GREEN AUDIT REPORT

CONSULTATION REPORT

Dr. R.G. Bhoyar Arts, commerce and Science College Seloo, Wardha Nagpur (M.H)

PREPARED BY

EMPIRICAL EXERGY PRIVATE LIMITED

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ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management of **Dr.R.G Bhoyar Arts Commerce and Science College Seloo Wardha Nagpur (M.H) for** giving us an opportunity to conduct green audit for the college.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.

Rajesh Kumar Singadiya

(Director)

M.Tech (Energy Management), PhD (Research Scholar)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Charted Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]

EXECUTIVE SUMMARY

Green Initiative Taken by College

- **CAMPAIGN OF PLANTATION AND GREEN CAMPUS:**
  - College has around **181** trees in the campus. Its good initiative taken by management for green campus under the campaign of plantation. **It's APPRECIABLE.**

RECOMMENDATION: -

- **5 DUST BIN WASTE MANAGEMENT SYSTEM:**
  - It was observed that college has applied 5 dust bin system for waste management in campus. Waste management system help to implement 3R concept (Recovery, Reuse and Recycling) of different type of waste generated in the college campus.
- **QR Code System on Tree:**
  - While the world seems to be going digital, people lack the time to read books and process the information they contain. Hence, college can be provided QR codes on the trees for its information and to exploit the rapidly growing platform for a unique purpose.
- **Eco-restoration programmes**
  - Frame aholistic campus development plan with long-term eco-restoration programmes for replacing exotic acacia plantations with indigenous trees.

CHAPTER-1
INTRODUCTION

1.1 About College

Dr. R. G. Bhoyar Arts, Commerce & Science College (Vidyabharti College) has inspired by Hon'ble Dr. Rajesh G. Bhoyar with their innovative vision and Noble mission "*Gun: Sarvatra Pujyate*" which established in 2008. The college is recognized under section 2(f) & 12 (b) of the UGC Act 1956, is affiliated to Rashtrasant Tukadoji Maharaj Nagpur University and accredited with B+ by NAAC in 2017. Our institute is only in Seloo taluka, Dist.-Wardha (Maharashtra), which gives service to rural flock to spread knowledge and provide quality education. This college in committed to impart quality education and to improve overall personality of the rural youths and make them to face the challenges of the competitive modern world. The College has Under Graduate courses in all discipline and post-graduation in Botany, Zoology, Physics and Commerce as well as research centre in Commerce. The college has received Green Championship award. The institute has the Best Rural College and succeeded in caring a niche for itself in the field of education and has earned the trust and confidence of the society mainly because of its quality and value-based education. The institute is located at rural area in Seloo and caters to need of 135 villages. The campus sprawling six acres with natural environment.

Vision

The women students through learners can contribute a lot towards National reconstruction and development, which shall finally lead us towards the balance between not only in body and spirit but also in the intellect and emotion.

Mission

To serve selflessly towards the cause of human excellence especially in character building, personality development and empowerment of women through knowledge and higher education

Goals

Academic Goals:

- To work towards the growth of institution into a centre of excellence.
- To provide the standard education in the field of Science, Home Science and Social Science to women.
- To encourage students and teachers in the pursuit of knowledge and in setting high standard of academic achievements.
- To bring women to the higher level for facing modern science age and to develop scientific and rational attitude.
- To develop free and fearless thinking leading to intellectual and moral maturity.
- To bridge the gap between educational and social needs.

Social Goals:

- To enable the women to come out from the stagnant pool of orthodoxy into the clear stream of reason, perfection, tolerance and dynamism.
- To make women aware of their social responsibilities and important role in nation building.
- To make the student aware of environmental issues and to hand over the moral responsibilities to the coming generation an eco-friendly lifestyle and earth free from pollution.
- To empower the girl students by helping them to become strong, self-reliant, socially motivated, responsible and dedicated women and better citizen of tomorrow, so as to equip them to meet the challenges in life positively.

1.2 About College Campus:

The College is build up area 3547 sq/m with plenty of open space and sports area interspersed within academic buildings. The details of various department and building are given below:

Total Build up area		
Sr.no	**Area Name**	**Total Area (Sqm.)**
1	Main Building (Administrative building)	2049.50
2	Building second (Wing A)	626.04
3	Building third (Wing B)	871.56

Name of Teaching Department and Courses

Three Year Degree Courses

- B.A.
- B.Com. (English / Marathi Medium)
- B.Sc.

Post Graduate Courses

- M.Com. (English / Marathi Medium)
- M.Sc. (Botany / Zoology / Physics)

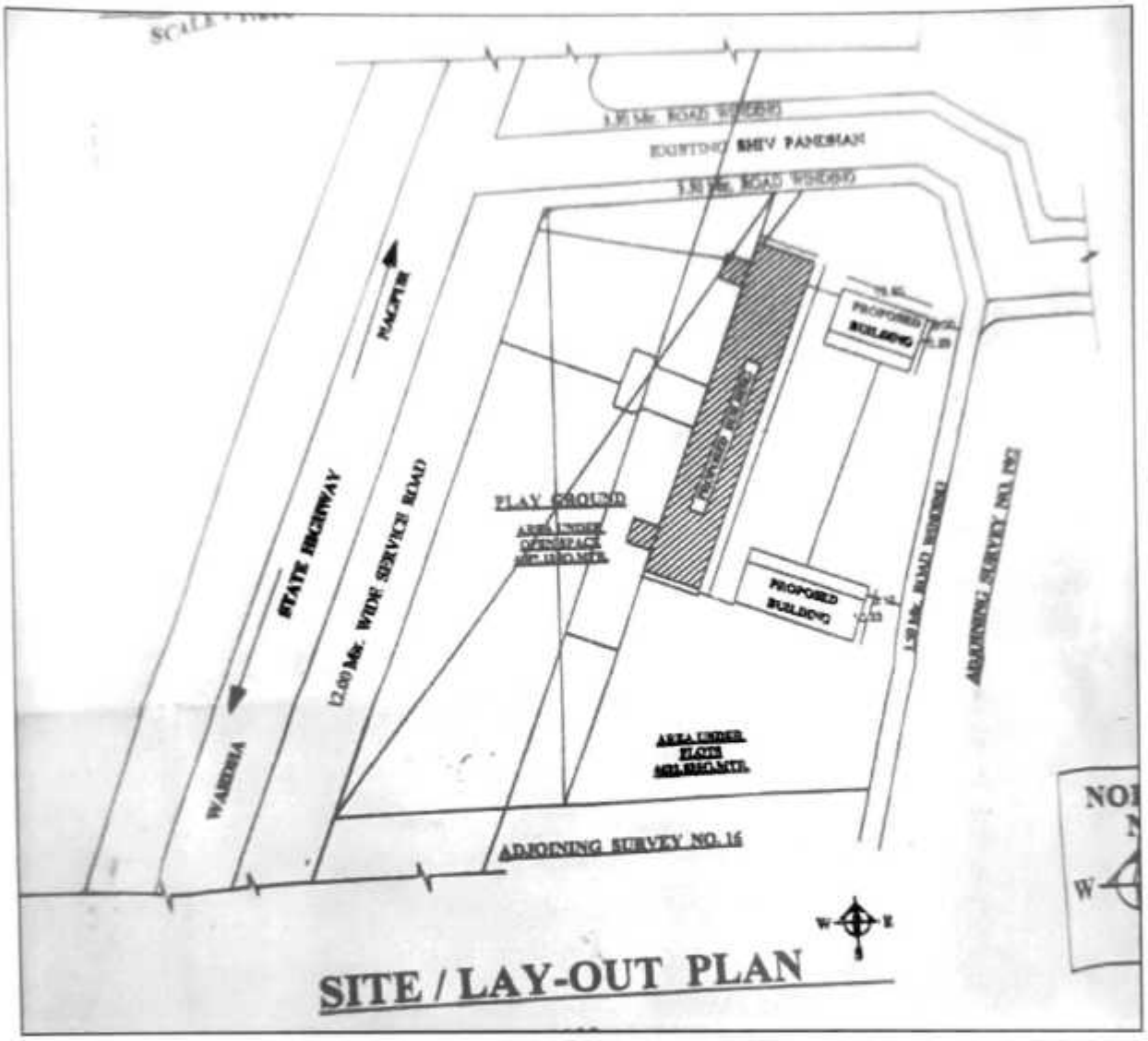
Place for Higher Education and research

- Commerce

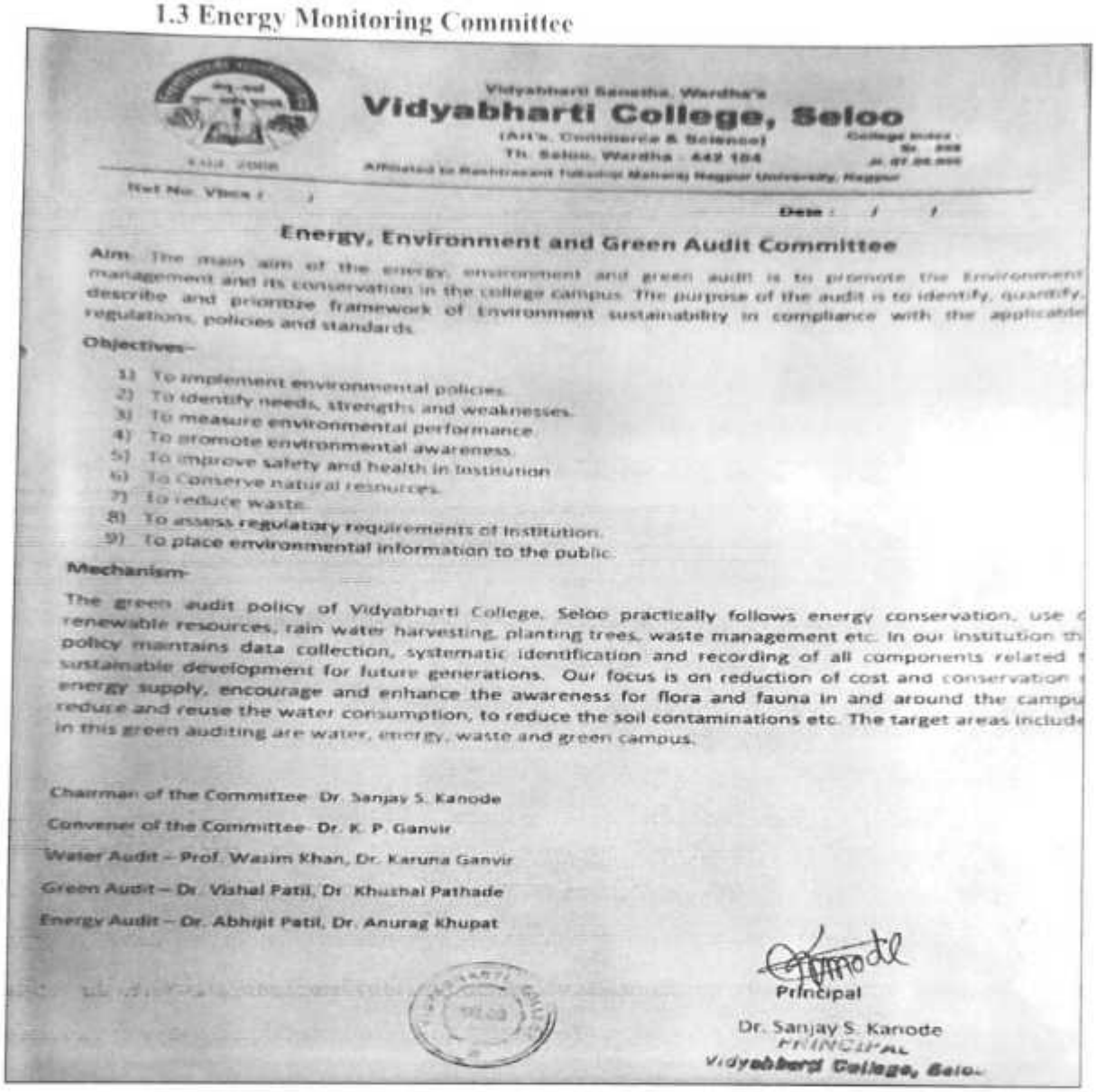
Departments of the college.

- Department of Commerce (UG and PG)
- Department of Botany (UG and PG)
- Department of Zoology (UG and PG)
- Department of Physics (UG and PG)
- Department of Microbiology
- Department of Biochemistry
- Department of Chemistry
- Department of Mathematics
- Department of Computer Science
- Department of Electronics
- Department of Arts
- Department of N.S.S.
- *Department of Physical Education*

COLLEGE LAYOUT OF VARIOUS FLOORS



1.3 Energy Monitoring Committee



Vidyabharti Sanastha, Wardha's
Vidyabharti College, Seloo
(Arts, Commerce & Science)
Ta. Seloo, Wardha - 442 104
Affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

Ref No. VBCS / /

Date : / /

Energy, Environment and Green Audit Committee

Aim: The main aim of the energy, environment and green audit is to promote the Environment management and its conservation in the college campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment sustainability in compliance with the applicable regulations, policies and standards.

Objectives–

1) To implement environmental policies.
2) To identify needs, strengths and weaknesses.
3) To measure environmental performance.
4) To promote environmental awareness.
5) To improve safety and health in institution.
6) To Conserve natural resources.
7) To reduce waste.
8) To assess regulatory requirements of institution.
9) To place environmental information to the public.

Mechanism-

The green audit policy of Vidyabharti College, Seloo practically follows energy conservation, use of renewable resources, rain water harvesting, planting trees, waste management etc. In our institution the policy maintains data collection, systematic identification and recording of all components related to sustainable development for future generations. Our focus is on reduction of cost and conservation of energy supply, encourage and enhance the awareness for flora and fauna in and around the campus, reduce and reuse the water consumption, to reduce the soil contaminations etc. The target areas included in this green auditing are water, energy, waste and green campus.

Chairman of the Committee- Dr. Sanjay S. Kanode
Convener of the Committee- Dr. K. P. Ganvir
Water Audit – Prof. Wasim Khan, Dr. Karuna Ganvir
Green Audit – Dr. Vishal Patil, Dr. Khushal Pathade
Energy Audit – Dr. Abhijit Patil, Dr. Anurag Khupat

Principal
Dr. Sanjay S. Kanode
PRINCIPAL
Vidyabharti College, Seloo

1. 4 Energy Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited,**

- **Mr. Rakesh Pathak**, [Director]
- **Dr. Suresh Soni** [Reviewer]
- **Mrs. Laxmi Raikwar Singadiya**, [Energy Engineer]
- **Mr. Sachin Kumawat** [Project Engineer]
- **Mr. Ajay Nahra,** [Site Engineer]

1.5 About Green Auditing

Eco campus is concepts implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge in to the environment.

Green audit means to identify opportunities to sustainable development practices, enhance environmental quality, improve health, hygiene and safety, reduce liabilities achieve values of virtue. Green audit also provides a basis for calculating the economic benefits of resource conservation projects by establishing the current rates of resource use and their associated costs.

Green auditing of **"Dr. R.G Bhoyar Arts Commerce and Science College Se"** enables to assess the life style, action and its impact on the environment. This green audit was mainly focused on greening indicators like utilisation of green energy (solar energy)and optimum use of secondary energy sources (petrol and diesel) in the college campus, vegetation, and carbon foot print of the campus etc. The aim of green auditing is to help the institution to apply sustainable development practices and to set examples before the community and young learners.

1.6 Objectives of Green Auditing

The general objective of green audit is to prepare a baseline report on "Biodiversity" and alternative energy sources (solar energy), measures to mitigate resource wastage and improve sustainable practices.

The specific objectives are:

- To suggest measures to make the college campus biodiversity rich
- To demarcate areas within the institute campus which have potential for restoration of biodiversity
- To make recommendations for the conservation, protection and rejuvenation of the natural vegetation and animal life by involving students and faculty members
- To inculcate values of sustainable development practices through green audit mechanism.
- Providing a database for corrective actions and future plans.
- To identify the gap areas and suggest recommendations to improve the green campus status of the college.

CHAPTER- 2
GREEN CAMPUS AND BIODIVERSITY

2.1 Biodiversity Audit

In the survey, focus has been given on assessment of present status of diversity in form of plants, in college campus and efforts made by the college authorities for nature conservation. Campus is located in the vicinity of approximately more than 181 trees/ plants.

The detail is given below:

Table: - 2.1 List of plants in college campus

Sr. No	Plant Name	Quantity (no)
1	Adenium (Adenium Roem. & Schult.)	2
2	Adulsa (Justicia adhatoda L.)	1
3	Aleria	1
4	Aloe vera (Aloe vera (L.) Burm. F.)	8
5	Amaltash (Cassia fistula L.)	2
6	Agave (Agave sp.)	1
7	Areka palm (Dypsis lutescens Beentje & J.Dransf.)	6
8	Babhul (Acacia nilotica (L.) Delile)	10
9	Bakul (Mimusops elengi L.)	2
10	Bhadraksha (Scavola taccada (Gaertn.) Roxb)	1
11	Bhuineem (Andrographis paniculata Nees.)	1
12	Boganvel (Bougainvillea sp.)	14
13	Cactus (Cactus sp.)	1
14	Gulvel (Tinospora cardifolia (Thunb.) Miers)	1
15	Hadjodi (Cissus quadrangularis L.)	1
16	Danti (Baliospermum montanum Blume)	1
17	Jatropha (Jatropha curcas L.)	1
18	Mandukparni (Centella asiatica (L.) Urban)	1
19	Mogra (Jasminum sambac (L.) Aiton)	18
20	Rose (Rosa sp.)	30
21	Panphuti (Bryophylum sp.)	2
22	Sag (Tectona grandis L. f.)	50
23	Saptparni (Alstonia scholaris (L.) R.Br.)	11
24	Thuja (Thuja sp. L.)	3
25	Tulsi (Oscimum sanctum L.)	6
26	Tecoma (Tecoma stans (L.) Juss. ex Kunth)	1
27	Cycas (Cycas sp.)	1
28	Rui (Calotropis gigantean (L.) W.T.Aiton)	4
	Total	181

2. 2 Some Photograph of Green campus: -

College has **181** trees in the campus. This is good initiative taken by management for green campus under the campaign of plantation. **It's APPRECIABLE.**

Chapter-03
Carbon Foot print

3.1 About carbon foot print.

Climate change is one of the greatest challenges facing nations, governments, institutions, business and mankind today.

Carbon footprint is a measure of the impact your activities have on the amount of carbon dioxide (CO_2) produced through the burning of fossil fuels and is expressed as a weight of CO_2emissions produced in tonnes.

We focus on consumption in each of our five major categories: housing, travel, food, products and services. In addition to these we also estimate the share of national emissions over which we have little control, government purchases and capital investment.

For simplicity and clarity all our calculations follow one basic method. We multiply a use input by an emissions factor to calculate each footprint. All use inputs are per individual and include things like fuel use, distance, calorie consumption and expenditure. Working out your inputs is a matter of estimating them from your home, travel, diet and spending behaviour.

Although working out you inputs can take some investigation on your part the much more challenging aspect of carbon calculations is estimating the appropriate emissions factor to use in your calculation. Where possible you want this emissions factor to account for as much of the relevant life cycle as possible.

We all have a carbon footprint...

3.2 Methodology and Scope

The carbon footprint gives a general overview of the College greenhouse gas emissions, converted into CO_2 -equivalents and it is based on reported data from internal and external systems. The purposes of the carbon indicators are to measure the carbon intensity per unit of product, in addition to showing environmental transparency towards external stakeholders. The carbon footprint reporting approach undertaken in this study follows the guidelines and principles set out in the "Greenhouse Gas Protocol Corporate Accounting and Reporting Standard" (hereafter referred to as the GHG Protocol) developed by the Greenhouse Gas Protocol Initiative and international standard for the quantification and reporting of greenhouse gas emissions -ISO 14064. This is the most widely used and accepted methodology for conducting corporate carbon footprints. The study has assessed carbon emissions from the College Campus. This involves accounting for, and reporting on, the GHG emissions from all those activities for which the company is directly responsible. The items quantified in this study are as classified under the ISO 14064 standards: The report calculates the greenhouse gas emissions from the College. This includes electricity, as well as emission associated with diesel consumption in the institute vehicle. The emission associated with air travel, waste generation, administration, and marketing related activities has been excluded from the current study. Emissions from business activities are generally classified as scope 1, 2 or 3 areas classified under the ISO 14064 standards.

3.3 Carbon emission from electricity

Direct emissions factors are widely published and show the number of emissions produced by power stations in order to produce an average kilowatt-hour within that grid region

Unlike with other energy sources the carbon intensity of electricity varies greatly depending on how it is produced and transmitted. For most of us, the electricity we use comes from the grid and is produced from a wide variety of sources. Although working out the carbon intensity of this mix is difficult, most of the work is generally done for us.

Electricity used in the site is the significant contributors towards GHGs emission from the unit. Electricity used onsite is the most direct, and typically the most significant, a contributor to a unit's carbon footprint. Thus, using an average fuel mix of generating electricity, carbon dioxide intensity of electricity for national grid is assumed to be 0.9613 KgCO2/Kwh

(Reference: Central Electricity Authority (CEA) Baseline Carbon Dioxide Emission database http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/database_11.zip) Electricity Purchased from the grid

Sr. No	Parameter	Unit	Value	Emission Factor kg CO2e/kWh	Emission ton CO2e/year
1	Electricity	6537	kWh	0.9613	6.28

3.4 Other Emissions Excluded

This study did not evaluate the carbon sequestration potential of existing plantation activities and emission from the staff commuting, food supply, official flights, paper products, water supply, and waste disposal and recycling due to limited data availability. The current study identifies areas where data monitoring, recording and archiving need to be developed for enlarging the scope of mapping of GHGs emission in the future years. Accordingly, a set of tools and record keeping procedure will be developed for improving the quality of data collection for the next year carbon footprint studies.

CHAPTER- 4
WASTE MANAGEMENT

4.1 About Waste:

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health Waste management is important for an eco-friendly campus. In college different types of wastes are generated, its collection and management are very challenging.

Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. A bio-degradable waste includes food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies, and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college. Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus, the minimization of solid waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

Different types of waste generated in the College Campus.

Sr. No.	Types of Waste	Particulars
1	Solid wastes	Damaged furniture, paper waste, paper plates, food wastes etc.
2	Plastic waste	Pen, Refill, Plastic water bottles and other plastic containers, wrappers etc.
3	E-Waste	Computers, electrical and electronic parts etc.
4	Glass waste	Broken glass wares from the labs etc.
5	Chemical wastes	Laboratory waste etc.
6	Bio-medical Waste	Sanitary Napkin etc.

4.2 Waste management Practices adopted by the College

College has a different type of waste generated like paper, Plastic, dust and wet waste. The college provided small dustbin to every classroom, office, laboratories, staff room, ladies common room etc. and collect the waste material at the end of the day. The waste (Especially dry material) is collected in a big dustbin which are provided at every floor and the next day collected municipal corporation for further processing.

wet waste generated in home economics laboratory as well as waste from agriculture (Tree and plants waste) used in vermicompost unit is one of the best tools to decompose wet waste by earthworm. It will provide several social economics of environmental benefits to the society by way of producing chemical free. safe nutritive and healthy protective (rich in minerals and antioxidants) food for people.

Vermicompost is a sustainable tool for environment, equilibria vermicompost significantly affect the plant growth and hence vermicompost generated from this unit is used in botanical garden and ornamental garden as additional food.

Table 4.1: - Details of Total dust bin in college premises.

Sr. No	Name of Building	Type of waste	Type of Colour	Quantity (no)
1	Admin Building	Garbage, papers etc	White	15
2			Blue	12
3			Green	13
		Total		**40**

Figure: - Dust Bins for waste collection at various Location

Recommendation:

Adopted 5 Bin Waste Collection System for collect different type of waste generated in college premises.

Figure: - 5 Dust Bin waste collection System

- **Waste Management** -

Organic waste recycling and waste management is rapidly increasing problem in ruler and urban areas in all over India. As per studies 40% to 50% of solid waste generated is organic. Organic waste dumped in soil release methane from decomposition of biodegradable waste under anaerobic conditions which contributes to global warming. Open dumping of organic waste, where number of flies sit and can spread diseases. One of more sustainable, economically valuable and environment friendly solution for management of such waste is the use of black soldier fly, *Hermecia illucens* L. farming, which helps for any organic waste management as well as can solve the food problem of aquaculture and poultry. Black soldier fly larvae not only useful as a feed of livestock but can generate other by products like Chitin, biodiesel, biogas, fertilizers etc. This activity in college campus focused a light on importance this fly and how this fly is best suitable for organic waste management, in rural and urban areas of India.

- **Aim and Objective of the Project** –

The main aim of the activity is to make aware to the students and farmers and common people of the villages about importance of organic waste management with the benefit of increasing their economy.

- **Nature of Activity of the Project**–

- In College campus at building B, this organic waste management activity is running from this session by the Department of Zoology.
- Department of Zoology did a curious study for the rearing and maintenance of this fly and throughout this session reared this fly successfully.
- The feed required for the larval stages of fly is received free of cost i.e., the organic waste like, vegetable waste, fruit waste, Kitchen waste, bakery waste, flour mill waste, oil factory waste, poultry slaughter house waste, Fish market waste etc.
- The college staff also bring their kitchen waste, fruit waste from their home as a feed for the larvae.

- The larval stages within 15 to 20 days of its life, feed voraciously on this organic waste and decompose and reduce the volume of these waste and convert waste into biomass as well as the residue which remained used as plant biofertilizer.
- When larval development completed, we fed the larvae to the free ranged Chickens within the Seloo tahasil so the villagers received the knowledge for the importance of the BSF fly rearing.
- We also dried the larvae in oven and send it to the poultry farm for the layers.
- We also make aware and insisted to the farmers for keeping the larvae in their dust bins, so that villagers can put their kitchen waste in the bins and will get the nutritious larvae for their chickens.
- Department organised workshop and guest lecture for students and farmers of different villages during this session.

Outcome of this Project

1) Farmers understood the importance of rearing of this fly to reduce the cost of feed for their livestock.
2) Because of easy and cheap method of rearing of the fly, farmers showed great interest to receive the knowledge for the fly.
3) Because of no feed cost and easily availability of waste food for the larvae, farmers were very curious for this fly and they mentioned that this type of fly rearing will be helpful for increasing their economy.
4) Some villagers wanted to start the rearing of BSF at their places.

Activity 1.

One Day Workshop - On date 28th march 2022, Department of Zoology organised One day workshop on 'Black Soldier Fly rearing' for the farmers and for college students. For this workshop 27 farmers from Seloo tehsil and from different villages were present.

Boucher for the Workshop

Dr. Ganvir Conducting the Workshop for Farmers

महिला - सांस्कृतिक

सैनिक माशी पालन करा आणि आपल्या उत्पन्नात भर घाला : डॉ. करुणा गणवीर

देशोन्नती वृत्तसंकलन...

- **Activity 2-**

Guest lecture and Demonstration of Black Soldier fly rearing in NSS activity

As per fundamental principles of National Service Scheme, the volenteers are expected to remain in constant touch with the community and their problems. NSS have to select a particular village slum for the implementation of NSS programmes and volenteers have to spread the health and hygiene related messages among the villagers during their residential camps. To study the Waste management policy, to disseminate its knowledge and importance among villagers is one of the priority of National Service Scheme of the Institution to develop the sustainable future.

Guest speaker-

Dr. karuna P. Ganvir, Assistant Professor, Dept. of Zoology

Program-

Accordingly NSS of the College organised a guest lecture on 'Black Soldier fly rearing for Organic Waste Management' on date 24th March 2022 in the College Seminar Hall for all NSS participated students . Students actively participated in the guest lecture as well as in the live demonstration of Black Soldier Fly rearing. All students understood the technique for the rearing of this fly and importance of rearing for the organic waste management. Total **37** students were present for this guest lecture and for demonstration.

Outcome of the program-

1) NSS students understood the importance of Black Soldier Fly rearing for the organic waste management.
2) As the topic of the guest lecture was new for all students, they were curious to ask the details of BSF rearing.
3) Students developed the attitute for self employment with the less investment.
4) Some students assured to start BSF rearing at their home places and in their fields.
5) Students were curious about diffents types of insects for generating income.


Dhanoli, Maharashtra, India
Aurangabad - Nagpur Rd, Dhanoli, Maharashtra 442104, India
Lat 20.827665°
Long 78.699165°
24/03/22 03:04 PM


Wardha, Maharashtra, India
Unnamed Road, Maharashtra 442104, India
Lat 20.828015°
Long 78.699694°
24/03/22 03:41 PM


GPS Map Camera
Dhanoli, Maharashtra, India
Aurangabad - Nagpur Rd, Dhanoli, Maharashtra 442104, India
Lat 20.827845°
Long 78.699555°
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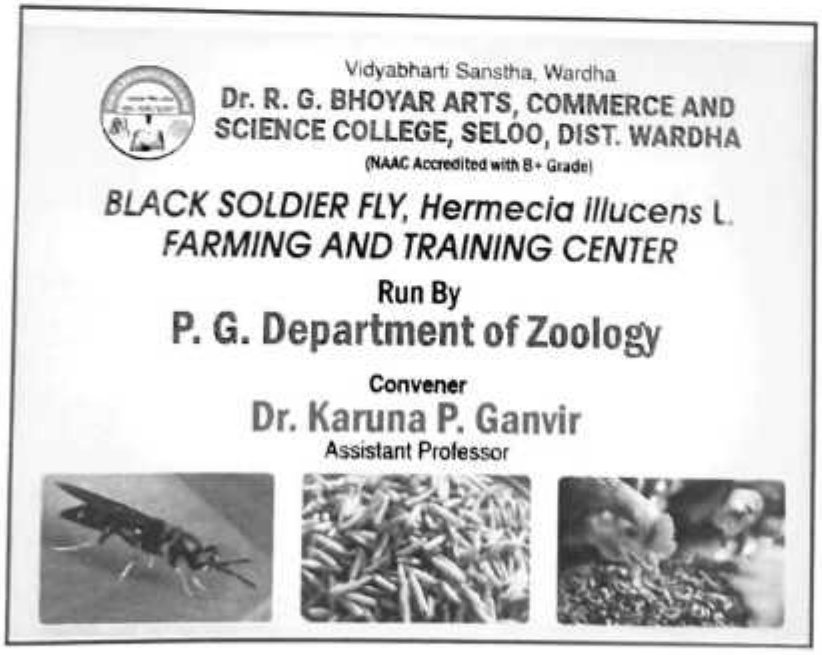
Google

Activity 3.

Dr. Ganvir insisted the villagers to keep dustbins containing the larvae so that they can put their kitchen waste and will get the Nutritious BSF larvae for their Chickens



College has started the BSF farming and training centre at college

4.3 The Green, Energy and Environment Management Policy

Vidyabharti College, Seloo now known as Dr. R. G. Bhoyar Arts, Commerce & Science College, Seloo from 2021. The college in committed to impart quality education and to improve overall personality of the rural youths and make them to face the challenges of the competitive modern world. The institute has the Best Rural College and succeeded in caring a niche for itself in the field of education and has earned the trust and confidence of the society mainly because of its quality and value-based education. The institute is located at rural area in Seloo and caters to need of 135 villages. The campus sprawling 6 acres with natural environment. The campus can be categorized as playgrounds, lawns and gardens.

- **Scope of the Policy**

The Green Campus, Energy and Environment Policies will develop exciting new co-curricular and extracurricular practices that encourage students to take the lead in creating positive change. These initiatives call for a thorough review of all infrastructural, administrative functions from the standpoints of energy efficiency, sustainability and the environment.

The focus areas of this policy are:

- Clean Campus Initiatives
- Landscaping Initiatives
- Gardening
- Clean Air Initiatives
- Infrastructure
- Installation of Energy Efficiency Equipment and solar power plant
- Water Conservation through Rainwater Harvesting System.
- Waste Management processes (Solid Waste Management, Liquid Waste Management, E-Waste Management)
- Awareness Initiatives
- Environment-centric Student Societies and Department Activities
- Green Audit
- Energy Audit
- Water Audit
- Plastic-Free Campus

Objectives of the Policy

- To protect and conserve ecological systems and resources within the campus.
- To ensure judicious use of environmental resources to meet the needs and aspirations of the present and future generations.
- To integrate environmental concerns into policies, plans and programmes for social development and outreach activities.
- To work with all stakeholders and the local community to raise awareness and seek the adoption of environmental good practice and the reduction of any adverse effects on the environment.
- To continuously improve our contribution to climate protection and adaptation to climate change and to the conservation of global resources.
- To continuously improve the efficient use of all resources, including energy and water, and to reduce consumption and the amount of waste produced, recovering and recycling waste where possible.
- To make the campus plastic free
- To conduct environmental, water and energy audits from time to time.
- To minimize the use of paper in administration through having policy for E-governance.

Policy:

Clean and Green Campus Initiatives

The college has actively coordinated cleanliness activities in the college and beyond the campus in accordance with the vision of Swachh Bharat Abhiyan. It commits to continue with this Programme. The broad vision is as follows:

- Generating mass awareness on cleanliness and hygiene amongst students and staff members by holding regular cleanliness drives. The idea is to motivate them to contribute in a proactive manner.
- Activities under 'Swachh Bharat Abhiyan' will be a key component of all the community work being done by NSS and Nature club volunteers of the college.
- Staff Members will be encouraged to participate in the cleanliness drive in the college campus.
- Events such as poster and slogan competitions, essay writing, spoken word poetry, speeches, skits on 'Swachh Bharat' will be organised.
- Rallies on themes connected with 'Swachh Bharat Abhiyan' in and around the college campus will be conducted to create mass awareness.
- Remove all kinds of waste material like broken furniture, unusable equipment etc.
- Administer of the pledge by students and staff members to maintain cleanliness of the college campus and its surrounding areas on an annual basis.
- Conduct workshops on the 3Rs: Reduce, reusing and recycling of waste.
- Commit to manage waste and maintain clean campus especially during college events.
- Organizing annual tree plantation drives.
- Encouraging student societies to hold tree planting events.

- **Clean Air Initiatives**

We encourage our students and staff to use public transportation. We encourage carpooling to college, an activity that will control air pollution and strengthen social interaction. In compliance with the framework provided by the National Tobacco Control Programme (NTCP) 2007-2008, the college prohibits smoking and the use of other tobacco products.

- **Infrastructural Initiatives**

➢ **Renewable Sources of Energy**

The college is dedicated to minimize and sustainably manage its use of electricity. The college believes in reducing the consumption of electricity produced by non-renewable resources. Now its plan to use clean energy sources like solar energy for purposes like lighting the campus.

➢ **Energy Saving and Energy Efficient Equipment**

We commit to install environment-friendly electrical appliances that save energy and reduce wasteful inefficiencies. The college believes in using cleaner energy such as LED lighting.

➢ **Water Conservation through Rainwater Harvesting System**

As an institution located in the area that has seen maximum fall of ground water levels, The College has committed itself to this effort to replenish the groundwater table by practicing rainwater harvesting. This practice helps in the replenishment and recharge of the groundwater.

Waste Management Processes

The college strives to have a minimal impact on the environment and is dedicated to reduce and manage the waste generated by the college campus. The following specific procedures will be undertaken to ensure institutional contribution in protecting the environment.

Solid Waste Management

With its aim to provide holistic education that also has a positive impact on the environment, the college will adopt practices that will mitigate the generation, and manage solid waste through the following methods.

- ✓ Systematically engage with the 3Rs of environment friendliness (Reduce, Reuse and Recycle).
- ✓ Collect paper waste produced on campus and collaborate with scrap dealers for recycling.
- ✓ Reduce solid waste by developing a technology-centric teaching and administrative model. Reduce use of paper by supporting digitization of attendance and internal assessment records. Reduce requirement of printed books by updating the e-books and e-journals collection of the college library.
- ✓ Encourage the students and teachers to use emails for assignment submissions.
- ✓ Take initiatives to spread awareness amongst students about Food wastage and ways of minimizing it. Minimizing the use of packaged food. The habit of reusing and recycling non-biodegradable products organizing workshops for students on solid waste management.

Liquid Waste Management

- ✓ Maintain leak proof water fixtures.
- ✓ Minimize the use of water by constructing more Indian style toilets instead of western style toilets.
- ✓ Continued employment of a caretaker to take immediate steps to stop any water leakage through taps, pipes, tanks, and toilet flush etc.

E-Waste Management

- More provisions for the disposal of the institutional e-waste.
- Awareness amongst students about reduction of e-waste and environment friendly disposal practices for e-waste.
- Encouraging department and society level activities pertaining to e-waste management.

Awareness Initiatives

Outreach and education are of utmost importance so that all members of the campus community may value the objectives of the policy and aid in its implementation. This is why institute supports and encourages awareness campaigns, seminars, workshops, conferences and other interactive sessions to facilitate effective implementation of the Green Campus, Energy and Environment policies.

Environment-centric Student Societies and Department Activities

Institute encourages all the departments and specific student societies like Nature club, NSS, and others to organize events, competitions and training sessions that will bring about positive environmental changes at the grassroot level. The college supports departments and student societies in moulding the students into active agents of environment protection and conservation.

Nature Club

Institutional changes towards sustainability and eco-friendly practices have percolated down to the students which have led more and more students to join Nature club. Making the society a compulsory one will provide it a bigger platform to broadcast the institution's environmental values to raise awareness. Because compulsory societies expect the fulfilment of a specified number of hours of work and commitment, this will aid the green initiatives and practices that are a part of this policy to grow exponentially.

Conduct Green Audit

The college aims to regularly conduct a Green Audit of our college campus to assess our strengths and weaknesses to further our goals of long-term sustainability. A green audit is a useful tool to determine how and where most energy or water or resources are being used. The college can then consider how to implement changes and make savings. It can determine the type and volume of waste. Recycling projects or waste minimization plans can be adopted. It will create health consciousness and promote environmental values and ethics. It provides a better understanding of the impact of eco-friendly practices on campus. Green auditing will promote financial savings through reduction of resource use. It is imperative that the college evaluate its own contributions toward a sustainable future.

Conduct Energy Audit

An Energy Audit to be conducted as and when required to further reduce its use of sustainable energy. The importance of reducing energy consumption cannot be overstated. The energy audit, with its specialized tools will identify wastage of energy. Such an inspection often reveals several different flaws which cause a loss of significant amounts of energy which the college will not be able to detect. These flaws often have easy and affordable solutions and provide significant savings.

Plastic-Free Campus

College has been observing most of its duties in terms of solid waste management since its inception. In view of the Government of India's resolution to ban all single use plastics due to the hazardous impact of plastic use and pollution, the college administration strictly bans the use of single use plastics in its premise to make it a 'Plastic Free Campus'.

CHAPTER- 5
RECOMMENDATIONS AND SUGGESTIONS

5.1 QR Code System and Biodiversity:

While the world seems to be going digital, people lack the time to read books and process the information they contain. Hence, College can be provided QR codes on the trees for its information and to exploit the rapidly growing platform for a unique purpose.

Figure:- QR Code System for plants

These codes can give students all the information they need to know about the tree — from its scientific name to its medicinal value. They only need to put their smart-phones to use. QR codes to them, making it easier for everybody to learn about a plant or a tree at the tip of their fingers," If any app generating a QR code, which is available for free on the online stores, can be used to avail the information of the trees.

- **Eco-restoration programmes**
  - Frame long-term eco-restoration programmes for replacing exotic Acacia plantations with indigenous trees and need of the hour is to frame a holistic campus development plan.

5.2 Other Suggestions

Some of the very important suggestions are:-

- Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.
- Increase recycling education on campus.
- Increase Awareness of Environmentally Sustainable Development in college campus.
- Practice Institutional Ecology- Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.
- Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development.
- Collaborate for Interdisciplinary Approaches- To develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- Increase reduces, reuse, and recycle education on campus.
- Develop a butterfly garden that arouses appreciation towards flora and fauna diversity.
- Name all the trees and plants (Plant DNA barcodes) with its common name and scientific name.
- Arrange training programmes on environmental management system and nature conservation.
- Renovation of cooking system in the canteen to save gas by installation solar water heater system with heat pump.
- Establish a procurement policy that is energy saving and eco-friendly.

ENVIRONMENT AUDIT REPORT

CONSULTATION REPORT

Dr. R.G. Bhoyar Arts, commerce and Science College Seloo, Wardha Nagpur (M.H)

PREPARED BY

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(2021-22)

CONTENT

ACKNOWLEDGEMENT

Empirical Exergy Private Limited (EEPL), Indore takes this opportunity to appreciate & thank the management of **Dr. R. G Bhoyar Arts, Commerce and Science College Seloo Wardha Nagpur (M.H) for** giving us an opportunity to conduct Environment audit for the college.

We are indeed touched by the helpful attitude and co-operation of all faculties and technical staff, who rendered their valuable assistance and co-operation the course of study.

Rajesh Kumar Singadiya

(Director)

M.Tech (Energy Management), PhD (Research Scholar)
Accredited Energy Auditor [AEA-0284]
Certified Energy Auditor [CEA-7271]
(BEE, Ministry of Power, Govt. of India)
Empanelled Energy Auditor with MPUVN, Bhopal M.P.
Lead Auditor ISO50001:2011 [EnMS) from FICCI, Delhi
Certified Water Auditor (NPC, Govt of India)
Charted Engineer [M-1699118], The Institution of Engineers (India)
Member of ISHRAE [58150]

EXECUTIVE SUMMARY

The executive summary of the water audit report furnished in this section briefly gives the identified water conservation measures, that can be implemented in a phased manner to water conservation and increase the productivity of the college.

RECOMMENDATION

FRESH WATER MONITORING SYSTEM:

- Installation of **"Cloud based (IoT based) ground water extraction monitoring system"** for Borewell to quantify fresh water consumption per day in the College.
- Install water flow meters (Mechanical or Electronics) in distribution network, like college building, main line and gardening line for quantity per day water consumption and waste water generation in the College campus.

WASTE WATER TREATMENT PLANT

- Waste water generated from various departments and canteen should be collect in separate waste water collection tank. It should be treated in proposed STP and ETP plants after that treated water reuse activity like gardening, toilet and wash room etc.

WATER MONITORING SYSTEM:

- Installation of **"Cloud based (IoT based) Ground Water extraction monitoring system"** for borewell to quantify fresh water consumption per day in the university".

WASTE WATER MEASUREMENT:

- Installation of **"Water flow meter"** on STP Plant to measure treated waste water per day. It will also be helpful for determination of chemical & operational cost of the plants.

REPLACEMENT OF ALL OLD BOREWELL STARTER: -

- There are generating sparking in borewell starter during the operation. So, it is recommended to update old electrical starter panels by new updated System.

DRIP WATER IRRIGATION SYSTEM FOR PLANTS.

- Use drip water irrigation system for Plants

USE SENSOR BASED EFFICIENT WATER TAPS: -

- Water saving taps either reduce water flow or automatically switch off to help save water. So, it is highly recommended to install efficient water taps in the University campus to reduce water consumption.

USE SENSOR BASED EFFICIENT URINAL TAPS: -

- Replacing these inefficient fixtures with water sensor labelled flushing urinal can save between 0.5 to 04 litters per flush without sacrificing performance. Installing water saving flushing urinal will not only reduce water use in facilities but also save money on water bills.

OTHER SUGGESTIONS.

Some of the very important suggestions are: -

- Prepare the water management policy, and work towards creating and implementing a strategy to reduce the water consumption.
- Conduct awareness programs for water conservation and sustainable development.
- Stablish institutional ecology policy and set an example of environmental responsibility and practices of resource conservation, recycling, waste management.
- Involve all stakeholders and encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in water conservation and sustainable development.
- Collaborate for interdisciplinary approaches to develop curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- Promote 3R education policy (reduces, reuse, and recycle) in campus.
- Arrange training programmes on water management system and nature conservation.
- Ensure participation of students and teachers in local water issues.
- Conduct seminars, workshops and exhibitions on water and environmental education.

CHAPTER-1
INTRODUCTION

1.1 About College

Dr. R. G. Bhoyar Arts, Commerce & Science College (Vidyabharti College) has inspired by Hon'ble Dr. Rajesh G. Bhoyar with their innovative vision and Noble mission "*Gun. Sarvatra Pujyate*" which established in 2008. The college is recognized under section 2(f) & 12 (b) of the UGC Act 1956, is affiliated to Rashtrasant Tukadoji Maharaj Nagpur University and accredited with B+ by NAAC in 2017. Our institute is only in Seloo taluka, Dist.-Wardha (Maharashtra), which gives service to rural flock to spread knowledge and provide quality education. This college in committed to impart quality education and to improve overall personality of the rural youths and make them to face the challenges of the competitive modern world. The College has Under Graduate courses in all discipline and post-graduation in Botany, Zoology, Physics and Commerce as well as research centre in Commerce. The college has received Green Championship award. The institute has the Best Rural College and succeeded in caring a niche for itself in the field of education and has earned the trust and confidence of the society mainly because of its quality and value-based education. The institute is located at rural area in Seloo and caters to need of 135 villages. The campus sprawling six acres with natural environment.

Vision

The women students through learners can contribute a lot towards National reconstruction and development, which shall finally lead us towards the balance between not only in body and spirit but also in the intellect and emotion.

Mission

To serve selflessly towards the cause of human excellence especially in character building, personality development and empowerment of women through knowledge and higher education

Academic Goals:

- To work towards the growth of institution into a centre of excellence.
- To provide the standard education in the field of Science, Home Science and Social Science to women.
- To encourage students and teachers in the pursuit of knowledge and in setting high standard of academic achievements.
- To bring women to the higher level for facing modern science age and to develop scientific and rational attitude.
- To develop free and fearless thinking leading to intellectual and moral maturity.
- To bridge the gap between educational and social needs.

Social Goals:

- To enable the women to come out from the stagnant pool of orthodoxy into the clear stream of reason, perfection, tolerance and dynamism.
- To make women aware of their social responsibilities and important role in nation building.
- To make the student aware of environmental issues and to hand over the moral responsibilities to the coming generation an eco-friendly lifestyle and earth free from pollution.
- To empower the girl students by helping them to become strong, self-reliant, socially motivated, responsible and dedicated women and better citizen of tomorrow, so as to equip them to meet the challenges in life positively.

1.2 About College Campus:

The College is built up area 3847 sq m with plenty of open space and sports area interspersed within academic buildings. The details of various department and building are given below.

Sr.no	Total Build up area	
	Area Name	Total Area (Sqm.)
1	Main Building (Administrative building)	2049.60
2	Building second (Wing A)	626.04
3	Building third (Wing B)	671.56

Name of Teaching Department and Courses

Three Year Degree Courses

- B.A.
- B.Com. (English Marathi Medium)
- B.Sc.

Post Graduate Courses

- M.Com. (English Marathi Medium)
- M.Sc. (Botany Zoology Physics)

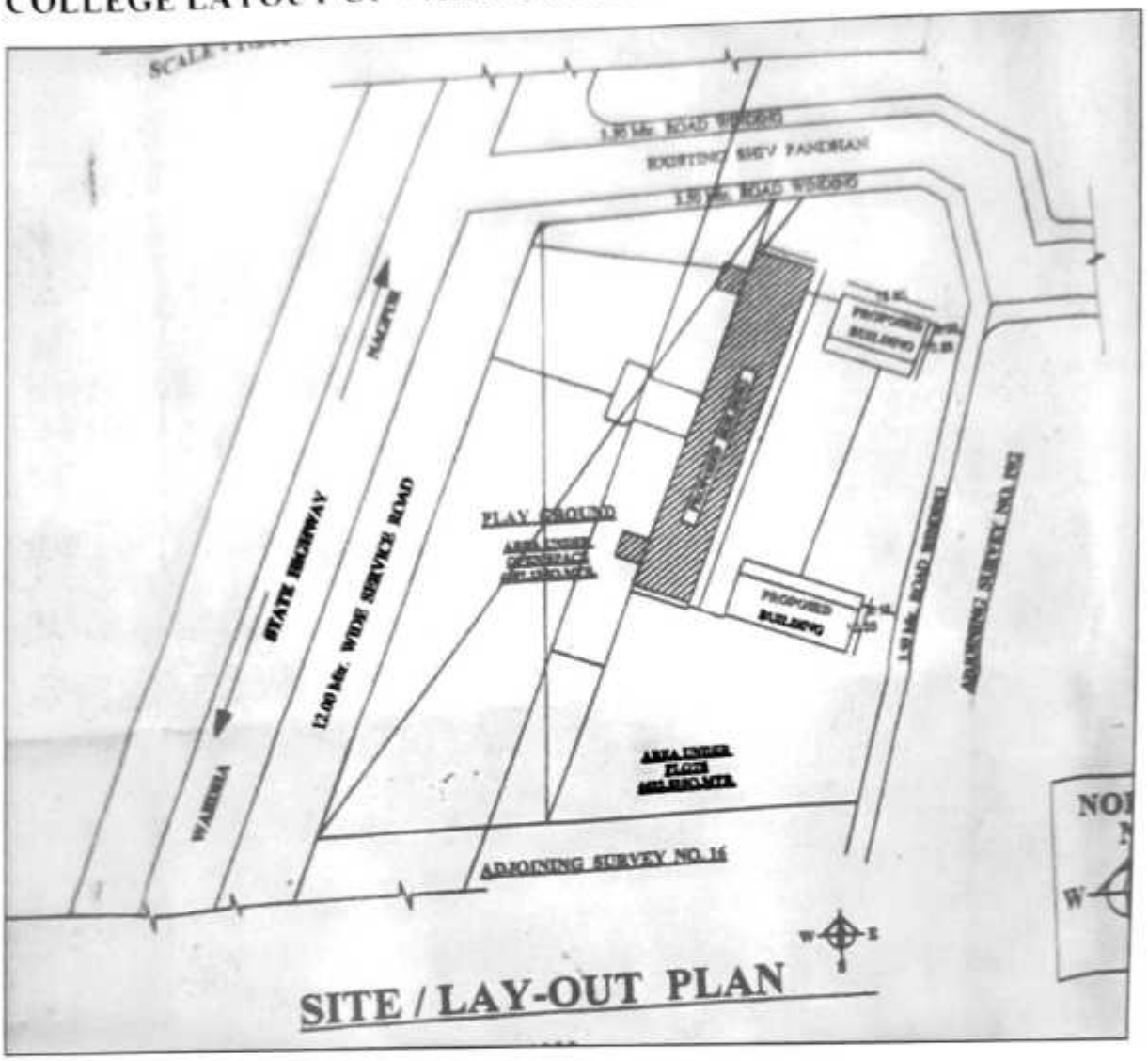
Place for Higher Education and research

- Commerce

Departments of the college.

- Department of Commerce (UG and PG)
- Department of Botany (UG and PG)
- Department of Zoology (UG and PG)
- Department of Physics (UG and PG)
- Department of Microbiology
- Department of Biochemistry
- Department of Chemistry
- Department of Mathematics
- Department of Computer Science
- Department of Electronics
- Department of Arts
- Department of N.S.S.
- Department of Physical Education

COLLEGE LAYOUT OF VARIOUS FLOORS



1.3 Energy Monitoring Committee

Vidyabharti Samstha, Wardha's
Vidyabharti College, Seloo
(Arts, Commerce & Science)
Ta. Seloo, Wardha - 442 104
Affiliated to Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

Ref No. Vbcs / / Date : / /

Energy, Environment and Green Audit Committee

Aim The main aim of the energy, environment and green audit is to promote the Environment management and its conservation in the college campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment sustainability in compliance with the applicable regulations, policies and standards.

Objectives-

1) To implement environmental policies.
2) To identify needs, strengths and weaknesses.
3) To measure environmental performance.
4) To promote environmental awareness.
5) To improve safety and health in institution.
6) To conserve natural resources.
7) To reduce waste.
8) To assess regulatory requirements of institution.
9) To place environmental information to the public.

Mechanism-

The green audit policy of Vidyabharti College, Seloo practically follows energy conservation, use o renewable resources, rain water harvesting, planting trees, waste management etc. In our institution th policy maintains data collection, systematic identification and recording of all components related t sustainable development for future generations. Our focus is on reduction of cost and conservation o energy supply, encourage and enhance the awareness for flora and fauna in and around the campu reduce and reuse the water consumption, to reduce the soil contaminations etc. The target areas include in this green auditing are water, energy, waste and green campus.

Chairman of the Committee- Dr. Sanjay S. Kanode
Convener of the Committee- Dr. K. P. Ganvir
Water Audit – Prof. Wasim Khan, Dr. Karuna Ganvir
Green Audit – Dr. Vishal Patil, Dr. Khushal Pathade
Energy Audit – Dr. Abhijit Patil, Dr. Anurag Khupat

Principal
Dr. Sanjay S. Kanode
PRINCIPAL
Vidyabharti College, Seloo

1. 4 Energy Audit Team

The study team constituted of the following senior technical executives from **Empirical Exergy Private Limited,**

- **Mr. Rakesh Pathak**, [Director]
- **Dr. Suresh Soni** [Reviewer]
- **Mrs. Laxmi Raikwar Singadiya**,[Energy Engineer]
- **Mr. Sachin Kumawat** [Project Engineer]
- **Mr. Ajay Nahra,** [Site Engineer]

1.5 About Environment Auditing

Water audits can be a highly valuable tool for institute in a wide range of ways to improve their energy, environment and economic performance, while reducing wastages and operating costs. Water audits provide a basis for calculating the economic benefits of water conservation projects by establishing the current rates of water use and their associated cost.

1.6 Objectives of Environment audit

The general objective of water audit is to prepare a baseline report on water conservation measures to mitigate consumption, improve quality and sustainable practices.

The specific objectives are:

- To monitor the water consumption and water conservation practices.
- To assess the quantity of water, usage, quantity of waste water generation and their reduction within the college.

1.7 Target Areas of Environment audit

This indicator addresses water sources, water consumption, irrigation, storm water, appliances and fixtures aquifer depletion and water contamination are taking place at unprecedented rates. It is therefore essential that any environmentally responsible institution should examine its water use practices.

1.8 Methodology followed for conducting Environment audit

Step 1: Walk through survey

- Understanding of existing water sourcing, storage and distribution facility
- Assessing the water demand and water consumption areas/processes
- Preparation of detailed water circuit diagram

Step 2: Secondary Data Collection

- Analyse historic water use and wastewater generation
- Field measurements for estimating current water use
- Metered & unmetered supplies.
- Understanding of "base" flow and usage trend at site
- Past water bills
- Wastewater treatment scheme & costs etc.

Step 3: Site Water Audit Planning (based on site operations and practices)

- Preparation of water flow diagram to quantify water use at various locations
- Wastewater flow measurement and sampling plan

Step 4: Conduction of Detailed Water Audit & Measurements

- Conduction of field measurements to quantify water/wastewater streams
- Power measurement of pumps/motors
- Preparation of water balance diagram
- Establishing water consumption pattern
- Detection of potential leaks & water losses in the system
- Assessment of productive and unproductive usage of water
- Determine key opportunities for water consumption reduction, reuse & recycle.

Step 5: Preparation of Water Audit Report

- Documentation of collected & analysed water balancing and measurement details
- Projects and procedures to maximize water savings and minimize water losses.
- Opportunities for water conservation based on reduce/ recycle/ reuse and recharge options

CHAPTER- 2
WATER CONSUMPTION AND WASTE WATER SOURCES

2.1 Details of Source of Fresh Water and Use Areas

The main source of freshwater is Borewell for the college. The freshwater is mainly used for drinking, housekeeping, gardening, domestic activity and new construction project. Details of the pumps are given in table.

Sr. No	Source of Fresh Water	Location	Depth (ft/m)	Type of Pumps	Rated (HP)	Rated Flow (m^3/hr)	Running Hr. per day
1	Borewell	College campus	320 feet	Submersible,	2	NA	4
2	Open well	College campus	68 feet	Submersible,	3	NA	NA
3	Nagar Panchayat Tap	Behind main building	NA	NA	NA	NA	1

2.2 Water Accounting & Metering system:

It was observed that there is requirement of water flow meters on borewell line to quantify per day ground water extraction from borewell.

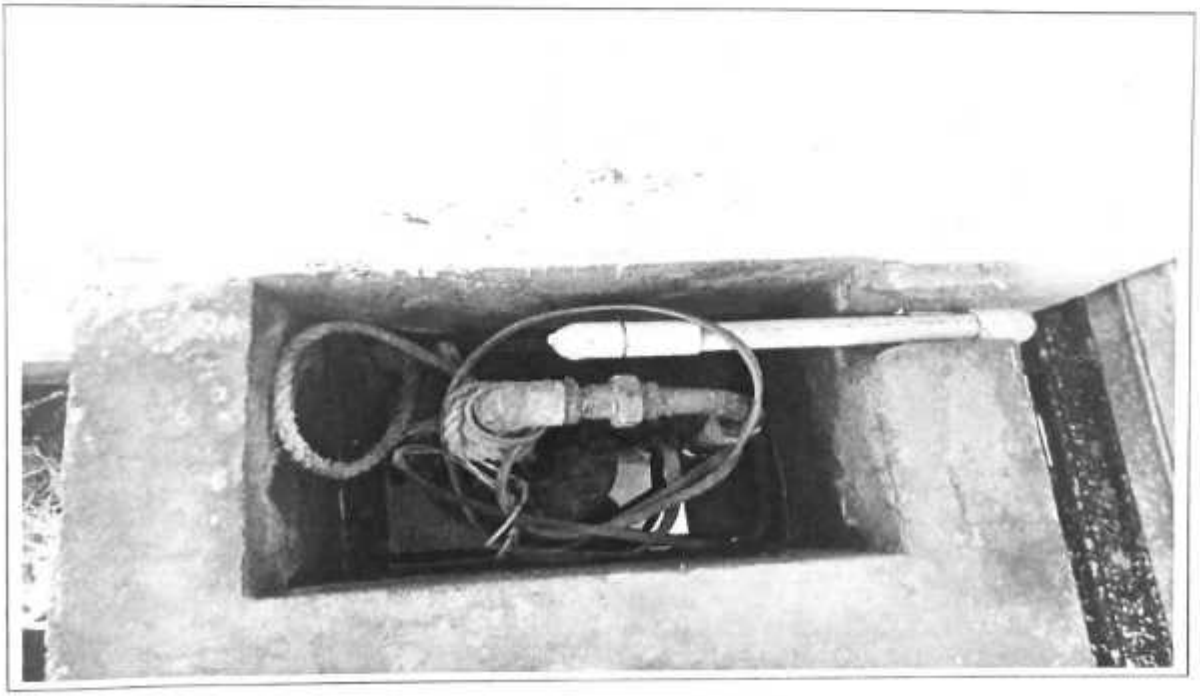


Figure 2.1 : - fresh water supply for college campus

2.3 Water Storge Capacity in College Campus: -

There is different type of tank available in college for water storage like Underground RCC tank, Overhead RCC tank etc.

Table 2.2: - Water Storage tank in college campus

Sr.no	Tank Type	Location	Size	Quantity	Capacity (M^3)
1	PVC (Sintex)	Main building Terrace	Circular	1	2
2	Under Ground tank	Front space of building	Circular	1	2

Photographs of water storage tanks.

Figure 2.2 :- Water Storge Tank and capacity of College Campus

2.4 Water use areas in College Campus: -

Water is preliminary used for drinking, domestic, gardening and activity. Audit team visited various departments and buildings to determine appliances. The details of washroom, toilet and taps are given in table.

Sr. No	Name of Building/Department/Section	No. of taps Service Water
1	Department of Chemistry	14
2	Department of Physics	03
3	Department of Botany	17
4	Department of Microbiology	15
5	Department of Biochemistry	13
6	Department of Zoology	24
7	Department of Marathi	01
8	Main water filter	01

Sr. No	Name of Building/Department/Section	Hand Wash	Urinals	Toilets
1	Main building (gents)	03	02	02
2	Main building (girls)	02	02	02
	Total	5	4	4

Sr. No	Type of Plant	Quantity	Plant Capacity (m^3/day)
1	RO	1	20 litres
	Total	1	20

2.5 Fresh Water uses for Gardening:

The one of major contribution from fresh water consumption is watering for other plants in college campus. There is good potential for water saving by adopt "Automatic Watering 360 adjustable misting nozzle irrigation Dripper's system" for plants. adjustable drip irrigation tools to provide different amounts of water depending on the water requirements of different plants. The drip speed can be set as for indoor and outdoor plants.

Adjustable Misting Nozzle Irrigation Drippers

Automatic Water Timer Unit

Fig: 2.3 Technology for Drip Water Irrigation for plant

2.6 Waste Water Generation sources: -

At present waste water generated from various departments canteen, Mess, hostels and clinical activity like washrooms, handwash and washing of medical equipment's and RO rejected etc is discharge into drain line.it should be collect is separate tank and treat in proposed STP and ETP plants. After that treated water reuse activity like gardening, toilet and wash room etc.

Sr. No	Key Water Usage Section	Type of water used (raw, treated etc.)	Water Consuming activities
1	Botanical Department	Fresh Water	Drinking and other uses
2	Zoology Department	Fresh Water	Drinking and other uses
3	Physics Department	Fresh Water	Drinking and other uses
4	Principal Office	Fresh Water	Drinking and other uses
5	Marathi Department	Fresh Water	Drinking and other uses
6	Micro Biology	Fresh Water	Drinking and other uses

- Some photographs of waste water generation sources are given

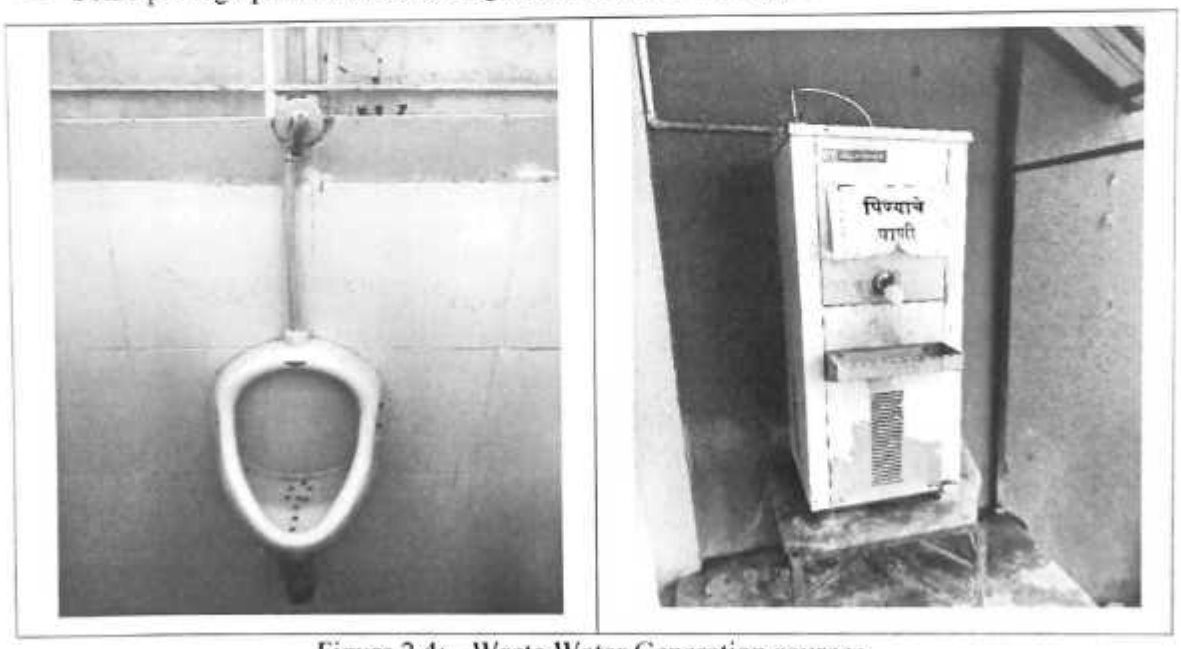


Figure 2.4: - Waste Water Generation sources

CHAPTER- 3
RAIN WATER HARVESTING SYSTEM

3.1. Rain water Harvesting systems

College has installed 100 Cu/m Rain water harvesting system. **Its appreciable**. The rainwater harvesting is a technique to capture the rainwater when it precipitates, store that water for direct use or charge the groundwater and use it later.

There are typically four components in a rainwater harvesting system:

- Roof Catchment.
- Collection.
- Transport.
- Infiltration or storage tank and use.

If rainwater is not harvested and channelized its runoffs quickly and flow out through storm-water drains. For storm-water management the recharge pits, percolation pits and porous trenches are constructed to allow storm water to infiltrate inside the soil.

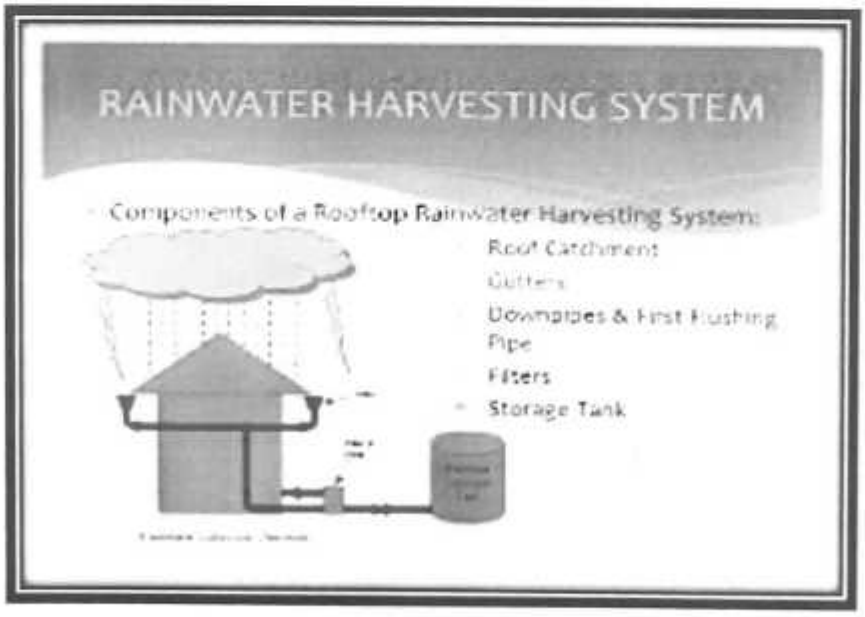


Figure 3.1 :- Components of a rooftop rainwater harvesting system

3.2 Rain water harvesting Objectives: -

- To increase the underground water level by capturing the rooftop run-off water.
- To utilize this water for institutional needs, like for gardening and washing purpose.

3.3 Importance and need for rainwater harvesting: -

- Increasing fresh water demand can fulfilled by rainwater harvesting.
- The availability of water from lakes, rivers wells etc is uncertain so collecting rainwater can solve the problem.
- During rainy season soil erosion occurs due to run-off water, this problem can be overcome by harvesting rainwater.
- Rooftop rainwater is of good quality water can be utilised for domestic purpose.
- Rainwater harvesting will reduce the chances of flood and water stagnation in urban areas.
- Reduces cost of water and electricity bill.
- Collecting the rainwater in borewell pits is easily accessible and convenient.
- The material required for rainwater harvesting are cheap, requires traditional knowledge, no need of large technical instruments and no need of any government technical assistance for repair and maintenance.

3.4 Context of rainwater harvesting

- Increased water level due to rainwater harvesting in borewell pit, water is utilised every day for different purposes in college campus like for making of building and wall compound. Every day for gardening, in wash rooms etc. enough amount of water is available in borewell pit.

3.5 About rain water harvesting practice in college

- In Vidyabharti College campus, rainwater harvesting system has been installed in main building. The terrace run-off water is collected through network of pipe lines and send to the borewell pit. The depth of borewell is 320 feet. Borewell capacity to supply water continuously is 1-2 hours/day. The borewell water is utilised throughout the year for gardening and washing purpose.

3.6 Rain water harvesting outcomes

- In college campus region, there is scarcity of water due to less rainfall. This practice of rainwater harvesting solved the problem of scarcity of water as underground water level increased, which fulfil the water demand by the college campus.

Figure 3.2: - Rain water harvesting system in college premises

END OF THE REPORT