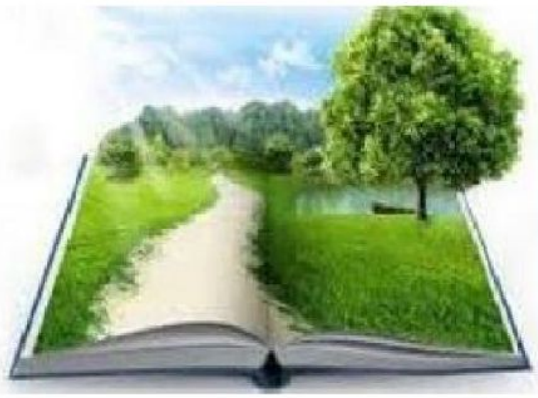
Maratha Vidya Prasarak Samaj's Karmaveer Kakasaheb Wagh Arts, Science and Commmerce College, Pimpalgaon Baswant Tal. Niphad Dist. Nashik (MS) India 422 209

(2017-18)



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Executive Summary

1. Introduction

Green Audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of environmental diversity. The 'Green Audit' aims to analyze environmental practices within and outside the college campus, which will have an impact on the eco-friendly ambience. It was initiated with the motive of inspecting the work conducted within the organizations whose exercises can cause risk to the health of inhabitants and the environment. Through Green Audit, one gets a direction as how to improve the condition of environment and there are various factors that have determined the growth by 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 and it declares the institutions as Grade A, B or C according to the scores assigned during the accreditation.

1.1 About the College

The Maratha Vidya Prasark Samaj's Karmavir Kakasaheb Wagh, Pimpalgaon (B) Nashik, Maharashtra, was established in June 1969. It is a NAAC (B) Grade college having four faculties - Arts, Commerce and Science from Junior to Graduate Level and Computer Science for Graduate Level. It is affiliated to Savitribai Phule Pune University, Pune. It is the Premier center of learning in the Pimpalgaon region. The institution has adopted a strategy of promoting research culture among the staff and students.

The College has appointed a Research Monitoring Committee to supervise and encourage research culture among the faculty. It motivates faculty members to take up Minor and Major Research Projects, publishing research papers, attending seminars and conferences, refresher and orientation programme. The committee also encourages faculty members to avail higher qualification such as M.Phil and Ph.D. The College also provides space, equipment, duty leaves and other facilities for carrying out the research. Notifications of university and other organizations that provide financial support are circulated and displayed on the staff notice board. The college also provides seed money for the research orientated activities. The faculty as well as students is encouraged to participate in the State level Research Project Competition- Avishkar.

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

VISION:

To create a centre of learning where universal knowledge, new concepts, innovative life skills and humane values take shape in response to personal and social needs and aspirations.

MISSION:

To contribute to the sustainable and inclusive development of the nation by imparting appropriate, holistic and value based higher education to the students to herald a modern knowledge-based and equitable social order.

OBJECTIVES:

To provide an easy, affordable and hassles-free access to quality education.

To inculcate analytical, inquisitive and innovative thinking skills by imparting comprehensive and interactive learning experiences of global standards.

To search promising sporting talent and groom them into prospective sports persons by providing modern infrastructure and coaching.

To inculcate sensible attitudes, humane values, secularism, environmental awareness, national integration and universal brotherhood by providing detached and critical perspectives.

To advance, create and disseminate knowledge through research, extension, consultancy and continuous updating.

To encourage the students to partake in co-curricular, extracurricular and outreach activates to ensure the all-round development.

To pay special attention to women's education to ensure their empowerment and emancipation.

To create repository of knowledge and expertise to cater to diverse needs and aspirations of local people.

To nurture the young minds into versatile graduates able to meet the needs of all the sectors of human endeavor as ideal citizens.

2. Objectives of the Study

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 make students aware of 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 require high cost.

- To bring out a status report on environmental compliance.

3. 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 summarise the present status of environment management in the campus:

- Water management
- Energy conservation
- Waste management
- E-waste management
- Green area management

4. Observations and Recommendations

Water Use

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 Well and Pimpalgaon Grampanchayat are the two major sources of water. Water is used for drinking purpose from Pimpalgaon Grampanchayat with two connections. Water is used for canteen, toilets, laboratory and gardening from well. During the survey, no loss of water is observed, neither by any leakages nor by 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 16,000 L/day, which include 4,000

L/day for domestic purposes, 9,000 L/day for gardening and 3,000 L/day for different laboratories.

From the Canteen, water used for drinking purpose analyzed as per IS 10500:2005 drinking water specification and observed it was potable.

Test 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	7.12	6.5-8.5	-
4.	Turbidity	0.6	*Max.* 1	N.T.U.
5.	Total Dissolved Solids	84	*Max.* 500	mg/L
6.	Calcium (as Ca)	9	*Max.* 75	mg/L
7.	Chloride (as Cl)	13.4	*Max.* 250	mg/L
8.	Fluoride (as F)	< 0.05	*Max.* 1	mg/L
9.	Iron (as Fe)	< 0.06	*Max.* 0.3	mg/L
10.	Magnesium (as Mg)	6.24	*Max.* 30	mg/L
11.	Nitrate (as NO_3)	6.02	*Max.* 45	mg/L
12.	Sulphate (as SO_4)	3.13	*Max.* 200	mg/L
13.	Alkalinity (as $CaCO_3$)	21	*Max.* 200	mg/L
14.	Total Hardness (as $CaCO_3$)	38	*Max.* 200	mg/L
15.	*E.coli*	Absent	Not Detectable	/100 ml
16.	Total Coliforms	Absent	Not Detectable	/100 ml

Water sampling for testing purpose

RO Plant

b) Recommendations

- Need of monitoring, controlling overflow is essential and periodically supervision drills should be arranged. In campus small scale/medium scale/ large scale reuse and recycle of water system is necessary.

- The college does not have waste water treatment for waste water generated from laboratories, canteen, hostel kitchen, toilets, bathrooms and office rooms.

- The college has to take actions to strengthen rain water harvesting. Rain water harvesting for separate buildings are lacking. Measurement of quantity of water obtained from the rain water harvesting should be done.

- Minimize wastage of water and use of electricity during water filtration process, if used, such as RO filtration process and ensure that the equipment's used for such usage, are regularly serviced and the wastage of water is not below the industry average for such equipment's used in similar capacity.

- Ensure that all cleaning products used by college staff have a minimal detrimental impact on the environment, i.e. are biodegradable and non-toxic, even where this exceeds the Control of Substances Hazardous to Health (COSHH) regulations.

- Year wise water consumption report.

Energy Use and Conservation

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.

a) Observations

Energy source utilized by all the departments and common facility center is electricity only. Total energy consumption is determined as 38784 KWH/Year by major energy consuming equipment.

All the departments and common facility centers are equipped with LED lamps. Approximately 302 CFLs were counted during survey. Besides this, photovoltaic

cells are also installed in the campus as an alternate renewable source of energy. Equipment like Computers are used with power saving mode. Also, campus administration runs switch–off drill on regular basis. In Science departments like Physics, Chemistry, Mathematics, Botany and Zoology, electricity was shut down after occupancy time as one of the practices for energy conservation.

Photovoltic cell

b) Recommendations

- This includes evaluation of procurement practices with ISO 50001. This does not exactly mean that you need to buy the most efficient, but you need to buy the most efficient which is financially viable. Example AC with efficiency star ratings, Transformer etc.
- Centralized controls of lighting, auditorium etc. to avoid any mis-use of electricity
- Installation of LED lamps instead of CFL.
- Installation of Solar panels, Power Purchase Agreements with Solar Power Plant Owners to buy environmentally friendly energy Source etc.
- Shift to paperless regime wherever not required, example attendance muster replaced by biometrics, DG logbook replaced by computerised logbook, daily reports converted from paper to paper less, HOD meetings converted to paperless formats, and all such examples.
- Appreciate that it is preferable to purchase electricity from a company that invests in new sources of renewable and carbon-neutral electricity.

Waste Generation

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 solid waste collected in the campus is 18 kg/day. Waste generated from tree droppings is a major solid waste in the campus. The waste is segregated at source by providing separate dustbins for Bio-degradable and Non Bio-degradable waste. Segregation of chemical waste generated in Chemistry and Zoology laboratories is also practiced. Single sided used papers reused for writing and printing in all departments. Important and confidential reports/ papers are sent for recycling after completion of their preservation period. Very less plastic waste (0.1 kg/day) is generated by some departments, office, garden etc. but it is neither categorized at point source nor sent for recycling. Metal waste and wooden waste is stored and given to authorized Scrap agents for further processing. Few glass bottles are reused in the laboratories. The food waste from main canteen and mess is sent for vermicomposting.

The institute has adopted vermiculture composting in culture house on 198 sq. ft. land. The main purpose of this is to reduce disposable waste in the college campus. After complete process of vermicomposting, it is used as manure in the garden and lawns. Awareness program among farmers is also conducted in the village nearby.

Composting Unit

Compost

b) Recommendations

- Reduce the absolute amount of waste that produces from college staff offices.
- Make full use of all recycling facilities provided by City Municipality and private suppliers, including glass, cans, white coloured and brown paper, 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.
- Single sided papers to be used for writing and photocopy
- Important and confidential papers after their validity to be sent for pulping.

E-Waste Generation

E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. This makes up about 5% of all municipal solid waste worldwide but is much more hazardous than other waste because electronic components contain cadmium, lead, mercury and Polychlorinated biphenyls (PCBs) that can damage human health and the environment.

a) Observations:

The E-waste generally includes the tube lights, CFL, LED are stored into the scrap yard of college and stored. This waste material is yet to be disposed. E-waste generated in the campus is very less in quantity. The college has total of 103 computers and 40 printers in working condition. The cartridges of laser printers are refilled outside the college campus. Administration conducts the awareness programmes regarding E-waste Management with the help of various departments. The E- waste and defective item from computer laboratory is being stored properly. The institution has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

b) Recommendations:

- Recycle or safely dispose of white goods, computers and electrical appliances.
- Use reusable resources and containers and avoid unnecessary packaging where possible.
- Always purchase recycled resources where these are both suitable and available.

Green Area

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 programmes.

Green Area of College Campus

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 65 types (species) of trees. Various tree plantation programs are being organized during the month of July and August at college campus and surrounding villages through NSS unit. This program helps in encouraging eco-friendly environment which provides pure oxygen within the institute and awareness among villagers. 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, water pond is well maintained in premises also rain water harvesting is well maintained. College also maintained botanical and mango garden in premises.

b) Recommendations

- Review periodically the list of trees planted in the garden, allot numbers to the trees and keep records. Give scientific names to the trees.
- Promote environmental awareness as a part of course work in various curricular areas, independent research projects and community service.
- Create awareness of environmental sustainability and take actions to ensure environmental sustainability.
- Establish a College Environmental Committee that will hold responsibility for the enactment, enforcement and review of the Environmental Policy. The Environmental Committee shall be the source of advice and guidance to staff and students on how to implement this Policy.
- Ensure that an audit is conducted annually and action is taken on the basis of audit report, recommendation and findings.
- Celebrate every year 5th June as 'Environment Day' and plant trees on this day to make the campus more Green.

5. Environment:

Air Quality: Air quality in the academic institute is very important for health of the students, faculty and staff of the institute. The air pollution sources in the college campus are wind storm, pollen grains, natural dust, vehicular emissions, generators, fires and laboratory fumes etc.

Observation: All results of Ambient Air monitoring (Near Main Gate) found within limits As per National Ambient Air Quality Standards, 2009.

Test Report

Meteorological Data / Environmental Conditions				
Average Wind Velocity: 3.0 km/h	Wind Direction: E-W	Relative Humidity (Max./Min.): 73/65 %	Temperature (Max./Min.): 26/18°C	Duration of Survey: 24 h

Parameter	Results	NAAQS 2009	Unit
Sulphur Dioxide (SO_2)	**15**	80	µg/m^3
Nitrogen Dioxide (NO_2)	**19**	80	µg/m^3
Particulate Matter (size less than 10 µm) or PM_{10}	**70**	100	µg/m^3
Particulate Matter (size less than 2.5µm) or $PM_{2.5}$	**27**	60	µg/m^3
Ozone (O_3)	**< 19.6**	180	µg/m^3
Lead (Pb)	**< 0.02**	1	µg/m^3
Carbon Monoxide (CO)	**0.61**	4	mg/m^3
Ammonia (NH_3)	**< 4**	400	µg/m^3
Benzene (C_6H_6)	**< 1**	5	µg/m^3
Benzo (a) Pyrene (BaP)- particulate phase only	**< 0.2**	1	ng/m^3
Arsenic (As)	**< 0.3**	6	ng/m^3
Nickel (Ni)	**< 3**	20	ng/m^3

Noise Environment: The noise levels measurements were carried out using Noise level meter. The Noise level survey was carried out at two locations, at outside as well inside the study area campus. The major source of noise identified in the study area has been predominantly the vehicular movement and the transportation activities.

Location	Time	1	2	3	4	5	Noise Level Readings dB (A)
Outside	11.00	49	50	51	50	51	50.2
Inside	11.30	50	52	51	50	49	50.3

As per The Noise Pollution (Regulation & Control) Rules, 2000 (Rules 3(1) and 4(1))			
Area Code	Area Type	Limits in dB (A)weighted scale	
		Day (6 a.m. to 10 p.m.)	Night (10 p.m. to 6 a.m.)
C	Residential	55	45

Observation: All results of Noise level monitoring (Inside & Outside) found within limits as per the Noise Pollution (Regulation & Control) Rules, 2000

Illumination Study: The Illumination Study were carried out using Lux meter. The Illumination Study was carried out at two locations, in Classroom & Laboratory

Sr. No.	Location	Time	Lux Level Reading (LUX)				Average LUX
			1	2	3	4	
1.	Class room	12:00	238.3	239.5	240.1	240.8	239.75
2.	Laboratory	12:30	232.4	235.6.	239.1	239.5	236.6

Observation: All results Illumination Study (Classroom & Laboratory) found within limits as per Factory Act Rules-Section-35, Schedule B.

Ventilation Study:

Sr. No.	Location	Temp. (^{0}C) (Max/ Min)	Humidity (%) (Max/ Min)	Local Air Velocities (m/ s)					
				1	2	3	4	5	Average
1.	Class room	31/26	70/63	1.5	1.4	1.3	1.3	1.4	1.3
2.	Laboratory	26/24	78/70	1.4	1.2	1.3	1.4	1.5	1.3
Observation: Air Velocity Should be at least 0.5 m/s to produce cooling effects **Remark:** Comfortable									

Details of expenditure on green initiatives and waste management during the last five years

Year	Green Initiative/ Waste Management	Expenditure
2013-14	Waste Management - Cleanliness	35350
	Water Bill	3000
2014-15	Waste Management - Cleanliness	71856
	Water Bill	18742
2015-16	Waste Management - Cleanliness	58620
	Water Bill	3600
	Garden Exp	1700
	Tree Protection Guard	18603
2016-17	Waste Management - Cleanliness	53676
	Water Bill	21300
	Garden Exp	8900
	Rain Water Harvesting	1000
	Tree Plantation	35000
	Dripping for Trees	5100
2017-18	Waste Management - Cleanliness	131232
	Water Bill	11025
	Vermi-composting	6000
Total		**484704**

Photo Gallery

4th International Yoga Day

National athlete Sultan Deshmukh


कर्मवीर काकासाहेब वाघ कला, विज्ञान आणि वाणिज्य
महाविद्यालय पिंपळगांव बसवंत, ता.निफाड, जि.नाशिक


शुक्रवार, दि. ६ एप्रिल, २०१८


महाराष्ट्र राज्य मार्ग परिवहन महामंडळ नाशिक विभाग
पिंपळगाव (ब.)
बस स्थानक

Maha Swachhta Abhiyan April 2018

6. Conclusions

Considering the fact that the institution is predominantly an undergraduate college, there is significant environmental awareness both by faculty and students and initiatives taken by them are substantial. The installation of solar panels, paperless work system and vermicomposting practices are noteworthy. Besides, environmental awareness programmes initiated by the administration shows how the campus is going to be a green. Few recommendations are added to curb the menace of waste management using ecofriendly and scientific techniques.

As part of green audit of campus, we carried out the environmental monitoring of campus includes Illumination, Noise level, Ventilation and Indoor Air quality of the class room. It was observed that Illumination and Ventilation is adequate considering natural light and air velocity present. Noise level in the campus well

within the limit i.e. below 50 dB at day time. Canteen water also analyzed and found it was potable.

This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development.

7. Acknowledgement

We are grateful to the committee members of Maratha Vidya Prasark Samaj's Karmavir Kakasaheb Wagh, Pimpalgaon (B) (Nashik), to award this prestigious project and allowed us to enter the new era of Green Audit in the College Campus.

Further we sincerely thank the college staff for providing us necessary facilities and co-operation during the audit. This helped us in making the audit, a success.

Further we hope, this will boost the new generation to take care of Environment and propagate these views for many generations to come.

FOR ASHWAMEDH ENGINEERS & CONSULTANTS

Handge

Chandrakant Handge

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