

# **REPORT OF ENERGY AUDIT**

*Submitted by*

**THE EXPERT TEAM, ENERGY AUDIT  
GOVERNMENT ARTS AND SCIENCE COLLEGE  
SATHYAMANGALAM.**

*Date of Audit: 09.02.2023 (Thursday)*

*Submitted to*

**THE PRINCIPAL  
GOVERNMENT ARTS AND SCIENCE COLLEGE  
SATHYAMANGALAM.**

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## 1. Introduction

An energy audit is a survey in which the study of energy flows for the purpose of conservation is examined at an Organization. It refers to a technique or system that seeks to reduce the amount of energy used in the Organization without impacting the output. The audit includes suggestions of alternative means and methods for achieving energy savings to a greater extent. Conventionally, electrical energy is generated by means of fossil fuels, hydraulic and wind. The availability of fossil fuels and their depletion rate, insist the need for alternate energy systems and conservation of electric energy. In general, the prime aim of an energy auditing and management of energy consumption is to provide goods or services at the lower cost and with the least amount of environmental impact (Backlund and Thollander, 2019). The necessity of an energy audit is to identify the savings potential and cost reducing methods, analyze the ways in which fuel is used, where, the waste occurs and find the scope for improvement.

An energy audit is proposed and conducted to ensure that energy saving practices these audits are implemented and followed in Educational Institutions and Industrial sectors in a sustainable way. Preparation and completion of a questionnaire, physical examination of the campus, observation and examination of documentation, key person interviews, data analysis, measurements and suggestions are all key ideas involved in the auditing process. Energy audit has several useful facts such as energy savings potential, energy management, finding alternatives, etc. (Cabrera *et al.*, 2020) With these facts in mind, the audit's specific objectives are to assess the competence of the sustainability management and control system, as well as the departments' compliance with applicable rules, policies and standards. It has the potential to have a significant influence on the organization's operational cost as well as the environmental impact (Singh *et al.*, 2016).

Energy Conservation Building Code (ECBC) is established in the year 2017 which provides minimum requirements for the energy-efficient design and construction of buildings across India. It also provides two additional sets of incremental requirements for buildings to achieve enhanced levels of energy efficiency that go beyond the minimum requirements (Gnanamangai *et al.*, 2018). Bureau of Energy Efficiency (BEE) came into force from the year 2002 towards the implementation of energy saving practices in an organization. Energy-efficiency labels are information affixed to manufactured products and usually communicate the product energy performance (Ingle, 2014). BEE has developed a scheme for energy efficiency labeling of buildings coinciding with the star ratings of the building at accelerating energy efficiency activities. BEE Star Rating Scheme is based on actual performance of the building in terms of specific energy usage termed as 'Energy Performance Indicator' by means of star ratings labelled items used (Mishra and Patel, 2016).

Energy audit Programme provides aid in maintaining a focus on energy price variations, energy supply availability and efficiency, determining an appropriate energy mix, identifying energy-saving technology, retrofitting for energy-saving equipment and so on. In general, an energy audit process dealt with the driving conservation concepts into reality by giving technically possible solutions within a specified time limit while also considering the economic and other organizational issues (Asnani and Bhawana, 2015). It also dealt with the uncover ways to cut operating expenses or reduce energy use per unit of production in terms of savings. It serves as a “benchmark” (reference point) for managing energy in the organization for planning more energy- efficient use across the board (Cabrera *et al.*, 2020).

## **2. Aims and Objectives of an Energy Audit**

An energy audit is a useful tool for developing and implementing comprehensive energy management plans of an Organization. The aim of an energy audit is to identify the energy efficiency, conservation and savings opportunities at the premises of the audit sites in a systematic manner. The audit process is carried out as per the following.

- Review of energy saving opportunities and measures implemented in the audit sites.
- Identification of energy conservation measures and saving opportunities.
- Implementation of alternative energy resources for energy saving opportunities and decision making in the field of energy management.
- Creating awareness among the stakeholders on energy conservation and utilization.
- Providing technical information on how to build an energy balance as well as guide them to manage particular applications.
- Suggest the energy saving opportunities and implementing the energy management practices to the organizations.

## **3. Procedures followed in an Energy Audit**

In order to conduct an energy audit, several methods are adopted in the audit sites. The balance of total energy inputs with total energy outputs and identification of all energy streams in a facility are noted. The amount of energy used by each of its energy streams are calculated as per the methodology mentioned in the Manual of Gnanamangai *et al.* (2018). The top three operating expenses of the organization are typically observed to be energy (both electrical and thermal), labor and materials. When the cost or prospective cost savings in each of the above components are considered, energy always wins, and the energy management task becomes a key cost reduction area.

The energy audit assisted in better understanding on how energy and fuel are used in the organization as well as identifying waste factors and develops energy savings opportunities. Finally after the audit process, the energy audit included suggestions for

energy cost reduction, preventive maintenance and quality control activities, all of which are critical for the utility operations in the audit.

### 3.1. Physical verification of loads and sources installed in the Campus

The audit involved visiting the campus and physical verification of the loads and sources installed. The entire campus is divided into different sections and those sections are audited in which electrical fittings and energy supply are monitored. The production process flow is studied and electricity consumption are measured. Location of the electrical machines, conditions of them and their accessories are inspected through physical verification is observed as per the regulation of Indian Green Building Council (IGBC, 2018) and World Green Building Council (WGBC, 2018). The energy bill from the supply utility company (Example: Tamil Nadu Electric Generation and Distribution Corporation Limited, Chennai) is audited and assessed for the load demand requirement and efficient consumption of energy. Stakeholders are interacted with the scope for improvement and energy management during the audit. Potential areas in which the scope of energy conservation and saving opportunities available in the current context have been identified and suggested for implementation to the organization.

B

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GST No. : 33AADCT4784E1ZC

HSN Code: 490000  
SAC Code: 996912

12 SEP 2022

தமிழ்நாடு மின் உற்பத்தி மற்றும் பகிர்மானக் கழகம்  
கோயிலெட்டிபாளையம் மின் பகிர்மான வட்டம்

The Principal  
மின் கட்டண இரசீது

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மின் இலக்கம் : ER/GB 3022557

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Total		14199/-

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இது விலாபம்  
Only by Cheque  
\*Electrical Energy & Distribution services are exempted under GST\*

Cheque/DD No.:746386 Date:07/09/2022 Amount:14199/-

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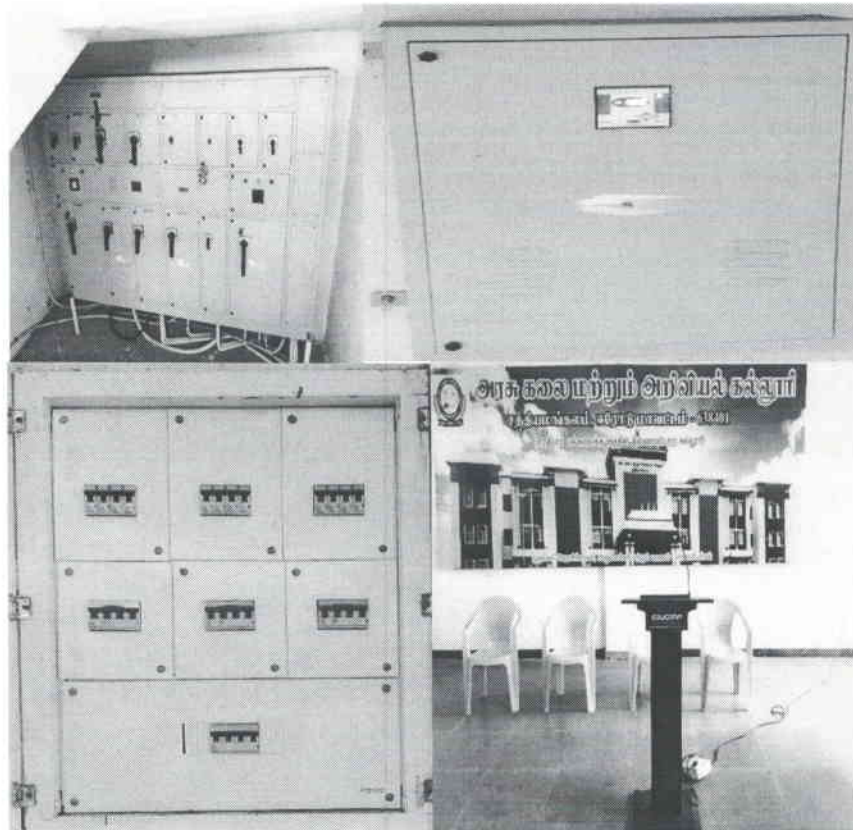
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 Only by Cheque

\*Electrical Energy & Distribution services are exempted under GST\*  
 Cheque/DD No.: 746392 Date: 08/12/2022 Amount: 38379/-

#### 4. Energy Audit Process

Energy audit is a sequence of tasks performed in a planned manner. It requires discussion, survey, collection of data, analysis, and reporting.



Power Panel Board, Switch Control and Audio Equipment's in our College

#### **4.1. Steps involved in an Energy Audit**

Step 1: Opening meeting among the audit team and audits

Step 2: Planning and organizing the energy audit

Step 3: Conduct a walk-through audit at different sites Step 4:

Macro data collection and observation

Step 5: Analysis of data collected from the organization

Step 6: Best practices followed in the organization towards energy savings Step 7:

Recommendations for further improvement

Step 8: Exit meeting after the audit to discuss about the audit findings

#### **4.2. Systems studied during the energy audit**

- Physical verification of lighting, fan, ventilators load fixtures.
- Verification of installed energy efficient systems.
- Inspection of Generators, Uninterrupted power supply machines.
- Inspect and verify the maintenance aspects of installed Generators and additional backup power sources.
- Analyze the electricity consumption through the supply utility company (Example: Tamil Nadu Electric Generation and Distribution Corporation Limited, Chennai).
- Review the potential usage of alternative energy resources.
- Review the energy conservation awareness among the stakeholders for optimum use of electricity and its savings.

#### **4.3. Planning and organizing the audit**

Planning and organizing are the integral part of the energy audit. An initial visit to the audit sites is organized and the areas to be inspected are listed. Following the listing, information on the energy consumption of various blocks in the recent past is obtained, and a planned analysis is carried out.

#### **4.4. Walk-through Audit**

Simple audit, screening audit or visual audit are the other names, by which walk-through audits are addressed. The main purpose of the walk-through audit is to obtain general information about the sites in which electrical energy is being used at the maximum. More specific information has been obtained from the maintenance and operational people during the time walk-through audit. It also included a walk-through of the facility to become familiar with the building's operation and a brief evaluation of facility utility bills (amount paid for electricity) and other operating data. During the audit the primary problem areas are discovered.

#### **4.5. Macro Data collection and observation**

Current level operation and practices within the campus are assessed and then the data regarding the number of electrical loads connected in each section are collected. The power ratings of each component and their respective hours of operation are also observed and documented for preparing the recommendations to the organization.

#### **4.6. Measurements in Energy Audit**

An energy audit required measurements, such as the energy identification and quantification, and these quantities necessitate the instruments used in a consistent way. Some of the basic electrical parameters are monitored during the energy audit such as Voltage (V), Current (I), Power factor, active power (kW), apparent power (demand in kVA), reactive power (kVAR), energy consumption (kWH), frequency (Hz), harmonics, illumination level, etc.

### **5. About the Organization**

With a view to providing higher education to all, Government Arts and Science College at Sathyamangalam was established by the Government of Tamilnadu in the year 2016. The College began its educational journey with 4 Under Graduate programmes, now it is emerging as the one of the top colleges in Erode District.

It is a Co-Educational Arts and Science College, affiliated to the Bharathiar University, Coimbatore. Also, it is recognized under 2(f) and 12(B) of UGC act 1956 by University Grants Commission, New Delhi. Our college has an intellectual capital of more than 54 academically well experienced teaching fraternity amongst 46 faculty members are doctorates and they cater to the needs of 1040 students on roll.

The Training and Placement Cell in the college functions effectively in providing various placement oriented training, value added programmes, company specific training to make them employable in the top MNCs. Every year, more than 40% placement opportunities are achieved. Apart from the placement cell, the Career Guidance Cell, Entrepreneurship Development Cell play vital role in fulfilling needs of the student community. The Government provides scholarships every year to all the girls students who have studied in the government schools and economically povered. It creates opportunities for many students to excel in education who belong to socially economically weaker section. The College firmly believes that the blend of discipline and education will make the students enter the present phenomenon with the flying colours.





## 6. Audit Details

<b>Date/Day of Audit</b>	<b>: 09.03.2023 (Thursday)</b>
<b>Venue of Audit</b>	<b>: Government Arts and Science College</b> Sathyamanglam, Tamil Nadu, India.
<b>Audited by</b>	<b>: Department Experts</b>
<b>Audit type</b>	<b>: Energy Audit</b>
<b>Name of the Energy Auditors</b>	<b>: Mr. A. SureshKumar B.E.,</b> Junior Engineer, TNEB, Govt. of Tamil Nadu Sathyamangalam. <b>: Dr. R. Banu Priya M.Sc., M.Phil., Ph.D.,</b> Associate Professor and Head Department of Physics, Gobi Arts and Science College, Gobi <b>Mrs. M.Jayamani M.S., M.Phil., M.Ed.,</b> Assistant Professor and Head in Physics, Kaamadhenu Arts and Science College, Sathy

## 7. Observations of the Energy Audit

### 7.1. Facilities visited during the Energy Audit:

**Table 1. Facilities visited during the Energy Audit**

Date	Sections where Energy Audits were conducted
09-02-2023	Main Block
	Power Control Panels
	Faculty Rooms
	Classrooms
	Auditorium
	Laboratories
	Sump and pumps.
	Library

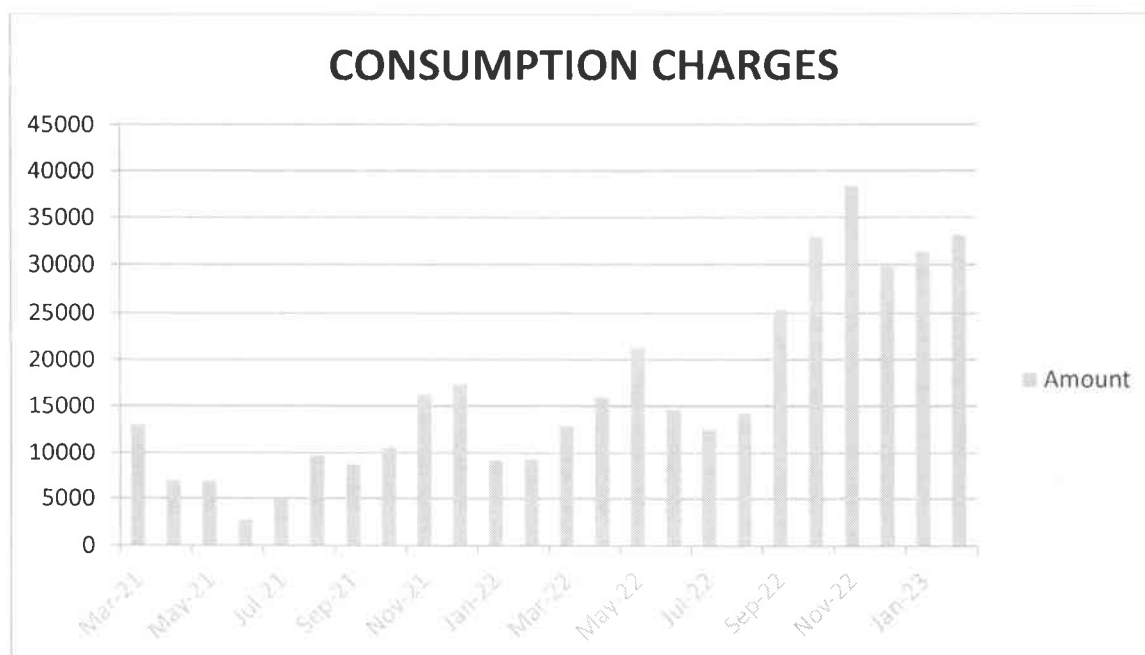
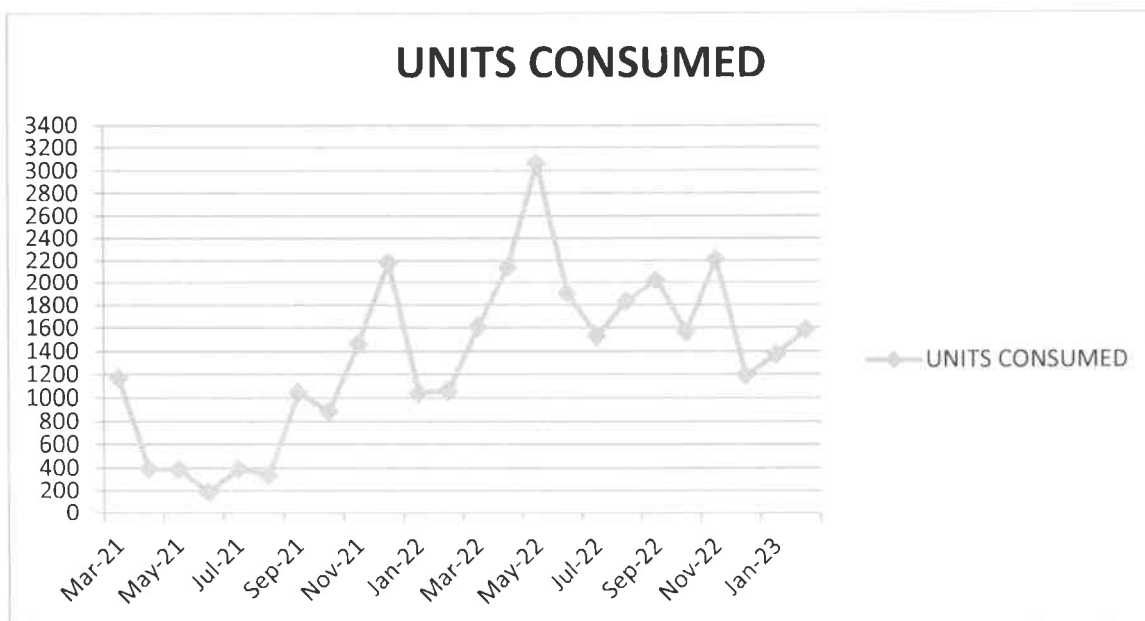
In the sections, the services offered are monitored, verified and analyzed on the aspects of energy consumption. In all these areas lighting systems forms the major consumer of electrical energy. Three phase electricity service connections available in the campus are provided by Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO Service Number: 043540042505). The electricity consumption charges are audited and studied for the load demand requirement and efficient consumption of energy. Stake holders are interacted and the scope for improvement has been discussed. Potential areas in which scope of energy conservation and saving opportunities available have been identified and suggested for implementation.

### 7.2. Systems Studied during the audit

1. Lighting fixtures are verified physically.
2. Installation of energy efficient lighting systems is verified.
3. Verified the installed safety systems.
4. Installed power backup systems (Generators and UPS) are verified on the aspect of maintenance.
5. Electricity consumption through the TANGEDCO bills were analyzed.
6. Reviewed the energy conservation awareness among the stake holders for optimum use of electricity and its savings.

### 7.3. Energy Consumption and Cost Profile

The following chart shows the profile of energy consumed and the cost for one year by the college stake holders.



#### Energy Cost Profile

Average energy consumption per stake holder per month: 1357 Units

#### 7.4. Power supply and Equipment Transformer

: 140 kVA

Sanctioned MD : 61 KW

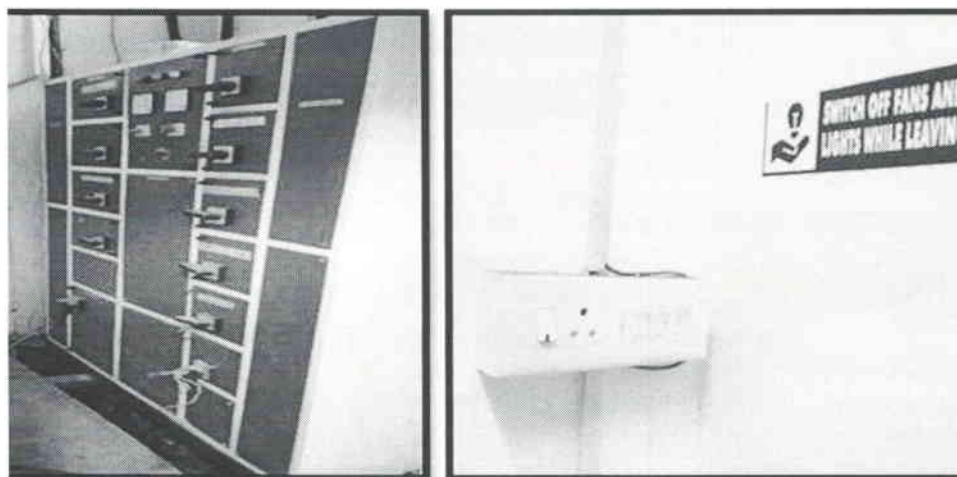
Generator : 20 KVA

**Table 2. Major Equipment**

S.No	Equipment/ Utility	Rating/ Capacity	Quantity
1.	Tube Lights	40 W and 28 W	210
2.	Fan	60W	147

**8. Best Practices followed in the Organization**

- Electrical wires, switch boxes and stabilizers were properly covered without any damage which will cause any problems to the staff and student members.
- Installed automatic switches with sensors.
- Most of places, sign board of ‘Switch ON’ and ‘Switch OFF’ are kept towards saving energy measures to the stakeholders.
- Air Ventilation and Day lighting facilities were made at Indoor and Outdoor seminar halls, auditorium and stadium for vigorous air circulation..
- Adaptation of drip irrigation to minimize the energy potential.
- Energy efficient appliances were used
- Saving Energy by using solar panel

**Power distribution and Sign Board for energy savings at our college campus****9. Recommendations for improving the energy efficiency and energy conservation**

The energy audit included suggestions for energy cost reduction, preventive maintenance and quality control activities, all of which are critical for utility operation in the audit sites. The suggestions and recommendations are as follows


- Recommended to fit HVLS Fans and Exhaust fans in the auditorium for proper ventilation

- Suggested to protect all Transformer, Generators and UPS with fencing and keep the awareness boards and safety signs on 'Dangers' and 'Warnings, etc.
- Advised to cover electrical wires, switch boxes, inverters, and stabilizers not to cause any problem to the staff and student members
- Advised to replace old generation computers and TVs with LED monitors and old incandescent (tungsten) bulbs with LED lights and install automatic street solar lights.
- Instructed to replace Overhead Projectors with LCD projectors to reduce the power consumption.
- Suggested to install more Roof top solar power plants
- Optimal water usage and temperature settings may be used which are coming under automatic process towards energy savings

## 10. Conclusion

Considering the fact that the organization is a well-established, long time run establishment with good reputation, there is significant scope for conserving energy and make the campus as self-sustained in it. The energy conservation initiatives taken up by the institution are substantial. Few recommendations, in addition, can further improve the energy savings of the college. This may lead to the prosperous future in context of Green Campus & thus sustainable environment and community development.

  
**ASSISTANT ENGINEER**  
**TANGEDCO**  
**GOBI, ELECY. DISTN CIRCLE**  
**KODIVERY - 638 503.**

  
**HEAD**  
**DEPARTMENT OF PHYSICS**  
**KAAMADHENU ARTS AND**  
**SCIENCE COLLEGE,**  
**SATHYAMANGALAM-638 503.**

  
**Dr. R. Banupriya**  
**Associate Professor & Head**  
**Department of Physics (IA)**  
**Gobi Arts & Science College (Autonomous)**  
**Karottadipalayam - 638453**  
**Gobi(Tk), Erode(Dt)**



  
**Principal**  
**Government Arts and Science College**  
**Sathyamangalam - 638 401.**



## ENERGY AUDIT



CHECKING THE CONSUMPTION OF ENERGY




INSPECTING ENERGY AUDIT

IDENTIFYING THE QUALITY OF ENERGY INPUTS



ENERGY AUDITOR INSPECTS IN COMMERCE BLOCK



  
Principal  
Government Arts & Science College  
Sathyamangalam  
Erode District.

## GREEN AUDIT

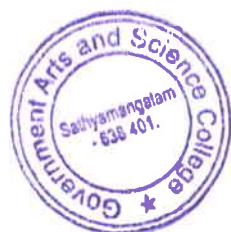
INSPECTING ENVIRONMENTAL PRACTICES



AUDITOR INSPECTING THE GREEN IMPACT OF INSTITUTION



AUDITING BY OFFICERS FOR GREEN AUDIT



  
12/05/24  
Principal  
Government Arts & Science College  
Sathyamangalam  
Erode District.



# REPORT OF GREEN AUDIT



*[Handwritten Signature]*  
12/04/2023  
Principal  
Government Arts & Science College  
Sathyamangalam  
Erode District.

*Submitted by*

THE EXPERT TEAM, GREEN AUDIT  
GOVERNMENT ARTS AND SCIENCE COLLEGE  
SATHYAMANGALAM.

*Date of Audit: 12.04.2023 (Wednesday)*

*Submitted to*

THE PRINCIPAL  
GOVERNMENT ARTS AND SCIENCE COLLEGE  
SATHYAMANGALAM.

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## **1. About the College**

Government Arts and Science College, Sathyamangalam, affiliated to Bharathiar University, Coimbatore, was established in the year 2016. It is situated in the outskirts of Sathyamangalam, spread over an area of 8 acres. The College is recognized with 2(f) and 12(B) of the UGC Act 1956.

The college was started with 3 UG degree programmes in Commerce, Economics and English with a total strength of 180 students. Currently, it functions with a total of 10 UG degree programmes in Botany, Mathematics, Computer Science, Computer Application, Business Administration, Visual Communication, Physics and Chemistry as additional courses and around 1300 students as its strength.

The campus, situated in the midst of lush greenery, hosts two storey building, with 10 well-ventilated classrooms, 6 state-of-the-art computer and science labs, a well-equipped library with INFLIBNET facility, a conference hall and a cafeteria. The campus is Wi-Fi enabled; the water is purified with RO technology and has separate parking facilities for the staff members and the students. The college is well-equipped with good quality infrastructure for academics as well as extra- curricular and co-curricular activities like NSS, YRC, RRC and Yoga for multidimensional approach.

## **2. About Botanical Garden**

The Government Arts and Science College is established to provide knowledge & educational facilities to the students of rural and urban areas. Since opening of the college our staff is dedicated to motivate the people of this area to increase their agricultural knowledge and social upliftments.

The college Botanical Garden was established according to needs of students' academicians, environmental studies and society from June 2022. Since, 2022 we are continuously planting phytogeographic, endemic, medicinal and rare plants. So today we have collection of number of plants in our garden. For achieving the aims and objectives of botanical garden we are conducting environmental awareness programme, tree plantation, plant relies and delivered lectures for rural society. The Botanic garden was systematically planned in the presence of principal and NSS volunteers. Botanical garden present in front of main building. Various plant species are planned to increase aesthetic sense. Our future plan is to establish Cactus Polyhouse, sectors to grow rare, endemic, endangered threatened plants.

### 3. Objectives of Green Campus

The development of urban area due to the necessity of increased population reduces the green coverage of our natural environment. Growing tree species wherever possible not only provides a healthy life style for human population but also acts as a habitat for other species of plants and animals that is vital for the living environment. To promote environmental sustainability within the institution by implementing eco-friendly practices, reducing carbon foot print and fostering a culture of environmental awareness among students and staff.

**The objectives of maintaining green covering of the campus are**

- Providing a healthy environment in college campus.
- Create awareness in people about biodiversity conservation and sustainable utilization.
- Enhancing the awareness towards ecosystem and environment protection.
- Making the students to study the species of various plants.
- Reducing the noise and air pollution.



### 4. Number of plants and important plant species of College Campus

#### 4.1 Number of species in the premises

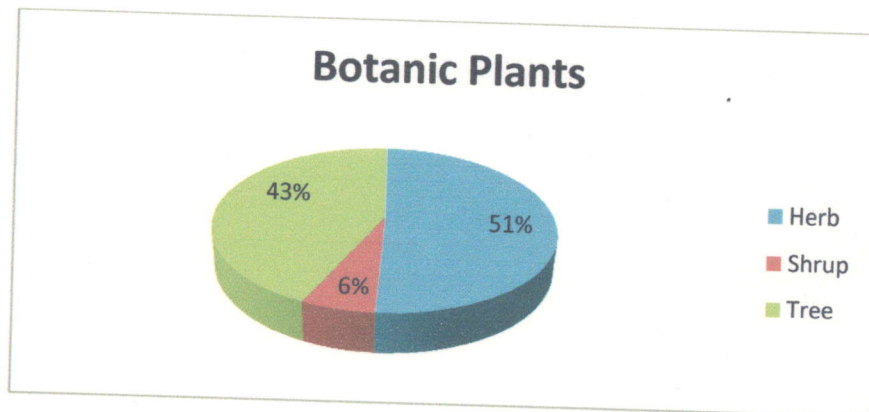
A total of 257 individuals of different plant species belonging to 20 families are planted and nurtured in the college premises. Genetic diversity is conserved in the botanical garden by nurturing herbs, shrubs and various trees that possess medicinal and ornamental values. The collection has varied species such as herb, shrub, tree, climbers, epiphytes etc. The details of plants species such as their botanical name, local and common names and corresponding families are given in above table.

**Table 1: List of plants species present in the college premises**

S. No.	Botanical Name	Common Name	Family	Habit	Total
1	<i>Albizia lebbbeck</i>	Siris Tree	Fabaceae	Tree	5
2	<i>Azadirachta indica</i>	Neem Tree	Meliaceae	Tree	30
3	<i>Arachis hypogaea</i>	Groundnut	Fabaceae	Herb	10
4	<i>Andrographis paniculata</i>	Green Chiretta	Acanthaceae	Herb	5
5	<i>Annona squamosa</i>	Custard apple	Annonaceae	Tree	2
6	<i>Butea monosperma</i>	Flame of the Forest	Fabaceae	Tree	7
7	<i>Calotropis procera</i>	Sodom apple	Euphorbiaceae	Herb	20
8	<i>Carica papaya</i>	papaya	Caricaceae	Tree	2
9	<i>Centella asiatica</i>	Indian pennywort	Apiaceae	Herb	15
10	<i>Euphorbia hirta</i>	S purge	Euphorbiaceae	Herb	35
11	<i>Lannea coromandelica</i>	India ash tree	Anacardiaceae	Tree	8
12	<i>Mimusops elengi</i>	Spanish Cherry	Sapotaceae	Tree	5
13	<i>Muntingia calabura</i>	CottonCandy Berry	Muntingiaceae	Herb	6
14	<i>Manilkara hexandra</i>	Khirni fruit	Sapotaceae	Tree	1
15	<i>Morinda coreia</i>	Indian Mulberry	Rubiaceae	Tree	2
16	<i>Mimosa pudica</i>	Touch me-not	Mimosaceae	Herb	19
17	<i>Pongamia pinnata</i>	Indian Beech Tree, Pongame Oil Tree	Fabaceae	Tree	6
18	<i>Phyllanthus emblica</i>	Gooseberry	Phyllanthaceae	Tree	2
19	<i>Psidium guajava</i>	Guava	Myrtaceae	Tree	5
20	<i>Rosa chinensis</i>	Deccenhemp	Malvaceae	Shrup	15
21	<i>Syzygium cumini</i>	Java Plum	Myrtaceae	Tree	6
22	<i>Saraca asoca</i>	Chit'sorrow,	Fabaceae	Tree	3
23	<i>Tectona grandis</i>	Teak	Lamiaceae	Tree	9
24	<i>Thespesia populnea</i>	Portia tree	Malvaceae	Tree	15

25	<i>Tamarindus indica</i>	Tamarind Tree	Fabaceae	Tree	2
26	<i>Tribulus terrestris</i>	Puncture vine	Zygophyllaceae	Herb	20
27	<i>Vitex negundo</i>	Five - Leaved chaste Tree	Verbenaceae	Tree	3
<b>Total</b>					<b>257</b>

#### 4.2 Proportion of plants in the campus based on the habitats



There are important medicinal herbs like *Catharanthus roseus*, *Ocimum sanctum*, *O. basilicum*, *Solanum trilobatum*, *Centella asiatica*, *Anisomelous malabarica*, *Coleus aromaticus* and *Bryophyllaum pinnatum* are grown and maintain in the college. Shrubs such as *Morinda tinctoria*, *Datura metal*, *Abutilon indicum*, *Vitex negundo*, *Tecoma stans*, *Ixora coccinea*, *Crotans*, *Nerium olendar* and climbers like *Clitoria ternatea* are also available in the college campus. Important tree species that are available in the premises are *Ficus religiosa*, *Ficus benghalensis*, *Acacia leucophloea*, *A.auriculiformis*, *Melia dubia*, *Delonix elata*, *D. regia* and *Terminalia catappa*.



*Azadirachta indica* (Vembu)



*Senna auriculata* (Avarampoo)



*Ficus religiosa* (Arasamaram)



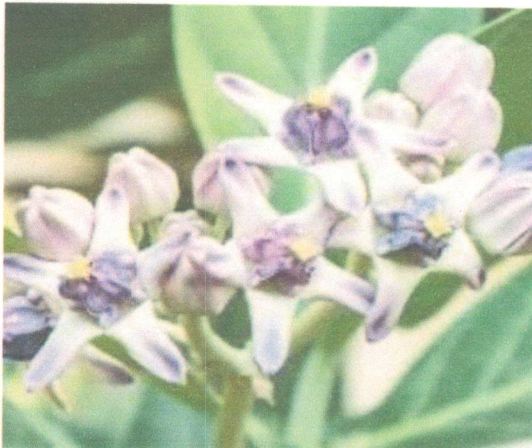
*Catharanthus roseus* (Nithyakalyani)



*Pongamia pinnata* (Pungai tree)



*Andrographis paniculata* (Nilavembu)



*Calotropis gigantea* (Erukku)



*Clitoria ternatea* (Sangu Poo)



*Andrographis echiioides* (Kopurathanki)



*Achyranthes aspera* (Nayuruvi)



*Albizia lebbek* (Vagai Tree)



*Sida cordifolia* (Sidamutti)

Many of the culinary herbs and spices have been used as medicines, from prehistoric times. Spices have been used partly to counter food spoilage bacteria, especially in hot climates and Angiosperms (flowering plants) were the original source of most plant medicines. Human beings are not the only entity to use plants as medicines such as nettle, dandelion and chickweed.

#### 4.3 Number of species in the Botanical Garden (Herbal)

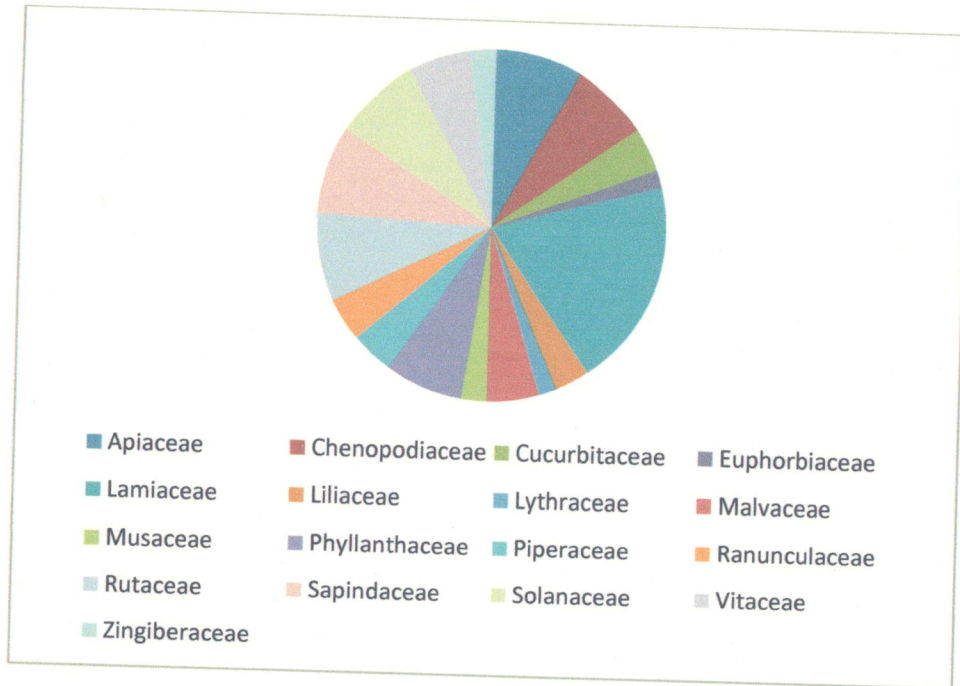
Wide ranges of plants are maintained in the botanical garden of our college. These different species are represented by a total of 18 different families. The details such as botanical name, local and common names and corresponding families of plants nurtured in the garden are listed out and given in Table 2.



**Table 2: List of plants species present in the College Botanical Garden**

BOTANICAL NAME	COMMON NAME	FAMILY	TOTAL
<i>Phyllanthus Niruri</i>	Keelanelli	Phyllanthaceae	9
<i>Citrus limon</i>	Lemon	Rutaceae	2
<i>Cissus quadrangularis</i>	Pirandai	Vitaceae	7
<i>Coleus amboinicus</i>	Karapuravalli	Lamiaceae	7
<i>Musa x paradisiaca</i>	Banana	Musaceae	3
<i>Hibiscus rosasinensis</i>	chembaruthi	Malvaceae	6
<i>Mentha spicata</i>	pudina	Lamiaceae	5
<i>Ocimum Sanctum</i>	Tulsi	Lamiaceae	5
<i>Lawsonia inermis</i>	Maruthani	Lythraceae	2
<i>Murraya koenigii</i>	Karuvepilai	Rutaceae	8
<i>Ocimum basilicum</i>	Thirineetru pachilai	Lamiaceae	5
<i>Centella asiatica</i>	Vallarai	Apiaceae	10
<i>Solanum trilobatum</i>	Thuthuvalai	Solanaceae	5
<i>Nigella sativa</i>	Kolanji	Ranunculaceae	5
<i>Phyllanthus emblica</i>	Nelli	Euphorbiaceae	2
<i>Spinacia oleracea</i>	Palak keerai	Chenopodiaceae	10
<i>Cardiospermum halicacabum</i>	Mudakkathan keerai	Sapindaceae	9
<i>Aloe barbadensis</i>	Sotru katralai	Liliaceae	4
<i>Vitex negundo</i>	Nochi	Lamiaceae	2
<i>Piper betle</i>	Vettilai	Piperaceae	5
<i>Cymbapogan citratus</i>	Lemon grass	Zingiberaceae	1
<i>Curcuma longa</i>	Turmeric	Zingiberaceae	2
<i>Solanum nigrum</i>	Manatthakkali keerai	Solanaceae	5
<i>Coccinia indica</i>	kovakkai	Cucurbitaceae	5
Total			124

#### 4.4 Major Plant families and important plant species of Botanical Garden



Herbal Plants in Our Botanical Garden

#### 4.5. Waste Management System

Our Institution has a deep concern to protect the environment, health and well-being through implementation of effective waste management practices such as segregation, recycling, and composting. Our house keeping staff and sweepers help in segregation of waste. Awareness programs are also conducted for preventing waste generation and its management.

##### 4.5.1 Solid Waste Management

The leaf litter collected from various locations within the campus was dumped in the decomposition pit. The dimension of decomposition pit was 4 X 4 X 2 ft. On average, 1 to 2 kilogram of leaf litter were collected particularly during the leaf-fall season. The leaf litter was decomposed using cow dung. The composted materials were stirred at frequent intervals. This was being done to avoid partial degradation of the solid waste materials.

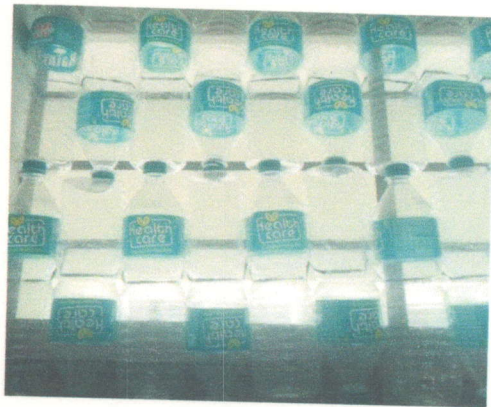
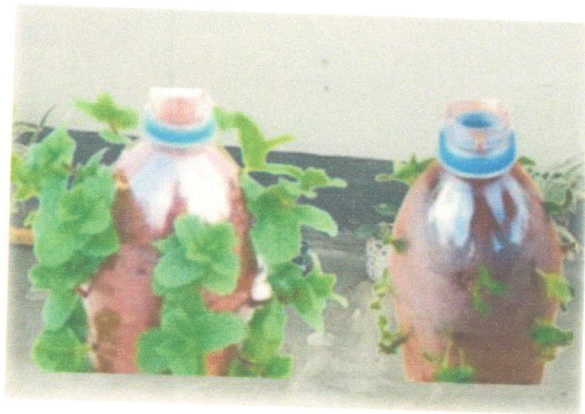
This is how we effectively decompose the solid waste in a sustainable manner. Again it used for trees as a green manure. The green manure is beneficial for soil as it adds organic matter to the soil. It acts mainly as soil-acidifying matter. The increased percentage of organic matter improves water infiltration and retention, aeration and other soil characteristics.

##### 4.5.2 Plastic Waste Recycling System (PWRS)

Our college has hired the services of Plastic Waste Recycling System for recycling of plastic and paper waste. The institution picks up the waste from our facility and sends it to the village panchayat for recycling and also our students create some useful things by using this plastic items like flower pot etc.



Sending Plastic and Paper waste to Recycling to the Village Panchayat



Students created flower pots and other items using plastic bottles

#### 5. Maintenance of plants and green coverage

The plants of the campus are maintained by Eco club, students and faculties of department of Botany and also other student and staff volunteers of our college. Enough water is supplied by the college for the maintenance of the plant species. In addition to this, our college has proper rain water harvesting system, which enables the storage and usage of rain water for water purpose also.

## 6. Outcome of maintaining greening in Campus


The plant diversity of the college premises and botanical garden of our college provides a considerable biodiversity and great green coverage. The major outcomes from this are

- About 1200 students benefitted by visiting this rich biodiversity of the campus during environmental study field visit.
- Created awareness among students, their parents, faculties and staff member on Green and Clean environment.
- Sequestration of CO<sub>2</sub> level and reduced noise pollution inside the college campus.
- Enhanced ecosystem development and management.


### Conclusion :

Considering a good impact on the green campus maintained by the institution crossing the social and environmental hurdles, it is categorized under a good phytogeographic surrounding. With a vast no of medicinal value plants in and around the campus provides a good practical knowledge for the students. The Institution with a high motto of concerning nature with effective waste management practices is inculcated to the students too.

The collection of plants has varied species such as herb, shrub, tree, climbers, epiphytes and the details of plants species such as their botanical name, local and common names and corresponding families are given in the format. The students were personally involved in maintaining the campus green and the institution and teachers are putting efforts to maintain it as the same. At enhancing the biodiversity in the campus it is advised to motivate the students to put more interest in protecting the environment as well relating the curriculum with the view of nurturing the nature.

  
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