



SREE NARAYANA COLLEGE KANNUR

ACCREDITED BY NAAC WITH 'A' GRADE (AFFILIATED TO KANNUR UNIVERSITY)

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7.1.3: Quality Audits on Environment and Energy regularly undertaken by the Institution.



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**Audit Report of
Green Audit/Environment Audit and Energy Audit**



SREE NARAYANA COLLEGE, KANNUR



Environment Audit Report

(Green audit, Energy audit & Water audit)
(Assessment Year 2021-2022)

Prepared & submitted by



Department of Environmental Studies
Kannur University
Mangattuparamba campus, Kannur - 670567

MARCH 2022



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KANNUR UNIVERSITY

(NAAC Accredited with B grade)

DEPARTMENT OF ENVIRONMENTAL STUDIES

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CERTIFICATE

*This is certified that this **Environment Audit Report** (Green audit, Energy audit and Water audit) submitted to the Sree Narayana College, Kannur is an authentic report of Environmental audit done by the Audit Team of the Department of Environmental Studies of Kannur University at Sree Narayana College, Kannur during the period from 22nd to 27th March 2022.*

Dr. Pradeepan Periyat

HEAD
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Place: Mangattuparamba

Date: 30/03/2022





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Certificate for Lead Auditor of Environment Management Audits



This is to certify that **Dr. A. Thangavelu**, Assistant Professor, Department of Environmental Studies, Kannur University, Mangattuparmaba Campus Kannur- 670 567, Kerala is appointed as a 'Lead Auditor of Environment Management Audits' of the Nature Science Foundation, Coimbatore, Tamil Nadu, India. The service extended by the Lead Auditor to the noble cause of environmental protection and nature conservation is extremely solicited.

It is valid upto 31st December 2026

Motto of NSF

'Save the Nature to Save the Future' & 'Go Green to Save the Planet'

Р. 114.

Chairman

Nature Science Foundation

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Joint Director

Certified Lead Eco Auditor

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Certified Auditor IGBC AP

Indian Green Building Council

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Certified BEE Auditor

Bureau of Energy Efficiency

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CONTENTS

Chapter No.	Title	Page No.
I	INTRODUCTION	1
II	ENVIRONMENT AUDIT	14
III	GREEN AUDIT	19
IV	ENERGY AUDIT	30
V	WATER AND WASTE AUDIT	38
VI	CONSOLIDATED STATEMENT OF AUDIT FINDINGS	45
VII	CONCLUSION AND RECOMMENDATIONS	47

Chapter I

INTRODUCTION

I.1. Sree Narayana College, Kannur – at a glance:

Sree Narayana College, Kannur is one of the biggest institutions of higher education in Kannur District. The Sree Narayana Trusts, Kollam, established the college in honor of His Holiness Sree Narayana Guru, the great saint and social reformer of Kerala. The late Sri. R. Sankar, the founder manager, took the lead in establishing a group of establishments under the name Sree Narayana Guru. On July 6, 1960, the late R. Sankar, the then Kerala chief minister, formally inaugurated this college. From being a junior college, it has developed into a fully functional post-graduate institution with research centers connected to its graduate programs in chemistry, commerce, and zoology. Nearly two thousand students receive education at the undergraduate and graduate levels in a variety of arts, science, and commerce streams from this Kannur University affiliated college.

This college is located near Thottada, on a tranquil twenty-acre campus named "Govardhan Giri," approximately six kilometers south of Kannur town. The late Haridas Govardhandas Khimji gave Govardhan Giri for this purpose. To handle its immediate requirements, the college has a Regional Development Council (R.D.C.) led by a president. Successive R.D.Cs. have contributed significantly to the enhancement of the college's numerous infrastructure facilities. Over the course of its many years of functioning, the institution has been able to significantly contribute to the social, cultural, and educational advancement of the home district. Owing to the efforts of its students, faculty, and patrons, the college has established a reputation for exceptional achievement in both its extracurricular and academic programs.

GOVERNING BODY OF THE COLLEGE

1. **DR. M.N. SOMAN (Chairman)**
2. **MR. VELLAPPALLY NATESAN (Gen. Secretary)**
3. **MR. V.N. THUSHAR**
4. **DR. G. JAYADEVAN**
5. **MR. AJI. S.R.M**
6. **MR. MOHAN SANKAR M.**
7. **MR. N. RAJENDRAN**
8. **MR. K. PADMAKUMAR**
9. **MR. A. SOMARAJAN**
10. **MR. K.R. GOPINATHAN**
11. **MR. P.M. RAVEENDRAN**
12. **MR. SANTHOSH ARAYAKKANDI**
13. **MR. MELAMKODU SUDHAKARAN**

Sree Narayana College, Kannur

COLLEGE EMBLEM



The emblem of Sree Narayana College, Kannur, reflects the institution's dedication to the teachings and philosophy of Sree Narayana Guru. It typically includes symbols that represent purity, enlightenment, knowledge, and wisdom. These elements are designed to inspire students and staff to pursue education and personal growth, in line with the Guru's vision of social equality and progress through education.

I.2. Vision and Mission of the College

Vision

To attain the noble notion of equality based on human dignity and practice the ideal of "Enlightenment through Education" as advocated by Sree Narayana Guru.

Mission

- ❖ Promote Education: To provide quality education to all sections of society, especially the underprivileged, and empower them to achieve their full potential.
- ❖ Foster Equality: To uphold the values of equality and social justice, ensuring that education serves as a tool for social transformation.
- ❖ Encourage Research: To foster a spirit of inquiry and innovation through research and development activities.
- ❖ Holistic Development: To focus on the overall development of students, including their intellectual, moral, and physical growth.

I.3. Specific Objectives of the College

- To attain the noble notion of equality based on human dignity and thus practice the ideal "Enlightenment through Education", of the great sage, seer and philosopher, Sree Narayana Guru, on, whose name the college is founded.
- To continuously involve in the process of removing the disparities based on race, religion and caste through greater participation of the minorities and the backward communities in the mainstream of formal education as propounded by Sree Narayana Guru.
- To act as the nucleus center for higher education in the district of Kannur and thus share the efforts of the State towards removing the social, economic and cultural backwardness of the home district.
- To remove the social inequalities among people and to uplift the economically and socially downtrodden, by providing them the facility of higher education.
- To transform the students into knowledgeable, competent, socially committed and honest citizens of the motherland by inculcating the spirit of scientific temper and analytical thinking which enable them to take up the challenges of life.
- To provide competitive and quality education and to inspire scholastic and aesthetic talents of the students for empowering them to seek gainful employment.
- To realize and honour human values, justice and universal brotherhood and thus provide value-based education for the mental advancement of the students.
- To provide a healthy and peaceful atmosphere for the maximum output in the fields of learning, teaching, research and extension.

Motto

The motto of Sree Narayana College, Kannur, is inspired by the teachings of Sree Narayana Guru. It embodies the principle of "**One Caste, One Religion, and One God for man**". This motto reflects the college's commitment to promoting social equality, unity, and the pursuit of knowledge for all.

Programmes offered by the College

Programmes	Sanctioned Strength
A) UNDERGRADUATE COURSES (6 SEMESTERS)	
1. B. A. English (Cultural History of England & Intellectual History of Modern World- Complementary)	156
2. B. A. Economics (Indian History & Political Science - Complementary)	186
3. B. A. Malayalam (Sanskrit –Complementary)	171
4. B. A. History (Tourism & Political Science – Complementary)	194
5. B. B. A. (Economics, Statistics and Information Technology – Complementary)	273
6. B. Sc. Physics (Chemistry & Mathematics – Complementary)	142
7. B. Sc. Zoology (Botany & Chemistry - Complementary)	97
8. B. Sc. Microbiology (Zoology & Chemistry – Complementary)	117
9. B. Sc. Mathematics (Statistics & Physics – Complementary)	157
10. B. Sc. Botany (Zoology & Chemistry – Complementary)	111
11. B. Sc. Chemistry (Zoology & Chemistry – Complementary)	144
12. B. Com (Statistics & Law – Complementary)	179
B) POST GRADUATE COURSES (4 SEMESTERS)	
1. M. A. English	31
2. M. A. Economics	44
3. M. Sc. Chemistry	24
4. M. Sc. Physics	33
5. M. Sc. Zoology	34
6. M.Sc. Mathematics	34
7. M. Com. Accountancy and Finance	38

I.4.Total Campus Area and Built-up Area:

Sree Narayana College, Kannur			
Location	Total campus area in acres	Built up area and others in square meters	
Urban	20.35	Total Built up Area	12632.57
		Total Green Area	7508.30
		Library	962.28
		Canteen	163.14
		Hostel	11695.41

I.5. Infrastructure facilities of the college:

1. Library and Reading Room: Library and reading room are the heart of Sree Narayana College, Kannur, slated to serve the educational, informational and research requirements of the faculty, students and researchers of the college. The computerized Central Library caters to the needs of the entire student community, research scholars and staff (both Teaching and Non-Teaching) of the college. The General library is housed in a separate block with an approximate build up area of 3840 sq. ft spread over two floors of the Jubilee Building of the college. The ground floor houses the general library section and reference and reading room are accommodated in the first floor. The library functions from 9 am to 5 pm on all working days, including Saturdays and also during vacations. The library possesses a rich collection of 48063 books, 30 journals and 20 periodicals/dailies, kept in an organized manner and displayed in the library. It also has a video library of NPTEL courses having a total capacity of 8 TB. The library also stores bound columns of Journals and CDs. In addition, the library also has a separate collection of books for competitive examinations.

Since 2011, all of the library's operations have been automated with Grandha Soft, developed by Grandha Associates, Pathanamthitta. The library is now using the upgraded version. The software includes modules such as Acquisition, Data Entry (in Malayalam and English), Circulation, DDC 23rd Edition English and Malayalam categorization, Dues Calculation, Stock Verification, and OPAC (Online Public Access Catalogue). Bibliographical information on the materials and their availability in the library is provided by the Computerized Catalogue Service, which makes searching and obtaining books and journals quick and simple. There are five terminals available for this facility. The web OPAC will help the users to search books available in the library without coming to the library.



Fig 1. General Library of Sree Narayana College, Kannur

2. Hostel: Sree Narayana College, Kannur offers a well-equipped hostel for girls close to the campus to ensure that they live in a healthy atmosphere free from barriers to learning and growth. There are two hostels for girls that can accommodate a combined total of 120 students. A chief matron is in charge of running the hostel. Every room is equipped with plenty of amenities, giving students a comfortable and cozy atmosphere. First -come, first-served policy governs the assignment of hostel rooms. Breakfast, lunch, supper, and evening drinks are served at the hostel mess. The mess committee regularly checks the food served in the mess for quality and cleanliness.



Fig 2. Ladies Hostel of Sree Narayana College, Kannur

3. Computer Centre: The college offers four computer centers with 110 computers, the majority of which have LAN capabilities and fiber optic 10MBPS internet connectivity. To fulfill the needs of the entire campus community, computer laboratories also provide printer and scanner facilities. The staff and students are assisted in using these services by the computer assistant. Five well-equipped PCs with internet access are part of the computerized central library. Additionally, computers with internet access, printers, and scanners are available in every departmental staff area. The school offers computer facilities, LCD projectors, over-head projectors, and smart boards for ICT-enabled teaching. Moreover, audiovisual tools are employed in teaching. Furthermore, seminar halls are frequently used for educational purposes.



Fig 3. Computer lab of Sree Narayana College, Kannur

4. Student Gymnasium: The aim of the gymnasium is to promote sports activities and the general health of the students participating in sports and games. It is connected to the physical education department and furnished with body building equipments.



Fig 4. Gymnasium present in the campus

5. Seminar Halls & Auditorium: A well-arranged auditorium is situated in the college in a separate block with a seating capacity of 1000. Audio Visual facility is available in the auditorium. Acoustics are properly maintained and balcony seating is arranged in the room. Auditorium stage is equipped with light and sound arrangements.

Three seminar halls are present in the campus. Seminar Hall-I is air conditioned, accommodating 120 seats with audio visual and LCD projection facilities with toilets at a nearby point. Seminar Hall-II accommodates 60 seats with Audio visual and LCD projection facilities. Seminar Hall – III involves 80 seats with Audio visual and LCD projection facilities in Economics Department.



Fig 5. Auditorium and Seminar Hall in the campus

6. IQAC: Sree Narayana College Kannur has established an Internal Quality Assurance Cell (IQAC) as a continuous post-accreditation quality sustenance measure for the enhancement and sustenance of quality in higher education. The IQAC is integrated into the institution's system and embodies commitment to performance evaluation, assessment, and accreditation. An IQAC room is present in the college to organise and schedule matters related to IQAC.



Fig 6. IQAC Room of Sree Narayana College, Kannur

7. Faculty: Teachers are qualified and knowledgeable so that the students can catch up easily. College has 87 faculty members and 10 non-teaching staff. Among the full-time faculty members, 27 have obtained their Ph.D. Apart from Ph.D. holders, 16 faculty members possess M.Phil. Degree. Some of the teachers have recognized as research supervisors by the Kannur University.

8. College Canteen: The College runs a canteen inside the campus. Students and staff are provided food at concessional rates.

9. Reprographic Centre: Reprographic centre is functioning in the college. It is equipped with photostat machines. Printing facility is available in the Reprographic Centre.

10. Student Co-operative Store: A student's co-operative store is functioning in the college to help the students to procure their text books, note books, record books, stationery etc. at a comparatively low price.

11. Staff Co-operative Society: A staff Co-operative Society is functioning in the college to offer ordinary banking facilities to the members.

12. Sports: The record of achievements of the Department of Physical Education forms one of the biggest strengths of the college through the last five decades. The college has been

consistently and progressively maintaining and bettering its track record in the field of sports and games at both intercollegiate and interuniversity levels by producing a number of achievers at state and national events.

Facility	No	Description
Facilities for Sports, Indoor and Outdoor games		
Football Field	1	100m X 70m outdoor Football and Hockey Field, established in 1970
Basketball Court	1	Well-furnished 32m X 18m outdoor Basketball court near the college main gate, established in 2013
Shuttle badminton Court	1	18m X 10m indoor shuttle badminton court inside college auditorium, established in 2001
Ball badminton Court	1	28m X 12m Ball badminton court near the college main gate, established in 2013
Table Tennis Arena	2	One Table tennis arena in college auditorium and the other is near to Physical education department established in 2000
Wrestling Arena	1	Indoor Wrestling arena of area 64m ² , with 40 numbers of wrestling mattresses, established in 2000
Gymnasium	1	Gymnasium of area 64m ² with all kinds of weight training equipments, established in 2014
Rest room for girls	1	Rest room for girls with attached toilet of area 28m ² near Physical education department
Indoor Stadium	1	UGC funded indoor stadium of size 36m X 24m X 12.5m

I.6. DETAILS OF BUILDINGS

Particulars	No. of rooms available	Dimensions (Sq. meter)
1. Classrooms	30	70
	21	60
2. Lecture/Seminar Halls		
◆ Conference Hall	3	140
Auditorium	1	800
3. Staff/Department Rooms		
◆ Botany	2	40
◆ BBA	1	50
◆ Commerce	2	50
◆ Chemistry	2	50
◆ Economics	2	50
◆ English	2	50
◆ History	1	40
◆ Malayalam	2	40
◆ Mathematics	2	40
◆ Microbiology	1	50
◆ Physics	2	50
◆ Zoology	1	800
4. Principal's Room	1	75
5. Office Room	1	220
6. Lab facilities		
◆ Zoology Lab	4	225
◆ Botany Lab	1	200
◆ Physics Lab	2	220
◆ Chemistry Lab	3	220
◆ Microbiology Lab	1	200
◆ Research Lab	5	200
7. Library	1	350
8. Computer Lab	3	200
◆ Computer Lab		
9. Other Room Facilities		
◆ Research Room	5	200
◆ Lecture Hall		

◆ Reprographic Centre		
◆ Photostat Centre	1	60
◆ NCC Room	1	25
◆ NSS Room	1	25
◆ IQAC	1	150
10. Toiletries		
◆ Student's Washroom (Boys) (Department)	3	60
◆ Girls Toilet	3	60
◆ Girls Room	1	60
◆ Department Toilets	12	50
◆ For Disabled	1	50
◆ For Staff	3	50
◆ Girls Room Wash Area	1	50

I.7. College rules

- Attendance will be taken at the beginning of each class. Absence during one period in the FN will be counted as absence in the FN session and absence in one period in the AN will be counted as absence in AN session.
- No student will be allowed to leave the class during class hours without the permission of the Head of the Institution.
- Students are expected to be cleanly and suitably dressed in their class as well as at any gathering within the college premises. Students should observe strict modesty in dress.
- Students shall always behave, with dignity and courtesy.
- As discipline is highly essential for the smooth working of the college, each and every student shall maintain it at any cost.
- Loitering through the corridors, hooting in the class rooms and other undesirable activities which disturb the calm atmosphere of the college are strictly forbidden.
- Absolute obedience is expected from every student. If any one tries to defy the authority of the principal or any teacher, he/she will be punished.
- Smoking is strictly prohibited in the college campus
- Students are forbidden to participate in any meeting or agitation directed against the authority of the Government or the college.
- No meeting or entertainments shall be organised or any fund collected in the college or hostel without the permission of the Principal.
- No student shall join or work for any organisation outside the college without the permission of the Principal.

- No student shall disfigure the walls and windows or furniture by writing on them. If any student damages or destroys any college property he/she will have to pay the cost of repair.
- Students who have no class to attend at any particular hour should remain in the reading room.
- Women students in particular, should not remain in class room when they have no class. They may proceed to the girls room or the library.
- Every student is expected to take part in one or more of the games for which facilities are provided by the college.
- Identity Cards:- All students admitted to the college shall keep with them their identity cards, with recent passport size photograph, duly attested by the Principal. All payments, issue of certificates etc. will be made to the students only on production of their identity card.
- Any tampering or disfiguring made on identity cards will be considered as a serious offence. Such identity cards will be cancelled and no new cards will be issued. The identity card shall be surrendered in the office at the time of issue of transfer certificate or on the completion of the course whichever is earlier.
- Hostel: No student will be allowed to stay out of the hostel after 6.30 p.m. except with the special permission of the resident tutor.
- If any student violates the rules and regulation stated above the Principal has absolute authority to expell him/her from the college.
- Use of mobile phones on college campus is strictly prohibited. It is a punishable offence as per court orders.
- All students shall wear the identity tag provided by the college in the college campus.

Chapter II

ENVIRONMENT AUDIT

II.1. Environment audit:

Environment audit is a method of assessing an organization's activities that is systematic, recorded, repeated, and objective and services in relation to:

- Assessing compliance with relevant statutory and internal requirements
- Controlling environmental activities under management is simplified.
- Promoting good environmental management
- Maintaining credibility with the public
- Raising staff awareness and enforcing commitment to departmental environmental policy
- Exploring improvement opportunities
- Establishing the performance baseline for developing an Environmental Management System

Conducting a green audit is no longer an option but a sound precaution and a proactive measure in today's heavily regulated environment. Indeed, evidence suggests that Environmental Audit has a valuable role to play, encouraging systematic incorporation of environmental perspectives into many aspects of an organization's overall operation, helping to trigger new awareness and new priorities in policies and practices.

The Green Auditing completed at Sree Narayana College is an innovative approach towards empowering the students and teachers in order to improve the existing environmental conditions in and around their campus. The main intention of the programme was to assess the existing biodiversity and natural resource (energy & water) management of the campus through active participation of the institutional community. The conservation of Natural resource through a participatory approach is the main agenda of Environment Auditing, which will make the community more aware about the nature and natural resources. Environment auditing involved the assessment of different components of the campus like Energy, Water, Biodiversity and Waste. The college which has undergone the proposed Environment auditing requires the assistance of any of the experts for biodiversity studies, natural resource management, energy conservation activities, etc.

Scope and Goals of Environment Auditing:

Green audit serves as a means to identify opportunities to sustainable development practices, enhance environmental quality, improve health, hygiene and safety, reduce liabilities and save money and achieve values of virtue. Environmental audits can be a highly valuable tool for colleges in a wide range of ways to improve their environmental and economic performance and reputation while reducing wastage and operating costs. Once baseline data is prepared after the auditing process, the data can serve as a point of departure for further action in campus greening.

Aim:

To conduct Environment Audit (Green audit, Energy audit and Water audit) of Sree Narayana College, Kannur so as to assess the environmental consciousness of college community.

II.2. General and Specific Objectives of Green Auditing

The general objective of green audit is to prepare a baseline report on biodiversity and other resources, measures to mitigate resource wastage and improve resource quality and sustainable practices.

The specific objectives are:

- To prepare a checklist of flora and fauna diversity in and around the College campus.
- To suggest measures to improve biodiversity within the campus.
- To monitor the energy consumption pattern of the College
- To assess the quantity of water usage within the College campuses.
- To suggest sustainable energy usage and water conservation practices.
- To find out various sources of organic and solid waste generation and mitigation possibilities.
- To inculcate values of sustainable development practices through green audit process.
- To assess the water usage, energy consumption, and waste management of the campus.
- To assess the selected flora and fauna of the campus.
- To create awareness among the University community.

- Verification of legislative and regulatory compliance.
- Assessment of internal policy and procedural conformance.
- Establishment of current practice status.

Areas of audit:

Areas of audit encompassed of:

- ❖ Material management, savings and alternatives.
- ❖ Energy management and savings.
- ❖ Water management and economy of use.
- ❖ Waste generation, management and disposal.
- ❖ Noise reduction, evaluation and control (internal and external).
- ❖ Air emissions and indoor air quality.
- ❖ Environmental emergency prevention and preparedness.
- ❖ Transportation and travelling practices.
- ❖ Staff awareness, participation and training in environmental issues.
- ❖ Environmental information publicity.
- ❖ Public enquiry and complaints response.

Procedure:

An environmental audit is typically undertaken in three phases:

- Pre-audit
- On-site audit and
- Post-audit

Each of these phases comprises a number of clearly defined objectives, with each objective to be achieved through specific actions, and these actions yield results in the form of outputs at the end of each phase. During the initial stage of the programme, training was conducted for the college, which included teaching and non-teaching staff, representatives of the syndicate, and students.

II.3. Target Areas of Environment Auditing

- **Green Audit**

All plant and animal species including humans are linked together in a complex web of life; we depend upon biodiversity for our survival. Biodiversity is the key to healthy ecosystems and ultimately a healthy planet. It keeps the air and water clean, regulates our climate and provides us with food, shelter, clothing, medicine and other useful products. Each part within this complex web diminishes a little when one part weakens or disappears.

The trees work hard to keep the air we breathe clean and healthy. Their leaves take in much of the poisonous unwanted carbon dioxide in the air and replace it with the oxygen we need for healthy living. In this process, the plants with the help of sunlight, water, minerals and the green material called Chlorophyll within the leaves change the carbon-dioxide into food for themselves. When doing this they release oxygen into the air which is vital for all life on earth. The roots of trees dig deep into the earth and hold it together so that the rain and wind cannot wash or blow it away. This is very important as the earth has only a very thin layer of fertile soil covering it.

The audit was focused to survey for biodiversity of flora and fauna within the campus. This was helped to quantify the area covered by vegetation and to assess the amount and diversity of habitats. Through the survey the students and faculties get encouraged to device strategies to increase the level of biodiversity in their campus.

- **Energy Audit**

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

Energy audit was carried out by the audit team in order to assess the energy usage pattern in the college. The purpose of an energy audit is to account for consumption and recommend where savings are possible. The audit typically involved data collection and review, in that equipment survey and system measurements are also collected. Equipment survey helped to understand the system functioning, efficiency can be estimated. During the auditing, the meter readings were recorded and along with that the hours of usage were also noted. The data collected includes total monthly use in units, total cost per month, number of students and other staff on each campus, etc. which was helped to determine the daily usage of

energy per person, daily cost, etc.

- **Water Audit**

This indicator addresses water consumption, water sources, irrigation, stormwater, 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.

A water audit was conducted in order to assess the daily water usage pattern in the college. Through this we have also measured the water wastage in the campus; this can be used for improving the equipments and its maintenance.

- **Biodegradable and hazardous Waste Audit**

This indicator addresses biodegradable waste from campus and hostel canteen, paper waste, hazardous waste of laboratories and worn-out electric & electronic goods, and plastic wastes. Hazardous materials represent significant risks to human health and ecological integrity. Hazardous wastes are also leached out through the e-waste generated on the campus. They often persist in the environment leaving a legacy of land and water contamination for generations. They also accumulate in the tissues of organisms and become concentrated within food chains, leading to cancer, endocrine disruption, birth defects, and other tragedies. The minimization, safe handling, and ultimate elimination of these materials are essential for the safety of the environment.

A waste audit was conducted to assess the amount of waste generated, types of waste generated and disposal methods on the campus. The amount of waste generated on the campus was assessed through a survey, which provided baseline data. It helped to identify the waste generation on the campus. The survey quantified the waste streams, the effectiveness of the existing waste management systems on the campus, etc. This helped to identify the ways to reduce waste, the need for implementing new waste management strategies. Waste audits helped in waste diversion and waste reduction, and this provided a healthy environment.

Audit Forms used for Data Collection: The various forms used for the data collection is given in the appendix -1



Chapter III

GREEN AUDIT

III.1. Green Audit Statement

Sl. No.	Name of Campus	Total vegetation cover (Acres)	Number of plant species identified
1.	Sree Narayana College, Kannur	4.16	213

III.2. Biodiversity status of Sree Narayana College, Kannur

III.2.i. Floral diversity

List of plants seen in Sree Narayana College, Kannur

The biodiversity status of Sree Narayana College, Kannur is given below:

Sl. No	Scientific name	Family	Habitat
1	<i>Abrus precatorius</i>	Fabaceae	Herb
2	<i>Acacia auriculiformis</i>	Fabaceae	Tree
3	<i>Achyranthus aspera</i>	Amaranthaceae	Herb
4	<i>Adathoda vasica</i>	Acanthaceae	Herb
5	<i>Adenantha pavonine</i>	Fabaceae	Tree
6	<i>Aegle marmelos</i>	Rutaceae	Tree
7	<i>Aerva lanata</i>	Amaranthaceae	Herb
8	<i>Aeschynomene americana</i>	Mimosaceae	Herb
9	<i>Ageratum conyzoides</i>	Asteraceae	Herb
10	<i>Allamanda cathartica</i>	Apocynaceae	Shrub
11	<i>Allophylus serratus</i>	Sapindaceae	Shrub
12	<i>Aloe vera</i>	Liliaceae	Herb
13	<i>Alstonia scholaris</i>	Apocynaceae	Tree
14	<i>Alternanthera sessilis</i>	Amaranthaceae	Herb
15	<i>Alternanthera tenella</i>	Amaranthaceae	Herb

16	<i>Alysicarpus ovalifolius</i>	Fabaceae	Herb
17	<i>Alysicarpus vaginalis</i>	Fabaceae	Herb
18	<i>Andrographis paniculata</i>	Acanthaceae	Herb
19	<i>Annona reticulata</i>	Annoaceae	Tree
20	<i>Aristolochia indica</i>	Aristolochiaceae	Climber
21	<i>Arundinella</i> sps.	Poaceae	Herb
22	<i>Asystasia gangetica</i>	Acanthaceae	Herb
23	<i>Averrhoa bilimbi</i>	Oxalidaceae	Tree
24	<i>Axonopus compressus</i>	Poaceae	Herb
25	<i>Azadirachta indica</i>	Meliaceae	Tree
26	<i>Bacopa monnieri</i>	Scrophulariaceae	Herb
27	<i>Bauhinia accuminata</i>	Caesalpinaceae	Shrub
28	<i>Bauhinia purpurea</i>	Caesalpinaceae	Tree
29	<i>Bignonia grandiflora</i>	Bignoniaceae	Creeper
30	<i>Biophytum sensitivum</i>	Oxalidaceae	Herb
31	<i>Blumea oxyodonta</i>	Compositae (Asteraceae)	Herb
32	<i>Boerhaavia diffusa</i>	Nyctaginaceae	Herb
33	<i>Bougainvillea spectabili</i>	Nyctaginaceae	Climber
34	<i>Brachiaria ramosa</i>	Poaceae	Herb
35	<i>Brachiaria remota</i>	Poaceae	Herb
36	<i>Breynia vitisidaea</i>	Phyllanthaceae (Euphorbiaceae)	Shrub
37	<i>Bridelia retusa</i>	Phyllanthaceae (Euphorbiaceae)	Tree
38	<i>Bridelia scandens</i>	Euphorbiaceae	Tree
39	<i>Calotropis gigantea</i>	Asclepiadaceae	Shrub
40	<i>Capsicum frutescens</i>	Solanaceae	Shrub
41	<i>Carallia brachiata</i>	Rhizophoraceae	Tree
42	<i>Cardiospermum helicacabum</i>	Sapindaceae	Climber
43	<i>Carica papaya</i>	Caricaceae	Tree
44	<i>Carallia intergersima</i>	Rhizophoraceae	Tree
45	<i>Caryota urens</i>	Arecaceae	Tree
46	<i>Cassia alata</i>	Caesalpinaceae	Shrub
47	<i>Cassia fistula</i>	Caesalpinaceae	Tree

48	<i>Casuarina equisetifolia</i>	Casuarinaceae	Tree
49	<i>Catharanthus roseus</i>	Apocynaceae	Herb
50	<i>Centella asiatica</i>	Apiaceae	Herb
51	<i>Centratherum punctatum</i>	Asteraceae	Herb
52	<i>Centrosema molle</i>	Papilionaceae	Climber
53	<i>Chamaecristaem imosoides</i>	Mimosaceae	Shrub
54	<i>Chassalia curviflora</i>	Rubiaceae	Shrub
55	<i>Cinnamomum zeylanicum</i>	Lauraceae	Tree
56	<i>Cissus latifolia</i>	Vitaceae	Climber
57	<i>Cissus quadrangularis</i>	Vitaceae	Climber
58	<i>Citrus limon</i>	Rutaceae	Tree
59	<i>Cleome viscosa</i>	Capparidaceae	Herb
60	<i>Clerodendrum infortunatum</i>	Lamiaceae	Shrub
61	<i>Clitoria ternate</i>	Papilionaceae	Climber
62	<i>Coleus aromaticus</i>	Lamiaceae	Herb
63	<i>Commelina kurzii</i>	Commelinaceae	Herb
64	<i>Corchorus aestuans</i>	Malvaceae	Herb
65	<i>Costus spicatus</i>	Zingiberaceae	Herb
66	<i>Crotalaria pallida</i>	Papilionaceae	Herb
67	<i>Cryptostegia grandiflora</i>	Apocynaceae	Climber
68	<i>Curculigo orchioides</i>	Hypoxidaceae	Herb
69	<i>Curcuma longa</i>	Zingiberaceae	Herb
70	<i>Curcuma zedoaria</i>	Zingiberaceae	Herb
71	<i>Cyanotis cristata</i>	Commelinaceae	Herb
72	<i>Cyathula prostrata</i>	Amaranthaceae	Herb
73	<i>Cycas revoluta</i>	Cycadaceae	shrub
74	<i>Cyclea peltate</i>	Menispermaceae	Climber
75	<i>Cynodon dactylon</i>	Poaceae	Herb
76	<i>Cyperus rotundus</i>	Cyperaceae	Herb
77	<i>Dactyloctenium aegyptium</i>	Poaceae	Herb
78	<i>Datura stramonium</i>	Solanaceae	Herb
79	<i>Delonix regia</i>	Caesalpinaceae	Tree

80	<i>Dendrocalamus giganteus</i>	Poaceae	Tree
81	<i>Desmodium gyrans</i>	Fabaceae	Shrub
82	<i>Desmodiums corpiurus</i>	Papilionaceae	Herb
83	<i>Desmodium triflorum</i>	Papilionaceae	Herb
84	<i>Dipteracanthus prostrates</i>	Acanthaceae	Herb
85	<i>Durantha repens</i>	Verbenaceae	Shrub
86	<i>Elephantopus scaber</i>	Asteraceae	Herb
87	<i>Eleusine coracana</i>	Poaceae	Herb
88	<i>Eleusine indica</i>	Poaceae	Herb
89	<i>Eragrostis unioloides</i>	Poaceae	Herb
90	<i>Eragrostis viscosa</i>	Poaceae	Herb
91	<i>Eryngium caeruleum</i>	Apiaceae	Herb
92	<i>Eupatorium odoratum</i>	Asteraceae	Shrub
93	<i>Euphorbia heterophylla</i>	Euphorbiaceae	Herb
94	<i>Euphorbia hirta</i>	Euphorbiaceae	Herb
95	<i>Euphorbia thirucalli</i>	Euphorbiaceae	Shrub
96	<i>Evolvulus nummularis</i>	Convolvulaceae	Herb
97	<i>Ficus recemosa</i>	Moraceae	Tree
98	<i>Flueggea leucopyrus</i>	Euphorbiaceae	Shrub
99	<i>Flueggea virosa</i>	Phyllanthaceae	Shrub
100	<i>Garcinia cambogia</i>	Fabaceae	Tree
101	<i>Gardenia jasminoides</i>	Rubiaceae	Shrub
102	<i>Gmelina arborea</i>	Lamiaceae	Tree
103	<i>Gomphrena globosa</i>	Amaranthaceae	Herb
104	<i>Grevillea robusta</i>	Proteaceae	Tree
105	<i>Grewia nervosa</i>	Malvaceae	Shrub
106	<i>Gymnema sylvestre</i>	Apocynaceae	Climber
107	<i>Hedyotis brachypoda</i>	Rubiaceae	Herb
108	<i>Hemidesmus indicus</i>	Apocynaceae	Shrub
109	<i>Hemigraphis alternata</i>	Acanthaceae	Herb
110	<i>Hemigraphis colorata</i>	Acanthaceae	Herb
111	<i>Heteropogon contortus</i>	Poaceae	Herb

112	<i>Hibiscus rosasinensis</i>	Malvaceae	Shrub
113	<i>Holigarna arnottiana</i>	Anacardiaceae	Tree
114	<i>Hybanthus enneaspermus</i>	Violaceae	Herb
115	<i>Hyptis suaveolens</i>	Lamiaceae	Herb
116	<i>Ipomea maxima</i>	Convolvulaceae	Creeper
117	<i>Ipomea</i> sps.	Convolvulaceae	Climber
118	<i>Ipomoea hederifolia</i>	Convolvulaceae	Climber
119	<i>Ischaemum ciliare</i>	Poaceae	Herb
120	<i>Ixora coccinea</i>	Rubiaceae	Shrub
121	<i>Jasminum sambac</i>	Oleaceae	Shrub
122	<i>Kaemferia galanga</i>	Zingiberaceae	Herb
123	<i>Kyllinga nemoralis</i>	Cyperaceae	Creeper
124	<i>Lanea coromandelica</i>	Anacardiaceae	Tree
125	<i>Lantana camara</i>	Verbenaceae	Shrub
126	<i>Laportea interrupta</i>	Urticaceae	Herb
127	<i>Leucas aspera</i>	Lamiaceae	Herb
128	<i>Leucas linifolia</i>	Lamiaceae	Herb
129	<i>Lindernia ciliata</i>	Linderniaceae	Herb
130	<i>Lygodium flexuosum</i>	Lygodiaceae	Climbing fern
131	<i>Macaranga peltate</i>	Euphorbiaceae	Tree
132	<i>Magnolia champaca</i>	Magnolaceae	Tree
133	<i>Mangifera indica</i>	Anacardiaceae	Tree
134	<i>Manikara zapota</i>	Sapotaceae	Tree
135	<i>Maranta arundinaceae</i>	Marantaceae	Herb
136	<i>Memecylon umbellatum</i>	Melastomataceae	Tree
137	<i>Merremia tridentata</i>	Convolvulaceae	Climber
138	<i>Microstachys chamaelea</i>	Euphorbiaceae	Herb
139	<i>Mikania micrantha</i>	Asteraceae	Climber
140	<i>Mimosa pudica</i>	Mimosaceae	Herb
141	<i>Mimusops elengi</i>	Sapotaceae	Tree
142	<i>Mitracarpus verticillatus</i>	Rubiaceae	Herb
143	<i>Mukia madraspatana</i>	Cucurbitaceae	Climber

144	<i>Murraya koenigii</i>	Rutaceae	Tree
145	<i>Ocimum basilicum</i>	Lamiaceae	Herb
146	<i>Ocimum sanctum</i>	Lamiaceae	Shrub
147	<i>Oplismenus burmannii</i>	Poaceae	Herb
148	<i>Oxalis corniculata</i>	Oxalidaceae	Creeper
149	<i>Panicum paludosum</i>	Poaceae	Herb
150	<i>Passiflora edulis</i>	Passifloraceae	Climber
151	<i>Passiflora foetida</i>	Passifloraceae	Climber
152	<i>Peltophorum pterocarpum</i>	Caesalpinaceae	Tree
153	<i>Pennisetum hohenackeri</i>	Poaceae	Herb
154	<i>Pentas lanceolata</i>	Rubiaceae	Shrub
155	<i>Phyllanthus amarus</i>	Euphorbiaceae	Herb
156	<i>Phyllanthus emblica</i>	Euphorbiaceae	Herb
157	<i>Phyllanthus virgatus</i>	Euphorbiaceae	Herb
158	<i>Physalis minima</i>	Solanaceae	Herb
159	<i>Pilea microphylla</i>	Urticaceae	Herb
160	<i>Piper longum</i>	Piperaceae	Herb
161	<i>Plumbago zeylanica</i>	Plumbaginaceae	Herb
162	<i>Plumeria pudica</i>	Apocynaceae	Shrub
163	<i>Pongamia pinnata</i>	Fabaceae	Tree
164	<i>Portulaca oleracea</i>	Portulacaceae	Herb
165	<i>Pothos scandens</i>	Araceae	Climbing shrub
166	<i>Psidium guajava</i>	Myrtaceae	Tree
167	<i>Pterocarpus santalinus</i>	Fabaceae	Tree
168	<i>Ricinus communis</i>	Euphorbiaceae	Shrub
169	<i>Rosa indica</i>	Rosaceae	Shrub
170	<i>Rungia pectinate</i>	Acanthaceae	Herb
171	<i>Samanea saman</i>	Papilionaceae	Tree
172	<i>Scoparia dulcis</i>	Plantaginaceae (Scrophulariaceae)	Herb
173	<i>Selaginella haematodes</i>	Selaginellaceae	Herb
174	<i>Sesamum indicum subsp. Malabaricum</i>	Pedaliaceae	Herb

175	<i>Sida acuta</i>	Malvaceae	Shrub
176	<i>Sida cordifolia</i>	Malvaceae	Shrub
177	<i>Sida retusa</i>	Malvaceae	Herb
178	<i>Simarouba glauca</i>	Simaroubaceae	Tree
179	<i>Spermacoce articularis</i>	Rubiaceae	Herb
180	<i>Spermacoce ocymoides</i>	Rubiaceae	Herb
181	<i>Spilanthes acmella</i>	Asteraceae	Herb
182	<i>Sterculia foetida</i>	Malvaceae	Tree
183	<i>Stereospermum tetragonium</i>	Bignoniaceae	Tree
184	<i>Swietenia mahagoni</i>	Meliaceae	Tree
185	<i>Synedrella nodiflora</i>	Asteraceae	Herb
186	<i>Syzygium aqueum</i>	Myrtaceae	Tree
187	<i>Syzygium cumini</i>	Myrtaceae	Tree
188	<i>Syzygium jambos</i>	Myrtaceae	Tree
189	<i>Tabernaemontana alternifolia</i>	Apocynaceae	Shrub
190	<i>Tabernaemontana divaricata</i>	Apocynaceae	Shrub
191	<i>Tamarindus indica</i>	Caesalpinaceae	Tree
192	<i>Tectona grandis</i>	Lamiaceae	Tree
193	<i>Terminalia bellerica</i>	Combretaceae (Cannabaceae)	Tree
194	<i>Terminalia sp</i>	Combretaceae	Tree
195	<i>Thespesia populnea</i>	Malvaceae	Shrub
196	<i>Thunbergia grandiflora</i>	Acanthaceae	Climber
197	<i>Tinospora cordifolia</i>	Menispermaceae	Climber
198	<i>Tragia involuerata</i>	Euphorbiaceae	Herb
199	<i>Trema orientalis</i>	Combretaceae	Tree
200	<i>Tridax procumbens</i>	Asteraceae	Herb
201	<i>Triumfetta annua</i>	Malvaceae	Shrub
202	<i>Triumfetta rhomboidei</i>	Malvaceae	Shrub
203	<i>Turnera subulate</i>	Passifloraceae	Herb
204	<i>Urena lobata</i>	Malvaceae	Shrub
205	<i>Vanda species</i>	orchidaceae	Epiphyte
206	<i>Vanilla fragrens</i>	orchidaceae	Climber

207	<i>Vernonia cinerea</i>	Asteraceae	Herb
208	<i>Vitex negundo</i>	Verbenaceae	Shrub
209	<i>Wattakaka volubilis</i>	Asclepiadaceae	Climber
210	<i>Zanthoxyl emhetsa</i>	Rutaceae	Tree
211	<i>Ziziphus mauritiana</i>	Rhamnaceae	Tree
212	<i>Ziziphus oenopolia</i>	Rhamnaceae	Shrub
213	<i>Cocos nucifera</i>	Arecaceae	Tree

III.2. ii. Faunal diversity

Table 2. Faunal diversity of Sree Narayana College, Kannur

Sl. No.	BIRDS:
1	Lesser Whistling-Duck
2	Indian Peafowl
3	Rock Pigeon
4	Spotted Dove
5	Greater Coucal
6	Asian Koel
7	Gray-headed Swamphen
8	White-breasted Waterhen
9	Pheasant-tailed Jacana
10	Bronze-winged Jacana
11	Wood Sandpiper
12	Asian Woolly-necked Stork
13	Indian Pond-Heron
14	Eastern Cattle Egret
15	Great Egret
16	Medium Egret
17	Gray Heron
18	Purple Heron
19	Glossy Ibis
20	Black-headed Ibis
21	Crested Goshawk
22	Shikra
23	Black Kite
24	Brahminy Kite
25	Spotted Owlet
26	White-throated Kingfisher
27	Asian Green Bee-eater
28	Blue-tailed Bee-eater
29	White-cheeked Barbet
30	Black-rumped Flame back
31	Rose-ringed Parakeet
32	Indian Golden Oriole

33	Ashy Drongo
34	Greater Racket-tailed Drongo
35	Indian Paradise-Flycatcher
36	Rufous Treepie
37	House Crow
38	Large-billed Crow
39	Common Tailorbird
40	Gray-breasted Prinia
Sl.No.	ANTS
1	<i>Solenopsis germinate</i>
2	<i>Pheidole species</i>
3	<i>Myrmicaria species</i>
4	<i>Camponotus species</i>
5	<i>Tapinoma melanocephalum</i>
6	<i>Paratrechina longicornis</i>
7	<i>Oecophylla smargadina</i>
8	<i>Polyrhachis dives</i>
9	<i>Crematogaster species</i>
10	<i>Odontomachus species</i>
11	<i>Anoplolepis gracillipes</i>
12	<i>Formica fusca</i>
13	<i>Lepisiota species</i>
Sl. No.	SPIDERS
1	<i>Hippasa angelenoides</i>
2	<i>Lyssomanes viridis</i>
3	<i>Pholcus phalangiodes</i>
4	<i>Plexippus ptersi</i>
5	<i>Telamonia dimidiata</i>
Sl. No.	BUTTERFLIES:
1	<i>Acraea terpsicore</i>
2	<i>Zizula hylax</i>
3	<i>Spialia galba</i>
4	<i>Euploea core</i>
5	<i>Tirumal limniace</i>
6	<i>Chilades pandava</i> (Horsfield)
7	<i>Eurema hecabe</i>
8	<i>Leptosia nina</i>



Fig 7. Garden View of the Campus



ENERGY AUDIT

Chapter IV
ENERGY AUDIT

IV.1. Energy usage in Sree Narayana College, Kannur

The following pattern of energy usage is noticed in the college during energy audit.

Sl. No	Campus	Average Monthly Electricity charge (Rs)	Average Monthly gas refilling charge (Rs)	Average Monthly generator fuel charge (Rs)
1.	Sree Narayana College, Kannur	24420	2900	2500

IV.2. Checklist of electrical and electronic equipment

NO	LOCATION	NAME OF EQUIPMENT	WATTAGE (W)	POWER RATING STAR	AVERAGE USE PER WEEK	AVERAGE DAYS OF USE /WEEK
1	CHEMISTRY DEPARTMENT	HOT AIR OVEN	1000	-	4 hr	6
		MICROWAVE OVEN	1150	-	4 hr	3
		FRIDGE	63	5	168 hr	7
		DISTILLATION UNIT	4000	-	4 hr	5
		MAGNETIC STIRRER (3 nos.)	1000	-	4 hr	4
2	PHYSICS DEPARTMENT	ELECTROMAGNET (3 nos.)	300	-	4 hr	3
		SOURCE OF SOLAR CELL APPARATUS	100	-	4 hr	3
		E/M APPARATUS	250	-	1hr	3
		HEATING ELEMENT IN FOUR PROBE APPARATUS	300	-	3 hr	3
3	BOTANY DEPARTMENT	WATER BATH	1000	-	4 hr	6
		HOT AIR OVEN	1000	-	0 hr	0
		CENTRIFUGE	100	-	0 hr	0
		AUTOCLAVE	1500	-	0 hr	0
		SINGLE DISTILLATION UNIT	800	-	0 hr	0
4	ZOOLOGY DEPARTMENT	WATER BATH	2000	-	4 hr	3
		HOT AIR OVEN	1000	-	3 hr	5
		SINGLE DISTILLATION UNIT	4000	-	4 hr	5
		FRIDGE	63	5	162 hr	7

		CENTRIFUGE	300	-	6 hr	3
		ELECTRONIC BALANCE	330	-	5 hr	3
5	MICROBIOLOGY DEPARTMENT	SPECTROPHOTOMETER	90	-	4 hr	4
		WATER BATH	1000	-	4 hr	3
		LAMINAR AIRFLOW	76	-	4 hr	
		HOT AIR OVEN	2000	-	4 hr	5
		INCUBATOR	100	-	4 hr	
		CENTRIFUGE	1500	-	4 hr	4
		6	OTHERS	PROJECTOR	900	-
			300	-	5 hr	3
			20	-	3 hr	6

Indoor and outdoor energy consumption:

Location No.	Type ¹	Use ²	Construction type ³	Windows & doors ⁴ /skylight ⁵ /wall windows ⁶		No. of light points ⁷	No. of fan points ⁸	Average Hours of use /week ⁹
				Windows	Door			
MAIN BLOCK / ZOOLOGY BLOCK								
1	Classroom	Lecture	Concrete	77	37	77	52	35 hr
2	Corridor	Walking	Concrete	-	-	-	-	2.5 hr
3	Toilet	Washroom	Concrete	-	-	4		2.5 hr
4	Office	Office Work	Concrete	25	10	37	20	40 hr
5	Lab	Lab Work	Concrete	23	11	36	25	40 hr
6	Others	-	Concrete	11	2	22	10	5 hr
B.COM BLOCK								
7	Classroom	Lecture	Tile Roof	22	9	11	20	35 hr
8	Corridor	Walking	Tile Roof	-	-	-	-	2.5 hr
9	Toilet	Washroom	Concrete	8	7	5	-	2.5 hr
10	Office	Office Work	Tile Roof	3	5	7	7	40 hr
11	Fitness Centre	Workout	Tile Roof	4	2	5	-	3 hr
12	Library	Reading and Reference	Concrete	3	2	4	1	40 hr
MALAYALAM BLOCK								
13	Classroom	Lecture	Concrete	45	13	17	33	35 hr
14	Corridor	Walking	Concrete	-	-	2		2.5 hr
15	Toilet	Washroom	Concrete	7	3	8	2	2.5 hr
16	Office	Office Work	Concrete	10	6	9	7	40 hr
17	Gym	Workout	Concrete	1	2	6	2	3 hr
18	Lab	Lab Work	Concrete	1	8	7	1	40 hr

HISTORY & LANGUAGE BLOCK								
19	Classroom	Lecture	Concrete&Tile Roof	74	26	28	31	35 hr
20	Corridor	Walking	Concrete &Tile Roof	-	-	-	-	2.5 hr
21	Toilet	Washroom	Concrete	-	-	-	-	2.5 hr
22	Office	Office Work	Concrete	3	1	2	1	40 hr
CHEMISTRY & PHYSICS BLOCK								
23	Classroom	Lecture	Concrete	7	9	16	12	35 hr
24	Corridor	Walking	Concrete	-	-	-	-	2.5 hr
25	Toilet	Washroom	Concrete	-	-	2	-	2.5 hr
26	Office	Office Work	Concrete	15	10	14	9	40 hr
27	Lab	Lab Work	Concrete	53	15	58	21	40 hr
STORE BLOCK								
28	Student Co- Operative Store	Purchase of Stationary Items	Concrete	2	2	4	2	30 hr
LIBRARY BLOCK								
29	College Library	Reading and reference	Concrete	28	9	29	28	40 hr
NSS & NCC BLOCK								
30	Auditorium	Conduct programs	Concrete	12	6	30	17	4 hr
31	NSS and NCC Rooms	Storage of respective accessories	Concrete	2	2	2	2	20 hr
CANTEEN BLOCK								
32	Canteen	Kitchen and food serving purpose	Concrete	5	3	11	7	35 hr
HOSTEL BLOCK								
33	Womens Hostel	Accommodation	Concrete	60	22	62	60	40 hr

IV.3. Existing energy sources of the College

- Solar energy is making use for outdoor lights
- Biogas plant is installed in the campus
- Electricity from Kerala State Electricity Board (KSEB) is the major source of energy

IV.4. Electric Appliance Audit:

The average energy utilization of Sree Narayana College, Kannur for different purposes is 90.489 kwh/month.

Average Electricity charge of the campus is Rs. 24420/-month. Average Gas refilling charge of the campus is Rs. 2900/-month. Average Generator fuel charge of the campus is Rs. 2500/-month. A hybrid source of energy comprising solar and wind type of non-conventional category of energy will be a good alternative energy sources for the college

Awareness programs for the stakeholders to save energy may also increase sustainability in the utilization of various energy sources. Although staffs are encouraged to switch off their own lights, monitors and other equipment, the college administrative staff should carry out a lock down of the building at the end of every day and switch off any lights or equipment that have been left on. All the incandescent bulbs have to be replaced by low energy bulbs. Lighting in some areas such as the toilets should be controlled by PIR (passive infrared light) sensors. Lighting in the library should be predominantly LEDs and energy saving bulbs. The college should improve its monitoring and reporting of energy usage and provide information to campus users. The awareness boards for energy savings have to be installed in the college campuses.

The sun provides more energy than we'll ever need, electricity from solar power is a very important energy source in the move to clean energy production and hence the important source of alternative energy for the college is solar power. No greenhouse gas emissions are released into the atmosphere while using solar panels to create electricity. Proper wiring of buildings has to be ensured and older wiring, if necessary, has to be replaced. The damaged wiring may be replaced to avoid electricity leakage and to protect the College and its appliances from potentially dangerous or expensive damage that may arise due to faulty wiring.

IV.5. Existing energy management methods in the College campus

- Energy saving campaigns are organised by different departments
- Established solar powered lights at Campus entrance and nearby library.
- Older and damaged equipment's found to be replaced if necessary.
- Wiring and electrical maintains are periodically monitored and replacements are made.



Fig 8. Data Collection by Audit Team during the Energy Audit



Chapter V
WATER AND WASTE AUDIT

V.1. Water usage in Sree Narayana College, Kannur

The following is water usage pattern noticed in the college during water audit.

Water usage:

Sl.	Purpose	Quantity
1	No of bore well	1
2	No of faucet	6
3	No of toilet	119
4	No of toilet flush	6
5	No of water taps including washbasin taps	320
6	No of wells	1
7	Water cooler	4

V.2. WATER AUDIT

Sl. No .	Tap name*/ Tap no.	Type of the tap (plastic/ brass etc.)	Condition (poor/moderate/ good)	Avg. number of people using per day	Avg. time per head per day	Avg. amount of water releasing per minute	Leaking or not	If leaking average amount of water loss per minute
1	Kitchen taps <u>12</u>	Plastic/ steel	Moderate	650	1 hours	1	No	Nil
2	Wash basins tap <u>201</u>	Plastic /steel	Moderate	770	1.5 hours	1	Yes	-
3	Toilet tap <u>119</u>	Plastic /Steel	Moderate	700	2 hours	2	No	Nil
4	Toilet flush <u>6</u>	Plastic	Moderate	700	2.5 hours	3	No	Nil
5	Shower <u>0</u>	-	-	-	-	-	-	-
6	Health faucet <u>6</u>	Plastic	Moderate	600	30 minutes	0.5	No	Nil
7	Others <u>4</u>	Steel	Moderate	8	3 hours	3	No	Nil

Water audit at Sree Narayana College, Kannur

The water audit was done during the March month where the usage of water is at the peak. The College campus uses 7930 litres of water every day. The main source of water is ground water. Water from the public water supply is also utilized. Approximately 21 litres of water are lost through the leaking of pipes per day. Proper passage of water through the pipes has to be ensured. Leakage has to be prevented and various other sources of water need to be found out as well within the campus to meet the future demand. Drip irrigation should be practiced in gardens. If water treatment system is installed at canteen and chemical laboratories, the amount of water lost through pollution can be prevented.

Preference should be given to the recycling of water in the College to maintain an Efficient Water Management system. Awareness programmes for the management of sustainable water use will be highly efficient on this campus. Efficient water saving devices should be installed in all toilets. New toilets that are to be installed should have a dual flush

system in place with sensor technology. Water management systems are to be introduced in the urinals. Consider carrying out meter readings on a regular basis in order to monitor water usage. Not only will this make checking water bills much easier but it will also allow a baseline to be set from which further reductions can be measured, as well as possibly altering the any leaks.

V.3. Existing water management methods adopted in the campuses

- Rainwater collection pits are dug in order to recharge groundwater.
- Rainwater harvesting system is functioning.
- Started to add more greenery in order to improve ground water resources.
- Water conservation and green awareness campaigns have been conducted on behalf of National Service Scheme (NSS).
- Awareness programme had been organized to save water.

V.4. Waste measure and its disposal

In connection with the Environment audit total solid waste generated per day from the various sources of the college was measured. The details are given below

- Total stakeholders : 2668
- Classroom : 49
- Other Rooms : 31
- Number of hostel inmates : 68
- Number of Garbage Dumps : 11
- Number of toilets : 17
- E wastes (computers, electrical and electronic parts)- by selling: 10.5Kg/Month
- Plastic waste – Burning, dumping pit – Nil :7.3 Kg/Month
- Solid wastes (damaged furniture, paper & paper plates, food waste): 36.5Kg/Month
- Chemical waste (laboratory): 3.5Kg/ Month
- Waste water- Washing, urinals, bathrooms: 2450 L
- Glass waste (broken glass wares from the lab): 1.5 kg/Month
- Waste treatment: 105 Kg/Month
- Napkin incinerator : 1

Quantity of waste generated in the campus

- Biodegradable – 38 kg/month
- Non-biodegradable – 19.55 kg/month
- Hazardous waste – Nil
- Canteen waste (biodegradable) – 32kg/day
- Canteen waste (non-biodegradable) – 1.5 kg/day
- Recyclable – 7 kg/month

Proper waste disposal measures have to be adopted in the college. A composting pit is highly essential for the treatment of biodegradable waste generated from the canteen, hostels, food leftover by students and staff, office, vegetable garden and from the College campus cleaning process. Different methods such as pit composting, vermi-composting, bacterial composting using bacterial consortium may be used to treat the biodegradable waste. E-waste, plastic and glass bottles, other plastic wastes, cans, broken glass wares, tins etc., may be recycled or sold out.

Properly label all waste containers, close the waste containers to minimise exposure to atmosphere, and contact the collaborating waste disposal agency for a pick up.

Laboratories should be asked to maintain the purchase of smallest quantities of chemicals for particular purposes and share surplus chemicals with other laboratories. Laboratories shall be asked to perform minimum scale experiments and keep software assisted chemical storage data to avoid duplicate purchases.

Hazardous waste Satellite accumulation areas can be maintained under strict and proper guidelines. The guidelines should address the requirements of the satellite storage area, properties of storage containers, storage limit and storage period before pick up. Proper labeling of the storage containers can be done which will ease the disposal process.

Individual safety of the students and staff working in the laboratories should be ensured along with the waste management guidelines. The College can provide the safety wears to all in the laboratory and wearing them should be made mandatory. Safety alarms can be installed in all laboratories and students can be given training to use fire extinguishers in emergency situations of fire and explosion. Fire extinguishing cylinders should be installed in all laboratory areas. In addition, eye bath facility and open area showers can be introduced in front

of all chemical laboratories. First aid boxes should be installed in all departments to help students who can possibly be injured while performing an experiment.

Eventhough the college is managing waste material in a properway; the College has missed a few major recycling opportunities, with the exception of food waste from the dining halls. Installation of more sanitary napkin destroyers at ladies' hostels, waiting room and enhance the capacity of existing incinerator in girl's hostels and campus. Different coloured bins may be placed in order to collect and segregate various types of waste. Training and campaigns in cotton bag making for students and staff will reduce the use of throw away plastic carry bags. Periodical training in health & hygiene, waste management and disposal, green healthy practices may inculcate a positive attitude for a clean and healthy living.

There should be proper sign boards display to tell students where to go for the disposal of other recyclables, plastics and hazardous waste. There should be in place a policy for the handling and disposal of hazardous materials. The College should have plans for dealing with hazardous waste in academic departments as well as the maintenance activities. The College should ensure that the hazardous materials are disposing in a proper way. The chemistry department may change their chemical waste disposal to eco-friendly method. Green chemistry is the utilisation of a set of principles that reduces or eliminates the use or generation of hazardous substances in the design, manufacture and application of chemical products.

College is committed to manage chemical wastes produced in its practical in a safe and environmentally sound manner that complies with all applicable central and state government regulations. At present, the College does not have a proper waste management system and a little wasteis reaching the environment (air and water). Since the College has a strong commitment to protect the environment and to be abide by the regulations of the government, in next five years can plan to introduce “Chemical’s Waste Management Guidelines”.

The College should develop and implement proper management practices in the handling, storage, and disposal of chemical wastes that are generated in its laboratories. The handling and storage will be the areas where College can take adequate steps in the campus itself while disposal can be done in cooperation with a suitable outside agency.

The handling and storage shouldl be strictly according to the “Chemicals Waste Management Guidelines”.

As part of the guidelines, hazardous waste determination will be carried out for the waste from all laboratories and it will be stored in separate appropriate containers. As part of the hazardous waste management, the laboratories will take essential steps to minimise the quantity of waste, set up a satellite accumulation area.

V.5. Existing waste management methods practised

- Cleaning the campuses on daily basis
- Installed Biogas plant for biodegradable waste disposal
- Installed Incinerators for sanitary napkin disposal
- Installed Plastic bottle collection (bottle booth)
- Open dumping of biodegradable waste
- Strictly banned use of paper cup and paper plate in the campus and promoted use of steel cup and steel plate.

Chapter VI

CONSOLIDATED STATEMENT OF AUDIT FINDINGS

VI.1. Audit findings:

Environment Audit (Green Audit) will create a greater appreciation and understanding of the impact of the College's actions on the environment. An overall finding of the onsite audit is that Sree Narayana College is conscious about their Environment health. College has successfully been able to identify the impacts on the environment through the various auditing exercises. The green auditing exercise has brainstormed and provides insights on practical ways to reduce negative impact on the environment. Participating in this green auditing procedure has gained knowledge about the need of sustainability of the College campus. It will create awareness around the use of the Earth's resources in your home, College, local community and beyond. College should adopt an Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions. White good producing companies are rapidly developing in the area of energy efficiency. Many computer hardware and electrical supply companies now cooperate with customers to reclaim old or damaged parts. Although over twice as expensive up front, LCD monitors are estimated to use 30-40% less energy overall than CRTs. All computers purchased by the College have an Energy Star rating, which is beginning to be a standard requirement for computers.

VI.2. Preparation of action plan

Administrators' policies referring to College and approach towards the use of resources need to be considered in purview of green audit report. An environmental policy should be formulated by the Administrator of the College. The College should have a policy on green awareness raising or training programmes for students and staff, green awareness policy right from kitchen staff to procurement policy by the Syndicate. Based on the policies, College should have an action plan. The green audit report will be a base line for the action plan to be evolved.

VI.3. Follow up action and plans

Green Audits are exercises which generate considerable quantities of valuable environmental and resource management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is

important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and action plans and implementation programmes based on the audit findings. Audit follow up is part of the wider process of continuous improvement. Without follow-up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organisational priorities and the passing of time.

VI.4. Environmental Education:

The following environmental education programmes may be implemented in the College campus before the next green auditing: -

Training programmes in solid waste management, liquid waste management, setting up of biodiversity garden, tree management, medicinal plant nursery, butterfly garden, vegetable cultivation, water management, energy management, landscape management, pollution mitigation methods, and water filtration methods.

- Display of environmental awareness board such as – Save water, save electricity, no wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.,
- Give priority to environmental clubs and its programmes
- Set up model rainwater harvesting system, vegetable garden, medicinal plant garden, butterfly garden etc,
- Conduct exhibition on throw away plastic danger, recyclable products etc
- Display various slogans and pictures to protect environment
- Implement chemical treatment system for wastewater from the laboratories and incinerators,
- Different coloured waste bins have to be placed to segregate waste and its easy collection.

Chapter VII

CONCLUSION AND RECOMMENDATIONS

Environment audit is the most efficient way to identify the strength and weakness of environmentally sustainable practices and to find a way to solve problem. Green Audit is one kind of professional approach towards a responsible way in utilising economic, financial, social and environmental resources. Green audits can “add value” to the management approaches being taken by the College and is a way of identifying, evaluating and managing environmental risks (known and unknown). There is scope for further improvement, particularly in relation to waste, energy and water management. The College in recent years considers the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the College does perform fairly well, the recommendations in this report highlight many ways in which the College can work to improve its actions and become a more sustainable institution.

VII.1. Suggestions

Some of the very important suggestions are: -

- i. Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.
- ii. Collaborate for Interdisciplinary Approaches- Convene college faculty and administrators with environmental practitioners to develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.
- iii. Educate for Environmentally Responsible Citizenship- Establish programs to produce expertise in environmental management, sustainable economic development, population, and related fields to ensure that all university graduates are environmentally literate and have the awareness and understanding to be ecologically responsible citizens.
- iv. Increase Awareness of Environmentally Sustainable Development- Use every opportunity to raise public, government, industry, foundation, and college

awareness by openly addressing the urgent need to move toward an environmentally sustainable future.

- v. Increase education on reduce, reuse, and recycling of resources and waste products in the campus.
- vi. Increase recycling education on campus.
- vii. Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development. Expand work with community and nongovernmental organizations to assist in finding solutions to environmental problems.
- viii. 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.

VII.2. Recommendations

- Adopt an environment policy for the College.
- Appoint a green protocol officer at college level.
- Arrange training programmes on environmental management system and nature conservation.
- Avoid plastic/thermocool plates and cups in the College level or department level functions.
- Conduct carbon neutral project at campus level.
- Conduct exhibitions for parents and public on environment and sustainable practices.
- Conduct seminars, workshops and exhibitions on environmental education.
- Declare the campus plastic free and implement it thoroughly.
- Develop butterfly gardens that arouse appreciation towards flora and fauna diversity.

- Dig sufficient rain water pits in the college campus wherever possible and maintain it regularly.
- Display boards of fauna diversity to generate enthusiasm for learners.
- Ensure participation of students and teachers in local environmental issues.
- Establish a purchase policy that is energy saving and eco-friendly.
- Establish an E-waste collection centre in campus.
- Establish water, energy and waste management systems.
- Grow up vegetable garden and medicinal garden and gradually develop it as a nursery.
- Install Biogas plant and Compost units
- Install Incinerators to dispose sanitary napkins
- Install rain water harvesting system in all roof top and ground.
- Install Solar panels wind energy harvesting system to generate electricity
- Install waste water system for chemistry labs.
- Introduce add-on courses eco-friendly income generating to all interested students.
- Layout 'Green Chemistry' that reduces or eliminates the use or generation of hazardous substances in the design, manufacture and application of chemical products.
- Name all the trees and plants with its common name and scientific name.
- Organize earn while learn eco-friendly programmes
- Renovation of cooking system in the canteen to save gas.
- Replace incandescent and CFL lamps with LED lights.
- Replace LCD computer monitors with LED monitors.
- Set up water recycling unit where the recycled water can be used for gardening in College and hostels.

- Sound level should be minimized by awareness and through the prohibition of horn by the vehicles within the University premises.

VII.3. Commitments after Green Auditing:

In the light of Environment audit or green audit, the College should, adopt some additions in the vision and mission statements promoting compliance with environmental laws and regulations for sustainable existence of the College.

VII.4. Vision Statement

Sree Narayana College is committed to becoming an innovative leader among academic institutions in the areas of environmental education and research and in the practice of environmental management and stewardship.

The College is obliged to the principle of sustainable development, and will use its resources in a manner that does not compromise the ability of future generations of the College and global communities to meet their needs.

VII.5. Mission Statement

Sree Narayana College is devoted to promote the environment management and conservation in the College campus and community with the purpose to identify, quantify, describe and prioritize framework of environment sustainability in compliance with the applicable regulations, policies and standards.

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Fig 9. Awareness Class of Environmental Audit



Fig 10. Audit Team



Fig. 11. NSS Volunteers of Sree Narayana College, Kannur involved in assisting the Audit team

SREE NARAYANA COLLEGE, KANNUR

PRE-AUDIT QUESTIONNAIRE - ENVIRONMENT AUDIT

Guidelines

The purpose of this questionnaire is to gather the necessary information on the audit site prior to undertaking an on-site audit. The questionnaire covers each area of environmental concern and is supplemented by information checklists for each of these areas. This questionnaire is designed to familiarize the environmental audit team with the site operations prior to the audit visit, while information checklists highlight a list of the documents required prior to the audit.

Please complete the forms as thoroughly and accurately as possible. Where a question does not apply or cannot be answered, please respond with not applicable or unknown. Respondents are encouraged to provide responses which reflect the actual conditions as opposed to the 'ideal' situation. Provision of pertinent information prior to the audit visit will allow the audit team to be adequately prepared resulting in a more effective audit.

Note: Unless otherwise specified, references made to 'premises' or 'area' in this questionnaire generally refer to premises which the respondent represents

SL NO	FORMS	DESCRIPTION	LINK
1.	Form-1	General Departmental Information (Building)	https://forms.gle/sj7Aj6Aeo5h3zpgM6
2.	Form-2	Overall Environmental Management Information (Departmental Level)	https://forms.gle/BwtNpaz1fgZN34qWA
3.	Form-3	Materials Procurement Policy (Departmental Level)	https://forms.gle/TCWHrFcmiZwGUzRJ7
4.	Form-4	Energy Management	https://forms.gle/DTzRVjVqcVWCrXnz9
5.	Form-5	Material Management (Office Operation)	https://forms.gle/ivztweAWpZxwiV2UA

6.	Form-6	Material Management (Laboratory Operation)	https://forms.gle/DLXBB3f86phTxUKV6
7.	Form-7	Material Management (Pesticide)	https://forms.gle/XiysYuHMnuViZ1Np9
8.	Form-8	Material Management (Asbestos)	https://forms.gle/fhFg5ZNHVAkgrWuY6
9	Form-9	Water Supply Management	https://forms.gle/HQq3wkaXFgdwttuu5
10	Form-10	Wastewater Management	https://forms.gle/1ipKP8TEPUBFVEBN9
11	Form-11	Solid Waste Management	https://forms.gle/p1t85D2KXjncpTga7
12	Form-12	Air Quality Monitoring and Control (General)	https://forms.gle/AUWRHh7D93RfDoU77
13	Form-13	Air Quality Monitoring and Control (Laboratory Operation)	https://forms.gle/LLEcZiuRqVBrDicv7
14	Form-14	Noise Monitoring and Control	https://forms.gle/6R8ZTrhM2TKrL4Ux9
15	Form-15	Transportation and Travel	https://forms.gle/D6PEt1WbUxc1DPT49
16	Form-16	Emergency Response Procedures	https://forms.gle/Uiv8mjBhYfgnktTQ6
17	Form-17	Staff Awareness and Training	https://forms.gle/o44PQ1LyPnifGEgT8
18	Form-18	Publicity of Environmental Information	https://forms.gle/Yk45V3agAJ6gWDgc9
19	Form-19	Response to Public Enquiries and Complaints	https://forms.gle/ZyYpE7JrtKGX6ruP8



Love nature.....Save future