|| GYAN SEVA TYAG ||

Shri Vyanknath Shikshan Prasarak Mandal's

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE, SOLANKUR

Taluka: Radhanagari, District: Kolhapur (Maharashtra, India). Pincode: 416212

Email: ypvmsolankur@gmail.com / ypvms436.edu@gmail.com

Website: www.ypsc.ac.in

Affiliated to Shivaji University Kolhapur, MS, India || Accredited by NAAC with 'B' Grade (CGPA=2.14)

Shri. A. Y. Patil
Secretary

Shri. R. Y. Patil
Chairman

6,5.2: Quality assurance initiatives of the institution include:

L Regular meeting of Internal Quality Assurance Cell (IQAC); quality improvement initiatives identified and implemented

2. Academic and Administrative Audit (AAA) and follow-up action taken

3. Collaborative quality initiatives with other institution(s)

4. Participation ill NIRF and other recognized rankings

5. Any other quality udit/accreditation recognized by state, national or international agencies such as NAAC, NBA etc.

2. Academic and Administrative Audit (AAA) and follow-up action taken: Environmental, Energy and Green audit.

Nature Solutions

Innovative technologies for sustainable Development

Date: 13 / 03 / 2022

CERTIFICATE OF GREEN AUDIT

This is to certify that **"Shri Yashwantrao Patil Science College, Solankur"**, TaL. Radhanagari, District Kolhapur has conducted **Green Audit** to access for academics year of **2021-22** for the green initiative planning, efforts, activities implemented in the college campus like plantation, waste management, rain water harvesting and various environmental Awareness Activities. This Green Audit is also aimed to access impact of green initiatives for maintenance of the campus eco-friendly.

Proprietor,

NATURE SOLUTIONS

Mr. S. S. Patane.

9881981112

SHRI VYANKNATH SHIKSHAN PRASARAK MANDAL, SOLANKUR

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR

SCIENCE Faculty Affiliated to Shivaji University, Kolhapur.

Accredited B Grade (CGPA 2.14) by NAAC.

Green Audit

(2021-22)

Introduction

a. Green Audit for Environmental Protection:

- Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. The purpose of Green auditing is to assess periodically the compliance of completed or on-going activities with the requirements of legislation, measures proposed in environmental policies, environmental management systems and environmental schemes or the provisions of standards and contracts.

b. Benefits of Green Audit:

- Ensuring legislative compliance.
- Reducing environmental impacts.
- Reducing waste, water and energy costs.
- To safeguard the Green and natural resources.
- Empower the organization to frame a better environmental performance.
- It portrays good image of institution through its clean and Green campus.
- Finally, it will help to build positive impression for the upcoming NAAC visit.

c. NAAC criteria VII Environmental Consciousness :

Green Audit is assigned to the criterion VII of NAAC. National Assessment and Accreditation Council which is a self-governing organization that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation of the institution. The intention of Green Audit is to upgrade the environmental condition in and around the institution. It is performed by considering some environmental parameters like water and wastewater management, energy conservation, waste management, air monitoring, etc. for making the institution more eco-friendly.

Students are the major strength of any academic institution. Practicing Green actions in any educational institution will inculcate the good habit of caring nature in students. Many environmental activities like plantation and nurturing saplings and trees, cleanliness drives, bird watching camp, no vehicle day, rain water harvesting visits to ecologically important places through Green clubs will make the student a good citizen of country.

Need of 'Green and Environmental Audit' is a management tool which comprises systematic assessment of the different components of the ecosystem in which the establishments have been made. It is the process of identifying and determining whether the institution's practices are eco-friendly and sustainable. With modernization, use of resources and chemicals have increased which have negatively impacted the Green creating an imbalance in nature. This is now a great matter of concern. Greenand Environmental audit is a way to ensure that such negative impacts on the campus environment, due to the development and other activities, are kept at a minimum. Realising the importance of Greenand Environmental audit, the Internal Quality Assurance Cell (IQAC) of the College has constituted a team to work towards such environment-related assessments on the Campus. An Eco-Friendly College agenda for Assam Don Bosco College is its road map for building and operating a healthy and self-renewing vibrant Campus community. With an idea to create Green where youth can be educated to live a sustainable life in harmony with nature, the College has formulated the eco-friendly policy with the following objectives:

- Creating a collaborative effort among the College fraternity in fostering an eco-friendly learning and working environment.

- Ensuring the sustenance of biodiversity by maintenance of the natural Greenin addition to conservation, restoration, and remediation of existing land and water.

. • Managing waste generated in the Campus through proper disposal and treatment.

- Commitment to sustainable management of land through agroforestry and kitchen gardening for meeting the food requirements in the Campus.

- Raising awareness of real-world issues affecting the rural communities living adjacent to the College Campus and working towards addressing these issues in partnership with the communities through teaching, research and extension activities.

- Encouraging students to participate in outreach education programmes as a part of Service Learning.

- Protecting, monitoring, and conserving flora and fauna of the Campus and preservation of their natural habitat.

- identifying existing invasive species to reduce their negative impact on the indigenous flora and fauna.

- Involving local communities in the custodianship of natural resources and utilizing local resources for infrastructure construction purposes.

- The Green and Environmental audit report consists of five components- Land, Energy, Air, Waste and Water.

❖ Objectives: The major objectives of the Green Auditing are:

1. To document the land use patterns in the Campus
2. To estimate the energy requirements of the Campus
3. To estimate the water quality of the Campus
4. To inventories the biodiversity of the Campus
5. To document the waste disposal system of the Campus

d. SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR

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1. To provide necessary but quality education to the students from hilly and rural areas which belongs to socially and economically backward classes so as to make them globally competent.
2. To inculcate social, human values such as equity, kindness, honesty, discipline.

   To promote the values regarding social services, secularism, nationalism, scientific temperament, environmental awareness.

Infrastructure SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR

Institution, consist of Ground floor and G+2 buildings, is situated at Solankur with necessary infrastructure for the departments of all the faculties. A proper care is taken to provide basic amenities for the students & the staff members. The facilities are as follows….

- **Classroom:** 10 spacious classrooms with necessary furniture & blackboards in all buildings of the college.
- **Library:** The library of the college with qualified staff and more than 16 thousand books.
- **Laboratory:** 04 spacious laboratories with Computers with Battery backup, Printer, Scanner, LCD projectors & equipment's & furniture etc.
- **Administrative Office:** The spacious LAN computerized administrative office with 02 cabins and modern technology & with necessary facilities.
- **Open Air Theatre:** An open air theatre of 2500 sq. ft. with paving blocks & stage is used for the big functions.
- **Seminar Hall:** Independent seminar hall with necessary facilities for different activities of the departments.
- **Study Room**: In the library building one study room for students & one study room for boys & girls students. Both the study rooms are spacious & necessary furniture & facilities, drinking water, toilet etc.
- **Reading Room 1**
  Ladies room: 1 **Boys Room: 1**
- **Toilets:** Total number of toilets are 06 including college, office, hostels, etc.
- **Botanical Garden:** We have developed 3000 sq. ft. garden for trees & plants with many types of species.

College Main Building

Methodology

The college has conducted Green Audit in the year 2021-22, on a yearly basis. The audit was carried out in three phases.

a. Questionnaire survey:

It includes administrative issues associated with the planning of audit, selecting the personnel for the audit team, preparing the audit protocol used by organization, obtaining background information, etc. The scope of the audit was defined at this step. It was decided that the information related to Water and Wastewater management, Energy conservation, green belt, Carbon inventory, Solid waste management, Hazardous waste management, Air and noise quality status, activities of nature club, etc. should be gathered for the audit purpose. For collecting data related to these different areas, specific questionnaires were prepared.

b. Onsite visit and observations:

The data related to above mentioned areas was collected by visiting each and every facility of college campus. The questionnaires were filled up according to the present situation. Photographic documentation was also done with the help of sophisticated camera.

c. Data analysis:

After collection of secondary data, the reviews related to each environmental factor were taken by the Green audit team. The data was tabulated, analysed and graphs were prepared using computer. Depending upon the observations and data collected, interpretations were made. The lacunas and good practices were documented. The Environmental Management Plan (EMP) was prepared for the next academic year in order to have better environmental sensitization. Finally, all the information was compiled in the form of Green Audit Report.


Green Auditing Process
Planning
Choosing Audit Team
Collection of Data
Analysing Results of Audit
Evaluating Audit

Overview of Environment Audit

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR is situated in Maharashtra at **16.4149331 and 74.0513187**, in the Kolhapur District and it is at altitude of 450 fts above mean sea level.

Satellite image of SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR Campus

Source: Google Earth

a) **Entrance**

b) **College Main Building**

c) **Parking**

d) **Library**

e) **Labs**

f) **Lecture Building**

In its effort towards creating an eco-friendly campus, the college encourages its Faculty and Students to engage in conserving the Campus environment, its flora and fauna, through activities that include individual and collaborative study, conservation practices, activities and initiatives of the Eco Club.

Water management Practices:

• Rain Water Harvesting (RWH) is practiced by means of recharge wells, recharge bore, and water tanks (for storage of rainwater). The institution Campus is independent of the city water supply system as it relies on three bore wells and four natural ponds, present in the Campus, to cater to the water requirements. Bore wells were made to help with the construction as well as to ensure drinking water for the campus. Three Bore Wells and Four natural ponds which helps with the construction as well as to ensure drinking water for the campus.

What is RWH?

Rain water harvesting is collection and storage of rain water that runs off from roof tops, parks, roads, open grounds, etc. This water run off can be either stored or recharged into the ground water. A rainwater harvesting systems consists of the following components:

1. catchment from where water is captured and stored or recharged,
2. conveyance system that carries the water harvested from the catchment to the storage/recharge zone,
3. first flush that is used to flush out the first spell of rain,
4. filter used to remove pollutants,
5. Storage tanks and/or various recharge structures.

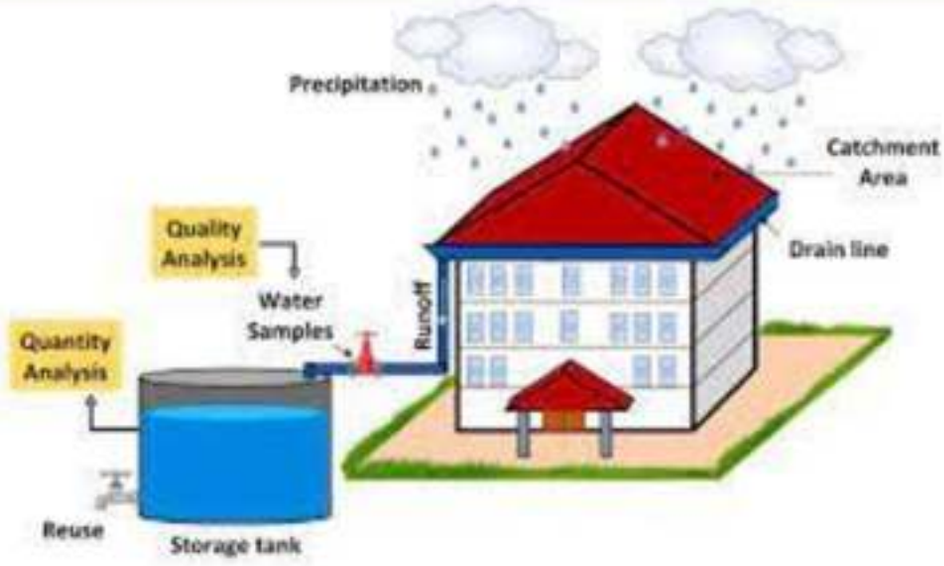
Why do RWH?

Rain may soon be the only source of clean water. Rainwater harvesting systems use the principle of conserving rainwater where it falls and have the following benefits:

- Helps meet ever increasing demand of water.
- Improves quality and quantity of groundwater.
- Reduces flooding.

How?

Setting up a rainwater harvesting is not difficult but requires some sort of understanding of hydrology and architecture and as a result most people find it too complicated to do it themselves. In order to make it simple and convenient for everyone to set up a rainwater harvesting system suitable for their needs, we have prepared a set of guidelines which will help you to set up your own rainwater harvesting system quickly and efficiently.



- **Bird's diversity:**

The diversity among birds is striking. Birds live in a variety of different habitats. Birds that live in different habitats will encounter different foods and different predators. Birds can be carnivores (feeding on other animals), herbivores (feeding on plants), or generalists (feeding on a variety of foods).

Sparrow, Crow, Bulbuls, Eagle, Pigeon, Cuckoo, Bat, Butterfly, Hornbill, etc these species are seen regularly around the campus.

i. Details of Tree census in College campus:

The beginning of the 21st century brought growing concern about global warming, climate change, food security, poverty, and population growth. CO_2 is a principle component causing global warming. Atmospheric carbon dioxide levels have increased to 40% from preindustrial levels to more than 390 parts per million CO_2. On this background it is a need of time to cover the educational campuses with Environment cover interrelated with climate change.

The current is a present status of tree cover, vegetation and carbon storage assessment of area under SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR Campus. In an era of global warming and climate change; carbon emission, carbon sequestration, mitigation, adaptation are the keywords in academia. Carbon sequestration is a phenomenon of converting atmospheric carbon i.e. CO_2 in to other pools of carbon such as vegetation, soil, ocean etc. in various forms to mitigate global

warming. It is one of the important clauses of Kyoto Protocol. Current tree census methodology has been adopted from the guidelines set by Indian Institute of Remote Sensing, Dheharadoon, Govt. of India.

- **Total biomass :**

Biomass, in ecology, is the mass of living biological organisms in a given area or ecosystem at a given time. Biomass can refer to *species biomass*, which is the mass of one or more species, or to *community biomass*, which is the mass of all species in the community. It can include microorganisms, plants or animals. The mass can be expressed as the average mass per unit area, or as the total mass in the community. 0.378 tons of total biomass of woody vegetation have been recorded in The Shri Yashwantrao Patil Science College (YPSC), Solankur Kolhapur campus during the current tree census.

- **Carbon stock:**

Forests and trees act as natural carbon stores, but this carbon is released when the trees are felled and the area deforested. The amount of carbon stored within an area of land varies according to the type of vegetation cover. 0.1891 tons of total carbon stocks are present on the campus.

- **Carbon Sequestration:**

Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change. It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels. Vegetation carbon pool having the potential of 560 Pg (Pg: Petagram= billion ton) of carbon storage globally. In the current study the focus is given on the assessment of existing carbon stock stored The Shri Yashwantrao Patil Science College (YPSC), Solankur Kolhapur campus in the form of woody vegetation by enumerating every tree species. Overall 0.694 tons of CO_2has captured and stored by the woody plants present in the college campus. A single tree consumes 0.0218 tons of CO_2 approximately annually consequently, as the campus possess 69 mature woody plants 1.5042 tons of CO_2 is consumed yearly by all woody vegetation on the college campus.

- **Oxygen released :**

Woody vegetation on The **Shri Yashwantrao Patil Science College (YPSC), Solankur,** Kolhapur campus has released 1.85 tons of oxygen in their lifetime till date. Released oxygen is directly proportional to CO_2 sequestrate in the ratio of 32/12. Thus, it is supposed to release of oxygen annually. It is assumed that a single tree supports oxygen demand of two people for their life.

- **Total number of trees enumerated on SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR campus:**

All the collected data was tabulated and analysed with the help of MS- Excel spreadsheets and objected findings were extracted by using various factors given by Inter governmental Panel on Climate Change (IPCC).

Total number of trees, plant & shrubs within premises of Shri Yashwantrao Patil Science College (YPSC), Solankur & planted by Botany Department are 788 only, which is very effective for environmental balance and biodiversity of campus.

Shri Vyanknath Shikshan Prasarak Mandal, Solankur

Shri Yashwantrao Patil Science College (YPSC), Solankur

Department of Botany College campus plant list

Tree Details		
Scirntific name	**Local Name**	**Number**
Lagerstroemia parviflora	Bondara / Lendi	6
Michelia champaca	Chafa /Sonchafa	6
Delonix regia	Gulmohar	8
Terminalia belerica	Hela	2
Terminalia chebula	Hirda	8
Garcinia spicata	Haldi	7
Strychnos nux-vomica	Kajara / Kuchala	6
Sapindus emarginatus	Ritha	8
Aegle marmelos	Bel	6
Cinnamomum tamala	bay leaf	8
Glycyrrhiza glabra	Licorice	5
Syzygium cumini	Jambhul	8
Artocarpus heterophyllus	Fanas	8
Bombax ceiba	Silk cotton tree	9
Tamarindus indica	Chinch	19
Bahunia verigata	Apta	25
Butea monosperma	Flame of forest	9
Terminalia tomentosa	Asan	6
Lagerstroemia speciosa	Pride of India	7
Garcinia indica	Kokam	5
Alstonia scholaris	Satwin	8
Ficus religiosa	Pimpal	2
Casuarina equisetifolia	Suru	9
Albizzia lebbek	Shiras	18
Oroxylum indicum	Tetu	6

Moringa oleifera	Shevga	8
Salmalia malabarica	Kate Sawar	9
Ficus bengalensis	Wad	2
Cinnamomum tamal	Tamal patra	6
Ficus benghalensis	Banyan Tree	2
Azadirachta indica	Neem Tree	13
Mangifera indica	Mango Tree	7
Ficus religiosa	Peepal Tree	2
Tamarindus indica	Tamarind Tree	11
Tectona grandis	Teak Tree	36
Dalbergia sissoo	Indian Rosewood	1
Calophyllum inophyllum	Indian Laurel	3
Syzygium cumini	Jamun Tree	8
Dalbergia latifolia	Sheesham Tree	2
Butea monosperma	Palash Tree	14
Shorea robusta	Sal Tree	9
Terminalia arjuna	Arjun Tree	16
Madhuca longifolia	Mahua Tree	2
Pongamia pinnata	Karanj Tree	16
Phyllanthus emblica	Indian Gooseberry (Amla)	21
Tectona grandis	Sag	36
Terminalia chebula	Hirda	21
Eukalyptus lanceolatus	Nilgiri	36
Polyathia longifolia	Ashoka	15
	Total trees	**505**

Shrub Details		
Scirntific name	**Local Name**	**Number**
Adhatoda vasica	Adulsa	5
Strobilanthes heyneanus	Akra	2
Alangium salvifolium	Ankul/Ankol	3
Gymnema sylvestre	Bedki/Gudmari	4
Colebrookea oppositifoli	Bhamani	4
Clerodendrum infortunatum	Bhandira	20
Leea macrophylla	Dinda	9
Lantana camara	Ghaneri	13
Nothapodytes nimmoniana	Narkya	2
Mimosa pudica	Lajalu	12
Murraya koenigii	Kadi patta	9
Gymnosporia Montana	Bharati/Hekal	5
Duranta erecta	Kadu Mendi	22

Adhatoda zeylanica	Adulsa	5
Clerodendrum viscosum	Vagati	16
Hibiscus rosa-sinensis	Jaswand	25
Murraya koenigii	Kadipatta	15
Gloriosa superba	Kalalawi	11
Carissa carandas	Karawand	5
Phyllanthus emblica	Amla	13
Rosa indica	Gulab	7
Lawsonia inermis	Mehndi	36
	Total shrubs	**243**

Climbers		
Scientific name	**Local Name**	**Number**
Caesalpinia mimosoides	Chillari	2
Entada scandens	Garambi	1
Smilax zeylanica	Ghotvel	3
Strychnos colubrine	Kajarvel	3
Mucuna pruriens	Khaj Kuhili	3
Quisqualis indica	Lal chameli	5
Butea superba	Palas vel	4
Argyreia speciosa	Samudrashoka	5
Asparagus racemosus	Shatawari	4
Creptolepis buchnani	Dudhwel	10
	Total climbers	**40**

GRASSES	
Scirntific name	**Local Name**
Andropogon tricticeus	Bhalekusal
Sorghum halepense	Boru
Crysopogon Montana	Dongari gawat
Andropogon pumilis	Gondal
Cynodon dactylon	Haryali
Heteropogon contortus	Kusali
Cyprus rotundus	Natgras
Ocimum tenuiflorum	Tulsi
Aloe vera	Korphad
Zingiber officinale	Ale
Cymbopogon citratus	lemon grass
Jasminum sambac	Mogra

Gardening Photo

Green Activity

CONCLUSION and RECOMANDATIONS

The Nature Solutions Kolhapur has conducted a green Audit of Shri Yashwantrao Patil Science College, Solankur, kolhapur in the academic year 2021-22. Environment auditing is the process of identifying and determining whether institution practices are eco-friendly and sustainable. The main objective of college to carry out green audit is to check Green practices followed by college and to conduct a well formulated audit to understand where we stand on a scale of environmental soundness.

Conclusions:

From the Environment audit conducted by college following are some of the conclusions which can be taken for improvement of the college campus to become Environment friendly college campus.

1. College takes efforts to grow and maintain tree species.
2. Air quality on the campus is good.
3. Due to all good biomass and biodiversity of campus.

Recommendations:

Following are some of the key recommendation for improving campus environment.

1. Construct proper composting plant by using tree leaves to produce organic fertilizer.
2. Increase number of local tree species which purifies air. (Kadulimb, Vad, Pimple)

Nature Solutions

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Date: 09 / 04 / 2022

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Proprietor,

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9881981112

401 and 402, 4th floor, Mahadkar Chambers, Karve Road, Kothrud, Pune 411038 & Kolhapur

416012 Cont. No. 9881981112

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1. To provide necessary but quality education to the students from hilly and rural areas which belongs to socially and economically backward classes so as to make them globally competent.
2. To inculcate social, human values such as equity, kindness, honesty, discipline.

   To promote the values regarding social services, secularism, nationalism, scientific temperament, environmental awareness.

Infrastructure SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR

Institution, consist of Ground floor and G+2 buildings, is situated at Solankur with necessary infrastructure for the departments of all the faculties. A proper care is taken to provide basic amenities for the students & the staff members. The facilities are as follows….

- **Classroom:** 10 spacious classrooms with necessary furniture & blackboards in all buildings of the college.
- **Library:** The library of the college with qualified staff and more than 16 thousand books.
- **Laboratory:** 04 spacious laboratories with Computers with Battery backup, Printer, Scanner, LCD projectors & equipment's & furniture etc.
- **Administrative Office:** The spacious LAN computerized administrative office with 02 cabins and modern technology & with necessary facilities.
- **Open Air Theatre:** An open air theatre of 2500 sq. ft. with paving blocks & stage is used for the big functions.
- **Seminar Hall:** Independent seminar hall with necessary facilities for different activities of the departments.
- **Study Room**: In the library building one study room for students & one study room for boys & girls students. Both the study rooms are spacious & necessary furniture & facilities, drinking water, toilet etc.
- **Reading Room 1**
  Ladies room: 1 **Boys Room: 1**
- **Toilets:** Total number of toilets are 06 including college, office, hostels, etc.
- **Botanical Garden:** We have developed 3000 sq. ft. garden for trees & plants with many types of species.
- **About Library :**
  - Library is a 'Heart' of Institute. Teaching and learning system are supported by library through reading material.
  - The library Established in year 2009.
  - Our Library is well equipped with textbooks, reference books, journals, magazine newspapers, and internet facility.
  - At present, 4314 books are available in the Library.

- Besides, study room facility is made available to the students.
- The total area of the library is 530 sq.fts.

- **SPORTS FACILITIES on GROUNDS-**
    - Outdoor – Kabaddi, Kho-Kho, Volleyball
    - Indoor – Yoga, Carom, Chess

- **National Service Scheme**
- **Nature Club**

1. Nature club is an autonomous organization of nature lovers from various departments of the college and run by dept. of Botany.
2. The club has been active on the campus since 2014, under the leadership of **Dr. S. V. Madhale** who is coordinator.

- **The major objectives of the club are:**

1. To inculcate Love of Nature in the minds of college youth
2. To develop social and environmental commitment
3. To develop leadership qualities and personality excellence through interdisciplinary group activities
4. To help students develop organizing capacity through independent planning and execution of environmental programs
5. To help them aware of the concept of ecological balance through environmental education programs

- **Activities by Nature Club :**
    - Plantation
    - Trekking and visit to nearby forest
    - Rally for awareness in Ganesh festival to avoid pollution
    - Cleaning of river after Genesh festival
    - Swatchyata Abhiyan
    - Guest lecture
    - Poster presentation on nature

College Main Building

Methodology

The college has conducted Environment Audit in the year 2021-22, on a yearly basis. The audit was carried out in three phases.

a. Questionnaire survey:

It includes administrative issues associated with the planning of audit, selecting the personnel for the audit team, preparing the audit protocol used by organization, obtaining background information, etc. The scope of the audit was defined at this step. It was decided that the information related to Water and Wastewater management, Energy conservation, green belt, Carbon inventory, Solid waste management, Hazardous waste management, Air and noise quality status, activities of nature club, etc. should be gathered for the audit purpose. For collecting data related to these different areas, specific questionnaires were prepared.

b. Onsite visit and observations:

The data related to above mentioned areas was collected by visiting each and every facility of college campus. The questionnaires were filled up according to the present situation. Photographic documentation was also done with the help of sophisticated camera.

c. Data analysis:

After collection of secondary data, the reviews related to each environmental factor were taken by the Environment audit team. The data was tabulated, analysed and graphs were prepared using computer. Depending upon the observations and data collected, interpretations were made. The lacunas and good practices were documented. The Environmental Management Plan (EMP) was prepared for the next academic year in order to have better environmental sensitization. Finally, all the information was compiled in the form of Environment Audit Report.


Environmental Auditing Process
Planning
Choosing Audit Team
Collection of Data
Analysing Results of Audit
Evaluating Audit

Overview of Environment Audit

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR is situated in Maharashtra at **16.4149331 and 74.0513187**, in the Kolhapur District and it is at altitude of 450 fts above mean sea level.

Satellite image of SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR Campus

Source: Google Earth

a) **Entrance**

b) **College Main Building**

c) **Parking**

d) **Library**

e) **Labs**

f) **Lecture Building**

In its effort towards creating an eco-friendly campus, the college encourages its Faculty and Students to engage in conserving the Campus environment, its flora and fauna, through activities that include individual and collaborative study, conservation practices, activities and initiatives of the Eco Club.

b. Water and Wastewater Audit:

Water audit can be defined as a qualitative and quantitative analysis of water consumption to identify means of reducing, reusing and recycling of water. Water Audit is nothing but an effective measure for minimizing losses, optimizing various uses and thus enabling considerable conservation of water in irrigation sector, domestic, power and industrial as well. A water audit is a technique or method which makes possible to identify ways of conserving water by determining any inefficiencies in the system of water distribution. The measurement of water losses due to different uses in the system or any utility is essential to implement water conservation measures in such an establishment.

Water accounting is the process of communicating water resources related information and the services generated from consumptive use in a geographical domain, such as a river basin, a country or a land use class; to users such as policy makers, water authorities, managers, etc.

Importance of Water Audit:

- Water audit improves the knowledge and documentation of the distribution system.
- Identifies the problem and risk areas and a better understanding of what is happening to the water after it leaves the source point.
- Leads to reduced water losses.
- Improved financial performance.
- Improved reliability of supply system.
- Efficient use of existing supplies.
- Better safeguard to public health and property and reduced legal liability.
- Reduced disruption, thereby improving level of service to customers.
- Large potential cost savings that can be achieved by water harvesting, through the recycling of water and the use of rain water.

It is observed that a number of factors like climate, culture, food habits, work and working conditions, level and type of development, and physiology determine the requirement of water.The community which has a population between 20,000 to 1,00,000 requires 100 to 150 liters per person (capita) per day. The communities with a population can consume over 100,000 — 150 to 200 liters person (capita) per day. As per the standards provided by WHO Regional office for South East Asia

Schools requires 5-7liters per student; 15-20liters per student if water-flushed toilets, Staff accommodation requires 45liters per person per day and for sanitation purposes it depends on technology.

i) Water Audit:

Water usage can be defined as water used for all activities which are carried out on campus from different water sources. This includes usage in all residential halls, academic buildings, on campus and on grounds. Wastewater is referred as the water which is transported off the campus. The wastewater includes sewerage, residence, hall waters used in cooking, showering, clothes washing as well as wastewater from chemical and biological laboratories which ultimately going down in sink or drainage system.

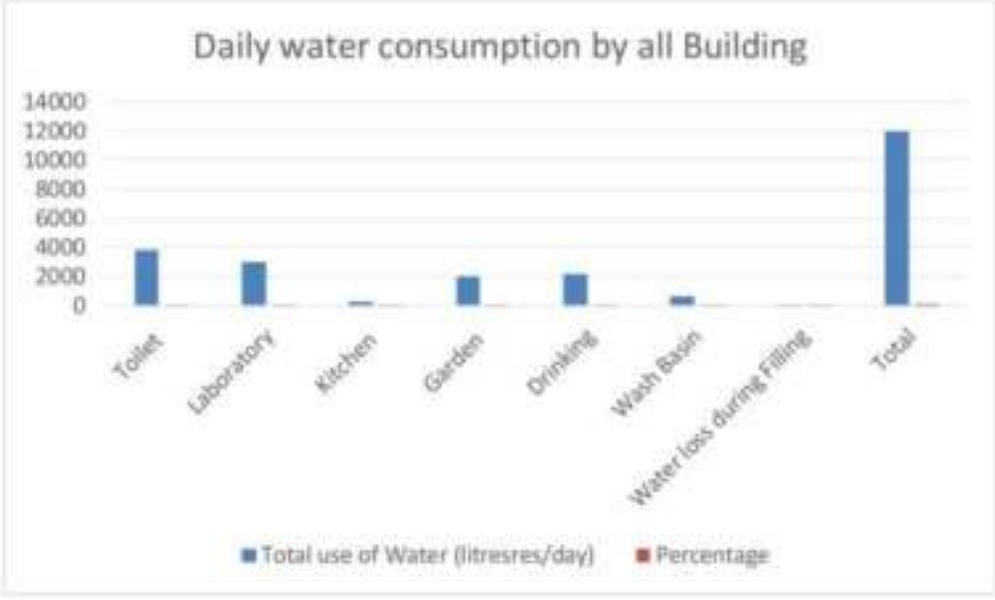
Water Audit Process:

ii) Overall water consumption in SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR:

From the data collected for water audit of Institution, Kolhapur, the water distribution and water consumption pattern is noticed as follow. The college is having main building for administrative work as well for teaching work. For the water audit purpose we categorized the college campus area into three buildings and Garden, etc.

In water audit study the daily water consumption by all Buildings is found to be as follows.

Daily water consumption by A Building								
Site	Toilet	Laboratory	Kitchen	Garden	Drinking	Wash Basin	Water loss during Filling	Total
Total use of Water (litresres/day)	3850	3000	250	2050	2150	690	10	12000
Percentage	32.08333	25	2.083333	17.08333	17.91667	5.75	0.083333	100



Graph No. 3.1 Daily water consumption by all buildings

The total water consumption per day for all buildings is found to be 12,000 lit/day.

Water management Practices:

• Rain Water Harvesting (RWH) is practiced by means of recharge wells, recharge bore, and water tanks (for storage of rainwater). The institution Campus is independent of the city water supply system as it relies on three bore wells and four natural ponds, present in the Campus, to cater to the water requirements. Bore wells were made to help with the construction as well as to ensure drinking water for the campus. Three Bore Wells and Four natural ponds which helps with the construction as well as to ensure drinking water for the campus.

What is RWH?

Rain water harvesting is collection and storage of rain water that runs off from roof tops, parks, roads, open grounds, etc. This water run off can be either stored or recharged into the ground water. A rainwater harvesting systems consists of the following components:

1. catchment from where water is captured and stored or recharged,
2. conveyance system that carries the water harvested from the catchment to the storage/recharge zone,
3. first flush that is used to flush out the first spell of rain,
4. filter used to remove pollutants,
5. Storage tanks and/or various recharge structures.

Why do RWH?

Rain may soon be the only source of clean water. Rainwater harvesting systems use the principle of conserving rainwater where it falls and have the following benefits:

- Helps meet ever increasing demand of water.
- Improves quality and quantity of groundwater.
- Reduces flooding.

How?

Setting up a rainwater harvesting is not difficult but requires some sort of understanding of hydrology and architecture and as a result most people find it too complicated to do it themselves. In order to make it simple and convenient for everyone to set up a rainwater harvesting system suitable for their needs, we have prepared a set of guidelines which will help you to set up your own rainwater harvesting system quickly and efficiently.

c. Total Electric Energy Audit :

An electricity audit is simply an audit or calculation of how much electricity you are using in your home and of where that electricity is going.

An energy audit is an analysis of a facility, indicating how and where that facility can reduce energy consumption and save energy costs. Its insight to energy efficiency and conservation can lead to significant savings on the company's utility.

Importance of Electric energy Audit:

- The audit will not only inform you of opportunities but provide you with financial analysis. This will enable prioritization based on financial benefit and return on investment.
- Provide you with solid, easy to understand technical information regarding the proposed energy conservation measures.
- A good quality audit will analyze your historical energy use and find potential issues using statistical methods.
- Provide you with emissions analysis to help you understand the benefits of your decisions from an environmental standpoint.
- Understand where energy is used and which areas are worth focusing on the most (energy hogs).
- Provide you with benchmark information to help you understand your energy use performance compared to others in your field and area.

Electricity and energy audit:

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, 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. However, many may not realize how much influence the higher education sector has in the larger energy market. Energy sources utilized by all the departments and common facility centres include electricity, liquid petroleum and LPG. Major use of energy is in Science Department, office, canteen, and laboratories for lighting, transportation, cooking and laboratory work. Energy consumption by energy consuming in college is **243.37 KwH/day.** Due to lack of adequate ventilation and natural light in rainy season some part of infrastructure more consumption of electricity at air and light appliances in the college is increased. Hence, survey of adequate ventilation and natural light of infrastructure is essential. Also high consumption of electricity

Is observed at office in duration of admission and examination. In science department like Physics, Chemistry, Mathematics, Botany and Zoology electricity was shut downed after occupancy time is one of greening practices for energy conservation. Audit shows major non-teaching staff is nearer to campus for resident and mass number of students are come from nearby villages of solankur hence consumption in fuel is less. As our college is situated in rural area very less number of students are using vehicles, 50 % of staff using four wheelers is high in number. Study shows about 1.5% students were use two wheeler, 9.92% students come to the college by walking, 0.90 % student are using bicycle and, 3.05% students were lifted by their parents to college, 84.57 % are using state transportation vehicles and no any student make use of public transportation like bus.

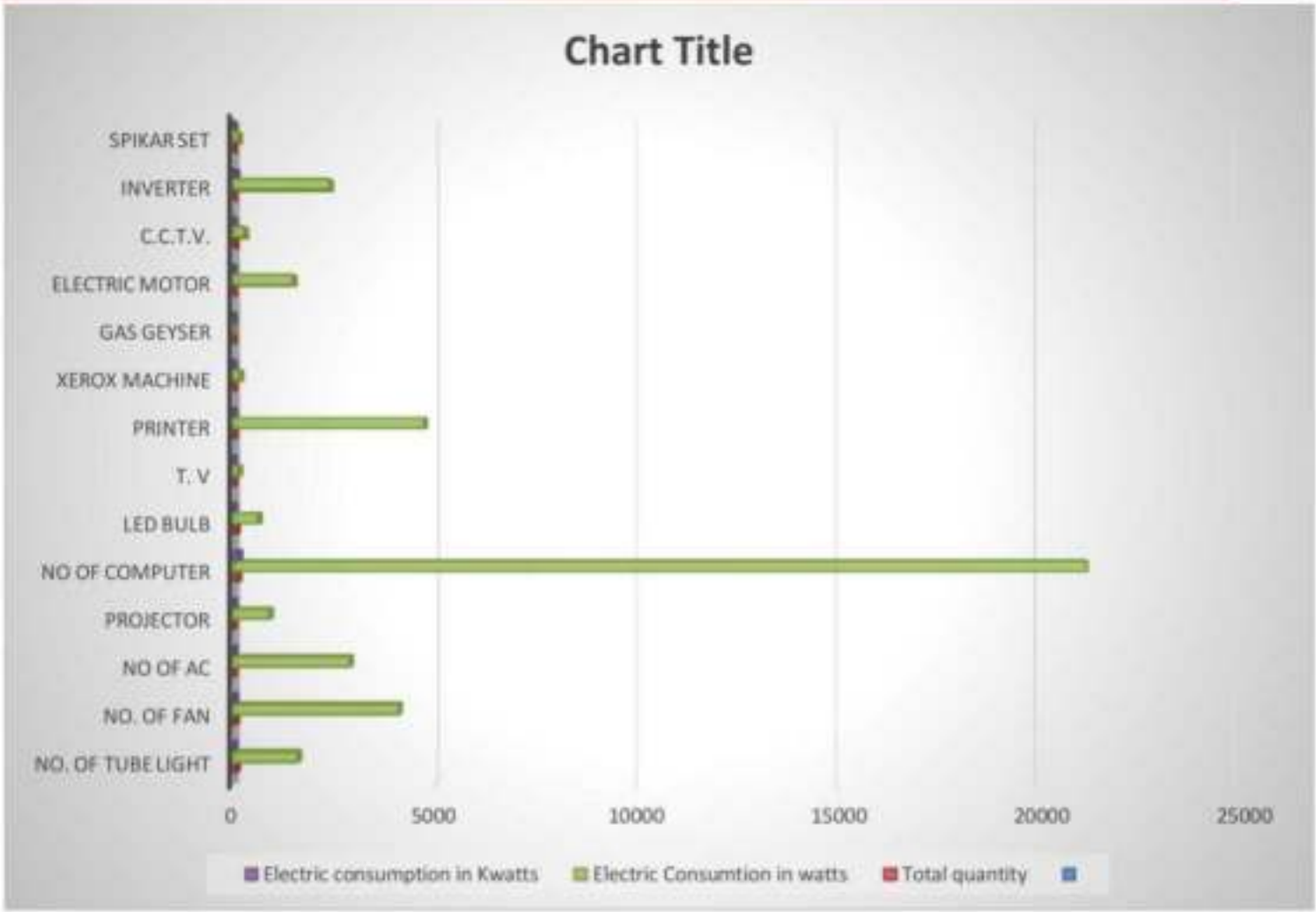
Staff members who lived out campus are using the vehicles in sharing for daily transportation. Study tours, collection tours, visits are followed by college which gives the message of importance of walking which is very good green practice. Consumption of LPG for education or practical purpose is very less. The LPG connection in name of the college and LPG is handled by departments of Chemistry. For heating purpose at the time of practical, no leakages and off mode regulators are seen at time of verification.

Total Energy usage per day in KwH = 243.37 KwH/day
Total lightning usage per day in KwH = 10.15 KwH/day
From total lightning regular light usage = 6.43 KwH/day
From total lightning LED light usage = 3.72 KwH/day
That is percentage of LED light usage against regular light per week is 57.86%

Electricity Usage Survey calculations chart of **Shri Yashwantrao Patil Science College (YPSC), Solankur** as follows :

Name of College	**Shri Yashwantrao Patil Science College (YPSC),** Solankur													
Address	Solankur, Radhanagari													
Consumer Number (on electricity bill)														
Type	No. of Tube light	No. of Fan	No of AC	Projector	No of Computer	LED Bulb	T. V	Printer	Xerox machine	Gas	Electric Motor	C.C.T.V.	Inverter	SPIKAR SET
Principal cabin		2	0		1	10	1	1						
office	3	4	0	0	6	1	1	4	1	0	2	2	1	2
staff room	3	3										1		
Store Room	1													
Library	3	3			2		0	1		0		3		
Student Reading Room	4	4												
Board Room														
Exam strong Room	1	1			1			2						
Girl common room														
Teacher Reading Room														
NSS Office	1	1			1									
List of Class Room (Name)														
Class Room 1	2	1	0		2		1	1						
Class Room 2	1	1			1	1								
Class Room 3	0	2				2						1		
Class Room 4	2	1												
Class Room 5		2		1		7						1		
Class Room 6	1	2										1		
Class Room 7	0	3										1		

Class Room 8	1	1				1								
Class Room9	2											1		
Class Room10	1	1			1	1		1						
List of laboratories (Name)														
laboratories 1	1	2			1			1						
laboratories 2	2	2		1								1		
laboratories 3	4	2												
laboratories 4	5	5			1		1		1			1		
laboratories 5	3	1			1	1						1	1	
laboratories 6	2	1										1		
laboratories 7	2	2		1	1			1				2		
Gymkhana					1			1						
Corridor	2	1				3								
Gents Student Wash Room	1					1								
Gents Staff Wash Room	1					1								
Ladies Student Wash Room	1					1								
Total quantity	**73**	**55**	**0**	**3**	**19**	**62**	**4**	**19**	**3**	**0**	**2**	**35**	**3**	**2**
Avg. Wattage of devices	**22**	**75**	**2900**	**300**	**200**	**10**	**32**	**250**	**55**		**746**	**8**	**800**	**60**
Electric Consumtion in watts	**1606**	**4125**	**0**	**900**	**21200**	**620**	**128**	**4750**	**165**	**0**	**1492**	**280**	**2400**	**120**
Avg. Usage in hours	**4**	**6**	**0**	**5**	**6**	**6**	**1**	**1**	**1**		**1**	**24**	**24**	**1**
Electric consumption in Kwatts	**6.424**	**24.75**	**0**	**4.5**	**127.2**	**3.72**	**0.128**	**4.75**	**0.165**	**0**	**1.492**	**6.72**	**57.6**	**0.12**
Total Electric consumption in Kwatts per day														**243.369**
. Electric consumption in Kwatts per year(Approximate acadmic days are 260)														**63275.94**



Graphical representation of Total Energy usage KwH/Year

d. Solid waste audit:

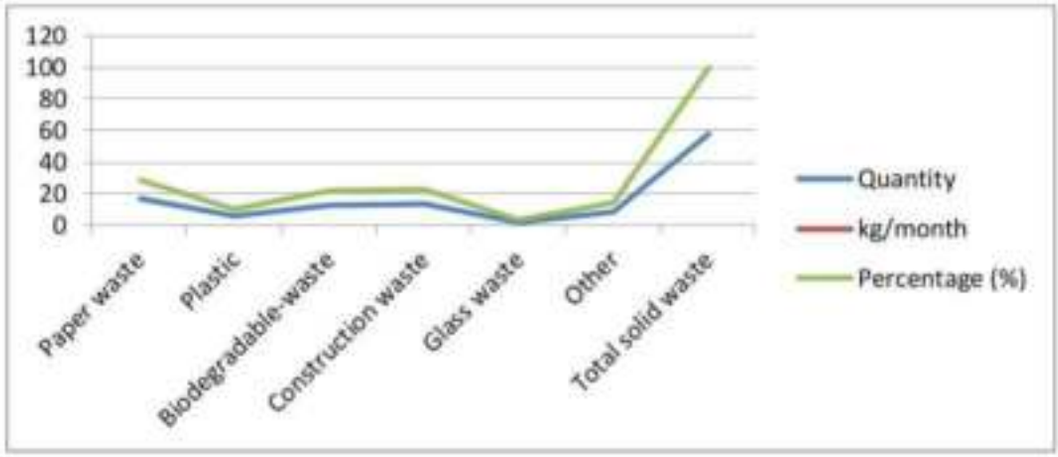
Solid waste management is becoming a major public health and environmental concern world over. Improper solid waste disposal leads to substantial negative environmental impacts e.g., pollution of air, soil, water and generation of greenhouse gases from landfills. Many insect borne diseases are spread through garbage. Therefore, it is necessary to manage the solid waste appropriately to reduce the load on waste management system. The intention of this inventory is to find out the quantity, volume, type and current management practice of solid waste generation in Institution, Kolhapur.

This survey related to solid waste generation would be helpful for making the college more environments friendly.

- **Generation of solid waste in Institution, Kolhapur:**

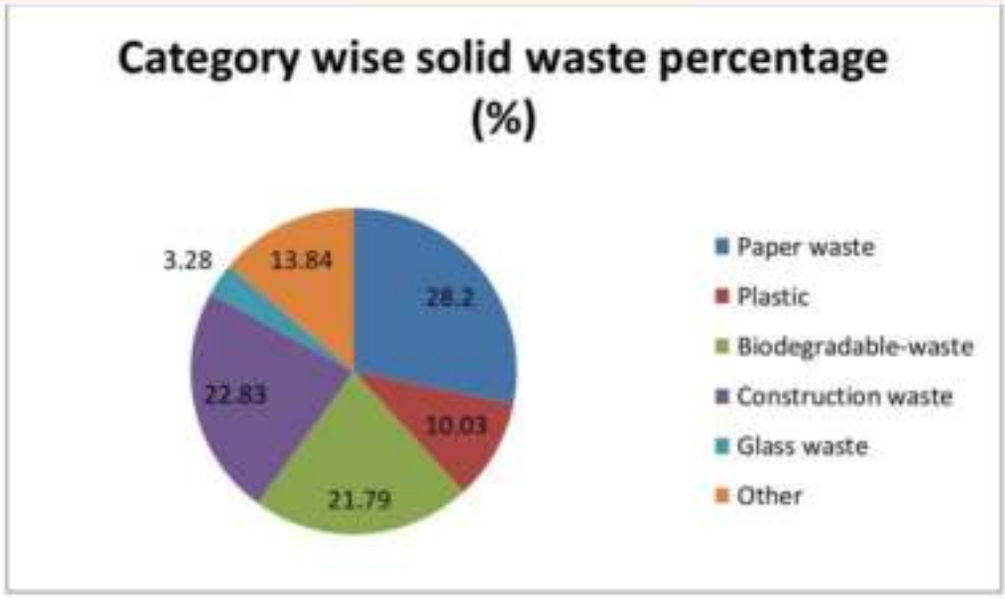
Category wise solid waste generation at Institution, Kolhapur (kg/month)

Category of waste	Paper waste	Plastic	Biodegradable-waste	Construction waste	Glass waste	Other	Total solid waste
Quantity kg/month	16.3	5.8	12.6	13.2	1.9	8.0	57.8
Percentage (%)	28.20	10.03	21.79	22.83	3.28	13.84	100



Category wise solid waste generation at Institution, Kolhapur

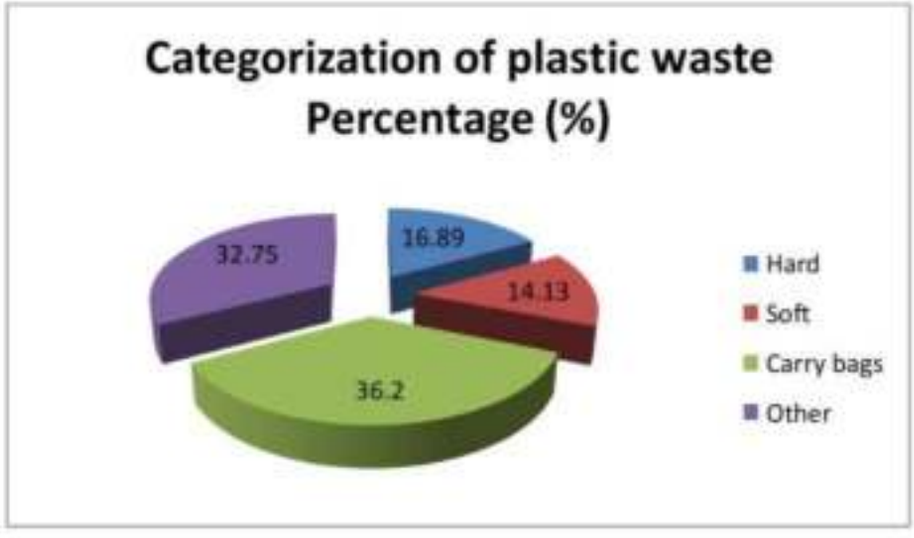
The average amount of solid waste generated per month in Institution, Kolhapur was 57.8 kg/month. On the basis of observations the highest quantity of solid waste generated is paper waste which is about 16.3 kg/month and construction waste is about 12.6 kg/month respectively. The examination department generated paper waste in large quantity in the college. The glass waste is produced in minimum quantity i.e. 1.9 kg/month. Besides, the above mentioned wastes, plastic waste is generated in the form of plastic wrappers of food items, old broken chairs, old broken water tank, etc.



- **Plastic waste generation and its distribution in college campus**

	Plastic kg/ month				Total
Category	Hard	Soft	Carry bags	Other	
Quantity	0.98	0.82	2.1	1.90	5.8
Percentage	16.89	14.13	36.20	32.75	100

Categorization of plastic waste at Institution, Kolhapur(kg / month):



The graph shows that the hard plastic and carry bag waste is generated in higher amount which is 36.2% and 32.75% respectively. The soft plastic and other plastic waste also generated in the college is 14.13% and 16.89% respectively

e.Hazardous waste audit:

Institution, Kolhapur is one of the well-known educational institutes having number of student strength. This college caters the facility for Medical faculty's students in their campus. Many department having chemicals hazardous waste but they provided their chemical and water treatment plant at the back side. If there is other waste is produces will hand over to the particular authority.

f. E-waste:

Generation of e-waste is found on every educational institute. It is observed that the E-waste generated at Institution, Kolhapur is of Schedule II category. Computers, Printers, Laptops, Scanners, Internet Routers and Xerox machines are used for administrative work. . The wire required for the connectivity also gets included in the e waste. The college has its own computer laboratory of 50 computers. The library uses some electronic scanners which after its use can become e-waste. Presently, the college is dispatching the e waste to SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR main office where the waste is collected centrally and it is given to authorised e- waste collector.

Key Observations:

- The average waste generated in the college is. 5.8Kg/month

- Highest quantity of solid waste is of paper waste16.3Kg/month
- Biodegradable waste is 12.6 Kg/month.
- Plastic waste is about 2.8% to the total solid waste on the college campus.
- Some of the classrooms were found without solid waste baskets.
- There is need of some improvements into the collection of solid waste.
- Solid waste is to be segregated at the source.

g. Ambient air quality status:

Ambient air sampling is important part of environmental monitoring. Particulate matter and trace gases sampling were carried out on the college campus. The sampling was carried out using calibrated Handy Dust Sampler APM 821 with flow rate 1 lit/min equipped with glass fibre filter paper (size 25 mm). The sampling period was 2 hrs.

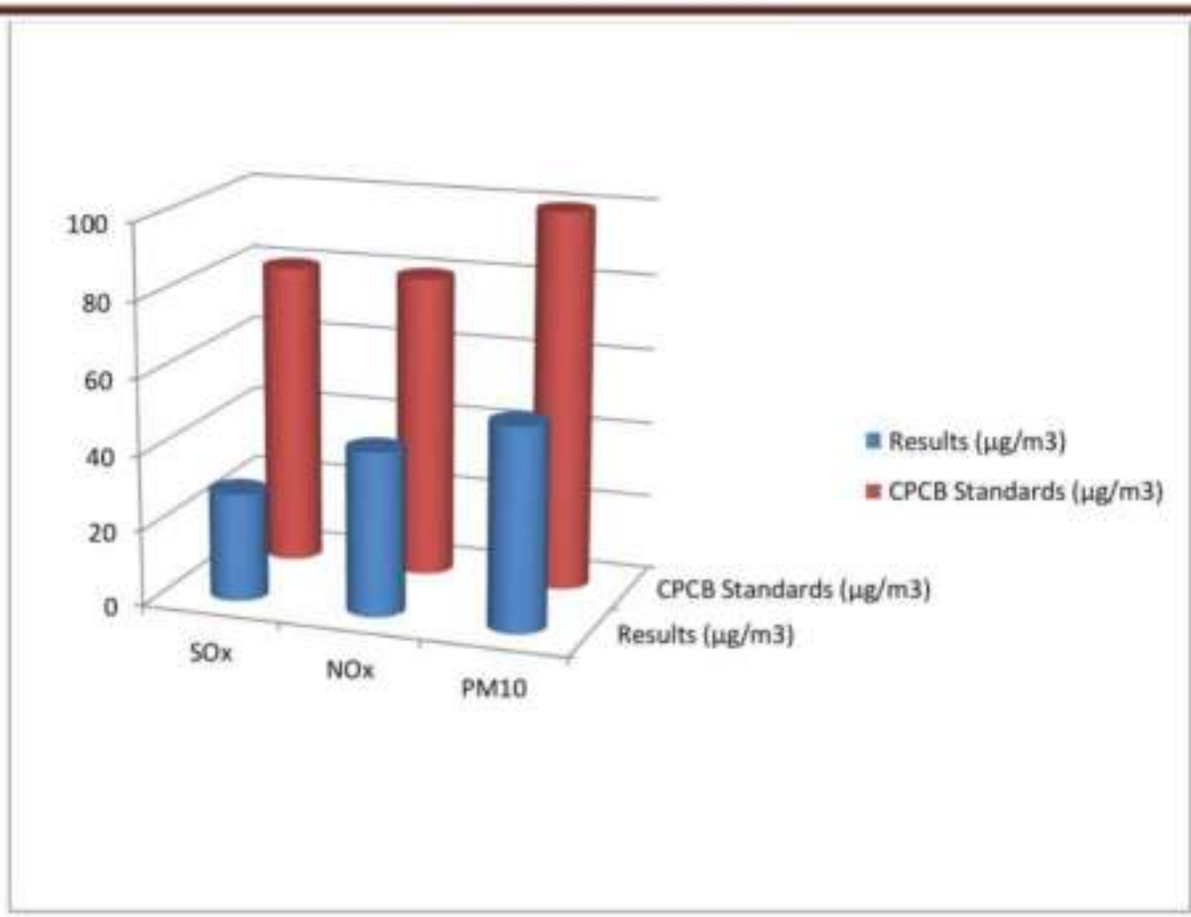
Sulphur dioxide (SO_2) and Oxides of Nitrogen (NOx) in the air were estimated with West and Gaeke method and Jacob and Hochheiser modified method respectively. Particulate matter (PM_{10}) was

measured gravimetrically. The samples were collected and analyzed in the approved laboratory. The details of air quality status in the college are given as bellow:

Ambient air quality status of Institution

Sr. No.	Parameters	Results ($\mu g/m^3$)	CPCB Standards ($\mu g/m^3$)
1	SOx	28.57	80
2	NOx	43.33	80
3	PM_{10}	53.61	100

It was observed that all the air quality parameters analyzed were within the Ambient Air Quality Standards of Central Pollution Control Board, India. The air quality is good in the college campus as well as surrounding.



Ambient air quality status of Institution.

h. Ambient noise monitoring status:–

Ambient noise monitoring was carried out in different areas of college campus like at college campus entry, college gate, corridor and floor. The sampling was carried out using calibrated Sound Level Meter (AZ 8921) by logarithmic scale in Decibels (dB). The noise readings were collected in the college campus and calculated. The details of noise status in college campus are given as below:

Ambient Noise levels in Institution, Kolhapur.

Sr. No.	Site Name	Results dB (A) Leq	Standards(Day Time) dB (A) Leq
1	College Campus Entry	66.21	50
2	College Gate	62.04	50
3	Corridor	60.82	50

4	Floor	56.27	50
5	Hostel	48.54	50
6	Canteen	58.39	50
7	Library	36.17	50

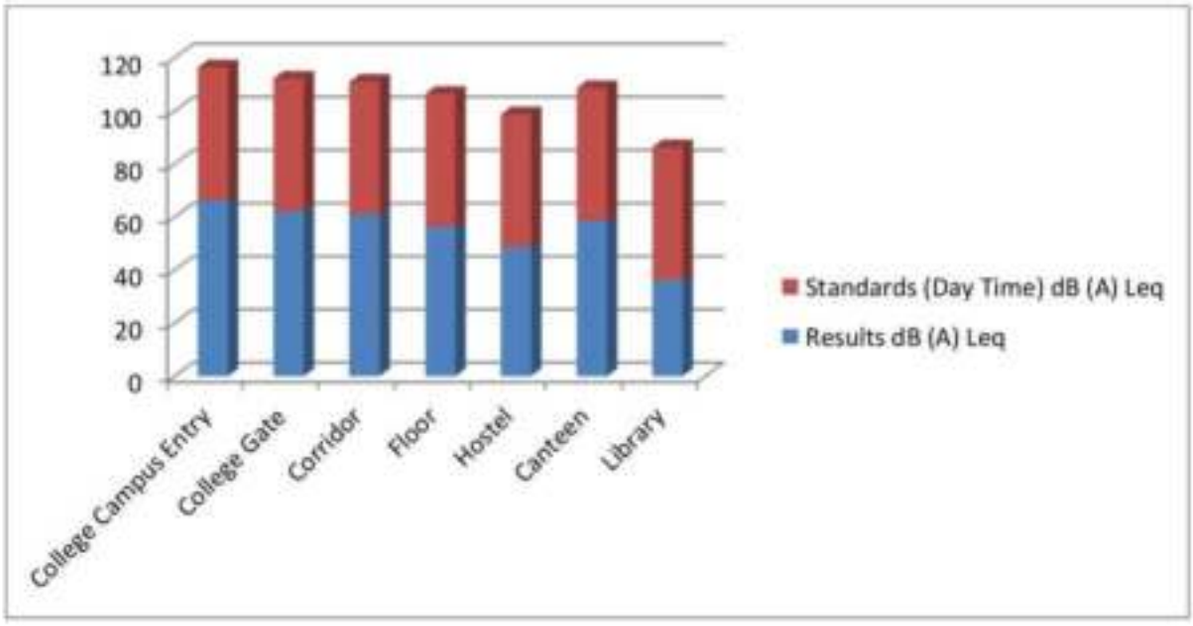
Note: - 1. All parameters expressed in dB (A) Leq.

2. Monitoring is carried during day time.

3. Day time is from 6.00 a.m. to 10.00 p.m.

It is observed from the table that the Ambient Noise levels overall in college is on higher side except ladies hostel as compared to the standards of Central Pollution Control Board for the day time.

Since the college is located adjacent of main roads and therefore, the major source of noise is automobile noise, rolling noise. The human communication and transportation are causing high level sound. It is advisable to increase the Environmentcover in the surrounding to avoid noise.



Ambient Noise levels in Institution

- **Parking and traffic management:**

Traffic generated from this project will confluent on 15 m wide road to college.

Parking statement:

Total parking area	2425.74 m2
Area per car	25 m2 for 4 wheeler 4 m2 for 2 wheeler

(Width of all internal roads (m) : Width of dive ways is 9 m to 12 m wide)

Bird's diversity:

The diversity among birds is striking. Birds live in a variety of different habitats. Birds that live in different habitats will encounter different foods and different predators. Birds can be carnivores (feeding on other animals), herbivores (feeding on plants), or generalists (feeding on a variety of foods).

Sparrow, Crow, Bulbuls, Eagle, Pigeon, Cuckoo, Bat, Butterfly, Hornbill, etc these species are seen regularly around the campus.

i. Details of Tree census in College campus:

The beginning of the 21st century brought growing concern about global warming, climate change, food security, poverty, and population growth. CO_2 is a principle component causing global warming. Atmospheric carbon dioxide levels have increased to 40% from preindustrial levels to more than 390 parts per million CO_2. On this background it is a need of time to cover the educational campuses with Environment cover interrelated with climate change.

The current is a present status of tree cover, vegetation and carbon storage assessment of area under SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR Campus. In an era of global warming and climate change; carbon emission, carbon sequestration, mitigation, adaptation are the keywords in academia. Carbon sequestration is a phenomenon of converting atmospheric carbon i.e. CO_2 in to other pools of carbon such as vegetation, soil, ocean etc. in various forms to mitigate global warming. It is one of the important clauses of Kyoto Protocol. Current tree census methodology has been adopted from the guidelines set by Indian Institute of Remote Sensing, Dheharadoon, Govt. of India.

- **Total biomass :**

Biomass, in ecology, is the mass of living biological organisms in a given area or ecosystem at a given time. Biomass can refer to *species biomass*, which is the mass of one or more species, or

to *community biomass*, which is the mass of all species in the community. It can include microorganisms, plants or animals. The mass can be expressed as the average mass per unit area, or as the total mass in the community. 0.378 tons of total biomass of woody vegetation have been recorded in The Shri Yashwantrao Patil Science College (YPSC), Solankur Kolhapur campus during the current tree census

- **Carbon stock:**

Forests and trees act as natural carbon stores, but this carbon is released when the trees are felled and the area deforested. The amount of carbon stored within an area of land varies according to the type of vegetation cover. 0.1891 tons of total carbon stocks are present on the campus.

- **Carbon Sequestration:**

Carbon sequestration describes long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change. It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels. Vegetation carbon pool having the potential of 560 Pg (Pg: Petagram= billion ton) of carbon storage globally. In the current study the focus is given on the assessment of existing carbon stock stored The Shri Yashwantrao Patil Science College (YPSC), Solankur Kolhapur campus in the form of woody vegetation by enumerating every tree species. Overall 0.694 tons of CO_2has captured and stored by the woody plants present in the college campus. A single tree consumes 0.0218 tons of CO_2 approximately annually consequently, as the campus possess 69 mature woody plants 1.5042 tons of CO_2 is consumed yearly by all woody vegetation on the college campus.

- **Oxygen released :**

Woody vegetation on The **Shri Yashwantrao Patil Science College (YPSC), Solankur,** Kolhapur campus has released 1.85 tons of oxygen in their lifetime till date. Released oxygen is directly proportional to CO_2 sequestrate in the ratio of 32/12. Thus, it is supposed to release of oxygen annually. It is assumed that a single tree supports oxygen demand of two people for their life.

- **Total number of trees enumerated on SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR campus:**

All the collected data was tabulated and analysed with the help of MS- Excel spreadsheets and objected findings were extracted by using various factors given by Inter governmental Panel on Climate Change (IPCC).

Total number of trees, plant & shrubs within premises of Shri Yashwantrao Patil Science College (YPSC), Solankur & planted by Botany Department are 788 only, which is very effective for environmental balance and biodiversity of campus.

Shri Vyanknath Shikshan Prasarak Mandal, Solankur

Shri Yashwantrao Patil Science College (YPSC), Solankur

Department of Botany College campus plant list

Tree Details		
Scirntific name	**Local Name**	**Number**
Lagerstroemia parviflora	Bondara / Lendi	6
Michelia champaca	Chafa /Sonchafa	6
Delonix regia	Gulmohar	8
Terminalia belerica	Hela	2
Terminalia chebula	Hirda	8
Garcinia spicata	Haldi	7
Strychnos nux-vomica	Kajara / Kuchala	6
Sapindus emarginatus	Ritha	8
Aegle marmelos	Bel	6
Cinnamomum tamala	bay leaf	8
Glycyrrhiza glabra	Licorice	5
Syzygium cumini	Jambhul	8
Artocarpus heterophyllus	Fanas	8
Bombax ceiba	Silk cotton tree	9
Tamarindus indica	Chinch	19
Bahunia verigata	Apta	25
Butea monosperma	Flame of forest	9
Terminalia tomentosa	Asan	6
Lagerstroemia speciosa	Pride of India	7
Garcinia indica	Kokam	5
Alstonia scholaris	Satwin	8
Ficus religiosa	Pimpal	2
Casuarina equisetifolia	Suru	9
Albizzia lebbek	Shiras	18
Oroxylum indicum	Tetu	6
Moringa oleifera	Shevga	8
Salmalia malabarica	Kate Sawar	9
Ficus bengalensis	Wad	2
Cinnamomum tamal	Tamal patra	6
Ficus benghalensis	Banyan Tree	2

Azadirachta indica	Neem Tree	13
Mangifera indica	Mango Tree	7
Ficus religiosa	Peepal Tree	2
Tamarindus indica	Tamarind Tree	11
Tectona grandis	Teak Tree	36
Dalbergia sissoo	Indian Rosewood	1
Calophyllum inophyllum	Indian Laurel	3
Syzygium cumini	Jamun Tree	8
Dalbergia latifolia	Sheesham Tree	2
Butea monosperma	Palash Tree	14
Shorea robusta	Sal Tree	9
Terminalia arjuna	Arjun Tree	16
Madhuca longifolia	Mahua Tree	2
Pongamia pinnata	Karanj Tree	16
Phyllanthus emblica	Indian Gooseberry (Amla)	21
Tectona grandis	Sag	36
Terminalia chebula	Hirda	21
Eukalyptus lanceolatus	Nilgiri	36
Polyathia longifolia	Ashoka	15
	Total trees	**505**

Shrub Details		
Scirntific name	**Local Name**	**Number**
Adhatoda vasica	Adulsa	5
Strobilanthes heyneanus	Akra	2
Alangium salvifolium	Ankul/Ankol	3
Gymnema sylvestre	Bedki/Gudmari	4
Colebrookea oppositifoli	Bhamani	4
Clerodendrum infortunatum	Bhandira	20
Leea macrophylla	Dinda	9
Lantana camara	Ghaneri	13
Nothapodytes nimmoniana	Narkya	2
Mimosa pudica	Lajalu	12
Murraya koenigii	Kadi patta	9
Gymnosporia montana	Bharati/Hekal	5
Duranta erecta	Kadu Mendi	22
Adhatoda zeylanica	Adulsa	5
Clerodendrum viscosum	Vagati	16
Hibiscus rosa-sinensis	Jaswand	25
Murraya koenigii	Kadipatta	15

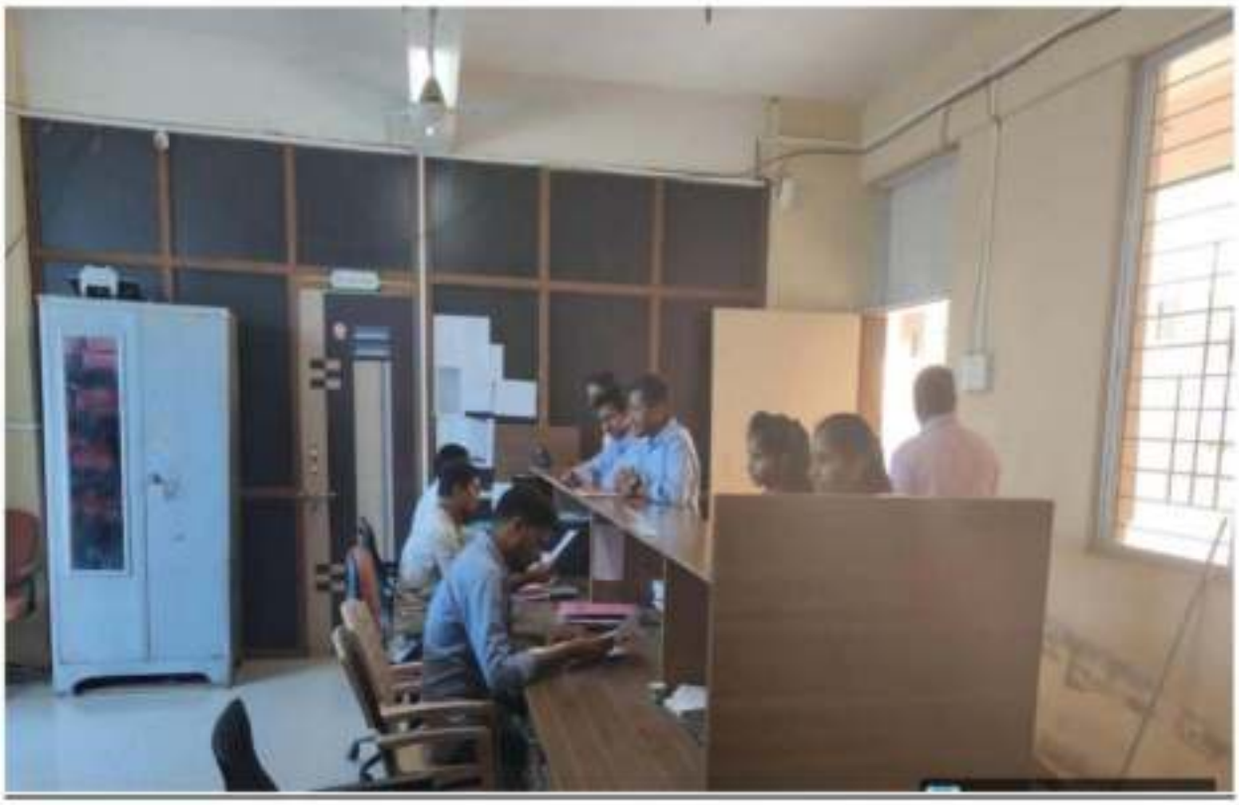
Gloriosa superba	Kalalawi	11
Carissa carandas	Karawand	5
Phyllanthus emblica	Amla	13
Rosa indica	Gulab	7
Lawsonia inermis	Mehndi	36
	Total shrubs	**243**

Climbers		
Scientific name	**Local Name**	**Number**
Caesalpinia mimosoides	Chillari	2
Entada scandens	Garambi	1
Smilax zeylanica	Ghotvel	3
Strychnos colubrina	Kajarvel	3
Mucuna pruriens	Khaj Kuhili	3
Quisqualis indica	Lal chameli	5
Butea superba	Palas vel	4
Argyreia speciosa	Samudrashoka	5
Asparagus racemosus	Shatawari	4
Creptolepis buchnani	Dudhwel	10
	Total climbers	**40**

GRASSES	
Scirntific name	**Local Name**
Andropogon tricticeus	Bhalekusal
Sorghum halepense	Boru
Crysopogon montana	Dongari gawat
Andropogon pumilis	Gondal
Cynodon dactylon	Haryali
Heteropogon contortus	Kusali
Cyprus rotundus	Natgras
Ocimum tenuiflorum	Tulsi
Aloe vera	Korphad
Zingiber officinale	Ale
Cymbopogon citratus	lemon grass
Jasminum sambac	Mogra

Photo Gallery


IQAC Room




ZOOLOGY LAB


NATIONAL SERVICE
SCHEME


Drinking Water


RAMP

CONCLUSION AND MANAGEMENT PLAN

The Nature Solutions Environment Kolhapur has conducted an Environment Audit of SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR in the academic year 2021-22. Environment auditing is the process of identifying and determining whether institution practices are eco-friendly and sustainable. The main objective of college to carry out Environment audit is to check Environment practices followed by college and to conduct a well formulated audit to understand where we stand on a scale of environmental soundness.

Conclusions:

From the Environment audit conducted by college following are some of the conclusions which can be taken for improvement of the college campus to become environment friendly college campus.

1. College takes efforts to dispose majority waste by using proper methods.
2. Confidential paper waste is disposed properly.
3. Glass waste is to be disposed properly.
4. Electricity consumption is more at some departments.
5. Use of CFL lamps in the college is minimum. Its use should be encouraged and now converted to LED lights.
6. Toilets and bathrooms are consuming more water and lights.
7. Roof top rain water harvesting should be planned which is useful for filling up of tanks on campus or filling of ground water level.
8. E-waste segregation, handling and disposal are properly done.
9. Practice of waste segregation to be initiated.
10. Air quality on the campus is good.
11. Conduct more seminars and group discussions on environmental education and awareness.
12. There is potential to generate wind energy.

Recommendations:

Following are some of the key recommendation for improving campus environment.

1. College should develop its own Environmental Policy by using guidelines given in Environment Audit document.
2. The data related to all measured environmental parameters should be monitored and recorded regularly and information be made available to administration.

3. The college should develop internal procedures to ensure its compliances with environmental legislation and responsibility be fixed to carry out it in practice.
4. Wherever possible the waste i.e. biodegradable and non-biodegradable should be reused or recycled.
5. All street lighting should be changed to LED lights and solar systems to save electricity.
6. Drip irrigation for gardens and vegetable cultivation can be initiated.
7. Gave few access to students for lightning and charging switches.
8. College having huge space, should develop own solar system for total campus.
9. Construct proper composting plant by using tree leaves to produce organic fertilizer.
10. Increase number of local tree species which purifies air. (Kadulimb, Vad, Pimple).

ENVIRONMENT MANAGEMENT PLAN:

By understanding the dynamics of present situation of resource utilization and current practices of waste disposal we have prepared an Environment Management Plan (EMP) for the SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKURDist. Kolhapur. This plan not only will provide the strengths, weaknesses and remedies for the Environment and clean campus but also give priority of the sector where the college has to give more efforts to improve its environment.

Sector	Strengths	Suggestions
Solid Waste		
Paper	1. Pulping of major portion of papers i.e. answer sheets, bills and other administrative papers. **2.** Use of one sided papers in many departments and main building	• Towards paperless office: More use of e-mails, e-money transfer and advance IT technology for communication
Plastic	Reuse of plastic at some departments	• Segregation of waste at the sourc and sending plastic waste for recycling • Ban on Plastic carry bags in College premises
Biodegradable waste	Solid waste generated	• Segregation of solid waste help in composting process
Energy		

Electricity	Use untraditional source of energy	• Employment of more solar panels and other renewable energy sources. • Electrification of street lights by solar power. • Use of solar pumps for water tanks. • General awareness about electricity saving.
Fuel	Use of public Transport system is comparatively more by staff and students.	• 'Cycle on rent' service for student • General awareness about efficient use of fuel.
Water		
Water utilization	College has potential of Rain water harvesting.	• Installation of automatic water pumps to avoid overflowing losses • Proper and timely maintenance of plumbing at all departments • Installation of rain water harvesting assembly.
Hazardous Waste		
E-waste	• E waste is sent to E waste collection center at Kolhapur.	• There must be segregation of e-waste from regular waste and also among the e-waste. • E-waste in all forms not only computers, should be collected properly
Air and Noise		
Air and Noise	Air quality is still in good condition	The plantation can be increased by vertical gardening.
Tree Census		
Tree Vegetation	There is requirement of Tree Plantation	Avoid monoculture, variety of species should be planted in campus area and surrounding of ground.

Nature Solutions

Innovative technologies for sustainable Development

Date: 20 / 03 / 2022

CERTIFICATE OF ENERGY AUDIT

This is to certify that "**Shri Yashwantrao Patil Science College, Solankur"**, TaL. Radhanagari, District Kolhapur has conducted **Energy Audit** in March 2021 for the academic year **2021-2022** for knowing present energy consumption, identification of energy conservation and saving opportunities for Environment protection.

Proprietor,

NATURE SOLUTIONS

Mr. S. S. Patane.

9881981112

SHRI VYANKNATH SHIKSHAN PRASARAK MANDAL, SOLANKUR

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR

SCIENCE Faculty Affiliated to Shivaji University, Kolhapur.

Accredited B Grade (CGPA 2.14) by NAAC.

Energy Audit

(2021-22)

Introduction

a. Energy Audit for Environmental Protection:

- Energy Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of various establishments. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. The purpose of Energy Auditing is to assess periodically the compliance of completed or on-going activities with the requirements of legislation, measures proposed in environmental policies, environmental management systems and environmental schemes or the provisions of standards and contracts.

b. Benefits of Energy Audit:

- Ensuring legislative compliance.
- Reducing environmental impacts.
- Reducing waste, water and energy costs.
- To safeguard the environment and natural resources.
- Empower the organization to frame a better environmental performance.
- It portrays good image of institution through its clean and Environment campus.
- Finally, it will help to build positive impression for the upcoming NAAC visit.

c. NAAC criteria VII Environmental Consciousness :

Energy Audit is assigned to the criterion VII of NAAC. National Assessment and Accreditation Council which is a self-governing organization that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation of the institution. The intention of Energy Audit is to upgrade the environmental condition in and around the institution. It is performed by considering some environmental parameters like water and wastewater management, energy conservation, waste management, air monitoring, etc. for making the institution more eco-friendly.

Students are the major strength of any academic institution. Practicing Environment actions in any educational institution will inculcate the good habit of caring nature in students. Many environmental activities like plantation and nurturing saplings and trees, cleanliness drives, bird watching camp, no vehicle day, rain water harvesting visits to ecologically important places through Environment clubs will make the student a good citizen of country.

Need of 'Energy and Environmental Audit' is a management tool which comprises systematic assessment of the different components of the ecosystem in which the establishments have been made. It is the process of identifying and determining whether the institution's practices are eco-friendly and sustainable. With modernization, use of resources and chemicals have increased which have negatively impacted the environment creating an imbalance in nature. This is now a great matter of concern. Environment and Environmental audit is a way to ensure that such negative impacts on the campus environment, due to the development and other activities, are kept at a minimum. Realising the importance of Environment and Environmental audit, the Internal Quality Assurance Cell (IQAC) of the College has constituted a team to work towards such environment-related assessments on the Campus. An Eco-Friendly College agenda for Assam Don Bosco College is its road map for building and operating a healthy and self-renewing vibrant Campus community. With an idea to create an environment where youth can be educated to live a sustainable life in harmony with nature, the College has formulated the eco-friendly policy with the following objectives:

- Creating a collaborative effort among the College fraternity in fostering an eco-friendly learning and working environment.

- Ensuring the sustenance of biodiversity by maintenance of the natural environment in addition to conservation, restoration, and remediation of existing land and water.

. • Managing waste generated in the Campus through proper disposal and treatment.

- Commitment to sustainable management of land through agroforestry and kitchen gardening for meeting the food requirements in the Campus.

- Raising awareness of real-world issues affecting the rural communities living adjacent to the College Campus and working towards addressing these issues in partnership with the communities through teaching, research and extension activities.

- Encouraging students to participate in outreach education programmes as a part of Service Learning.

- Protecting, monitoring, and conserving flora and fauna of the Campus and preservation of their natural habitat.

- Identifying existing invasive species to reduce their negative impact on the indigenous flora and fauna.

- Involving local communities in the custodianship of natural resources and utilizing local resources for infrastructure construction purposes.

- The Environment and Environmental audit report consists of five components- Land, Energy, Air, Waste and Water.

❖ Objectives: The major objectives of the Energy Auditing are:

1. To document the land use patterns in the Campus
2. To estimate the energy requirements of the Campus
3. To estimate the water quality of the Campus
4. To inventories the biodiversity of the Campus
5. To document the waste disposal system of the Campus

d. SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR

Shri Vyanknath Shikshan Prasarak Mandal, Solankur was established in 1996. Starting with primary, highschool, junior college of arts & science; the senior college started in the year 2009 with the mission to sensitize the students to ethical, social and cultural values to make an enlightened nation and strive for mass welfare and happiness through spread of education. The college is committed to meet the educational and societal needs of the hilly rural area which will help to build up the humane nation under the skilled leadership of college Chairman Hon. R. Y. Patil saheb.

Shri Yashwantrao Patil Science College (YPSC), Solankur was established in 2009 and received State Governments Grant-in-Aid in 2013. It is accredited by NAAC in 2017. The college has organized various State Level workshops/seminars. It has successfully organized two National Level Conferences, three International Conferences.

The college is based nearby the riverside of Dudhganga, a hilly rural area of Radhanagari tehsil in the Kolhapur district of Maharashtra. It is the only science college in the tehsil. Being the mountainous rural area, to meet the barrier in higher education and to remove the inequities in access to education amongst various social groups, the foundation of Sanstha pillared under the competent guidance of Hon. A. Y. Patil saheb.

VISION

It means "Knowledge, Services, and Sacrifice". In the present era of knowledge, every child should get the education. The necessary services should be provided to them to get quality education to develop responsible citizen, intellect with moral values.

MISSION

To sensitize the students to ethical, social and cultural values to make an enlightened nation and strive for mass welfare and happiness through spread of education.

GOALS

The college is committed to achieve the vision and mission statements in terms of the following objectives.

1. To provide necessary but quality education to the students from hilly and rural areas which belongs to socially and economically backward classes so as to make them globally competent.
2. To inculcate social, human values such as equity, kindness, honesty, discipline.

   To promote the values regarding social services, secularism, nationalism, scientific temperament, environmental awareness.

Infrastructure SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR

Institution, consist of Ground floor and G+2 buildings, is situated at Solankur with necessary infrastructure for the departments of all the faculties. A proper care is taken to provide basic amenities for the students & the staff members. The facilities are as follows….

- **Classroom:** 10 spacious classrooms with necessary furniture & blackboards in all buildings of the college.
- **Library:** The library of the college with qualified staff and more than 16 thousand books.
- **Laboratory:** 04 spacious laboratories with Computers with Battery backup, Printer, Scanner, LCD projectors & equipment's & furniture etc.
- **Administrative Office:** The spacious LAN computerized administrative office with 02 cabins and modern technology & with necessary facilities.
- **Open Air Theatre:** An open air theatre of 2500 sq. ft. with paving blocks & stage is used for the big functions.
- **Seminar Hall:** Independent seminar hall with necessary facilities for different activities of the departments.
- **Study Room**: In the library building one study room for students & one study room for boys & girls students. Both the study rooms are spacious & necessary furniture & facilities, drinking water, toilet etc.
- **Reading Room 1**
  Ladies room: 1 **Boys Room: 1**
- **Toilets:** Total number of toilets are 06 including college, office, hostels, etc.
- **Botanical Garden:** We have developed 3000 sq. ft. garden for trees & plants with many types of species.

College Main Building

Methodology

The college has conducted Energy Audit in the year 2021-22, on a yearly basis. The audit was carried out in three phases.

a. Questionnaire survey:

It includes administrative issues associated with the planning of audit, selecting the personnel for the audit team, preparing the audit protocol used by organization, obtaining background information, etc. The scope of the audit was defined at this step. It was decided that the information related to Water and Wastewater management, Energy conservation, green belt, Carbon inventory, Solid waste management, Hazardous waste management, Air and noise quality status, activities of nature club, etc. should be gathered for the audit purpose. For collecting data related to these different areas, specific questionnaires were prepared.

b. Onsite visit and observations:

The data related to above mentioned areas was collected by visiting each and every facility of college campus. The questionnaires were filled up according to the present situation. Photographic documentation was also done with the help of sophisticated camera.

c. Data analysis:

After collection of secondary data, the reviews related to each environmental factor were taken by the Energy Audit team. The data was tabulated, analysed and graphs were prepared using computer. Depending upon the observations and data collected, interpretations were made. The lacunas and good practices were documented. The Environmental Management Plan (EMP) was prepared for the next academic year in order to have better environmental sensitization. Finally, all the information was compiled in the form of Energy Audit Report.


Energy Auditing Process
Planning
Choosing Audit Team
Collection of Data
Analysing Results of Audit
Evaluating Audit

Overview of Environment Audit

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR is situated in Maharashtra at **16.4149331 and 74.0513187**, in the Kolhapur District and it is at altitude of 450 fts above mean sea level.

Satellite image of SHRI YASHWANTRAO PATIL SCIENCE COLLEGE (YPSC), SOLANKUR Campus

Source: Google Earth

a) **Entrance**

b) **College Main Building**

c) **Parking**

d) **Library**

e) **Labs**

f) **Lecture Building**

In its effort towards creating an eco-friendly campus, the college encourages its Faculty and Students to engage in conserving the Campus environment, its flora and fauna, through activities that include individual and collaborative study, conservation practices, activities and initiatives of the Eco Club.

c. Total Electric Energy Audit :

An electricity audit is simply an audit or calculation of how much electricity you are using in your home and of where that electricity is going.

An energy audit is an analysis of a facility, indicating how and where that facility can reduce energy consumption and save energy costs. Its insight to energy efficiency and conservation can lead to significant savings on the company's utility.

Importance of Electric energy Audit:

- The audit will not only inform you of opportunities but provide you with financial analysis. This will enable prioritization based on financial benefit and return on investment.
- Provide you with solid, easy to understand technical information regarding the proposed energy conservation measures.
- A good quality audit will analyze your historical energy use and find potential issues using statistical methods.
- Provide you with emissions analysis to help you understand the benefits of your decisions from an environmental standpoint.
- Understand where energy is used and which areas are worth focusing on the most (energy hogs).
- Provide you with benchmark information to help you understand your energy use performance compared to others in your field and area.

Electricity and energy audit:

This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, 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. However, many may not realize how much influence the higher education sector has in the larger energy market. Energy sources utilized by all the departments and common facility centres include electricity, liquid petroleum and LPG. Major use of energy is in Science Department, office, canteen, and laboratories for lighting, transportation, cooking

and laboratory work. Energy consumption by energy consuming in college is **243.37 KwH/day.** Due to lack of adequate ventilation and natural light in rainy season some part of infrastructure more consumption of electricity at air and light appliances in the college is increased. Hence, survey of adequate ventilation and natural light of infrastructure is essential. Also high consumption of electricity

Is observed at office in duration of admission and examination. In science department like Physics, Chemistry, Mathematics, Botany and Zoology electricity was shut downed after occupancy time is one of greening practices for energy conservation. Audit shows major non-teaching staff is nearer to campus for resident and mass number of students are come from nearby villages of solankur hence consumption in fuel is less. As our college is situated in rural area very less number of students are using vehicles, 50 % of staff using four wheelers is high in number. Study shows about 1.5% students were use two wheeler, 9.92% students come to the college by walking, 0.90 % student are using bicycle and, 3.05% students were lifted by their parents to college, 84.57 % are using state transportation vehicles and no any student make use of public transportation like bus.

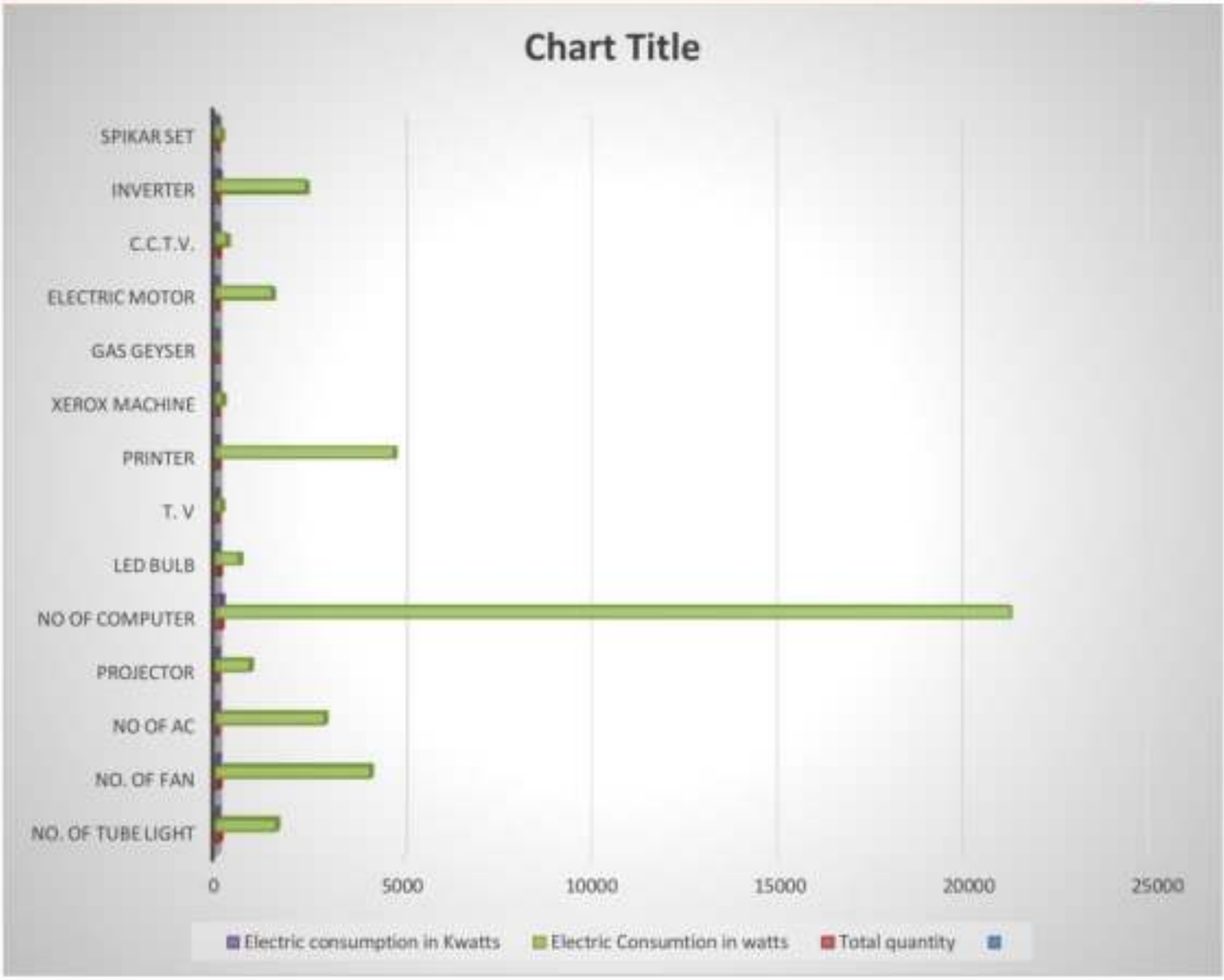
Staff members who lived out campus are using the vehicles in sharing for daily transportation. Study tours, collection tours, visits are followed by college which gives the message of importance of walking which is very good green practice. Consumption of LPG for education or practical purpose is very less. The LPG connection in name of the college and LPG is handled by departments of Chemistry. For heating purpose at the time of practical, no leakages and off mode regulators are seen at time of verification.

Total Energy usage per day in KwH = 243.37 KwH/day
Total lightning usage per day in KwH = 10.15 KwH/day
From total lightning regular light usage = 6.43 KwH/day
From total lightning LED light usage = 3.72 KwH/day
That is percentage of LED light usage against regular light per week is 57.86%

Electricity Usage Survey calculations chart of **Shri Yashwantrao Patil Science College (YPSC), Solankur**, Solankur as follows :

Name of College	**Shri Yashwantrao Patil Science College (YPSC),** Solankur													
Address	Solankur, Radhanagari													
Consumer Number (on electricity bill)														
Type	No. of Tube light	No. of Fan	No of AC	Projector	No of Computer	LED Bulb	T. V	Printer	Xerox machine	Gas	Electric Motor	C.C.T.V.	Inverter	SPIKAR SET
Principal cabin		2	0		1	10	1	1						
office	3	4	0	0	6	1	1	4	1	0	2	2	1	2
staff room	3	3										1		
Store Room	1													
Library	3	3			2		0	1		0		3		
Student Reading Room	4	4												
Board Room														
Exam strong Room	1	1			1			2						
Girl common room														
Teacher Reading Room														
NSS Office	1	1			1									
List of Class Room (Name)														
Class Room 1	2	1	0		2		1	1						
Class Room 2	1	1			1	1								
Class Room 3	0	2				2						1		
Class Room 4	2	1												
Class Room 5		2		1		7						1		
Class Room 6	1	2										1		
Class Room 7	0	3										1		
Class Room 8	1	1				1								
Class Room9	2											1		
Class Room10	1	1			1	1		1						

List of laboratories (Name)														
laboratories 1	1	2			1			1						
laboratories 2	2	2		1								1		
laboratories 3	4	2												
laboratories 4	5	5			1		1		1			1		
laboratories 5	3	1			1	1						1	1	
laboratories 6	2	1										1		
laboratories 7	2	2		1	1			1				2		
Gymkhana					1			1						
Corridor	2	1				3								
Gents Student Wash Room	1					1								
Gents Staff Wash Room	1					1								
Ladies Student Wash Room	1					1								
Total quantity	**73**	**55**	**0**	**3**	**19**	**62**	**4**	**19**	**3**	**0**	**2**	**35**	**3**	**2**
Avg. Wattage of devices	**22**	**75**	**2900**	**300**	**200**	**10**	**32**	**250**	**55**		**746**	**8**	**800**	**60**
Electric Consumtion in watts	**1606**	**4125**	**0**	**900**	**21200**	**620**	**128**	**4750**	**165**	**0**	**1492**	**280**	**2400**	**120**
Avg. Usage in hours	**4**	**6**	**0**	**5**	**6**	**6**	**1**	**1**	**1**		**1**	**24**	**24**	**1**
Electric consumption in Kwatts	**6.424**	**24.75**	**0**	**4.5**	**127.2**	**3.72**	**0.128**	**4.75**	**0.165**	**0**	**1.492**	**6.72**	**57.6**	**0.12**
Total Electric consumption in Kwatts per day														**243.369**
. Electric consumption in Kwatts per year(Approximate acadmic days are 260)														**63275.94**



Graphical representation of Total Energy usage KwH/Year

CONCLUSION

The Nature Solutions Kolhapur has conducted a Energy Audit of ***Shri Yashwantrao Patil Science College (YPSC), Solankur, Kolhapur*** in the academic year 2021-22. Energy Auditing is the process of identifying and determining whether institution practices are eco-friendly and sustainable. The main objective of college to carry out Energy Audit is to check Environment practices followed by college and to conduct a well formulated audit to understand where we stand on a scale of environmental soundness.

Conclusions:

From the Environment audit conducted by college following are some of the conclusions which can be taken for improvement of the college campus to become environment friendly college campus.

1. Electricity consumption is more at science departments.
2. Use of fans and LED lamps in the college is good.
3. Solar System is used for electric generation and water heating at hostel.
4. Toilets and bathrooms are consuming more lights.

Recommendations:

Following are some of the key recommendation for improving campus environment.

1. The data related to all measured environmental parameters should be monitored and recorded regularly and information be made available to administration.
2. The college should develop internal procedures to ensure its compliances with environmental legislation and responsibility be fixed to carry out it in practice.
3. All street lighting should be changed to LED lights and solar systems to save electricity.
4. Gave few access to students for lightning and charging switches.
5. College having huge space, should develop own solar system for total campus.