GREEN and Environmental Audit

Year 2023-24

Green Audit

Environmental Audit

TRIMURTI SHIKSHAN SANSTHA'S

SMT. VIMALBAI UTTAMRAO PATIL ARTS AND LATE DR. BHASKAR SADASHIV DESALE SCIENCE COLLEGE, SAKRI

Dist. Dhule, Maharashtra, India

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ACKNOWLEDGEMENT

Vikram Geoinfo Tech thanks the management of **Trimurti Shikshan Sanstha's SMT. Vimalbai Uttamrao Patil Arts and Late Dr. Bhaskar Sadashiv Desale Science College, Sakri** for assigning this important work of GREEN & Environmental Audit. Vikram Geoinfo Tech appreciates the cooperation in the completion of the study. Our special thanks are due to:

- Honourable Chairman
- Honourable Secretary
- Honourable Director Board Members of the college
- Honourable Principal
- IQAC Members
- Teaching & Supporting Staff of College

For giving us the necessary inputs to carry out this very vital exercise of GREEN and Environmental Audit. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

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(ISO 9001:2015 Certified)

(Dr. Vikram Agone)

Founder & Chairman

Vikram Geoinfo Tech

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Report by: Lead Auditor

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Date of Report Issue: 01/07/2024

Valid Till: 30/06/2025

305023092154Q

INTRODUCTION

Trimurti Shikshan Sanstha's SMT. Vimalbai Uttamrao Patil Arts and Late Dr. Bhaskar Sadashiv Desale Science College, Sakri aims at creating awareness about environmental awareness. The college takes lead in organizing different events on green practices to know the knowledge among students, teachers, and non-teaching staff. This green message in the form of an environmental audit report being transferred along with its practical dimensions among the families, societies and thereby to the stakeholders, forms a chain and network to spread the message at large. College is additionally geared toward giving resolution to the various burning topics associated with the environment, its awareness still as its protection. As the government is taking initiative to inform about environmental protection, newer concepts are being introduced to make colleges eco-friendly. To create and conserve the environment within the **Trimurti Shikshan Sanstha's SMT. Vimalbai Uttamrao Patil Arts and Late Dr. Bhaskar Sadashiv Desale Science College, Sakri** college campus and to solve the environmental problems such as raising energy savings and conservation, water reduction, water harvesting, solid waste management, improvement in the air quality of the campus, control noise pollution, and minimizing the use of Plastic, etc. is one of the prime objectives of the college.

GREEN and Environmental auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. GREEN and Environmental audit provides an assessment of the environmental performance of a business or organization. The environment audit report is one such initiative that has been introduced to create a college environmentally sustainable and active in spreading education concerning constant. it's a tool to assess general practices enforced by the organization in terms of the impact on the environment. The report additionally aims to unfold awareness of the adverse practices that are accountable for the degradation of the environment and the way powerfully the institute is concerned in curtailing those practices. It helps in recognizing the necessity for colleges to figure around the academic years **2023-24** for environmental sustainability. Thus, the Environment audit forms the baseline survey to decide on the **green policy**.

The term "***GREEN***" means eco-friendly or not damaging the environment. This can acronymically be called "***Global Readiness in Ensuring Ecological Neutrality***" (GREEN). Green Audit can be defined as the systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. Green accounting can be defined as the systematic identification quantification, recording, reporting & analysis of components of ecological diversity & expressing the same in financial or social terms. "***GREEN Audit***", an umbrella term, is known by another name "***Environmental Audit"***. The 'Green Audit' aims to analyze environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. GREEN Audit can be a useful tool for a college or institute to determine how and where it uses the most energy, water or resources. The college or institute can then consider how it can implement changes and achieve savings. It can also be used to determine the type and amount of waste that can be used in a recycling project or to improve a waste minimization plan. It can create health awareness and promote environmental awareness, values and ethics. It gives staff and students a better understanding of the green impact on campus. It is therefore essential that the university evaluates its own contributions to a sustainable future. As environmental sustainability becomes increasingly important to the country, the role of higher education institutions in environmental sustainability is becoming increasingly important. An environmental audit is a type of assessment that aims to identify gaps in environmental compliance and the implementation of management systems, as well as related corrective actions. They therefore fulfil similar function to financial audits.

Educational institutions have broad impacts on the world around them, both negative and positive. The activities pursued by campus can create a variety of adverse environmental impacts. But they are also in a unique position as educational institutions to be leaders in pursuing environmentally sustainable solutions.

The rapid urbanization with economic development at the local, regional and global levels has led to numerous environmental and ecological catastrophes. Environment auditing is the process of documentation and determination of the institution's practices in creating awareness

and practising environment-friendly measures. Over the period overexploitation of natural resources like energy, water, soil, vegetation, etc. has resulted in environmental degradation which will be a crisis in future. It is necessary to check whether our way of living and handling resources is not going to cause detrimental effects on our surroundings.

In this context it becomes essential to adopt the system of the Green Campus for the college which will lead to sustainable development and at the same time decrease a sizable amount of atmospheric pollution from the environment, conserve water and many more. The National Assessment and Accreditation Council, New Delhi (NAAC) has made it compulsory that all Higher Educational Institutions should submit an annual Green Audit/ Environment Audit Report. Moreover, it is part of the Corporate Social Responsibility of Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through carbon footprint reduction measures. The environment audit Report aims at summarising the college's contribution and its activeness in creating awareness and consciousness in practically applying environmentally friendly measures towards an institute in A.Y. **2023-24.**

ENVIRONMENTAL SETTING OF THE COLLEGE

The college has a sprawling pollution-free campus on the west side of Sakri town. Sakri is a town and taluka in the Dhule district of Nashik Division, Maharashtra, and It is located on National Highway No. 6 which is now Asian Highway AH 46. This highway connects it with the larger Delhi-Mumbai Industrial Corridor (DMIC) which once completed will be game-changing for industrial investments and growth. The Panzara river flows through the city. Sakri is a developing town in North Maharashtra.

In Sakri, the wet season is hot, oppressive, and mostly cloudy and the dry season is sweltering and mostly clear. Over the year, the temperature typically varies from 12°C to 38°C and is rarely below 11°C or above 42°C while the average annual rainfall is 700 mm.

The college campus is spread over 2.10 acres which include about 0.32-acre sports ground and a 0.58-acre green area situated at the 405 m (1,329 ft) MSL. College is easily accessible by road for the rural area which is 20 km away. Although the campus is located in a residential area, the presence of a green belt including dense tree cover has considerably reduced noise pollution and provided fresh air on the campus. The College campus area has an academic building, a sports auditorium and a canteen.

OVERVIEW OF INSTITUTE

Established in 1998, we are one of the proud and resource-rich establishments of 'Trimurti Shikshan Sanstha, Sakri, Dist. Dhule'. Our college is gifted with the most experienced teachers, a rich books library, best infrastructure resource. We are one of the prominent educational institutions established by 'Trimurti Shikshan Sanstha, Sakri' With the visionary approach of the honourable Late Dr. Bhaskar Sadashiv Desale. We are committed and fully devoted to social reforms through mass education and are located in the hilly and rural region of Dhule district and affiliated with North Maharashtra University, Jalgaon. We offer Undergraduate Degree Courses in Arts and Science Faculty in various special subjects along with Post Graduation Degree Master in Arts courses. Do take a moment to navigate through our Courses and Facilities offered and keep visiting for the latest updates and announcements.

VISION

To contribute nation building through quality higher education in rural, tribal and hilly areas and creating highly educated, righteous, conscious and self-reliant students.

MISSION

To provide quality higher education to students from Adivasi, backward, rural and economically weaker sections including women in order to holistic development of them.

CORE VALUES

- Academic Excellence
- Social Commitment
- Skill Development
- Value Orientation
- Nation Building

OBJECTIVES

1. To inculcate the moral and ethical values among the rural students.
2. To provide facilities to the students by given them opportunities to face all.
3. To introduce courses which are currently relevant to need of the national and self-employment.

4. To promote the faculty for research, and participation in state, national, international seminars, workshops and conferences.
5. To impart qualitative higher education to the students.
6. To aim overall personality development of the students through extra-curricular activities in association with various social and cultural organizations.
7. To shoulder the responsibilities of generating & promoting awareness and devote time for society.
8. To create a positive attitude and approach, motivating and providing support, organize co-curricular or extra-curricular activities, promoting research culture, encourage teachers to organize seminars, workshops for motivating students to learn beyond the curricular accepts.

COLLEGE PROFILE

- Affiliating University –North Maharashtra University, Jalgaon
- Year of Establishment –1998
- Year of Affiliating: Permanent Affiliation No. NMU/5/T.No.06/Permanent 2010-2011/647/2010
- Year of Recognition (UGC) – U/S 2(F) – F.No.8 220/2009 (CPP-I) 2 Sep. 2009
  – U/S 12(B)- of UGC Act 1956. Applied

AIMS AND OBJECTIVE

Trimurti Shikshan Sanstha's SMT. Vimalbai Uttamrao Patil Arts and Late Dr. Bhaskar Sadashiv Desale Science College, Sakri conducted a GREEN and Environmental auditing survey for the year 2023-24. The primary aim of this report is to analyse the environmental profile of the college for GREEN and Environmental Audit. The following were the objectives:

- A baseline survey to recognize the real status of green practices.
- Identification of the problems faced while practising green practices on the college campus.
- Inspection of the current practices that have an impact on the environment such as natural resource utilization, waste management, etc.
- Analysis and suggestion for the plausible solutions for problems identified from the Audit Report.
- Increasing and spreading the awareness for environmental awareness and sustainable use of resources amongst the students, teaching and non-teaching staff members.
- Identification and assessment of any environmental risk if any inside the college campus.
- Enhancement of College profile.
- Improving environmental standards of the institute.
- Financial savings through a reduction in resource use.
- Giving direction and guidance working on local environmental issues.

DATABASE AND METHODOLOGY

The present study is based on visits to the college, personal observations, and a primary database that was collected using sets of questionnaires and other survey tools. The audit report was divided into different areas viz, Carbon footprint, water and water management audit, waste management audit, etc. For a proper survey whole campus was divided into different sections, based on data requirements, sets of questionnaires about water consumption, fuel waste, solid waste collection etc. The WorldView-3's satellite 31cm resolution multi-spectral data is used for supervised classification for preparing a Land use map. The software ERDAS-2022, ArcGIS Pro 3.0.2, IBM SPSS and MS Excel is used for data processing. Calculating carbon footprint using the following formulas,

Electricity: use (kWh/yr) * EF (kg CO_2e/kWh) = emissions (kg CO_2e/yr)
Fuel Oil: use (litres/yr) * EF (kg CO_2e/litre) = emissions (kg CO_2e/yr)
Where EF = emissions factor

Carbon sequestration was calculated using InVEST (Integrated Valuation of Ecosystem Services and Trade-offs) software models developed by the Natural Capital Project - Stanford University. InVEST models are spatially explicit, use remote sensing data as sources of information, and produce carbon sequestration data as outputs. Electrical vehicles' CO_2 emissions have been calculated by their consumption of electrical energy. Consumed energy emission is calculated by its generation of energy emission. A noise measuring app, Noise test pro, was used to measure the noise level. Noise test pro detects any noise, music or sound in your surroundings. It will show maximum, minimum and average decibels. Light intensity was measured using the Lux Meter app.

ANALYSIS OF THE DATABASE

The database has been prepared for statistical analysis for the Environment audit using Minitab and IBM SPSS statistical software. The surveys from each group were tabulated in MS Excel spreadsheets. The tabulated data were further analyzed through statistical analysis and computing. For a better understanding of the results and to avoid complications, averages and percentages of the tables were taken. A graphical representation of these results was made to give a summarized picture of the status. The outcome was interpreted with the overall consequences, conclusion and plausible solutions or steps for them.

CARBON FOOTPRINT

A carbon footprint is the total greenhouse gas emissions caused directly and indirectly by an individual, organization, event or product. A carbon footprint is the total amount of greenhouse gases including carbon dioxide and methane that are generated by our actions. carbon footprint, the amount of carbon dioxide (CO_2) emissions associated with all the activities of a person or other entity e.g., building, corporation, country, etc. It includes direct emissions, such as those that result from fossil fuel combustion in manufacturing, heating, and transportation, as well as emissions required to produce the electricity associated with goods and services consumed. It is calculated by summing the emissions resulting from every stage of a product or service's lifetime. The calculations for CO_2 emission were done using the method reported in the methodology. CO_2 emission has been calculated annually by vehicle category of college staff and students.

In the A.Y. 2023-24 there are 31 teaching and 10 non-teaching staff, while 572 students enrolled in the college. The highest CO_2 emissions 25841.97 kg has been reported by Public Transport use by students, followed by two-wheeler use by students reported 4985.1 kg of CO_2 emissions in the A.Y. 2023-24, while the lowest CO_2 emissions (1091.34 kg) has been reported by electrical vehicles used by college staff and students in the A.Y. 2023-24. Total CO_2 emissions for this academic year of all the vehicles have been **38966.67 kg** by the college into the atmosphere. By using electrical energy, the college is contributing an average of **31.38 kg** of CO_2 emissions into the atmosphere per day this year. In 2023-24, the total CO_2 emission into the atmosphere due to the use of electrical energy was **11453.70 kg**. Overall CO_2 emission to the atmosphere from A.Y. 2023-24 by all activity was **50420.37 kg** i.e., **50.42 Metric Ton.** Academic year 2023-24 CO_2 emission particulars are mentioned in the following tables. The vegetation on campus has **carbon sequestration** of approximately **10376.00 kg** CO_2 in the years 2023–24. In this way, the total activity of the college emits **40044.37 kg** of **CO_2** into the atmosphere within the years 2023–24.

Table 1 Aggregate CO_2 emission for the year 2023-24 of all the vehicles

Type of Vehicles	No of vehicles	CO_2 emission (kg)
Four-Wheeler (Staff)	6	1637.55
Four-Wheeler (Students)	0	0.00
Two-Wheeler (Staff)	20	1719.00
Two-Wheeler (Students)	58	4985.10
Electrical vehicles (Staff)	1	90.95
Electrical vehicles (Students)	22	2000.79
Bicycles (Staff)	12	0.00
Bicycles (Students)	160	0.00
Public Transport (Staff)	2	3691.71
Public Transport (Students)	280	25841.97
Diesel Generator	0	0.00

(Source: CO_2 emissions were calculated by using counting of vehicles)

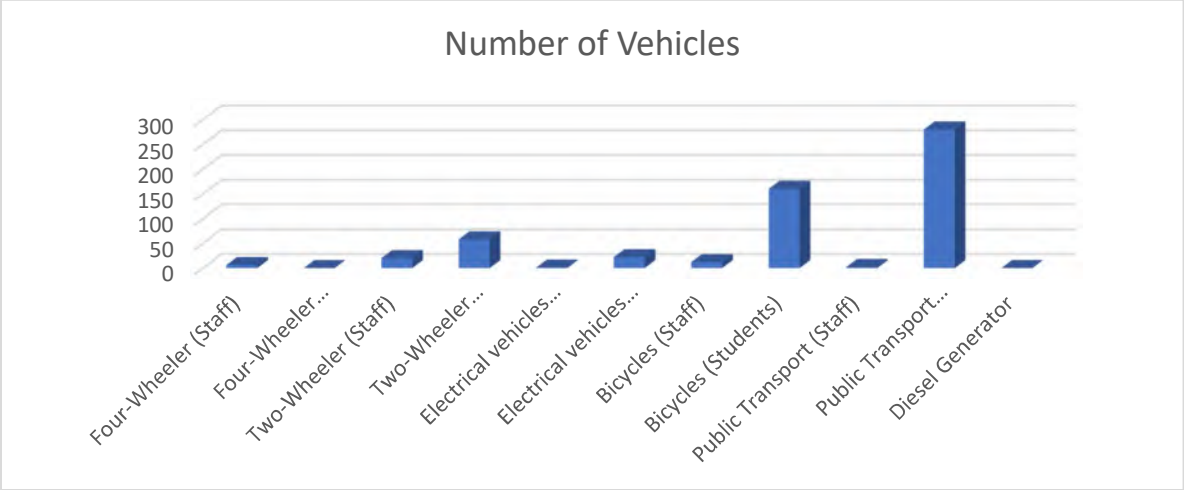

Figure 1 Number of Vehicles in A.Y. 2023-24.

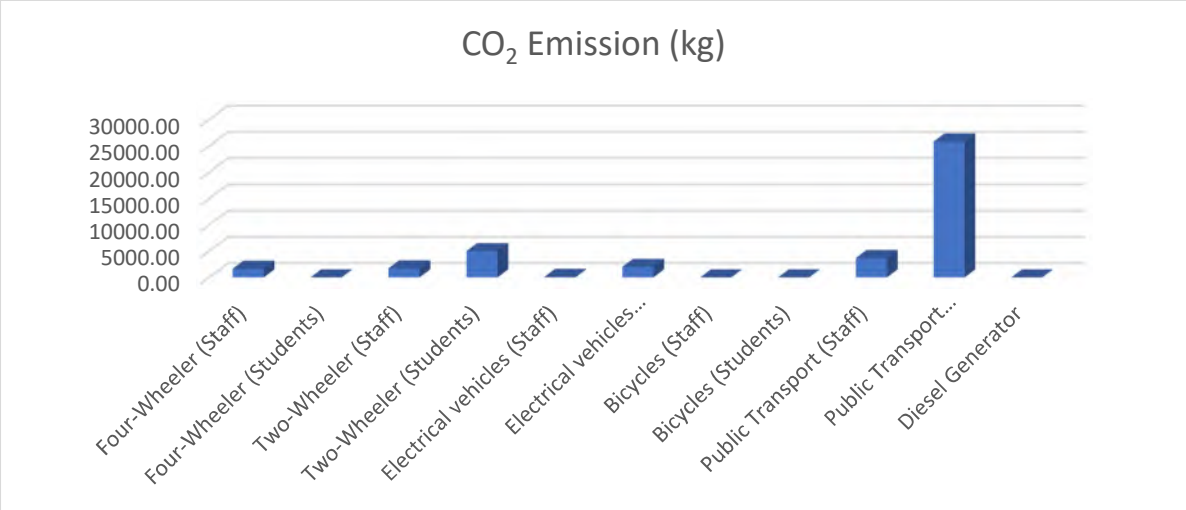

Figure 2 Total CO_2 Emission by Vehicles in A.Y. 2023-24.

The campus area 8470 m^2 (2.10 Acre) consists of the following regions as stated below for land consumption in the built-up area of the college: The central region is densely built-up having Main Administrative Block, departments, lecture rooms and an auditorium. The central region comprises Sports grounds. The western region has various trees. The southern region has an entrance gate and dense tree cover. The eastern boundary of the campus has various types of trees observed. Approximately 30.63 % **i.e., 2594 sq. m** of the region is occupied by **trees and forms the part of green cover of the campus**. Vegetation area has been reported good in the academic year 2023-24. The vegetation on campus has carbon sequestration of approximately **10376.00 kg** CO_2 in the years 2023-24.

Table 2 Land-Use of the College campus

Land Use	**Area (m^2)**	**Area (acre)**	**Area (%)**
Vegetation	**2594**	**0.64**	**30.63**
College Built-up	2394	0.61	28.26
Bare land & Play Ground	3705	0.91	43.74

(Source: GeoEye-4 Satellite Imagery)

The College campus geo-position is at 21° 59' 42.65" N latitude and 74° 18' 18.93" E longitude in Sakri, Maharashtra, India. It encompasses an area of about 2.10 Acres. The area is enormously diverse with a variety of tree species performing a variety of functions. Most of these tree species are planted in different periods through various plantation programmes organised by the college and have become an integral part of the college. The trees of the college have increased the quality of life, not only for the college society but also for the people around the college in terms of contributing to our environment by providing oxygen, improving air quality, climate improvement, conservation of water, preserving of soil, and supporting wildlife, controlling climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in the summer months. Many species of birds are dependent on these trees mainly for food and shelter. The fluid of flowers and plants is a favourite of birds and many insects. Leaf-covered branches keep many animals, such as birds and squirrels, out of reach of predators. Different species show an endless variety of shapes, forms, textures and vibrant colours. Even individual trees vary their appearance throughout the year as the seasons change. The strength, long lifespan and imperial stature of

trees give them a monument–like quality. They also remind us of the glorious history of our institution in particular. We often make an emotional connection with these trees and sometimes become personally attached to the ones that we see every day. A thick belt of large shady trees in the periphery of the college is bringing down the noise and cutting down dust and storms. Thus, the college has been playing a significant role in maintaining the environment of Dondaicha town in its surrounding areas. Various types of Fauna were observed at the college campus, table 3,4 & 5 show Fauna at the college campus.

Table 3 Birds observed at the college campus

Sr. no	*Common name*	*Scientific name*
1	Parrot	Psittacula krameri
2	Sparrow	Passer domesticus
3	Crow	Corvus splendens
4	Pigeon	Columba livia
5	Koel	Eudynamys scolopaceus
6	King fisher	Halcyon smyrnensis
7	Owl	Bubo bengalensis
8	Hawk	Nisaetus cirrhatus
9	Nilpankh (Indian roller)	Coracias benghalensis
10	Lavri (Indian teetar)	Ortygornis pondicerianus
11	Titodi (Red wattle lapwing)	Vanellus indicus
12	Indian white Egret	Egretta Ardea alba
13	Bulbul	Pycnonotus barbatus
14	Jungle babbler	Turdoides striata

Table 4 Reptiles observed at the college campus

Sr. no	*Common name*	*Scientific name*
1	Garden lizard	Calotes versicolor
2	Wall lizard (Gecko)	Hemidactylus frenatus
3	Varanus Indian monitor	Varanus bengalensis

Table 5 Arthropods observed at the college campus

Sr. no	*Common name*	*Scientific name*
1	Butterfly	Papilla Machaon
2	Cockroach	Periplaneta americana
3	Lady bugs (ladybirds beetles)	Harmonia axyridis
4	Moths (brown house moth)	Hofmannophila pseudospretella
5	Termite	Isoptera brulle
6	Ants (black carpenter ants)	Camponotus pennsylvanicus
7	Honey bee	Apis dorsata, Apis indica
8	Dragon fly	Pantala flavescens, Anax imperator

(Source: Field visit and Survey)

Table 6 List of plant species observed in the campus.

Sr. No.	Botanical Name	Local Name	Family	Uses
1	*Acacia Catechu*	Khair	Mimosaceae	Traditional Medicine
2	*Abrus precatorius*	Gunj	Leguminosae	
3	*Aloe vera* L.	Korphad	Liliaceae	
4	*Annona squamosa* L.	Sitaphal	Annonaceae	
5	*Azadirachta indica* L.	Neem	Meliaceae	
6	*Delonix regia*	Gulmohar	Caesalpiniaceae	Avenue Tree, Ornamental
7	*Ficus benghalensis*	Vad	Moraceae	Avenue Tree, Aesthetic
8	*Ficus racemose*	Umber	Moraceae	
9	*Ficus religiosa*	Peepal	Moraceae	
10	*Polyanthia Longifolia*	Ashok	Annonaceae	Avenue Tree

(Source: Field visit and Survey)

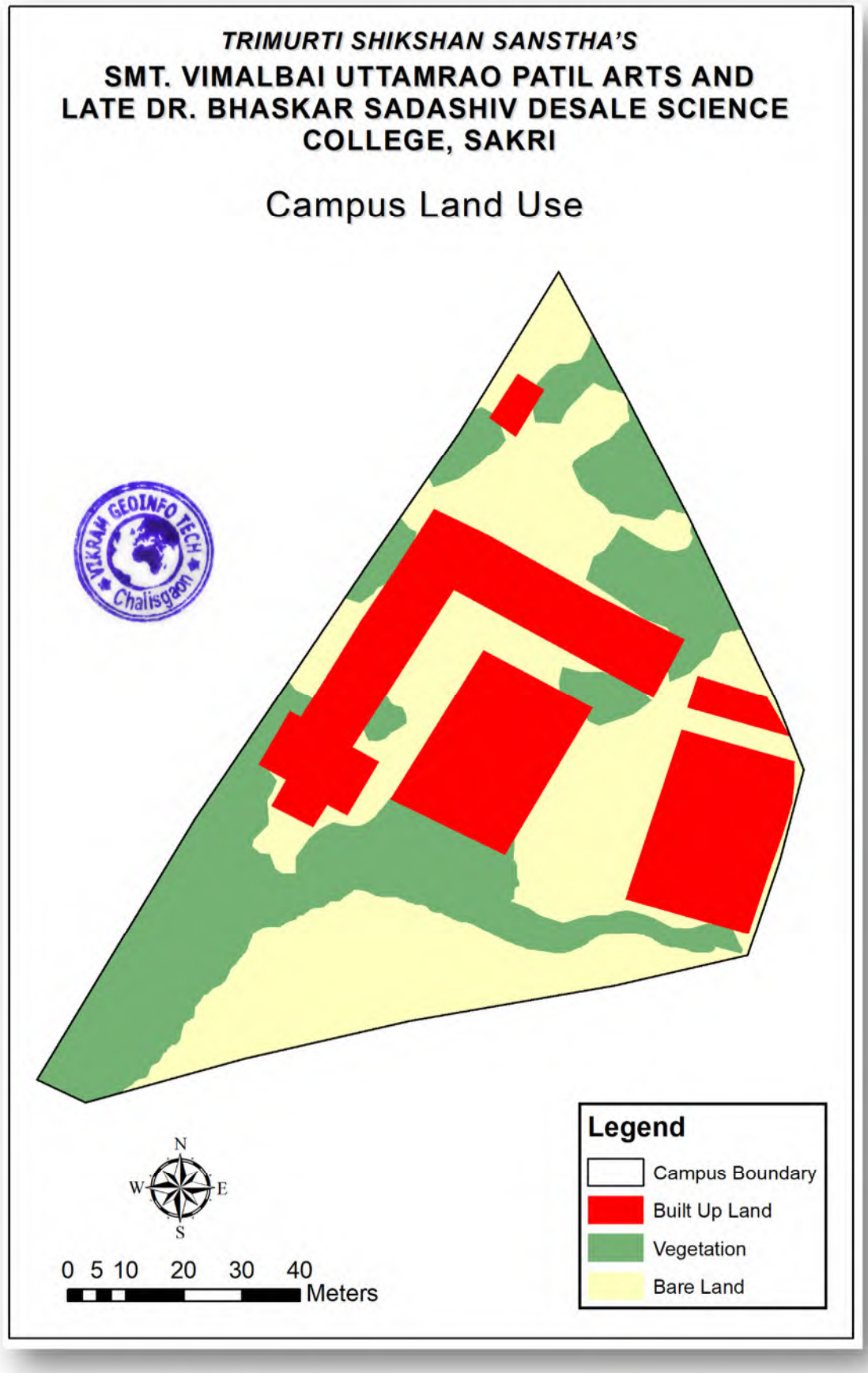

Figure 3 College Campus Land Use Map year 2023-24.

AIR EMISSIONS

Air Emissions is the term used to describe the gases and particles which are put into the air or emitted by various sources. Ambient air quality mentions to the condition or quality of air surrounding us outdoors. Exhausts from the chemical vapours in the chemistry department laboratory produce emissions. Exhaust fans are not provided in the chemistry department laboratory. Exhaust fans are not provided in the washroom. No vehicle entry is allowed on the College campus except for dignities & differently-abled students. A separate parking area for vehicles is available at the entry of the college campus. **Classrooms on the college Campus are Well Ventilated**, while the Window Floor ratio of the classroom is very good. This fact proves that there is no need for Exhaust fans in classrooms.

INDOOR AIR QUALITY

Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, as it relates to the health and comfort of building occupants. Common indoor pollutants are;

- Carbon monoxide – Sources of carbon monoxide are incomplete combustion of fossil fuels
- Volatile organic compounds (VOCs) – VOCs are emitted by paints and lacquers, paint strippers, pesticides, office equipment such as copiers and printers, correction fluids and carbonless copy paper, graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions etc.
- Carbon dioxide – Due to human respiration
- Particulate matter (PM) – Due to construction and maintenance activities, vehicular pollution
- Nitrogen Oxides- Due to vehicular pollution

In the Canteen area, parameters responsible for affecting indoor air quality are,

- Type and quantity of fuel used
- Medium of cooking
- Type of cooking e.g., roasting, frying, steaming etc.
- Duration of cooking, the quantity of food being cooked

- Efficiency of ventilation

Indoor air quality should be monitored at least once a year and results should be compared with The Indian Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE) standards for indoor air quality.

In classrooms, ventilation is a natural draft through windows and is enhanced by fans. In corridors, cross-ventilation is observed. **Green belts** have been set up in the campus area, plants are present near the College building **which helps in maintaining ambient air quality**. In the canteen used LPG fuel, which is less pollutant.

LIGHTS AND ACOUSTICS

The human ear is constantly being beset by man-made sounds from all sides, and there remain few places in crowded areas where relative quiet prevails. There are two basic properties of sound Loudness and Frequency. Loudness is the strength of sensation of sound apparent by the individual. It is measured in terms of Decibels. Just audible sound is about 10 dB, a whisper about 20 dB, library place 30 dB, normal conversation about 35-60 dB, heavy street traffic 60-100 dB, boiler factories 120 dB, jet planes during take-off is about 150 dB, rocket engine about 180 dB. The loudest sound a person can stand without much discomfort is about 80 dB. Sounds beyond 80 dB can be safely regarded as Pollutants as it harms the hearing system. According to WHO, 45 dB is the safe noise level for a city. For international standards, a noise level of up to 65 dB is considered tolerated. Loudness is also expressed in sones. One sone equals the loudness of 40 dB sound pressure at 1000 Hz. Frequency is defined as the number of vibrations per second. It is denoted as Hertz (Hz).

The college campus is located in the Sakri city area; vehicular noise pollution is minimum on the premises probably due to tree cover in the campus. Noise levels are between 50-75 dB on the premises. Light intensity is between 1000 - 2000 Lux. Light intensity and noise levels were monitored at 13 different locations and the results are presented in Table 7.

As per the Occupational Safety and Health Administration (OSHA) standards, permissible noise exposure for 8 hours/day is 90 dB(A). Colleges, schools, hospitals and courts come under the silent zone. Permissible noise limits in and near the College is 50 dB during day time. Noise

levels monitored during the audit are above the permissible limits at all locations. The illumination (Lux) levels were adequate or less in a few areas that are because lights are kept switched off in rooms, and laboratories which are not occupied and receive natural sunlight. High noise was reported in the canteen premises.

Table 7 Light intensity and noise levels monitoring results

Department	*Noise level (dB)*	*Light Intensity (Lux)*
Principal Cabin	61	1100
Library	55	1102
Staff Room	70	1080
Office	67	1150
Sport	72	1610
Canteen	75	1960
Geography	70	1300
History	68	1200
Marathi	68	1200
English	55	1800
Hindi	54	1900
Microbiology	50	1000
Information Technology	60	1050
Computer Science	60	1100
Chemistry	65	2000

WATER MANAGEMENT

A major water source for the college is a borewell on the campus. Data related to the water audit was collected by circulating a proforma based on water user profiles. The college has 527 students enrolled in different courses and 41 employees. The assessment of water requirements comprises sanitation, laboratory, kitchen, drinking, washing, etc. For assessment of water management, the college has been divided into six blocks: Academic block, Garden, Canteen, Common Toilet, teaching and non-teaching staff room and office.

As can be seen, the consumption of water by the canteen is 11.63 % as compared to 37.23 % for the academic block. The collective consumption of water by departments (comprising Chemistry, Microbiology, History, English, Marathi, Information Technology, Computer Science and Geography) is 32.57 %. In the academic departments, the major consumers of water are Chemistry Department (23.29 %). Highest utilisation of water in the common toilet block and for Trees and Garden. The college utilises approximately 4300 litres per day of water. Water consumption of the College works out to be 4.50 Litre /Person/Day. As per IS 1172 standards for non-residential institutions, water consumption should be a maximum of 45 Litre /Person/Day. Drip irrigation system to water the trees on the college premises. **Thus, water consumption is well under the limit.**

The green and environmental audit conducted for the academic year 2023-24 assessed the water consumption patterns across various departments and facilities within the college campus. The findings are summarized below:

Water Consumption Patterns The total daily water consumption was analyzed, revealing significant usage across different sections. Key findings include:

- **Highest Consumers:**
    - The Chemistry department and the common toilet block were the largest consumers, each utilizing 1000 liters per day, accounting for 23.26% of the total daily water usage.
    - Drinking water for students ranked second, consuming 900 liters per day (20.93%).

    - The canteen utilized 500 liters per day (11.63%), reflecting its central role in campus operations.
- **Moderate Consumers:**
    - Trees and gardens required 300 liters per day (6.98%), underscoring the campus's commitment to maintaining green spaces.
    - Departments such as Microbiology, Geography, and the office each consumed 100 liters per day (2.33%), representing moderate water usage.
- **Lowest Consumers:**
    - Departments like Marathi (40 liters/day, 0.93%) and History (60 liters/day, 1.40%) exhibited minimal water usage, consistent with their operational needs.

Utilization Analysis The utilization of water as a percentage of total consumption highlights priorities in resource allocation:

- Academic departments collectively accounted for 33.37% of total water usage, with Chemistry contributing the most.
- Administrative and common facilities, including the office, staffroom, and toilet block, constituted 28.59% of water usage.
- Amenities such as canteen services and drinking water for students combined for 32.56% of water consumption, reflecting essential support for campus life.
- The remaining 6.98% was dedicated to environmental upkeep through tree and garden irrigation.

Sustainability Implications

The water consumption patterns indicate several areas for sustainable management:

- **Efficiency in High-Use Areas:**
    - The Chemistry department and toilet blocks' significant water usage necessitate targeted conservation measures such as installing low-flow fixtures and recycling water where feasible.
    - Reducing canteen water use through water-efficient appliances can also contribute to savings.
- **Promoting Green Initiatives:**

- The allocation of nearly 7% of water for trees and gardens emphasizes the college's focus on environmental stewardship. Rainwater harvesting or greywater reuse can enhance sustainability in this area.

- **Awareness Campaigns:**
  - Encouraging staff and students to adopt water-saving practices, particularly in shared spaces like the staffroom, office, and toilet blocks, can help reduce overall consumption.

The water consumption analysis underscores the importance of targeted strategies for efficient water management on campus. High-use areas such as the Chemistry department, toilet blocks, and canteen present significant opportunities for conservation. Through the adoption of sustainable practices and infrastructure, the college can minimize water wastage, enhance resource efficiency, and strengthen its commitment to environmental responsibility.

Table 8 Utilizations of water per day in liters.

Particulars	***Utilisation of water (litres / per day)***	***Utilisation of water (%)***
Department/Section		
Chemistry	1000	23.26
Microbiology	100	2.33
History	60	1.40
Geography	100	2.33
English	50	1.16
Marathi	40	0.93
Hindi	50	1.16
Staffroom	100	2.33
Office	100	2.33
Common Toilet block	1000	23.26
Trees and Garden	300	6.98
Canteen	500	11.63
Drinking Water for Students	900	20.93

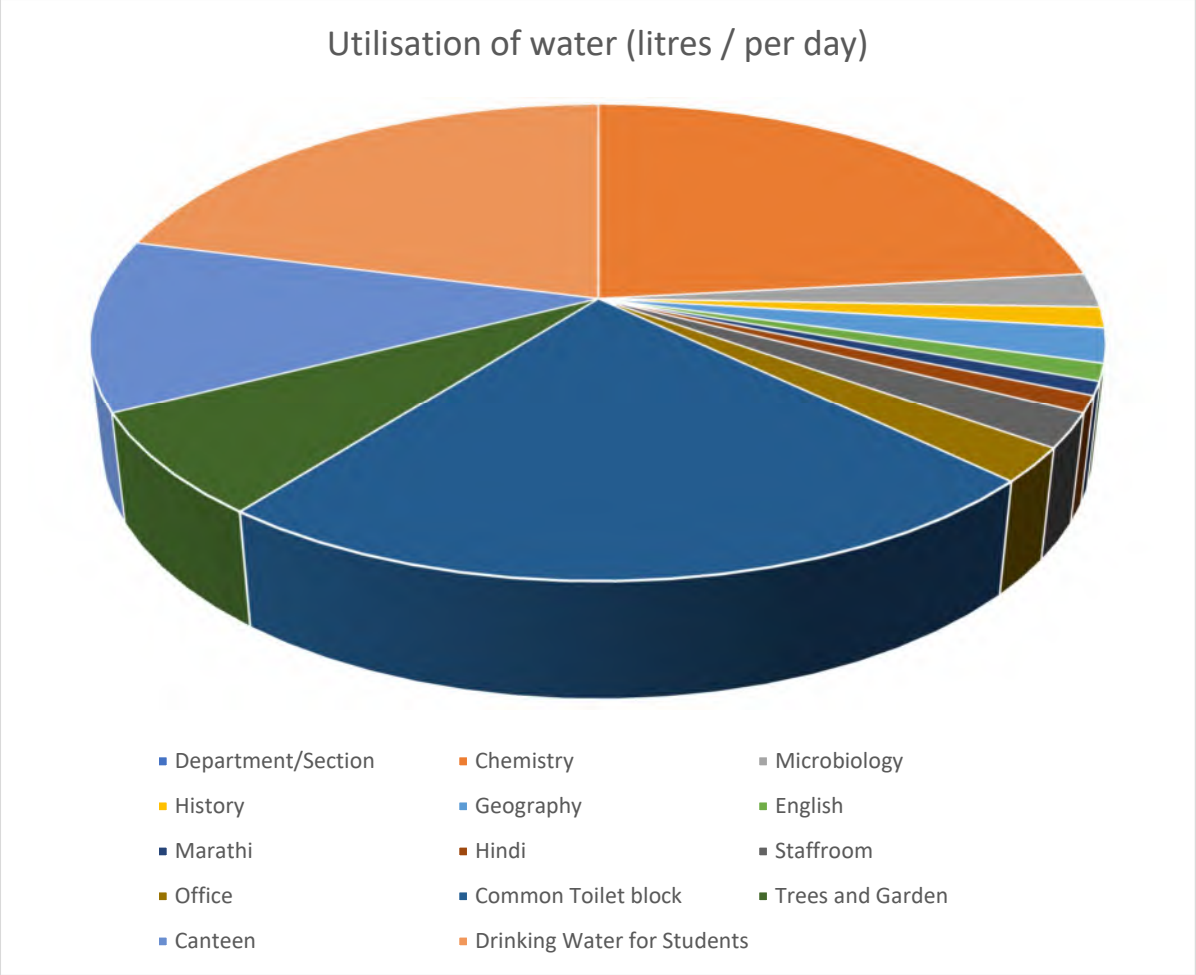

Figure 4 Daily water consumption

- **Flora and fauna conservation**

The college's lush green campus serves as a habitat for diverse species. A recent flora and fauna survey identified various birds, including Parrots, Sparrows, Crows, Pigeons, Koels, Kingfishers, Owls, Hawks, Nilpankh, Indian Teetar, Red Wattle Lapwings, Indian White Egrets, Bulbuls, and Jungle Babblers, along with reptiles like Garden and Wall Lizards and Varanus Indian Monitors. Additionally, it documented insects such as Butterflies, Cockroaches, Ladybird Beetles, Moths, Termites, Black Carpenter Ants, Honey Bees, and Dragonflies.The survey also highlighted the presence of various plant species that contribute to the vibrant ecosystem of the campus. Towering trees like Banyan and Peepal provide shelter and nesting sites for many avian inhabitants. Underneath, shrubs like Hibiscus and Bougainvillea offer nectar-rich flowers that attract butterflies and bees, playing a crucial role in pollination.

Furthermore, the initiative to maintain this ecological balance has introduced several conservation efforts. Nature walks and workshops are organized to raise awareness about the importance of preserving such a habitat. This synergy between education and nature fosters a deeper understanding of the environment among the college community, inspiring a sense of responsibility towards wildlife conservation. Overall, the college's commitment to promoting biodiversity ensures that its lush green campus remains a thriving ecosystem for both flora and fauna, nurturing a rich tapestry of life that benefits all.

- **Tree Plantation Drives**

Every guest is honored with a plant during campus tree plantation events held periodically by students and staff, who present these plants to dignitaries as a gesture of goodwill. These events not only enhance the campus's greenery but also foster a sense of community and responsibility towards the environment. Each plant symbolizes a commitment to sustainability and serves as a reminder of the collaborative efforts of students and staff in promoting eco-friendly practices. Tree plantation at adopted village Ramnagar by Principal and college staff with NSS students. In addition to the ceremonial aspect, the tree plantation initiatives are meticulously planned, with selections made based on native species that will thrive in the local climate, ensuring that the efforts contribute positively to the local ecosystem.

- **Pollution Reduction**

Personal Vehicles of Students are not allowed at the campus. In this way reduction in Air Pollution through vehicular emission. Most of the students prefer bicycles and public transportation to reduce CO_2 emissions.

- **Solid Waste Management**

Municipal corporations lift garbage from the campus every other day, while leaves and food scraps are vermicomposted on the college premises. This not only helps maintain cleanliness but also fosters an eco-friendly environment that encourages students and staff alike to participate in sustainable practices. Additionally, the compost produced from vermicomposting enriches the soil in the college gardens, promoting healthy plant growth and contributing to the local biodiversity.

- **Water Management**

A systematic rainwater harvesting pit has been established on campus for water resource conservation. This initiative not only aims to enhance water conservation practices but also serves as an educational tool for the campus community. By capturing and storing rainwater, the pit contributes significantly to replenishing groundwater levels and reduces the dependency on borewells. Students and staff are encouraged to engage in activities that promote awareness about the importance of rainwater harvesting, fostering a culture of sustainability across the campus. The pit is designed with specific features, such as filters to remove debris and a collection system that channels rainwater effectively. This method not only ensures the quality of harvested water but also maximizes its utility for gardening and other non-potable uses, thereby reducing overall water consumption.

- **Environment Awareness**

Various activities like cleanliness drives, tree plantation, seminars and workshops are organised by college to increase awareness and sensitivity among students and faculty. Students participate in field visits to biodiversity parks and other places of ecological importance are also being arranged by college various departments.

The collective aim of these initiatives is to create a culture of environmental stewardship within the college community, ensuring that all members recognize the importance of protecting our natural resources for future generations. Through these multifaceted efforts, the college strives to instil a lasting commitment to environmental sustainability among students and faculty alike.

CONCLUSION

The GREEN and Environmental audit thoroughly examined all the indicators, collecting, analysing, and summarizing information about them. This comprehensive Environmental and biodiversity conservation audit involved extensive collaboration with the campus team and interactions with key personnel, covering a wide range of environmental issues. As a result of the audit, several actionable insights were identified to enhance the campus's eco-friendliness. Certain sections with instruments exhibit higher electricity consumption, while other departments have minimal usage. The college boasts an abundance of diverse trees and plants, contributing to its lush greenery. To reduce fuel energy consumption for daily tasks, both students and staff are encouraged to utilize public transportation, bicycles and carpooling options. Notably, the majority of students prefer traveling by buses. Additionally, staff members traveling long distances also show a preference for public transportation. Furthermore, the campus maintains good air quality.

The recommendations are also mentioned with observations for the campus team to initiate actions. The audit team opines that the overall site is maintained well from an environmental perspective. There are no major observations but a few things that are important to initiate urgently are e-waste management records by the monthly inventory of hazardous waste, water balance cycle and periodic inspection of buildings housekeeping and environment policy.

RECOMMENDATIONS

1) Adopt an environmentally responsible purchasing policy and work towards creating and implementing a strategy to reduce environmental impact.
2) Drips and sprinklers can be used for watering the gardens and trees.
3) E-waste and solid waste segregation, handling and disposal can be deployed at the campus.
4) Reduction in use of paperwork by goes digital system.
5) Exhaust fans will be provided in the canteen kitchen.
6) It is recommended to measure emissions from every vehicle of staff and students & ambient air quality at least once a year and results should be compared with Indian Ambient Air Quality Standards.
7) Encourage staff and students who regularly use sustainable modes of transportation, such as walking, cycling, or public transportation, by offering them prizes or recognition for their green commuting efforts.
8) Encouraging the adoption of electric vehicles through incentives and infrastructure development.
9) Implementing measures to reduce reliance on conventional vehicles, such as carpooling initiatives and improving public transportation services.
10) Establishing rainwater harvesting infrastructure to reduce reliance on external water supplies.
11) Recycling greywater for use in toilets, gardens, and cleaning purposes.
12) Conducting regular maintenance of plumbing systems to prevent leaks and wastage.
13) Launching awareness programs to promote water conservation among students and staff.

REFERENCES

- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Petroleum Act: 1934 – The Petroleum Rules: 2002
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle Rules:1989 (Amended in 2005)
- Energy Conservation Act 2010.
- The Water [Prevention & Control of Pollution] Act – 1974 (Amended 1988) & the Water (Prevention & Control of Pollution) Rules – 1975
- The Air [Prevention & Control of Pollution] Act – 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules – 1982
- The Gas Cylinders Rules – 2016 (Replaces the Gas Cylinder Rules – 1981
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- The Batteries (Management and Handling) Rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices
- Internal Records of the Campus, (A.Y.2023-24)

ANNEXURE – PHOTOGRAPHS

Photo 1 Tree plantation on the college campus by Hon. Dr. Manglatai Desle (Secretary)

Photo 2 Tree plantation on the college campus by Hon. Dr. Manglatai Desle (Secretary), Principal and college staff.

Photo 3 Tree plantation on the college campus by Hon. Dr. Manglatai Desle (Secretary), Principal and college staff with NSS students.

Photo 4 Tree plantation on the college campus by Principal and college staff with NSS students

Photo 5 Tree plantation on the college campus by Principal and college staff.

Photo 6 Tree plantation at adopted village Ramnagar by Principal and college staff with NSS students

Photo 7 Tree plantation on bare land at adopted village Ramnagar by college staff with NSS students

Photo 8 Extensive Tree plantation on bare land at adopted village Ramnagar by college staff with NSS students

Photo 9 Preserved and watering to Tree plantation on bare land at adopted village Ramnagar by college staff with NSS students.

Photo 10 Watering by drip irrigation system in college campus trees to save water

Photo 11 Classrooms of the college Campus are Well Ventilated, with a very good Window Floor ratio.

Photo 22 Classrooms of the college Campus are Well Ventilated, with a very good Window Floor ratio.

Photo 13 Well-Ventilated laboratory to maintain indoor air quality.

Photo 14 Classrooms of the college Campus are Well Ventilated, with a very good Window Floor ratio.