GREEN Audit

Year 2023-24

Green Audit

Rashtriya Sahakari Shikshan Prasarak Mandal Ltd., Chalisgaon Sanstha's

Nanasaheb Yashvantrao Narayanrao Chavan

Arts, Science & Commerce College

Chalisgaon, Dist - Jalgaon

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- Honourable Vice Chairwoman Taisaheb Pushpa Sadashiv Bhosale
- Honourable Secretary Abasaheb Prin. Balasaheb Vishwasrao Chavan
- Honourable Director Board Members of the college
- Prin. Dr. S. R. Jadhav
- IQAC Members
- GREEN Audit coordinator
- Teaching & Supporting Staff of College

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

Vikram Geoinfo Tech
Revealing Earth Information

(ISO 9001:2015 Certified)

(Dr. Vikram Agone)

Founder & Chairman

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Report by: Lead Auditor

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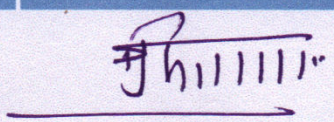
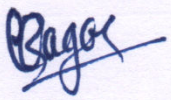
Prin. Dr. S. R. Jadhav	Principal & Chairman	
Dr. U. R. Magar	Vice-Principal	
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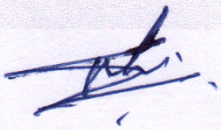
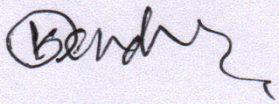
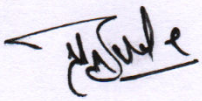
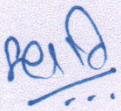
Dr. A. L. Suryawanshi	Member	
Dr. K. B. Bendre	Member	
Dr. Y. M. Bhosale	Member	
Prof. S. E. Pate	Member	

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		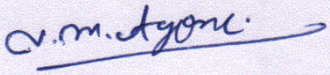
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INTRODUCTION

R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon 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 ***R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon*** 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/Environmental auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. GREEN/ 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. Through Green Audit, one gets a direction as to how to improve the condition of the environment and various factors have determined the growth of carrying out Green and Energy Audit.

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 central part of Chalisgaon city. Chalisgaon is a city and taluka in Jalgaon district of Nashik Division, Maharashtra, and It is located on state Highway NH 211, NH 753J and Central Railway. The Tittur River flows through the city. Chalisgaon city has been situated at 356 m MSL altitude. Chalisgaon has a tropical climate with hot and humid summers and mild winters. The average temperature ranges from 27°C to 40°C in the summer and 12°C to 20°C in the winter. The city receives an average rainfall of 700 mm per year, most of which falls during the monsoon season (June to September). Chalisgaon is located at the foot hill of Ajanta Satmala Mountain range. The vegetation in Chalisgaon is mainly tropical deciduous forest. The city is home to a variety of trees and plants.

The college campus is spread over 4.038 acres (1.63 hectare) which include about 1.52-acre (0.61 hectare) sports ground. College is easily accessible by road for the rural area which is 25 km away. Although the campus is located near the residential area, the presence of a green belt considerably reduced noise pollution and provided fresh air on the campus. The College campus area has an academic building, library, parking, canteen and sports ground.

OVERVIEW OF INSTITUTE

Nanasaheb Yashwantrao Narayanrao Chavan Arts, Science and Commerce College is run by Rashtriya Sahakari Shikshan Prasarak Mandal Ltd., Chalisgaon (Jalgaon) Sanstha's. Established in 1953 in the form of a hostel the Institute now has 1 Senior College, 5 Junior Colleges (+ 2 Level), 21 Secondary Schools, 2 Primary Schools, 1 Ashramshala (residential school), 1 School for Blind Students, 5 Pre-Primary Schools, 5 hostels, 1 MCVC Unit and 1 Cooperative Consumer Stores.

At present about 25, 000 students are learning in all these schools, junior colleges, ashramshala and senior college. The Office-bearers of the Institute represent various fields like medicine, law, education, agriculture and business. The R. S. S. P. Mandal is run by visionary and committed Office-bearers and resultantly this is one of the well-known educational institutes in this region.

Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College, Chalisgaon is run by Rashtriya Sahakari Shikshan Prasarak Mandal Ltd. Chalisgaon Dist. Jalgaon. The College was established in June 1984 and is affiliated to the North Maharashtra University, Jalgaon. The College is Grant-in-aid, affiliated and co-education system. The College was first accredited in January 2004 and was awarded B+ by the NAAC.

In the Second cycle of NAAC Reaccreditation our institute excelled and achieved "A" grade with CGPA 3.10, in 2012. Similarly, in 2013 North Maharashtra University, Jalgaon bestowed upon us 'Best College Award' in the University. In Academic Audit conducted by the University we were again given 'A' grade.

The college started with B. A, B. Com and B.Sc. During the course of time moved upward by adding various graduate, post-graduate and doctoral courses. To be in tune with the time of professionalism we also offer undergraduate programmes like B.C.A. and B.B.M. and PG course M.B.M.

The need of the hour is 'skill-based courses and this institute has rightly initiated the course like 10-Certificate, 06-Diploma, 06-Advanced Diploma Courses as Career Oriented Courses and One P. G. Diploma Course. M. Phil, and Ph. D. activities by the recognized guides are available on the campus of the College.

Every year our students secure ranks in university merit list some are gold medallists. Highly qualified staff along with academic growth of students complement by co-curricular and extra-curricular activities to nurture all round personality of our students.

Our students represent University at various levels in sports. We are always at 1st or 2nd position among the '10 Best Colleges in the University'. Our students are recipients of gold, silver and bronze medals at various events in university level cultural event: Yuvarang. Our respected Principal has been awarded "Best Centre In-charge Award" (Karya Gaurav Puraskar) by Yashwantrao Chavan Maharashtra Open University, Nashik.

The college has been recognized under 2(f) and 12 (b) by the UGC. The campus area of the college is 14284 sq. mts. And Women's hostel 1184.19 sq. mts. The college stands in a multi-storied, majestic building with various facilities. More than two thousand and four hundred students and studying in the college.

There is Library building with NRC for students and teachers, Playground and well-equipped Gymnasium. There is Canteen and Health Centre on the campus.

To enhance the potential of students in writing, compiling annual magazine 'Rashtriyata' is published. Some departments compile wall papers on certain subjects. In the competitive world and to prepare for competitive examination with the philanthropic contribution by our Ex-Principal we have been conducting State Level General Knowledge Quiz Competition every year.

The College also has a Study Centre of Yashwantrao Chavan Maharashtra Open University, Nasik. The Centre offers B. A., B. Com., M. A. and M. Com. Courses. The strength of students at the Centre almost equals to that of the strength of our regular courses.

Through this Centre we provide opportunity of learning to those who cannot attend regular college. Our respected Principal has been awarded 'Best Centre In-charge Award' (Karya Gaurav Puraskar) by Yashwantrao Chavan Maharashtra Open University, Nashik.

The faculties in our college are competent and committed and they upgrade the knowledge of their subjects by participating in state, national and international conferences and seminars. There are 21 Ph. D. holders and 6 are pursuing Ph. D.

Our faculty members also engage in Research projects. Most of the faculty members have published their Research articles in state, national, international level and online journals with impact factors. They are also authors of some books.

VISION

Imparting instruction in social sciences, humanities; business, commerce and management; basic and applied sciences with humanitarian, national and global outlook.

MISSION

Knowledge that liberates

AIMS AND OBJECTIVE

R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon conducted a GREEN/Environment auditing survey for the year 2023-24. The primary aim of this report is to analyse the environmental profile of the college for Green 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

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.

GREEN Audit Report

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 75 teaching and 19 non-teaching staff, while 1735 students enrolled in the college. The highest CO_2 emissions (55485 kg) has been reported by Public Transport use by students, followed by two-wheeler use by students reported 18110.86 kg of CO_2 emissions in the A.Y. 2023-24, while the lowest CO_2 emissions (218.40 kg) has been reported by Diesel Generator used by college in the A.Y. 2023-24. Total CO_2 emissions for this academic year of all the vehicles have been **89353.57 kg** by the college into the atmosphere. Electrical vehicles used by staff and Student's CO_2 emissions have been low i.e., for this academic year emission has **1637.01** kg. The college contributes average **196.668** kg per day of CO_2 emission to the atmosphere by using electrical energy, in this way in this A.Y. total CO_2 emission to the atmosphere by using electrical energy was **58017.06 kg**. Overall CO_2 emission to the atmosphere from A.Y. 2023-24 by all activity was **147370.63 kg** i.e., **147.370 Metric Ton.** Academic year 2023-24 CO_2 emission particulars are mentioned in the following tables. In India's forests, trees absorb between 41 and 48 kg of CO_2 per square meter annually; in non-forest areas, the absorption is only 4 kg. Therefore, the vegetation on college campuses has absorbed **24016.88 kg** of CO_2. In this way, the total activity of the college emits **123353.75 kg** of **Carbon** into the atmosphere.

Many important conclusions from the thorough examination of the transportation data have ramifications for the institution's sustainability initiatives, as stated in the GREEN audit. First off, despite the fact that both staff and students drive electric vehicles, the proportion of these vehicles is still small when compared to other types. Their significantly lower CO_2 emissions, however, highlight how crucial it is to encourage their adoption as a competitive alternative. Furthermore, the popularity of bicycles, especially among students, shows a positive trend toward environmentally friendly, zero-emission mobility. However, the considerable use of two-wheelers by faculty and students, as well as the heavy reliance on public transportation, particularly by students, add considerably to the total amount of CO_2 emissions. This emphasizes how urgent it is to address the underlying causes of reliance on traditional modes of transportation, such as a lack of alternatives or insufficient infrastructure. Furthermore, the diesel generator's presence highlights a problem with energy consumption and emissions related to the production of electricity. These emissions can be reduced by putting policies in place to switch to renewable energy sources or to improve energy efficiency. The organization needs to give top priority to projects that encourage the use of electric cars, support non-motorized transportation, improve public transportation, and switch to cleaner energy sources in order to create a truly sustainable transportation ecosystem. The institution can effectively reduce its carbon footprint, improve environmental sustainability, and align with the GREEN audit's objectives by implementing these recommendations.

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)	*0*	*0.00*
Four-Wheeler (Students)	*0*	*0.00*
Two-Wheeler (Staff)	*80*	*10203.30*
Two-Wheeler (Students)	*142*	*18110.86*
Electrical vehicles (Staff)	*6*	*272.84*
Electrical vehicles (Students)	*30*	*1364.18*
Bicycles (Staff)	*5*	*0.00*
Bicycles (Students)	*350*	*0.00*
Public Transport (Staff)	*3*	*3699.00*
Public Transport (Students)	*1013*	*55485.00*
Diesel Generator	*1*	*218.40*

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

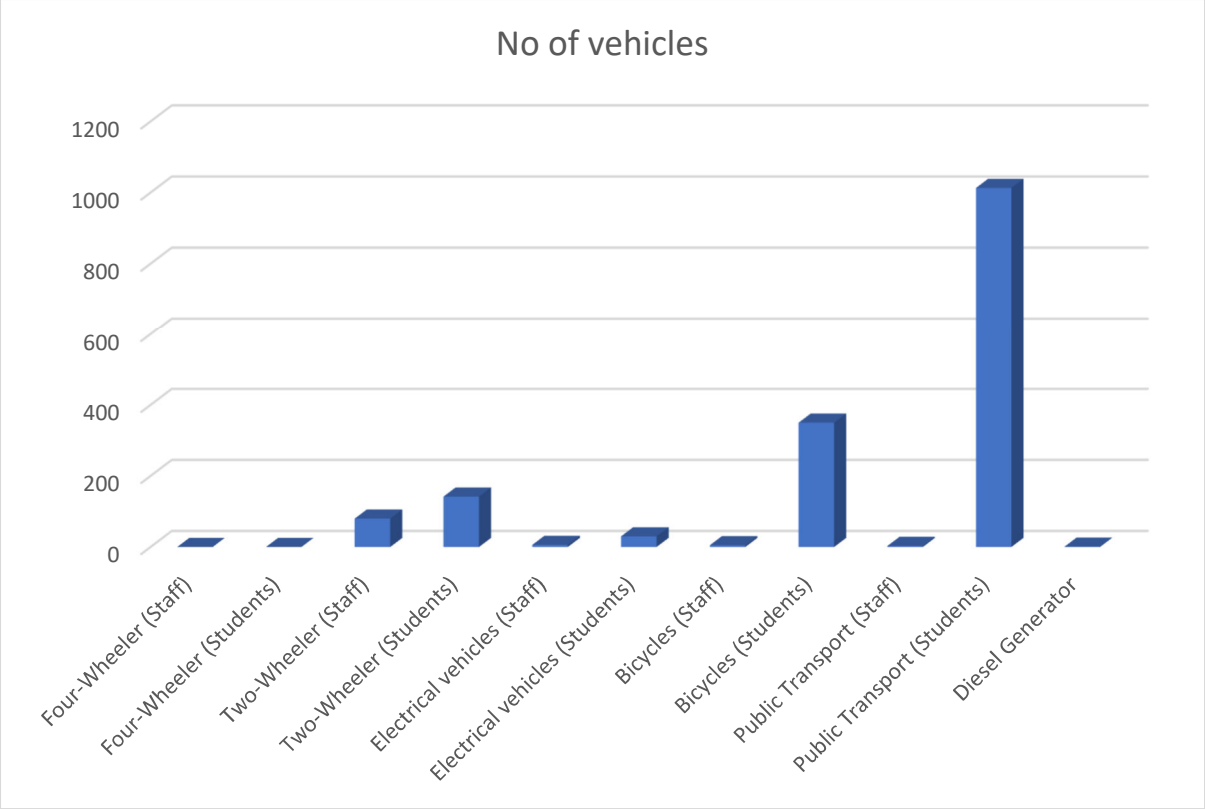

Figure 1 Number of Vehicles in A.Y. 2023-24

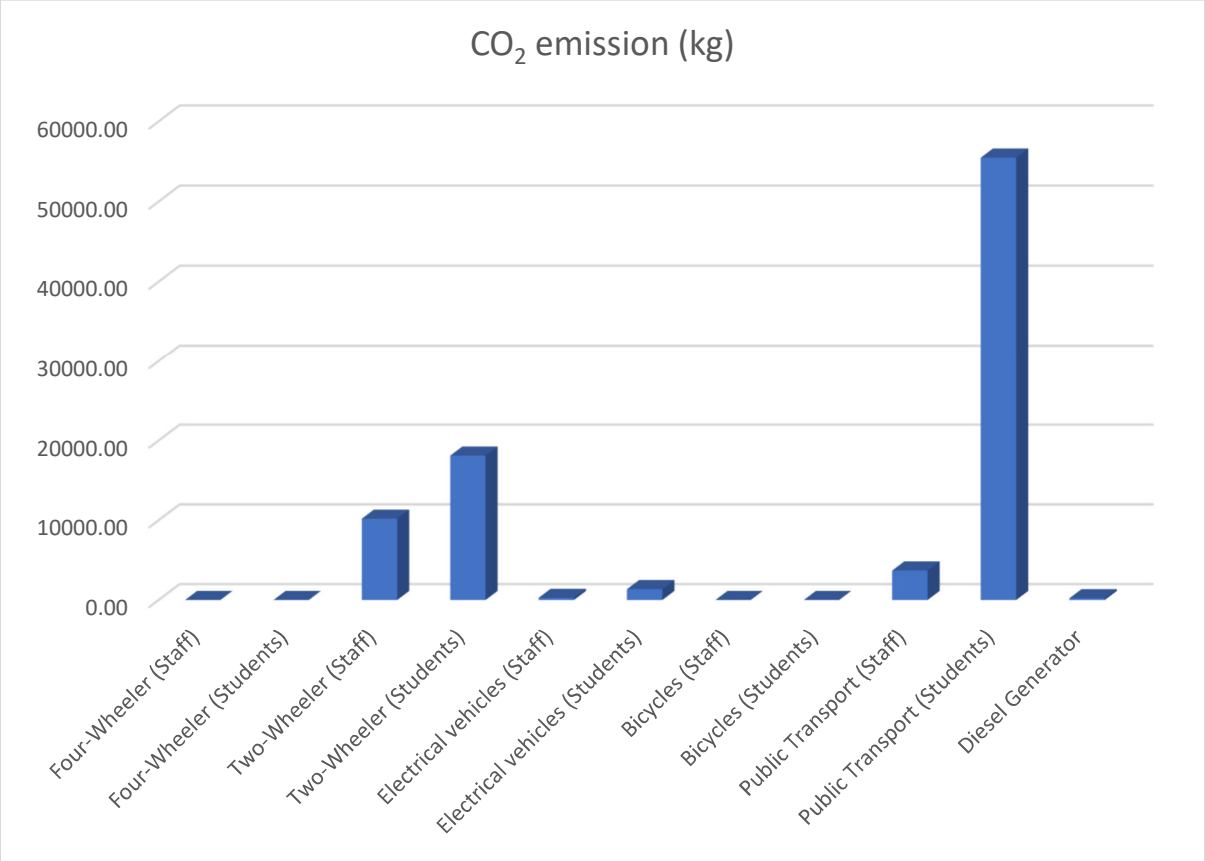

Figure 2 Total CO_2 Emission by Vehicles in A.Y. 2023-24

LAND USE AUDIT

The campus area of 16391.5 m^2 (4.04 acres) consists of the following regions as stated below for land consumption in the built-up area of the college. The central and south region of campus is densely built-up having Main Administrative Block, departments and lecture rooms. The northern region comprises Sports ground and bare land. The periphery boundary of the campus has various types of trees observed. Approximately **6004.22 sq. m** of the region is occupied by trees and forms the part of green cover of the campus in the A.Y 2023-24. Vegetation area has been reported good in the academic year 2023-24. The vegetation on campus absorbs roughly **24016.88** kg **CO_2** in the years 2023–24 because trees in India absorb between 41 and 48 kg of CO_2 per square meter annually in forests and 4 kg in non-forest areas.

Table 2 Land-Use of the College campus

Land Use	Area (m^2)	Area (acre)
Built-up	2956.42	0.73
Vegetation	6004.22	1.48
Bare land	13435.08	3.31

(Source: GeoEye-3 Satellite Imagery)

The college campus geo-position is at 20° 27' 41" N latitude and 75° 00' 15" E longitude in Chalisgaon, District Jalgaon, Maharashtra, India. It encompasses an area of about 4.08 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 and near building 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 Chalisgaon city 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	*Aegle marmelos L.*	Bel	Rutaceae	Avenue Tree, Aesthetic
4	*Aloe vera* L.	Korphad	Liliaceae	
5	*Annona squamosa* L.	Sitaphal	Annonaceae	
6	*Azadirachta indica* L.	Neem	Meliaceae	
7	*Bambusa tulda* Roxb.	Bamboo	Poaceae	
8	*Cocos nucifera L.*	Coconut	Arecaceae	
9	*Delonix regia*	Gulmohar	Caesalpiniaceae	Avenue Tree, Ornamental
10	*Ficus benghalensis*	Vad	Moraceae	Avenue Tree, Aesthetic
11	*Ficus racemose*	Umber	Moraceae	
12	*Ficus religiosa*	Peepal	Moraceae	
13	*Polyanthia Longifolia*	Ashok	Annonaceae	Avenue Tree

(Source: Field visit and Survey)

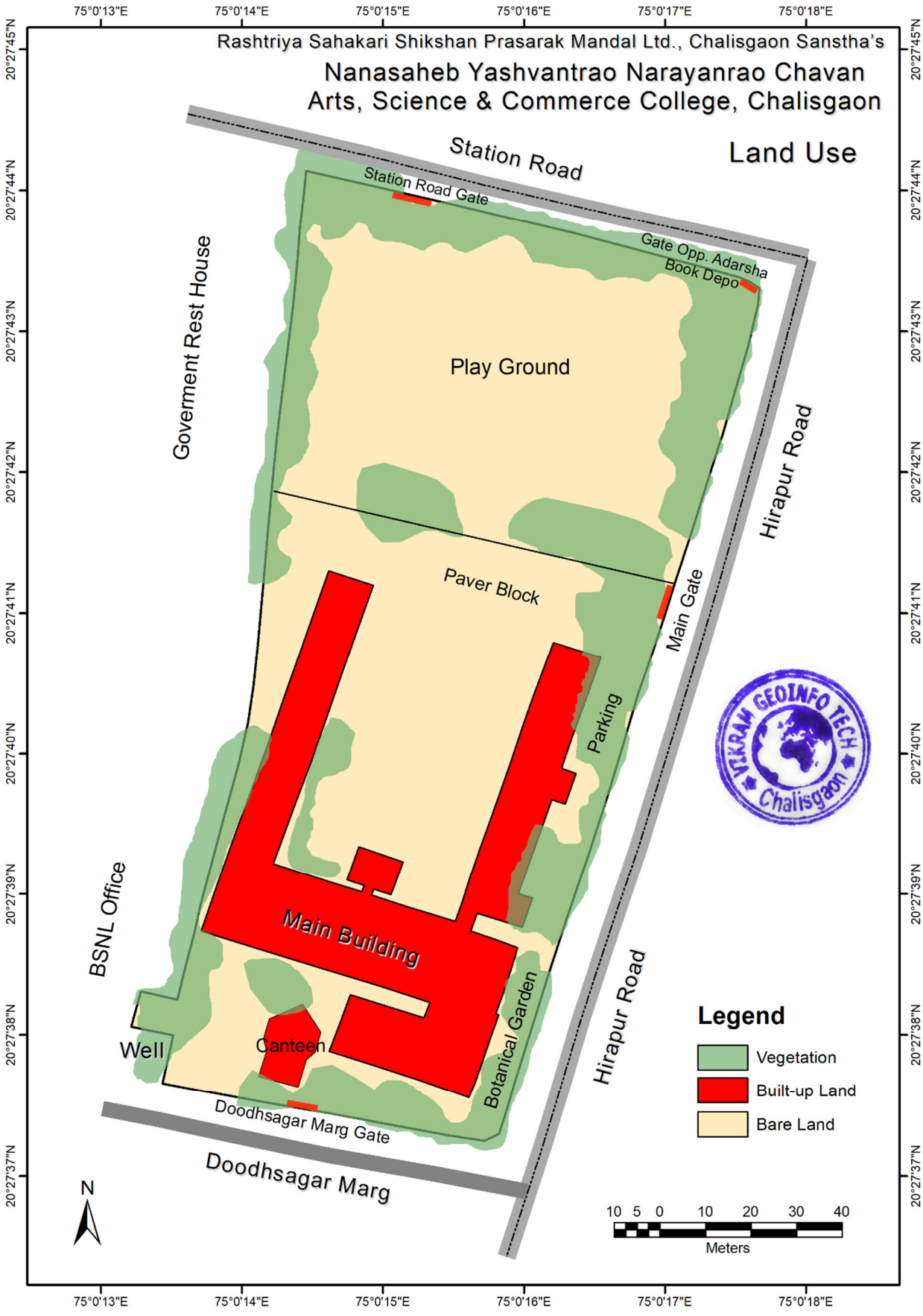

Figure 3 College Campus Land Use Map

AIR EMISSIONS

Air emissions, which include gases and particles released into the air, are a significant concern due to their impact on ambient air quality. The presence of exhaust fans in enclosed spaces like parking garages has been shown to influence indoor air pollution distribution. In college settings, where occupants share indoor spaces, the ventilation regime plays a crucial role in mitigating the airborne transmission of infectious respiratory droplets, highlighting the importance of proper ventilation in classrooms. While exhaust fans are essential for maintaining indoor air quality in residential buildings by venting out pollutants and excessive humidity, the need for exhaust fans in well-ventilated classrooms may be less critical. Adequate ventilation in classrooms is crucial to prevent the buildup of pollutants generated indoors, emphasizing the significance of well-ventilated spaces. Natural ventilation, such as opening windows, can be effective in improving air quality in classrooms, but caution is advised to avoid introducing particulate matter into the rooms.

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. 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).

Table 7 Light intensity and noise levels monitoring results

Department / Section	*Noise level (dB)*	*Light Intensity (Lux)*
Principal Office	35	350
Administrative office	40	300
Multipurpose Hall	50	600
Conference Hall	45	300
IQAC office	35	300
Computer	45	550
Information Technology	45	500
YCMU	45	300
Botany	50	385
Zoology	45	450
Zoology Research Lab	45	300
Microbiology	45	300
Electronics	50	500
Physics	50	550
Psychology	40	550
BCA Lab	50	550
Staff Room	45	500
Ladies Room	50	500
English	50	450
Chemistry	48	550
Geography	50	550
Statistic	50	550
Mathematics	50	550
Class Room	50	400
Canteen	55	600
Library	30	350
Gymkhana	45	1000
Sports ground	65	4000

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 are 35 dB during day time. Noise levels monitored during the audit are the near about 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 occupied and receive diffuse natural sunlight. High noise was reported in the playground premises.

The college campus is located in the Chalisgaon city area; vehicular noise pollution is minimum on the premises probably due to tree cover on the campus. Noise levels are between 30 - 65 dB on the premises. Light intensity has been between 300 - 4000 Lux. Light intensity and noise levels were monitored at nine different locations within academic years 2023-24 and the results are presented in Table 7.

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 1015 students enrolled in different courses and more than 58 employees in the A.Y. 2023-24. The assessment of water requirements comprises sanitation, laboratory, kitchen, drinking, washing, etc. For assessment of water management, the college has been divided into five blocks: Canteen, Garden, Common Toilet, teaching and non-teaching staff room and office.

As can be seen, the average consumption of water by the Trees and Garden is 32.55 % as compared to 47.44 % for the Drinking water for students and common toilet block respectively. The collective average consumption of water by overall college has been 12290 litres / Day. In the college, the major consumers of water by Trees and Garden (4000 litres / Day). Highest utilisation of water in the Drinking water for students and for Trees and Garden. Water consumption of the College works out to be 8 Litre /Person/Day. As per IS 1172 standards for non-residential institutions, water consumption should be a maximum of 45 Litre /Person/Day. Water Where the Roots Are, Water in the Morning and avoid overwater-to-tree methods have been used to water the trees on the college premises. A proper and systematic rainwater harvesting pit has been established on the college campus. **Thus, water consumption is well under the limit.**

Table 10 Utilizations of water per day in liters.

Particulars	*(litres / Day)*	*(%)*
Canteen	1000	8.14
Common Toilet block	2830	23.03
Trees and Garden	4000	32.55
Staffroom	1460	11.88
Drinking Water for Students	3000	24.41

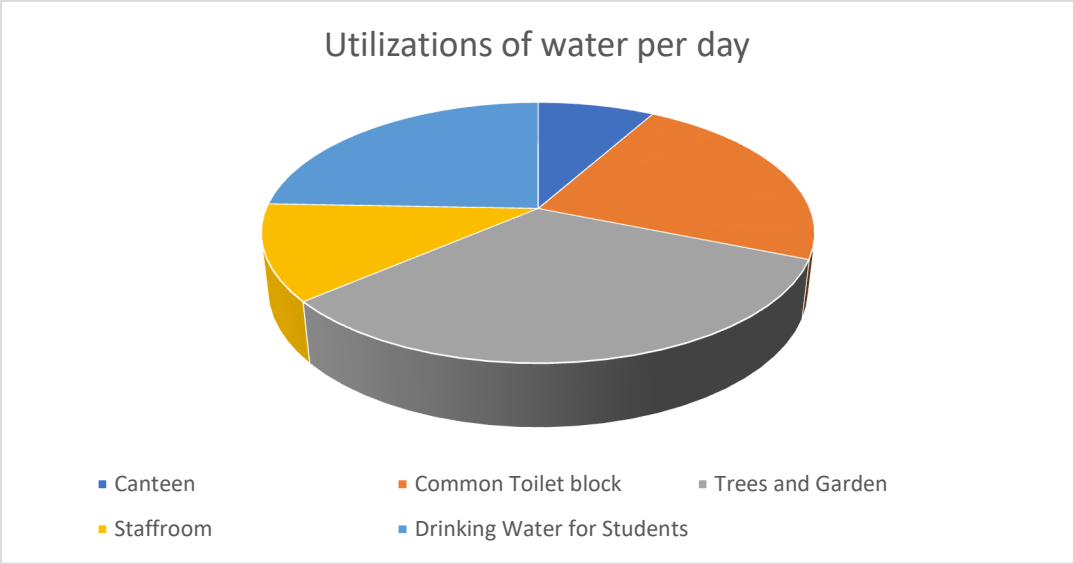

Figure 4 Daily water consumption for A.Y. 2023-24

The data reveals that the most significant water consumption occurs in maintaining trees and the garden, which accounts for over 32% of the total water usage. While greenery is important for aesthetic and environmental reasons, there may be potential for optimizing irrigation systems or selecting drought-resistant plants to reduce water consumption in this area. Employing rainwater harvesting and efficient irrigation practices can contribute to substantial water savings.

The common toilet block is another area of concern, using approximately 23% of the daily water supply. This highlights the need for water-saving fixtures, regular maintenance to fix leaks, and educating users on water conservation practices.

While the canteen's water consumption is relatively low, it is still important to monitor and manage this area to ensure that water usage is efficient. Implementing water-efficient appliances and practices in the canteen can contribute to conservation efforts.

The staffroom and drinking water for students, although less water-intensive than other areas, should not be overlooked. Staffrooms can benefit from the installation of water-saving fixtures, and the distribution of drinking water for students should be efficient while ensuring students' hydration needs are met.

To enhance overall water efficiency and conservation, it is essential to address each area's specific needs and opportunities for improvement. Implementing water-saving measures and raising awareness about responsible water use among staff and users can collectively lead to reduced water consumption and contribute to sustainability goals.

BEST PRACTICES / INITIATIVES FOR THE ENVIRONMENT

- **Flora and fauna conservation**

The college's lush, green campus serves as a habitat for a variety of wildlife. Parrot, Sparrow, Crow, Pigeon, Koel, Kingfisher, Owl, Hawk, Nilpankh, Indian Teetar, Red wattle lapwing, Indian white Egret, Bulbul, Jungle babbler, Garden lizard, Wall lizard, Varanus Indian monitor, Butterfly, Cockroach, ladybird's beetles, Moths, Termite, Black Carpenter Ants, Honey Bee, and Dragonfly are among the species found in the recently conducted Flora and Fauna survey reports.

- **Tree Plantation Drives**

On campus, the Tree Plantation honors each and every guest. On occasion, campus employees and students drive the plantation.

- **Pollution Reduction**

Students are not permitted to drive their own vehicles on campus. Reduction of air pollution as a result of vehicle emissions. When it comes to lowering CO_2 emissions, the majority of students favor bicycles and public transportation.

- **Solid Waste Management**

Lifting of garbage from campus on an alternate day by municipal corporations and leaves and food scraps has been Vermicomposting at college premises.

- **Water Management**

Water must be used properly and systematically on college campuses in order to conserve water resources.

- **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.

CONCLUSION

The Green/Environmental audit gathered, analysed, and summarized data regarding each indicator in order to conduct a thorough examination. This thorough audit of the environment, land use, and energy covered a wide range of environmental issues and required close coordination with the campus team as well as interactions with key personnel. The audit produced a number of useful insights that could be implemented to improve the campus's environmental friendliness. Some departments use less electricity than others, and some sections with instruments use more. The college's lush vegetation is a result of the diversity of trees and plants that it has in abundance. In order to minimize fuel energy consumption for routine tasks, staff and students are encouraged to take public transportation, ride bicycles, and carpool. Remarkably, most students Favor bus transportation. Furthermore, employees who travel great distances exhibit a preference for public transit. Additionally, the campus's air quality is maintained.

Along with the observations, the recommendations are also mentioned, encouraging the campus team to take action. According to the audit team, the site is generally kept up nicely in terms of environmental preservation. There aren't any significant findings, but a few things need to be started right away, including waste management records through the monthly hazardous waste inventory, rainwater harvesting recharge, the water balance cycle, and periodic building housekeeping and environment policy inspections.

RECOMMENDATIONS

1) Climate change has brought forth challenges such as water scarcity, global warming, and sustainable resource management. More than ever, educational institutions must spread the word about the need of reducing harmful environmental effects, managing resources sustainably, and safeguarding ecosystems. Students must be made aware, and awareness must be disseminated as widely as feasible. Students gain from awareness sessions by understanding how their actions and inactions impact the environment, gaining the information and abilities needed to handle challenging environmental problems, and feeling motivated to protect the sustainability and health of our environment.
2) Establish an advisory committee on the environment that includes students. Environment-related ideas and awareness can be generated through departmental discussions and information sharing.
3) Adopt an environmentally responsible purchasing policy and work towards creating and implementing a strategy to reduce environmental impact.
4) LEDs lamps can be used in all sections and classrooms to minimize the usage of fluorescent tubes.
5) Wastewater management still needs to be practised and designed on campus.
6) Drinking water quality shall be as per IS:10500.
7) Drips and sprinklers can be used for watering the gardens and trees.
8) E-waste and solid waste segregation, handling and disposal can be deployed at the campus.
9) Records of the creation and disposal of e-waste must be kept up to date. The type and amount of waste produced should be listed in the inventory that the college maintains. e.g. batteries, circuit boards, cables, keyboards, scanners, and computer monitors, among other items.
10) Reduction in use of paperwork by goes digital system.
11) Water meters should be installed at the college for monitoring water consumption for gardening and landscape.
12) Exhaust fans will be provided in the canteen kitchen.

13) Every staff and student vehicle should have its emissions and ambient air quality measured at least once a year. The results should be compared to the Indian Ambient Air Quality Standards.
14) Reward employees and students who consistently choose environmentally friendly forms of transportation, like walking, bicycling, or public transportation, with incentives or recognition for their efforts.
15) Encouraging the adoption of electric vehicles through incentives and infrastructure development.
16) Promoting non-motorized transportation options such as bicycles by providing facilities like bike lanes and parking.
17) Implementing measures to reduce reliance on conventional vehicles, such as carpooling initiatives and improving public transportation services.
18) looking into ways to generate power using renewable energy sources in addition to or instead of diesel generators.

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)

GREEN Audit

Year 2022-23

Green Audit

Rashtriya Sahakari Shikshan Prasarak Mandal Ltd., Chalisgaon Sanstha's

Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College

Chalisgaon, Dist - Jalgaon

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ACKNOWLEDGEMENT

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- Honourable Chairman, Bapusaheb Dr. Vinayak Yashwantrao Chavan
- Honourable Vice Chairwoman Taisaheb Pushpa Sadashiv Bhosale
- Honourable Secretary Abasaheb Prin. Balasaheb Vishwasrao Chavan
- Honourable Director Board Members of the college
- Prin. Dr. S. R. Jadhav
- IQAC Members
- GREEN Audit coordinator
- Teaching & Supporting Staff of College

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

Vikram Geoinfo Tech
Revealing Earth Information

(ISO 9001:2015 Certified)

V. M. Agone.

(Dr. Vikram Agone)

Founder & Chairman

Vikram GeoInfo Tech

VIKRAM GEOINFO TECH Chalisgaon

DISCLAIMER

Vikram GeoInfo Tech has prepared this report for ***R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon*** based on input data submitted by the representatives of the College complemented with the best judgment capacity of the expert team.

It is further informed that the conclusions have arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Vikram GeoInfo Tech in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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Report by: Lead Auditor

Vikram Geoinfo Tech
Revealing Earth Information
(ISO 9001:2015 Certified)

V. M. Agone

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Founder & Chairman
Vikram GeoInfo Tech

VIKRAM GEOINFO TECH Chalisgaon

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Internal Auditor

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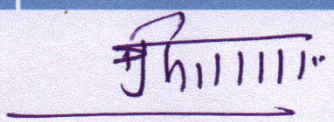
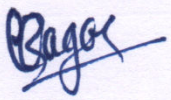
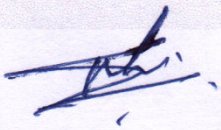
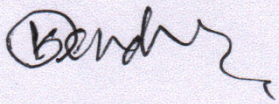
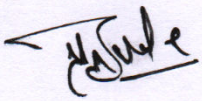
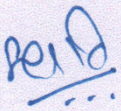
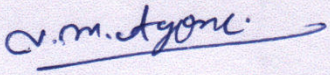
Prin. Dr. S. R. Jadhav	Principal & Chairman	
Dr. U. R. Magar	Vice-Principal	
Dr. G. D. Deshmukh	IQAC Coordinator & Vice-Principal	
Dr. A. L. Suryawanshi	Member	
Dr. K. B. Bendre	Member	
Dr. Y. M. Bhosale	Member	
Prof. S. E. Pate	Member	

External Auditor

NAME	POSITION	QUALIFICATION
		
Dr. Vikram Madhukar Agone	Lead Auditor	Ph.D. FRGS (UK)

INTRODUCTION

R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon 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 ***R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon*** 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/Environmental auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. GREEN/ 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 **2022-23** 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. Through Green Audit, one gets a direction as to how to improve the condition of the environment and various factors have determined the growth of carrying out Green and Energy Audit.

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. **2022-23**

ENVIRONMENTAL SETTING OF THE COLLEGE

The college has a sprawling pollution-free campus on the central part of Chalisgaon city. Chalisgaon is a city and taluka in Jalgaon district of Nashik Division, Maharashtra, and It is located on state Highway NH 211, NH 753J and Central Railway. The Tittur River flows through the city. Chalisgaon city has been situated at 356 m MSL altitude. Chalisgaon has a tropical climate with hot and humid summers and mild winters. The average temperature ranges from 27°C to 40°C in the summer and 12°C to 20°C in the winter. The city receives an average rainfall of 700 mm per year, most of which falls during the monsoon season (June to September). Chalisgaon is located at the foot hill of Ajanta Satmala Mountain range. The vegetation in Chalisgaon is mainly tropical deciduous forest. The city is home to a variety of trees and plants.

The college campus is spread over 4.038 acres (1.63 hectare) which include about 1.52-acre (0.61 hectare) sports ground. College is easily accessible by road for the rural area which is 25 km away. Although the campus is located near the residential area, the presence of a green belt considerably reduced noise pollution and provided fresh air on the campus. The College campus area has an academic building, library, parking, canteen and sports ground.

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OVERVIEW OF INSTITUTE

Nanasaheb Yashwantrao Narayanrao Chavan Arts, Science and Commerce College is run by Rashtriya Sahakari Shikshan Prasarak Mandal Ltd., Chalisgaon (Jalgaon) Sanstha's. Established in 1953 in the form of a hostel the Institute now has 1 Senior College, 5 Junior Colleges (+ 2 Level), 21 Secondary Schools, 2 Primary Schools, 1 Ashramshala (residential school), 1 School for Blind Students, 5 Pre-Primary Schools, 5 hostels, 1 MCVC Unit and 1 Cooperative Consumer Stores.

At present about 25, 000 students are learning in all these schools, junior colleges, ashramshala and senior college. The Office-bearers of the Institute represent various fields like medicine, law, education, agriculture and business. The R. S. S. P. Mandal is run by visionary and committed Office-bearers and resultantly this is one of the well-known educational institutes in this region.

Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College, Chalisgaon is run by Rashtriya Sahakari Shikshan Prasarak Mandal Ltd. Chalisgaon Dist. Jalgaon. The College was established in June 1984 and is affiliated to the North Maharashtra University, Jalgaon. The College is Grant-in-aid, affiliated and co-education system. The College was first accredited in January 2004 and was awarded B+ by the NAAC.

In the Second cycle of NAAC Reaccreditation our institute excelled and achieved "A" grade with CGPA 3.10, in 2012. Similarly, in 2013 North Maharashtra University, Jalgaon bestowed upon us 'Best College Award' in the University. In Academic Audit conducted by the University we were again given 'A' grade.

The college started with B. A, B. Com and B.Sc. During the course of time moved upward by adding various graduate, post-graduate and doctoral courses. To be in tune with the time of professionalism we also offer undergraduate programmes like B.C.A. and B.B.M. and PG course M.B.M.

The need of the hour is 'skill-based courses and this institute has rightly initiated the course like 10-Certificate, 06-Diploma, 06-Advanced Diploma Courses as Career Oriented Courses and One P. G. Diploma Course. M. Phil, and Ph. D. activities by the recognized guides are available on the campus of the College.

Every year our students secure ranks in university merit list some are gold medallists. Highly qualified staff along with academic growth of students complement by co-curricular and extra-curricular activities to nurture all round personality of our students.

Our students represent University at various levels in sports. We are always at 1st or 2nd position among the '10 Best Colleges in the University'. Our students are recipients of gold, silver and bronze medals at various events in university level cultural event: Yuvarang. Our respected Principal has been awarded "Best Centre In-charge Award" (Karya Gaurav Puraskar) by Yashwantrao Chavan Maharashtra Open University, Nashik.

The college has been recognized under 2(f) and 12 (b) by the UGC. The campus area of the college is 14284 sq. mts. And Women's hostel 1184.19 sq. mts. The college stands in a multi-storied, majestic building with various facilities. More than two thousand and four hundred students and studying in the college.

There is Library building with NRC for students and teachers, Playground and well-equipped Gymnasium. There is Canteen and Health Centre on the campus.

To enhance the potential of students in writing, compiling annual magazine 'Rashtriyata' is published. Some departments compile wall papers on certain subjects. In the competitive world and to prepare for competitive examination with the philanthropic contribution by our Ex-Principal we have been conducting State Level General Knowledge Quiz Competition every year.

The College also has a Study Centre of Yashwantrao Chavan Maharashtra Open University, Nasik. The Centre offers B. A., B. Com., M. A. and M. Com. Courses. The strength of students at the Centre almost equals to that of the strength of our regular courses.

Through this Centre we provide opportunity of learning to those who cannot attend regular college. Our respected Principal has been awarded 'Best Centre In-charge Award' (Karya Gaurav Puraskar) by Yashwantrao Chavan Maharashtra Open University, Nashik.

The faculties in our college are competent and committed and they upgrade the knowledge of their subjects by participating in state, national and international conferences and seminars. There are 21 Ph. D. holders and 6 are pursuing Ph. D.

Our faculty members also engage in Research projects. Most of the faculty members have published their Research articles in state, national, international level and online journals with impact factors. They are also authors of some books.

VISION

Imparting instruction in social sciences, humanities; business, commerce and management; basic and applied sciences with humanitarian, national and global outlook.

MISSION

Knowledge that liberates

AIMS AND OBJECTIVE

R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon conducted a GREEN/Environment auditing survey for the year 2022-23. The primary aim of this report is to analyse the environmental profile of the college for Green 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

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.

GREEN Audit Report

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. 2022-23 there are 38 teaching and 18 non-teaching staff, while 2014 students enrolled in the college. The highest CO_2 emissions (147960 kg) has been reported by Public Transport use by students, followed by two-wheeler use by staff reported 5203.683 kg of CO_2 emissions in the A.Y. 2022-23, while the lowest CO_2 emissions (110.80 kg) has been reported by Diesel Generator used by college in the A.Y. 2022-23. Total CO_2 emissions for this academic year of all the vehicles have been **161595.14 kg** by the college into the atmosphere. Electrical vehicles used by staff and Student's CO_2 emissions have been low i.e., for this academic year emission has **954.93** kg. The college contributes average **178.473** kg per day of CO_2 emission to the atmosphere by using electrical energy, in this way in this A.Y. total CO_2 emission to the atmosphere by using electrical energy was **40156.425 kg**. Overall CO_2 emission to the atmosphere from A.Y. 2022-23 by all activity was **201751.565 kg** i.e., **201.75 Metric Ton.** Academic year 2022-23 CO_2 emission particulars are mentioned in the following tables. In India's forests, trees absorb between 41 and 48 kg of CO2 per square meter annually; in non-forest areas, the absorption is only 4 kg. Therefore, the vegetation on college campuses has absorbed **27138.8 kg** of CO_2. In this way, the total activity of the college emits **174612.765 kg** of **Carbon** into the atmosphere.

The comprehensive analysis of the transportation data reveals several key findings that have significant implications for the institution's sustainability efforts as outlined in the Green audit. Firstly, while there is a commendable presence of electric vehicles among both staff and students, their numbers remain relatively low compared to conventional vehicles. However, their notably lower CO2 emissions underscore the importance of promoting their adoption as a viable alternative. Additionally, the prevalence of bicycles, particularly among students, presents an encouraging trend towards sustainable, zero-emission transportation. Nonetheless, the substantial usage of two-wheelers by both staff and students, coupled with the heavy reliance on public transport primarily by students, contributes significantly to overall CO2 emissions. This highlights a pressing need to address the underlying factors driving the dependence on conventional transportation methods, such as inadequate infrastructure or lack of alternative options. Moreover, the presence of a diesel generator underscores an area of concern regarding energy usage and emissions associated with electricity generation. Implementing measures to transition towards renewable energy sources or enhancing energy efficiency can mitigate these emissions. To foster a truly sustainable transportation ecosystem, the institution must prioritize initiatives that encourage the adoption of electric vehicles, promote non-motorized transportation options, optimize public transport systems, and transition towards cleaner energy sources. By addressing these recommendations, the institution can effectively reduce its carbon footprint, enhance environmental sustainability, and align with the objectives outlined in the Green audit.

Table 1 Aggregate CO_2 emission for the year 2022-23 of all the vehicles

Type of Vehicles	No of vehicles	CO_2 emission (kg)
Four-Wheeler (Staff)	0	0.00
Four-Wheeler (Students)	0	0.00
Two-Wheeler (Staff)	51	5203.68
Two-Wheeler (Students)	45	4591.49
Electrical vehicles (Staff)	6	272.84
Electrical vehicles (Students)	15	682.09
Bicycles (Staff)	5	0.00
Bicycles (Students)	202	0.00
Public Transport (Staff)	3	2774.25
Public Transport (Students)	1208	147960.00
Diesel Generator	1	110.8

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

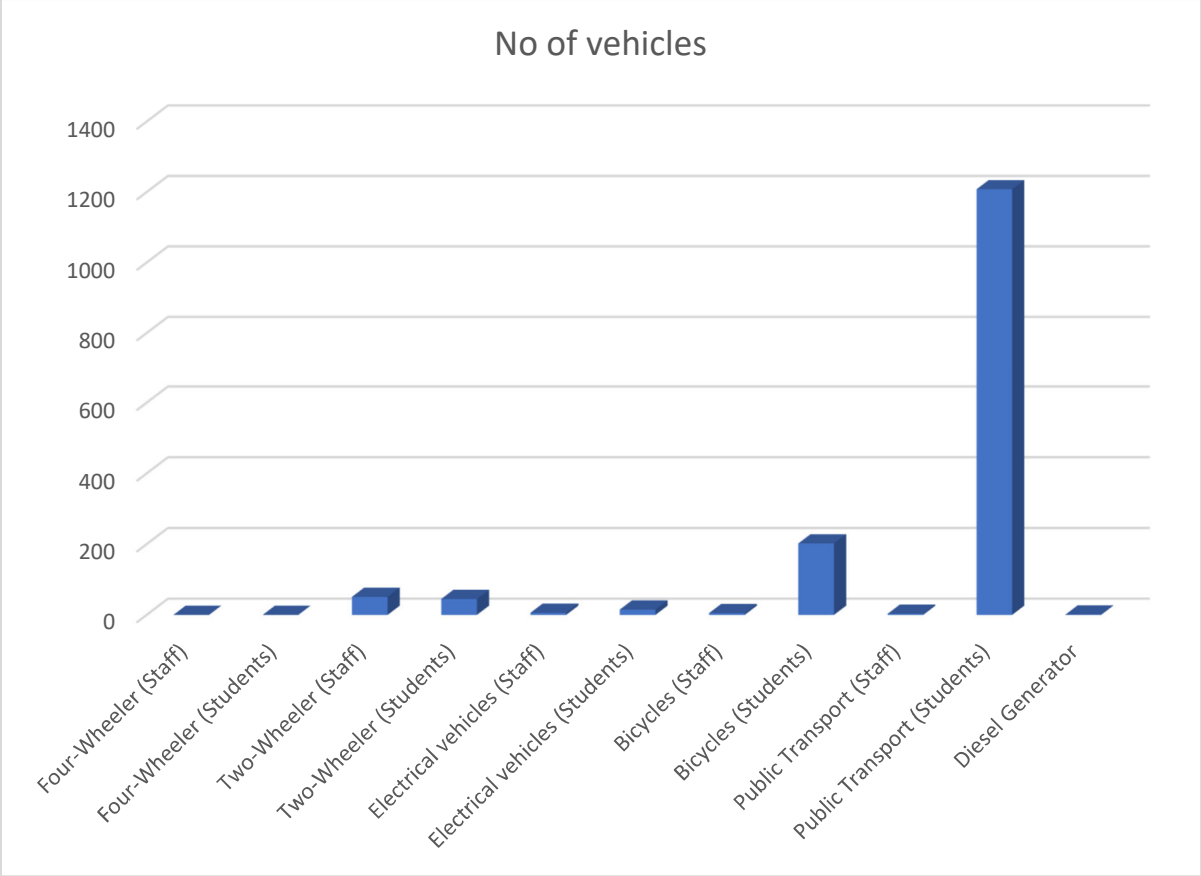

Figure 1 Number of Vehicles in A.Y. 2022-23

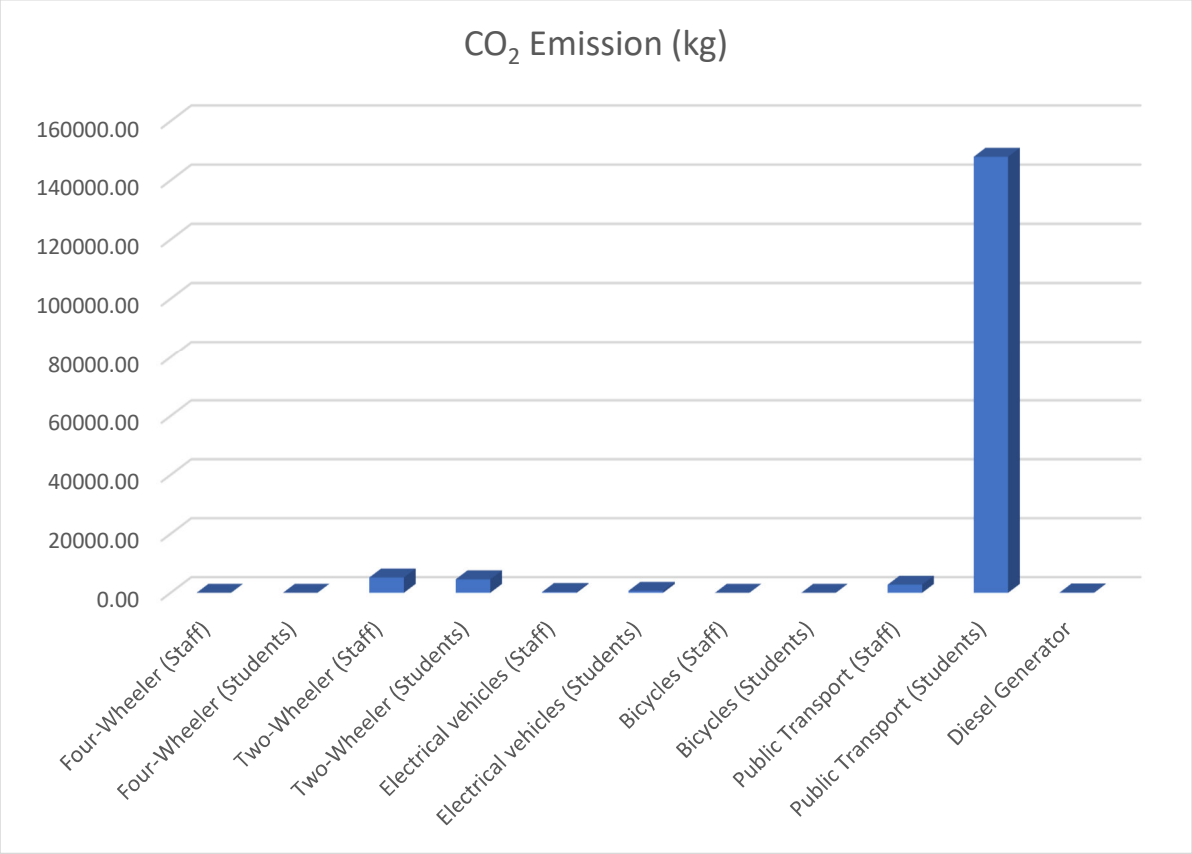

Figure 2 Total CO_2 Emission by Vehicles in A.Y. 2022-23

LAND USE AUDIT

The campus area of 16391.5 m^2 (4.04 acres) consists of the following regions as stated below for land consumption in the built-up area of the college. The central and south region of campus is densely built-up having Main Administrative Block, departments and lecture rooms. The northern region comprises Sports ground and bare land. The periphery boundary of the campus has various types of trees observed. Approximately 6784.70 sq. m of the region is occupied by trees and forms the part of green cover of the campus in the A.Y 2022-23. Vegetation area has been reported good in the academic year 2022-23. The vegetation on campus absorbs roughly 27138.8 kg CO2 in the years 2022–23 because trees in India absorb between 41 and 48 kg of CO_2 per square meter annually in forests and 4 kg in non-forest areas.

Table 2 Land-Use of the College campus

Land Use	Area (m^2)	Area (acre)
Built-up	2956.42	0.73
Vegetation	6784.70	1.67
Bare land	13435.08	3.31

(Source: GeoEye-3 Satellite Imagery)

The college campus geo-position is at 20° 27' 41" N latitude and 75° 00' 15" E longitude in Chalisgaon, District Jalgaon, Maharashtra, India. It encompasses an area of about 4.08 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 and near building 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 Chalisgaon city 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	*Aegle marmelos L.*	Bel	Rutaceae	Avenue Tree, Aesthetic
4	*Aloe vera* L.	Korphad	Liliaceae	
5	*Annona squamosa* L.	Sitaphal	Annonaceae	
6	*Azadirachta indica* L.	Neem	Meliaceae	
7	*Bambusa tulda* Roxb.	Bamboo	Poaceae	
8	*Cocos nucifera L.*	Coconut	Arecaceae	
9	*Delonix regia*	Gulmohar	Caesalpiniaceae	Avenue Tree, Ornamental
10	*Ficus benghalensis*	Vad	Moraceae	Avenue Tree, Aesthetic
11	*Ficus racemose*	Umber	Moraceae	
12	*Ficus religiosa*	Peepal	Moraceae	
13	*Polyanthia Longifolia*	Ashok	Annonaceae	Avenue Tree

(Source: Field visit and Survey)

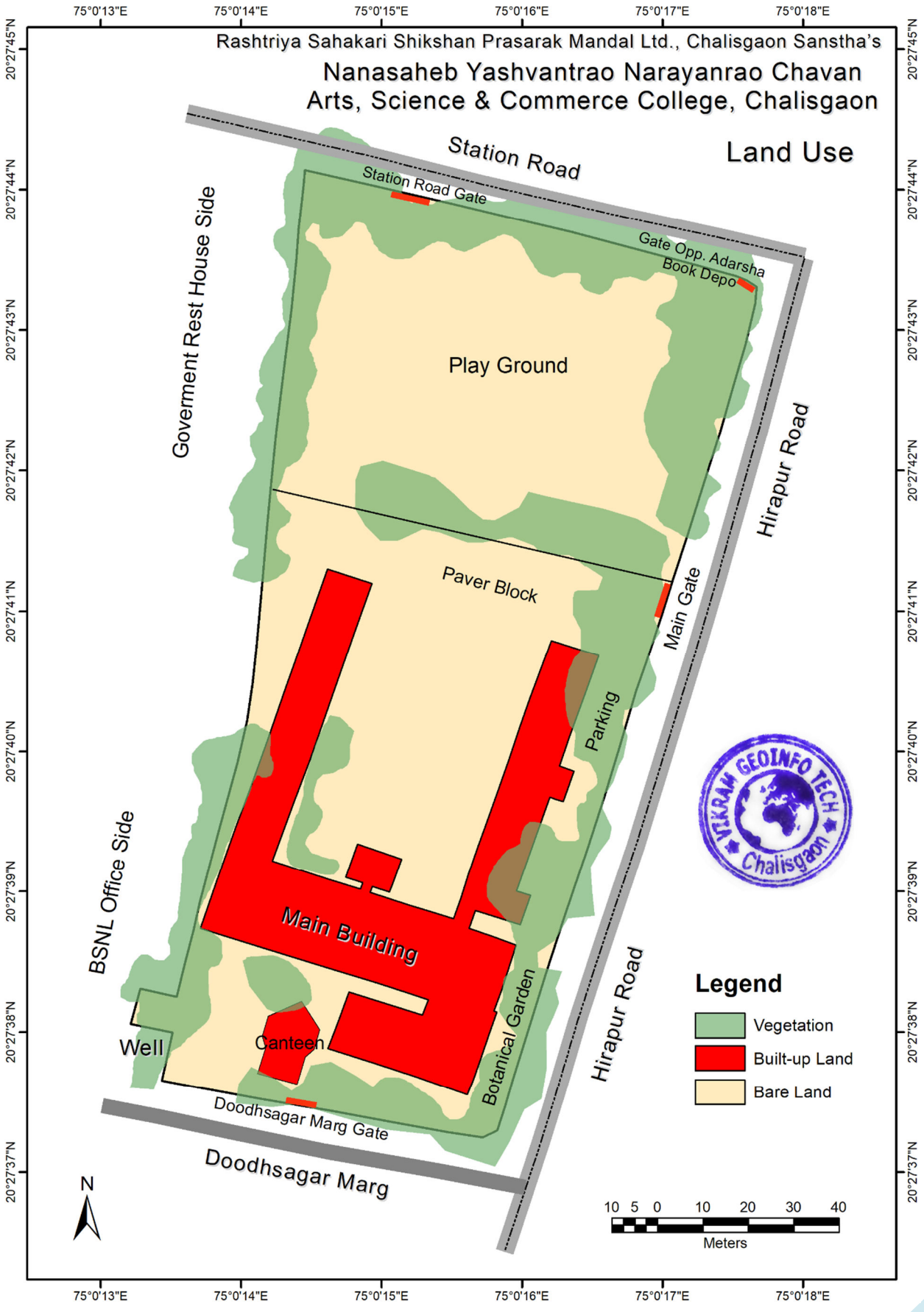

Figure 3 College Campus Land Use Map

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. 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).

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 are 35 dB during day time. Noise levels monitored during the audit are the near about 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 occupied and receive diffuse natural sunlight. High noise was reported in the playground premises.

The college campus is located in the Chalisgaon city area; vehicular noise pollution is minimum on the premises probably due to tree cover on the campus. Noise levels are between 25 - 65 dB on the premises. Light intensity has been between 300 - 4000 Lux. Light intensity and noise levels were monitored at nine different locations within academic years 2022-23 and the results are presented in Table 7.

Table 7 Light intensity and noise levels monitoring results

Department / Section	*Noise level (dB)*	*Light Intensity (Lux)*
Principal Office	35	350
Administrative office	40	300
Multipurpose Hall	50	600
Conference Hall	40	300
IQAC office	30	300
Computer	40	550
Information Technology	45	500
YCMU	45	300
Botany	50	385
Zoology	40	450
Zoology Research Lab	45	300
Microbiology	45	300
Electronics	50	500
Physics	50	550
Psychology	40	550
BCA Lab	45	550
Staff Room	45	500
Ladies Room	50	500
English	50	450
Chemistry	40	550
Geography	45	550
Statistic	45	550
Mathematics	50	550
Class Room	45	400
Canteen	50	600
Library	25	350
Gymkhana	45	1000
Sports ground	65	4000

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 1015 students enrolled in different courses and more than 58 employees in the A.Y. 2022-23. The assessment of water requirements comprises sanitation, laboratory, kitchen, drinking, washing, etc. For assessment of water management, the college has been divided into five blocks: Canteen, Garden, Common Toilet, teaching and non-teaching staff room and office.

As can be seen, the average consumption of water by the Trees and Garden is 32.55 % as compared to 47.44 % for the Drinking water for students and common toilet block respectively. The collective average consumption of water by overall college has been 12290 litres / Day. In the college, the major consumers of water by Trees and Garden (4000 litres / Day). Highest utilisation of water in the Drinking water for students and for Trees and Garden. Water consumption of the College works out to be 8 Litre /Person/Day. As per IS 1172 standards for non-residential institutions, water consumption should be a maximum of 45 Litre /Person/Day. Water Where the Roots Are, Water in the Morning and avoid overwater-to-tree methods have been used to water the trees on the college premises. A proper and systematic rainwater harvesting pit has been established on the college campus. **Thus, water consumption is well under the limit.**

Table 10 Utilizations of water per day in liters.

Particulars	*(litres / Day)*	*(%)*
Canteen	1000	8.14
Common Toilet block	2830	23.03
Trees and Garden	4000	32.55
Staffroom	1460	11.88
Drinking Water for Students	3000	24.41

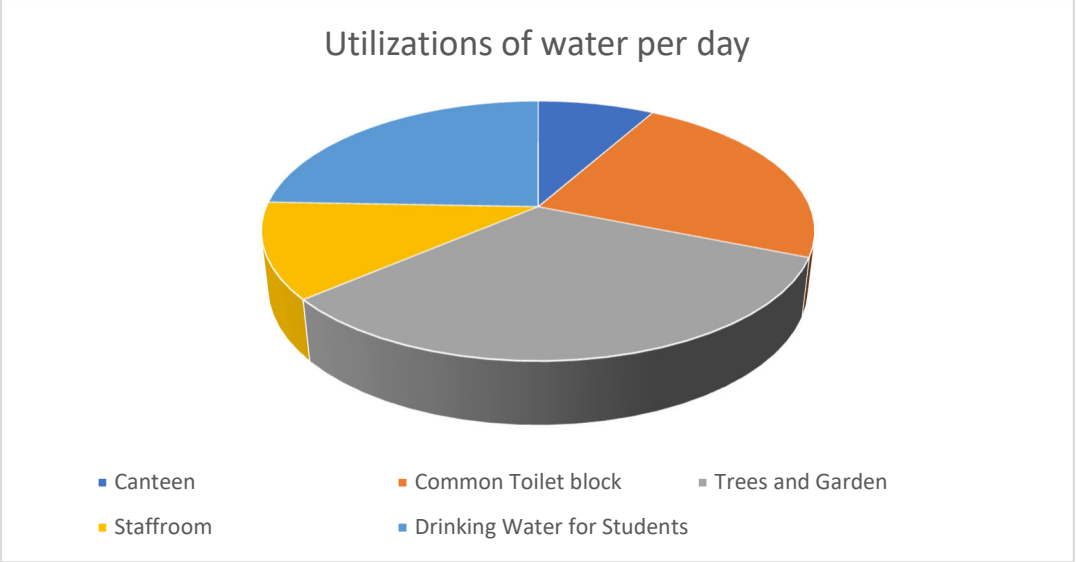

Figure 4 Daily water consumption for A.Y. 2022-23

The data reveals that the most significant water consumption occurs in maintaining trees and the garden, which accounts for over 32% of the total water usage. While greenery is important for aesthetic and environmental reasons, there may be potential for optimizing irrigation systems or selecting drought-resistant plants to reduce water consumption in this area. Employing rainwater harvesting and efficient irrigation practices can contribute to substantial water savings.

The common toilet block is another area of concern, using approximately 23% of the daily water supply. This highlights the need for water-saving fixtures, regular maintenance to fix leaks, and educating users on water conservation practices.

While the canteen's water consumption is relatively low, it is still important to monitor and manage this area to ensure that water usage is efficient. Implementing water-efficient appliances and practices in the canteen can contribute to conservation efforts.

The staffroom and drinking water for students, although less water-intensive than other areas, should not be overlooked. Staffrooms can benefit from the installation of water-saving fixtures, and the distribution of drinking water for students should be efficient while ensuring students' hydration needs are met.

To enhance overall water efficiency and conservation, it is essential to address each area's specific needs and opportunities for improvement. Implementing water-saving measures and raising awareness about responsible water use among staff and users can collectively lead to reduced water consumption and contribute to sustainability goals.

- **Flora and fauna conservation**

The college has a lush green campus which provides habitat to various species. Recently conducted Flora and fauna survey reports Parrot, Sparrow, Crow, Pigeon, Koel, Kingfisher, Owl, Hawk, Nilpankh, Indian Teetar, Red wattle lapwing, Indian white Egret, Bulbul, Jungle babbler, Garden lizard, Wall lizard, Varanus Indian monitor, Butterfly, Cockroach, ladybird's beetles, Moths, Termite, black carpenter ants, Honey bee and Dragonfly.

- **Tree Plantation Drives**

Every Guest is honoured by Tree Plantation on Campus. Periodically the plantation drove by students and staff of the campus.

- **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**

Lifting of garbage from campus on an alternate day by municipal corporations and leaves and food scraps has been Vermicomposting at college premises.

- **Water Management**

For water resource conservation a proper and systematic rainwater harvesting pit has been established on the college campus.

- **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.

CONCLUSION

The Green/Environmental audit thoroughly examined all the indicators, collecting, analyzing, and summarizing information about them. This comprehensive Environment, Land use, and Energy 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 waste management records by the monthly inventory of hazardous waste, rainwater harvesting recharge; water balance cycle and periodic inspection of buildings housekeeping and environment policy.

RECOMMENDATIONS

1) Global warming, water scarcity, and sustainable resource management are all issues the world is facing as a result of climate change. It is now more crucial than ever for educational institutions to raise awareness of the need to minimize negative environmental effects, manage resources sustainably, and protect ecosystems. As much awareness as possible must be spread, and students must be made aware. Students benefit from awareness sessions by learning how their actions and inactions affect the environment, developing the knowledge and skills required to address complex environmental issues, and being inspired to preserve the health and sustainability of our environment.
2) Consider setting up an environmental advisory committee with students' involvement. The discussions & information sharing among different departments can create ideas and awareness of environmental issues.
3) Adopt an environmentally responsible purchasing policy and work towards creating and implementing a strategy to reduce environmental impact.
4) LEDs lamps can be used in all sections and classrooms to minimize the usage of fluorescent tubes.
5) Wastewater management still needs to be practised and designed on campus.
6) Drinking water quality shall be as per IS:10500.
7) Drips and sprinklers can be used for watering the gardens and trees.
8) Special days like Teachers' Day, Guru Poornima, and Van Mahotsav can be celebrated with plant donations.
9) E-waste and solid waste segregation, handling and disposal can be deployed at the campus.
10) Records of E-waste generation and disposal are to be maintained properly. College should maintain the inventory mentioning the type and quantity of waste generated e.g., computer monitors, scanners, keyboards, cables, circuit boards, batteries etc.
11) Reduction in use of paperwork by goes digital system.
12) Water meters should be installed at the college for monitoring water consumption for gardening and landscape.
13) As practically feasible avoid the use of personal vehicles inside the campus.
14) Exhaust fans will be provided in the canteen kitchen.

15) 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.
16) 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.
17) Encouraging the adoption of electric vehicles through incentives and infrastructure development.
18) Promoting non-motorized transportation options such as bicycles by providing facilities like bike lanes and parking.
19) Implementing measures to reduce reliance on conventional vehicles, such as carpooling initiatives and improving public transportation services.
20) Exploring renewable energy options to replace or supplement diesel generators for power generation.

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.2022-23)

GREEN Audit

Year 2021-22

Green Audit

Rashtriya Sahakari Shikshan Prasarak Mandal Ltd., Chalisgaon Sanstha's

Nanasaheb Yashvantrao Narayanrao Chavan

Arts, Science & Commerce College

Chalisgaon, Dist - Jalgaon

CONTENTS

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- Prin. Dr. S. R. Jadhav
- IQAC Members
- GREEN Audit coordinator
- Teaching & Supporting Staff of College

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Vikram Geoinfo Tech
Revealing Earth Information

(ISO 9001:2015 Certified)

(Dr. Vikram Agone)

Founder & Chairman

Vikram Geoinfo Tech

VIKRAM GEOINFO TECH Chalisgaon

DISCLAIMER

Vikram Geoinfo Tech has prepared this report for ***R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon*** based on input data submitted by the representatives of the College complemented with the best judgment capacity of the expert team.

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Report by: Lead Auditor

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Revealing Earth Information
(ISO 9001:2015 Certified)

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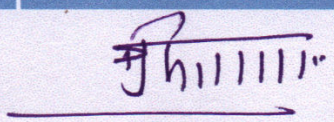
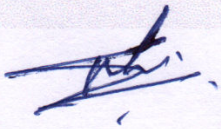
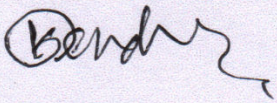
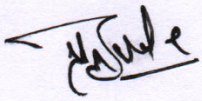
Internal Auditor

NAME	POSITION	SIGNATURE
Prin. Dr. S. R. Jadhav	Principal & Chairman	
Dr. U. R. Magar	Vice-Principal	
Dr. G. D. Deshmukh	IQAC Coordinator & Vice-Principal	
Dr. A. L. Suryawanshi	Member	
Dr. K. B. Bendre	Member	
Dr. Y. M. Bhosale	Member	
Prof. S. E. Pate	Member	

External Auditor

NAME	POSITION	QUALIFICATION
Dr. Vikram Madhukar Agone	Lead Auditor	Ph.D. FRGS (UK)

INTRODUCTION

R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon 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 ***R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon*** 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/Environmental auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. GREEN/ 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 **2021-22** 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. Through Green Audit, one gets a direction as to how to improve the condition of the environment and various factors have determined the growth of carrying out Green and Energy Audit.

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. **2021-22**

ENVIRONMENTAL SETTING OF THE COLLEGE

The college has a sprawling pollution-free campus on the central part of Chalisgaon city. Chalisgaon is a city and taluka in Jalgaon district of Nashik Division, Maharashtra, and It is located on state Highway NH 211, NH 753J and Central Railway. The Tittur River flows through the city. Chalisgaon city has been situated at 356 m MSL altitude. Chalisgaon has a tropical climate with hot and humid summers and mild winters. The average temperature ranges from 27°C to 40°C in the summer and 12°C to 20°C in the winter. The city receives an average rainfall of 700 mm per year, most of which falls during the monsoon season (June to September). Chalisgaon is located at the foot hill of Ajanta Satmala Mountain range. The vegetation in Chalisgaon is mainly tropical deciduous forest. The city is home to a variety of trees and plants.

The college campus is spread over 4.038 acres (1.63 hectare) which include about 1.52-acre (0.61 hectare) sports ground. College is easily accessible by road for the rural area which is 25 km away. Although the campus is located near the residential area, the presence of a green belt considerably reduced noise pollution and provided fresh air on the campus. The College campus area has an academic building, library, parking, canteen and sports ground.

OVERVIEW OF INSTITUTE

Nanasaheb Yashwantrao Narayanrao Chavan Arts, Science and Commerce College is run by Rashtriya Sahakari Shikshan Prasarak Mandal Ltd., Chalisgaon (Jalgaon) Sanstha's. Established in 1953 in the form of a hostel the Institute now has 1 Senior College, 5 Junior Colleges (+ 2 Level), 21 Secondary Schools, 2 Primary Schools, 1 Ashramshala (residential school), 1 School for Blind Students, 5 Pre-Primary Schools, 5 hostels, 1 MCVC Unit and 1 Cooperative Consumer Stores.

At present about 25, 000 students are learning in all these schools, junior colleges, ashramshala and senior college. The Office-bearers of the Institute represent various fields like medicine, law, education, agriculture and business. The R. S. S. P. Mandal is run by visionary and committed Office-bearers and resultantly this is one of the well-known educational institutes in this region.

Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College, Chalisgaon is run by Rashtriya Sahakari Shikshan Prasarak Mandal Ltd. Chalisgaon Dist. Jalgaon. The College was established in June 1984 and is affiliated to the North Maharashtra University, Jalgaon. The College is Grant-in-aid, affiliated and co-education system. The College was first accredited in January 2004 and was awarded B+ by the NAAC.

In the Second cycle of NAAC Reaccreditation our institute excelled and achieved "A" grade with CGPA 3.10, in 2012. Similarly, in 2013 North Maharashtra University, Jalgaon bestowed upon us 'Best College Award' in the University. In Academic Audit conducted by the University we were again given 'A' grade.

The college started with B. A, B. Com and B.Sc. During the course of time moved upward by adding various graduate, post-graduate and doctoral courses. To be in tune with the time of professionalism we also offer undergraduate programmes like B.C.A. and B.B.M. and PG course M.B.M.

The need of the hour is 'skill-based courses and this institute has rightly initiated the course like 10-Certificate, 06-Diploma, 06-Advanced Diploma Courses as Career Oriented Courses and One P. G. Diploma Course. M. Phil, and Ph. D. activities by the recognized guides are available on the campus of the College.

Every year our students secure ranks in university merit list some are gold medallists. Highly qualified staff along with academic growth of students complement by co-curricular and extra-curricular activities to nurture all round personality of our students.

Our students represent University at various levels in sports. We are always at 1st or 2nd position among the '10 Best Colleges in the University'. Our students are recipients of gold, silver and bronze medals at various events in university level cultural event: Yuvarang. Our respected Principal has been awarded "Best Centre In-charge Award" (Karya Gaurav Puraskar) by Yashwantrao Chavan Maharashtra Open University, Nashik.

The college has been recognized under 2(f) and 12 (b) by the UGC. The campus area of the college is 14284 sq. mts. And Women's hostel 1184.19 sq. mts. The college stands in a multi-storied, majestic building with various facilities. More than two thousand and four hundred students and studying in the college.

There is Library building with NRC for students and teachers, Playground and well-equipped Gymnasium. There is Canteen and Health Centre on the campus.

To enhance the potential of students in writing, compiling annual magazine 'Rashtriyata' is published. Some departments compile wall papers on certain subjects. In the competitive world and to prepare for competitive examination with the philanthropic contribution by our Ex-Principal we have been conducting State Level General Knowledge Quiz Competition every year.

The College also has a Study Centre of Yashwantrao Chavan Maharashtra Open University, Nasik. The Centre offers B. A., B. Com., M. A. and M. Com. Courses. The strength of students at the Centre almost equals to that of the strength of our regular courses.

Through this Centre we provide opportunity of learning to those who cannot attend regular college. Our respected Principal has been awarded 'Best Centre In-charge Award' (Karya Gaurav Puraskar) by Yashwantrao Chavan Maharashtra Open University, Nashik.

The faculties in our college are competent and committed and they upgrade the knowledge of their subjects by participating in state, national and international conferences and seminars. There are 21 Ph. D. holders and 6 are pursuing Ph. D.

Our faculty members also engage in Research projects. Most of the faculty members have published their Research articles in state, national, international level and online journals with impact factors. They are also authors of some books.

VISION

Imparting instruction in social sciences, humanities; business, commerce and management; basic and applied sciences with humanitarian, national and global outlook.

MISSION

Knowledge that liberates

AIMS AND OBJECTIVE

R.S.S.P. Mandal Ltd., Chalisgaon Sanstha's Nanasaheb Yashvantrao Narayanrao Chavan Arts, Science & Commerce College Chalisgaon, Dist - Jalgaon conducted a GREEN/Environment auditing survey for the year 2021-22. The primary aim of this report is to analyse the environmental profile of the college for Green 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, 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

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.

GREEN Audit Report

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. 2021-22 there are 38 teaching and 18 non-teaching staff, while 2244 students enrolled in the college. The highest CO_2 emissions (27742.5 kg) has been reported by Public Transport use by students, followed by two-wheeler use by staff reported 9820.68 kg of CO_2 emissions in the A.Y. 2021-22, while the lowest CO_2 emissions (218.40 kg) has been reported by Diesel Generator used by college in the A.Y. 2021-22. Total CO_2 emissions for this academic year of all the vehicles have been **64720.23 kg** by the college into the atmosphere. Electrical vehicles used by staff and Student's CO_2 emissions have been low i.e., for this academic year emission has **727.56** kg. The college contributes average **0.48** kg per day of CO_2 emission to the atmosphere by using electrical energy, in this way in this A.Y. total CO_2 emission to the atmosphere by using electrical energy was **54.28 kg**. Overall CO_2 emission to the atmosphere from A.Y. 2021-22 by all activity was **64774.51 kg** i.e., **64.78 Tons.** Academic year 2021-22 CO_2 emission particulars are mentioned in the following tables. In India's forests, trees absorb between 41 and 48 kg of CO_2 per square meter annually; in non-forest areas, the absorption is only 4 kg. Therefore, the vegetation on college campuses has absorbed **27824 kg** of CO_2. In this way, the total activity of the college emits **36950.51 kg** of **Carbon** into the atmosphere.

The thorough examination of the transportation data yields a number of important conclusions, some of which have ramifications for the institution's sustainability initiatives as mentioned in the GREEN audit. First off, despite the fact that both staff and students drive electric cars, the proportion of these vehicles is still small when compared to other types. Their significantly lower CO_2 emissions, however, highlight how crucial it is to encourage their adoption as a competitive alternative. Furthermore, the popularity of bicycles, especially among students, shows a positive trend toward environmentally friendly, zero-emission mobility. However, the considerable use of two-wheelers by faculty and students, as well as the heavy reliance on public transportation, particularly by students, add considerably to the total amount of CO_2 emissions. This emphasizes how urgent it is to address the underlying causes of reliance on traditional modes of transportation, such as a lack of alternatives or insufficient infrastructure. Furthermore, the diesel generator's presence highlights a problem with energy consumption and emissions related to the production of electricity. These emissions can be reduced by putting policies in place to switch to renewable energy sources or to improve energy efficiency. The organization needs to give top priority to projects that encourage the use of electric cars, support non-motorized transportation, improve public transportation, and switch to cleaner energy sources in order to create a truly sustainable transportation ecosystem. The institution can effectively lower its carbon footprint, improve environmental sustainability, and be in line with the goals stated in the GREEN audit by implementing these recommendations.

Table 1 Aggregate CO_2 emission for the year 2021-22 of all the vehicles

Type of Vehicles	**No of vehicles**	**CO_2 emission (kg)**
Four-Wheeler (Staff)	0	0.00
Four-Wheeler (Students)	0	0.00
Two-Wheeler (Staff)	77	9820.68
Two-Wheeler (Students)	336	9565.59
Electrical vehicles (Staff)	6	272.84
Electrical vehicles (Students)	20	454.73
Bicycles (Staff)	5	0.00
Bicycles (Students)	448	0.00
Public Transport (Staff)	3	16645.50
Public Transport (Students)	1220	27742.50
Diesel Generator	1	218.40

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

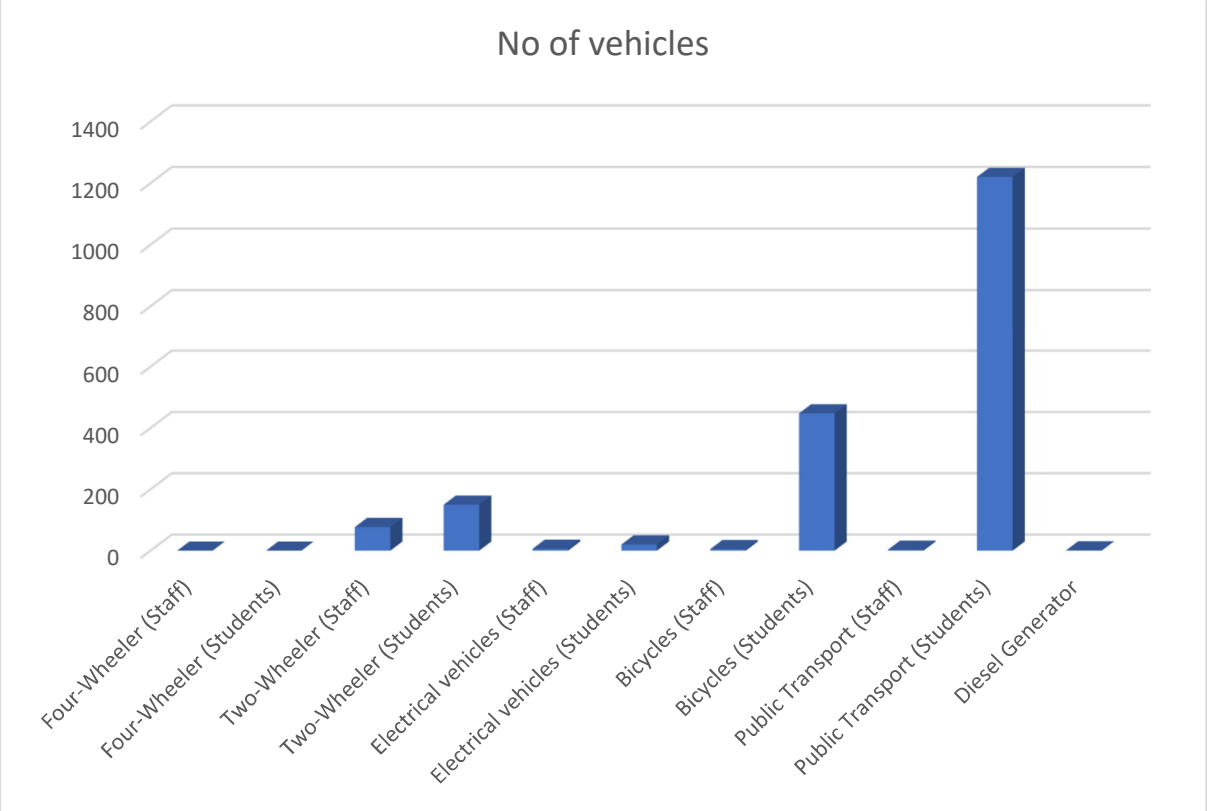


Figure 1 Number of Vehicles in A.Y. 2021-22

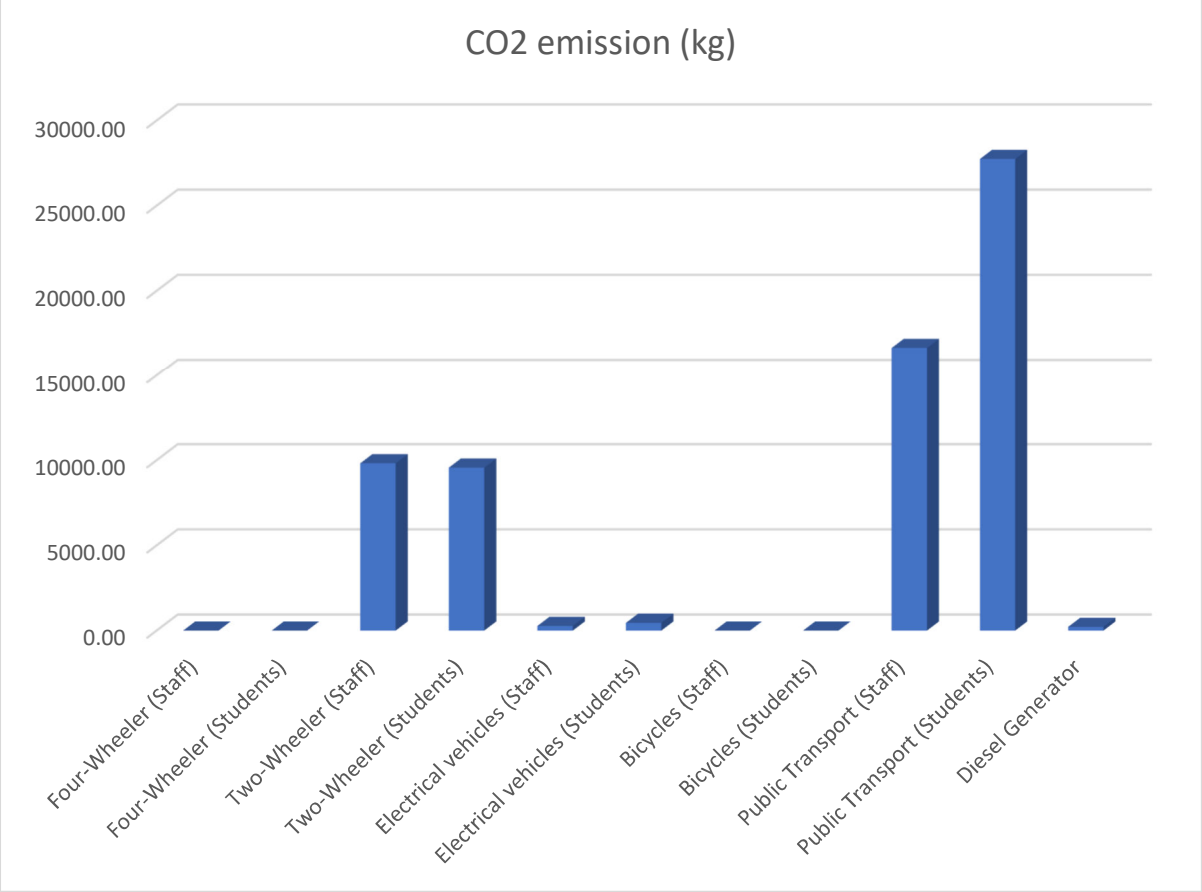


Figure 2 Total CO_2 Emission by Vehicles in A.Y. 2021-22

LAND USE AUDIT

The campus area of 16391.5 m^2 (4.04 acres) consists of the following regions as stated below for land consumption in the built-up area of the college. The central and south region of campus is densely built-up having Main Administrative Block, departments and lecture rooms. The northern region comprises Sports ground and bare land. The periphery boundary of the campus has various types of trees observed. Approximately 6956.50 sq. m of the region is occupied by trees and forms the part of green cover of the campus in the A.Y 2021-22. Vegetation area has been reported good in the academic year 2021-22. The vegetation on campus absorbs roughly 27824 kg CO_2 in the years 2021–22 because trees in India absorb between 41 and 48 kg of CO_2 per square meter annually in forests and 4 kg in non-forest areas.

Table 2 Land-Use of the College campus

Land Use	Area (m^2)	Area (acre)
Built-up	2956.42	0.73
Vegetation	6956.50	1.72
Bare land	13435.08	3.31

(Source: GeoEye-2 Satellite Imagery)

The college campus geo-position is at 20° 27' 41" N latitude and 75° 00' 15" E longitude in Chalisgaon, District Jalgaon, Maharashtra, India. It encompasses an area of about 4.08 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 and near building 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 Chalisgaon city 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	*Aegle marmelos L.*	Bel	Rutaceae	Avenue Tree, Aesthetic
4	*Aloe vera* L.	Korphad	Liliaceae	
5	*Annona squamosa* L.	Sitaphal	Annonaceae	
6	*Azadirachta indica* L.	Neem	Meliaceae	
7	*Bambusa tulda* Roxb.	Bamboo	Poaceae	
8	*Cocos nucifera L.*	Coconut	Arecaceae	
9	*Delonix regia*	Gulmohar	Caesalpiniaceae	Avenue Tree, Ornamental
10	*Ficus benghalensis*	Vad	Moraceae	Avenue Tree, Aesthetic
11	*Ficus racemose*	Umber	Moraceae	
12	*Ficus religiosa*	Peepal	Moraceae	
13	*Polyanthia Longifolia*	Ashok	Annonaceae	Avenue Tree

(Source: Field visit and Survey)

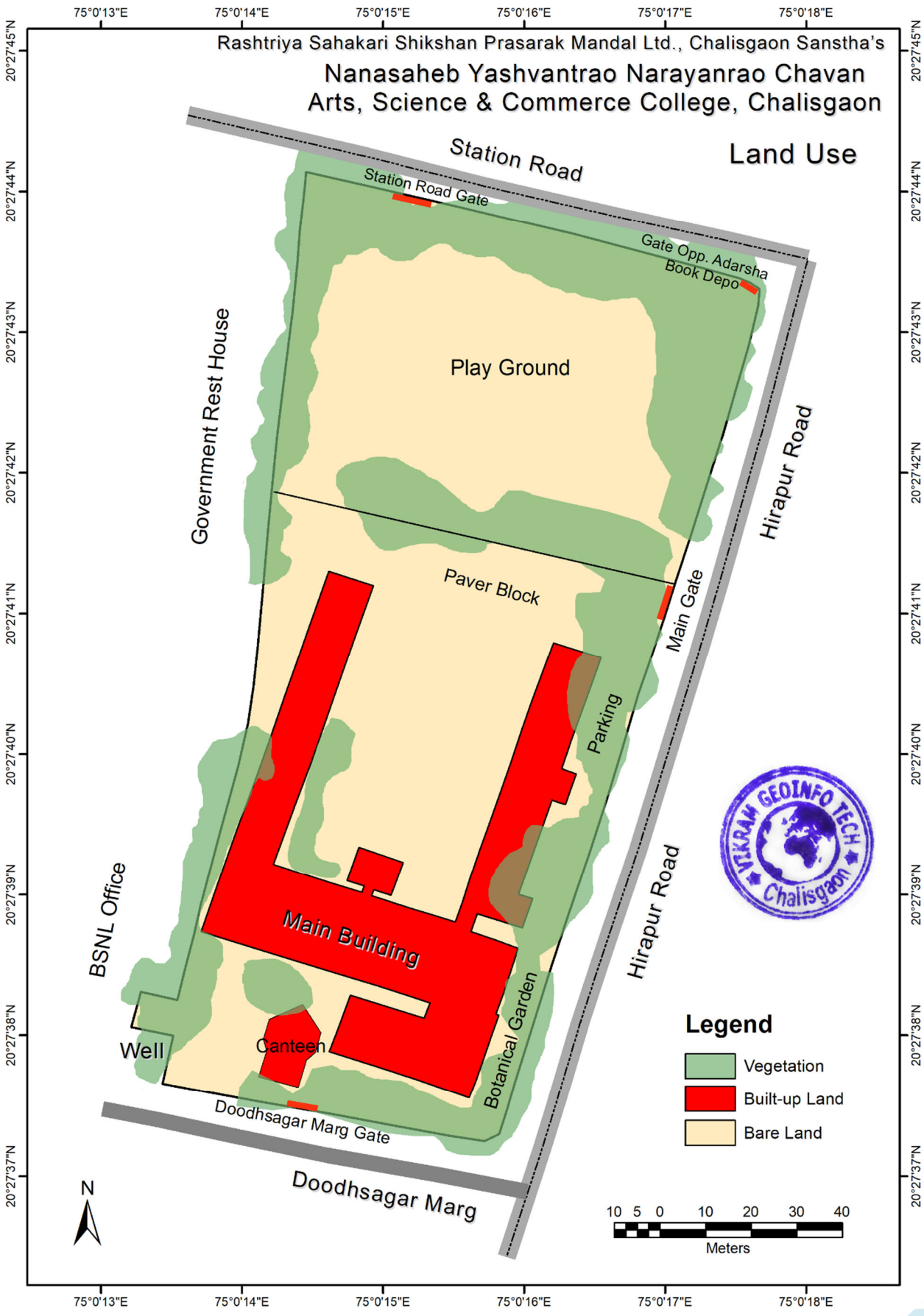


Figure 3 College Campus Land Use Map

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. 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.

Natural airflow through windows and the addition of fans provides classroom ventilation. Cross-ventilation is acknowledged in hallways. The college building's vicinity has greenery and green spaces that have been planted to improve the quality of the surrounding air. LPG fuel, which emits fewer emissions, is utilized in the canteen.

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).

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 are 35 dB during day time. Noise levels monitored during the audit are the near about 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 occupied and receive diffuse natural sunlight. High noise was reported in the playground premises.

The college campus is located in the Chalisgaon city area; vehicular noise pollution is minimum on the premises probably due to tree cover on the campus. Noise levels are between 25 - 50 dB on the premises. Light intensity has been between 300 - 4000 Lux. Light intensity and noise levels were monitored at nine different locations within academic years 2021-22 and the results are presented in Table 7.

Table 7 Light intensity and noise levels monitoring results

Department / Section	*Noise level (dB)*	*Light Intensity (Lux)*
Principal Office	35	350
Administrative office	40	300
Multipurpose Hall	40	600
Conference Hall	35	300
IQAC office	30	300
Computer	40	550
Information Technology	45	500
YCMU	45	300
Botany	50	385
Zoology	40	450
Zoology Research Lab	45	300
Microbiology	45	300
Electronics	50	500
Physics	50	550
Psychology	40	550
BCA Lab	45	550
Staff Room	45	500
Ladies Room	50	500
English	50	450
Chemistry	40	550
Geography	45	550
Statistic	45	550
Mathematics	50	550
Class Room	45	400
Canteen	50	600
Library	25	350
Gymkhana	45	1000
Sports ground	50	4000

WATER MANAGEMENT

A major water source for the college is an open well and borewell on the campus. Data related to the water audit was collected by circulating a proforma based on water user profiles. The college has 2244 students enrolled in different courses and more than 91 employees in the A.Y. 2021-22. The assessment of water requirements comprises sanitation, laboratory, kitchen, drinking, washing, etc. For assessment of water management, the college has been divided into five blocks: Canteen, Garden, Common Toilet, teaching and non-teaching staff room and office.

As can be seen, the average consumption of water by the Trees and Garden is 32.26 % as compared to 50.00 % for the Drinking water for students and common toilet block respectively. The collective average consumption of water by overall college has been 12400 litres / Day. In the college, the major consumers of water by Trees and Garden (4000 litres / Day). Highest utilisation of water in the Drinking water for students and for Trees and Garden. Water consumption of the College works out to be 3.5 Litre /Person/Day. As per IS 1172 standards for non-residential institutions, water consumption should be a maximum of 45 Litre /Person/Day. Water Where the Roots Are, Water in the Morning and avoid overwater-to-tree methods have been used to water the trees on the college premises. A proper and systematic rainwater harvesting pit has been established on the college campus. **Thus, water consumption is well under the limit.**

Table 10 Utilizations of water per day in liters.

Particulars	*(litres / Day)*	*(%)*
Canteen	1000	8.06
Common Toilet block	3200	25.81
Trees and Garden	4000	32.26
Staffroom	1200	9.68
Drinking Water for Students	3000	24.19

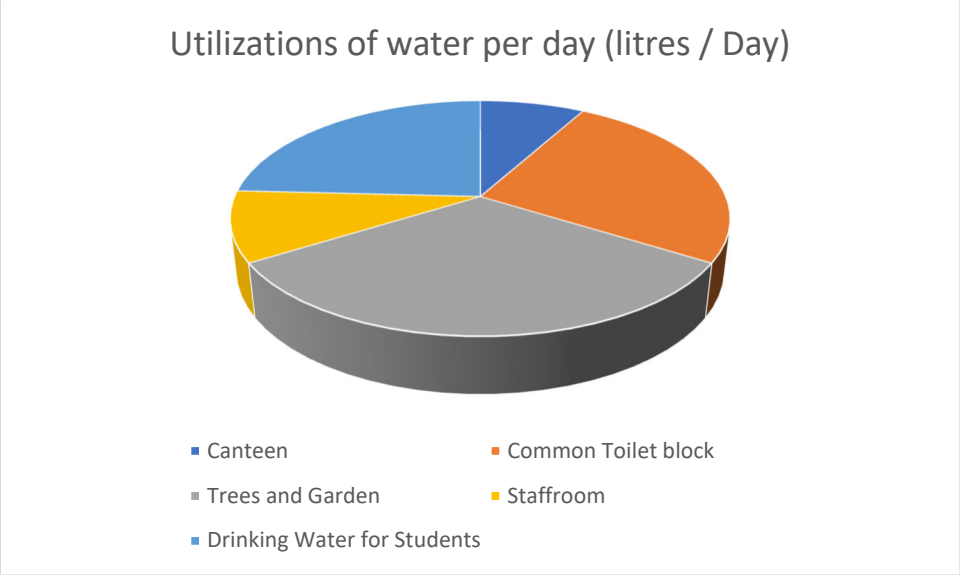


Figure 4 Daily water consumption for A.Y. 2021-22

The analysis of the data shows that over 32.26 percent of the water used is used for watering the garden and trees. This represents the largest water consumption. Although greenery is beneficial to the environment and aesthetics, there may be ways to minimize water use in this area, such as by choosing drought-resistant plants or designing irrigation systems more efficiently. Effective irrigation techniques and the collection of rainwater can help save a significant amount of water.

The common toilet block is another area of concern, using approximately 25.81% of the daily water supply. This highlights the need for water-saving fixtures, regular maintenance to fix leaks, and educating users on water conservation practices. Even though the canteen uses a small amount of water, it is nevertheless crucial to keep an eye on and manage this area to guarantee that water is used effectively. Using water-efficient equipment and procedures in the canteen can help with conservation initiatives.

Water-intensive areas such as the staff room and student drinking water should not be disregarded, despite their lower usage. Installing water-efficient fixtures in staff rooms and distributing drinking water to students in an economical manner while meeting their needs for hydration are both beneficial ideas. To enhance overall water efficiency and conservation, it is essential to address each area's specific needs and opportunities for improvement. Implementing water-saving measures and raising awareness about responsible water use among staff and users can collectively lead to reduced water consumption and contribute to sustainability goals.

- **Flora and fauna conservation**

The college has a lush green campus which provides habitat to various species. Recently conducted Flora and fauna survey reports Parrot, Sparrow, Crow, Pigeon, Koel, Kingfisher, Owl, Hawk, Nilpankh, Indian Teetar, Red wattle lapwing, Indian white Egret, Bulbul, Jungle babbler, Garden lizard, Wall lizard, Varanus Indian monitor, Butterfly, Cockroach, ladybird's beetles, Moths, Termite, black carpenter ants, Honey bee and Dragonfly.

- **Tree Plantation Drives**

On campus, the Tree Plantation honors each and every guest. On occasion, campus employees and students drive the plantation.

- **Pollution Reduction**

Students are not permitted to drive their own vehicles on campus. Reduction of air pollution as a result of vehicle emissions. When it comes to lowering CO_2 emissions, the majority of students favor bicycles and public transportation.

- **Solid Waste Management**

Lifting of garbage from campus on an alternate day by municipal corporations and leaves and food scraps has been Vermicomposting at college premises.

- **Water Management**

Water must be used properly and systematically on college campuses in order to conserve water resources.

- **Environment Awareness**

Colleges organize a variety of events, such as cleanliness campaigns, tree plantings, seminars, and workshops, to raise awareness and sensitivity among staff and students. Departments and NSS within the college organize field trips for students to biodiversity parks and other sites of ecological significance.

CONCLUSION

Using data collection, analysis, and summarization, the Green/Environmental audit looked closely at each indicator. The audit of Environment, Land Use, and Energy encompassed a broad spectrum of environmental concerns and required close cooperation with the campus team and key personnel. Several practical insights to improve the campus's eco-friendliness were found as a consequence of the audit. Electricity consumption varies among departments; some with instruments use more than others. Lush greenery is a result of the college's profusion of diverse trees and plants. It is encouraged for staff and students to use bicycles, public transportation, and carpooling as ways to cut down on fuel energy consumption for everyday tasks. It's interesting to note that most students choose bus travel. Staff employees who travel great distances also indicate that they prefer public transit. It also keeps the air quality on campus good.

Along with the observations, the recommendations are also mentioned, encouraging the campus team to take action. According to the audit team, the site is generally kept up nicely in terms of environmental preservation. There aren't any significant findings, but a few things need to be started right away, including waste management records through the monthly hazardous waste inventory, rainwater harvesting recharge, the water balance cycle, and periodic building housekeeping and environment policy inspections.

The first semester's COVID-19 lockdowns significantly improved the atmosphere on college campuses. Air and water pollution significantly decreased as a result of less energy use and transportation. Clearer skies and better air quality on campus resulted in healthier ecosystems and the resurgence of some wildlife. Less human activity also meant less noise pollution, which promoted a more tranquil environment for nature to flourish in. During this time, the significant impact that human behaviours has on the environment was brought to light, as was the potential advantages of sustainable practices in reducing environmental degradation.

RECOMMENDATIONS

1) Climate change has brought forth challenges such as water scarcity, global warming, and sustainable resource management. More than ever, educational institutions must spread the word about the need of reducing harmful environmental effects, managing resources sustainably, and safeguarding ecosystems. Students must be made aware, and awareness must be disseminated as widely as feasible. Students gain from awareness sessions by understanding how their actions and inactions impact the environment, gaining the information and abilities needed to handle challenging environmental problems, and feeling motivated to protect the sustainability and health of our environment.
2) Establish an advisory committee on the environment that includes students. Environment-related ideas and awareness can be generated through departmental discussions and information sharing.
3) Adopt an environmentally responsible purchasing policy and work towards creating and implementing a strategy to reduce environmental impact.
4) LEDs lamps can be used in all sections and classrooms to minimize the usage of fluorescent tubes.
5) Wastewater management still needs to be practised and designed on campus.
6) Drinking water quality shall be as per IS:10500.
7) Drips and sprinklers can be used for watering the gardens and trees.
8) Special days like Teachers' Day, Guru Poornima, and Van Mahotsav can be celebrated with plant donations.
9) E-waste and solid waste segregation, handling and disposal can be deployed at the campus.
10) Records of E-waste generation and disposal are to be maintained properly. College should maintain the inventory mentioning the type and quantity of waste generated e.g., computer monitors, scanners, keyboards, cables, circuit boards, batteries etc.
11) Reduction in use of paperwork by goes digital system.
12) Water meters should be installed at the college for monitoring water consumption for gardening and landscape.
13) As practically feasible avoid the use of personal vehicles inside the campus.
14) Exhaust fans will be provided in the canteen kitchen.

15) Measurements of ambient air quality and emissions from staff and student vehicles should be made at least once a year. The outcomes should be compared to the Indian Ambient Air Quality Standards.
16) Reward employees and students who consistently choose environmentally friendly forms of transportation, like walking, bicycling, or public transportation, with incentives or recognition for their efforts.
17) Encouraging the adoption of electric vehicles through incentives and infrastructure development.
18) Promoting non-motorized transportation options such as bicycles by providing facilities like bike lanes and parking.
19) Implementing measures to reduce reliance on conventional vehicles, such as carpooling initiatives and improving public transportation services.
20) Exploring renewable energy options to replace or supplement diesel generators for power generation.

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.2021-22)