

GREEN AUDIT REPORT (2018-19)

**Maratha Vidya Prasarak Samaj's
Arts, Commerce & Science College, Dindori**
Gut No.836, Umrade Road, Near Government ITI,
Dindori Shivar, Tal. Dindori, Dist. Nashik.



Prepared by

Dr. Vedashree V. Thigale (Principal-ACS College, Dindori)	Dr. V. B. Gaikwad (Principal-KTHM College, Nashik)
Mr. S. S. Dive (Dept. of Botany-Green Audit College Coordinator)	Dr. P.M. Nalawade (Dept. of Environment Science, KTHM College)

Table of Contents

Executive Summary	4
1. Introduction	5
1.1 About the College	6
VISION	6
MISSION	6
2. Objectives of the Study	7
3. Methodology	7
4. Observations and Recommendations.....	7
4.1. Water Use.....	7
a) Observations.....	8
b) Recommendations:	9
4.2. Energy Use and Conservation.....	10
a) Observations.....	10
b) Recommendations	13
4.3. Waste Generation	13
a) Observations.....	13
b) Recommendations	15
4.4 Organic waste Management	
4.5. E-Waste Generation	13
a) Observations.....	15
b) Recommendations	16
4.6. Green Area.....	16
a) Observations.....	17
b) Recommendations	24
5. Conclusions	24

College Entry



Old College Building



New College Building

Executive Summary

The rapid urbanization and economic development at local, regional and global level has led to several environmental and ecological crises. Eco campus is a concept rooted to all over the world to make them sustainable because of their mass resource utilization and waste discharge in to the environment. On this background it becomes essential to adopt the system of the Green Campus for the institute which will lead for sustainable development.

MVPs Arts, Commerce & Science College, Dindori is deeply concerned and unconditionally believes that there is an urgent need to address these fundamental problems and reverse the trends. Being a premier institution of higher learning, the college has initiated 'The Green Campus' program two years back that actively promote the various projects for the environment protection and sustainability.

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documentation, interviewing key persons, 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. With this in mind, the specific objectives of the audit are to evaluate the adequacy of the management control framework of environment sustainability as well as the degree to which the departments are in compliance with the applicable regulations, policies and standards. It can make a tremendous impact on student's health and learning college operational costs and the environment. The criteria, methods and recommendations used in the audit are based on the identified risks.

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.

It is well known that educational institutions consume resources like water, electricity; Forest products and generates wastes like many industries. Establishment and operating of educational institute are not covered by any of the environmental laws in India. As a result, the importance of making the educational institute operate with self-consciousness in the utility of resources inside the campus is least understood. Eco campus is a concept implemented in many educational institutes across the globe to make them sustainable because of their mass consumption of resources and creation of waste. Waste minimization plans inside the educational institute for solid and wastewater is now mandatory to maintain the cleanliness inside the campus. To find out the environmental performance of the educational institutions and to analyze the possible solutions for converting the educational campus as eco-campus the conduction of Green Auditing of institution is essential.

Green audit is assigned to the criterion 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

MVPs Arts, Commerce & Science College, Dindori, Gut No.836, Umrade Road, Near Government ITI, Dindori (Maharashtra) 422202 is located in tribal area committed to provide higher educational opportunities to socially under-privileged and financially weaker sections of the society. The vision, mission and objectives of the College are well communicated to students and stakeholders.

The College offers 12-UG and 02-PG courses affiliated to the Savitribai Phule Pune University, Pune. For the effective operationalization of the curricula, a meticulous action plan is developed and deployed. Teaching plans are prepared and followed according to the time table. For the better teaching practices, teachers participate in workshops on Curriculum Restructuring, Training Programmes and Special Guidance on ICT based Teaching Technology. Eminent scholars are invited to enlighten the faculty as well as students. Career Oriented/ Placement Activity is conducted to orient students towards employment market. The College has established MOU's, Linkages and Collaborations with Industries, Research Bodies and other Universities for good academic prospectus. A good number of faculty members is working on Editorial Boards of various International Journals. Experienced faculty members participate in the procedure of curriculum design & development. Some faculty members are elected /nominated on BOS and other committees of S P Pune University, Pune.

VISION

To Empower Students with Innovative Life Skills and Social Values for Global Competency.

MISSION

Upholding the motto of MVP Samaj, 'BahujanHitaya, BahujanSukhaya', i.e. welfare and happiness of the masses, the College is committed to provide higher educational opportunities to the socially under-privileged and financially weak sections of the society and create dignity of labour and importance of self-reliance.

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 analyzing 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

4.1. Water Use

This indicator addresses water consumption, water sources, irrigation, 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, Water supply for toilets, laboratories and gardening purpose will be available from underground bore and well. For drinking water college has Aqua Fresh Technology water purifier system. The purifier has 35Ltr/Day capacity. 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 7,000L/day, which include 2000L/day for domestic purposes, 3,000 L/day for gardening and 2,000 L/day for different laboratories. Drip irrigation system is used for gardening purposed to save water. About 1.5 m³ of domestic and 0.5 m³ of Laboratory waste water were generated per day. The waste water generated from Laboratory was stored and treated before disposal. Whereas domestic waste was dump for soak pit purpose.

Drinking water analysis report:

Sr.No.	Parameter	Result	Acceptable Limit as per IS 10500: 2012
Organoleptic & Physical Parameters			
1.	Colour	1	Max. 5
2.	Odour	Agreeable	Agreeable
3.	pH Value	7.56	6.5 to 8.5
4.	Turbidity	0.4	Max. 1
5.	Total Dissolved Solids	52	Max. 500
6.	Calcium (as Ca)	1.6	Max. 75
7.	Chloride (as Cl)	6.5	Max. 250
8.	Fluoride (as F)	0.56	Max. 1
9.	Iron (as Fe)	BDL(DL:0.06)	Max. 0.3
10.	Magnesium (as Mg)	0.97	Max. 30
11.	Nitrate (as NO ₃)	2.9	Max. 45
12.	Sulphate (as SO ₄)	5.2	Max. 200
13.	Total Alkalinity (as CaCO ₃)	23	Max. 200
14.	Total Hardness (as CaCO ₃)	8	Max. 200
Bacteriological Analysis			
15.	<i>E.coli</i>	Absent	Not Detectable
16.	Total Coliforms	Absent	Not Detectable

Water Purifier System:



b) Recommendations:

It is suggested that if the management is looking forward to overall environmental sustainability then a Effluent Treatment Plant (ETP) may be installed. This would treat & recycle the waste water within the campus and this treated waste water can further be used either for flushing, thus further reducing fresh water requirement of the campus by 30 %– 40 % of the total. This type of Effluent treatment plant can be used for environmental student's project course.

Ensure that all cleaning products used by college staff have a minimum 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. To prepare year wise water consumption report, it helps in to minimise the water consumption and recycle of water.

4.2. Energy Use and Conservation

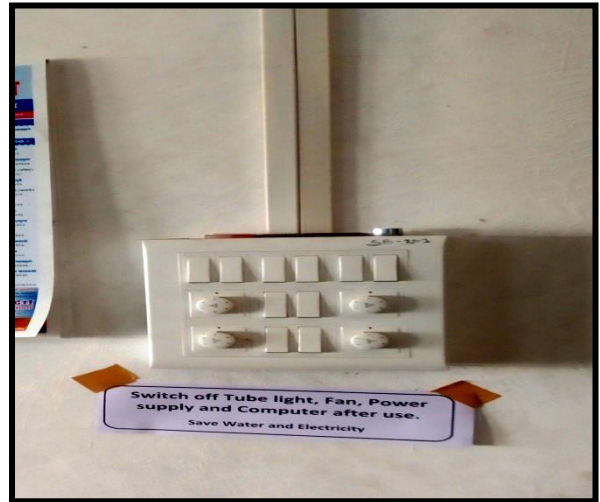
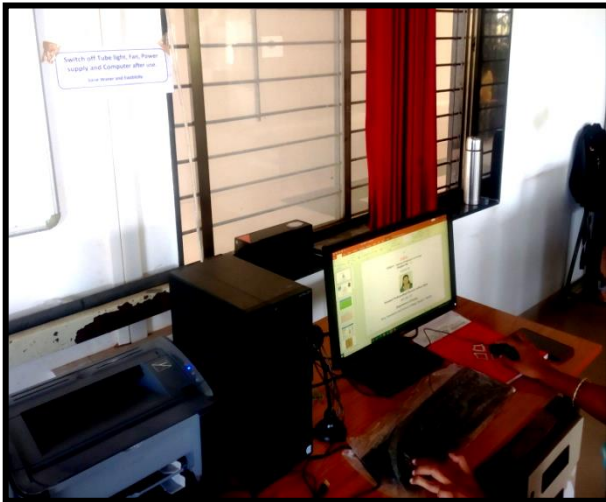
This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliance, natural gas and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment.

a) Observations

Energy source utilized by all the departments and common facility center is electricity only. Total energy consumption is determined as 37kWh/month by major energy consuming equipment. College has provided class rooms and laboratories with proper light and ventilation provision for energy conservation. Earth Leakage Circuit Breaker has been installed at various locations on the campus to prevent current leakage and protect other electrical installations. College has placed notice boards for employees and students to off the lights and fans whenever not needed also Conducted internal Energy Audit Regular maintenance of electrical appliances to save the energy consumption

Collage has used of Light Emitting Diode (LED) and Compact Fluorescent Lights (CFL) bulbs which have revolutionized energy-efficient lighting. Approximately 91LED tube light, 2 LED Halogen was counted during survey.

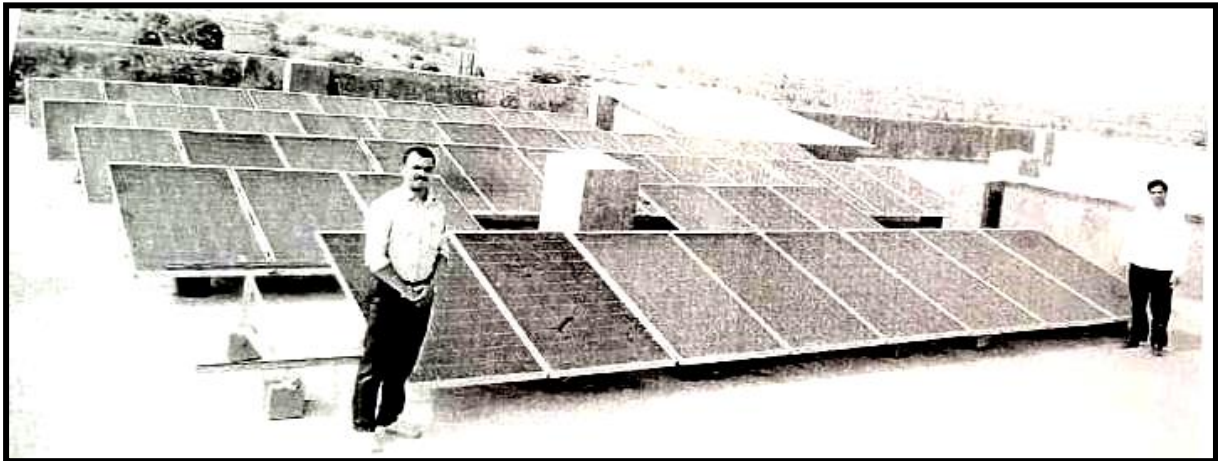
Equipment like Computers is used with power saving mode. The electricity was shut down after occupancy time as one of the practices for energy conservation.



Notice boards for employees and students to off the lights and fans whenever not needed.

Solar System Details:-

Total Solar Panel:48, Power generated per panel : 320W. Total Power generation by 48 Panel:15KW, Energy generation in terms of Units : $1\text{KW} = 5\text{Unit/day}$, So using 48-panel college can generate $5 \times 15 \times 30 = 2250$ Unit/month. As college shifted in new building in August 2018 so the Solar system is currently not in working.



PHOTOVOLTAIC CELLS

b) Recommendations

- Support renewable and carbon-neutral electricity options on any energy-purchasing consortium, with the aim of supplying all college properties with electricity that can be attributed to renewable and carbon-neutral sources.
- Appreciate that it is preferable to purchase electricity from a company that invests in new sources of renewable and carbon-neutral electricity.
- More improvement is required to improve their campus lighting, if possible they can convert to solar lights.
- Start Solar system.

4.3. Waste Generation

This indicator addresses waste production and disposal of different wastes like paper, food, plastic, biodegradable waste, 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 are as mentioned above.

a) Observations

The total solid waste collected in the campus is 10kg/day. Waste generated from dead organic matter 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 laboratories is also practiced.

Single sided used papers are 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 (0.3kg/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. The tree droppings are sent for composting plant.



b) Recommendations

- Reduce the absolute amount of Organic waste that is produced from college.
- Make full use of all recycling facilities provided by Nashik Municipal Corporation 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.
- The main purpose of vermi-composting is to reduce solid organic disposable waste in the college campus. After complete process of composting, it is used as manure in the garden and lawns.

Vermicomposting Unit

4.4. 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

E-waste generated in the campus is very less in quantity. The college has total of 36-Computers & 02-laptops and 07printers, 01-xerox machine & 01-Scanner in working condition. The cartridges of laser printers are refilled outside the college campus. The E- waste and defective item from computer laboratory is being stored properly.

Electronic waste material such as Computer, Computer Peripherals, Printer, Scanner etc. can be handed over to the following organization/department, where they will be reused safely to protect our environment.

1. Dept. of Physics & Electronics, ACS College, Dindori who Conduct "Computer Hardware Course" for science students



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.
- Electronic waste material such as Computer, Computer Peripherals, Printer, Scanner etc. can be handed over to the recognized organization where they will be reused and recycled safely to protect our environment.

4.5. 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.

a) Observations

Various manmade activities have wide range of impacts on the surrounding ecosphere, both negative as well as positive. Over the years, MVP College, Dindori has undertaken various activities like plantation and beautification of campus through various drives. The campus has good plantations and landscaping. It's a positive step to reduce its environmental impact. This section provides a detailed list of plant species observed within the campus.

The campus attempts to maintain eco-friendly atmosphere on the campus; the number and variety of plant species helps to maintain eco-friendly ambience. Further, to create eco-friendly awareness among the students college arranges special programmes through which the students get clear idea and importance of trees in life. There are approximately 385 tree habit species, 25 shrubhabit species have been observed.

Campus is located in the vicinity of approximately 52 types species and 13 medicinal plant species. Total 385 trees are observed in the campus. Tree plantation programs are being organized during the month of July and August at college campus and surrounding villages through NSS. 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 medicinal as well as wild plant species. Under the biodiversity and ecological survey, pond is well maintained as an ecosystem in the premises. Rain water harvesting practices is well maintained in the campus. College has following meditational plants

Medicinal Plant Name



Ocimum santum



Asparagus



Lantana



Tridax



Aloevera



Withania



Curcuma domestica



Tinospora quadrifolia



Cymbopogon citratus



Termenalia



Cymbopogon martinii



Emblica Officinalis



Azardicta Indica

Sr.no	Botanical name	Common name	Family
1	<i>Cycas</i>	Cycas	<i>Cycadaceae</i>
2	<i>Sapindus mukorossi</i>	Rheetha	<i>Sapindoideae</i>
3	<i>Musa acuminata</i>	Banana	<i>Musaceae</i>
4	<i>Cinnamomum tamala</i>	Thahaman	<i>Cinnamomum</i>
5	<i>Neolamarckia cadamba</i>	kadambha	<i>Acanthaceae</i>
6	<i>Mimusops elengi</i>	Bakul	<i>Sapotaceae</i>
7	<i>Manilkara zapota</i>	Manilkara	<i>Sapotaceae</i>
8	<i>Ficus religiosa</i>	Wad	<i>Moraceae</i>
9	<i>Ficus</i>	Pipal	<i>Moraceae</i>
10	<i>Azadirachta indica</i>	Neem	<i>Meliaceae</i>
11	<i>Desmodium gangeticum</i>	Sadaparni	<i>Fabaceae</i>
12	<i>Spathodea campanulata</i>	pichkari	<i>Bignoniaceae</i>
13	<i>Pongamia pinnata</i>	Karanj	<i>Fabaceae</i>
14	<i>Swietenia macrophylla</i>	mahogany	<i>Meliaceae</i>
15	<i>Areca catechu</i>	Supari	<i>Piperaceae</i>
16	<i>Washingtonia filifera</i>	palm	<i>Arecaceae</i>
17	<i>Elaeocarpus ganitrus</i>	Rudraksha	<i>Elaeocarpaceae</i>
18	<i>Araucaria columnaris</i>	Christmas tree	<i>Araucariaceae</i>
19	<i>Saraca asoca</i>	Sita Ashok	<i>Caesalpiniaceae</i>
20	<i>Punica granatum</i>	Lalit	<i>Lythraceae</i>
21	<i>Plumeria rubra</i>	Latin rubra	<i>Apocynaceae</i>
22	<i>Grevillea robusta</i>	silver oak,	<i>Proteaceae</i>
23	<i>Bambusa vulgaris</i>	Bamboo	<i>Poaceae</i>
24	<i>Tecoma stans</i>	Yellow bell	<i>Bignoniaceae</i>
25	<i>Brassica oleracea</i>	Mustard	<i>Brassicaceae</i>
26	<i>Tabebuia rosea</i>	pink poui	<i>Bignoniaceae</i>
27	<i>Cassia fistula</i>	Amaltas	<i>Fabaceae</i>
28	<i>Ficus racemosa</i>	Audumbar	<i>Moraceae</i>
29	<i>Citrus limon</i>	Limbu	<i>Rutaceae</i>
30	<i>Jasminum sambac</i>	Mogara	<i>Oleaceae</i>
31	<i>Setaria italica</i>	Foxtail millet	<i>Poaceae</i>
32	<i>Mangifera indica</i>	Mango	<i>Anacardiaceae</i>
33	<i>Abelmoschus esculentus</i>	Okra	<i>Malvaceae</i>
34	<i>Phyllanthus emblica</i>	Amla	<i>Phyllanthaceae</i>
35	<i>Caesalpinia pulcherrima</i>	Shankasur	<i>Fabaceae</i>
36	<i>Pyrostegia venusta</i>	Sankrant Vel	<i>Bignoniaceae</i>

37	<i>Passiflora Incarnata</i>	Krishna Kamal.	<i>Passifloraceae</i>
38	<i>Combretum indicum</i>	Madhumalti	<i>Combretaceae</i>
39	<i>Aristolochiarings</i>	Badak vel	<i>Aristolochiaceae</i>
40	<i>Ixora coccinea</i>	Ixora	<i>Rubiaceae</i>
41	<i>Acalypha wilkesiana</i>	copperleaf	<i>Euphorbiaceae</i>
42	<i>Jasminum polyanthum</i>	Jasmine	<i>Oleaceae</i>
43	<i>Victoria amazonica</i>	Victoria	<i>Nymphaeaceae</i>
44	<i>Drypetesepiaria</i>	Kalvirai	<i>Putranjivaceae</i>
45	<i>Plumeria rubra</i>	Chafa	<i>Apocynaceae</i>
46	<i>Cocos nucifera</i>	Coconut	<i>Arecaceae</i>

Water Loving Plants (Hydrophytes)

- Hydrilla
- Nymphaea (Lotus)



4.6 Environmental Monitoring :

Environmental Awareness Course (EVS): This is compulsory course introduced by SP Pune University, Pune for second year students for all faculty. Under this course students learn to be environmental friendly. They are made aware of

- 1) Renewable and Non-renewable energy sources
- 2) Energy conservation.
- 3) E-waste management.

4.6.1 Air Monitoring: 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.

4.6.2 Noise Environment:

The noise levels measurements were carried out using Noise level meter. The noise level survey was carried out at seven locations, at outside as well inside the study area. The Noise levels monitored in the college campus as well as inside the classroom and found the noise level within the permissible limit.

Sr.No	Location	Minimum Reading In dB	Maximum Reading In dB	Limits
1.	Near Main Gate	28.3	28.9	75
2.	Near Back Gate	28.4	28.8	75
3.	Inside Class room	28.2	28.6	75
4.	Outside Classroom	28.1	28.5	75
5.	Inside Library	27.2	27.7	75
6.	Inside Chemistry lab	28.0	28.4	75
7.	Inside Physics lab	26.9	27.5	75

4.6.3 Ventilation Study:

Ventilation study was carried out using Anemometer at four different classrooms and the result was satisfactory.

Sr.No	Location	Reading In m/s	Limits
1.	Inside Class room	0.9	>0.5
2.	Inside Library	1.2	>0.5
3.	Inside Chemistry lab	0.9	>0.5
4.	Inside Physics lab	1.1	>0.5

4.6.4 Illumination Study:

The Illumination measurements were carried out using Luxmeter at five locations inside the study area and light intensity found adequate in monitored area.

Sr.No	Location	Reading In Lux	Limits
1.	Inside Class room	211	>100
2.	Inside Library	265	>100
3.	Inside Chemistry lab	198	>100
4.	Inside Physics lab	214	>100

b) Recommendations

- Periodically review the list of trees planted in the garden. 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.

5. Conclusions

Considering the fact that the institution is predominantly an undergraduate as well as post graduate college, there is significant environmental awareness both by faculties and students and initiatives taken by them are substantial. The

installation of solar panels, paperless work system, composting and besides, environmental awareness course 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 where 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 is well within the limit Canteen water was also analyzed and found to be potable.

Efforts for Carbon Neutrality

College is having its own vehicles and regular maintenance has been carried out for these vehicles which are support to low down the Carbon Neutrality.

- Institute has separate parking zone for vehicles.
- Dead leaves of tree are decomposed and used as organic fertilizer.
- Green Treasure Day and Pollution Free Day were initiated in 2015-16 to spread awareness about Green India.
- Planting a variety of trees has contributed to carbon neutrality on the campus.

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

Worthy Notes:

Participation in Institutional Social Responsibility (ISR) and Extension activities:

- Swachha Bharat Abhiyan
- Avoid Tobacco Campaign
- Tree Plantation Programme of Govt. of Maharashtra
- Environmental awareness programme
- Celebration of Ozone day, Geography day, etc. every year
- Organic Waste management
- No vehicle day
- Solar system

Galaxy



