

CHAPTER-1 INTRODUCTION

1.1 Introduction about College:

The Maratha Mandal's Arts & Commerce College, Khanapur is one of the many Educational Institutions run by the prestigious Maratha Mandal Belgaum established under the able leadership of Late **Shri. Nathajirao G. Halgekar**. The College was established in the year 1979 with a Noble Vision of promoting higher education in the rural area. At present the institution is marching ahead under the creative and dynamic leadership of **Smt. Rajshree Nagaraju**.

College provides instruction in Humanities and Social Science covering the three year integrated courses of Bachelor of Arts and Bachelor of Commerce Degrees of the Karnataka University. The medium of institution is English and Kannada.

The College regards itself as an academic community where scholars both students and teachers have the freedom and responsibility to communicate evaluate and enlarge mankind's store of knowledge. It stands for academic excellence and endeavors to create an environment which generates love of learning, habits of critical thought and effective communication. It hereby aims to prepare the students with an intellectual, mental and moral outlook that will make them worthy members of society.

The college has qualified teaching faculty, with several scholars. Its students have consistently fared well in University examination. A number of prizes and government scholarship free ships and fee concessions are available to students from backward groups. The College has been accredited by NAAC at 'B⁺⁺' Grade in the third cycle.

1.2. Goals of Green Audit:

1. Identify and assess environmental risk.
2. Avoid interruptions in an environment that are difficult to handle and expensive to correct.
3. Conduct various types of surveys related to waste generated water resources and electrical energy utilized.
4. To suggest the best protocols to follow for sustainable development.
5. Protect the environment in and around the campus.

6. Recognize the cost-saving methods through waste minimization and energy conservation.

7. To project the Institution's image through green initiatives and improve ratings in the upcoming NAAC visit.

1.3 Objectives of Green Audit:

1. To examine the impact of current practices such as resource utilization, waste management, etc. on the environment.
2. To identify and analyze significant environmental issues.
3. Setup goal, vision, and mission for Green practices on the campus.
4. Establish and implement Environmental Management in various departments.
5. Continuous assessment for betterment in the performance of green practices and their evaluation.
6. To prepare an Environmental Statement Report on green practices followed in the different departments, support services, and administration building.

1.4 Area of study:

Maratha Mandal's Arts and Commerce College, situated on the west side of a national highway designated as NH-48 the College campus has red lateritic soil. The maximum temperature recorded is 38°C (Source-weather.com) during the summer months of March to May, and the minimum temperature is 12°C during the winter months of November to January. The average rainfall is about 1700 mm received during the rainy season of June to the end of September.



Google map image of Maratha Mandal's Arts and Commerce College, Khanapur showing the boundary.

1.5 Location of the study area:

Maratha Mandals Arts and Commerce college campus lies between North latitude 15°39'42" and East longitude 74°50'85.4". The college is in Khanapur Taluk and in Belagavi District of Karnataka. The Maratha Mandal's Arts and Commerce college is situated outside the Khanapur city on the side of highway Belagavi to Panjim i.e. NH-748 connecting to Belagavi and Panjim. The3 nearest railway station is Khanapur which is just 3.4 kilometer which is attached to South zone Rail network to Bangalore 550 km. The airport is located near Sambra with flights to 8 cities (Source- www.airportia.com).

CHAPTER-2

METHODOLOGY

2.1 Background of MM's Arts and Commerce College, Green Audit Preparation:

This is first Green Audit of Maratha Mandal's Arts and Commerce College, Khanapur. The report not only includes data regarding the use of resources but also highlights the biodiversity status of the College. The resource utilization of Water, Electricity, Solid waste generation, Noise, Temperature, Humidity, wastewater generation, solid waste, Carbon sequestration of the college campus, are studied through this Green Audit process. The audit process was carried out in three phases. First, all the **secondary data** required for the study was collected from various departments. A broad reference work was carried out to rich the idea of green auditing. Different case studies and methodologies were studied and the following methodology was adopted for the present audit. To perform a green audit, the methodology included different techniques such as physical inspection of the campuses, observation and review of the documentation, interviewing key persons, data analysis, measurements, and recommendations. The study covered the following area to summarize the present status of environmental management on the campus:

- Water quality assessment.
- Water Consumption and management.
- Electricity consumption and management.
- Sound pollution monitoring.
- Waste management.
- Biodiversity status of the campus.
- Carbon Sequestration.

2.2 A survey by Questionnaire:

Baseline data for green audit report preparation was collected by the questionnaire-survey method. Maintaining records of the handling of solid and hazardous waste is very important in a green audit. There are possibilities of loss of resources like water, energy due to improper maintenances, and assessment of this kind of probability is necessary for any green audit. One separate module of questions is devoted to this aspect. Another module is related to maintaining records - like records of disposal of solid waste, records of solid waste recovery, etc. For better convenience of the surveyor, some statistics like

basic energy consumption characteristics for electrical equipment was provided with the questionnaires themselves.

2.3 Onsite Visits and Observations:

Maratha Mandal's Arts and Commerce College, Khanapur have a vast built-up area comprising of Principal chamber, various departments, Staff room, Student hostel, Library, Sports room, Canteen, Function hall and NCC room. All these features have different kinds of infrastructure as per their requirement. All these places were visited by the surveyors and the existing condition is observed with the help of the questionnaires. Personal observations were made and noted during the onsite visit. The raw data were tabulated, analyzed and graphs were prepared using a computer. Suitable interpretations were made depending upon the observations and data collected, Lacunae and good practices were documented. Finally, all the information was compiled in the form of a Green Audit Report.



**Onsite visit to college- Image of Maratha Mandal's arts and commerce college,
Khanapur**

CHAPTER- 3

ENERGY AUDIT

3.1 Introduction

Energy is one of the major inputs for the economic development of any country. The fundamental goal of energy management is to produce goods and provide services at the least cost and the least environmental impact. Also, it can be said to be “the strategy of adjusting and optimizing energy, using the system and procedure to reduce energy requirements per unit of output while holding constant or reducing total costs of producing the output from these systems”. The energy audit is key to a systematic approach for decision-making in the area of energy management. It attempts to balance the total energy inputs with its use and serves to identify all the energy streams in a facility.

Aim and objective:

- 1) To save conventionally produced electric energy
- 2) Use of non-conventional sources of energy
- 3) Minimization of electricity expenses

Observations:

The following Energy Sources are used in the college:

1. Solar
2. Electrical
3. Diesel
4. Petrol
5. LPG

3.2 Electricity Audit: An Energy resource utilized by all the departments, support services, and the administrative buildings of Maratha Mandal’s Arts and Commerce College, Khanapur. The campus includes electricity and liquid petroleum as energy sources. The major use of the energy is in the Office, Canteen, hostels and lab, for purpose of lighting, cooking, and workshop instruments.

There are not many issues in the demand and supply chain of the overall energy-electricity management. Campus gets its electricity supply from the urban feeder of HESCOM, Karnataka.

Table no. 3.1 Electrical Energy consumption details:

SR. NO.	APPLIANCES	TOTAL	WORKING	NON -WORKING
1	Tube lights	45	27	18
2	Tube lights (LED)	22	22	
3	LED bulbs	4	4	
4	Led lamps	5	4	1
5	CFL bulbs	4	4	
6	Computers	67	50	17
7	Projectors	6	6	
8	Water Filters	1	1	
9	CCTV Cameras	25	23	2
10	Smart Boards	7		7
11	Printers	8	7	1
12	Air conditioner	1		1
13	Biometric	1		1
14	Exhaust Fan	2	2	
15	Podium cum Speaker	1	1	
16	UPS	2	2	
17	Amplifiers	1	1	
18	Speakers	4	4	
19	Electric bell	1	1	
20	Fountain	1	1	
21	Fan	31	30	1
22	Water pump	2	2	

Graph no. 3.1 Energy consumption details.

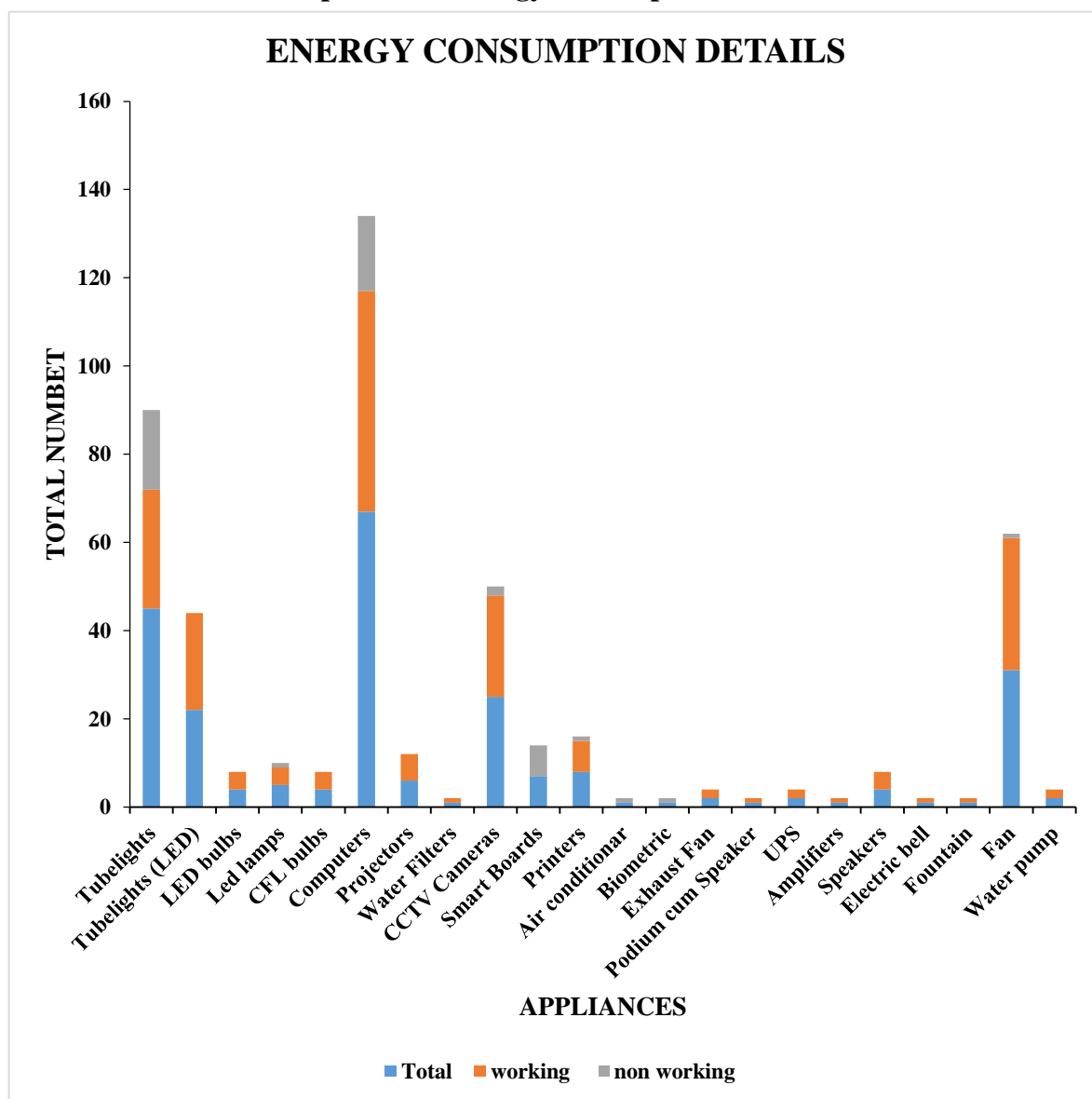




Table no. 3.2. Energy Consumption Details other than Electrical

SL.NO	TYPE	QUANTITY
1.	L.P.G. Cylinders	2

	
<p>1HP Motor pump</p>	<p>Bore well</p>



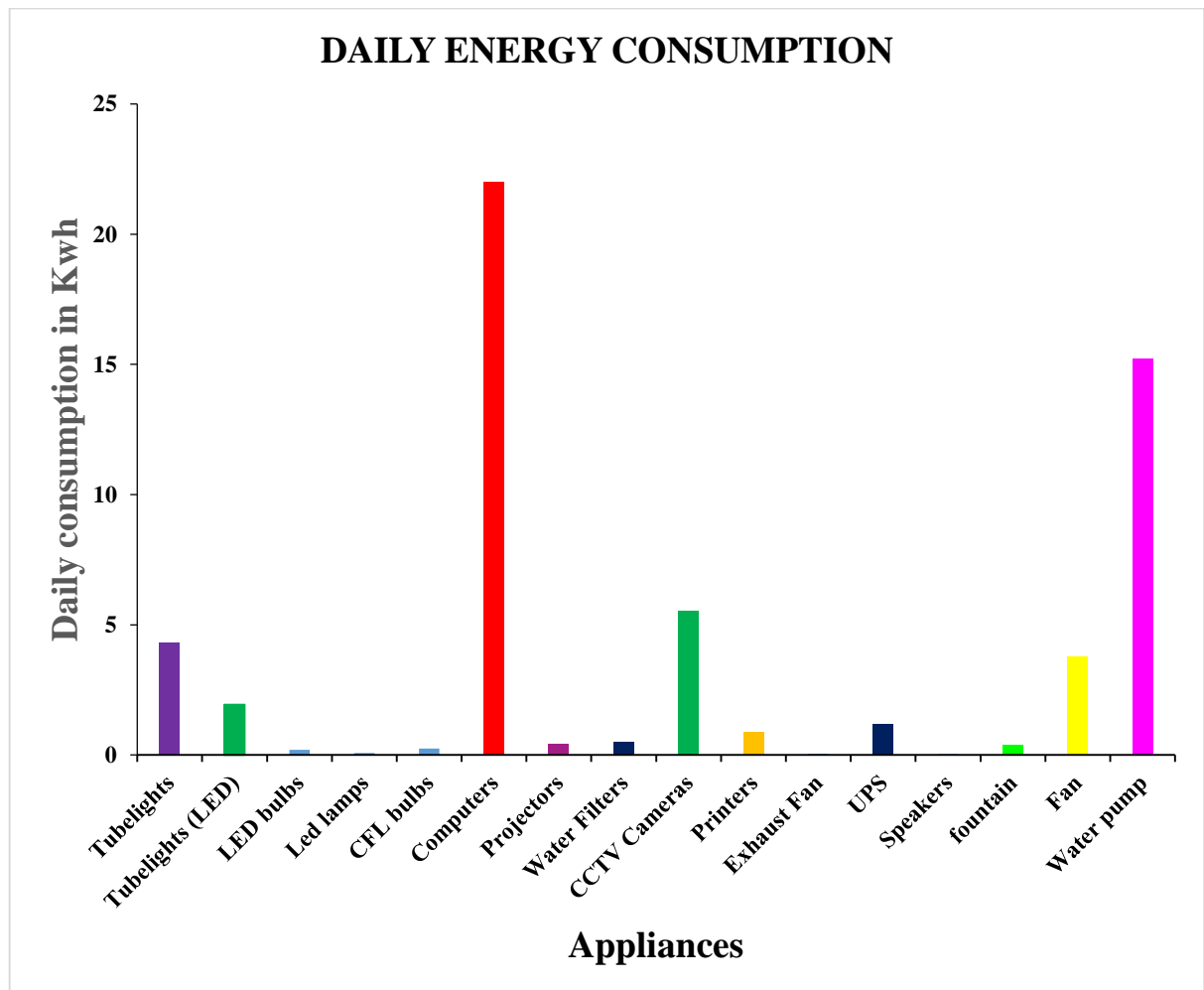
	
<p>Computer Lab</p>	<p>Classroom with adequate lighting</p>

Table no. 3.3 Energy Consumption by Various appliances in the Campus.

Sr. No.	Electrical Appliances	Max Load in Kwh
1.	Tube lights	4.32
2.	Tube lights (LED)	1.93
3.	LED bulbs	0.192
4.	Led lamps	0.07
5.	CFL bulbs	0.24
6.	Computers	36
7.	Projectors	0.4
8.	Water Filters	0.5
9.	CCTV Cameras	5.52
10.	Printers	0.875
11.	Exhaust Fan	0.04
12.	UPS	1.2
13.	speakers	0.03
14.	fountain	0.373
15.	Fan	3.788
16.	Water pump	15.2

Graph no. 3.2 Energy Consumption of Various Appliances in the Campus.

To analyze electricity consumption, lights, fans, and other illumination equipment were taken into consideration. The maximum use of electricity is for lighting and fans in all the buildings. The electricity consumption is maximum due to more usage of computers and Water pump. The bar diagram of fig. 3.1 illustrates graphically the energy load of the various Appliances. Fig. 3.1 is constructed based on the data given in table 3.2.

3.3 Energy conservation efforts:

1. The building is designed with windows on both the side i.e. east and west that allows sunlight to enlighten the classrooms, reducing the use of tube lights.
2. Windows also helps to aerate the classrooms, hence reducing the use of fans.
3. Only during extreme bad light, tube lights are being used and during summer fans are used.

3.4 Recommendations

1. Use of LED lights instead of sodium bulbs and fluorescent tubes to reduce the consumption of electricity.
2. Energy-saving awareness shall be promoted by displaying suitable boards at different places.
3. The Management should try to install solar panels on the terrace of the building to reduce consumption of electricity.



Save Energy Message Should be Displayed on Each Board



Proper safety precautions should be taken for panel board

CHAPTER-4

WATER AUDIT

4.1 Water Audit

Water is a valuable natural resource available with fixed quantum. Per capita availability of utilizable water is going down due to the increasing population. Demand for fresh water is increasing day by day due to ever-rising standards of living of people, and increasing urbanization and industrialization. The discharge of industrial effluent in the available water bodies is reducing the quality of these ample sources of water continuously. Hence, the national mission on water conservation of 'Jal Shakti Abhiyan' was declared by Prime Minister Narendra Modi who appealed to all citizens to collectively address the problem of water shortage by conserving every drop of water and suggested conducting water audit for all sectors of water users.

A Water Audit is a full analysis of water processed by a utility. Water audit comprises preparation of layout of water sources, distribution network, and service/delivery points to water users, and return flow of waste or excess water. Water audits trace water use from its point of entry into the facility/system to its discharge into the sewer/river/canal etc.

4.2 Advantages of a water audit.

- Water Audit provides decision-making tools to utility managers and operators. It helps them to know where water is being used in our system and helps to make an informed decision about investing resources such as time, labor, and money.
- Water audit allows managers to efficiently reduce water losses in the system.
- A water audit is an effective management tool for minimizing losses, optimizing various uses, and thus enabling considerable conservation of water.
- Creating awareness among water users. Customers can see and understand that the utility is taking proactive steps to manage wasted water and save for the future.
- Water audit also identifies which water uses are earning revenue for utility and which water uses are not.

4.3 Findings.

A. Sources of water:

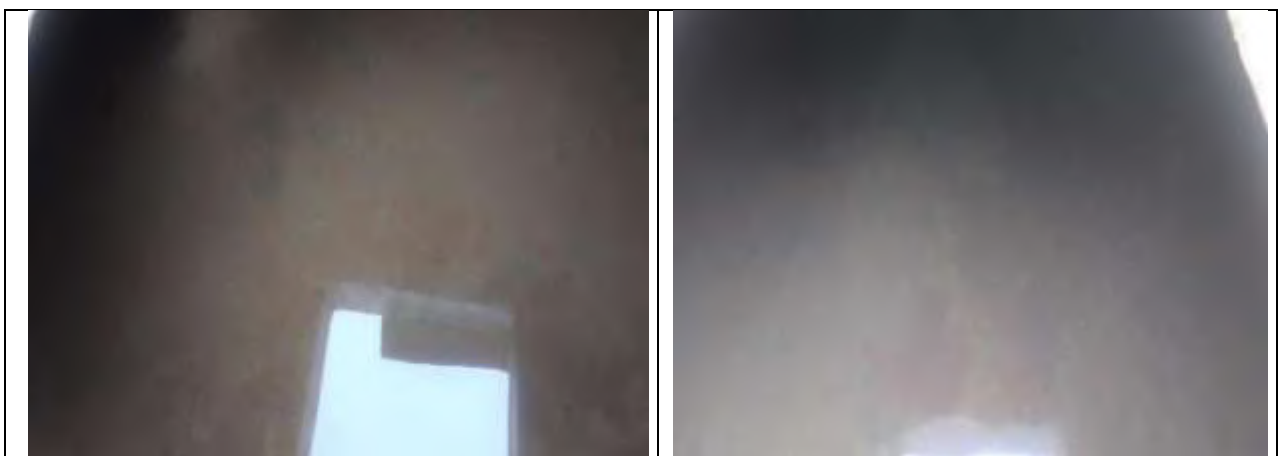
The major source of water for the Maratha Mandal's Arts and Commerce college

campus is two own bore wells. The bore well contain two motors of each 3 horse power. Each building has an overhead Storage tank and demand is satisfied by the regularly managed continuous supply of water from bore well.



Bore wells in backside of college ground

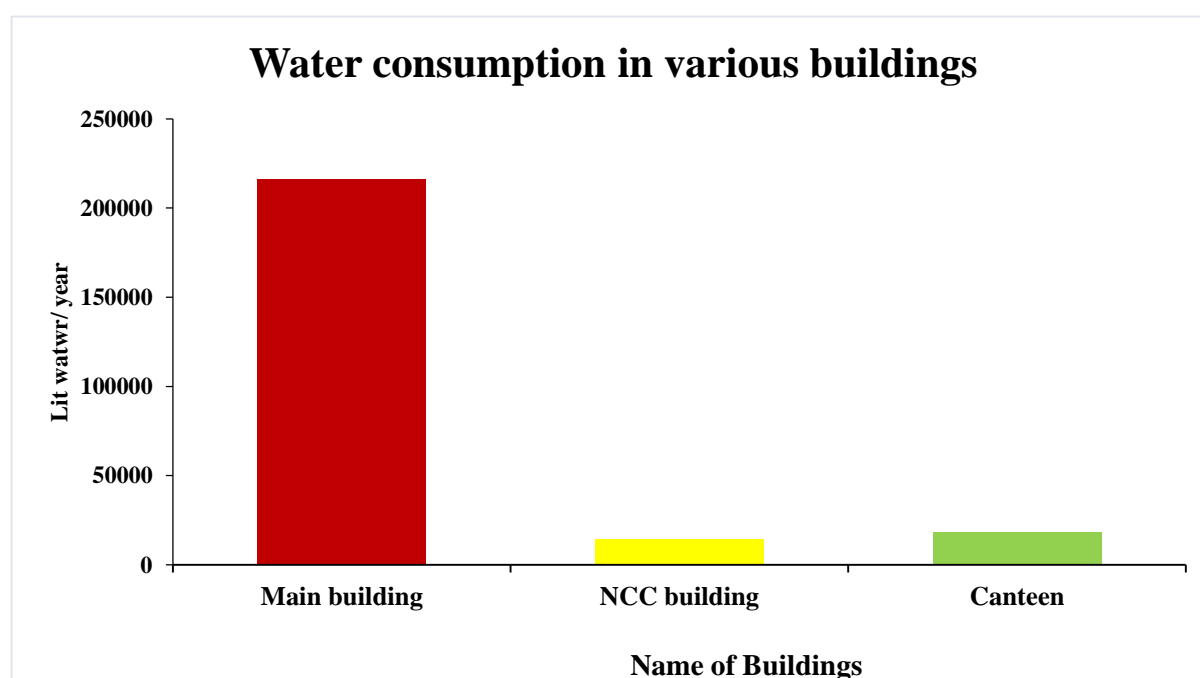
The college stores the water in ten overhead tanks present on six different buildings having a storage capacity of 3500 liters from where water is supplied to different rooms and toilet bathrooms and usage points. All water tanks are in good condition few of them showing a silt problem where there is a need to clean frequently and also display the date of the last cleaning.



Water tank showing accumulation of silt

B. Water consumption:**Table no 4.1: Total water consumption in various buildings**

Sr. No.	Name of building	Tank capacity (Lit)	Total daily use (Lit)	Total yearly use (Lit)
1	Main building	2000	1200	216000
2	NCC building	500	80	14400
3	Canteen		100	18000
Total				248400

Graph no 4.1: Total water consumption in various buildings.**C. Water quality assessment**

Water quality assessment is the overall process of evaluation of the physical, chemical, and biological nature of the water. In the present report water from bore wells in Maratha Mandal's arts and commerce college campus is tested at an external laboratory (ISO Water testing Laboratory GSS College, Belagavi) and the result of water sample found was **fit** for human consumption. The scanned copy of the respective reports is attached with Annexure-3.

D. Water assessment:

The team collected building-specific data from the 18 buildings on the campus on parameters like source, storage, leakage of water, and simultaneously gathered suggestions for the improvement.

Table 4.2: Water assessment parameters in all buildings.

Sr. No.	Parameter Assessed	Observations	Condition / Remarks
1	No. of the pipes inspected for leakage.	All buildings pipes, sprinkler irrigation system and tank pipes.	Leakage was found in only four pipes.
2	Number of water taps Inspected.	15	Only 2% of water taps having leakage Problem.
3	No of toilets inspected	6	Only few toilets found in bad condition.
4	No. of drinking water facility	1	Need to improve and Install new drinking water units.

In general, there are no issues in the demand-supply process and storage facilities. But the drinking water infrastructure is very poor and inadequate for the student and staff population, which needs to be addressed on an urgent basis.

4.4 Roof Top Rain Water Harvesting- Need of Future

The roof-top water of all buildings waste every year as it goes in to stream can be collected and released into water harvesting pits and in the open percolation tank in right side of college campus, which would increase the groundwater table. Considering average rainfall of 1700 mm in the Khanapur region, around 8189750 liters of water is harvested by college every year.

Table No 4.3: Rooftop area of different buildings.

Sr. no.	Name of building	Rooftop area in sq. meter
1	Main Building	14800
2	NCC Building	690
3	Canteen	3780
Total area in square meter		19270

Calculation of Rainwater harvesting

The rain falls in the Khanapur region = 1700 mm

The rooftop of building in the campus = 19270 sq meters (18 buildings)

Coefficient = C (collection efficiency in %)

(Rooftop area in square meter) X (Total annual rainfall in mm) X (efficiency coefficient/runoff coefficient)

$19270 \times 1700 \times 0.25 = 8189750$ liters of rainwater is west every year, so this water can be stored by using water harvesting pits.

4.5 Sprinkler Irrigation

College has a big green campus including Garden, Garden near NCC building, fountain. Drip irrigation and the sprinkler irrigation system has been installed at Front Garden, which helps to save water and nutrients by allowing water to drip slowly to the roots of plants. The goal is to save water by feeding water directly into the root zone and thereby minimize evaporation.



Sprinkler irrigation in front garden of college campus

4.6 Precautionary measures.

- For conservation of resources and their management college has appointed a well-trained 4 gardeners.
- The duties are assigned respectively to control the wastage of water, energy, and other resources of a college campus.

4.7 Recommendations:

- The college have much more scope to establish water harvesting pits to increase ground water table so water scarcity is overcome.
- The Water Conservation Awareness Program to be conducted on World Water Day, 22nd March every year.
- Display boards for turning the taps off to be put on at appropriate places.
- Drinking water facility is required to be provided at each floor of all buildings.



Need to repair water linkage in pipes to save water

CHAPTER-5 **SOLID WASTE**

5.1 Solid waste.

Solid waste is a heterogeneous mixture of waste comprising papers, plastic, cloth, metal, glass, organic matter, construction and demolition debris, dust, and so on. Solid waste generation and its management is a serious problem all over the world. The rate and amount of generation of solid waste are very high. However, we do not have satisfactory technology to manage the generated waste. Solid waste refers to all non-liquid waste. Solid waste can give rise to significant health problems and a very unpleasant living environment if not disposed of safely and appropriately. Thus, it is essential to manage solid waste appropriately to reduce the load on the waste management system. The purpose of a solid waste audit is to find out the quantity and current management practices of solid waste generation in Maratha Mandal's Arts and Commerce college campus. The report will help in the waste management and development of the green campus.

5.2 Conducting a solid waste audit.

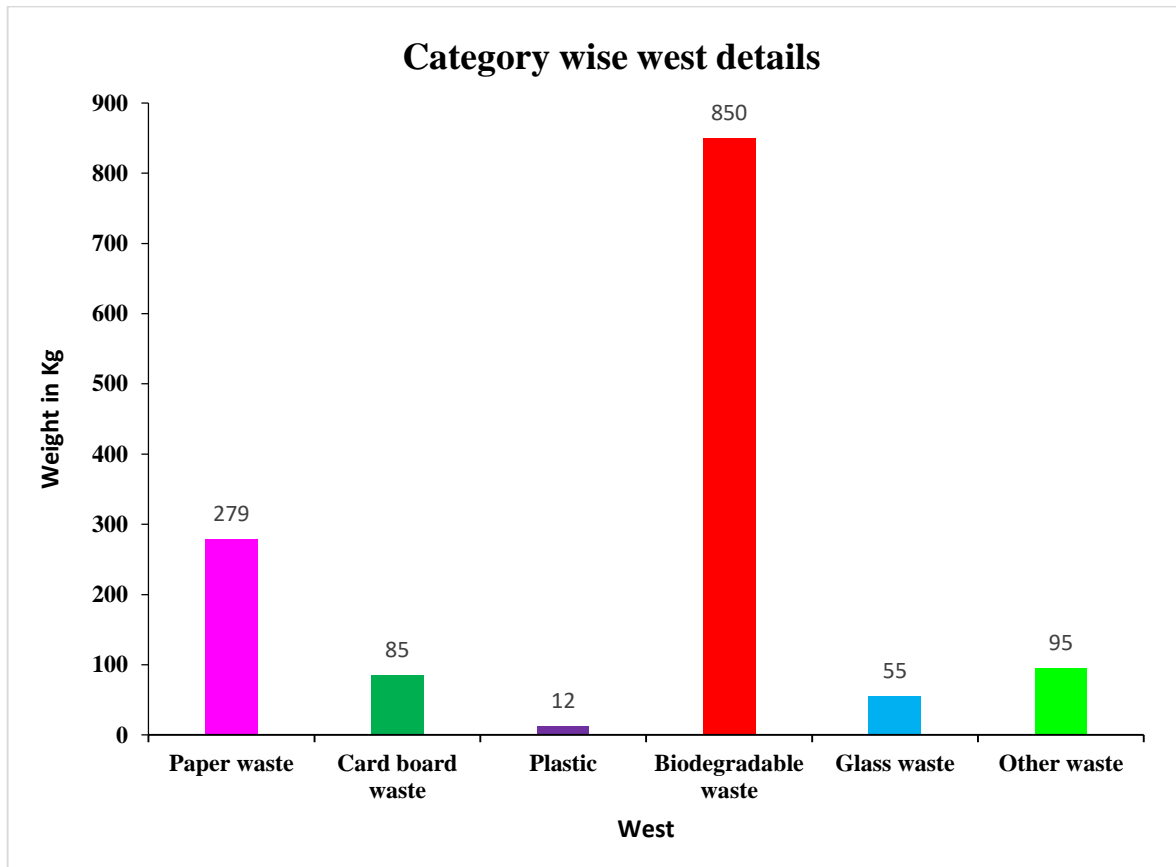
The estimates of solid waste generation were carried out on the basis of a questionnaire and direct interviews with all attenders, sweepers, and stakeholders of college. The solid waste audit is envisioned for providing basic amenities to keep the campus clean and green. Table 5.1 gives information on the type of solid waste generated on campus per year during the sampled duration of the work.

The waste generated in College campus is 1321 kg per year out of these wastes large amounts of biodegradable waste and paper waste. The paper waste is sold to recycle stores for recycling. The remaining waste generated on the campus is collected by sweepers and given to Municipal Corporation once in three days.

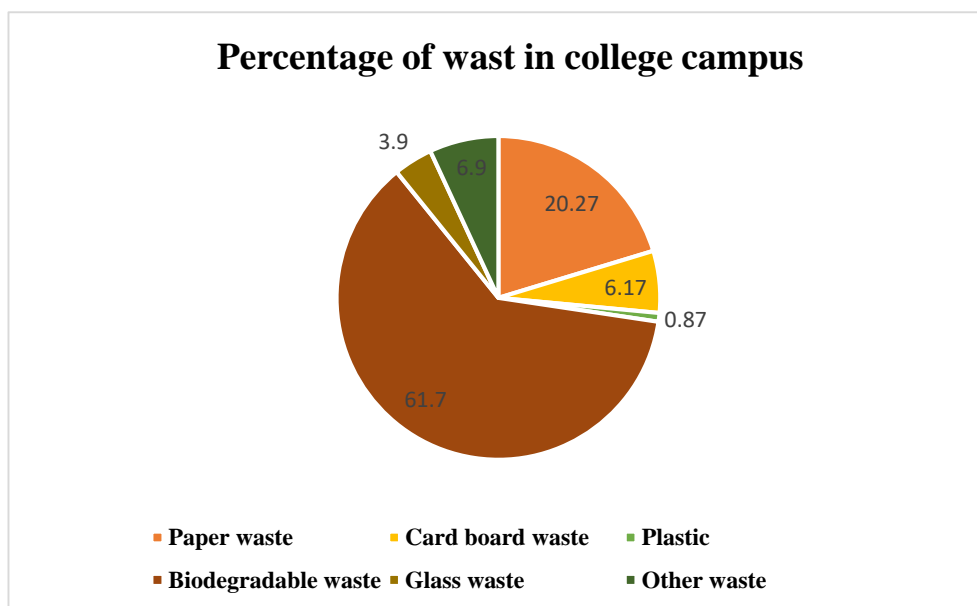
Table No. 5.1: Status of solid waste (kg/year).

Category of waste	Paper waste	Card board waste	Plastic waste	Biodegradable waste	Other waste	Total waste
Quantity kg/month	279	85	12	850	95	1321
Percentage %)	21.11	6.43	0.90	64.34	7.19	100

Graph 5.1 Category wise solid waste generated in College campus.



Graph 5.2 Percentage of solid waste generated in College campus.



The result of the survey reveals various solid waste generated are as follows: Paper waste 21.11%, Cardboard waste 6.43%, Plastic waste 0.9%, Biodegradable waste 64.34%, and

Other waste 7.19% the above-stated statistics are illustrating in pictorial form as graph 5.2. The amount of plastic generated is 0.9% is negligible. The biodegradable waste includes waste collected from different gardens of the college campus.

5.3 Status of paper waste generation in Commerce college campus:

Every year 279 Kg of paper waste is generated in college campus but all paper waste is not directly giving to corporate stakeholders. But a large amount of paper waste is collected by college from various departments every month. The collected paper waste is further sold by college once in a year for recycling of papers. The details of these mention in the following table.

Table No.5.2 Status of recycling paper waste.



Sr. No.	Particulars	Amount in kg.	Rate	Amount (Rs)
1	Answer paper and Assignment papers	169	8	1352/-
2	Newspaper Marathi	67	8.5	569.5/-
3	Newspaper English	23	9	207/-
4	Card Sheet (Ratha)	20	5	100/-
Total				2,228.5/-

5.4 Preventive Measures:

- 1) Paper waste which is generated by all departments particularly one side is used for printing and writing which is a good practice.
- 2) Answer sheets and old assignment papers are sent for pulping and recycling after completion of their period.
- 3) Dust bins are placed for segregation of plastic and paper waste, so that they can be subjected to recycling.

5.5 Recommendations:

- 1) As per the requirement of Municipal Corporation there is needed to separate all types of waste.
- 2) There is need for proper disposal or recycling of e-waste generated in campus.
- 3) Installation of Vermicompost unit can be done to recycle biodegradable wastes.
- 4) More number of dust bins should be installed separately for dry and wet waste at various places.

	
<p>Dustbin in front of college office</p>	<p>Dustbin in classroom</p>

	
<p>Burning of waste materials should be avoided</p>	<p>Disposal of waste should be done properly</p>

CHAPTER-6

CARBON SEQUESTRATION

6.1 Introduction:

Carbon is the basis of life on mother Earth. It is incorporated into plants through photosynthesis, consumed by animal species as food, present in the form of carbon dioxide (CO₂) in the atmosphere, locked into rocks like limestone, and transformed into different fossil fuels such as coal and oil. As CO₂ levels in the atmosphere continue to increase, trees will keep soaking up more than half of CO₂.

The starting of the 21st century brought growing concern about global warming, climate change, food security, poverty, and population growth. In the 21st century, more carbon has been released into the atmosphere than that has been absorbed. CO₂ is a principle component causing global warming. Atmospheric carbon dioxide levels have increased to 40 % from pre-industrial levels to more than 390 parts per million CO₂. In this background, it is a need for time to cover the research areas interrelated with climate change.

The “Carbon Sequestration is a current status of tree cover and vegetation carbon storage assessment of area under the Maratha Mandal’s Arts and Commerce College, Campus. In an era of climate change and global warming carbon emission, carbon footprints, carbon sequestration, and adaptations are the keywords in academia. In carbon sequestration conversion of atmospheric carbon i.e., CO₂ into other sinks of carbon such as vegetation, soil, ocean, etc. takes place.

6.2 Carbon sequestration:

Carbon is found in all living organisms and is the major building block for life on Earth. Carbon exists in many forms, predominately as plant biomass, soil organic matter, and as the gas carbon dioxide (CO₂) in the atmosphere and dissolved in seawater.

The term “carbon sequestration” is used to describe both natural and manmade processes by which CO₂ is either removed from the atmosphere or diverted from emission sources and stored in the ocean, terrestrial environments (vegetation, soils, and sediments), and geologic formations. Before human-caused CO₂ emissions began, the natural processes

that make up the global “carbon cycle” maintained a near balance between the uptake of CO₂ and its release back to the atmosphere. However, existing CO₂ uptake mechanisms (sometimes called carbon “sinks”) are insufficient to offset the accelerating pace of emissions related to human activities.

6.3 Methodology:

Study Area: Maratha Mandal’s Arts and Commerce College, Khanapur. College is situated at North Karnataka at **15°39’44” N and 74°29’44” E**, near Khanapur city on the side of Belagavi Goa highway and it is at the altitude of 784m above mean sea level. Maratha Mandal’s Arts and Commerce College, Khanapur covers an area of about 12 acres. The major area of the campus is covered with green vegetation, plantation, ground and lake.

Field survey: Current tree census methodology has been adopted from the guidelines set by the Indian Institute of Remote Sensing, Dehradun. The campus area of 12 acres is divided into 2 sectors with the help of Google Earth. Audit team carried out tree census on 6th and 7th November 2023. For this tree census measurements of plants is taken with the measuring tape, chalks, writing pad. A tree with girth (circumference of tree) more than 10 cm at chest level and height more than 4 feet were considered as a tree and taken for enumeration. The girth of each tree was measured with the help of tailoring tape and approximate height by the visual method. Identification of tree species was done with the help of field guides, web sources, floras, and with the help of the expertise of the Botany Department of GSS College.

The marked area shows a green campus of Maratha Mandal’s Arts and Commerce College, Khanapur. (Source- Google earth) Data Analysis: All the collected data were tabulated and analyzed with the help of MS-Excel spreadsheets.

ALL THE TABULATED DATA IS ANALYZED BY THE FOLLOWING STANDARD FORMULAE:

A. Measurement of the circumference of the tree: To estimate the biomass of each tree species non-destructive method was used. To calculate the circumference Diameter at Breast Height (DBH) can be determined by measuring tree Girth at Breast Height (GBH), approximately 1.3 meters from the ground. The Girth at Breast Height of trees

having a diameter greater than 10 centimeters were measured directly by measuring tape.

B. Height measurement: Tree height is an important factor for calculating tree biomass and evaluating tree life history. There are several different methods that are used for the measurement of tree height from the ground. For the present tree census, the height of the individual tree is measured by the visual method of the theodolite. (A theodolite is a precision optical instrument for measuring angles between designated visible points in the horizontal and vertical planes.)

C. Weight above ground (WAB) of the tree: The Weight above Ground is the most abundant and visible pool of carbon in all its forms. The above-ground biomass of the tree includes branches, stem, fruit, whole shoots, and flowers.

The specific wood density is used from the standard guidelines. By using the above formula, the AGB of all the tree species is calculated. The total above-ground biomass is calculated by using the formulae given by Brown et al., 1989; Negi et al. 1988.

Formulae:

Weight above-ground= $0.25 D^2 H$ (for trees with $D < 11$)

Weight above-ground= $0.15 D^2 H$ (for trees with $D > 11$)

Where-D- Diameter of the tree.

H- Height of tree.

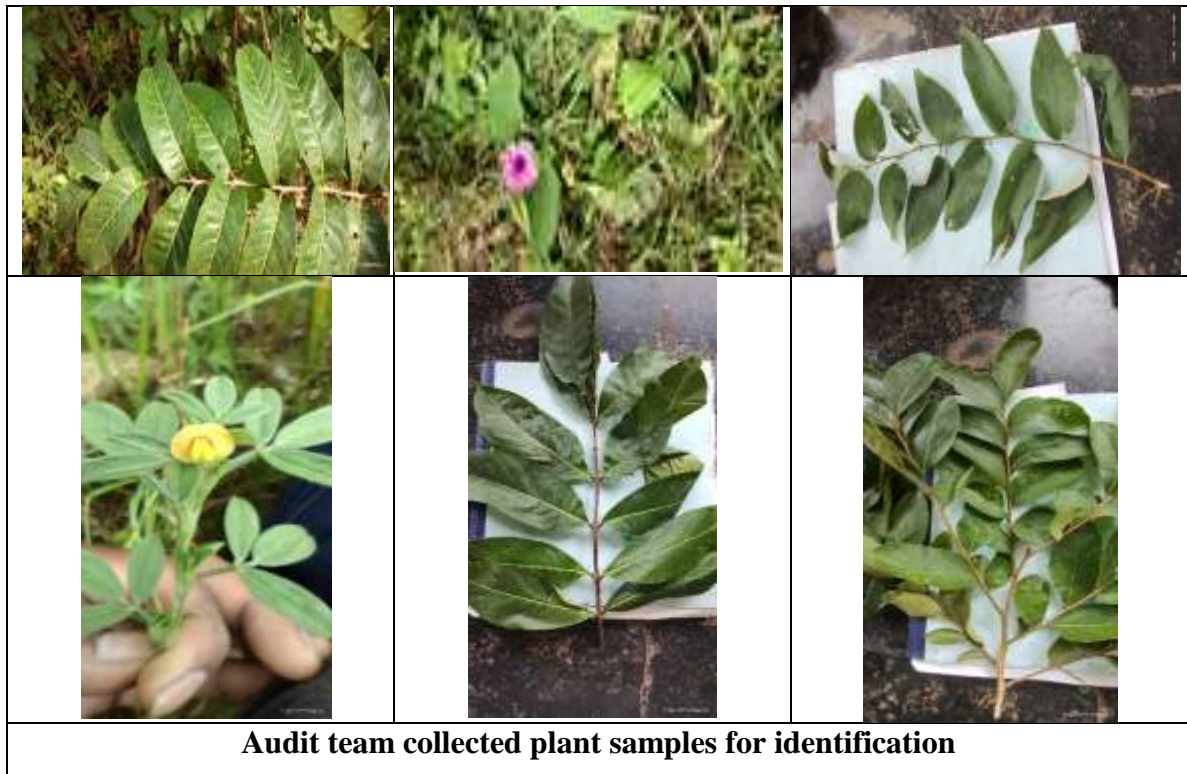
D. Estimation of carbon: Generally, in any plant species 50 % of its biomass is considered to consist of carbon.

Formula: Weight of carbon= $0.5 * \text{Dry weight of the tree}$.

E. Determination of the weight of carbon dioxide (CO₂) sequestered in the tree:

Trees are the autotrophs, which make their own food by using photosynthesis. They take CO₂ and release O₂. The sequestered CO₂ is calculated by using the Carbon Sequestration Factor is used given by the standard guidelines by IPCC.

Formula: Weight of carbon-dioxide = $3.67 * \text{Weight of carbon}$.



Audit team collected plant samples for identification

6.4. Findings

The total number of trees enumerated in Maratha Mandal's Arts and Commerce College, Khanapur:

The total 12 acres area of the Institution contains **857** numbers of trees with 10 cm or more girth and height 4 feet or more have been enumerated. The girth and height of every tree have been measured by using tailoring tape and chalks. Total of **47** tree species have been identified during the census. It shows rich plant diversity on the present on the college campus.

Tree species with the highest population:

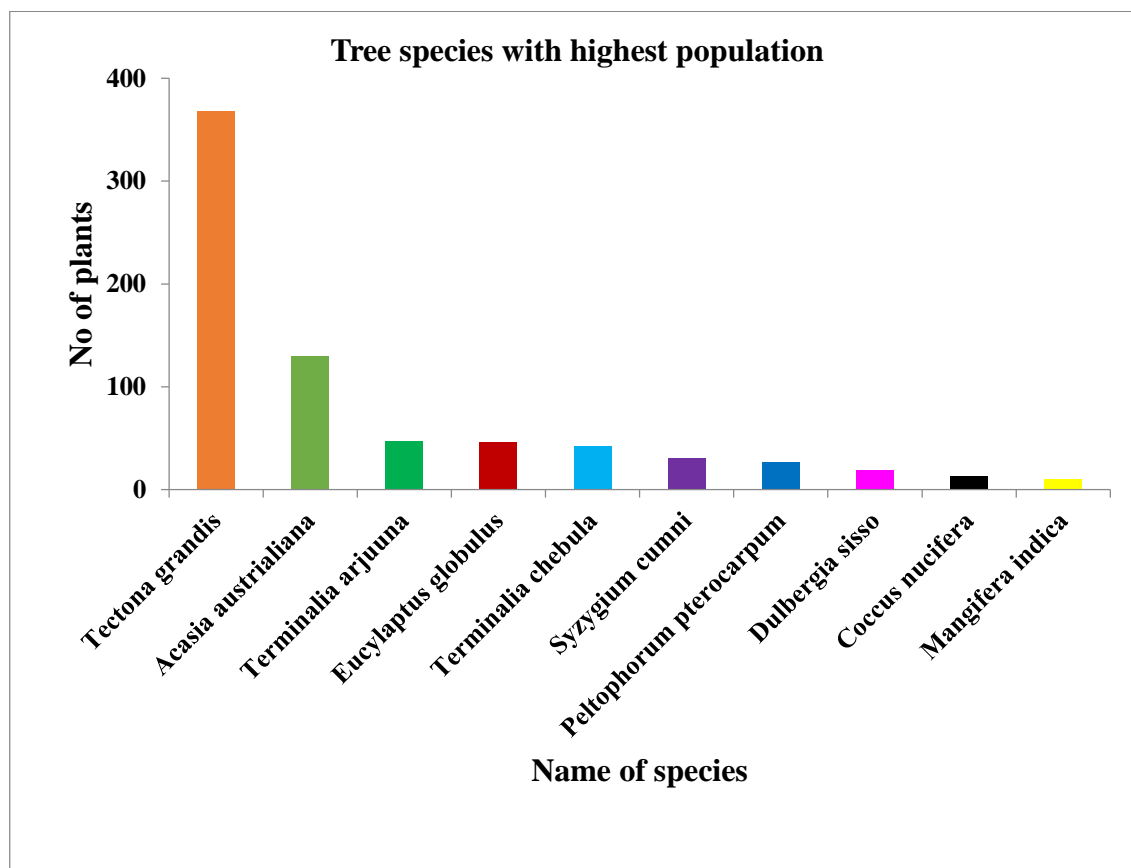
The tree species with the highest population is *Tectona grandis* contributing much in biomass generation accompanied by *Acacia australiana*. It is followed by *Carya arborea*, which is deciduous and adds a large amount of biomass in the soil every year. Followed by *Eucalyptus globulus* which is useful for timber. They are multipurpose as they provide fuelwood. Biomass and helps in carbon sequestration. Followed to this *Terminalia chebula* is a species placed in sixth place which is indigenous. It provides timber, fuelwood, fodder, has medicinal value, and is used extensively as an ornamental

tree as well as for shading, erosion control, and soil fertility. *Syzygium cumni* is a perennial tree that is economically important for its value in forestry, agroforestry. The seventh and eighth positions are of *Peltophorum pterocarpum* and *Dulbergia sisso* respectively. The former is used for timber. In the last two places are *Coccus nucifera* called as ‘kalpvruksh’ and used for various purposes and second one is *Mangifera indica* which is used as fruit yielding plants.

Table 6.1: Tree species with the highest population

Sr. No.	Botanical Name	Common Name	Number
1	<i>Tectona grandis</i>	Teak	368
2	<i>Acacia australiana</i>	Acaasia	130
3	<i>Carya arborea</i>	Wild guava	47
4	<i>Eucalyptus globulus</i>	Eucylaptus	46
5	<i>Terminalia chebula</i>	Myrobalan	42
6	<i>Syzygium cumni</i>	Jamun	31
7	<i>Peltophorum pterocarpum</i>	Peltophorum	27
8	<i>Dulbergia sisso</i>	Shisam	19
9	<i>Coccus nucifera</i>	coconut	13
10	<i>Mangifera indica</i>	Mango	10

Graph 6.1: Tree species with highest population

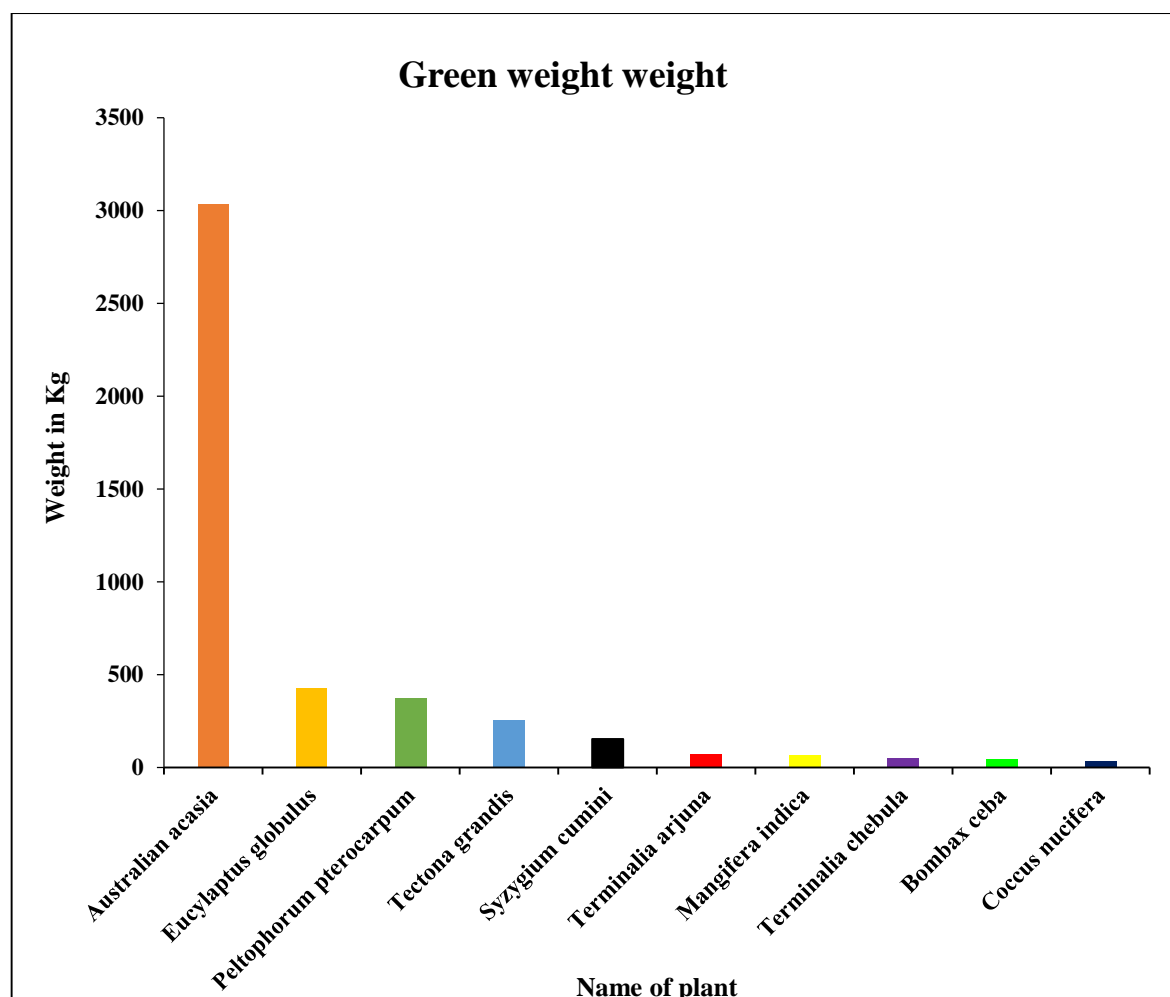


Total biomass:

In ecology, the mass of living biological organisms in a given area or ecosystem at a given time is called biomass. Biomass can refer to species biomass and community biomass. 4851.751742 Kg of the total biomass of woody vegetation has been recorded on the **Maratha Mandal's Arts and Commerce College, Khanapur** during the current tree census. *Australian acasia* shows the highest biomass as it is with the highest volume with large sized trees on the campus. Followed by *Eucalyptus globulus*, *Peltophorum pterocarpum* and *Tectona grandis* are ranked at second, third, and fourth places respectively.

Table 6.2: Tree species with the highest biomass (Kg)

Sr. No	Botanical Name	Common Name	Total Biomass (Kg)
1	<i>Australian acasia</i>	Acasia	3034.04
2	<i>Eucylaptus globulus</i>	Nilgiri	429.17
3	<i>Peltophorum pterocarpum</i>	Yellow flame	373.55
4	<i>Tectona grandis</i>	Teak	255.56
5	<i>Syzygium cumini</i>	Jamun	153.66
6	<i>Carya arborea</i>	Dorli	71.79
7	<i>Mangifera indica</i>	Mango	66.64
8	<i>Terminalia chebula</i>	Myrobalan	50.72
9	<i>Bombax ceba</i>	Indian silk	43.22
10	<i>Coccus nucifera</i>	Coconut	34.13

Graph 6. 2: Tree species with highest biomass (Kg)

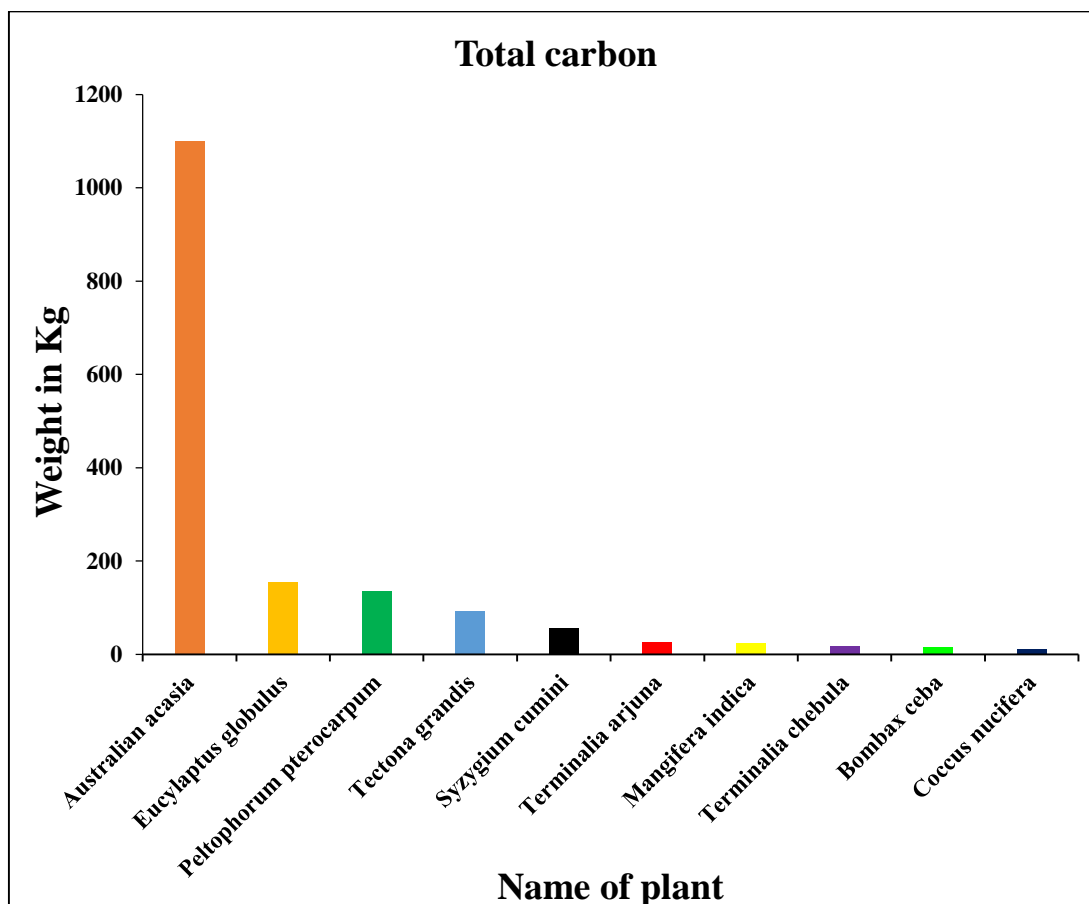
Carbon Stock:

The main carbon sink in tropical forest ecosystems includes the living biomass of trees, under-story vegetation, and dead mass of litter, woody debris, and soil organic matter. The carbon stored in the Above Ground Biomass (AGB) of trees is the largest pool and is directly impacted by deforestation and degradation. Trees and forests act as natural carbon stores, but this carbon is released when the trees are felled and the area deforested. The amount of carbon stored within an area of land varies according to the type of vegetation cover. 21,98,260.21Kg of total carbon stock is present at the college campus.

Table 6.3: Tree species with the highest carbon stock.

Sr. No	Botanical Name	Common Name	Carbon sequestered (Kg)
1	<i>Australian acasia</i>	<i>acasia</i>	1099.84
2	<i>Eucylaptus globulus</i>	<i>Nilgiri</i>	155.58
3	<i>Peltophorum pterocarpum</i>	<i>peltophorum</i>	135.41
4	<i>Tectona grandis</i>	<i>Teak</i>	92.64
5	<i>Syzygium cumini</i>	<i>Jamun</i>	55.70
6	<i>Terminalia arjuna</i>	<i>Arjuna</i>	26.02
7	<i>Mangifera indica</i>	<i>Mango</i>	24.16
8	<i>Terminalia chebula</i>	<i>Bheda</i>	18.39
9	<i>Bombax ceba</i>	<i>savar</i>	15.67
10	<i>Coccus nucifera</i>	<i>Coconut</i>	12.37

Graph no.6.3: Tree species with the highest carbon stock.



Carbon Sequestration:

Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide. It is one method of reducing the amount of carbon dioxide in the atmosphere to reduce global climate change. It has been considered as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels and other activities. In the current study, the focus is given on the assessment of existing carbon stock stored in the college campus in the form of woody vegetation by enumerating every tree species. Overall, a total of 6454.649224 Kg of CO₂ has been captured and stored by the woody plants present on the College campus. A total of 322.73 Kg of CO₂ is consumed yearly by **857** woody plants from the campus.

Oxygen released:

The Released oxygen is directly proportional to CO₂ sequestrate in the ratio of 32/12.

Thus, it is supposed to release 195.87 Kg of oxygen annually.

6.5. Conclusion:

Forests and woody trees are the biggest carbon pool on Earth, act as a major source and sinks of carbon in nature. The trees present on the **Maratha Mandal's Arts and Commerce College, Khanapur** sequester 6454.64 kg of CO₂ and release 17,210.66 Kg of oxygen annually. Thus, the campus is working as a good carbon sink and a productive oxygen park.

- The total tree count on the campus recorded is 369. The highest number shows by *Tectona grandis*.
- College has planted much more *Tectona* trees on side of highway where a large no of *Tectona* and other trees is located.
- Apart from this college have big ground i.e. 400 meter and on the side plantation of *Eucylaptus* and *Acasia* is there.
- Every year college conduct plantation programme at various location.

6.6. Recommendations:

- Plantation of endemic species like *Mangifera indica*, **Artocarpus intigrifolia**, *Butea monosperma*, *Azadirachta indica*, etc., will be helpful for the conservation of native biodiversity.
- Plantation activity should be taken yearly to increase the green cover on the College campus.
- Avoid plantation of exotic species like *Austalian acasia* which is fast-growing species with less ecological values.
- College also have much scope to make QR code of entire college campus plants to know plant names and importance easily.

6.7 Biodiversity of the campus

SR. NO	BOTANICAL NAME	FAMILY
1.	<i>Acalypha Indica</i> Linn.	Euphorbiaceae
2.	<i>Achyranthes aspera</i> Linn.	Amaranthaceae
3.	<i>Aegle marmelos</i> (Linn.) Corr.	Rutaceae
4.	<i>Albizia lebbek</i> (Linn.) Benth.	Mimosaceae
5.	<i>Aloe barbadensis</i> Mill (A.vera (linn.) Burm.)	Liliaceae
6.	<i>Anacardium occidentale</i> Linn.	Anacardiaceae
7.	<i>Duranta repens</i> Linn.	Verbinaceae
8.	<i>Artocarpus heterophyllus</i> Lam. (A. Integrifolia. Non Linn.)	Moraceae
9.	<i>Asparagus racemosus</i> Willd.	Liliaceae
10.	<i>Argerya nervosa</i> , (Burm.f). Bojer	Convolvulaceae
11.	<i>Bauhinia variegata</i> , Linn	Caesalpiniaceae
12.	<i>Bombax ceiba</i> , Linn. (schott&Endlicher)	Bombacaceae
13.	<i>Butea monosperma</i> (Lam.) Taub. (B.froncosa Koenig ex Roxb.)	Fabaceae
14.	<i>Carya arborea</i> , Roxb.	Lecthyidaceae
15.	<i>Cassia tora</i> , Linn.	Caesalpiniaceae
16.	<i>Catharanthus roseus</i> (Linn.) G.Don (Vinca rosea Linn.)	Apocynaceae
17.	<i>Cinnamomum verum</i> Presl (Czeylanicum BL)	Lauraceae
18.	<i>Citrus medica</i> Linn.	Rutaceae
19.	<i>Clitoria ternatea</i> Linn.	Fabaceae
20.	<i>Duranta plumeri</i> , L.	Apocynaceae
21.	<i>Croton tilgium</i> Linn.	Euphorbiaceae
22.	<i>Cuminum cyminum</i> Linn.	Apiaceae
23.	<i>Curcuma longa</i> Linn.	Zingiberaceae
24.	<i>Cycas Circinalis</i> ,Linn.	Cycadaceae
25.	<i>Cynodon Dactylon</i> (Linn.) Prs.	Poaceae
26.	<i>Cyperus rotundus</i> linn	Cyperaceae
27.	<i>Erythrina variegata</i> linn.(<i>E. varegata</i> (Linn) var.	Fabaceae
28.	<i>Eucalyptus Globulus</i> . Labill.	Myrtaceae
29.	<i>Ficus Benghalensis</i> . Linn.	Moraceae
30.	<i>Ficus racemose</i> linn(F. Glomerata Roxb.)	Moraceae
31.	<i>Dulbergia sisso</i> Roxb.	Fabaceae
32.	<i>Gloriosa superb</i> Linn.	Liliacease
33.	<i>Grewia tiliifolia</i> Vahl.	Tiliaceae
34.	<i>Gymnema sylvesre</i> (Retz.) R. Br.	Apocynaceae
35.	<i>Hibiscus rosa-sinensis</i> Linn.	Malvacease
36.	<i>Ixora coccinea</i> Linn.	Rubiaceae
37.	<i>Jasminum granfflorum</i> Linn.	Oleaceae
38.	<i>Lawsonia Inermis</i> Linn. (L. alba Lam)	Lythraceae
39.	<i>Mallotus philippensis</i> (Lam.) Muell. Arg.	Euphorbiaceae
40.	<i>Michelia Champaca</i> Linn.	Magnoliaceae
41.	<i>Mimosa pudica</i> ,Linn.	Mimosaceae
42.	<i>Mitragyna parvifolia</i> (Roxb.) korth.	Rubiaceae

43.	<i>Ficus bengaminac</i> Linn.	Moraceae
44.	<i>Ficus glomurata</i> Roxb	Moraceae
45.	<i>Gliricedia sepium</i> (Jacq) steud	Fabaceae
46.	<i>Babusa striata</i> Schrad ex J. C wendl.	Poaceae
47.	<i>Ocimum tenuiflorum</i> Linn. (O. sanctum Linn.)	Lamiaseae
48.	<i>Phyllanthus emblica</i> Linn. (Emblica officinalis Gaertn.)	Euphorbiaceae
49.	<i>Pasidium guajava</i> Linn.	Myrtaceae
50.	<i>Pongamia pinnata</i> ,Linn.	Fabaceae
51.	<i>Punica granatum</i> Linn.	Lythraceae
52.	<i>Rauvalfia serpentine</i> (Linn.)	Apocynaceae
53.	<i>Ricinus communis</i> Linn.	Euphorbiaceae
54.	<i>Santalum album</i> Linn.	Santalaceae
55.	<i>Semecarpus anacardium</i> Linn.f.	Anacardicaceae
56.	<i>Syzygium jambos</i> (Linn.) Alston (Eugenia Jambos Linn)	Myrtaceae
57.	<i>Tamarindus indica</i> Linn.	Caesalpiniaceae
58.	<i>Tectona grandis</i> Linn.f.	Verbenaceae
59.	<i>Terminalia bellirica</i> (Gartn.) Roxb.	Combretaceae
60.	<i>Vitex negundo</i> Linn.	Verbenaceae
61.	<i>Delomix regia</i> Boj. ex Hook.	Fabaceae
62.	<i>Albizia saman</i> L.f Benth.	Fabaceae
63.	<i>Dypsis leutescence</i> (H. Wendl.) Beentje & Dransf.	Arecaceae
64.	<i>Acasia austrialina</i> .	Mimosaceae
65.	<i>Senna siamea</i> (Lam.) H.S. Irwin & Barneby)	Fabaceae
66.	<i>Cassurina equisetifolia</i> L.	Casurinaceae
67.	<i>Citharexylum subserratum</i> Sw.	Verbinaceae
68.	<i>Coccus nucifera</i> Linn.	Arecaceae
69.	<i>Cupressus semipervens</i> Linn.	Cupressaceae
70.	<i>Cycus revolute</i> Thunb.	Cycadaceae
71.	<i>Hemidesmus indicus</i> , R. Br.	Apocynaceae
72.	<i>Terminalia cattppa</i> , Linn.	Combretaceae
73.	<i>Glochidion lanceolarium</i> , Wild.	Phyllanthaceae

List of Amphibians

- 1) Indian bull frog, (*Haplobatrachus tigerinus*)
- 2) Indian tree frog, *Polypedates maculatus*
- 3) Common Indian toad, *Duttaphrynus melanostictus*
- 4) Indian burrowing frog, *Sphaerotheca breviceps*
- 5) Reddish burrowing frog, *Fejervarya rufescens*
- 6) Common skittering frog, *Euphlyctis cyanophlyctis*

- 7) Knob headed shrub frog, *Raorchestes tuberochelus*
- 8) Common Bush frog, *Pseudophilautus* sps.
- 9) Ornate narrow mouthed frog, *Microhyla ornata*

Reptile diversity in campus

- 1) Common calotis
- 2) Garden lizard
- 3) Common skink
- 4) Common house Gecko
- 5) Brook's Gecko
- 6) Dwarf gecko
- 7) Indian Rat snake
- 8) Spectacled cobra
- 9) Common krait
- 10) Green keel back
- 11) Striped keel back
- 12) Checkered keel back
- 13) Common cat snake
- 14) Common shield tail

Mammal diversity in campus

- 1) Bonnet macaque
- 2) Hanuman langur
- 3) Jungle cat
- 4) Common Palm civet
- 5) Mongoose
- 6) Domestic Gog
- 7) House shrew

- 8) Indian gerbil
- 9) House Rat
- 10) Three striped squirrel
- 11) Common bandicoot
- 12) Indian flying fox
- 13) Short nosed fruit bat
- 14) Lesser false vampire bat
- 15) Indian pipistrellus
- 16) Javan pipistrellus
- 17) Asiatic greater yellow house bat

List of Butterfly species

Family: Papilionidae (Swallowtails)

1. Southern Birdwing, *Troides minos*
2. Common Mormon, *Papilio polytes*
3. Blue Mormon, *Papilio polymnestor*
4. Red Helen, *Papilio helenus*
5. Common jay, *Graphium doson*

Family: Lycaenidae (Blues)

6. Common Pierrot, *Caleta rosimon*
7. Tiny Grass Blue, *Zizula hylax*
8. Common Cerulean, *Jamides celeno*
9. Red Pierrot, *Talicerca nyseus*

Family: Pieridae (Whites & Yellows)

10. Common Emigrant, *Catopsilia pomona*
11. Mottled Emigrant, *Catopsilia pyranthe*
12. Common Grass Yellow, *Eurema hecabe*
13. Common jezebel, *Delias eucharis*
14. Psyche, *Leptosia nina*
15. Great Orangetip, *Hebomoea glaucippe*
16. Common Wanderer, *Pareronia valeria*

Family: Nymphalidae (Brush-footed Butterflies)

17. Common Evening Brown, *Melanitis leda*
18. Common Bushbrown, *Mycalesis perseus*
19. Nigger, *Orsotrioena medus*
20. Common Five Ring, *Ypthima baldus*
21. Common four ring, *Ypthima huebneri*
22. Rustic, *Cupha erymanthis*
23. Common Sailer, *Neptis hylas*
24. Common Castor, *Ariadne merione*
25. Lemon Pansy, *Junonia lemonias*
26. Blue Pansy, *Junonia orithya*
27. Soldier (Chocolate Pansy), *Precis iphita*
28. Grey Pansy, *Junonia atlites*
29. Danaid Eggfly, *Hypolimnas misippus*
30. Blue Tiger, *Tirumala limniace*
31. Glassy Tiger, *Parantica aglea*
32. Striped tiger, *Danaus chrysippus*
33. Common Indian Crow, *Euploea core*

Listing of Bird diversity

1. Red whiskered bulbul
2. Red-vented bulbul
3. Magpie robin
4. Indian robin
5. Tailor bird
6. Purple rumped sunbird
7. Loten's sunbird
8. Crested lark
9. Pied bush chat*
10. Red wattle lapwing
11. Black drongo
12. Cattle egret
13. Indian pond heron
14. house sparrow
15. Green bee-eater
16. Greater coucal
17. White eye
18. Common kingfisher
19. Eurasian golden oriole
20. Black headed oriole
21. Barn owl
22. Spotted owlet
23. White cheeked barbet
24. Coppersmith barbet
25. Ashy prinia
26. Jungle crow

27. House crow
28. Crow pheasant
29. Indian Grey hornbill
30. Malabar paid hornbill
31. Blue rock pigeon
32. Oriental turtle dove
33. Common iroa
34. Indian scoops owl
35. Common myna
36. Brahmany myna
37. common grey babbler
38. Indian night jar
39. Indian roller
40. Long tailed shrike
41. Rose ringed parakeet
42. Black shoulder kite
43. Common kite
44. Asian paradise flycatcher
45. Tickle's blue flycatcher
46. Fan tail flycatcher

CHAPTER-7
NOISE AND AIR QUALITY INDEX

7.1 Noise quality:

A sound or noise audit examines noise levels in any premises. Noise can cause ill health effects as well as socio-cultural and economic effects. In most of the cases the long and short term effects cannot be evaluated objectively.

Noise is generated from various sources. The increasing ambient noise levels in everyday life is due to various industrial and commercial activities, fire crackers, sound producing instruments, generator sets, loud speakers, public address systems, music systems, vehicular honking and other mechanical devices have deleterious effects on human health and psychological wellbeing of the people. It is considered necessary to monitor, regulate and control noise producing and generating sources with the objective of maintaining the ambient air quality standards in respect of noise.

The various national and international standards and regulations highlight the need to monitor, control and regulate sound/noise levels and the use of protective gears to prevent the adverse effects caused from the continuous exposure to loud/noisy environments. In India, under the Environment protection Act – 1986 and 2010 amendment (as per Central Pollution Control board regulation), the Noise pollution (Regulation and Control) Rules, 2000 is in existence.

- Noise pollution is defined by the World Health Organization (WHO) as noise above 65 decibels (dB). More specifically, noise becomes unpleasant over 120 decibels (dB) and hazardous above 75 dB.
- As an average noise level over a day, your ear can tolerate noise levels up to 85 decibels.
- Our hearing can be harmed by sounds louder than 85 dB. The typical decibel range for normal conversation is between 60 and 70. Decibel is sometimes referred to as dB or dB (A).

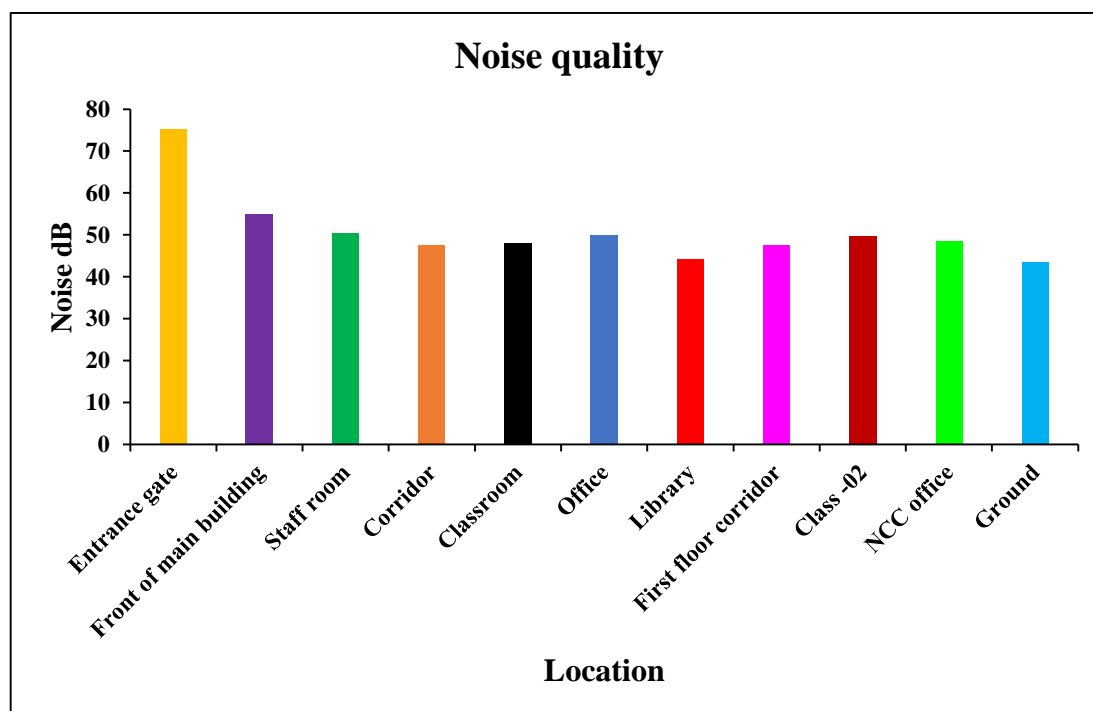
Noise quality of college campus at various location:

The data on the noise quality of College campus are listed in table 7.1. According to observations, it is clear that the noise quality of college campus is sufficiently good.

Table no.7.1 Noise quality at the college campus

Sr. No.	Location	Noise (dB)			Limits in dB (A) Leq	
		Leq	Min	Max	Day time	Night time
1.	Entrance gate	75.2	70	80.1	50	
2.	Front of main building	55	52	58		
3.	Staff room	50.4	46	54.2		
4.	Corridor	47.6	45.2	50		
5.	Classroom	48.1	44.2	52		
6.	Office	49.4	45	54.8		
7.	Library	44.2	32	55		
8.	First floor corridor	47.5	38	67		
9.	Class -02	49.6	42	65		
10.	NCC office	48.5	40	67		
11.	Ground	43.6	39	65		

Graph no. 7.1 Noise quality at the college campus



7.2 Air quality:

It is very important to maintain the AQI of our surroundings because; they can increase the risk of heart and respiratory diseases, as well as lung cancer. It raises the danger of heart disease, lung cancer, and respiratory infections. Air pollution exposure, both short-term and long-term, has been linked to negative health effects. Those who are already unwell are subject to more severe effects. In general, AQI levels of 100 or less are considered to be good. Air quality is unhealthy when AQI values are above 100; initially for some susceptible individuals who are susceptible, then as AQI values rise for everyone

Air Quality Index

The introduction of substances into the air that is harmful to humans, other living things, or the environment, such as chemicals, particulate matter, or biological elements like pollen grains, is referred to as air pollution. Human health impacts from exposure to air pollution include respiratory, cardiac, vascular, and neurological problems. Children are more vulnerable. Monitoring, exposure assessment, dosimeter, toxicology, and epidemiology are examples of scientific methods for evaluating the effects of air pollution on health. Primary and secondary air contaminants are differentiated. Secondary pollutants are created in the atmosphere, whereas primary pollutants are directly released. Sulfur dioxide (SO₂), which can cause acid rain, is one of the main major pollutants produced by human activities. The most noticeable air pollutants are NO₂, particularly nitrogen dioxide released during high-temperature combustion. Both natural and man-made particles can be found in the air. Health risks are associated with elevated fine particle concentrations in the air. Particulate matter, which is created by diesel engines, power plants, factories, wind-borne dust, wood stoves, etc., is made up of very minute particles of soot, dust, or other substances, including tiny droplets of liquid. They have negative welfare impacts including impaired visibility, atmospheric deposition, and aesthetic problems in addition to having substantial health implications.

Location	Status	AQI-US	PM	Temperature	Humidity
Front of college	Moderate	60	2.5	28 ⁰ C	30%

Noise pollution is an important parameter that is taken into account for this Green Audit

of the college campus. Maratha Mandals Arts and commerce college campus is a green campus. The College campus records minimum noise pollution as compared to other locations in Khanapur city. Noise detector mobile application scientific instruments are used and different locations are selected to monitor noise quality in the College.

- **7.3 Average Humidity, Temperature and Rainfall recorded in the year 2023**

Month	Humidity (%)	Temperature (°C)	Rainfall (mm)
January	43	29	0.1
February	27	32	0
March	39	35	0
April	47	36	30.35
May	61	34	75.5
June	73	27	173.2
July	90	24	686.55
August	85	25	88.65
September	87	26	97.75
October	70	28	119.7
November	66	28	75.69
December	63	28	32.4

7.3 Observations:

- The Noise Monitored at 11 different locations on the campus by Noise detector mobile application. The readings are under the limits and do not come in the Range of Noise pollution except on which is high that come near entrance of college gate because of highway traffic.
- The campus is rich in biodiversity and the number of trees planted. Hence there is no issue with the temperature as well as humidity.
- The recorded temperature in the summer is high but as all the classrooms are provided with a sufficient number of fans hence in summer there is no issue of heat.

CHAPTER-8

Conclusion:

Maratha Mandal's Arts and Commerce College, Khanapur, Conducted Green audit of college campus in the academic year 2022-23. The main objective to carry out a green audit is to check the green practices followed by College and to conduct a well-defined audit report to understand whether the college is on the track of sustainable development. This is the first green audit of the college.

After completing the audit procedure of the college for green practices, there are following conclusions, recommendations, and Environmental Management Plan (EMP) which can be followed by the college in the future for keeping campus environment friendly.

From the green audit following are some of the **conclusions** which can be taken into consideration

- The college has planted a huge number of trees that helps in reduction of air pollution.
- Since the buildings are well planned, illumination and aeration is provided naturally, except during bad weather or high temperature.
- There are some issues with respect to solid waste management i.e. not proper disposal and burning of wastes.
- Electricity consumed by the college is mostly by the use of computers except which the colleges uses very less electricity.
- The gardens are well maintained by the gardeners.

Recommendations:

1. The plants present in the campus can be labelled with **QR codes** for the identification and know the uses of the plant.
2. Installation of **sensor-based** electrification items like fans, lights, etc. can save electricity.
3. A rainwater harvesting system on terrace of the buildings will be useful in

conserving the natural resources.

4. More number of dust-bins can be placed to separate dry and wet waste.
5. Solar panels can be installed on the terrace of the building, which can help in reduction of use of electricity.
6. Green computing i.e., online payment system, online circulars, and examination procedures (SRPD) help reduce the use of papers and ultimately reducing the carbon footprint.

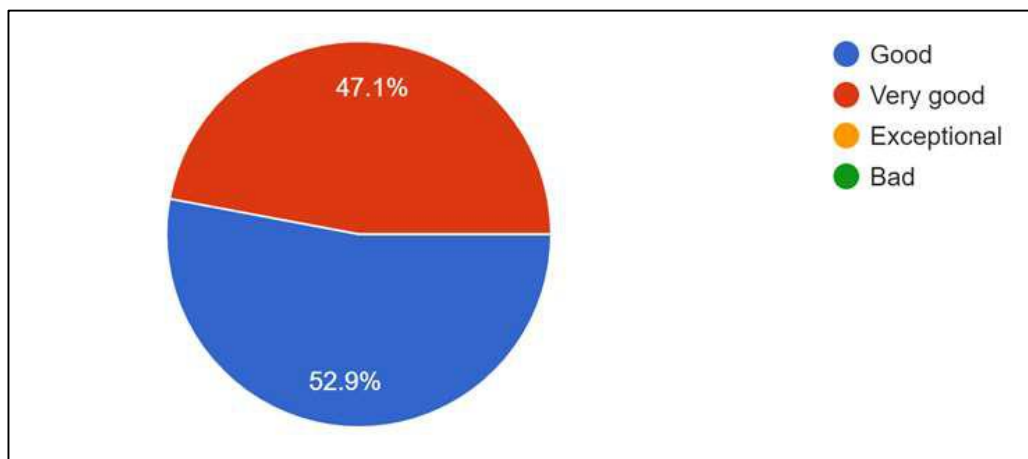
The management of Maratha Mandal's Arts and Commerce College, Khanapur, Belagavi is well focused and has a vision. Management meets every week where several activities are discussed and planning is done. The Principal holds a meeting every week with the Head of the Departments to discuss the weekly calendar that helps for the development of academics and administration.

❖ Staff and student awareness assessment:

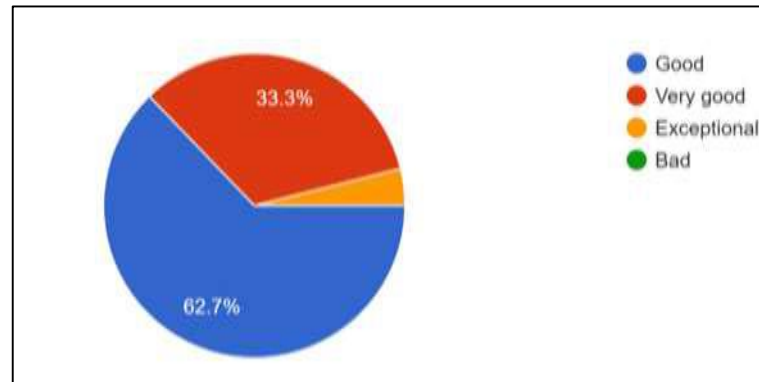
A small self-designed exercise was undertaken to assess the environmental awareness, their perceptions, understanding, involvement I social- environmental cause, and sensitivities etc.

All the staff members were asked to fill questionnaires on based on campus cleanliness, waste disposal, their understanding of ecology and green processes, problems faced by them, possible solutions. This exercise was to make staff members think about environmental systems dynamics. (The questionnaire is attached in the annexure)

1. Staff members and students also assigned to give grades to the College campus based on the Cleanliness.
 - Most of the staff and students has given good remark.

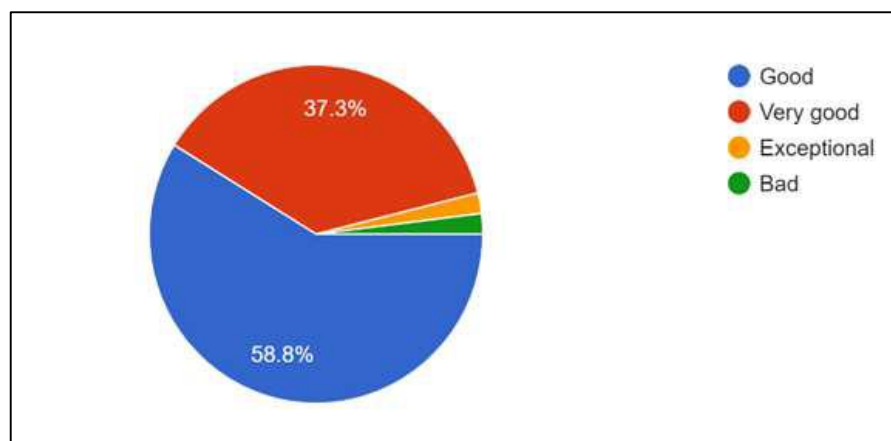


2. Staff members and students also assigned grades to the College campus based on the College building / Campus/ work environment, sanitation infrastructure, Drinking water facility.

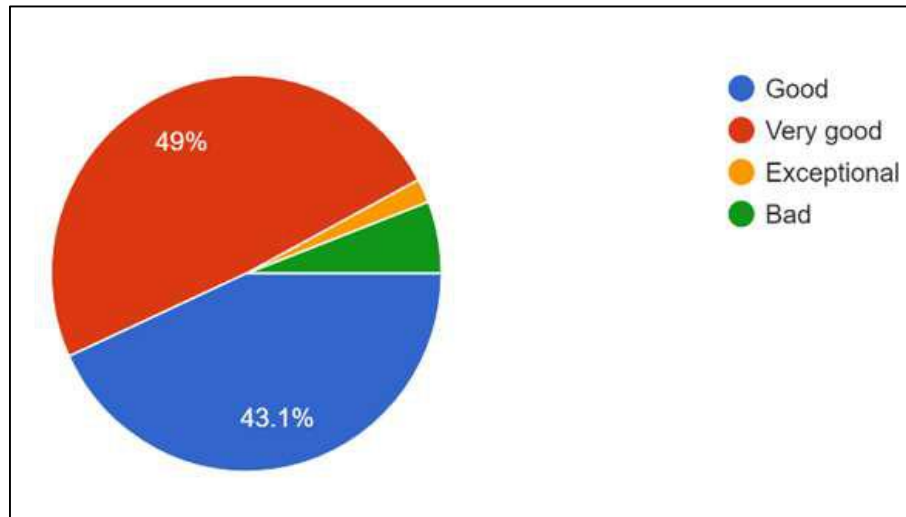


- Most of the staff and students of college i.e. 62.7% staff and students feels that College campus and work environment is good.
- 33.3% staff and students feedback is very good while few staff and students feedback is exceptional.

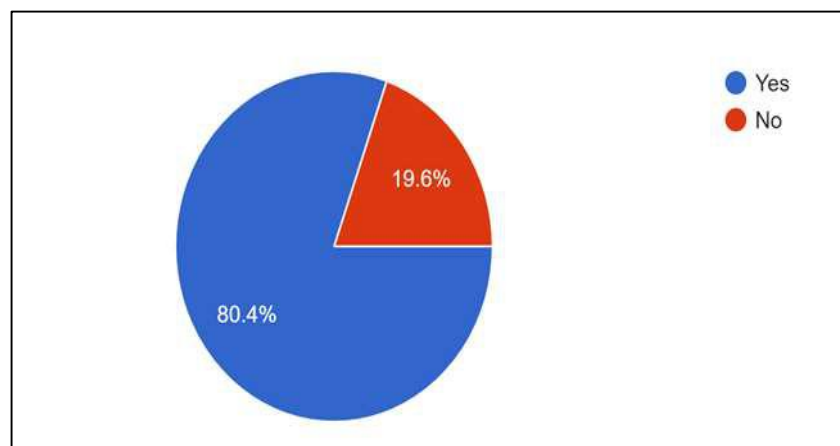
3. Staff and students were asked about infrastructure in college campus.



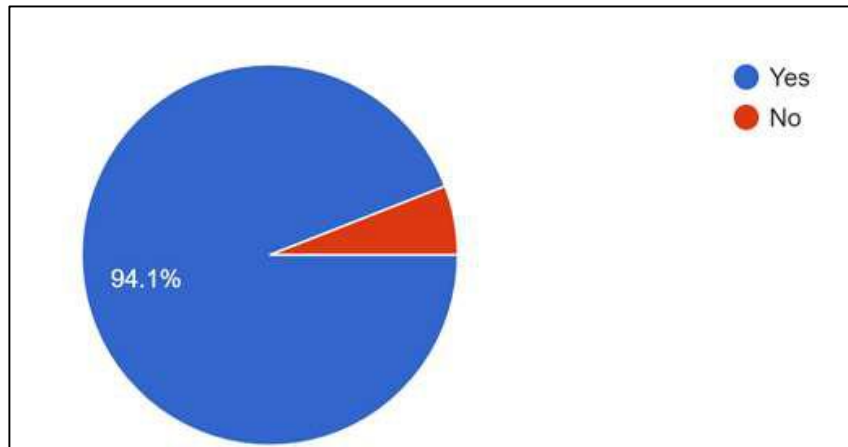
- Staff members and students also assigned grades to the infrastructure in college campus in which 58.8 % staff member feel infrastructure is good while 37.3% feels it is very good.
 -
4. Staff members and students also assigned grades for drinking water facility in which most of the students and staff is satisfactory.



5. Questions were asked to observe if staff members have tried or taking any social/ environmental / educational / conservation etc. initiatives inside or outside college campus.

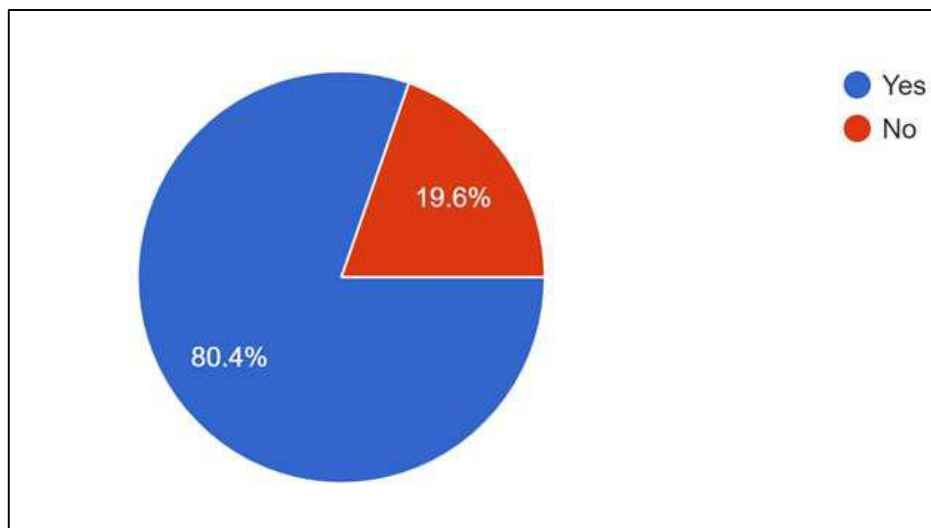


- Maximum staff and students i.e. 81% willing to take responsibility for social environmental and conservation while only 19 are not interested.
6. Staff members and students were also asked to take responsibility for ecofriendly campus.



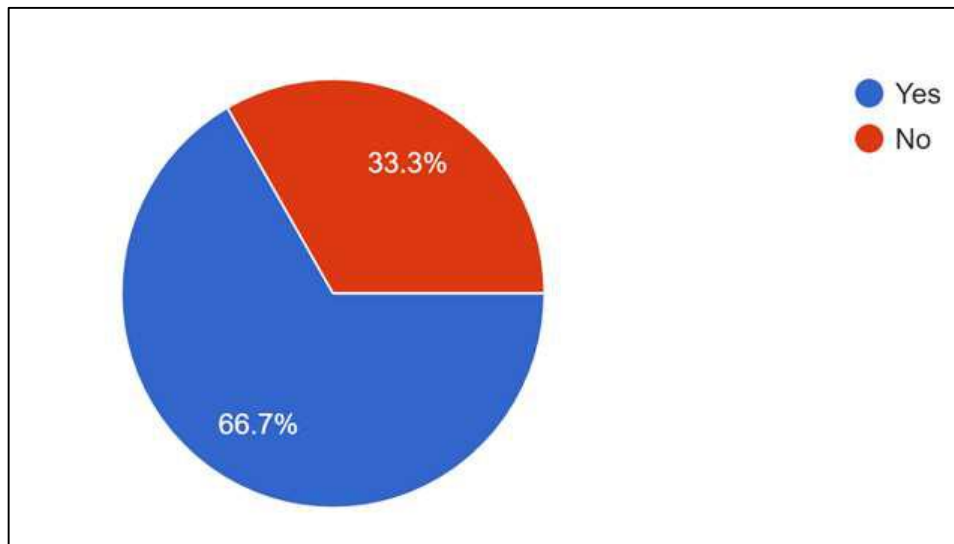
- 94.1 % of the staff members are willing to dedicate extra time for social cause

7. Staff and students were also asked were they make to reduce water and energy consumption in which most of the staff members are interested.

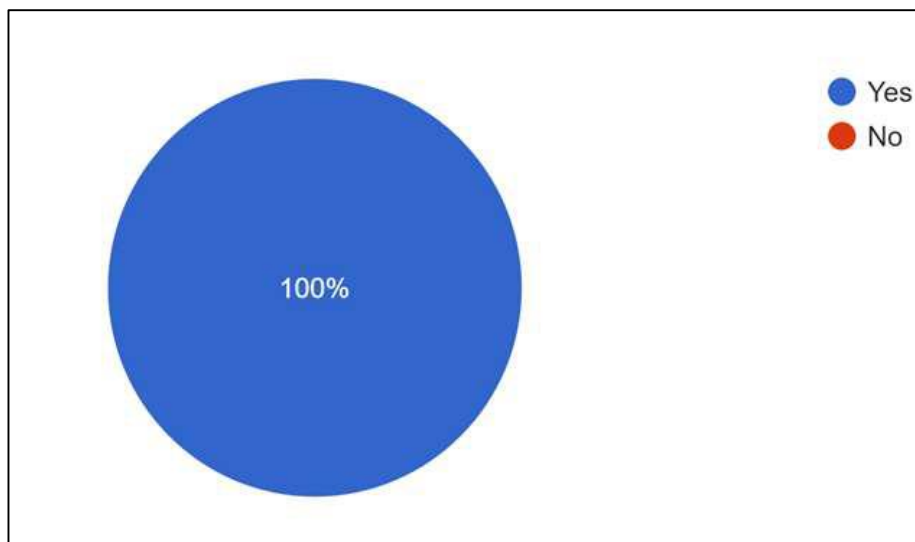


8. They are also asked about are they aware about carbon emission. Most of the staff

members i.e. 66.7 % are aware about carbon emission.

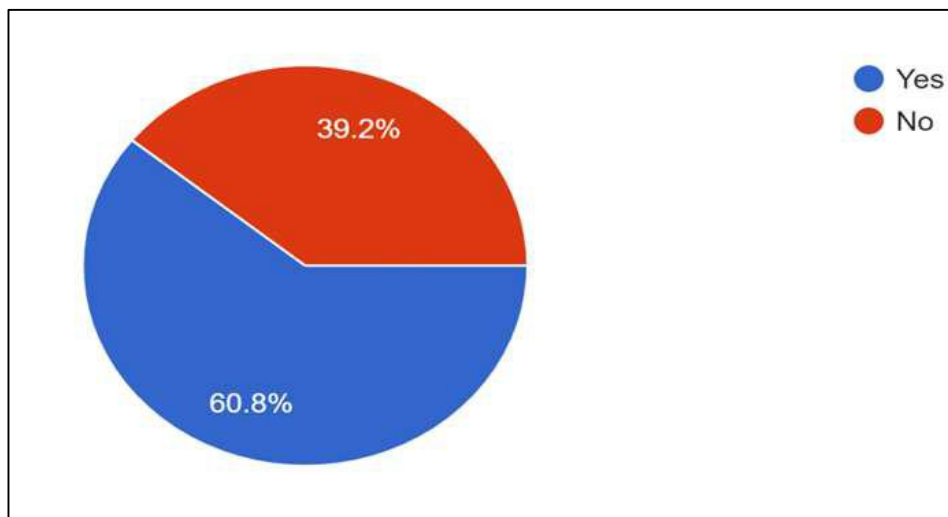


9. All staff members and students also aware about throwing plastic in dustbins.



10. Staff and students are also asked about effect of pollution on health and most of the

staff members response is positive means they are much more conscious about their health so they knows about green practices.



ANNEXURE -1 ENERGY AUDIT

Expenditure	Energy management efficiency & alternatives	
	2013	2014
Electricity Expenses		
January		
February		
March		
April		
May		
June		
July		
August		
September		
October		
November		
December		
Total		

Stationary/ Paper/Print Expenses	2012		2013		2014	
Total						

Gift - Bouquet Expenses	2012		2013		2014	
Total						

Electrical Instruments		Year & Make	Capacity	Diesel cost
Electrical machinery				
¹ Generators				
² Pump set				
³ Air conditions				
⁴ Number of Computers	RPD		GSS	
⁵ Any other Equipment				
Data Filled by				

ANNEXURE-2

Water Audit

Sample questioner

Observations: Name of department.....

Month and year.....

Total no of employee.....

Average working days in a month.....

Area of rooftop/terrace.....

Daily water supply.....

Formula:Total daily use=Rate of discharge \times average duration of use.No. of users = Number of times used \times Number of students or staff members.**Water storage: Storage capacity of tank****Calculation:** Length \times Breadth \times Height**Amount of water intake in-tank** = Discharge capacity of motors \times time (when the motor is on)**Water consumption:**

Storage tanks	Capacity (Liter)	Number	Number of times it is topped daily	Average time of water overflow	Total no of leakages	Rate of discharge
Main building						
NCC building						
Canteen						

ANNEXURE-3
Solid Waste Audit

Department/ Building:

No of classrooms and laboratory:

Total no of students:

Total no of employees:

Visitors:

Form for maintaining the record of solid waste:

Sr. No	Specification	Yes	No
1	Whether street sweepings burned, dumped to Dustbins.		
2	Whether solid waste properly stored/ containerized for Offsite disposal?		
3	Are solid accumulation areas labeled?		
4	Are the dustbins being present in all classrooms?		
5	Are one side papers reused by departments?		

ANNEXURE-4

QUESTIONARE FOR GREEN AUDIT

- 1). Why do you think an Environment-Green audit is necessary for an educational institution?
 - a) an audit will help determine which native species are best suited to an area
 - b) audits, when properly installed, reduce energy consumption
 - c) audits gather information to embarrass the administration into making changes
 - d) audits collect baseline information to assess where change will help and how much change has occurred

2. How safe is your college building / campus/ work environment?
 - a) Good
 - b) Very good
 - c) Exceptional
 - d) Bad

3. How would rate the sanitation infrastructure in college campus?
 - a) Good
 - b) Very good
 - c) Exceptional
 - d) Bad

4. What grade will you assign to the Drinking water facility?
 - a) Good
 - b) Very good
 - c) Exceptional
 - d) Bad

5. Have you personally tried or taken any social/ environmental / educational / conservation etc. initiatives inside or outside college campus?
 - a) Yes
 - b) No

6. Are you willing to take small additional responsibility for eco-friendly campus? *

- a) Yes
- b) No

7. Do you make an effort to reduce water / electricity Consumption?

- a) Yes
- b) No

8. Are you aware about carbon emission?

- a) Yes
- b) No

9. Do you always throw the plastic in dustbin?

- a) Yes
- b) No

10. I believe my health has already been affected by pollution?

- a) Yes
- b) No

11. Which of the following is a greenhouse gas

- a) Methane
- b) Carbon dioxide
- c) Nitrous oxide
- d) all of above

12. Humans were meant to rule over the rest of nature

- a) Agree
- b) disagree
- c) don't know

13. Write few suggestions for well-being of college campus.