



NSS COLLEGE
OTTAPALAM

ACCREDITED WITH 'A' GRADE BY NAAC | AFFILIATED TO UNIVERSITY OF CALICUT

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Green, Energy and Environment Audit Report 2023-2024

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ACKNOWLEDGEMENT

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We commend N.S.S. COLLEGE, OTTAPALAM for recognizing the importance of sustainability and environmental consciousness by initiating the Green, Energy, and environment Audit. This commitment to evaluating and enhancing eco-friendly practices is a commendable step toward creating a more environmentally responsible campus.

Our team looks forward to presenting comprehensive findings and recommendations that align with N.S.S. COLLEGE, OTTAPALAM commitment to sustainability. We appreciate the opportunity to contribute to the university's ongoing efforts to promote green initiatives and energy efficiency. Thank you for your cooperation and dedication to fostering a more sustainable and environmentally friendly academic environment.


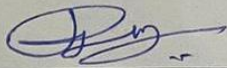



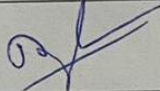
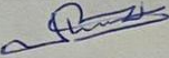
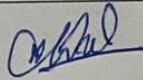
Our special thanks are due to:

- Dr.Sajeev K,Principal
- Prof.Prasanth Assistant professor
- Dr P Lakshmi Devi Menon, Assistant professor
- Sreeja Gopal, Assistant professor

For giving us necessary inputs to carry out this very vital exercise of Green, Energy, and environment Audit.

We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

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CONCEPT

An environmental management system (EMS) is a data system that tracks air, water, and waste to improve performance. It helps maintain a clean and green environment that leads to partnerships. EMS provides a 360-degree view of the surrounding campus, making it easier for owners, managers, and environmentalists to collaborate, measure, control, and mitigate environmental impacts. Ultimately, it leads to raising the living standards of humans, animals, and plants. Due to changes in environmental conditions, global warming, and the growing human population, green campus initiatives are needed around the world. The goal is to create a sustainable and eco-friendly campus for participants.

Environmental management audits, such as green campus audit and energy audit, are well-developed processes for extracting information about an organization's environmental impact. These audits provide an actual assessment of how organizations are taking action to protect the environment. To save the eco-friendly atmosphere of an institution, well-developed environmental objectives and targets should be undertaken to reduce harmful effects. These audits can significantly reduce environmental pollution on campus, which in turn reduces the overall impact of global warming. According to government law, all institutions and organizations must comply with environmental legislation and ensure that their activities do not harm the environment.

INTRODUCTION

The growth of a country starts from its educational institutions, where ecology is considered as an important component of development related to the environment. Educational institutions today are becoming more sensitive to environmental factors and presenting more ideas to make them eco-friendly. To protect the environment within the campus, many educational institutions adopt different perspectives on promoting energy savings, recycling waste, reducing water and addressing environmental issues such as water storage. Various types of adverse environmental impacts to the activities pursued by colleges. Environmental auditing is the process of examining the environmental performance of an organization against its environmental policies and objectives. An environmental audit is a formal examination of the impact on a college environment. As part of such training, an internal environmental audit is conducted to assess the actual situation on campus. Environmental audit is a useful tool for determining how and where a college uses the most energy, water or resources; The college can then think about how to implement the changes and make savings. It can also be used to determine the type and amount of waste, be it used for a recycling project or to improve a waste reduction plan. Environmental auditing and implementation of mitigation measures is a win-win situation for all colleges and students.

OVERVIEW OF INSTITUTION

VISION

Social Emancipation

MISSION

Thamasoma Jyothir Gamaya.

Total Campus Area and College Building Spread Area

- Campus Area: 25 Acres

COURSES OFFERED

The institutes offer thirteen undergraduate programs and six postgraduate programs under the affiliation of University of Calicut. At present institution also offer several addon courses and certificate courses along with the university affiliated programmes.

Undergraduate Programs			
1	BA English	7	BSc Chemistry
2	BA Hindi	8	BSc Industrial Chemistry
3	BA Malayalam	9	BSc Mathematics
4	BA Economics	10	BSc Physics
5	BA History	11	B Sc Zoology
6	BSc Botany	12	BSc Computer Science
		13	B Com Finance

Postgraduate programs			
1	MA English	4	MSc Mathematics
2	MA Economics	5	MSc Physics
3	MSc Computer Science	6	M. Com.

Green Campus Audit-Report

INTRODUCTION

The Green Audit is a tool for identifying opportunities for sustainable development practices, improving environmental quality, improving health, hygiene and safety, reducing liability, saving money, and achieving values of virtue. Green audit is a process of systematic identification, measurement, recording, reporting and analysis of the components of the institute's environmental diversity. The goal of Green Auditing is to help the organization implement sustainable development practices and to establish role models for the community and young learners. It can create health awareness and promote environmental awareness, values and ethics. This makes staff and students better aware of the green impact on campus. If self-inquiry is the natural and inevitable growth of quality education, then institutional self-inquiry can be said to be the natural and inevitable growth of a quality educational institution. As environmental sustainability is becoming more and more important issue for the country, the role of higher education institutions in relation to environmental sustainability is becoming more and more prevalent.

GENERAL AND SPECIFIC OBJECTIVES OF GREEN AUDITING

The general objective of the Green Audit is to prepare a basic report on biodiversity and other resources, measures to reduce resource wastage, and improve resource quality and sustainability.

The specific goals are:

- ▶ To prepare a checklist of flora and fauna on and around the college campus.
- ▶ To suggest measures to improve biodiversity within the college campus.
- ▶ To monitor the energy consumption pattern of the college.
- ▶ To assess the level of water usage within the college campus.
- ▶ To suggest sustainable energy use and water conservation methods.
- ▶ To explore different sources and mitigation possibilities to produce organic and solid waste.
- ▶ Develop the values of sustainable development activities through a green audit system.
- ▶ To find out various sources of organic and solid waste generation and mitigation possibilities.
- ▶ To report the expenditure on green initiatives during the last five years

METHODOLOGY

The aim of the Green Audit is to ensure that the practices followed by the campus are in line with the country's green policy. Methodology includes: data collection, campus physical inspection, monitoring and review of documentation, and data analysis.

BEST PRACTICE GREEN INITIATIVES FOR A SUSTAINABLE COMMUNITY

Green campus / Environment Policy

Introduction

N.S.S. COLLEGE, OTTAPALAM dedicated to fostering a green campus environment and prioritizing environmental protection, conservation, and safety. This policy document outlines our approach to creating a sustainable and environmentally conscious campus.

Objectives

Green Campus Environment Conservation Policy aims to:

1. Enhance environmental protection within the college campus through various awareness programmes and several energy efficient measures.
2. Minimize our ecological footprint and contribute to biodiversity conservation.
3. Promote awareness and responsibility for environmental conservation among the college community.
4. Ensure safety and well-being through sustainable practices.

Conservation Measures

A. Biodiversity Conservation

N.S.S. COLLEGE, OTTAPALAM recognizes the importance of biodiversity in maintaining a healthy environment. Our conservation measures will include:

- ▶ Establishing green spaces with native plants to support local biodiversity.
- ▶ Implementing sustainable landscaping practices to preserve natural habitats.
- ▶ Conducting various awareness programmes

B. Waste Reduction and Recycling

To minimize our impact on the environment, college will focus on waste reduction and recycling initiatives:

- ▶ Implementing a campus-wide recycling program for paper, plastics, and other recyclables.
- ▶ Encouraging the reduction of single-use plastics and promoting reusable alternatives.
- ▶ Separate waste collection bins
- ▶ Using biogas plant
- ▶ Tie up and Mou with various NGO'S and Schemed

C. Water Conservation

N.S.S. COLLEGE, OTTAPALAM is committed to responsible water usage and conservation:

- ▶ Installing water-efficient fixtures and irrigation systems.
- ▶ Rainwater harvesting pond.
- ▶ Promoting water conservation awareness campaigns among students and staff.

D. Sustainable Transportation

To reduce carbon emissions and promote sustainable transportation,

- ▶ Encourage the use of public transportation, EV's, cycling, and carpooling.
- ▶ Provide designated areas and facilities for bicycle parking.
- ▶ EV charging ports.

E. Safety and Well-being

Ensuring the safety and well-being of the college community is paramount. College includes the following measures:

- ▶ Conducting regular safety drills and emergency preparedness training.
- ▶ Implementing sustainable construction and maintenance practices to create safe environments.
- ▶ Functioning of NSS, Nature club.
- ▶ Implementation of nature policies

Responsibility and Accountability

Every member of the college community shares the responsibility for creating a green campus environment. To ensure accountability, specific roles and responsibilities will be assigned. A designated Green Campus Committee will oversee the implementation of this policy and report progress to college leadership and stakeholders.

Effective Measures for Environment Protection and Conservation

1. Renewable Energy Integration

- Implement renewable energy sources such as solar or wind power to meet a significant portion of the college's energy needs.

2. Sustainable Lighting Practices

- Utilize energy-efficient lighting solutions for all buildings and outdoor spaces. Replace conventional lighting fixtures with LED bulbs to reduce energy consumption and promote sustainable illumination.

3. Eco-friendly Infrastructure

- Prioritize the use of environmentally friendly materials in construction and renovation projects.
- Incorporate green building design principles to enhance energy efficiency and reduce the ecological impact of structures.

4. Efficient Electronic Gadgets

- Embrace energy-efficient electronic devices with high STAR ratings to minimize power consumption.
- Regularly maintain and upgrade electronic equipment to ensure optimal energy efficiency.

5. Environmental Monitoring Committee

- Establish an Environmental Monitoring Committee comprising student and staff representatives from all departments.
- Task the committee with overseeing the implementation of environmental protection and conservation programs.

6. Resource Use and Waste Reduction

- Regularly monitor and benchmark the college's resource use, emphasizing reduction and optimization.
- Implement waste reduction initiatives, including recycling programs and proper waste disposal practices.

7. Training Programs for Environmental Conservation

- Provide training sessions for faculty and students to raise awareness about environmental conservation.
- Offer workshops on sustainable practices, waste management, and biodiversity preservation.

8. Annual Environmental Audits

- Conduct annual environmental audits to assess the college's impact on the surrounding ecosystem.
- Evaluate the effectiveness of conservation measures and identify areas for improvement based on audit findings.

These measures aim to enhance environmental protection and conservation within the college, fostering a commitment to sustainable practices among students, faculty, and staff. The implementation of these initiatives will contribute to the overall well-being of the environment and support the college's dedication to creating a green and eco-conscious campus.

Continuous Improvement

Recognizing that environmental conservation is an ongoing process, this policy will be periodically reviewed and updated to incorporate new technologies and best practices and committed to continuous improvement in our efforts to create a sustainable and environmentally friendly campus. N.S.S. COLLEGE, OTTAPALAM is dedicated to leading by example in environmental conservation. By implementing measures such as biodiversity conservation, waste reduction, and sustainable practices, aim to create a campus that prioritizes the well-being of our community and contributes positively to the environment.

Activities conducted for green campus.

World Environment Day was celebrated on 5th June 2018. Medicinal plant sapling was planted in the campus. An exhibition on “Medicinal Plants” was organized. In the afternoon an essay writing competition was conducted for the students on the topic “Role of students in Environment Protection” in collaboration with Bhoomithrasena Club.



Nature trekking was conducted in association with Kerala Forest Department to Kuthiran Forest range on 28/11/2019. About 45 members of Bhoomithrasena club participated in this trekking.



Nature trekking was conducted in association with Kerala Forest Department to Nellyampathy Forest range on 06/03/2020. About 35 members of Bhoomithrasena club participated in this trekking.



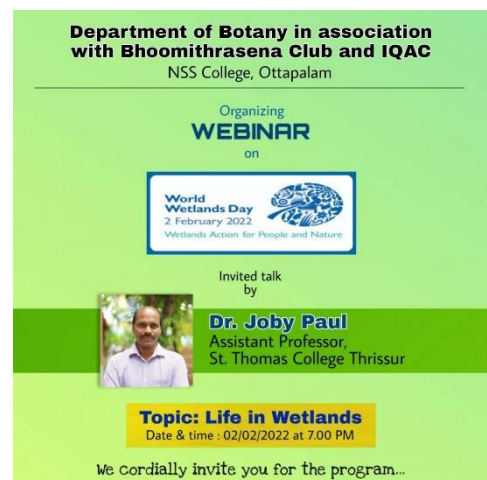
A webinar was organized in connection with World Forestry Day celebrations on **23-03-2021** at 7.30 PM in Google meet (**Topic: Eco restoration & Forest Conservation**). The webinar was organized jointly by Bhoomithrasena Club and Department of Botany. Mr. Prabhu P M, Assistant Conservator of Forest, Social Forestry Division, Thrissur was the resource person. He is a skilled Wildlife Photographer and Writer too. The webinar started at 7.30 PM. Dr. Ranjusha A P, HoD Botany welcomed Dr. R. Rajesh, Principal; Mrs. Manju B L, IQAC Co-ordinator, Mr. Prabhu PM, Dr. Lakshmi Devi Menon, Member Bhoomithrasena Club and students. Nearly 70 students participated in the webinar. The resource person well explained the necessity for the conservation of flora and fauna of forest ecosystem. The session concluded at 9.00PM after student interaction and delivering vote of thanks by Dr. Pramod Kumar N.



WORLD ENVIRONMENT DAY IS celebrated on 05.06.2021 and 06.06. 2021. Celebration include Webinar On 'Ecosystem Restoration', Nature Photography Competition And Stamp Making Competitions. DR. PRASAD G. Assistant Conservator of Forest, Social Forestry Division, Kottayam leads the sessions.



WORLD WETLAND DAY IS celebrated on 02.02.2022. Webinar is conducted On The Topic 'Life In Wetland' is lead by DR. JOBY PAUL, Assistant Professor Botany, St. Thomas College, Thrissur



World Environment Day was celebrated with a Webinar on the topic 'Biodiversity through ages' on 06/06/2022 by Prof. C.C. Harilal, Head, Division of Environment Science, Department of Botany, University of Calicut.

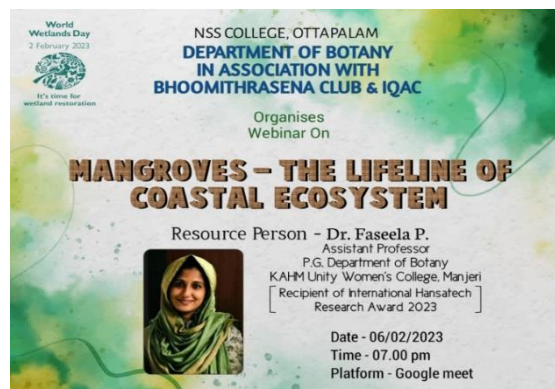


Inaugurated Butterfly Garden in the college campus on 06/06/2022 by Prof. R. Rajesh, Principal, N.S.S. College, Ottapalam.



A webinar was conducted on 06/02/2023 in connection with the World Wetland Day 2023. The topic was 'Mangroves – the lifeline of coastal ecosystem' which was presented by Dr. Faseela P., Assistant Professor, PG Department of Botany, KAHM Unity Women's College, Manjeri.

N.S.S. College, Ottapalam Bhoomitrasena club, Science club and Department of Botany in association with IQAC supported by NGGFn and Department of Environment and Climate Change, Government of Kerala conducted a training program on Green Auditing on 13th and 14th March 2023. Botany students were given the charge of Biodiversity Auditing of the college campus.



CONCLUSION

The Green Audit Report conducted for N.S.S. College, Ottapalam reflects the institution's strong commitment to fostering a sustainable and environmentally conscious campus. Through the implementation of various conservation measures and initiatives, the college has made significant strides towards achieving its objectives of environmental protection, biodiversity conservation, waste reduction, water conservation, sustainable transportation, and ensuring safety and well-being.

Key Achievements:

Biodiversity Conservation: The establishment of green spaces with native plants and sustainable landscaping practices demonstrates the college's commitment to preserving natural habitats and supporting local biodiversity.

Waste Reduction and Recycling: The implementation of a campus-wide recycling program, reduction of single-use plastics, and utilization of biogas plants showcase the college's efforts to minimize its ecological footprint and promote sustainable waste management practices.

Water Conservation: Initiatives such as installing water-efficient fixtures, implementing rainwater harvesting ponds, and promoting water conservation awareness campaigns highlight the college's dedication to responsible water usage and conservation.

Sustainable Transportation: Encouraging the use of public transportation, electric vehicles, cycling, and carpooling underscores the college's commitment to reducing carbon emissions and promoting sustainable commuting practices.

Safety and Well-being: The implementation of safety drills, sustainable construction practices, and the functioning of NSS and Nature Clubs reflect the college's focus on ensuring the safety and well-being of its community while maintaining environmental sustainability.

Continuous Improvement:

The college's commitment to continuous improvement is evident through its participation in various activities such as nature treks, webinars, World Environment Day celebrations, and training programs on green auditing. By periodically reviewing and updating its policies and practices, the college aims to stay abreast of new technologies and best practices in environmental conservation.

Future Outlook:

Moving forward, N.S.S. College, Ottapalam will continue its efforts to create a greener and more sustainable campus environment. By leveraging renewable energy sources, implementing eco-friendly infrastructure, promoting resource efficiency, and conducting regular environmental audits, the college aims to further enhance its environmental performance and contribute positively to the well-being of the environment and its community.

In conclusion, the Green Audit Report underscores N.S.S. College, Ottapalam's steadfast commitment to environmental stewardship and sustainability. Through concerted efforts and ongoing initiatives, the college is poised to serve as a beacon of environmental responsibility and inspire positive change within its campus and beyond.

Energy Audit-Report

INTRODUCTION

Energy efficiency means economizing on the use of energy without adversely affecting economic growth and development. It includes improving the efficiency of energy extraction, Transmission and distribution and increasing the productivity of energy use.

Energy Audit is defined as “the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption”.

Objectives

The energy Audit was intended to meet the following objectives

- ▶ Conduct a simple walk-through audit or observation of the energy consumption of electrical appliances within the campus of N.S.S. COLLEGE, OTTAPALAM Review and analyses energy usage history of the institution to create a baseline for which savings can be measured in the audited building.
- ▶ Determine steps to be taken to reduce energy consumption throughout the buildings and to suggest available options for system improvements in accordance with the budget.
- ▶ Identify and evaluate measures that could improve the environmental performance of the buildings/wards and provide recommendations.

Methodology

There are three phases of Energy Audit

1. Pre audit phase
2. Audit phase
3. Post audit phase

Above phase include following stages

Data Collection: In preliminary data collection phase, executive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurement.

Following steps were taken for data collection:

- ▶ The team went to each department, classroom, office, Library, canteen, hostel etc.

- ▶ Data about the general information was collected by observation and interview.
- ▶ The power consumption of appliances was recorded by taking an average value in some cases.

Audit Phase: In N.S.S. COLLEGE, OTTAPALAM energy auditing was done with the help of faculty members. The energy audit started with the team walking through all the different facilities at the college, determining the different types of appliances and utilities (lights, fans, taps, fridges, air conditioners etc.) as well as measuring the usage per item (Watts indicated on the appliances) and identifying the relevant consumption patterns and their impacts. The staff were interviewed to get details of usage, frequency or general characteristics of certain appliances.

Energy Conservation Policy

The college is dedicated to maximizing conservation and energy efficiency, particularly in the light of the climate crisis and growing public concern for the environment. This policy will assist the institution in creating a campus that is both economically and environmentally viable.

Strategies for the efficient use of Environment & Energy

- ▶ Planning how the institution's development, communications, purchase, curriculum, research, and campus activities will affect the environment.
- ▶ Extending its responsibility to include environmental education through various extension activities.
- ▶ Reducing environmental impacts by promoting best practices for recycling, reusing, and reducing.
- ▶ Wherever possible, encouraging the preservation of natural habitats in the campus.
- ▶ To encourage the use of environmentally friendly modes of transportation, such as carpooling and public transportation.
- ▶ To collaborate with government organizations to enhance best practices for energy conservation within the campus activities.
- ▶ To turn off computers and other office and lab equipment, when not in use.
- ▶ To conduct green audit and develop policies for the proper compliance to sustainability.

Responsibility

The Energy Management Team comprises of:

- Head of the institution
- Staff and Students Representatives
- Faculty familiar with Energy auditing
- Technical Staff

FINDINGS

1. Water

The provided data offers valuable insights into the institution's water management system, essential for conducting an energy audit to optimize resource usage and minimize wastage. Key findings from the data include:

Water Sources: The institution relies on a combination of municipal supply, wells, and rainwater harvesting, showcasing a diverse range of water procurement methods.

No.	Source	Details
1	KWA/Municipal/Supply	1
2	Own Well/s	1
3	Pond/ Rain Water Harvest	3
4	Other	0

Water Distribution Infrastructure: Multiple water pumps, tanks, and a rainwater harvester are utilized to distribute water across various facilities within the institution. This infrastructure is crucial for maintaining adequate water supply and accessibility.

No.	Item	Details
1	Water pump 1 : Electric/Diesel	No:2 - power:20HP
2	Water pump 2 : Electric/Diesel	No:2 - power:1HP
3	Overhead Tank/s, Capacity litre	10000L
4	Canteen Tank Capacity litre	1000L
5	Common Tank Capacity litre	6000L

6	Hostel water Tank Capacity litre	10000L
7	Pumping Hours	4
8	Rain Water Harvester Capacity	100000L

Water Consumption Patterns: Detailed breakdowns of water consumption highlight significant usage for handwashing, personal hygiene, and toilet flushing, indicating areas where energy-saving measures could be implemented.

Place No.	Water Source	Total persons using	Average time/ person (minute)	Water flow/ min. Litre	Disposal to Drainage %	Dis Open Space %	Dis Treated Reused %	Dis Soak Pit %
1	10k Tank	1667	1.5	12	30	50	15	5
2	1k Tank	880	1.5	10	0	100	0	0
3	6k Tank	1200	1	15	10	90	0	0
4	10 tank	80	30	10	60	40	0	0

Efficiency Opportunities: Despite efforts to treat and reuse water, a considerable portion is still disposed of, suggesting potential inefficiencies in water management that could be addressed through energy-saving strategies.

No.	Water Used for	Per Day Total
1	Toilet flushing	5000LPD
	boys and girls urinal	2000Lpd
	Hand washing	7070LPD
2	Cooking	1900LPD
3	Utensils Wash	2000LPD
4	Floor Wash	30LPD
5	Gardening	1200LPD
6	Bathing/Personal cleaning	9900LPD
	Drinking water	120LPD
7	Other/	600LPD

8	Other/Occasional	400LPD
9	Loss thro' - tap leaks	LPD
10	Loss thro' pipe break	70LPD
	Total	30290LPD

Water Outlet Distribution: The distribution of water outlets across different departments, labs, and facilities provides insights into where water is predominantly utilized, aiding in the identification of areas for potential energy-saving interventions.

No.	Building	Taps	Single tap unit	Toilet	Toilet Special
1	English department	4	2	1	
2	Botony department+lab	4	2	1	
3	Commerce department	4	3	1	
4	Electronics lab	1	1		
5	Maths department	3	2	1	
6	Zoology department+lab	9	8	1	
7	Physics department +lab	4	3	1	
8	Hindi department	4	2	2	
9	Office room	2	2		
10	Principal room	2	2		
11	canteen	6	6		
12	Gents toilet	4		4	1
13	Gents urinal	18	18		1
14	Girls toilet	10		10	
15	Physical education department	2	1	1	
16	Malayalam department	2	1	1	
17	Women's hostel	36		36	
18	Economics department	3	2	1	
19	History department	2	1	1	

20	Chemistry department+lab	8	6	2	
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Overall, this comprehensive dataset lays the groundwork for conducting an energy audit focused on optimizing water usage, improving efficiency, and reducing energy consumption within the institution's water management system.

Electric Energy Consumption Breakdown:

- Lighting: LED lights were installed in most areas, contributing to a reduction in power consumption.
- Climate Control: Fans and air conditioners were identified as significant energy consumers.
- Power Generation: The college utilizes a combination of KSEB and solar power, with solar contributing to a significant portion of the load demand.
- Power Backup: UPS and inverters are used for power backup, contributing to additional energy consumption.
- Water Facility: RO water facilities also add to the overall energy consumption.

Effective Measures Implemented:

- Replacement of traditional lighting with LED bulbs, resulting in a significant reduction in power consumption.
- Use of energy-efficient electronic equipment and regular maintenance to achieve energy conservation goals.
- Establishment of an Energy Monitoring Committee for effective implementation of energy management programs.

Recommendations:

Based on the findings of the energy audit, the following recommendations are proposed to further enhance energy efficiency at N.S.S. College, Ottapalam:

- Explore additional renewable energy sources like solar energy to further reduce dependency on conventional power.
- Expand LED lighting retrofitting initiatives to cover all campus facilities for maximum energy savings.
- Implement energy-efficient practices in all operational aspects, including climate control and water facility management.
- Enhance awareness and training programs for students and staff to promote a culture of energy conservation.
- Regularly review and update the energy conservation policy to incorporate emerging technologies and best practices.

Vehicle Use Pattern (Staff & Students)

1. Motor bike/scooter (single, shared) Per day		
o No. of Motor bike/scooter	: 28	single/shared
o No. of Students	: 30	
o Total km travelled/day (To and fro)	: 621 km/pax	
2. Auto Rickshaw		
a. No. of Auto Rikshaws used	: 2	
b. No. of Students/staff	: 2	
c. Total km travelled/day (To and fro)	: 6	km/person
3. Own Car (single, shared)		
a. No. of Own cars	: 19 single; 5 shared	
b. No. of Students/staff	: 35	
c. Total km travelled/day (To and fro)	: 700	km to and fro/car
4. Shared Taxi Car		
a. No. of Taxi cars	: nil	
b. No. of Students	:	
c. Total km travelled/day (To and fro)	:	
5. Private Van/Mini Bus/Bus		
a. No. of Van/Mini bus used	: nil	
b. No. of Students	:	
c. Total km travelled/day (To and fro)	:	
6. Public Transportation (Bus & Train)		
a. No. of students and staff	: 703	
b. Total km travelled/day (To and fro)	: 14060	km to and fro
7. Students Cycling to College		
a. No. of students	: nil	
b. Average km travelled by person/day	:	km to and fro
8. Students Walking to College		
a. No. of Students/staff	: 15	
b. Average km travelled by person/day	: 30	km/pax to & fro

Upon analyzing the vehicle use pattern among staff and students, several key observations have been made:

Predominance of Personal Vehicles: The data reveals a significant reliance on personal vehicles, including motorbikes/scooters and own cars, with 28 motorbikes/scooters and 24 own cars being utilized daily. This indicates a high level of individual motorization among the staff and students.

Limited Use of Shared Transportation: While some shared transportation options exist, such as shared motorbikes/scooters and shared own cars, their usage appears relatively low compared to the total number of vehicles. This suggests that opportunities for further promoting shared transportation need to be explored.

Public Transportation Utilization: Public transportation, including buses and trains, is utilized by a substantial number of students and staff, with 703 individuals using it daily. This indicates a positive trend towards mass transit usage, which can contribute to reducing overall energy consumption and traffic congestion.

Promising Sustainable Modes: The presence of students walking to college highlights a commendable effort towards adopting sustainable transportation practices. However, the absence of students cycling to college suggests a potential area for encouraging alternative modes of commuting.

Recommendations for Energy Efficiency Improvement:

Promotion of Shared Transportation: Encourage the use of shared transportation options such as carpooling, ride-sharing, and bike-sharing programs to reduce the number of single-occupancy vehicles on the road and minimize energy consumption.

Enhancement of Public Transportation: Invest in improving the efficiency, reliability, and accessibility of public transportation services to encourage more individuals to opt for mass transit options.

Infrastructure for Walking and Cycling: Develop and maintain infrastructure such as pedestrian walkways, cycling lanes, and bike racks to support and encourage active modes of transportation like walking and cycling.

Awareness and Education: Conduct awareness campaigns and educational programs to promote the benefits of sustainable transportation practices and encourage behavioral changes among staff and students.

By implementing these recommendations, the institution can enhance energy efficiency, reduce greenhouse gas emissions, and promote sustainable transportation options among its staff and student population.

ENVIRONMENT Audit-Report

INTRODUCTION

Environmental Audit is a well-developed process of extracting information about an Institution and Organization that provides a realistic assessment of how the Institutions and Organizations take steps towards protecting the environment. In order to save the eco-friendly atmosphere of an Institution and Organization, well-developed environmental objectives and targets should be undertaken to reduce the harmful effects to a greater extent. These audits can minimize the environmental pollution in the campus remarkably which in turn reduce the global warming effect as a whole. It is used to maintain the clean and green environment that leads to the stakeholders. It provides a solution at 360° view of a surrounding campus and makes it easy for Owners / Managers/ Environmentalists to collaborate, measure, control, and reduce environmental impacts. Finally, it leads to enhancing the quality of life for human beings, animals and plants.

This audit is a systematic, documented, periodic and objective review by a regulated entity of facility operations and practices related to meeting the environmental requirements. This audit should be undertaken by observing, measuring, recording the data and collecting and analyzing the various components in an organization related to environment.

Objectives of Environmental Auditing

- Define sources, quantify types of waste being generated.
- Collate information on unit operations, raw material, products, water usage and wastes.
- Highlight process inefficiencies and areas of poor management.
- Help in setting targets for waste reduction.
- Permit the development of cost-effective waste management strategies.
- Raise awareness in the workforce regarding the benefits of waste reduction.
- Help to improve process efficiency.
- Assess the quantity of water usage within the institution.
- Find out various sources of organic and solid waste generation and mitigation possibilities.
- Document the waste disposal system.
- Bring out a status report on environmental compliance.

Methodology

Methodology includes data collection, campus physical inspection, monitoring and review of documentation, and data analysis.

Plastic ban policy

The college developed the policy based on the UGC Guidelines for Ban of Plastic Use in Higher Education Institutions. The policy aims to make our campus 'plastic-free' by systematically banning use of plastics and replacing the same with suitable environment- friendly substitutes.

The policy aims at:

- ▶ Prohibiting the use of single-use plastics at the college's canteen and other areas.
- ▶ Conducting sensitization and awareness campaigns on the negative impacts of single-use plastics.
- ▶ Using alternate materials, such as paper cups, cloth bags, and drinking water facilities, can help reduce the amount of plastic water bottles on campus.
- ▶ Segregating the wastes at the point of generation and then transferred, via authorized trash collection service, to approved waste processing centers, disposal sites, or deposition centers.
- ▶ All events organized inside the campus should strictly follow plastic ban guidelines.

Activities identified.

District Level Workshop for Biodiversity Management Committee (BMC)

In association with Biodiversity club and Albatross Nature Club, organized District level workshop for BMC supported by Kerala State Biodiversity Board, Thiruvananthapuram on 11 March 2019.



The session was presided over by Dr. Balachandran S (Principal) and inaugurated by Mr. M.N. Narayanan Namboothiri (Ottapalam Municipal Chairperson). Ms Manju felicitated the session. Dr. Giridharan (Resource Person, KSBB) gave the talk on “Empowering EMC s and role of BMCs in project”.

World Wetland Day 2019 - All Kerala Intercollegiate Quiz Competition Feb 06, 2019 (Wednesday)

All Kerala Mannam Memorial Intercollegiate Quiz Competition on Environment in association with Albatross Nature Club

Quiz master : Dr. Jain Therattil, St. Aloysius College, Elthuruth, Thrissur

Winners:

First Place: NSS College, Nemmara

Runners up : MES College Kalladi, Mannarkad



All Kerala Intercollegiate Quiz on Environment for Mannam Memorial Ever rolling Trophy

2020 : 31 January 2020

Organized jointly by Department of Zoology and Albatross Nature Club.

First prize: SNGS College Pattambi,

Runners up: NSS College Ottapalam



Webinar Series on Magical Mangroves: 20 February 2021

Institutional partner: Sree Narayana College Kollam

Sponsors: WWF India & Godrej

Cohosts: Albatross Nature Club, NSS College Ottapalam

Target group: Students and faculties of Department of Zoology & Members of Albatross Nature Club



World Environment Day 2022 was celebrated on 06.06.2022 with the setting up of Butterfly Garden in the college campus.

Inauguration: Dr. Rajesh R., Principal, NSS College Ottapalam
Inauguration was done by planting a *Citrus* sapling, a host plant for many butterflies, in the garden.

Participation: Faculty and students of Department of Zoology and Botany, along with members of Albatross Nature Club and Bhoomitrasena Club.



Wildlife Week Celebration & Extension Activity: 08.10.2022

Forest cleaning and Faunal Monitoring at Dhoni Forests, Palakkad. Organised jointly by Biodiversity Club and Department of Zoology & Botany

Student Participants: 41 student members of the club

Wildlife Week 2023

The Department of Zoology and Albatross Nature Club jointly celebrated the Wildlife Week 2023 from Oct 3rd to Oct 7th 2023.

03.10.2023: Wildlife documentary screening

The celebration commenced with film screening of Oscar winning Documentary “Elephant whisperers”.

05.10.2023: Faunal Hunt

On Oct 5th ,the campus faunal hunt was conducted from 12:30pm .The maximum number of photos of campus fauna were collected by students and was shared in whatsapp group created for campus faunal hunt.

06.10.2023: Flash Mob



The students conducted awareness campaign by flash mob and prepared charts to create awareness on endangered wildlife. This helped the students in gaining more knowledge and sharing the information with their peers.

Scientific spell bee

Interdepartmental competition.

Winners: First: Rahul (B.Sc. Computer Science); Second:

Anjana G.S. (B.Sc. Zoology)

Adaptation charade and Pictionary

Conducted for students of Department of Zoology and

prizes were awarded to winners.

07.10.2023: Online talk.

Resource Person: Ms. Aparna Purushotaman (HSST Physics and a wildlife photographer by passion).

Nature Walk to Chulanoor Peafowl Sanctuary

Participants : II & III Year B.Sc. Zoology students

Date :15.08.2023



CONCLUSION

Introduction:

This environmental audit report aims to evaluate the environmental management practices and initiatives undertaken by [Institution/Organization Name] based on the provided documents. The audit focuses on assessing waste management, biodiversity conservation efforts, plastic ban policy implementation, and overall environmental sustainability practices.

1. Waste Management:

The audit identified comprehensive efforts towards waste management within the institution. The institution has diligently documented sources of waste generation, quantified waste types, and highlighted areas of inefficiency. Notably, there is a focus on setting targets for waste reduction,

promoting cost-effective waste management strategies, and raising awareness among the workforce. The waste disposal system is well-documented, indicating a structured approach towards waste handling and disposal.

2. Plastic Ban Policy:

The institution has developed and implemented a robust plastic ban policy aligned with UGC guidelines. The policy encompasses various measures to reduce single-use plastics on campus, including prohibition at canteens and events, awareness campaigns, and the promotion of alternative materials. The emphasis on waste segregation and authorized waste processing centers demonstrates a systematic approach to plastic waste management.

3. Biodiversity Conservation Initiatives:

The institution has actively engaged in biodiversity conservation through a series of workshops, competitions, and nature-related activities. Collaborations with external organizations and government bodies indicate a concerted effort to raise awareness and empower stakeholders in biodiversity management. Events such as World Wetland Day celebrations and Wildlife Week activities contribute significantly to fostering a deeper understanding of ecological issues among students and faculty.

4. Student Engagement and Participation:

A notable aspect of the audit is the high level of student engagement and participation in environmental initiatives. Various activities such as quiz competitions, faunal hunts, and flash mobs demonstrate student involvement in environmental conservation efforts. These activities not only enhance students' knowledge but also instill a sense of responsibility towards environmental stewardship.

5. Collaborations and Partnerships:

The institution has established collaborations and partnerships with external organizations, sponsors, and government bodies to support its environmental initiatives. These collaborations have facilitated knowledge exchange, resource sharing, and the amplification of impact in environmental conservation efforts.

Conclusion:

Overall, the environmental audit findings indicate that [Institution/Organization Name] has demonstrated a commendable commitment to environmental sustainability. Through effective waste management practices, implementation of a plastic ban policy, biodiversity conservation initiatives, and active student engagement, the institution has made significant strides towards creating a cleaner, greener campus environment. Continued efforts in these areas, along with ongoing monitoring and improvement, will further enhance the institution's environmental performance and contribute to a better quality of life for all stakeholders.

Recommendations:

- ▶ Continuously monitor and evaluate waste management practices to identify further opportunities for improvement and waste reduction.
- ▶ Expand awareness campaigns and educational initiatives to promote broader participation in environmental conservation efforts.
- ▶ Strengthen partnerships with external organizations and stakeholders to leverage resources and expertise for enhanced impact.
- ▶ Regularly review and update the plastic ban policy to adapt to changing regulations and best practices in plastic waste management.
- ▶ Integrate sustainability principles into academic curricula to foster a culture of environmental responsibility among students and faculty.

Audit Team visit Photos.



CONCLUSION AND RECOMMENDATIONS

Green Audit

- Increase MoU with Govt and Non-Governmental organizations to ensure green campus.
- Labelling of common name and botanical name of plants.
- Zodiac and ornamental plants garden in the campus to be established
- Direction boards and indoor plants for better understanding.
- List of names of visiting birds and names of visiting animals in the campus to be displayed
- Collaborate with government agencies for E-waste disposal.
- Keep soft copies of student's project to reduce paper waste.
- Viewpoints and space for bird watch.
- Miyawaki forest to be strengthened
- Open Group discussion points to be established
- Strengthen Organic waste management and reuse methods.
- Project and dissertation work on environmental science and management carried out by students and staff members.
- New UG programs in Life sciences (Zoology, Botany, etc.) recommended
- Establishment of Open Class.
- Purchase environmental studies related books and Journals to library.
- Establishment of freshwater fish aquarium and aquatic plants.

Environment Audit

- Sign boards indicating the following to be created *plastic free campus, tobacco free campus, don't walk on the lawns and don't pluck the flowers.*
- separate boards to be used for the following (with names in English, Malayalam and scientific name). A QR code also can be implemented with short descriptions. Fruit garden, Vegetable garden, Butterfly garden, Herbal garden.
- Some schemes of Government can be implemented for environmental protection of the campus like Swatch Bharath Abhiyan and Clean India Mission
- Recycling of kitchen wastes collected from hostel, Canteen and other places should implemented properly
- Steps should be taken for organic waste management, segregation of waste and resume methods
- Projects or dissertation works on environmental science and management can carry out by students and teachers in collaboration with concerned bodies
- Methods should be adopted for E-waste management and biochemical waste management strategies in the campus
- Digital or automatic technology to reduce consumption of paper, gas, water and energy can implemented
- Number of Tri-Colour Waste bins to be increased.
- As the institution having wide variety of trees and plants, list of trees and its variety can be prepared
- Keep details of services and maintenance on the drinking water machines for ensuring its credibility among users
- Ensure proper cleanliness and maintenance in classrooms and Labs

Energy Audit

- Solar Energy generation may be improved up to 30% of total connecting load
 - Sensor based lights and water taps to be implemented
 - Ventilation in Labs to be improved.
 - Refrigerators, Air conditioners and other electrical equipment to be assured five-star category in the coming purchases
 - Awareness boards needs to be displayed near switches and water taps.
 - Avoid overflow in the water tank.
 - Solar streetlights are suggested.
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Reference

- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Petroleum Act: 1934 – The Petroleum Rules: 2002 13
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle Rules:1989 (Amended in 2005)
- Energy Conservation Act 2010.
- The Water [Prevention & Control of Pollution] Act – 1974 (Amended 1988) & the
- Water (Prevention & Control of Pollution) Rules – 1975
- The Air [Prevention & Control of Pollution] Act – 1981 (Amended 1987) The Air
- (Prevention & Control of Pollution) Rules – 1982
- The Gas Cylinders Rules – 2016 (Replaces the Gas Cylinder Rules – 1981
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules,2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- The Batteries (Management and Handling) rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices
- Internal Records of the Campus