntary international standard for environmental management systems ("EMS"). ISO 14001:2004 provides the requirements for an EMS and ISO 14004 gives general EMS guidelines.

The Supreme Audit Institution (SAI) in India is headed by the Comptroller and Auditor General (CAG) of India who is a constitutional authority. The audit conducted by CAG is broadly classified into Financial, Compliance and Performance Audit. Environmental audit by SAI India is conducted within the broad framework of compliance and performance audit.

Environmental auditing is a systematic, documented, periodic and objective process in assessing an organization's activities and services in relation to:

- Assessing compliance with relevant statutory and internal requirements

- Facilitating management control of environmental practices
- Promoting good environmental management
- Maintaining credibility with the public
- Raising staff awareness and enforcing commitment to departmental environmental policy
- Exploring improvement opportunities
- Establishing the performance baseline for developing an Environmental Management System (EMS)

Figure no 7: Aspects of Environmental Audit

3.0 Objectives of Green audit

The overall objective of green auditing is to help safeguard the environment and minimize risks to human health. The key objectives of an environmental audit therefore are to:

- To determine how well the environmental management systems and equipment are performing
- To verify compliance with the relevant national, local or other laws and regulations
- To minimize human exposure to risks from environmental, health and safety problems.
- More efficient resource management
- To provide basis for improved sustainability
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To create green plastic free campus and evolve health consciousness among the stakeholders
- To Recognize the cost saving methods through waste minimizing
- To Point out the prevailing and forthcoming complications
- Impart environmental education through systematic environmental management approach and improving environmental standards
- Financial savings through a reduction in resource use
- Enhancement of college profile
- Developing an environmental ethic and value systems in students

4.0 Goals of Green Audit

- To achieve compliance standards and establish a report with regulatory bodies
- To identify needs, strengths, and weaknesses of the educational institute
- To review management systems and identify liabilities
- To assess environmental performance of the educational institute with the help of direct assessment.
- To promote environmental awareness among the staff and students
- To conserve non-renewable resources for betterment of future
- The long term goal is to collect the baseline data in terms of environmental parameters, calculate its impact on the environment and recommend measures to reduce them

Figure 8: Goal

5.0 Target Areas of Green and Environmental Auditing

- **Energy Conservation and Management:** This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles.

- **Water Quality and Conservation**: This indicator addresses water consumption, water sources, irrigation, storm water, appliances and fixtures.

- **Biodiversity Conservation**: All plant and animal species - including microorganisms - are a part of biodiversity. All types of gardens, lawns and trees are considered in this aspect.

- **Waste Management**: This indicator addresses all types of waste from college and associated amenities. The minimization, safe handling, and ultimate elimination of these materials are essential to the long-term health of the planet.

- **Carbon Footprint:** This aspect is for quantifying the carbon emissions from all the parts of the institution and quantifying how much of it is sequestrated with the help of landscape.

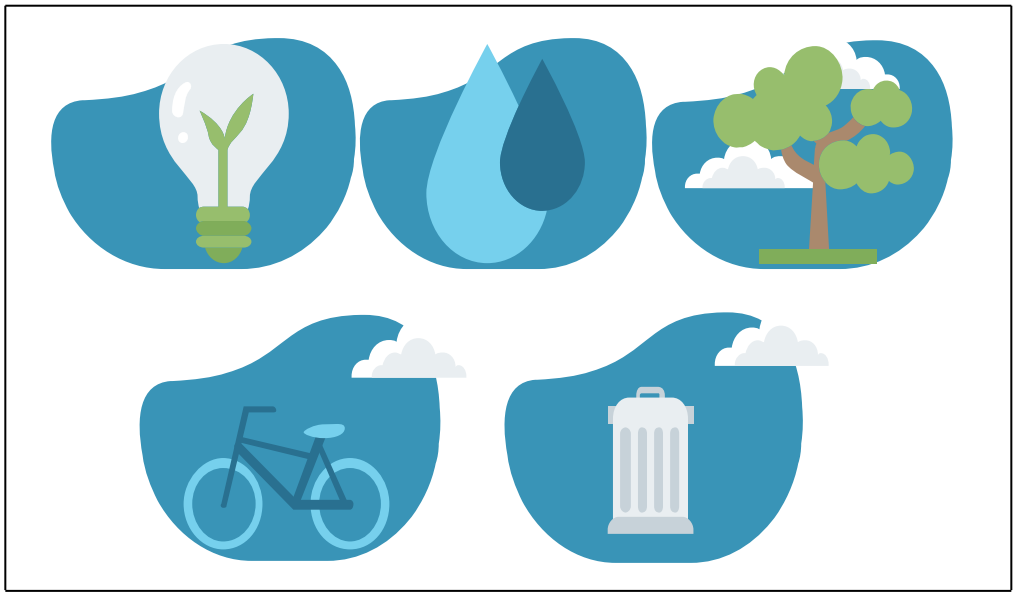


Figure 9: Target Areas of Green Audit

6.0 Methodology

6.1 Data Collection

In preliminary data collection phase, exhaustive data collection is performed using different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons, etc. Focus groups, if practiced, can also be a vital part of data collection stage to acquire qualitative information. The discussion should be focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level. Questionnaire (Annexure) prepared to conduct the green audit in the campus is in accordance with the guidelines, rules, acts and formats prepared by Ministry of Environment and Forest, New Delhi, Central Pollution Control Board and other statutory organizations. The data covers the target areas to summarize the present status of environment management in the campus.

6.2 Survey by Questionnaire

Baseline data for green audit report preparation was collected by questionnaire survey method. Most of the guidelines and formats are based on broad aspects. Therefore, using these guidelines and formats, combinations, modifications and restructuring was done and sets of questionnaires were prepared as solid waste, energy, water, biodiversity, carbon footprint. All the questionnaires comprises of group of modules. The first module is related to the general information of the concerned department, which broadly includes name of the department, month and year, total number of students and employees, visitors of the department, average working days and office timings etc. The next module is related to the present consumption of resources like water, energy, or the handling of solid and hazardous waste. One separate module is based on the questions related to the losses. Another module is related to maintaining records, like records of disposal of solid waste, records of solid waste recovery etc.

6.3 Data Analysis

The data required for the analysis is taken from the data collection, it includes: calculation of energy consumption, analysis of latest electricity bill of the campus, measuring water consumption, carbon foot printing, etc. The data from questionnaire and survey forms is tabulated for the convenience of data availability; Recommendations and Environmental Management Plan is built according to the analysis done in this step.

6.4 Recommendations and Reporting

Based on the data analysis step, some recommendations in the target areas are made. Specific measures are suggested to reduce water and energy consumption. Proper treatments of waste are suggested with respect to waste collection, waste disposal and recycling. Recommendations to reduce the use of fossil fuels are made for the betterment of community health. Proper disposal of hazardous waste is suggested to prevent mishaps. Management also takes into account the suggestions related to reducing their carbon footprint.

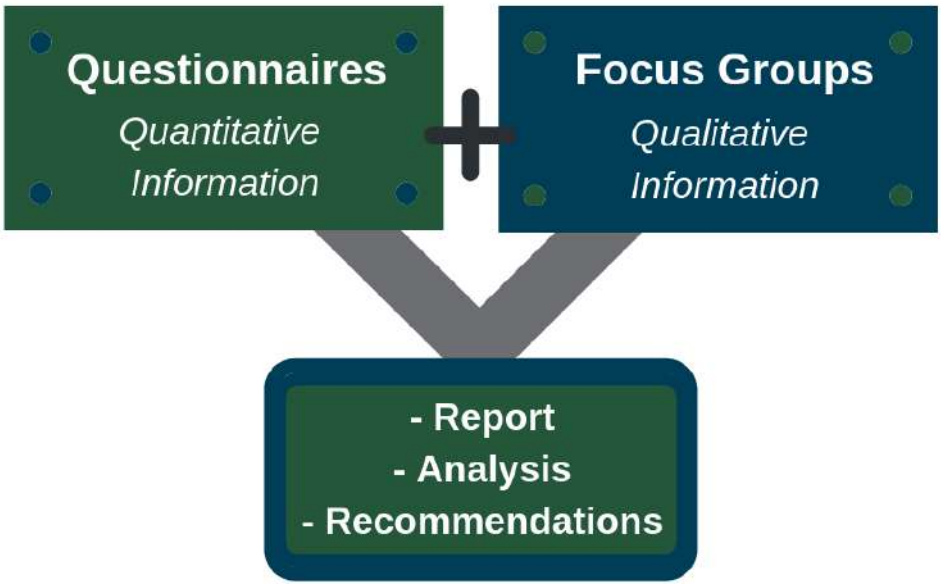


Figure 10: Green Audit Methodology

7.0 Detailed Analysis

7.1 Water quality and conservation

We investigate the relevant method that can be adopted and implemented to balance the demand and supply of water. The overall objective of conducting a water audit is to identify opportunities to make system or building water use more efficient.

This indicator addresses water consumption, water sources, irrigation, storm water, appliances and fixtures. The data collected from all the sections is examined and verified. Water consumption data tabulated below is then used for analysis and reporting.

a) Water Consumption:

Total Water Consumption: Dayanand Science College has total 61 m^3/day of water consumption

Table No. 1:- Daily Water Consumption

Parameter	Quantity	Total water consumption
Total Overhead tanks	**19**	**61 m^3**
Capacity of each tanks	**1 m^3 and 2 m^3**	
Total capacity	**30 m^3**	
Science library water consumption	**1 tank of 1 m^3**	
Underground tank	**10 m^3**	
Frequency of water filling	**Twice a day**	

There are 19 overhead tanks of 1m^3 and 2 m^3 in total on the roof with the capacity of 30m^3 which is filled twice a day. The Science library has a water tank of 1m^3 which is filled daily. There is one underground tank with the capacity of 10m^3. In summer season, this underground tank is filled using water tankers. There is leakage in 5 taps in the lab.

Table No. 2:- Bifurcation of water consumption in science college

	Washrooms	Laboratory	Library	Leakage	Total
Total Use of water (liters/day)	27168	31968	1000	864	61000

b) Current practices of waste water management:

Conserving water is important because it keeps water pure and clean while protecting the environment. Conserving water means using our water supply wisely and be responsible. As every individual depends on water for livelihood, we must learn how to keep our limited supply of water pure and away from pollution.

Sewage treatment plant (STP) treats about 30 m^3 of water per day which comes from girls hostel and boys hotel and the treated water is then reused for watering plants and cricket stadium ground.

Treatment scheme:

To have eco-friendly and natural treatment, this plant is designed based on the biological treatment concept. This means naturally occurring microbes removes or degrade the organic matter present in the sewage and at the end the clean water is available for non-potable usage or to dispose safely in the drainage or the river bodies as per the norms.

The treatment is done in following steps:

1. **Pre-treatment**:
   1.1 Screening: This is the first units of the plant in which large or floating materials in the sewage gets arrested and blockage or choking of the downstream equipment's can be avoided. This arrested material will be removed manually and then will be disposed of suitably.
   1.2 Equalization: To absorb variation in quantity and quality of sewage and to provide uniform flow at the downstream treatment process, a collection or

equalization tank is provided. This will avoid shock loading and process upsets of the treatment plant.

1.3 Fine Screening: After the separation of floating materials and equalization of raw influent form equalization tank will pass through the fine screen which having 4 mm pore size and separate the fine particles from the raw effluent.

2. **Secondary Treatment**:

1.1 Biological Treatment: This is the main section of the plant where degradation of organic pollutants with the help of aerobic micro-organism takes place. To provide higher surface area for micro-organism, floating media is provided. On which micro-organism growth takes place.

1.2 Tube Settler: Gravity overflow from the bioreactor is collected in the tube settler tank. In this settling tank, generated sludge from the bioreactor undergoes a gravity settling.

1.3 Disinfection: Supernatant from Tube settler, flow by gravity to the Filter Feed tank. To disinfect the harmful bacteria in the treated water as well as to remove the refractory organics from treated water, in this tan 'Chlorine with the help of dosing system.

3. Tertiary treatment

Secondary treated water will be further passed through sand media filter followed by activated carbon filter.

The Clarified water is first passed through a Pressure Sand filter to reduce the suspended solids and organic matter present in the raw water. Pressure sand filter bed consists of multi-grade Sand media the filter will have to be washed with the help of raw water for 10 to 15 minutes daily. This filter is provided to keep a check on the suspended solids.

The plant is designed to treat sewage generated having following characteristics:

Table No. 3:- Daily specifications of STP

Particulars	Characteristics
Nature of waste water	Domestic sewage
Flow	30 m^3 /day
Average flow	1.25 m^3/hr
Operating period	16 hrs/day
Design average flow	2.5 m^3/hr

Raw sewage parameter (at the inlet of collection tank/ septic tank):

Table No. 4:- Raw sewage parameter

Sr. No.	Parameters	Range	Unit
1	pH	6.5-8.0	--
2	COD	<350	Mg/lit
3	BOD(5 days @ 25 C)	<300	Mg/lit
4	Suspended solids	<500	Mg/lit
5	Oil and grease	<50	Mg/lit

Treated water parameter (after tertiary filtration system):

Table No. 5:- Treated water parameter

Sr. No.	Parameters	Range	Unit
1	pH	6.5-8.0	--
2	COD	<30	Mg/lit
3	BOD(5 days @ 25 C)	<10	Mg/lit
4	Suspended solids	<05	Mg/lit
5	Oil and grease	<01	Mg/lit

Figure 11: Sewage Treatment Plant

Rainwater harvesting: Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, deep pit**.**

Rain Water Harvesting is practiced by the institute that produces 530 m^3 of water.

Campus has prepared pits for rainwater harvesting in the following places:

Table No. 6:- rainwater harvesting details

Sr. no.	Building name	Size of rainwater harvesting area Sq ft	No of pits
1.	Dayanand BCA college	4455	02
2.	Dayanand canteen	11657	04
3.	Dayanand swanstha karyalay	17800	18
4.	Dayanand arts college	23340	04
5.	Dayanand commerce college	25343	04
6.	Dayanand indoor stadium	12920	02
7.	Dayanand commerce library	2704	01
8.	Dayanand arts and science library	7748	03
9.	Dayanand boys hostel	8250	06
10.	Dayanand girls hostel	25619	05
11.	Dayanand pharmacy college	11173	03
12.	Dayanand law college	12792	02
13.	Dayanand science college	49781	05
14.	Dayanand rashtriya pati ground	163800	04
15.	Dayanand parking ground	13780	02
	Total	**512173**	**65**

Figure 12: Rain Water Harvesting

7.2 Energy Conservation and Management

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy sources utilized by all the departments and services of college include electricity, liquid petroleum and LPG. Data for electricity consumption of the college for various departments was collected and is listed below.

a) Electricity consumption:

Electrical Equipment in the Institute:

Dayanand Senior Science College

Table No. 7:- Electrical Equipment

Sr. No.	Name of Appliance	Wattage	Qty	WATTAGE
1	AC	2200	15	**33000**
2	Tube light	40	232	**9280**
3	Fan	60	184	**11040**
4	Water Cooler	1500	4	**6000**
5	Computer	200	160	**32000**
6	LED Panel	22	21	**462**
7	Exhaust Fan	150	14	**2100**
8	Oven	2000	12	**24000**
9	RO Machine	3000	1	**3000**
10	Smart Board	250	10	**2500**
10	LIFT	4000	1	**4000**

Dayanand Junior Science College

Table No. 8:- Electrical Equipment

Sr. No.	Name of Appliance	Wattage	Qty	WATTAGE
1	AC	2200	7	**15400**
2	Tube light	40	273	**10920**
3	Fan	60	323	**19380**

4	Water Cooler	1500	3	**4600**
5	Computer	200	70	**1400**
6	LED Panel	22	120	**2640**
7	LED Panel	12	83	**996**
8	Exhaust Fan	120	8	**960**
9	LED	50	18	**900**

Alternate Energy Initiatives:

The Institute has been installed Solar Power Plant.

Fig No 13: Solar Panels On Rooftop

Annual Power requirement met by renewable energy Source

30 KW Total Power generated KWH = **54750** units /year

Annual Power Requirement:

Table No. 9:- Electricity Bills

Month & Year	Units	Bill Amount
18-Sep	2,534	25,840.00
18-Oct	5,263	83,330.00
18-Nov	2,309	81,110.00
18-Dec	426	1,110.00
19-Jan	1,988	22,060.00
19-Feb	1,876	41,660.00
19-Mar	2,751	60,880.00
19-Apr	2,241	53,480.00
19-May	3,353	86,620.00
19-Jun	1,439	102,710.00
19-Jul	3,163	33,170.00
Total	27,343	591,970
Solar Power Generation	**KWH**	54000
Total Power Consumption	**KWH**	645,970

<u>Percentage of Annual Power requirements met Renewable Energy Sources</u>
(Current year data):

% of Annual Power Requirement Of The Institution Met By Renewable Energy Sources = $\frac{\text{Annual Power Requirement Met By Renewable Sources}}{\text{Annual Power Requirement}}$

$= \left\{ \frac{54000}{645,970} \right\} * 100$

= 8.36 %

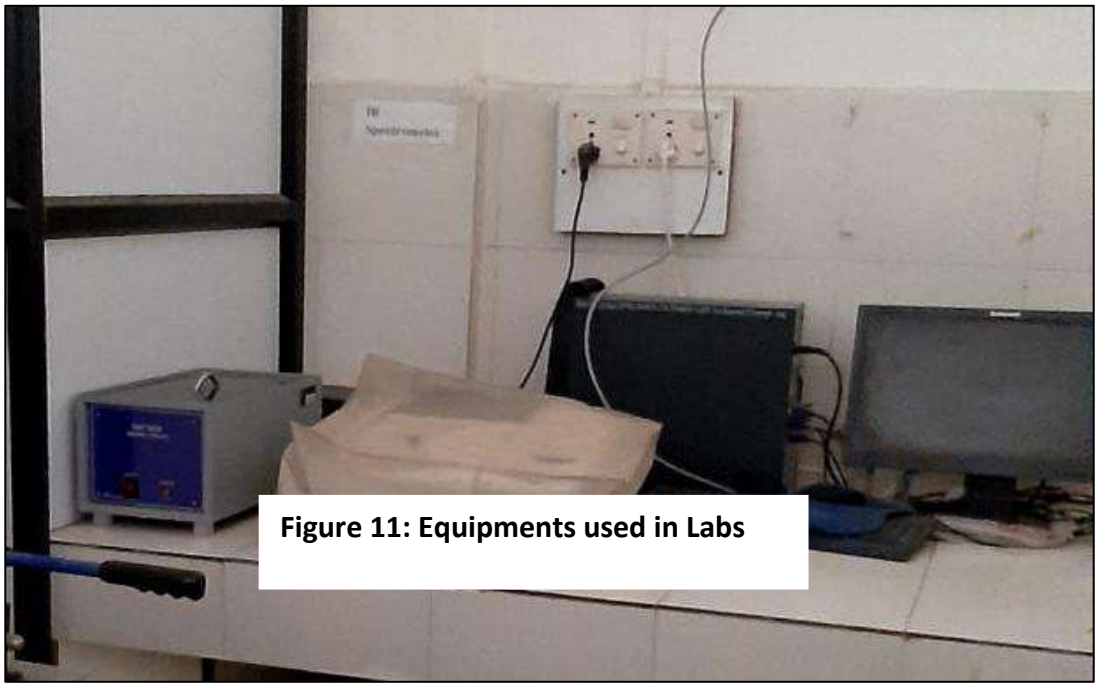


Figure 11: Equipments used in Labs

Figure 14: Equipments used in Labs

b) Current practices for energy management

With billions of harmful emissions in the atmosphere, cutting back is always a good thing. In turn, conserving energy produces a higher quality of life. Reduced emissions result in cleaner air quality. In addition, it helps create a healthier planet, or at least helps sustain the resources we already have.

The institution has installed solar panels on the roof that produces renewable energy to try to meet the increased electricity demand. Currently, the institute has solar panels that contribute to 8.36% of their yearly electricity consumption.

Institute has also installed some LED fixtures that meets almost 24.62% of annual lighting power requirement. A seminar was conducted by Department of Botany on 'Energy Management' on 11th April 2018. There was a one-day workshop on 'Energy Management and its Awareness' sponsored by UGC-CPE on 7th September 2018.

7.3 Waste Management

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health. Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. Unscientific management of these wastes may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. We collected the details of solid waste generation using questionnaires and observations and tabulated them below. We also diagnosed the prevailing waste disposal policies and suggested the best way to combat the problems in the recommendations. E-waste is among the fastest growing solid waste classes and represents a serious hazard for the environment.

a) Generation of waste:

Total Waste Generation: 54 kg/month waste is generated by Science College

Table No. 10: Category Wise Solid Waste Generation (kg/month)

Category of waste	Paper waste	Plastic Waste	Biodegradable / wet waste	Glass waste	Hazardous waste
Quantity	12	8	30	0.25	2

Table No.11: E-Waste Generation (kg/month)

Type of Waste	Generation Quantity	E-waste handled	E-waste treated and disposed (kg)
E-waste	1	Recycled	0

b) Current practices of solid waste management

Waste management reduces the effect of waste on the environment, health, etc. It can also help reuse or recycle resources, such as; paper, cans, glass, etc. There are various types of waste management techniques that include the disposal of solid, liquid, gaseous, or hazardous substances. All the biodegradable waste along with paper waste produced in the college is sent to the microbial culture composting which then produces organic manure. This organic manure is used for trees in the campus.

Composting is a natural process that stems through microbial succession, marking the degradation and stabilization of organic matter present in waste. The use of microbial additives during composting is considered highly efficient, likely to enhance the production of different enzymes resulting in better rate of waste degradation. In lesser developed countries, composting has emerged as a vital technology to recycle the biodegradable waste while generating a useful product. Depending on the composition of the waste material, it can either directly undergo composting or homogenized prior to secondary waste treatment methods such as land filling.

The **Microbial Culture Composting** unit is situated near ladies hostel. All the wet waste from the hostels and other colleges is collected and then sent to the composting unit and the compost collected through this unit is then used as natural fertilizers for trees and plants in whole campus.

Fig no. 15: Microbial Culture Composting

The plastic waste is collected and handed over to the scrap dealer or sent with municipal solid waste.

The hazardous waste generated in biology lab is sterilized in an autoclave and then disposed off.

Majority of the **E-waste** is repaired and donated to schools for academic purposes. The minimal remaining e-waste is then sold to authorized scrap vendors.

Sanitary Napkin Incinerator: **Incinerator** uses electricity to heat the heating coil which in turn will lit up the **sanitary napkins** when dumped into the **incinerator**. When the **sanitary napkin** burns, it is reduced to ashes and then disposed off.

Fig no. 16: Sanitary Napkin Incinerator

Figure 17: Waste Collection

Figure 18: Waste Segregation

Figure 19: Microbial Culture Composting

7.4 Biodiversity Conservation

The term biodiversity (from "biological diversity") refers to the variety of life on Earth at all its levels, from genes to ecosystems, and can encompass the evolutionary, ecological, and cultural processes that sustain life.

This aspect addresses all the flora and fauna of the campus. The list below has the name and quantity of trees as well as bird species.

Table No.12: Trees of the campus

Sr. no	Common name of plant	Botanical name	Quantity	Total
1.	Palm (large)	*Roystonea regia*	03	**26**
2.	Palm (small)	*Roystonea regia*	22	
3.	Supari	*Aareca catechu*	01	
4.	Ashok	*Saruca asoca*	07	**45**
5.	Mahogani	*Swietenia mahagoni*	02	
6.	Sagwan	*Tectona grandis*	02	
7.	Peepal	*Ficus religiosa*	01	
8.	Gulmohar	*Delonix regia*	02	
9.	Badam	*Terminalia katappa*	03	
10.	Subabhul	*Leucaena leucocephala*	02	
11.	Limbu	*Citrus aurantifolia*	02	
12.	Tamarind	*Tamarindus indica*	01	
13.	Mango	*Mangifera indica*	01	
14.	Bamboo	*Bambusoideae*	01	
15.	Sururu	*Casuarina equisetifolia*	01	
16.	Nandurki	*Toona ciliate*	02	
17.	Nivdung	*Cacti species*	01	
18.	Takli	*Silene conoidea L*	02	
19.	Aapta	*Bauhinia racemosa*	02	

20.	Jaswand	*Hibiscus rosasinensis*	01	
21.	Ruchik	*Calotropis gigantean*	02	
22.	Adulsa	*Justicia adhatoda*	01	
23.	Chafa	*Plumeria*	02	
24.	Kektad	*Agave Americana*	02	
25.	Necha	*Acorus calamus*	03	
26.	Bogan Vel	*Bouglanvillea glabra*	01	
27.	Limbu	*Citrus x aurantifolia*	01	
28.	Buch	*Millingtonia hortensis*	02	
29.	Subabhul	*Leucaena leucocephala*	04	
30.	Gulmohar	*Delonix regia*	26	
31.	Peepal	*Ficus religiosa*	01	
32.	Ashok	*Saraca asoca*	02	
33.	Umbar	*Ficus racemosa*	01	
34.	Mahogani	*Swietenia mahagoni*	02	**16**
35.	Subabhul Karanji	*Leucaena leucocephala*	02	
	Karanji	*Millettia pinnata*	01	
36.	Badam	*Terminalia katappa*	03	
37.	Chafa	*Plumeria*	07	
38.	Swastik	*Tabernaemontana divaricata*	01	

Girls hostel area:

Sr. no	Common name of plant	Botanical name	Quantity	Total
1.	Bakuli	*Minusops elengi*	04	98
2.	Shirish Gulabi	*Albizia Lebbeck*	10	

3.	Chafa	*Plumeria*	03	
4.	Limbu	*Citrus aurantiifolia*	02	
5.	Kadam	*Neolamarckia cadamba*	05	
6.	Sitafal	*Annona squamosa*	03	
7.	Limbu	*Citrus aurantiifolia*	02	
8.	Wad	*Ficus benghalensis*	01	
9.	Palm	*Roystonea regia*	14	
10.	Mango	*Mangifera indica*	10	
11.	Jambhul	*Syzygium cumini*	02	
12.	Mahogani	*Swietenia mahagoni*	02	
13.	Limboni	*Limonia acidssima L.*	01	
14.	Jaswand	*Hibiscus rosasinensis*	05	
15.	Peepal	*Ficus religiosa*	01	
16.	Parijatak	*Nyctanthes arbor-tristis*	03	
17.	Christmas Tree	*Araucaria columnaris*	02	
18.	Ramfal	*Annona reticulata*	01	
19.	Swastik	*Tabernaemontana*	02	
20.	Adulsa	*Justicia adhatoda*	01	
21.	Sagwan	*Tectona grandis*	16	
22.	Shevga	*Moringa oleifera*	04	

23.	Dalimb	*Punica granatum*	02	
24.	Peru	*Psidium guajava*	02	

Arts college:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Ramfal	*Annona reticulate*	01	23
2.	Subabhul	*Leucaena leucocephala*	03	
3.	Buch	*Millingtonia hortensis*	06	
4.	Mango	*Mangifera indica*	03	
5.	Badam	*Millettia pinnata*	03	
6.	Fan palm	*Livistona chinensis*	07	
7.	Palm	*Roystonea regia*	03	
8.	Chafa	*Plumeria*	02	
9.	chandan	*Santalum album*	01	
10.	ashok	*Saruca asoca*	14	
11.	Christmas Tree	*Araucaria columnaris*	02	

Commerce jr college:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Subabhul	*Leucaena leucocephala*	02	04
2.	Mango	*Mangifera indica*	01	

3.	peepal	*Ficus religiosa*	01	

Main office area:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Subabhul	*Leucaena leucocephala*	04	18
2.	Palm	*Roystonea regia*	04	
3.	Sonmohar	*Peltophorum pterocarpum*	05	
4.	Badam	*Millettia pinnata*	03	
5.	limbu	*Citrus aurantiifolia*	02	

Commerce College:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Nilgiri	*Eucalyptus*	02	19
2.	Sonmohar	*Peltophorum pterocarpum*	10	
3.	ashok	*Saruca asoca*	09	
4.	Palm	*Roystonea regia*	02	
5.	Mango	*Mangifera indica*	03	
6.	Badam	*Millettia pinnata*	03	
7.	Gulmohar	*Delonix regia*	02	
8.	limbu	*Citrus aurantiifolia*	03	

9.	ashok	*Saruca asoca*	16	
10.	Kamal	*Nelumbo nucifera*	01	

Music department area:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Buch	*Millingtonia hortensis*	01	04
2.	Sonmohar	*Peltophorum pterocarpum*	03	

Meeting hall area:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Buch	*Millingtonia hortensis*	10	96
2.	limbu	*Citrus aurantiifolia*	01	
3.	peepal	*Ficus religiosa*	01	
4.	Subabhul	*Leucaena leucocephala*	05	
5.	Gulmohar	*Delonix regia*	07	
6.	Bakuli	*Minusops elengi*	03	
7.	limbu	*Citrus aurantiifolia*	03	
8.	Kadam	*Neolamarckia cadamba*	03	
9.	Chinch	*Tamarindus indica*	01	
10.	Umbar	*Ficus racemosa*	02	

11.	Sonmohar	*Peltophorum pterocarpum*	04	
12.	English chinch	*Pithecellobium dulce*	01	
13.	Others			

Canteen (behind meeting hall):

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Badam	*Millettia pinnata*	08	18
2.	Subabhul	*Leucaena leucocephala*	02	
3.	Umbar	*Ficus racemosa*	02	
4.	peepal	*Ficus religiosa*	02	
5.	Kadam	*Neolamarckia cadamba*	03	
6.	limbu	*Citrus aurantiifolia*	01	

Pharmacy College:

Sr. no	Common name of plant	Botanical name	Quantity	Total
1.	Ashoka	*Saruca asoca*	01	136
2.	Badam	*Terminalia catapa*	06	
3.	Subabhul	*Leucaena leucocephala*	01	
4.	Mango	*Mangifera indica*	04	
5.	Palm	*Roystonea regia*	02	

6.	Peepal	*Ficus relogiosa*	02	
7.	Buch	*Millingtonia hortensis*	01	
8.	Chafa	*Plumeria*	02	
9.	Fan palm	*Livistona chinensis*	02	
10.	Bakuli	*Minussops elngi*	06	
11.	Kadam	*Neolamackia cadamba*	02	
12.	Gulmohar	*Delonix regia*	02	
13.	Sitafal	*Annona squamosa*	01	
14.	Jaswand	*Hibiscus rosasinensis*	01	
15.	Adulsa	*Justicia adhatoda*	01	
16.	Jambhul	*Syzygium cumini*	01	
17.	Limbu	*Citrus aurantifolia*	01	
18.	Karanji	*Millettia pinnata*	01	
19.	Ghaneri	*Lantana camara linn*	01	
20.	Mahagoni	Swietenia mahagoni	02	
21.	Shevaga	*Moringa olifera*	02	
22.	Kadulimb	*Azadirachta indica*	04	
23.	Bor	*Ziziphus mauritiana*	01	
24.	Sonmohar	*Peltophorum pterocarpum*	01	
25.	Arjun	*Terminalia arjuna*	01	

26.	Awala	Phyllanthus emblica	01	
27.	Others		17	

Boys hostel:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Ashoka	Saruca asoca	06	18
2.	Badam	Terminalia catapa	03	
3.	Bakuli	Minusops elengi	05	
4.	Kadulimb	Azadirachta indica	01	
5.	Mango	Mangifera indica	02	
6.	apta	Bauhinia racemosa	01	

Gate no 9:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Gulmohar	*Delonix regia*	08	46
2.	Shevaga	*Moringa olifera*	03	
3.	Kadulimb	*Azadirachta indica*	01	
4.	Badam	*Terminalia catapa*	01	

5.	Subabhul	*Leucaena leucocephala*	02	
6.	English chinch	*Pithecellobium dulce*	01	
7.	liboni	*Limonia acidssima l.*	02	
8.	others		29	

Architecture:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Palm	*Roystonea regia*	05	90
2.	Gulmohar	Delonix regia	13	
3.	Chafa	*Plumeria*	73	
4.	Mango	*Mangifera indica*	01	
5.	Kadulimb	Azadirachta indica	01	
6.	others			

Indoor stadium area:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Naral	Coco nucifera	05	24
2.	Bakuli	Minusops elengi	15	
3.	Ashoka	*Saruca asoca*	01	
4.	Rubber	Hevea brasiliensis	01	
5.	Jambhul	*Syzygium cumini*	02	

6.	Ruchik	Calotropis gigantean	01	
7.	Shisham	Dalbergia sissoo	01	
8.	saptparni	Alstonia schoaris	01	

Boys hostel (back area):

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Palm	*Roystonea regia*	20	36
2.	Subabhul	*Leucaena leucocephala*	02	
3.	Bamboo	*Bambusoideae*	02	
4.	Arjun	*Terminalia arjuna*	05	
5.	Mango	*Mangifera indica*	03	
6.	Chafa	*Plumeria*	01	
7.	papaya	*Carica*	01	
8.	Peepal	*Ficus relogiosa*	02	

Well area:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Umbar	*Ficus racemosa*	01	11
2.	Bakuli	*Minusops elengi*	09	

3.	Nandurki	*Toona ciliate*	01	

Cricket ground:

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Bakuli	*Minusops elengi*	07	47
2.	Kadulimb	*Azadirachta indica*	03	
3.	Mahogani	*Swietenia mahagoni*	01	
4.	Shami	*Prosopis cineraria*	01	
5.	Vada	*Ficus benghalensis*	06	
6.	Peepal	*Ficus relogiosa*	06	
7.	Subabhul	*Leucaena leucocephala*	10	
8.	Mango	*Mangifera indica*	01	
9.	Others		12	

Dayanand law college (indoor area):

Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Gulmohar	*Delonix regia*	03	165
2.	Chafa	*Plumeria*	50	
3.	Ashoka	*Saruca asoca*	16	
4.	Badam	*Terminalia catapa*	03	

5.	Suru	*Casuarina equisetifolia*	08	
6.	Peru	*Psidium guajava*	01	
7.	Palm	*Roystonea regia*	29	
8.	Shevaga	*Moringa olifera*	01	
9.	chickoo	*Manikara zapota*	01	
10.	Bel	*Aegle marmelos*	30	
11.	Rubber	*Hevea brasiliensis*	02	
12.	Mango	*Mangifera indica*	01	
13.	Anjir	*Ficus carcia*	02	
14.	Christmas Tree	*Araucaria columnaris*	01	
15.	Kadulimb	*Azadirachta indica*	10	
16.	Swastik	*Tabernaemontana divaricata*	02	
17.	others			

Dayanand law college (outdoor area):

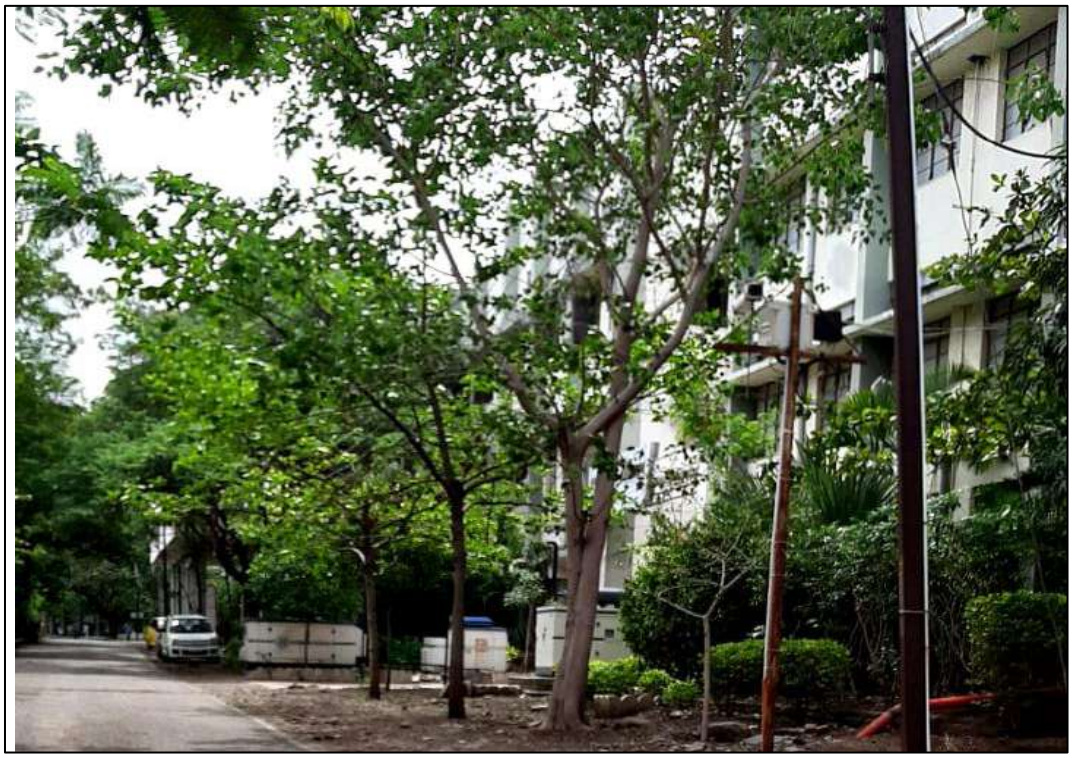
Sr .no	Common name of plant	Botanical name	Quantity	Total
1.	Ashoka	*Saruca asoca*	07	11
2.	Karanji	*Millettia pinnata*	04	

Around playground:

Common name of plant	Botanical name	Quantity	Total
Vada, peepal, shirish, bakuli, subabhul, buch, gulmohar, badam, kadulimb, chafa, shevari, jambhul, chinch, chanadan, sitafal, ramfal, parijatak, etc	Infront of law building	29	237
	Gate no 5	67	
	Gate no 4	75	
	Infront of arts building	43	
	Law side	23	

Total No of Trees In Dayanand Education Campus Is 2464.



Current Practices for Biodiversity Conservation

Fig no. 20: Trees in the Dayanand education campus

Biodiversity conservation refers to the protection, preservation, and management of ecosystems and natural habitats and ensuring that they are healthy and functional, to protect and preserve species diversity and to ensure sustainable management of the species and ecosystems.

Institute has been growing and nurturing a botanical garden. They plant more and more trees every year. The campus is almost 40% covered with vegetation on ground

Figure 21: Vegetation in front of Science

Animals in the college:

Figure 20: Botanical Garden of Science College

Table No 13: Fauna In The Campus

Sr. No.	Specie Name	Scientific Name
1.	House Crow	*Corvus splendens*
2.	House Sparrow	*Passer domesticus*
3.	Domestic Pegion	*Columba livia domestica*
4.	Crow Pheasant	*Centropus sinensis*
5.	Indian Palm Squirrel	*Funambulus palmarum*
6.	Common emigrant	*Catopsilia pomona*
7.	Tawny coster	*Acraea terpsicore*
8.	Common crow	*Euploea core*

Figure 22: Fauna In The Campus

7.5 Carbon Footprint

A **carbon footprint (CF)** is the total amount of **greenhouse gases** (including carbon dioxide and methane) that are generated by our actions.

A carbon footprint is an estimate of the climate change impact of activity – such as making a product, living a lifestyle or running a company.

There are many existing and evolving standards for calculating carbon footprints but in truth no footprint is precise. For more complicated activities these uncertainties are greatly multiplied.

a) Carbon Emissions:

Table No. 14: List of carbon emissions

Classification/Scope	Sources	Description
Scope 1 (Direct)	Equipments usage	DG set and LPG
Scope 2 (Indirect)	Electricity Use	Dayanand education society latur (DSCL) uses electricity to heat, cool, light, and run appliances at its facilities.
Scope 3 (Indirect)	Employee commuting And raw materials transportation	Employees commute from their residences to the college and material transportations
	Wastewater treatment	DSCL generate total 61 m^3 of wastewater

Emission Data and Calculations:

- **Scope 1 –** All Direct Emissions from the activities of an institution or under their control. Including fuel combustion on site such as gas, etc.

Table No.15: Scope 1 Emissions

Type of Fuel	Quantity	Emission Factor	$KgCO_2$/month
Fuel used for DG set	90	2.653	238.77

	lit/month		
LPG	560 kg/month	2.983	1670.48
TOTAL SCOPE 1 EMISSIONS			**1909.25 $kgCO_2$/month**

- **Scope 2 –** Indirect Emissions from electricity purchased and used by the institution. Emissions are created during the production of the energy and eventually used by the organization.

Emissions from Purchased electricity:

Table No. 16: Indirect Emissions /scope 2 emissions

Type of Emission	Quantity	Emission Factor	$KgCO_2$
Emissions from Purchased electricity	2278.583 KWH/month	0.97	**2210.225 KgCO2/month**
Renewable energy generation	4562.5 KWH/year	0.97	**4425.625 KgCO2/year**
TOTAL SCOPE 2 EMISSIONS			**6635.85 KgCO2/month**

- **Scope 3 – All Other Indirect Emissions** from activities of the institution, occurring from sources that they do not own or control.

A. **Delivery/Construction Transportation:** Carbon footprints through transportation also come into major consideration when whole picture has to be taken care of. Travelling distance, mode of transportation and type of fuel used for transportation are other major factors associated with carbon emission.

Table No. 17: Fuel Consumption through Upstream Transportation

Type Of Transportation	Distance Travelled In One Month (Km)	Emission Factor	$KgCO_2$
Trucks	100	0.7375	**73.75 $KgCO_2$/month**

B. **Employee Transportation:** Increase in student intake can lead to increased greenhouse gas (GHG) pollution caused by the resulting growth in vehicular traffic, energy use, and other activities. This unit seeks to identify the impact on global climate change through its emissions of greenhouse gases (GHGs), notably carbon dioxide (CO2). Transportation is the fastest growing major contributor to global climate change, accounting for 23% of energy-related carbon dioxide (CO2) emissions.

Table No. 18: Fuel Consumption through staff Transportation

Mode of transportation	Daily Count	Travelling distance (km/Vehicle) (to and fro)	Total Km	Emission Factor	$KgCO_2$
2 wheeler (teachers)	58	10	580	0.0319	18.502
4 Wheeler (Cars)	4	10	40	0.13	5.2
Public Transport	166	20	3320	0.01516	50.3312
TOTAL					**74.0332 $KgCO_2$/day**
					2220.996 $KgCO_2$/month

Table No. 19: Fuel Consumption through students Transportation

Mode of transportation	Daily Count	Travelling distance (km/Vehicle) (to and fro)	Total Km	Emission Factor	$KgCO_2$
2 wheeler	1150	10	11500	0.0319	366.85
Public Transport	767	20	15340	0.01516	232.554
TOTAL					**599.404 $KgCO_2$/day**
					17982.183 $KgCO_2$ /month

C. Waste Water Generation:

Table No. 20: Waste Water Generation

Wastewater generated	Emission Factor	Total Kg CO_2
61000 lit/day	0.21	**12810 KgCO2/day**
Total		**384300 kgCO2/month**

D. Paper consumption:

Table No.21: Paper consumption

Paper consumption	Emission factor	Kgco2
4 kg/ month	2.42	**9.68 KgCO2/month**

E. Stationary goods:

Table No.22: Stationary goods

Stationary goods	Emission factor	Kgco2
8 kg/ month	2.4	**19.2 KgCO2/month**

F. Solid Waste Generation:

Table No.23: Dry Solid Waste Generation

Wet waste generated	Emission factor	Total Kg CO_2
30 kg/month	0.21	**6.3 KgCO_2 /month**

- **Total emissions throughout a year**

Table No.24: Total emissions throughout an year

Reporting Year	Total Emissions (kg CO_2 /month)	Total Emissions (kg CO_2 /year)
2021	**413157.209**	**4957886.508**

Carbon Sequestration

Table No.25: Carbon Sequestration

Sr. no	Common name of plant	Botanical name	Quantity	Kg CO2 sequestration/year	Total Kg CO2 sequestration
1.	Palm (large)	*Roystonea regia*	25	925.0	23125
3.	Supari	*Aareca catechu*	01	491.55	491.55
4.	Ashok	*Saraca asoca*	07	1675.36	11727.52
5.	Mahogani	*Swietenia mahagoni*	02	803.80	1607.6
6.	Sagwan	*Tectona grandis*	02	3030.82	6061.64
7.	Peepal	*Ficus religiosa*	01	983.21	983.21
8.	Gulmohar	*Delonix regia*	02	5705.37	11410.74
9.	Badam	*Terminalia catappa*	03	419.22	1257.66
10.	Subabhul	*Leucaena leucocephala*	02	3976	7952
11.	Limbu	*Citrus aurantifolia*	02	835.87	1671.74
12.	Tamarind	*Tamarindus indica*	01	3164.24	3164.24
13.	Mango	*Mangifera indica*	01	2012.30	2012.30
14.	Bamboo	*Bambusoideae*	01	537.51	537.51
19.	Aapta	*Bauhinia racemosa*	02	457.35	914.7
23.	Chafa	*Plumeria*	02	4267.04	8534.08
27.	Limbu	*Citrus x aurantifolia*	01	835.87	837.87
28.	Buch	*Millingtonia hortensis*	02	52.583	105.166
29.	Subabhul	*Leucaena leucocephala*	04	3976	15904
30.	Gulmohar	*Delonix regia*	26	5705.37	148339.62
31.	Peepal	*Ficus religiosa*	01	983.21	983.21
32.	Ashok	*Saraca asoca*	02	1675.36	3350.72
33.	Umbar	*Ficus racemosa*	01	336.43	336.43
34.	Mahogani	*Swietenia mahagoni*	02	803.80	1607.6

35.	Subabhul	*Leucaena leucocephala*	02	3976	7952
36.	Karanji	*Millettia pinnata*	01	217.20	217.20
37.	Badam	*Terminalia catappa*	03	419.22	1257.66
38.	Chafa	*Plumeria*	07	4267.04	29869.28
				TOTAL	**292212.246**

- **Total carbon Emissions: 4957886.508 $KgCO_2$ /year**
- **Carbon Sequestration by trees : 292212.246 kg CO_2 /year**
- **Annual power requirement met by solar energy: 54750 KWH/year**
- **Avoided carbon emissions through renewable energy(solar energy)= 53107.5 $KgCO_2$ /year**
- **Total reduction in carbon emissions in percentage = 6.96% (by using renewable energy and trees)**

b) Carbon Emissions Management:

Global warming presents many environmental dangers, but as individuals, we pay the costs of climate change out of our own pockets. When we lower our individual carbon footprints – by reducing our consumption, using clean energy, or offsetting our emissions, we're investing in our long-term financial security.

For reducing Carbon Footprint of the college, all the staff as well as students observe **'No Vehicle Day'** on every Saturday.

c) Mitigatory measures:

1. Reduce water consumption of Science College as it contributes majorly to the total carbon emission.

2. Make sure most teachers and students opt for public transport instead of using personal vehicle.

3. Use as much renewable sources of energy as you can.

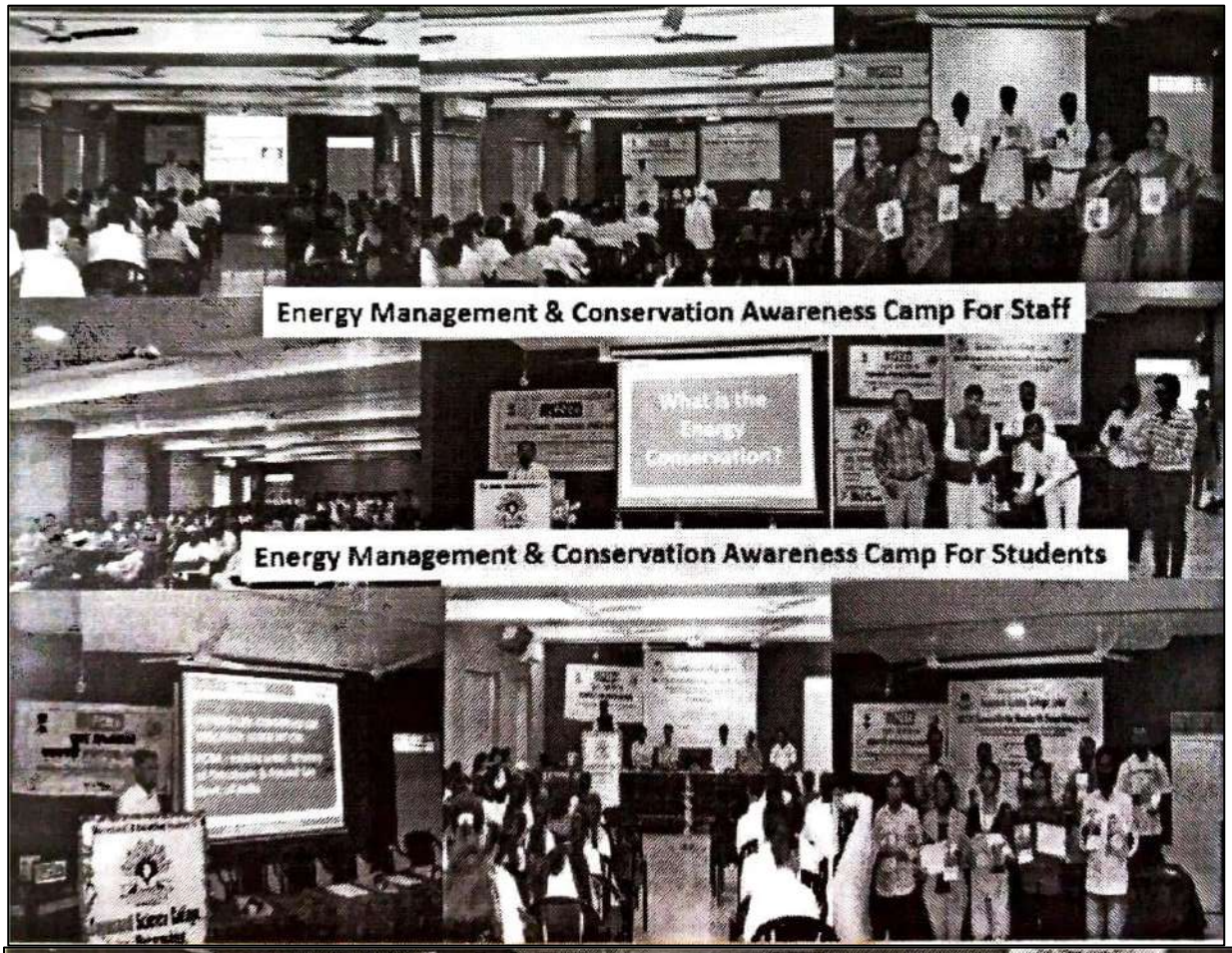
4. Increase the solar energy consumption of overall college.

5. Reduce the waste generated by biology, chemistry and other departments.

8.0 Innovative Strides

- The campus has hanged water feeders for birds on every tree
- The campus has started **Microbial Culture Composting** to convert the solid waste into manure which is given to the trees for better fertilization of the soil.
- The campus has initiated the successful **No Vehicle Day On Saturday Program** to reduce the pollution caused by the transportation and hence reduce the overall carbon footprint of the campus
- The campus has distributed **Mask And Sanitizer** in whole latur city worth Rs. 8 lakhs
- The campus has installed Automatic Water sprinklers in cricket stadium

Fig No 23: Innovations By The Campus


Energy Management & Conservation Awareness Camp For Staff
What is the Energy Conservation?
Energy Management & Conservation Awareness Camp For Students


Skill Development Floricultural Workshop for Students

Fig No 24: Green Initiatives Organized By Campus

9.0 Facilities Given By the Campus:

Cricket stadium:

Fig No 25: Cricket stadium

Separate gyms for girls and boys:

Fig No 26: Separate gyms for girls and boys

Badminton court:

Fig No 27: Badminton court

Auditorium:

Fig No 28: Auditorium

10.0 Recommendations:

1. **Water Management:**
    - Add aerators/regulators to taps to save water it work by simply mixing air into the flow and this reduces the amount of water passing through the tap.
    - Pipes, overhead tanks and plumbing system should be maintained properly to reduce leakages and wastages of water
    - Install water meters to measure water consumption regularly
    - Set up college's own water recycling unit/STP where the recycled water can be used for gardening in college and hostels
    - Perform water, energy and waste management audits frequently
    - Non-teaching staff or peons in the concerned section should take responsibility of monitoring the overflow of water tanks
    - Regularly do the water check of the treated water from the STP
    - Keep record of the waste generation by the college

2. **Energy:**

- College has many areas where lighting is not required at all times. Installing sensor based lighting in such areas can generate massive rewards. This is one of the easiest ways to save energy at college.
- Replacing old computers and instruments with ones having energy efficiency certifications is the easiest way to conserve energy at university.
- A huge amount of energy is wasted because no one really cares about switching off the fans and lights when not required. Hence, planning workshops on energy conservation to educate students, faculty and staff can generate huge results.
- Establish a purchase policy that is energy saving and eco-friendly
- Replace all incandescent and CFL lamps with LED lights
- The college needs to arrange the energy conservation program for the purpose of awareness of fuel energy conservation and motivation of students for use of non-conventional energy devices.
- College needs to use alternative sources instead of use of LPG (Non-conventional sources) for laboratory and other sources.

3. **Solid Waste:**
    - Install a Biogas plant in the campus. It can be used as an agricultural fertilizer. **Biogas** can be used as the fuel in the system of producing biogas from agricultural wastes and co-generating heat and electricity in a combined heat and power (CHP) plant
    - Avoid plastic/thermocol plates and cups in the college level or department level functions
    - The college should ban use of plastic and campus should be declared “Plastic free campus”
    - In all functions, workshops and conferences, the plastic mineral water bottles, tea cups, straws, bouquets and gifts with plastic covering, decorations and unwanted plastic should be strictly avoided.
    - To cut down the waste and carbon footprint, the university administration and various departments follows paperless methods of communication by using emails.
4. **Biodiversity:**

- Grow up vegetable garden and fruit garden to attract more fauna
- Develop a butterfly garden that arouses appreciation towards flora and fauna diversity
- Name all the trees and plants with its common name and scientific name and their uses
- Display boards of fauna diversity to generate enthusiasm for learners

5. **General**:
    - Establish an environmental committee to look after the environmental aspects of the campus
    - Adopt green building rating system like IGBC GRIHA OR LEED which will further help in maintaining the campus for different environmental aspects
    - Layout 'Green Chemistry' that reduces or eliminates the use or generation of hazardous substances in the design, manufacture and application of chemical products
    - Organize earn while learn eco-friendly programmes
    - Conduct exhibitions for parents and public on environment and sustainable practices
    - Organize earn while learn eco-friendly programmes
    - Adopt an environment policy for the college
    - Ensure participation of students and teachers in local environmental issues

11.0 Conclusions

Green Audit is the most efficient way to identify the strength and weakness of environmental sustainable practices and to find a way to solve problems. Green Audit is one kind of a professional approach towards a responsible way in utilizing economic, financial, social and environmental resources. Green audit can “add value” to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (known and unknown). There is scope for further improvement, particularly in relation to waste, energy and water management. The college in recent years considers the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the college does perform fairly well, the recommendations in this report highlight many ways in which the college can work to improve its actions and become a more sustainable institution.

12.0 References

- https://www.conserveconsultants.com/naac-accreditation-through-green-audit
- https://www.ipcc.ch/site/assets/uploads/2018/03/srccs_wholereport-1.pdf
- https://www.epa.gov/sites/production/files/2016-03/documents/warm_v14_containers_packaging_non-durable_goods_materials.pdf
- http://wgbis.ces.iisc.ernet.in/energy/paper/IISc_Emissions_from_Indias_Transport_sector/index.htm
- https://dsclatur.org/mission-goals/
- http://www.neptjournal.com/upload-images/NL-46-33-(31)B-2040.pdf
- https://www.ijsr.net/archive/v5i4/NOV163155.pdf
- https://www.unm.edu/~jbrink/365/Documents/Calculating_tree_carbon.pdf

Checklist

1. Waste Management

Sr. No.	Parameters	Response	Remarks
1.	Waste treatment system	Yes	Composting ,STP
2.	Sanitation waste treatment	Yes	
3.	Waste polluting ground water	No	
4.	Waste polluting air	No	
5.	Recycling, Reusing, Composting	Yes	
6.	Waste Segregation	Yes	
7.	Hazardous waste generation	Yes	
8.	Quantity of hazardous waste generated	1 kg/month	--
9.	Sources of Hazardous Waste	Chemistry and Biology labs	--
10.	E-waste quantity	1 kg/year	--
11.	Hazardous waste disposal	Dilution and Incineration	--

2. Energy Management

Sr. No.	Parameters	Response	Remarks
1.	Ways to use energy	--	--
2.	Electricity bills of last year	Taken	
3.	Amount of LPG cylinders used in an year and their cost	40	
4.	Energy saving methods	Yes	Solar energy

5.	Number of LED panel with its usage	224	4096 W
6.	Number of LED bulbs with its usage	18	900 W
7.	Number of tube lights with its usage	505	20200 W
8.	Number of fans with its usage	507	30420 W
9.	Number of ACs and its usage	22	48400 W
10.	Number of electrical equipments with its usage		
11.	Number of computers used with its usage	230	33400 W
12.	Number of smart board used with its usage	58	14500 W
13.	Number of street lights with its usage		
14.	Alternative energy usage	Yes	Solar energy

3. Water Management

Sr. No.	Parameters	Response	Remarks
1.	Treatment of lab water	Yes	Dilution and Incineration
2.	Rain water harvesting	Yes	--
3.	Number of wells	1	--
4.	Number of motors with their powers		--
5.	Number of washrooms and average water used	60	--
6.	Any other water storage		--
7.	Number of tanks with capacities	19 overhead	--

		1 underground	
8.	Quantity of water pumped everyday		
9.	Treatment of waste water	Yes	STP
10.	Number of water coolers and their water capacities	7	11600 W
11.	Number of taps	70	--

4. Carbon Footprint Management

Sr. No.	Parameters	Response	Remarks
1.	Total number of vehicles	1204	--
2.	Number of two wheelers with average fuel used and average distance travelled	1200	--
3.	Number of cars with average fuel used and average distance travelled	4	--
4.	Number of people using public transport with average fuel used and average distance travelled	933	--
5.	Number of visitors with vehicles everyday		
6.	Number of generators used per day with fuel requirement	3	--
7.	Number of LPG cylinders used	40	--
8.	Transportation for canteen commodities	100 km/month	--
9.	Carbon emission reduction techniques	No vehicle day on Saturday	--

5. Biodiversity Management

Sr. no	Common name of plant	Botanical name	Quantity	Total
1.	Palm (large)	*Roystonea regia*	03	**26**
2.	Palm (small)	*Roystonea regia*	22	
3.	Supari	*Aareca catechu*	01	
4.	Ashok	Saruca asoca	07	**45**
5.	Mahogani	Swietenia mahagoni	02	
6.	Sagwan	Tectona grandis	02	
7.	Peepal	Ficus religiosa	01	
8.	Gulmohar	Delonix regia	02	
9.	Badam	Terminalia katappa	03	
10.	Subabhul	Leucaena leucocephala	02	
11.	Limbu	Citrus aurantifolia	02	
12.	Tamarind	Tamarindus indica	01	
13.	Mango	Mangifera indica	01	
14.	Bamboo	Bambusoideae	01	

15.	Suru	Casuarina equisetifolia	01	
16.	Nandurki	Toona ciliate	02	
17.	Nivdung	Cacti species	01	
18.	Takli	Silene conoidea L	02	
19.	Aapta	Bauhinia racemosa	02	
20.	Jaswand	Hibiscus rosasinensis	01	
21.	Ruchik	Calotropis gigantean	02	
22.	Adulsa	Justicia adhatoda	01	
23.	Chafa	Plumeria	02	
24.	Kektad	Agave Americana	02	
25.	Necha	Acorus calamus	03	
26.	Bogan Vel	Bouglanvillea glabra	01	
27.	Limbu	Citrus x aurantifolia	01	
28.	Buch	Millingtonia hortensis	02	
29.	Subabhul	Leucaena leucocephala	04	
30.	Gulmohar	Delonix regia	26	
31.	Peepal	Ficus religiosa	01	
32.	Ashok	Saraca asoca	02	
33.	Umbar	Ficus racemosa	01	
34.	Mahogani	Swietenia mahagoni	02	**16**
35.	Subabhul Karanji	Leucaena leucocephala	02	
36.	Badam	Millettia pinnata	01	
37.	Chafa	Terminalia katappa	03	
38.	Swastik	Plumeria	07	
39.	Pinwheel Flower	Tabernaemontana divaricata	01	

Our Team

1. Ms. Arati Bhosale:

Designation - Director

M. Sc. Environment, PGDISHE,

IGBC AP, GRIHA CP, LEED GA

EMS lead Auditor

CII certified Carbon Footprint Professional

2. Dr. Ganesh Kadam:

PhD (Environmental Science & Technology)

M.Sc. (Env. Sci.),RIO +20 India (2013)

PGDISHE (Post Graduate Diploma in Industrial Safety Health & Environment)

PGDGIS (Post Graduate Diploma in Geoinformatics)

3. Ms. Sadiya Khan:

BE (Chemical)

Environmental Executive at Greenex Environmental

Work Experience:

Working on LCA, Carbon Footprint, Green Building certification and Green Audit Projects since 6 months

4. Ms. Lakshika Kotak:

BE (Chemical)

Environmental Executive at Greenex Environmental

Work Experience:
Working on LCA, Carbon Footprint, Green Building certification and Green Audit Projects since 6 months