

GREEN AUDIT REPORT

2020-2021



VASANT KANYA MAHAVIDYALAYA
(Admitted to the privileges of Banaras Hindu University)
KAMACHHA-221010
VARANASI



Prepared by
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Certificate

This is to certify that “Green Audit” for **Vasant Kanya Mahavidyalaya, Kamachha, Varanasi – 221010** has been conducted in March 2021 to assess the environmental impact and green initiatives planning and efforts made to implement them in the college campus based on institutional working framework. The Green initiatives carried out by the Institution was found to be satisfactory. The efforts taken by the management and faculty towards environment and sustainability are highly appreciated and commendable.

Place: Varanasi

Date: 25th March 2021

Kshul
25.3.21

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Green Audit Report



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Dr. Rachna Srivastava	Principal & Professor, Vasant Kanya Mahavidyalaya
Dr. Niharika Lal	Head & Professor, Department of English
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Dr. Anshu Shukla	Associate Professor, Department of Home Science
Dr. Anju Lata Singh	Assistant Professor, Department of Psychology
Dr. Ashish Kumar Sonkar	Assistant Professor, Department of Political Science

For giving us 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.

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Disclaimer:

Green Audit Team has prepared this report for VKM based on input data submitted by the representatives of college complemented with the best judgment capacity of the expert team. While all reasonable care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered. It is further informed that the calculations are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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Executive Summary

Educational institutions now a days are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. The activities pursued by colleges can create a variety of adverse environmental impacts. The environmental assessment should be conducted in such a way that it provides, as specifically as possible, a baseline reference for future sustainability programming. Green audit is defined as an official examination of the effects a college has on the environment.

Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green auditing and the implementation of mitigation measures is a win-win situation for all the college, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of green impact on campus. Green auditing promotes financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus, it is imperative that the college evaluate its own contributions toward a sustainable future.

In Vasant Kanya Mahavidyalaya, the audit process involved initial interviews with administration to clarify policies, activities, records and the co-operation of staff and students in the implementation of mitigation measures. This was followed by collection of data through the questionnaire, review of records, observation of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the green auditing process in the college.

The baseline data prepared for the Vasant Kanya Mahavidyalaya, will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development of the college. Existing data will allow the college to compare its programmes and operations with those of peer institutions, identify areas in need of improvement, and prioritize the implementation of future projects. We expect that the college administration will be committed to implement the green audit recommendations.

We are happy to submit this green audit report to the Vasant Kanya Mahavidyalaya authorities.

Prof. Kavita Shah
Institute of Environment and Sustainable Development
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1. INTRODUCTION

About the Vasant Kanya Mahavidyalaya

Vasant Kanya Mahavidyalaya is situated within the premises of the Theosophical Society at Kamachha, Varanasi. Established in 1954, it is run by Besant Education Fellowship and is affiliated to Banaras Hindu University. The college is situated in heart of Varanasi with a campus area of 10436.83 Sq. Mtr. The college at present runs Ph.D., Post-graduate and Undergraduate courses in arts and social sciences as well as Diploma courses sanctioned by UGC. With the motto of 'Education as Service', the institution aims at providing quality education and ensuring an all-inclusive growth. It cherishes the theosophical idea of Universal Brotherhood of Humanity, without distinction of race, creed, sex, caste and colour. The college has been accredited "A" by NAAC in its second cycle of accreditation in 2017.

Campus layout and map

S. No.	Building Name	G.F. Area (Sq.Mtr.)	F.F. Area (Sq.Mtr.)	S.F. Area (Sq.Mtr.)	T.F. Area (Sq.Mtr.)	Roof Area (Sq.Mtr.)
1.	Administrative Wing Block 'A'	325.75	325.75	-	-	325.75
2.	Academic Wing Block 'C'	411.61	411.61	-	-	411.61
3.	Annie Besant Academic Block – 1	354.86	354.86	354.86	-	354.86
4.	Annie Besant Academic Block – 2	192.81	192.81	-	-	192.81
5.	Library	104.12	104.12	-	-	104.12
6.	Leela Sharma Block	635.00	635.00	635.00	635.00	635.00
7.	Canteen	97.85	-	-	-	-
	Total covered area	2122.00	2024.15	989.86	635.00	2024.15

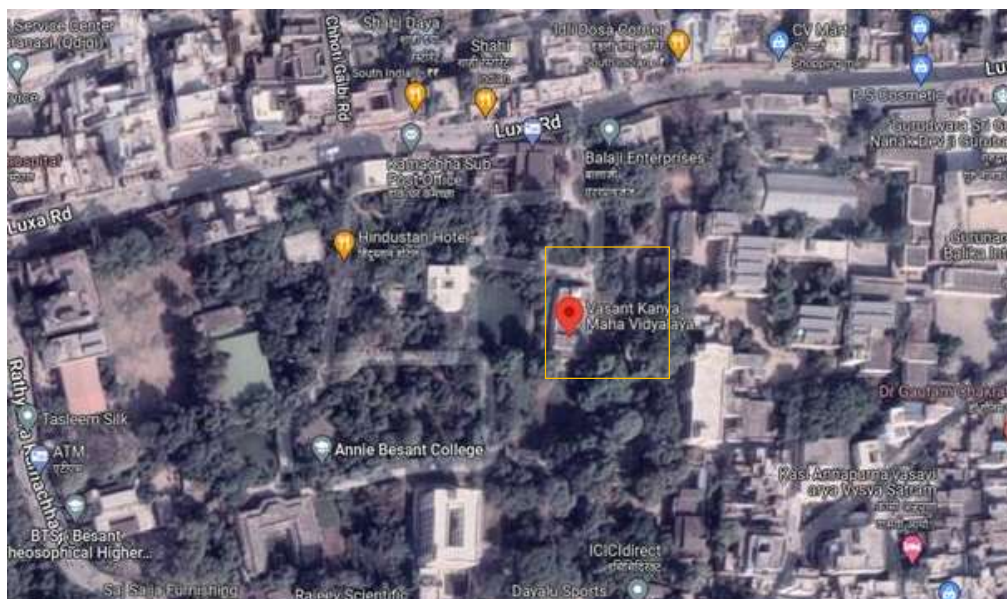


Figure 1: Satellite map showing location of Vasant Kanya Mahavidyalaya

General Information About the College:

A. General Information

Name of the institution	Vasant Kanya Mahavidyalaya
Address	Kamachha, Varanasi
Contact Details	0542-2455382, 09454329315
Website	www.vkm.org.in
Location	Urban

B. Infrastructure

Built up area (including others)	3968.03 Sq.Mtr. {2122.00 Sq. Mtr (VKM)}
Campus area	10436.83 Sq.Mtr.
Roof area	2024.15 Sq.Mtr.
Open space (including greenery area)	6468.83 Sq.Mtr.
Built up area (only VKM)	7795.46 Sq.Mtr.
Greenery area	2087.46 Sq.Mtr.
No. of auditorium - AC/Non-AC	01
Library	01
Laboratories	02
Pharmacy	Facility provided at the level of BHU
Playground	04
Students' hostels	No hostel available under the college, however facility for girls hostel provided by Theosophical Society
Canteen	01
Transport facilities	-

C. Courses and Class duration

Class duration	UG -3 years PG – 2 years Diploma in Spoken English – 6 months; Certificate in Spoken English – 1 year Certificate in Fashion Designing – 1 year Certificate in Self Realization through Theosophy – 6 months
Courses	UG – 15 PG – 11 Ph.D. – 5 Certificate – 3 Diploma – 1
Total No. of working days	262 days

D. Human Resources

Total Staff	Teaching – 47 Honorary/Guest Faculty – 17 Non-Teaching – 39
Total Student uptake 2020-21	Intake – 2398 Admitted – 1994
Teacher: Student Ratio	1:43
Girl Student: Boy Student Ratio	VKM is a Women’s College In UG & PG, only girls are admitted In Ph.D., there are 14 male students (997:7)

2. NEED FOR GREEN AUDIT

As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher education institutions in environmental sustainability becomes more pertinent. Green Audit is a process of systematic identification, quantification, recording, reporting, and determining whether institutional practices are eco-friendly and sustainable. It aims to analyse environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. Green audit is a useful ecological tool and official examination for a college to determine how and where they are in using the natural resources as energy or water, in view of which the college can consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for recycling project or to improve waste minimization. It allows the college to evaluate its own contributions towards a sustainable future.

The rapid urbanization and economic development at local, regional, and global level have led to several environmental and ecological crises. On this background it becomes

essential to adopt the system of the Green Campus for the institutes which will lead for sustainable development and at the same time reduce a sizable amount of atmospheric carbon-di-oxide from the environment. In recent times, the Green Audit of an institution has become of paramount importance for self-assessment of the institution which reflects its the role in mitigating the present environmental problems. VKM is committed to responsible stewardship of resources and to demonstrate leadership in sustainable academic practices. The college supports the climate neutrality goals as outlined by the Government of India and monitors the sustainability of the research and education mission through the Green Audit of its campus.

2.1 NAAC CRITERIA VII ENVIRONMENTAL CONSCIOUSNESS

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory for Higher Education Institutions to have an annual Green Audit Report under Criterion VII of NAAC. Moreover, it is part of Corporate Social Responsibility of the Higher Education Institutions to ensure that they contribute towards the reduction of global warming by taking measures to minimize their Carbon Footprint. Green Audit thus intends to upgrade the environmental condition inside and around the institution.

3. OBJECTIVES OF GREEN AUDIT

1. To assess the quality of water and soil in the VKM campus.
2. To quantify the solid and liquid waste generated on campus and its management
3. To provide environment management plans to the college.
4. To assess the performances in green practices on a yearly basis and identify strengths and weaknesses.
5. To prepare a list of green practices adopted by the college.
6. To provide a database for corrective actions and future development plans.
7. To identify the gaps and give recommendations to improve the Green Campus status of VKM.

4. AUDIT METHODOLOGY

The purpose of the green audit of VKM is to ensure following of green on campus. The present Green Audit of the Institution comprises of the following stages:

I. Pre-Audit Stage:

It involves the identification of target areas for auditing.

II. Audit Stage:

1. Review of previous records and policies
2. Onsite physical inspection of the campus
3. Interaction with the stakeholders
4. Collection of data and observation
5. Focus Group Discussions

III. Post-Audit Stage

It includes the data analysis, preparation of the final report, and recommendations to overcome the flaws and to keep a watch on the action plan.

4.1 MAJOR AREAS OF AUDIT REPORT

For Green Audit the following 5 major areas (including their subsections) were covered and compliance/ initiatives under these areas were verified/ validated.

- (i) Water Audit and its Management
- (ii) Energy Audit and its Management
- (iii) Waste Audit and its Management
- (iv) Green Campus Management
- (v) Carbon Footprint

5. WATER AUDIT AND ITS MANAGEMENT

Water Audit can be defined as a qualitative and quantitative analysis of water consumption to identify the means of reducing, reusing and recycling water. Water auditing is conducted to evaluate the quality, availability and usage of water; the facilities available and methods adopted to revitalize and use it so that the resources are intact without leading to deterioration. As per the standards provided by Manual on Water supply and Treatment, Ministry of Urban Development, GoI, water requirement for higher educational institute is 45L per capita.

The major water source in the campus is ground water. The college has 4 borewell in the campus out of which 3 are in working condition and are being used for water withdrawal. The daily water consumption for the entire campus when in full strength and operational is 7-8 KL per day. But during the covid period the water consumption per day was reduced to 790L. In the campus water is largely used for drinking, toilets, office, canteen, garden and laboratory. The organisation does not have any automatic leak detection system however, all the leakages are prevented by manual observation and through regular maintenance of pipelines. No leakage of water from pipes was observed by the auditing team.

Storage of water is in 2 overhead tanks, each with capacity of 25 KL of which 10KL capacity is reserved for use in firefighting system. Water from overhead tanks is then distributed to washrooms, basins, laboratory and water purifiers/ coolers installed in the college building. Water coolers fitted with RO purifiers are provided in each building in the campus as a source of safe drinking water. Third party contractor is appointed by the College for their annual maintenance.

Wastewater Management:

- Wastewater is mainly generated from washings, toilet flushing, canteen kitchen and washroom on each floor of all the buildings.
- Currently, sanitary wastewater generated is sent to municipal sewer line.

Average water consumptions in the year 2020 on campus

Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Daily Water Usage (kiloliter)	20/31= 0.64	20/28= 0.71	20/31= 0.64	7.5/30= 0.25	7.5/31= 0.24	7.5/30= 0.25	20/31= 0.64	20/31= 0.64	20/30= 0.66	20/31= 0.64	20/30= 0.66	20/31= 0.64

Water Usage – 2020- 2021

Hand Wash	4 times	4x0.5L	2L
Flush (Toilet)			5L
Drinking Water			1L
Total Water Usage by a person in a day			8L

Water Usage by 80 Persons	80x8L	640L
Gardening		150L
Total Water Usage in a day		790L

Considering Water Usage per day as 790L ~ 800L

Water Usage Approx 25 days (Monthly)	25x800L	20000L
	20KL	

At the time of COVID

Water Usage by 20 Persons	20x8L	160L
Gardening		150L
Total Water Usage in a day		310L

Let Water Usage per day 310L ~ 300L

Water Usage Approx. 25 days (Monthly)	25x300L	7500L
	7.5KL	

Water Conservation Initiatives:

1. **Rain water harvesting:** The rainwater harvesting strengthens the water supply to the campus as well as enhance water level of wells in the campus through ground water recharging process. VKM has rainwater harvesting system installed in the campus under the scheme of Uttar Pradesh Government. The rainwater is collected from the terraces of the 2 blocks and taken through pipes to the underground reservoir.

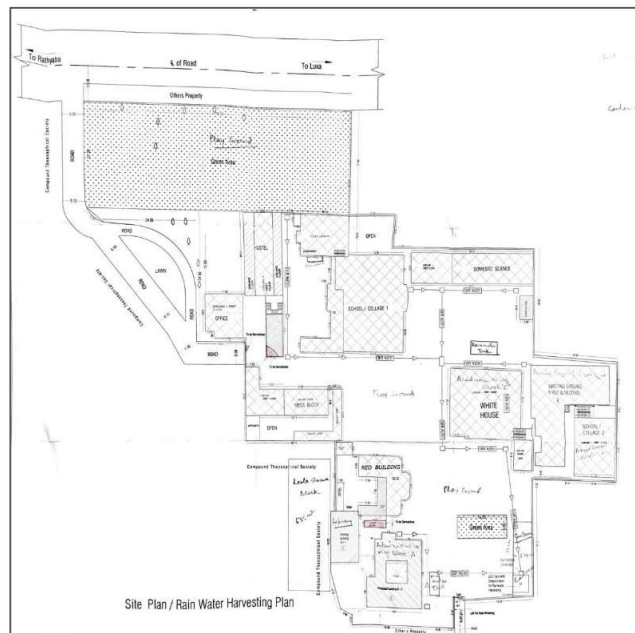


Figure 2: Rain water harvesting plan in the college premises



Figure 3: Rainwater Harvesting in places on the college premises

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2. **Water dripping from Air Conditioners:** The water dripping from Air Conditioners in the college is collected in the buckets to water plants in garden area inside the campus.
 3. **Reuse of the effluents of the Home Science Laboratory:** The water effluents from the laboratory of Home Science department is collected and channelled for gardening purposes.
 4. No leakage of water from faucets and pipes were noticed by the audit team.

6. ENERGY AUDIT AND ITS MANAGEMENT

According to Energy Conservation Act, 2001, Energy Audit is the verification, monitoring, and analysis of the use of energy including submission of a technical report containing recommendations for improving energy efficiency with cost-benefit analysis and an action plan to reduce energy consumption. The energy audit is key to a systematic approach for decision making in the area of energy management. The areas of major consumption of electricity by an institution include:

Lights	522
LED bulbs and tubes	522
CFL lights	-
Fans (ceiling + standing)	326
Computers and laptops	70
Projectors	10
CCTV cameras	7
LCD panels as notice boards	-
Air Conditioners	7 Pcs. (5 Pcs. – 2 Ton 2 Pcs. – 1.5 Ton)
Pumps	4 Pcs. (1 Pcs. – 3 HP 2 Pcs. – 1.5 HP 1 Pcs. – 0.5 HP)
Refrigerators	4 Pcs. (3 Pcs. – 185 L 1 Pcs. – 300 L)
Campus lights	Solar Power Generation-100KVA (Generation of Power to Grid) & 600 VA (with inverter); Tubelights & LED – 522; Flood Light – 9
Aquaguard water filters and coolers	5 Pcs. Aquaguard with Water Cooler 1 Pcs. Kent RO

Energy sources utilized by all the departments and services of college include electricity. The average electricity consumption is 2683.33 KWH/month for the year 2020 and 1971.42 KWH/month for the year 2021.

All the Electricity is supplied through “The Indian Section, The Theosophical Society”. The major use of the energy is at administrative building, academic buildings, Library, and canteen. In addition to this, there are two sound free diesel generator (DG sets) of 30 KVA capacity each installed for meeting the energy requirements during power cuts. Conventional tube lights, LEDs and fans are installed in classrooms, halls and library. For efficient energy consumption and saving on electric bill, the college has initiated the process of replacing incandescent bulbs and tube lights with LEDs.



Figure 4: DG sets for Electricity Backup

For the year 2020-2021, the LPG cylinder consumption is approximately 2 cylinder per month (commercial connection). LPG cylinders are used mainly in canteen kitchen for cooking. 1 cylinder of 19 kg generates 881.6 MJ (Mega Joules) of energy.

Energy consumption pattern of the college for a month:

S. No.	Electrical appliances/instruments	No.	Power (W)/unit	Total power (W)	kW	Operation /day	kW/hr	No of days in month	Total consumption per month
1.	LED bulbs and tubes	522	20	10440	10.44	6	62.64	25	1566
2.	Projector	10	280	2800	2.8	1	2.8	25	70

3.	Fan (ceiling + standing)	326	60	19560	19.56	6	117.36	25	2934
4.	Computer and Laptops	70	250	17500	17.5	4	70	20	1400
5.	A/C	7	7000	49000	49	1	49	15	735
6.	Refrigerator	4	150	600	0.60	24	14.4	30	432

Electricity Consumption at VKM campus

Electricity load (2-year average of 2020 and 2021) (Source: Electricity bill of the campus)												
Months	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average Daily Energy Usage (kWh)	2450.50/31 =79.04	2245.50/28 =80.20	1737.00/31 =56.03	1546.00/30 =51.53	1435.00/31 =46.29	1143.50/30 =38.12	1915.00/31 =61.77	2313.00/31 =74.61	2916.00/30 =97.20	1888.50/31 =60.92	1519.00/30 =50.63	1969.00/31 =63.52
Months with peak load	August, September											
Average Electricity Usage (1 year)												
Month	Units Consumed (KWH)	Bill Amount (Rs.)	Deduction for solar energy injection		Total Amount (Monthly Average) – Rs. 19274.16							
		Unit@9.81			Total Units (Monthly Average) – 1971.42 KWH							
Jan 2021	2060.00	20209.00	-									
Feb 2021	1605.00	15745.00	-									
Mar 2021	2070.00	20307.00	-									
April 2021	1479.00	14509.00	-									
May 2021	1194.00	11713.00	-									
June 2021	1535.00	15058.00	-									
July 2021	2411.00	23652.00	-									
Aug 2021	2557.00	25084.00	-									
Sept 2021	3562.00	34943.00	-									
Oct 2021	1510.00	14813.00	-									
Nov 2021	1693.00	16608.00	-									
Dec 2021	1981.00	18649.00	-									

Electricity Conservation Initiative:

1. **Centralized Solar Panels:** A 100KVA Photovoltaic Array has been installed on roof top of the college building which have been connected to the 600VA solar panel inverter. This is used in the lighting of the campus. This is the step forward for energy conservation reducing thereby the electricity consumption by the college.



Figure 5: Rooftop Solar Panels

2. **Energy efficient appliances:** The electrical appliances used in the college are star rated equipment which saves energy such as LED Bulbs/ CFL lights, 3-4 star rated air conditioners and refrigerators.



Figure 6: Energy saving 3-star AC installed in the Hall

3. **Signages:** The college campus has signages reminding people to turn off the light and fans in the rooms and laboratories.
4. **Fuel Energy Audit:** The fuel energy audit determines the approximate use of petrol or diesel by the vehicles inside the College. It also includes the efforts taken by the college to conserve the fuel. The conventional source of fuel for the vehicle is petrol and diesel. Maximum students, teaching and non-teaching staff of college and visitors use two-wheeler and four-wheeler vehicles. Number of four wheelers is 10 and they consume 1500 litres of fuel/month whereas 150 are two wheelers and they consume 15,000 litres of fuel/month.

Major findings are given in the table below:

1.	Total number of Students	1994
2.	Total number of Teachers	64
3.	Number of non-teaching staff	39
4.	Total number of vehicles used by the stakeholders of the college (per day)	510
5.	No. of cycles used	350
6.	No. of two wheelers used (average distance travelled and quantity of fuel and amount used per day)	150 (8 km/day and 30 litre of fuel/day)
7.	No. of cars used (average distance travelled and quantity of fuel and amount used per day)	10 (10 km/day and 7 litre of fuel/day)
8.	No. of parent-teacher meetings in a year? Parent turn up (approx.)	2 200 (approx.)
9.	No. of visitors with vehicles per day	10
10.	No. of generators used every day (hours). Give the amount of fuel used per day	1 hour 1.5 litre Diesel
11.	No. of LPG cylinders used in the canteen	2

5. **Fire Fighting System:** In VKM, ABC MAP 90 type fire extinguishers are placed at each floor. In the newly constructed Leela Sharma block a fire hydrant system is installed. A 10KL in water tank at the rooftop is reserved for the firefighting unit.

Fire Safety Audit	
Firefighting systems in main campus Details	- Fire Hydrant System (Complete Fire Fight System) installed in the Leela Sharma Block
Fire extinguishers installed and their types	7 Pcs. (ABC - MAP 90)
Fire exists	2

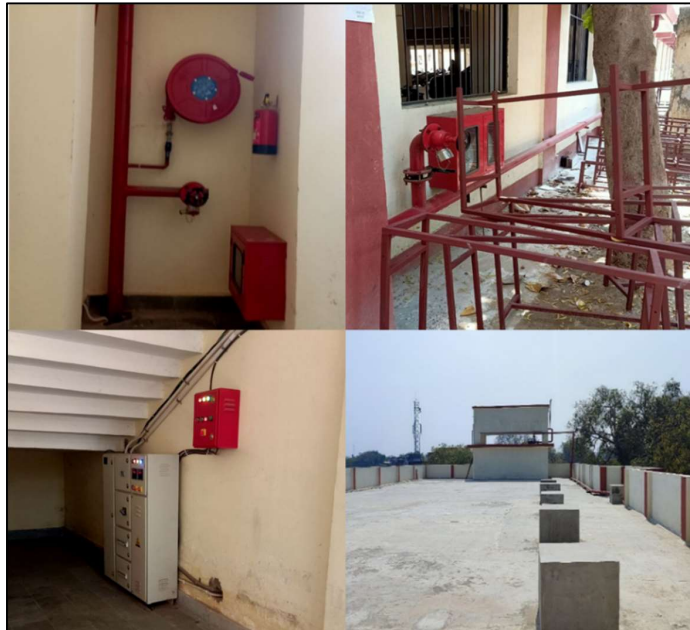


Figure 7: Fire Fighting System installed in Leela Sharma Block of VKM



Figure 8: ABC-MAP 90 type Fire Extinguisher installed at each floor of the campus building

7. CARBON FOOTPRINT

The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Among these greenhouse gases, carbon dioxide is the most prominent one, comprising of 416 ppm of the Earth's atmosphere. Each human being is contributing towards adding green-house gases to the atmosphere depending upon his day-to-day activities and usage of instruments and machineries for different purpose. A carbon footprint is the total sum of carbon dioxide emissions released into the Earth's atmosphere through by an organization, event, product, or a person.

An understanding about the same of any institute where large number of anthropogenic activities are happening is important to assess the contribution of emission of gases that are responsible for Green House Effect. Auditing for carbon footprint of VKM Campus was done using a detailed questionnaire, so that the impact of the community on environment can be assessed.

There are some standards and guidelines to measure GHG emissions like GHG protocol, ISO 14064, the more comprehensive one Life Cycle Assessment (LCA), market-based mechanisms like Clean Development Mission (CDM), and Voluntary Carbon Standards (VCS), etc. Out of them, ISO 14064 is an offset protocol and independent, voluntary GHG project accounting standard helps to quantify GHG emission of the organization, event, product, or person. From the provided data of annual electricity bill, annual fuel and LPG consumption of VKM College, the carbon footprint is calculated by multiplication with their emission factor which is about 12.35 tons (Kg of CO₂).

8. WASTE AUDIT AND ITS MANAGEMENT

Pollution from waste is aesthetically unpleasing and results in large amounts of litter in our communities which can cause health problems. Solid waste is the unwanted or useless solid material generated from all sorts of daily activities. Solid waste management averts the adverse impacts on the environment and human health.

Waste generation on campus

The solid waste data from the V.K.M. was collected from all the buildings along with support services. Different kinds of solid waste including paper wastes, canteen wastes, plastic wastes and e-wastes are generated in the campus. These solid wastes have been classified into two categories- biodegradable and non-biodegradable. Waste bins were provided on each floor, in staff rooms, laboratories, washrooms, kitchen and in campus area. Liquid waste generation from the two labs (psychology and home science) has also been recorded. No issues regarding municipal dump yard, garbage heap, sewer line, open drainage, etc in the near vicinity of the campus were recorded. Owing to the outbreak of COVID-19, a significant drop in the waste generation was observed.



Figure 9: Wastebins at different locations in the college premise

Biodegradable wastes

Bio-degradable wastes comprising of food wastes, canteen waste, and other organic wastes are added to a compost pit that is dug out. The organic wastes filled in the pits are subjected to composting which forms a best practice in the campus. In addition to the organic waste generated from different units, large sources of organic wastes other than kitchen wastes (college canteen, etc) like leave litter, terrestrial weeds etc that are generated from maintain and cleaning the campus are also added to the compost pit. All the paper waste generated from the classrooms, libraries, offices, etc is collected and sold out to the scrap dealers. Human waste is disposed via sewage pipes of the municipal corporation. Dustbins are installed in good numbers in all the buildings of the college to avoid littering.

Non-biodegradable waste

Non-biodegradable waste consisting of e-waste is weeded out by the college weed-out committee on the regular basis and given to the scrap-dealers who further re-cycle the waste. Remaining non-biodegradable wastes including plastic wastes, glass wastes, unused equipments and sanitary napkins are disposed off with the help of the municipal department.

Liquid waste disposal

Liquid waste generated from home science lab is used to water the flower beds that is situated just outside the lab area. The manure from the compost is used to fertilize these plantations as well.

Hazardous waste

There is no generation of any hazardous waste in the college.

9. GREEN CAMPUS MANAGEMENT

Water Quality Assessment

Water samples from three different borewell which are the main water source of the college campus were collected and analysed for its physicochemical parameters. The samples were collected, preserved and transported to the laboratory and analysed for various physio-chemical parameters. The major parameters analysed include dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, conductivity, total dissolved solids and salinity. The results are presented in the Table below. The results are comparable with the values of drinking water standards prescribed by different agencies.

Physicochemical parameters of borewell water samples

S.No.	Parameters	Borewell 1	Borewell 2	Borewell 3	Standard value (BIS)
1.	pH	7.5	7.2	7.5	6.5-8.5
2.	Total Dissolved Solids (ppm)	624	600	648	500
3.	Dissolved Oxygen (mg/l)	6.72	6.4	7.3	6-8
4.	Turbidity	Nil	Nil	Nil	1 NTU
5.	Conductivity (μ s)	143.3	99	179	-
6.	Acidity (mg/l)	56	22	22	200
7.	Alkalinity (mg/l)	16	24	18	200
8.	Salinity (ppt)	0.097	0.069	0.118	-
9.	Hardness (Total)	161	168	164	200
10.	Total coliform	Nil	Nil	Nil	0
11.	Fecal coliform	Nil	Nil	Nil	0

Soil Quality Assessment

Soil samples were collected from two different locations of the campus and analysed for the basic parameters. The results are tabulated and presented in the table below.

Soil Quality Assessment

S.No.	Parameter	Location 1 (Garden)	Location 2 (Ground)
1.	pH	7.3	7.1
2.	Total Kjeldhal Nitrogen (mg/kg)	2.7	2.6
3.	Total organic carbon (%)	1.4	1.1
4.	Phosphate (mg/kg)	0.2	0.1

Air Quality Assessment

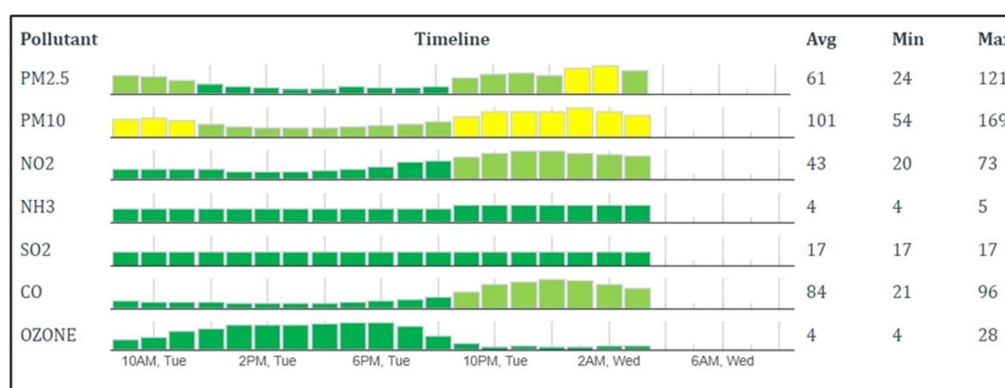


Figure 10: Concentration of air pollutant on the audit day

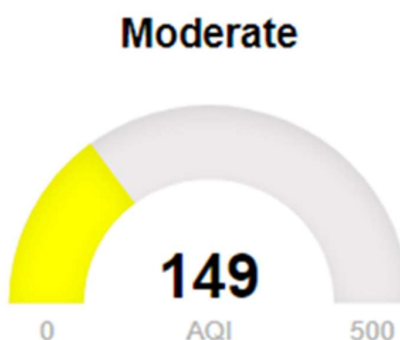


Figure 11: Air Quality Index on the audit day

Green cover

VKM garden is highly biodiverse and contains almost 100 species of plants, shrubs and trees. The garden area is spread in about 2087.46 sq.mtr., where students spend their free time during lunch and for reading books during lecture break. The college campus is divided into 4 blocks A, B, C, D and theosophical society area. All the blocks are full of greenery having diverse type of plant species, comprising mainly of ornamental plants and fruit bearing plants. Every year the college organizes 2 plantation campaign

for the students. The first plantation drive of the year is conducted during the month of July as “Varsha Mangal” program and later on a 7 days NSS camp is conducted in which an average 100 plants are planted by the students altogether. College does not have separate botanical, medicinal and vegetable garden. All the plants are randomly planted in the college premise and scientific names are not displayed. A small patch of mango and jackfruits trees are present in the theosophical society premise. Irrigation is performed mainly by groundwater borewell and by overflow water from the rooftop. The stakeholders in-charge of the garden area informed that instead of chemical fertilizers and pesticides, organic manures are used which is prepared from the compost pit of the college. The garden area also conserves rare and threatened species of plants, *Santalum album* (Chandan) in the college premises.

Green Initiative

1. Tree plantation and Annual village camp

The College has registered itself in the Unnat Bharat Abhiyan in March 2018, a programme launched by the Ministry of Human Resources Development (MHRD) for enabling the villages in India to achieve sustainable development and better quality of life. The College has adopted 5 villages to conduct the programme - Badagaon, Khushipur, Kukaraha, Badiasanpur and Paharigaon. On 17.03.2021, 50 students of the college went on a field tour of Badiasanpur village. The students planted neem and mango saplings in the village and carried an awareness programme among the villagers about environment conservation, non-use of polythene bags. The college has a Go-Green Committee which takes care of the greenery in the college campus. A trained gardener takes care of gardening and plantation.

2. Plastic free campaign

The college campus is declared as no polythene zone. Signage for promoting no polythene zone has been put up in the college premises.



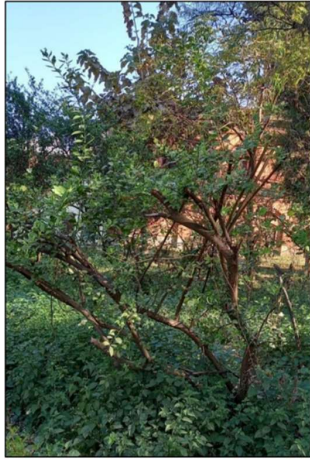
Figure 12: Initiatives taken to promote plastic free campus

- The bio-degradable waste is regularly buried in the earth. It not only supports carbon-neutrality but also produces excellent manure for plants.

Flora in the VKM campus:

S.No.	Common Name	Botanical Name	No. of Plants/ Shrubs/Trees
1.	Adenium (desert roses)	<i>Adenium</i>	1
2.	Alchornea	<i>Alchornea cordifolia</i>	12
3.	Allamanda	<i>Allamanda cathartica</i>	1
4.	Almond Tree	<i>Prunus dulcis</i>	1
5.	Amaltas	<i>Cassia fistula</i>	1
6.	Areca	<i>Dypsis lutescens</i>	7
7.	Ashoka (False Ashoka)	<i>Polyalthia longifolium</i>	18
8.	Bamboo	<i>Bambusa vulgaris</i>	2
9.	Banana Palm	<i>Musa</i>	1
10.	Begonia 'Vista	<i>King begonia</i>	1
11.	Bela (Mogra)	<i>Jasminum sambac</i>	2
12.	Bottle Palm	<i>Hyophorbe lagenicaulis</i>	1
13.	Bottlebrushes	<i>Callistemon</i>	4
14.	Butterfly	<i>Dypsis lutescens</i>	6
15.	Caterceterum Palm (Cat Palm)	<i>Chamaedorea cataractum</i>	2
16.	Champa	<i>Michelia</i>	2
17.	Christmas Tree	<i>Araucaria hetrophylla</i>	4
18.	Copper Leaf	<i>Acalypha weilkesiana</i>	1
19.	Crepe jasmine (Chandani)	<i>Tabernaemontana divaricata</i>	3
20.	Croton	<i>Codiaeum variegatum</i>	1
21.	Crown-of-thorns	<i>Euphorbia milii</i>	4
22.	Cycas Zamia	<i>Zamia</i>	1
23.	Dahlia	<i>Dahlia</i>	8
24.	Double Bensia	<i>Double bensia</i>	10
25.	Dumb Cane Plant	<i>Dieffenbachia bowmannii</i>	1

26.	Duranta	<i>Duranta erecta</i>	1
27.	Fan Palm	<i>Livistona chinensis</i>	4
28.	Fig (Anjeer)	<i>Ficus carica</i>	2
29.	Gandhraj	<i>Gardenia jasminoides</i>	1
30.	Giant Bamboo	<i>Dendrocalamus giganteus</i>	1
31.	Gudhal	<i>Hibiscus</i>	11
32.	Guldaudi	<i>Chrysanthemum</i>	2
33.	Ixora	<i>Ixora coccinea</i>	1
34.	Jack Fruit Tree	<i>Artocarpus heterophyllus</i>	2
35.	Kachnar	<i>Bauhinia variegata</i>	1
36.	Kamini	<i>Murraya paniculata</i>	5
37.	Kaneir or Kane	<i>Cascabela thevetia</i>	1
38.	Koliyas	<i>Spathiphyllum</i>	1
39.	Lal patti	<i>Iresine herbstii</i>	1
40.	Lily	<i>Lilium</i>	1
41.	Mango	<i>Mangifera indica</i>	2
42.	Monstera	<i>Monstera deliciosa</i>	1
43.	Morpankhi	<i>Platycladus orientalis</i>	3
44.	Moulsari Tree	<i>Mimusops elengi</i>	1
45.	Naagdon	<i>Euphorbia tithymaloides</i>	5
46.	Neem	<i>Azadirachta indica</i>	2
47.	Night-blooming jasmine (RatRani)	<i>Cestrum nocturnum</i>	1
48.	Parijat	<i>Nyctanthes arbor-tristis</i>	2
49.	Parlour Palm	<i>Chamaedorea elegans</i>	4
50.	Ponytail Palm (Lolina)	<i>Beaucarnea recurvata</i>	1
51.	Pteris	<i>Pteris vittata</i>	2
52.	Rose	<i>Rosa</i>	1
53.	Rubber fig	<i>Ficus elastica</i>	1
54.	Sadabahar	<i>Catharanthus roseus</i>	2
55.	Shirisha Tree	<i>Albizia nedbeck</i>	2
56.	Sleeping Hibiscus/ Mirchi Gudhal	<i>Malvaviscus</i>	1
57.	Swarna champa	<i>Magnolia champaca</i>	1
58.	Tecoma	<i>Tecoma stans</i>	1
59.	Tulsi	<i>Ocimum tenuiflorum</i>	2



Citrus limon
Lemon



Polyalthia longifolium
False ashoka



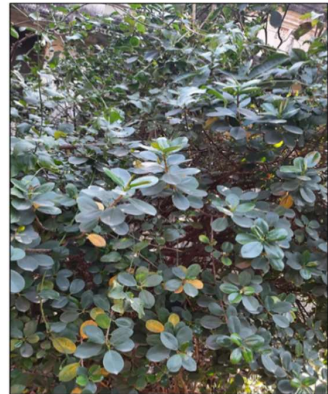
Eucalyptus
Gum tree



Manilkara zapota
Chikoo



Platycladus orientalis
Morpankhi



Ficus elastica
Rubber fig

List of Flora found in the Theosophical Society Campus:

1. Plants:

S. No.	Name	Botanical Name	No. of plants
1.	Adusa	<i>Justicia adhatoda</i>	2
2.	Ajooba	<i>Kalanchoe pinnata</i>	30
3.	Arica palm	<i>Dypsis lulescena</i>	15
4.	Bottle brush	<i>Callistemon citrinus</i>	4
5.	Bottle palm	<i>Hyophorbe leganicaulis</i>	8
6.	China palm	<i>Liuidstonia chinesis</i>	32
7.	Chitwan	<i>Alstonia scholaris</i>	4
8.	Croton	<i>Codiaeum variegatum</i>	120
9.	Cycas	<i>Cycas zamia</i>	8
10.	Dawna	<i>Artemisia pallens</i>	4
11.	Euphorbia	<i>Euphorbia ingens</i>	10

12.	Euphorbia	<i>Euphorbia ingens</i>	10
13.	Golden Duranta	<i>Duranta erecta</i>	100
14.	Golden trumpet	<i>Allamenda cathartical</i>	6
15.	Hatjod	<i>Cissus quadrangularis</i>	1
16.	Henna tree	<i>Lauesonia inermis</i>	10
17.	Jatropha	<i>Jatropha curcas</i>	17
18.	Kathari champa	<i>Arlaleotrys oeloratissimus</i>	6
19.	Lasoda	<i>Cordia dichotoma</i>	2
20.	Meethi neem/ Curry leaves	<i>Murraya koenigii</i>	10
21.	Morphankhi	<i>Plalycladus orientalis</i>	30
22.	Myrtales	<i>Lummitzera littorea</i>	6
23.	Panchiyana	<i>Delonix regia</i>	8
24.	Phoenix palm	<i>Phoenix canariensis</i>	10
25.	Rabar	<i>Ficus elastica</i>	18
26.	Red Powder Puff	<i>Calliandra haematocephala</i>	4
27.	Rhapis palm	<i>Rhapis excelsa</i>	10
28.	Sago palm	<i>Cycas revoluta</i>	8
29.	Sanai	<i>Crotealaria juncea</i>	8
30.	Satwari	<i>Asparagus racemosus</i>	6
31.	Savaani	<i>Laigarastromiya indica</i>	8
32.	Semal	<i>Bombax ceiba</i>	4
33.	Tecoma	<i>Tecoma stans</i>	4



Arlaleotrys odoratissimus
Kantili champa/Nag champa



Bombax ceiba
Semal



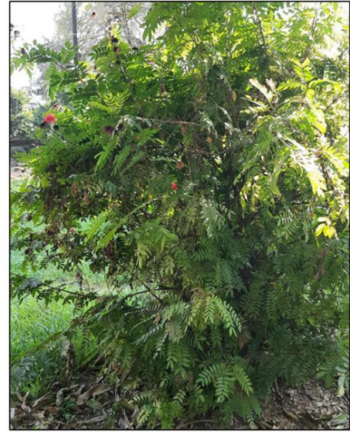
Zamia
Cycas Zamia



Livistona chinensis
China palm



Ficus carica
Anjeer



Calliandra haematocephala
Red Powder Puff



Hyophorbe lagenicaulis
Bottle palm



Bougainvillea
Booganbel

2. Trees:

S. No.	Name	Botanical Name	No. of trees
1.	Amaltas	<i>Cassia fistula</i>	10
2.	Ashoka (False Ashoka)	<i>Polyalthia longifolium</i>	80
3.	Cassia	<i>Genus cinnamemum</i>	6
4.	Chandan	<i>Santalum alleum</i>	4
5.	Cockscomb	<i>Celosia orgentea</i>	1

6.	Doub Palm	<i>Berassus flabellifer</i>	3
7.	Gular	<i>Cluster fig</i>	2
8.	Gulchin	<i>Terminalia arjuna</i>	6
9.	Gulmohar	<i>Delonix regia</i>	6
10.	Imily	<i>Tamarindus indica</i>	2
11.	Jackfruit	<i>Artocarpus heterophyllus</i>	13
12.	Jungal jalebi	<i>Pithecellobium dulce</i>	8
13.	Kaath badaam	<i>Terminalia caloppa</i>	3
14.	Kadam	<i>Neolamarckia cadamba</i>	1
15.	Naagdauna	<i>Artemisia absinthium</i>	97
16.	Neem	<i>Azadirachta indica</i>	8
17.	Pakad	<i>Ficus virens</i>	1
18.	Peepal	<i>Ficus religiosa</i>	4
19.	Sagaun	<i>Tectona</i>	35
20.	Sirish	<i>Alleizia lebbeck</i>	12
21.	Sisham	<i>Dalbergia sisseo</i>	5
22.	Vat vricha	<i>Ficus benghalensis</i>	1



Terminalia caloppa
Kaath badaam



Cordia dichotoma
Lasoda



Santalum album
Chandan

3. Flower:

S. No.	Name	Botanical Name	No. of plants
1.	Adenium	<i>Adenium obesum</i>	6
2.	Bambetiya	<i>Beugainvillia</i>	8
3.	Bichhi adhul	<i>Hibiscus</i>	10
4.	Chandni	<i>Tabernalmontana divaricata</i>	15
5.	Gandhraaj	<i>Gardenia jasmineides</i>	6
6.	Gudanad	<i>Cordia dichotoma</i>	1
7.	Gulab	<i>Genus rosa</i>	500(more)
8.	Harsringaar	<i>Nyctanthes arbor-tristis</i>	8
9.	Juhi	<i>Jasminum auriculatum</i>	2
10.	Kaamni	<i>Calophyllum inophyllum</i>	More than 3 thousand

11.	Kachnar	<i>Bauhinia variegata</i>	8
12.	Kamal/Lotus	<i>Nelumbo nucifera</i>	20
13.	Kaner	<i>Cascabela thevetia</i>	4
14.	Madhumalti	<i>Cambretum indicum</i>	1
15.	Paaras	<i>Thespesia populnea</i>	4
16.	Raat raani	<i>Cestum nocturnum</i>	7
17.	Rukmanjani	<i>Memecylon umlellatum</i>	More than 100
18.	Savani	<i>Lagerstroemia indica</i>	
19.	Yellow carnell	<i>Cascabela thevelia</i>	10



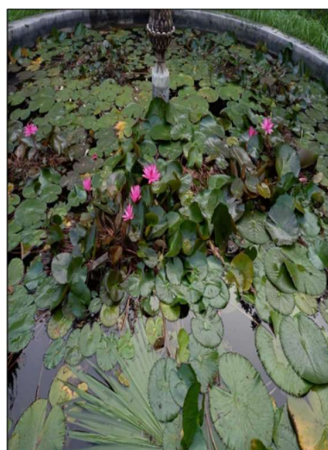
Rosa
Rose



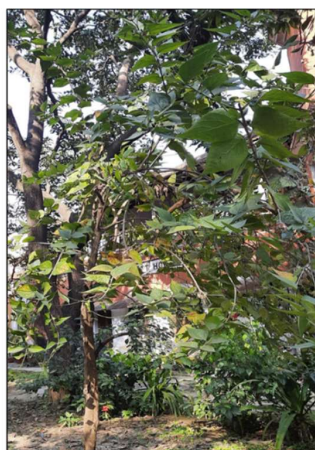
Kalanchoe pinnata
Ajooba



Murraya koenigii
Curry Leaf



Nelumbo nucifera
Kamal/Lotus



Nyctanthes arbor-tristis
Parijat/ Harsingar



Bauhinia variegata
Kachnar

4. Fruit:

S. No.	Name	Botanical Name	No. of trees/plants
1.	Amada	<i>Spondias mombin</i>	4
2.	Amla	<i>Phyllanthus emblica</i>	6
3.	Anjeer	<i>Ficus carica</i>	1

4.	Apple	<i>Malum domestica</i>	1
5.	Calamansi	<i>Citrofortunella mitis</i>	4
6.	Custard apple	<i>Annona squamosa</i>	8
7.	Guava	<i>Psidium guajava</i>	10
8.	Indian bael	<i>Aegla marmelos</i>	10
9.	Indian jujube	<i>Ziziphus mauritiana</i>	1
10.	Lemon	<i>Citrus limon</i>	25
11.	Lychee	<i>Litchi chinesis</i>	3
12.	Mahua	<i>Madhuca longilolia</i>	2
13.	Mango	<i>Mangifer indica</i>	50
14.	Orange	<i>Citrus sinensis</i>	2
15.	Pomegranate	<i>Punica garnatum</i>	6
16.	Sahtoot	<i>Morus alba</i>	3
17.	Sapodilla/Chikoo	<i>Manilkara zapota</i>	4
18.	Sweet lemon	<i>Citrus limetta</i>	3

5. Vine:

S. No.	Name	Botanical Name
1.	Double beans	<i>Phaseolus lunatus</i>
2.	Giloy	<i>Tinospora cordifolia</i>
3.	Monstera	<i>Monstera deliciosa</i>
4.	Shivling	<i>Couroupita guianensis</i>

6. Grass:

S. No.	Name	Botanical Name
1.	Kaalmedh	<i>Andrographis paniculata</i>
2.	Kaleen Ghas	<i>Axonopus</i>

10. CONCLUSION AND RECOMMENDATIONS

Green audits “adds value” to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks (both known and unknown). The green audit reports assist in the process of attaining an eco-friendly approach to the development of the college. Hope that the results presented in the green auditing report will serve as a guide for educating the college community on the existing environment related practices and resource being used at the college as well as spawn new intricacies and innovative practices.

Due to the onset of Covid -19 pandemic the college has been functioning in online mode since March 2020 as students were asked to stay back home. Therefore, the green audit for this academic is not a true reflection of an institution running in full physical mode with students and faculty. Nevertheless, in view of the findings of the green audit team some of the recommended actions are suggested to support the management practices of VKM. These actions if considered and implemented between audits it will help the college to grow in a clean and green sustainable campus.

Actions recommended from green audit are mainly minor adjustments in management practices. Some actions require purchases to replace inefficient items. Such action could be expected to be implemented between audits or at least considered and rejected, based on factors other than environmental protection grounds.

- Signage on water conservation were not seen in washrooms or near water purifiers.
- Conduction of “switch off” drills in the campus to create awareness among the students for energy conservation.
- Scientific names of the plants and trees in the campus premise should be displayed.
- A centralized system of recycling paper could be adopted.
- Segregation of biodegradable and non-biodegradable wastes should be practiced by the students while disposing off the wastes.
- Separate bins should be installed for the disposal of different kinds of solid waste.
- Covered waste bins should be installed in each washroom and classroom.
- Replacing the old tube lights with the new LED tubes.
- 5–star rated Air Conditioners, Fans and CFLs should be used.
- In campus premises electricity should be shut down from main building supply after occupancy time, to prevent power loss due to eddy current.