GREEN AUDIT REPORT
(2021-2022)

Vidya Vikas Mandal's Pathrud

Shankarrao Patil Mahavidyalaya, Bhoom

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1.0 ACKNOWLEDGEMENT

Sahyagiri Enterprises Green Audit Team thanks the management of Shankarrao Patil Mahavidyalaya for assigning this important work of Green Audit. We appreciate the co-operationm to our team for completion of study.

Our special thanks to:

- Principal of the college – Dr. S. B. Chandanshiv
- IQAC Head – Dr. A. S. Jagdale
- IQAC Member – Dr. D. V. Shinde
- Environment Expert at the campus – Dr. N. D. Padwal
- Green Audit coordinator– Shri. G. S. Khandare
- Teaching & Supporting Staff of College

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.

2.0 DISCLAIMER

Sahyagiri Enterprises Green Audit Team has prepared this report for Shankarrao Patil Mahavidyalaya based on input data submitted by the representatives of College complemented with the best judgment capacity of the expert team.

It is further informed that the conclusions 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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Report by: Mayuri M. Jadhav

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3.0 CONCEPT

Green Audit is defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The 'Green Audit' aims to analyse environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth of carrying out Green Audit. Green audit is assigned to the criteria 7 of NAAC, (National Assessment and Accreditation Council) which is a self-governing organization of India which declares the institutions as per scores assigned during the accreditation.

4.0 INTRODUCTION

A Nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. Educational institutions now days are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc. The activities pursued by colleges can also create a variety of adverse environmental impacts.

Environmental auditing is a process whereby an organization's environmental performance is tested against its environmental policies and objectives. Green audit is defined as an official examination of the effects a college has on the environment. As a part of such practice, internal environmental audit (Green Audit) is conducted to evaluate the actual scenario at the campus.

Green audit is 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 promote 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. Thus it is imperative that the college evaluate its own contributions toward a sustainable future. As environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues.

Environmental Management Systems (EMS) is very popular in the industrial sector, but the general belief is that EMS is something pertaining to industries only. Other parts of the

world have started adopting compatible environmental management systems either voluntarily or for promoting standards by external certification. International environmental standards do not suit the existing Indian educational system. Hence Sahyagiri Enterprises has developed a compatible system by developing locally-applicable techniques.

A very simple indigenized system has been devised to monitor the environmental performance of educational institutions. It comes with a series of questions to be answered on a regular basis. Environmental conditions may be monitored from angles that are relevant to Indian requirements, without stress on legal issues or compliance.

This innovative scheme is user-friendly and totally voluntary. The environmental monitoring system helps the institution to set environmental examples for the community and to educate young learners. It can be adapted to urban and / or rural situations.

5.0 OVERVIEW OF INSTITUTE

Vidya Vikas Mandal, Pathrud established Shankarrao Patil Mahavidyalaya, in 1984. It is matter of great pride and honour to lead Sharnakrao Patil Mahavidyalaya at this historic location. Vidya Vikas Mandal was established by founder Chairman Shri. Rambhau Narhari Borade with a commitment to provide quality education to the students from remote villages of Bhoom Taluka.

This institution aims at academic excellence and social justice through education. Shankarrao Patil Mahavidyalya has become a center of academic activities in this region. The college began with Arts and Commerce faculties. In 2003, Faculty of Science was also introduced. The college is permanently affiliated to Dr. Babasaheb Ambedkar Marathwada University and has acquired 12B and 2F status of the UGC. In all these courses, the students are encouraged to undertake research projects and participate in extracurricular, co-curricular and sports activities. College has 3.5 Acre campus Area. College is accredited by NAAC.

College provides instructions to the students for three year degree courses B.A., B.Com. B.Sc. The college, right from its inception has shown academic excellence and students have won meritorious awards and have maintained top ranks in the University examinations as well as in extra-curricular activities. Total Student strength of college is 682. College has total 27 teaching staff and 7 non-teaching staff. College has highly qualified staff.

The infrastructure of a college plays a vital role in the development of the college as the students are now focusing on the labs, class rooms, etc. while selecting a college. It is important that the college has very good infrastructure with ICT Based Classrooms, Specious Labs, I.Q.A.C Department, NSS, Separate Canteen, Playground and Store Rooms etc. Various indoor and outdoor games are conducted by college.

The college has also adopted the 'Green Campus' system for environmental conservation and sustainability. The goal is to reduce CO_2 emission, water use while creating an atmosphere where students can learn and be healthy.

6.0 AUDIT OBJECTIVES AND SCOPE

The main objective of the green audit is to promote the Environment Management and Conservation in the College Campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards. The main objectives of carrying out Green Audit are:

- To introduce and aware students to real concerns of environment and its sustainability.
- To secure the environment and cut down the threats posed to human health by analysing the pattern and extent of resource use on the campus.
- To establish a baseline data to assess future sustainability by avoiding the interruptions in environment that are more difficult to handle and their corrections requires high cost.
- Developing an environmental ethic and value systems in young people.
- Improving environmental standards.
- Benchmarking for environmental protection initiatives.
- Enhancement of College profile.

7.0 EXECUTIVE SUMMARY

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. On this background it becomes essential to adopt the system of the Green Campus for the institute which will lead for sustainable development.

An environmental audit is a snapshot in time, in which one assesses campus performance in complying with applicable environmental laws and regulations. Though a helpful benchmark, the audit almost immediately becomes out-dated unless there is some mechanism in place to continue the effort of monitoring environmental compliance.

Shankarrao Patil Mahavidyalaya done internal green assessment and annual reports published for continual improvements; QS Programme and doing their bid towards environmental protection and environmental awareness at local and global front.

The methodology include: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. It works on the several facets of 'Green Campus' including Water Conservation, Tree Plantation, Waste Management, Paperless Work, Alternative Energy and Mapping of Biodiversity.

This audit report contains observations, appreciations and recommendations for improvement of environmental consciousness.

8.0 METHODOLOGY

In order to perform green audit, the methodology included different tools such as preparation of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurements and recommendations. The study covered the following areas to summarize the present status of environment management in the campus:

- Waste Management
- Energy Conservation
- Water Conservation
- Green area management/biodiversity survey
- Carbon Footprint
- Best Practices for Environment

9.0 OBSERVATIONS, APPRECIATIONS AND RECOMMENDATIONS

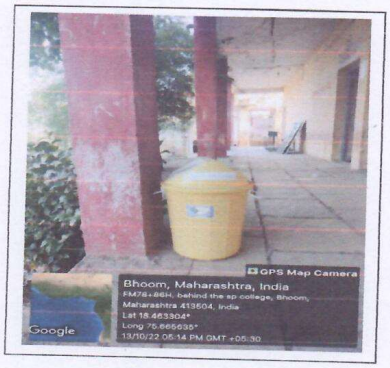
9.1 WASTE MANAGEMENT

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable, construction, glass, dust etc. and recycling. Furthermore, solid waste often includes wasted material resources that could otherwise be channeled into better service through recycling, repair and reuse. Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. The survey focused on volume, type and current management practice of solid waste generated in the campus. The different solid wastes collected as mentioned above.

A) Observations:

The total organic waste collected in the campus is 30 kg/month. Waste generated from canteen and garden is a major solid waste in the campus. Near about 5 kg/month of non-biodegradable waste is generated in the campus including glass bottles. Near about 25-30 lit/day chemical waste is generated from laboratories. The waste is segregated at source by providing separate dustbins for Bio-degradable, Non-Bio-degradable. Single sided used papers reused for writing and printing in all departments. Approx.1 kg/month plastic waste is generated by departments, office, garden etc. but it is neither categorized at point source nor sent for recycling. College has not E-waste collection centre. The institute doesn't have composting unit but the waste generated from the trees is collected at the base of each tree and it naturally forms compost and used as manure for trees. The main purpose of this is to breakdown & decomposes all kind of organic waste by using microorganisms that require oxygen called compost. After complete process of composting, it is used as manure in the garden.

Composting at the base of each tree



Dustbins are provided in the campus for Degradable and Non-Degradable waste

Dustbins are provided throughout the college premises for waste collection

B) Appreciations:

- Each and every place of campus is provided with dustbin.
- Laboratory waste is properly disposed in soak pit.
- Reuse of paint buckets as a dustbins in the campus.
- Paper waste generated from office, laboratories and departments are transported to the vendors for recycling.
- Every department and office tries to reduce consumption of paper.
- College reuses empty side of printed paper.

C) Recommendations:

- Make full use of all recycling facilities provided by City Municipality and private suppliers, including glass, cans, plastic bottles, batteries, print cartridges, cardboard and furniture.
- Provide sufficient, accessible and well-publicized collection points for recyclable waste with responsibility for recycling clearly allocated.

- There should be E- waste collection centre in campus.
- Collected E-waste should supply to E-waste management and disposal facility in order to dispose E-waste in scientific manner.

9.2 WATER CONSERVATION

This indicator addresses water consumption, water sources, irrigation, storm water appliances and fixtures. A water audit is an on-site survey and assessment to determine the water use and hence improving the efficiency of its use.

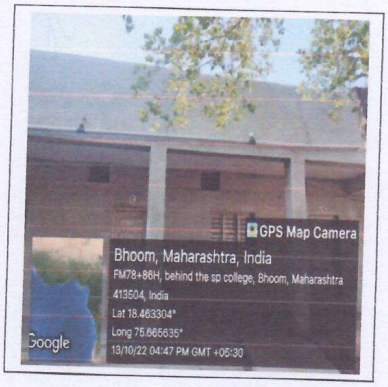
A) Observations:

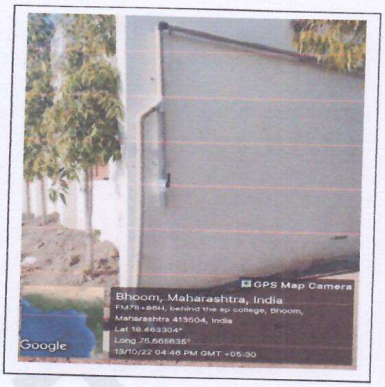
The study observed that bore well water and corporation water is main sources of water in the campus. Water is used for drinking, canteen, toilets, laboratory and gardening purpose. During the survey, no loss of water is observed, through leakages and no over flow of water from overhead tanks. The data collected from all the departments is examined and verified. On an average the total use of water in the college is 9,000 L/day, which include 7,500 L/day for domestic purposes, 1,000 L/day for gardening and 5,00 L/day for different laboratories. College has 1 R.O systems having capacity 100 LPH. The college has not rain water harvesting facility in a campus. Water used for drinking purpose analyzed as per IS 10500:2012 drinking water specification and observed it was potable.

Daily Water Consumption

Parameter	Quantity	Total water consumption
Total tanks	5	9 m3
Garden water consumption	1 m3	
College building water consumption	7.5 m3	
R.O. water consumption	0.5 m3	

R.O. System





Rainwater Harvesting System

Water Sample Analysis Report

Sr. No.	Parameters	Results	Acceptable Limit as per IS 10500: 2012	Units
1.	Colour	< 1	Max. 5	Hazen Units
2.	Odour	Agreeable	Agreeable	-
3.	pH	7.04	6.5-8.5	-
4.	Turbidity	0.7	Max. 1	N.T.U.
5.	Total Dissolved Solids	90	Max.500	mg/L
6.	Calcium (as Ca)	18	Max.75	mg/L
7.	Chloride (as Cl)	15	Max.250	mg/L
8.	Floride (as F)	*< 0.05*	Max.1	mg/L
9.	Iron (as Fe)	<0.06	Max.0.3	mg/L
10.	Magnesium (as Mg)	9	Max. 30	mg/L
11.	Alkalinity (as $CaCO_3$)	32	Max.200	mg/L
12.	Nitrate (as NO_3)	5.19	Max. 45	mglL
13.	Sulphate (as SO_4)	2.95	Max.200	mglL
14.	Total Hardness (as CaCO3)	59	Max.200	mg/L
15.	E. coli	Absent	Not Detectable	/100 ml
16.	Total Coliforms	Absent	Not Detectable	/100 ml

B) Appreciations:

- Water is properly used in the campus and water reusing strategy is followed by the college.
- R.O. reject water is reused for washrooms.
- Rain water is collected and reused for gardening purpose. Waste water from R.O. is reused for gardening purpose.
- Waste water generated from campus is collected in septic tank.

C) Recommendations:

- Year wise water consumption report.
- Maintenance of R.O. system is necessary.
- Provide leakage free water taps.

9.3 ENERGY CCONSERVATION:

A) Observations:

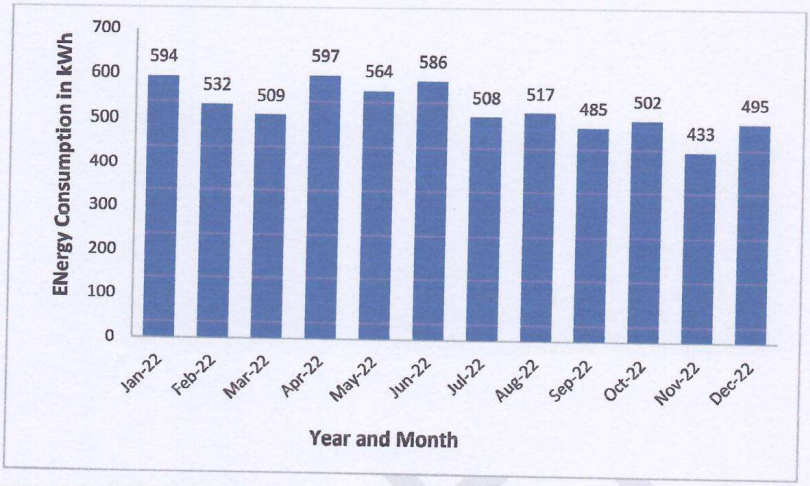
This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliance, natural gas and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment.

Energy source utilized by all the departments and common facility center is electricity only. Maximum energy consumption is by major energy consuming equipment.

All the departments and common facility centers are equipped with LED lamps. Approximately 27 computers, 9 printers, 60 LED bulbs, 13 fans, 2 projectors, 2 A.C with 3star rating, 3 LED screens these all are observed during the survey. Equipment like Computers is used with power saving mode. Also, campus administration runs switch-off drill on regular basis. In various labs after completion of work, electricity was shut down; it is one of the practices for energy conservation.

The campus imports electricity from Maharashtra State Electricity Distribution Co. Ltd. The total electricity that was imported by the college during the year 2021-2022 is as shown below. Total 12 month's energy consumption of the campus is presented below for the year 2021-2022. The graph shows that institute requires more electricity and it costs too much. If instate install solar panels then it will saves electricity charges.

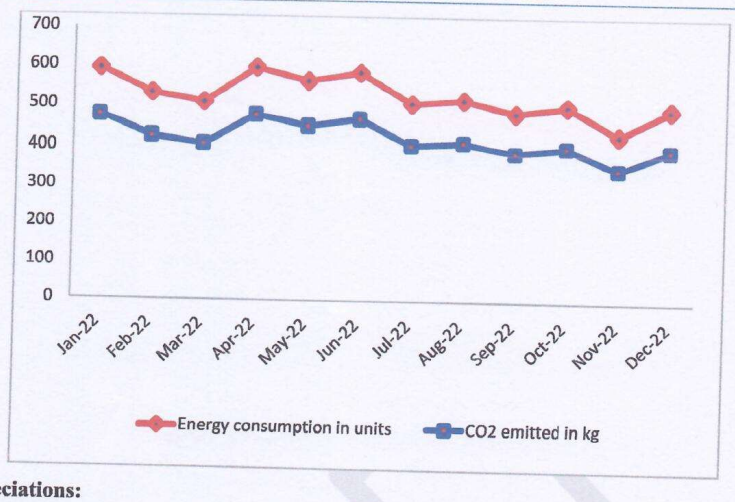
Month	Energy consumption in units
January -2022	594
February -2022	532
March -2022	509
April -2022	597
May -2022	564
June -2022	586
July -2022	508
August -2022	517
September -2022	485
October -2022	502
November -2022	433
December -2022	495
Avg.	526.83



CARBON- DIOXIDE EMISSION

For consumption of 1 Unit (1 kWh) of Electricity, the CO_2 emitted is 0.8 Kg. OR the Emission is 0.8 Kg/kWh. In the following Table we present the total units consumed and CO_2 emitted as under:

Sr.No.	Month	Energy consumption (kWh)	CO_2 emitted in kg
1	January -2022	594	475.2
2	February -2022	532	425.6
3	March -2022	509	407.2
4	April -2022	597	477.6
5	May -2022	564	451.2
6	June -2022	586	468.8
7	July -2022	508	406.4
8	August -2022	517	413.6
9	September -2022	485	388
10	October -2022	502	401.6
11	November -2022	433	346.4
12	December -2022	495	396
13.	Avg.	526.83	421.4667



B) Appreciations:

- Appreciate that college has 5 & 3 star electrical appliances like A.C.
- Campus is well equipped with LED lamps.

C) Recommendations:

- Try to install solar street light throughout the campus.
- Installation of solar power plant is necessary.

9.4 GREEN AREA MANAGEMENT/BIODIVERSITY SURVEY

This includes the plants, greenery and sustainability of the campus to ensure that the buildings conform to green standards. This also helps in ensuring that the Environmental Policy is enacted, enforced and reviewed using various environmental awareness programs.

A) Observations:

To create- green cover, eco-friendly atmosphere, pure oxygen at the college campus, plantation program is organized every year with involving all students, principal and all departments faculty members.

Campus is located in the vicinity of approximately 50 (species) of trees total no. 150, 25 (species) of shrubs total no.60. Approximately 15 species of birds, 8 species of mammals and 4 species of reptiles are found in the campus. Various tree plantation programs are being organized during the month of July and August at college campus and outside the college campus. This program helps in encouraging eco-friendly environment which provides pure oxygen within the institute and awareness among students and staff members. The plantation program includes plantation of various type of indigenous species of ornamental and medicinal as well as wild plant species under the biodiversity and ecological survey. The Institute has a policy of gift a plant to guests in any program. It is a good thing for environment.

Green Campus

B) Appreciations:

- Appreciate that the college has variety of trees, bushes & shrubs.
- Appreciate that college celebrates 1st June as 'Krushi Din', every year and plant trees on this day to make the campus Greener.
- Appreciate that college celebrates 5th June as 'Environment Day', every year and plant trees on this day to make the campus Greener.

C) Recommendations:

- Review periodically the list of trees planted in the campus and keep records.
- Try to plant more trees in the campus.
- Promote environmental awareness as a part of course work in various curricular areas, independent research projects and community services.

- Ensure that an audit is conducted annually. And action is taken on the basis of audit report and recommendation and findings.

9.6 CARBON FOOTPRINT

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

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

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

a) Carbon Emissions:

List of carbon emissions

Classification/Scope	Sources	Description
Scope 1 (Direct)	Equipments usage	LPG, D.G.
Scope 2 (Indirect)	Electricity Use	Shankarrao Patil Mahavidyalaya uses electricity to heat, cool, light, and run appliances at its facilities.
Scope 3 (Indirect)	Employee commuting	Employees commute from their residences to the college

Emission Data and Calculations:

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

Scope 1 Emissions

They don't have LPG or D.G. set in campus.

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

Emissions from Purchased electricity:

Indirect Emissions /scope 2 emissions

Type of Emission	Quantity	Emission Factor	$KgCO_2$
Emissions from Purchased electricity	526.83 kWh/month	0.97	511.025 $KgCO_2$/month
TOTAL SCOPE 2 EMISSIONS			**511.025 $KgCO_2$/month**

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

A. Employee Transportation: Increase in student intake can lead to increased greenhouse gas (GHG) pollution caused by the resulting growth in vehicular traffic, energy use, and other activities. This unit seeks to identify the impact on global climate change through its emissions of greenhouse gases (GHGs), notably carbon dioxide (CO_2). Transportation is the fastest growing major contributor to global climate change, accounting for 23% of energy-related carbon dioxide (CO2) emissions.

Fuel Consumption through Staff Transportation

Mode of transportation	Daily Count	Travelling distance (km/Vehicle) (to and fro)	Total Km	Emission Factor	Kg CO_2
2 wheeler (teachers)	25	10	250	0.0319	7.975
4 Wheeler (Cars)	05	10	50	0.13	6.5
Public Transport	20	20	400	0.01516	6.064
TOTAL					20.539 KgCO2/day
					616.17 KgCO2 /month

Fuel Consumption through students Transportation

Mode of transportation	Daily Count	Travelling distance (km/Vehicle) (to and fro)	Total Km	Emission Factor	Kg CO_2
2 wheeler (teachers)	20	10	200	0.0319	6.38
TOTAL					6.38 KgCO2/day
					191.4

	KgCO2 /month

B) Solid Waste Generation:

Dry Solid Waste Generation

Wet waste generated	Emission factor	Total Kg CO2
30 kg/month	0.21	**6.3 KgCO2 /month**

Total emissions throughout a year

Total emissions throughout a year

Reporting Year	Total Emissions (kg CO2 /month)	Total Emissions (kg CO2 /year)
2022	**1324.895**	**15898.74**

C) Recommendations:

- Make sure most teachers and students opt for public transport instead of using personal vehicle.
- Use as much renewable sources of energy as you can.
- Reduce the waste generated by all departments.
- For reducing Carbon Footprint of the college, try to conduct 'No Vehicle Day' on every Saturday.

10. BEST PRACTICES FOR ENVIRONMENT

1. **Biodiversity Conservation:**

- They have green campus which provides habitat to various species.
- They maintain flora and fauna in the campus.

2. **Tree Plantation Drives and Days Celebrations**

- Periodically the plantation drives conducted by students and staff of campus.
- Every Guest is honored by tree at campus.
- World Environment Day, Wetland Day, Ozone Day, Krushi Din etc. celebrated by students and staff every year.
- College has Eco Club.
- To create awareness among the students campus is provided with different Environmental Slogans.

3. Solid Waste Management

- ♣ Different mechanisms for proper disposal of biodegradable, non-biodegradable and MSW are implemented in campus.
- ♣ Cleanliness drives are arranged by college.

4. Water Conservation

- ♣ Water saving push taps fitted in the drinking water zone and the toilets to avoid the wastage of water.
- ♣ Drip irrigation system is applied through the campus for watering plants, and it saves water.
- ♣ Sign boards for awareness of environment are there in the campus.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11. OVERALL RECOMMENDATIONS

- Formation of Environment Policy and communicated to all faculties and other staff members.
- Environmental Monitoring i.e. (Ambient Air Quality monitoring, Water monitoring) need to be conducted by approved laboratory with frequency of six month.
- Reduction in use of paper work by go digital system.
- Need of installation of roof top solar panels.
- Increase in Environmental promotional activities for spreading awareness at campus.
- As practically feasible avoid use of personal vehicles inside the campus.
- Need of E-waste management is necessary.

12. CONCLUSION

This audit involved extensive consultation with all the campus team, interactions with key personnel on wide range of issues related to Environmental aspects. The Shankarrao Patil Mahavidyalaya has Environmental Committee for sustainable use of resources. The audit has identified several observations for making the campus premise more environmental friendly. The recommendations are also mentioned with observations for campus team to initiate actions.

The audit team opines that the overall site is maintained well from environmental perspective. The paperless work system, green campus management, solid waste management, rain water harvesting system, composting unit and water conservation practices are noteworthy.

As part of green audit of campus, we carried out the environmental monitoring of campus which includes Water Testing which is used for drinking purpose in the campus. Drinking water analyzed and found it was potable.

There are some major observations like installation of solar panels are necessary, try to create plastic free campus and implementation of E-waste management is necessary. And few minor things are important to initiate urgently are waste management records by monthly inventory, water balance cycle and periodic inspection of buildings housekeeping and environment policy.

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