

ENVIRONMENTAL AUDIT

PREPARED BY, DR. P.R. KANTHALE DR. N.S. PADMAVAT

Approved by,
INCUBATION CENTRE,
NUTAN MAHAVIDYALAYA, SELU

2017

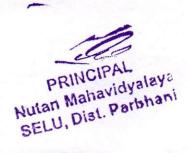
SELU

PRINCIPAL Itan Mahavidyalaya

SELU, Dist. Parbhani

CONTENTS

Sr. No.	Indicators	Page No.
01	Introduction	01
02	Campus Energy Power	03
03	Use of Renewable Energy	05
04	Roof Water Harvesting	07
05	Check Dam Construction	10
06	Efforts for carbon Neutrality	11
07	Campus Plantation	12
08	Solid Waste Generation and Reuse	16
09	Environmental Studies Curriculum & Environmental Awareness	19



Environmental Audit

Environmental Mudit is an examination of how an institution has maintained atmosphere which is conducive for the learning by means of keeping environment echo friendly.

Introduction

Nutan Mahavidyalya, Selu has been established on 15th June 1968 in the building of Nutan Vidyalya., Selu. In the less time span, college has created its own specific Status at State Level in Maharashtra. Nutan Vidyalaya Shikshan Sanstha which was established in 1939 by the Freedom Fighters of Sailu with the inspiration and motivation of Brahmibuth Swami Ramanand Teerth. Nutan Vidyalaya Shikshan Sanstha has been a pioneer institution which imparts the quality education right from pre-primary level (KG) to post-graduate (PG) in the Marathwada Region of Maharashtra. Recently, Nutan Vidyalaya Shikshan Sanstha has celebrated its Platinum Jubilee Year (The 75 Years of glorious achievements).

The college has been settled in the new building which located at Jintoor Road Selu, on 15th June, 1970. The pleasure and proud movement of college is Swami Ramanand Teerth visited the college at the time of building construction. The college has been accredited by NAAC with 'B' Grade in the year 2003 and reaccredited with 'B' Grade in the year 2013. The college has excellent, highly qualified & dedicated faculties with good infrastructure, disciplines and competent administration with the track of good results in all the disciplines. The college offers number of add-on-courses to increase the employability of the students. The college is implementing the healthy and innovative practices like Parents Association, Alumni Association, Earn and Learn scheme, Career Guidance and Counseling Cell, Competitive Examination Classes (MPSC/UPSC) Remedial Coaching, etc. which students to develop their personality in all aspects. The NSS unit of the College develops a sense of civilization among the students. Gunvanta Sanman (Felicitation of meritorious students) is a special feature of the College. With the help of Alumni Association and grants from the UGC, the College has developed different labs as Computer Labs, Language Lab and Mathematics Lab, Network Resource Center, Internet Lab, which have certainly resulted to increase the techno- skills among the students and staff.

College must be an abode of peace as Shantiniketan established by esteemed Poet Rabindranth Tagore. The peace and harmony in an educational surrounding can only be maintained by means of proper environment. The environmental changes have a different kind of impact on the students, therefore educational institutions are expected to maintain environment free of health hazards. It can only be possible by having

greenery and clean sampus. Arts, Commerce & Science College has been trying to maintain this sort of conducive environment for the all round personality development of the students. It is from the establishment itself the authorities of the college are keen in the provision of better surrounding for the overall growth of the students.

The authorities are cautious of fact that college much to do regarding the maintenance of green campus. It is through this audit by the proper authorities the college intends to judge its strength and the future approach to keep and enhance the surrounding by means of proper steps in the direction of maintenance of greenery throughout the college campus. Environmental Audit mainly focuses on the basis of eight indicators; it is through these indicators the college intends to judge it strength at the present juncture.





Goal: To encourage efficient use of promotion of energy in a proper manner

Benchmark:

Total consumption of energy for College office, Laboratories, Library, and Play ground etc. does not Exceed 400 Units / month /meter.

Observation Procedure:

01	The number of Electrical Meters in the campus are counted	
02	The average electricity consumption in Units is calculated	
03	The electrical appliances available in campus area have been observed.	
04	We have also observed the types of electrical appliances in the campus.	
05	The available electrical appliances and the power saving appliances have been observed.	

Observations of Electric Meters and Electricity consumption

The number of elec	tricity meters in the campus are = 08		
Average Electricit	y Consumption per month		
Year Total usage of energy for academic year (in Unit			
2017 – 2018	Average 2800 units / month Total usage in the academic year = 33600 units		

Since 2015 the college has employed several measures to save energy including;

- The use of CFL lamps and LED lamps in the college office, class rooms and laboratories
- Computers and other equipments are put on power-saving mode.
- The six solar focus are installed in the campus
- The two solar water heaters were installed on ladies and boys hostel.

These missions have helped to reduce the overall energy consumption in campus. The college authorities have adopted several measures to inculcate the value of energy conservation among the staff members and students. This results in reduction of electric meters from 08 to 07.

Generator is also used as alternative source whenever needed.

Details of Electrical particulars working in the campus

Sr. No.	* Hame of Particulars	Total No
01	Total No. of Electrical fans	225
02	Exhaust fans	025
03	Air Conditioner	003
04	Total No. of Tubes	275
05	Total No. of LED lamps	050
06	Total No. of LED Tubes	020
07	Street Light	010
08	Total No. of CFL lamps	070
09	Total No. of Sockets	450
10	Water Motors	01 HP x 02 02 HP x 01 03 HP x 01 05 HP x 01
11	RO Motors	01 KW x 01 250 W x 02
10	Water Cooler	003
11	No. of Computer	112
12	Printers	036
13	Xerox Machine	005
14	Inverters	023
15	LCD TV	001
16	Smart Board	006
17	LCD Projectors	006

Re	Recommendations: The college should employ several measures to save energy including;		
The			
01	The alternative source of renewable energy such as solar power should be used more to reduce electrical consumption.		
	Electricity wastage is controlled through central double switch system one at centre board (Nearby office) and another in hall, laboratories so the lights and fans can be switched off timely on each wing and floor.		
03	By using stickers of switch off power. These initiatives had helped to reduce the Overall energy consumption in campus.		
04	The College should improve its monitoring cell to save the energy.		
05	the second secon		



Ind East 18: Use of Renewable Energy

Goal: Encourage purchasing and / or production of renewable energy.

The Practice:

Solar energy has been proved to be a great means to save the electricity. Solar technologies are broadly characterized as passive or active solar technologies depending on the way these equipments capture, convert and distribute solar energy. Active solar techniques include the use of photovoltaic panels and solar thermal collectors to control energy. Passive solar techniques include orienting a building to the Sun, selecting materials with favourable thermal mass or light dispersing properties, and designing spaces that naturally circulate air. Solar energy is one of the sources for lights, fans, heaters. In a nearby future the college intends to adopt use of solar energy to reduce the use of electricity.

Minimal consumption of energy is the saving factor of energy conservation in the campus. College has installed 06 solar Focus lamps in working. Each one has 12 W powers. Therefore, total power receive from solar energy is 60 W.

01	Do you have solar street lights in your campus ?	Yes
02	Do you have solar lights in your college building?	Yes
03	Do you have solar inverters in your college?	No
04	Do you have solar DP in your college campus?	No
05	Do you have solar cookers in your college?	No
06	Do you have solar heaters in your college building?	Yes
07	Do you have solar motor pumps in your college?	No





Solar LED Lamp (Focus) with panel 05







Solar water heater

Rec	ommendations:
01	College should plan to use Non conventional sources of energy such as Solar inverters, solar pumps, solar cookers in the campus to save the use of conventional sources of energy i.e. reduction in electricity.
02	Solar motor pump should be used for garden irrigation.
03	Electricity wastage is controlled through central double switch system one at centre board (Nearby office) and another in hall, laboratories so the lights and fans can be switched off timely on each wing and floor.
04	By using stickers of switch off power. These initiatives had helped to reduce the Overall energy consumption in campus. Staff and students were motivated towards energy conservation. Generator is also used as alternative source in emergency only.

r III: Roof Water Harvesting

Rainwater harvesting first of all increases water security. It is the perfect solution to meet water requirements especially in the areas which do not have sufficient water resources. It helps in improving the quality of the ground water and increasing the level of the ground water. It reduces the loss of top layer of the soil. If we capture the water directly, we need not to depend much on the water storage dams.

Goal: To use rain water for the bore well.

The Practice:

The most important part of the rain water harvesting is the storage system. The storage system is designed in a proper manner so that there will be adequate water storage in the bore well.

The institution has enacted the projects of Roof water harvesting. The project of roof water harvesting is in operation. It is setup on the top of the hostel building. Rain water which precipitates on roof is collected through pipes and filtered it in bore well. Roof Water Harvesting is observed to be very beneficial to conserve the wastage of water into water use. The water is used in campus for Drinking, in laboratories, urinals, lavatories and gardening.

01	Whether the institution has installed roof water harvesting unit at college campus?	Yes
	If yes, give the details -	
	The institution has installed total (02) Roof Water college campus.	Harvesting units at
02	Provide the total requirement of water per day in campus	

Total area used for roof water harvesting unit				
Sr. No.	Area used for roof water harvesting	Size	Sq feet	
01	Ladies Hostel	95x39	3705	
02	Ladies Canteen	85x37	3145	
	Total		6850	
		2087.88	Sq. Mt.	



Total requirement of water per day in campus are given below:

Academi c year	Consumption of water / day for drinking and sanitation	Consumpti on of water / day for gardening	Total consumpti on / day	Total annual usage of water By considering 272 days working
2015-16	04 lit Per person X strength of students & Staff (949) = 2847 Litres	6000 litre	9796	2664512 Litres (681460.87 Gallons)

Detailed calculations of RWH are given below:

Α	(catchment area of building where Roof water harvesting is done)	2087.88 Sq. M.
R	Inches of rain or Annual rain fall in a area in m.m.	215 m.m.
G	Total amount of collected rain water	269336.52 G
	G = (A) x (R) x 600 gallons /1000	(54761501.2
	G = 3221.66 x 215 x 600 /1000	Litres)

Cond	clusion:	
01	Total usage of water in the college per annum	681460.87 G
02	Total amount of collected rain water per annum	269336.52 G
03	% age of water conserved	About 39.52%

Kecc	mmendations:
01	Rainwater harvesting should be done on each building.
02	Provide information and take feedback on water use for campus users.









Harvesting of Roof water through pipes

Easy Formula to Remember: 1" of Rain on 1,000 sf Roof will Yield 623 Gallons

Indicator : Check Dam Construction

Goal : To collect and utilize the rain water

The Practice:

In order to have sufficient water availability in the college campus, check dam has been constructed in the college premises. The main purpose of it is to collect the rain water and re-use it for the college premises. It is a practice just like Roof Water Harvesting. It has been proved to be very beneficial to increase the water availability. The length of this check dam is 46.33 mts., width is 13.41 mts. its area is 621.33 Sq. Mt. It will definitely help to provide adequate water storage in the college premises.



Check Dam Constructed in the campus

The college students have made survey for effect of check dam in the college campus and behind area. This survey has been taken by college students under the 'Earn and Learn Scheme.' Around 100 families living behind the college have been selected as the sample of survey. The result of survey is increased water level of the society located immediate behind college.



Indicate for Carbon Neutrality





Goal: To internalize in our operations the costs associated with climate change impacts due to carbon emissions

The Practice:

Carbon neutrality refers to the practice of balancing carbon dioxide released into the atmosphere from burning fossil fuels, with renewable energy that creates a similar amount of useful energy, so that the carbon emissions are compensated, or alternatively using only renewable energies that don't produce any carbon dioxide (this last is called a post-carbon economy).

The college has practiced carbon offsetting 100% of the carbon dioxide emitted from the atmosphere, by planting trees. This practice has ultimately proved to be useful in balancing the emitted carbon dioxide. It is just a first step and in near future the college intends to plant more trees so as to have better output regarding maintenance of carbon level.

The College has made following efforts as a remedy for carbon neutrality such as plantation in available ground, specific area is covered with Tectona grandis L., use of solar energy, bi-cycle day, no-vehicle day, more emphasis on using, one bike in two person etc.



ndicator VI: Campus Plantation

Tree plantation means planting trees and plants. The purpose of tree plantation is to save the endangered environment and to beautify our campus and life. Trees are valuable gifts of nature. They are known as the best friends of human beings. They benefit us in various ways. The lives of men and other animals and insects are inconceivable without the existence of trees in the world.

Trees absorb carbon dioxide and give us oxygen without which no living being can live. Trees give us shade, medicine, food, fruits, furniture, fuel etc. Trees also keep the weather cool and cause rainfall. They also bind soil and thus prevent erosion. Trees are part and parcel of our life. So, it is our duty to plant more trees and takes care of them in order to maintain balance between man and nature. To make the country economically developed and to save the globe from green house effect, we should plant trees on a large scale.

The Practice:

The purpose of tree plantation is to beautiful surrounding that ultimately results in a sort of creativity. It is very useful in educational surrounding where the outside atmosphere creates a different type of impact on the youth and makes him active learner instead of being a passive receptor.

Trees absorb carbon dioxide and give us oxygen without which no living being can live. Trees give us shade, medicine, food, fruits, furniture, fuel etc. Trees also keep the weather cool and cause rainfall. They also bind soil and thus prevent erosion.

The college though has witness low rainfall, but has planted trees so as to provide better atmosphere for the creative output. In the recent days the college has set up a small Botanical Garden and intends to enlarge it in the coming years. The better rainfall in the present year has enlightened the authorities and the resultant output is to follow systematic approach to provide green and clean campus.

	Description of area for particulars	Area occupied for particulars in meters (in %)
01	Nutan Mahavidhalaya, Selu Total Campus area	113313 Sq. M.
02	Built up area	005042 Sq. M.
03	Total Open space	108271Sq. M.
04	Total Play Ground	51100 Sq. M.
05	Check Dam	621.33 Sq. M.
06	Total Plantation covered	9966.00 Sq. M.
07	Total Botanical Garden	6052.54 Sq. M.
08	Total Lawn area	, 14 Sq. M.
	Total Green covered in college campus	16032.54 Sq M

12

The following table gives a clear indication of different types of trees available in the college campus.

Common * Name	Botanical Name	Family	No. of
	A		Plants
Ramphal	Annona squamosa L.	Annonaceae	03
Sitaphal	Annnona reticulata L.	Annonaceae	11
Ashok	Polyathia longifolia L	Annonaceae	26
Akash Neem	Milingtonia hortensis L.	Bignoniaceae	11
Amba	Mangifera indica L.	Anacardaceae	02
Apta	Bauhinia racemoasa	Caesalpinaceae	06
Awla	Phyllanthus amarus	Euphorbiaceae	01
Babhul	Acacia longifolia willd.sp	Mimosaceae	25
Ber	Ziziphs mauritiana L.	Rhamnaceae	02
Chandan	Santalum album L.	Santalaceae	13
Chikku	Manilkara zotota L.	Sapotaceae	01
Chinch	Tamarindua indica L.	Caesalpinaceae	03
Devkapus	Gossypium herbaceum	Malvaceae	02
Hirda	Terminalia chebula Retz.	Combretaceae	01
Jamb	Psidium guayava L.	Myrataceae	02
Jambul	Syzygium cumini L.	Myrataceae	01
Medshinghi	Dlichandron falcate L.	Bignoniaceae	01
Pandhara chapa	Plumeria rubra L	Olaceae	03
Pimprin	Ficus amplissima L.	Moraceae	01
Wad	Ficus benghalensis L.	Moraceae	01
Anjir	Ficus carica L.	Moraceae	01
Pimpal	Ficus religosa L.	Moraceae	02
Sagwan	Tectona grandis L.	Verbenaceae	647
Ritha	Sapindus emarginatus L.	Sapinadaceae	04
Karanji	Pingamia pinnata(L.)pierre	Facaceae	42
Amaltas	Caesalpina bonduc(L.)Roxb	Caesalpinaceae	19
Kaduneem	Azadirachta indica L.	Meliaceae	69
Kadamba	Anthocephalus cadamba L	Rubiaceae	01
Hiwar	Albiza amara L.	Mimosaceae	13
Gulmohar	Denoix regia L.	Caesalpinaceae	05
Shankasur	Caesalpinia pulcherrima	Caesalpinaceae	05
Kahsid	Cassia siamea Lamk.	Caesalpinaceae	56
Subabul	Leucaena latisiiqua(L.)Guill	Mimosaceae	21
Wilayati chinch	Pithecellobium dulce L.	Mimosaceae	03
Mahuwa	Madhuka lingifolia (Koen)Machr.var.	Sapotaceae	02

Total no of Trees, Shrubs, Ornamental Plants in Campus

Sr. No	Туре	Total Number
01	Trees	937
02	Shrubs	045
03	Ornamental plant	125









Conclusion:

01 Total green covered in college campus is about 14.148 %

Rec	Recommendations:		
01	14.148% green cover is not sufficient to keep campus environmental healthy at least 15.85% more land is required to maintain greenery as per the environmental norms.		
02	The institution has land but the low rainfall in the last couple of years has resulted in this fact. However, the institution is expected to have sufficient greenery available in the near future.		
03	"Trees like Neem, Peepal and Babul and plants like honey plants and Tulsi give out maximum oxygen and absorb pollutants from environment.		
04	Endangered and Threatened species of the area should be conserved.		



II : Solid Waste Management

Goal: Minimize the impacts of solid waste use by means of dumping

The Practice:

Nearly everything humans do leave behind some kind of waste. Nutan Mahavidhalaya, Selu also generates a variety of wastes such as electronic wastes, institutional waste, landscape wastes. The college does a good job of ensuring that hazardous materials are disposed of properly. So the college has given its top priority to dispose of the waste material in scientific manner. Chemical and biological waste generated from chemistry and biological departments are separately sorted and the biological waste is dumped in pit, where as chemical waste is disposed of separately to avoid health hazards. Some small amounts of chemicals can escape down the sink when glassware is cleaned, but not much. All chemicals are labeled with handling and disposal instructions to ensure proper use and disposal in the lab. The amount of chemicals used in the lab is minimum which reduces chance of incident, injury, spills, and reduces the amount of chemicals that must be cleaned up and disposed off.

First the solid waste generated in college campus is separated in to two parts 01. Decomposable solid waste 02. Non decomposable solid waste. Non decomposable solid waste is further separated in to two parts Polythene bags and other non-decomposable material is separated and sold to vendors before disposing the organic wastes. Broken glass, and plastic, rubber and other materials are disposed into municipal dump bins to be recycled. The organic waste is dumped in to decomposing pit for organic decomposition.

01	Is there any mechanism developed by the institution regarding solid waste management?	Yes
02	How Classification of Solid waste generated in the done?	college campus is
	First the solid waste generated in college campus is s parts 01. Decomposable solid waste 02. Non de waste.	
03	How do the institute dispose off the non decomposable	ole waste?
	The non decomposable waste generated in colleg municipal dump van.	e is collected by
04	Whether the decomposable waste is properly treated?	Yes
05	What is the management mechanism of decomposab	le waste?
	The college has constructed One decomposition pits	for the disposal of
	decomposable waste and dump the decomposition pits.	sable wastes in
	40	1

16

Compose Fertilizar Unit :

Compost sertilizer is prepared form plant litter of the college campus. This compost is used as fertilizer for plants of college garden. Compost is a key ingredient in organic farming. At the simplest level, the process of composting simply requires making a heap of wet organic matter and waiting for the materials to break down into humus after a period of three months. Compost is rich in nutrients. The compost itself is beneficial for the land in many ways, including as a soil conditioner, a fertilizer, addition of vital humus or humic acids, and as a natural pesticide for soil. In ecosystem, compost is useful for erosion control, land and stream reclamation, wetland construction, and as landfill cover. The decomposition process is aided by shredding the plant matter, adding water and ensuring proper aeration by regularly turning the mixture. Worms and fungi further break up the material. Aerobic bacteria manage the chemical process by converting the inputs into heat, carbon dioxide and ammonium. The ammonium is further converted by bacteria into plant-nourishing nitrites and nitrates through the process of nitrification.



Compost Fertilizer Unit

Vermi Composting Unit:

College has also developed a Vermi-compost unit. Vermi-compost is prepared form plant litter of the college. This compost is used as fertilizer in college garden. Vermi-compost is the excreta of Earthworms, usually red wigglers (*Eisenia fetida*) earthworms are used for the production of vermin-compost. Vermi-compost is rich in essential elements required for the growth and development of plants. Vermi-compost improves fertility, physical structure of soil and reduce use of chemical fertilizers. Due to that reason vermin-compost is used as fertilizer in garden.



Vermi composting Unit

E-Waste: E-waste can be described as consumer and business electronic equipment that is near or at the end of its useful life. E -waste are hazardous than other waste because electronics contain cadmium, lead, mercury, and polychlorinated biphenyls (PCBs) that can damage human health and the environment. The e-waste management is an inevitable process due to advancement in technology. The older computers, printers, batteries are removed are given to an outside agency "Pacific Incorporation, Nanded" which operates e-waste properly.

Rec	ommendations:
01	In order to help reduce the large amount of post-consumer food waste, the College should provide better labeling and more self-service options and work to educate students about food waste.
02	and Recycle processes.
03	The approach of work culture should be towards paper less campus.
04	It is simple daily decisions and small changes that can make a notable difference in our environment. Raising awareness and participation in the greening process

Indicates Will : Conservation of Environment

Goal: To Create an atmosphere of awareness and sense of responsibility of campus regarding environmental issues. Engage students, faculty, staff and administration in cooperative analysis and response to these issues.

Performance:

The college runs Environmental Studies course designed by SRTM University, Nanded for UG – III year students. The Environmental Studies Program provides an academic forum for information and analysis of environmental issues. Studies thus play a highly significant role in increasing in-depth student understanding of such issues and thereby increasing overall campus awareness. Environmental Studies' emphasis on leads to numerous student projects advancing the College's environmental knowledge and practices.

Most students and faculty involved in the Environmental program are exceptionally enthusiastic about it. Some of the most applauded aspects of the Botany department include its strongly interdisciplinary nature.

The college is having following practice as the part of 'Green Practice.'

- 01. Eco-friendly Festivals are Celebrated.
- 02. Soil Testing of 500 hundred farms per year in collaboration with IFFCO.
- 03. Ban on the use of plastic Polybags.





Soil Testing in collaboration with IFFCO

Apart from it, college has one best practice of publishing Students Magazine entitled 'Precapa' from the very beginning year of college establishment with specific theme this magazine students write their articles. For the awareness about environment and environmental pollution control college has given the theme concern with 'Saving Nature.' After the gap of every two three years, the subject of Prerana is selected related to environment protection. The specific reason behind it is students being the pillars of nation must be aware of Nature, Natural resources and how to care for environment protection. Following table shows the details of it.

Sr. No.	The title of Prerana	Academic Year
01	' Nature-Special'	2003-04
02	'Sensitivity Towards Water Land'	2005-06
03	'Strengthen of Environment - special issue'	2007-08
04	'Cultural of Rural India'	2011-12
05	'Science Special'	2012-13

To create environmental awareness among the students, teachers, Visitors the college authorities have displayed various environmental conservation slogans in the campus.













20



In addition to that the expert lectures are organized in NSS camps.

High Priority Recommendations Improve the College's monitoring and reporting of water and energy usage and provide better feedback and information to campus users. Continue working towards composting the post-consumer food waste generated in the campus. Continue working to collect and use for composting the amount of leaf fall and sprayed on campus ground. Properly dispose of chemical materials that may contain hazardous chemicals. With regards to the concerns mentioned in this report, the College should consider adopting specific goals and targets in its pursuit of sustainability. To identify existing efforts to make the College a more environmental friendly.





Report Prepared By

I have prepared the Environmental Audit Report. The information incorporated in the report is as per the college record.

Dr. P. R. KANTHALE

Head, Dept. of Botany