REPORT OF ENVIRONMENT AUDIT

Submitted to

St. Joseph's College of Arts and Science for Women
Hosur – 635 126, Tamil Nadu, India.

Date of Audit: 11.09.2021 (Saturday)

Submitted by

Regd. No. 114/2017

NATURE SCIENCE FOUNDATION

(An ISO 9001:2015 Certified Organization)

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Motto

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

Contents

1. Introduction

Environment (Eco) audit is quantitative and qualitative data to track air, soil and water waste, and to gain actionable insights to improve the operational performance in the atmosphere. This audit is generally used to observe the clean and green environment of an Organization. It provides a 360° view of a surrounding campus and makes it easyfor 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. Eco audit initiatives are the need of the hour across the world due to change in environmental conditions, global warming and increasing human population (Maltby, 1995; Haahkim and Yunus, 2017). It aims to make a sustainable and friendly environment for the stakeholders.

Environment audit is a well-developed process of extracting information about an Organization that provides a realistic assessment of how the Organizations take steps towards protecting the environment. In order to save the eco-friendly atmosphere of an Organization, well-developed environmental objectives and targets should beundertaken to reduce the harmful effects to a greater extent. The audit process can minimize the environmental pollution in the campus remarkably which in turn reducesthe global warming that affects as a whole. As per the Government law, the environmental legislations should be followed by all the Institutions and Organizationsand make sure that their activities should not destroy the environment (Ramachandra and Bachamanda, 2007). An environmental audit is a kind of assessment supposed to create awareness of environmental compliance and implementation gaps in the management system, along with related corrective movements.

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. Environment audit should be undertaken by observing, measuring, recording the data and collecting and analyzing the various components in an Organization related to the environment. To be effective, it must be done systematically and thoroughly together with full management support (Conde and Sanchez, 2017). In general, environmental audit is designed to achieve a maximum resource optimization and improved process performance in the audit sites. It is a 'Common Sense Approach'to identify the problems and solve those problems pertaining to curb eco-friendly atmosphere (APHA, 1981; Venkataraman, 2009). Environmental audit enables a comprehensive look at the audit sites to facilitate our understanding of material flows and to focus our attention on areas where waste reduction is executed and therefore cost saving is made possible (Gowri and Harikrishnan, 2014).

Environmental audits ensure that the environment is not disturbed from its balanced existence, so that it provides an eco-friendly atmosphere to the stakeholders. Similar to that of Environmental audit, Green campus audit is also a type of assessmentto ensure that the Institution and Organization campus should grow a large number of trees, shrubs, herbs, lawns, climbers, twins and lianas in their campus to produce moreamount of oxygen and absorb more amount of carbon-di-oxide to provide a healthy atmosphere to the stakeholders (Aparajita, 1995; Adeniji, 2008). Environmental audit provides vivid dimensions on how waste materials are being managed and the source

of wastes along with the solutions for environmental degradation is managed. Environmental Management System (ISO EMS 14001:2015) should be implemented by every Organization to ensure that the eco-friendly campus is being given to the stakeholders. Eco-friendly youth leadership programmes, green campus practices,social responsibility and Institutional values comprehending the relationship with the ecosystem for a sustainable environment are being evaluated (IGBC, 2021).

2. Aims and Objectives of Environment Audit

The important goal of an Environment audit is to promote the environment management and conservation for future generations. The reason for the environmental audit is to perceive, quantify, describe and prioritize the framework of environment sustainability in compliance with the applicable rules, regulations and requirements. In general, Environment audit can be achieved by creating awareness on the importance of safeguarding the environment among students, faculties and staff members, including public domain. The major goals of environment audit are:

- To safeguard the environment and reduce the threats posed to human health by the Organization.
- To create awareness among the stakeholders about the importance of environmental degradation and conservation as per the Environment Management Systems (ISO standard of 14001:2015) and Environmental Legislations by the Organization.
- To establish a baseline information about the eco-friendly environment in the campus to the stakeholders for future sustainability.
- To review the disposal of solid wastes and wastewaters in the campus and identify the sources of waste generation and possibilities of mitigation with respect to environmental compliance.
- To conduct outreach programmes to the rural, tribal and urban community people on the environment damage and conservation.
- To correlate the flora and fauna with environmental sustainability in the audit sites to provide a healthy atmosphere to the members of the Organization.
- To take steps to minimize the environmental pollution and degradation by means of developing 'Sanitation and hygiene policy', 'Water conservation policy', 'Waste management policy' and 'Green campus and Environment policy' by the Organization.

3. Procedures followed in Environment Audit

Environmental audit involves monitoring an Organization concerning about the green campus, environment, sanitation and hygiene policies. It is a regular process thatis conducted periodically by a regulated entity to check whether an Organization meetsthe requirements of environmental compliance. The process of environmental audit includes examining, collecting, evaluating, documenting data and analyzing various components related to environmental aspects (IGBC, 2021; WGBC, 2021). Environmental audit was carried out as per the procedures mentioned of the Manual ofGnanamangai *et al*. (2021). The environmental audit possesses the following characteristic features in which various aspects of wastes generation and steps taken bythe Organization to reduce both solid and liquid wastes without harming the environment.

- Identification of various sources to generate wastes and types of degradable and non-degradable wastes in the campus.
- Collection of information related to type of operations, use of various raw materials and products that generate wastes.
- Finding the highlights of inefficiencies in the process that generate wastes and areas that are to be monitored with extra care.
- Setting up the target for reduction of wastes and source of waste generation without affecting the environmental health.
- Steps taken to minimize the environmental pollution and degradation by means of developing internal policy methods.
- Suggestion of cost effective waste management strategies and zero waste discharge in the Organization.
- Creation of awareness among stakeholders on the benefits of reducing wastes without damaging the ecosystem.
- Aids in increase of process efficiency and status report with regards to environmental compliance and management.

4. Steps involved in the Process of Environmental Audit

The following are the major steps involved in the process of environmental audit:

Step #1: Opening meeting among the audit team and auditees, discussed about the audit procedure and document verification.

Step #2: Visited the on-site of the audit along with the audit team and auditees.

Step #3: Walked around campus to check the facility as walk-through audit and took photographs for preparing the audit report.

Step #4: Monitor the components as per the environmental audit checklist (Sanitation and hygiene, water conservation, waste management and green campus and environment policies).

Step #5: Noted down what all components are present and what are all not available in the campus as of environmental audit components listed by NSF ISO-EMS checklist.

Step #6: Identified the issues in the campus with respect to the environmental compliance and strengths and weaknesses of the Auditee's Management controls and risks associated with the audit.

Step #7: Looked into other items to be monitored as per the NSF checklist with respect to Ecology and Environment studies.

Step #8: Exit meeting held after the audit in which the audit findings with the members of the Organization was discussed.

Step #9: Prepared and distributed the findings as a Report and Certificate along with the recommendations including the best practices followed by the Auditee.

5. Benefits of an Environmental Audit:

Environmental audit provides the following benefits to the Organization:

- Discover various issues related to the environment in the Organization.
- Compute the issues, identify and assess the impact of the issues.
- Provide suggestions to minimize the issues found in the Organization.

On conducting an Environmental audit, it provides the following results:

- Conservation of resources and reduction of raw materials.
- Minimizing wastes, control of pollution and reduction of costs.
- Improvement in working conditions and improvement in process efficiency.

6. Phases of an Environmental Audit:

The environmental audit encompasses three phases such as pre-audit, during-audit and post-audit. These phases involve various components to resolve the problems in the campus as well (Arora, 2017; Gnanamangai *et al.*, 2021).

6.1. Pre-Audit:

Pre-audit involves the following components:

- ✓ Planning the audit
- ✓ Selecting the audit team
- ✓ Scheduling the audit facility
- ✓ Acquiring the background information
- ✓ Visiting the site of audit
- ✓ Collection of data and documents verification

6.2. During-Audit:

During the audit, the following components are involved:

- ✓ Understanding the scope of audit
- ✓ Analysing the strength and weakness of the internal controls audit
- ✓ Conducting the on-site audit
- ✓ Evaluating the observations of audit programme
- ✓ Noting down the key observations and taking photographs
- ✓ Clarifications if required during the audit site and document verification

6.3. Post-Audit:

Post-audit involves the following components:

- ✓ Identification of the best practices followed by the Organization
- ✓ Compiling a report of the data collected
- ✓ Distributing the report and certificate to the Organization
- ✓ Preparing an action plan to overcome the flaws
- ✓ Providing suggestions to implement the action plan
- ✓ Setting up the future environmental aims and objectives

7. Components of an Environmental Audit:

Environmental audit has five components, namely: 1) Sanitation and hygiene policy, 2) Water conservation policy, 3) Rainwater harvesting policy, 4) Waste management policy and 5) Waste management initiatives

7.1. Sanitation and Hygiene Policy:

In this component, the following are being considered:

- Physical appearance and overall ambience
- Adequacy of toilets (Student/Employee: toilet ratio)
- Gender balance and disabled-friendly toilets (Male: Women)
- Water taps and sanitation plumbing, adequacy and efficiency
- Adequate clean drinking water facilities
- Kitchen staff apparel and hygiene
- Canteen and hostel hygiene maintenance
- Kitchen hygiene and fly proof condition
- Cutlery, crockery and utensils hygiene
- Dining hall hygiene and bad odour free
- Cleaning equipment and consumables

7.2. Water Conservation Policy:

In this component, the following are being considered:

- Know the source of the campus water availability
- Monitor overhead tanks for periodical cleaning
- Reuse of treated water, recycling, leakages etc.
- Drip irrigation / sprinkler irrigation system for watering to plants
- Water efficient dispensing mechanism in campus

7.3. Rainwater Harvesting Policy:

In this component, the following are being considered:

- Implementation of rainwater harvesting system
- Functioning status of rainwater harvesting system
- Connectivity between rainwater harvesting and open wells and bore wells

7.4. Waste Management Policy:

In this component, the following are being considered:

- Is the campus a 'Plastic free zone'?
- What are the methods adopted for waste segregation and storage?
- Disposal of solid wastes, reuse and recycling process
- Vermicompost, cow dung and organic manure units
- Availability of Biogas plant and its implementation status
- Installation of incinerators and their functioning status
- Adequate number of waste bins, separate bins for dry and wet wastes
- Food waste dumped status methods of disposal

7.5. Waste Management Initiatives:

In this component, the following are being considered:

- Sign boards indicating energy / water conservation in respective places
- Awareness sign boards on usage of tobacco and tobacco free campus
- Awareness sign boards on plastic usage and plastic free campus
- Programmes related to waste segregation / waste disposal systems
- Sufficient ventilation facility
- Social responsible activities to rural, tribal and urban areas

8. About the Organization

With the noble goal of higher education for women, St. Joseph's College of Arts and Science for Women (SJCASW), a renowned institution affiliated to the Periyar University, Salem, Tamil Nadu takes the pride of providing sound morality, discipline and overall development of individuals. It carries a rich history, holding the pride of gaining a far-famed reputation under the Periyar University and managed by the FSPM Sisters, Coimbatore. The college was established in 2006 which offers various undergraduate (B.A./B.Sc./B.Com.), postgraduate (M.A./M.Sc./M.Com./MBA.) and Research courses (M.Phil and Ph.D) with a strength of 1642 undergraduate and 74 postgraduate students during the academic year of 2021-22.. The College provides high quality education and training in the field of Arts, Science and Management to prepare students to contribute to India's social, technological and economic development. Apart from quality education, the College provides training to make students responsible and socially and culturally aware. The College is situated in a sprawling 10.55 acre in the business hub of Hosur city. Around 80 teaching and 42 non-teaching staff members representing 10 academic Departments are working as on date in the College to enhance the teaching and learning process.

SJCASW is maintaining more than 75% of green cover area and open unutilized landfills zone after building construction as per the guidelines of World Green Building Council, Indian Green Building Council, Environmental Regulations and Compliances.

9. Audit Details

Date/Day of Audit	: 11.09.2021 (Saturday)
Venue of Audit	: St. Joseph's College of Arts and Science for Women, Hosur, Tamil Nadu.
Audited by	: Nature Science Foundation, Coimbatore, Tamil Nadu, India.
Audit type	: Environment Audit
Name of ISO EMS Auditor	: Mrs. S. Rajalakshmi, Chairman & ISO EMS Auditor, NSF.
Name of Lead Auditor	: Dr. R. Mary Josephine, Board of Directors & Botanist, NSF.
Name of Subject Expert-I	: Dr. D. Vinoth Kumar, Lead Auditor & Joint Director, NSF.
Name of Subject Expert-II	: Dr. M. Ravichandran, Lead Auditor & Associate Scientist in Bayer Bioscience Ltd, Hyderabad.
Name of IGBC AP Auditor	: Dr. B. Mythili Gnanamangai, IGBC AP, Indian Green Building Council.
Name of Eco & Green Officer	: Ms. S. Sowndharya Eco & Green Council Programme Officer, NSF.

10. Observations of the Environment Audit

10.1. Plastics use and their impact on the environment

People use plastic bags and plastic ware items every day to hold objects like meals, clothes, groceryand stationary items, which can be bought from shops. Generally, the plastic items are non- degradable in nature that lead to soil pollution and affect the soil health significantly. Most of the plasticitems are considered as solid waste. This has resulted in many damaging environmental effects inclusive of animal choking, pollution, blockage of channels, rivers and streams, and landscape disfigurement. According to the World HealthOrganization (WHO) report, plastic items take at least 400 years to decompose completely in the soil which illustrates the subsequent effects on the environment. Plastic pollutants form a basis for damage to humans, animals and flora through toxic pollution. It can take masses or even heaps of years for plastic to break down so the environmental harm is lengthy-lasting. It impacts all organisms in the food chain fromtiny species to big ones. There is a need to reduce the plastic use to effectively limit plastic waste in the campus.

The SJCASW Management has taken sufficient attempts not to use plastics in the campus and displayed a slogan 'Plastic free campus' in places like canteen, hostel dining halls, seminar halls, corridors, etc. to the students, parents and public. The SJCASW Management insisted the people use eco-friendly bags made from organic materials like plant fibres which are easily decomposable in nature. These efforts are very much essential to keep the environment neat and clean to conserve nature.

10.2. Solid Waste Management

Solid waste control is a term that is used to consult the method of accumulating and treating solid wastes by following the method of eco- friendly manner. It also offers solutions for recycling objects that do not belong to garbage ortrash. As lengthy as humans have been living in settlements and home regions, rubbish or solid waste has been a difficult task. In the solid waste management, the wastes are accrued from different parts and are disposed of based on degradability materials like paper and non-degradability materials like glasses, plastics and metals. Integrated Solid Waste Management (ISWM) is an activity that promotes prevention of waste, recycling, composting, and disposal. A powerful ISWM considers how to save, recycle, and manage stable waste in better methods that will protect the humans and the environment.

The SJCASW Campus has a very good solid waste recycling unit which operates a few vehicles to collect wastes using compostable bags across the campus. Both degradable and non-degradable items are being collected from different Department laboratories, canteen and open corridors every day and dumped in the places which is subsequently segregated based on the nature of degradability. The segregated items are neatly packed in eco-friendly covers and subjected to degradation without harming the environment. In addition, dust bins are kept in different places across the campus to provide a dust free

atmosphere to the stakeholders. The dust binsare labelled properly for the indication of degradable and non-degradable items. Thesebiocomposts are utilized for cultivation of plants in the campus and enhance the healthof soils and population density of beneficial microorganisms to a greater extend.

10.3. Composting

This is the biological process where fresh organic waste are allowed to be decomposed into humus like substances. In this process aerobic microorganism fasten the decomposition of waste under aerobic condition (presence of oxygen). The end product of the compositing method converts the waste into compost which acts as good manure and increases the fertility of soil. Composting is of two types: Natural process of decomposition by small microorganism and bacteria. Artificial process also known as vermicomposting, where the earthworms feed on and degrade the organic waste and convert it into high grade, nutrient rich compost, which acts as a significant biofertilizer and soil conditioner.

10.4. Recycling of Wastewaters

Wastewater recyclers are important features in any Organization or Industry. Once for all the implementation should follow the proper guidelines for wastewater treatment system discharge standards as per Central Pollution Control Board (CPCB), Government of Tamil Nadu. The main feature of these discharge standards is the treated water should not be harmfulto the biodiversity, resources and the environment. If an industry or Organization has the wastewater treatment plan, proper records on the analysis of water input and output parameters including the running time of the wastewater treatment plant; its operation cost, its maintenance and the reuse records of the treated water should be well accounted. A typical wastewater treatment system should be based on the waste characterization and the treatment of wastes can be modified so as to fit into the mottoof treating the wastewater which in turn to release of safe water subsequently it shouldbe ensured.

The SJCASW Campus has a very good wastewater treatment facility covering primary, secondary and tertiary water treatments for elimination of excess phosphorus, potassium, zinc, chromium and nitrogen contents along with harmful pathogens and the degradation of inorganic wastes. In addition, there is a Reverse Osmosis (RO) water unit to get RO water. The RO treated water is periodically tested for the physico-chemical properties for which Registers containing data relevant to water analysis are being maintained. There is a periodical test to check the physico-chemical properties of wastewaters such as pH,biological oxygen demand, chemical oxygen demand, dissolved oxygen and carbon-di-oxide and total soluble solids before reuse for gardening.

10.5. Rainwater Harvesting

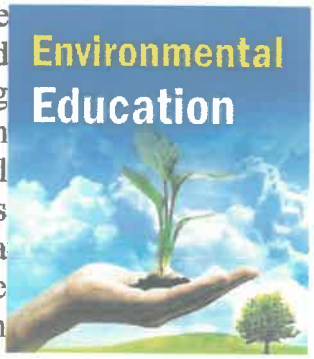
Rainwater harvesting is a simple strategy by which rainfall is gathered and stored for future usage. The process involves collection and storage of rain water with help of artificially designed systems, that runs off natural or man-made catchment areas eg. Rooftop, compounds, rocky surface, hill slopes or artificially reparied imprevious/semi-pervious land surface. The collected rain water from surfaces on which rain falls may be filtered, stored and utilized in different ways or directly used for recharge

purposes. Rainwater Harvesting is unrestricted from any kind of impurity, with relatively less storage cost and no maintenance cost. Rainwater harvesting systems are cost-effective, provide high-qulity water, lessens dependence on wells and are considerably easy to maintain since they are not utilized for drinking, cooking or ther sensitve.

10.6. Oxygen producing and Carbon-di oxide absorbing plants to give pure atmosphere to the Stakeholders

Attempts are being made to give a pure atmosphere without any air contaminants to the stakeholders for whicha large number of oxygen producing and CO2 absorbing plants are planted in the SJCASW Campus. There are some plants which are being considered highly efficient in oxygen production and carbon-di-oxide absorption which in turn reflected the air quality of the green campus. If more oxygen is made available in the campus naturally, the stakeholders may be free from cardiovascular and pulmonary problems including breathing troubles. The oxygen producing and CO2 absorbing plants available in the campus are Neem (*Azardirachta indica*), Amla (*Phyllanthus emblica*), Coconut (*Cocos nucifera*), Hibiscus (*Hibiscus rosa-sinensis*), Pampas grass (*Cortaderia selloana*), Pongam (*Pongamia pinnata*), Star Gooseberry (*Phyllanthus acidus*), Henna (*Lawsonia inermis*), Guava (*Psidium guajava*), Oyster Plant (*Tradescantia spathacea*), Papaya (*Carcia papaya*), Betel leaf (*Piper betel*), Areca palm (*Dypsis lutescens*), Custard apple (*Annona reticulata*), Silver oak (*Grevillea robusta*) and God's crown (*Phaliria macrocarpa*). The predominant families of various monocot and dicot plants of oxygen producing and CO_2 absorbing plants found in the SJCASW Campus are Acanthaceae, Anonaceae, Arecaceae, Bignoniaceae, Caesalpiniaceae, Combretaceae, Cycadaceae, Euphorbiaceae, Fabaceae, Lythraceae, Malvaceae, Meliaceae, Moraceae, Myrtaceae,Nyctaginaceae, Phyllanthaceae, Polygalaceae, Rutaceae, Rubiaceae, Turneraceae, Verbenaceae and Vitaceae.

11. Environmental Education



An environmental study is the learning principle of the ecosystem and how it will expand sustainable techniques to defend the surroundings. It enables people to develop anunderstanding of the environment in which we live and helpsto overcome tough environmental troubles affecting nature. Inaddition, the physical aspects of the environment should be studied, it also emphasizes the need to conserve biodiversity and undertake an extra sustainable way of life and make use of sources in a responsible manner. To create attention amongst today's generation on pressing environmental troubles, the University Grants Commission (UGC) in India has made it mandatory forthe Universities and Autonomous Colleges to introduce a course in 'Environmental studies' and teach to the students about the ecosystem, pollution and problems associated with the environment.

The students of SJCASW are motivated to study 'Environmental Science' subject as per the University guidelines. The Undergraduate students of SJCASW are studying 'Environmental Science'subject which is included as a core subject in the curriculum. In addition, the students from Biotechnology, Chemistry and Physics courses are studying 'Environmental Studies', 'Business Environment, 'Solid Waste Management' and 'Wastewater Treatment' elaborately as core subjects. Both UG and PG students are motivated to do mini-projects and final year projects as a part of their curriculum on environmental protection and biodiversity conservation. The students are encouraged to visit industries involving in solid waste management and wastewater purification and eco-friendly materials production processes across India.

11.1. Implementing Swachh Bharath Abhiyan Scheme under Clean India Mission

Swachh Bharat Mission (SBM), Swachh Bharat Abhiyan, or Clean India Mission was a country-wide campaign initiated by the Government of India in 2014 to eliminate open defecation and improve solid waste management. It is a restructured version of the Nirmal Bharat Abhiyan launched in 2009 that failed to achieve its intended targets. It was claimed to be "the largest behavior change campaign ever attempted in the zzfield of sanitation in the world" and was introduced as two sub-missions. Swachh Bharat Mission was to devise a robust mechanism to keep India clean. Be it an initiative to "say no to single-use plastic" or ban crackers, there is still a need to establish a corporate and civic partnership that could develop and promote national cleanliness ethics. Introducing a voluntary national effort to increase recycling in the workplace, in government and private offices is useful in promoting recycling of waste and discouraging people to use single-use plastic.

This scheme was implemented by Educational institutions covering universities, colleges and schools ,Government Department, Companies and Public sectors across the country to give a safe pollution free environment, eliminate the open defecation, improve the waste management and sanitization and refining drinking water quality to the stakeholders. The NSS, RRC, and YRC students collected and dispose the waste in the trash by using ecofriendly covers. The rallies were conducted during the world environment day celebration.

11.2. Public transport, Low emitting vehicles and Control of car smokes and exhausts

A smart method is to pick out public transportation as much as feasible without polluting the environment by way of driving a car or bike. It additionally often is cheaper, and it leaves much tear in personal automobile expenses. Public transportationcars together with buses reduce carbon emissions which greatly decreases the development of smoke within the towns. This means that human beings have more healthy air to respire. Comparing a bus travelling with seven people to one single person using a vehicle, it's been observed that buses are the most effective by producing 1/5 the quantity of carbon gas emissions compared to the findings of the car effects.This is a huge decrease in discharge of natural resources per person. Public transportation is better for the surroundings which have been proven through research on emissions. Other than this, it also gives more benefits like less noise and traffic congestion. Whenever possible, try to take public transport in place of one's own vehicle. Fewer miles means approachingfewer emissions.

The SJCASW operates some vehicles to pick up the students and staff members around Hosur city to enhance the teaching and learning processes. In addition, a few vehicles are operated to collect the garbage for day-to-day activities with respect to running of canteen, electrical, mechanical, civil works like construction, plumbing and wiring. The vehicles are maintained properly by following periodical services, changing oil filters and belts, grease and lubricate, batteries, and etc. It is observed that a few of staff members and students are coming to SJCASW every day using their own vehicles (Cars and Bikes / Scooters) which accounted to be moderate. These vehicles are properly maintained by them which showed the carbon emission to the environment is controlled effectively.

11.3. Napkin disposal facility

Menstrual Hygiene Management (MHM) is anindispensable part of the Swachh Bharath Mission Guidelines (SBM-G) for adolescent girls and ladies. As in step with MHM hints, 'Safe disposal' method making sure that the process of destruction of used and dirty materials is performed without human touchand with minimum environmental pollutants and 'Unsafe disposal' method throwing used material intoponds, rivers, or inside the fields exposes others inside the vicinity to decaying material and have to be averted. Some of the unsafe practices of napkins include throwing them unwrapped into fields and rooftops, Wrapping them in paper/ plastic bags and throwing them outdoors or in dustbins, burying them for de-composting, throwing them in latrine / toilets, burning it. These unsafe practices are to be avoided and rather health practices can be adopted.

The SJCASW Management is implementing the safe practices of disposing of napkins using small scale incinerators in ladies hostels. Incinerators facility and disposal structures in the proper directions and other social stigmas connected to menstruation influences the sanitary waste disposal conduct of women within the campus is very much appreciated. The Management is taking care of adolescent girls and ladies significantly.

11.4. Ventilation and Exhaust systems in Buildings

Ventilation is necessary in buildings to remove 'stale' air and replace it with 'fresh' air. This helps to moderate internal temperatures, reduce the accumulation of moisture, odours and other gases that can build up during occupied periods. In addition, it create air movement which improves the comfort of occupants. Mechanical (or 'forced') ventilation tends to be driven by exhaust fans to replace stable air with fresh air along with moderating the optimum temperature to the occupants. Natural ventilation is driven by 'natural' pressure differences from one part of the building to another. Internal partitions may block the air paths, hence the creation of draughts adjacent to openings for more flow of air circulation. Natural ventilation can be wind driven, or buoyancy driven. If air quality is poor, nature ventilation by means of opening windows may be adopted to use in the building. It may also be useful to reduce the noise level to a greater extent. It is recorded that Joseph's Block has 90 Nos of ventilators followed by 33 Nos ventilators at Mary's

Block rest room. Similarly, auditorium has 5 Nos, Joseph's Block rest room has 3 Nos, canteen has 6 Nos and security room has one number of ventilators.

11.5. Disposal of e-Wastes at SJCASW Campus

In compliance to the E-Waste Management Rules (2016), Government of India, e-waste materials were collected from St. Joseph's Institutions are being segregated and then sold to authorized agencies which are approved by the Pollution Control Board (PCB) of Tamil Nadu for handling e-waste. Due to this e-waste activity disposal, the e-waste pollutionwas significantly reduced in the SJCASW Campus.

11.6. Reduce Laboratory Waste -Think Beyond Recycling Programmes by SJCASW

Scientific laboratories can produce a significant amount of waste. The scientific process is very materials heavy so designing an eco-friendly laboratory can be challenging when it comes to trash output. While recycling in the laboratory is often the first thing that comes to mind, reducing the amount of resources you use from the very beginning is an even better solution to reduce waste. Get started setting up your sustainable laboratory with these simple steps as per the following:

- Call for an all hands on deck laboratory meeting. Discuss the need to reduce waste in the laboratory and brainstorm a few ideas with your employees.
- Hang signage in appropriate areas as a reminder of eco-friendly laboratory practices (ie: when, how and what to recycle).
- Unwanted or unneeded items can be donated to nearby laboratories that have a need for them.
- Placed a recycling bin in the laboratory for paper to be recycled. Placed another one in the break room for the recycling of aluminum cans and plastic water bottles
- Do not throw away broken equipment.
- Dishwashers for laboratory glassware should not be run unless the machine is full.
- All the hazardous waste is disposed of properly. While laboratories cannot always control the amount of chemical waste they produce, they can certainly make sure it is disposed of the right way.

11.7. Drinking water (RO water) facility to the Stakeholders

Reverse osmosis removes contaminants from unfiltered water, or feed water, when pressure forces it through a semipermeable membrane. Water flows from the more concentrated side (more contaminants) of the RO membrane to the less concentrated side (fewer contaminants) to provide clean drinking water. The fresh water produced is called permeate. The concentrated water left over is called the waste or brine, the rejected impurities from the concentrated side being washed away in the reject water. RO membranes can also act as an ultra-filter for removing heavy metal particles including some microorganisms that may be too large to pass through the pores of the membrane. The College provides clean and hygienic drinking water with a capacity of 500 litres per hour with the help of Reverse Osmosis treatment system which has been installed in each block for the benefit of students and staff members. The water facilities are made available in all the buildings at different locations for the students and staff members. The RO water quality in terms of TDS estimation showed that the input water TDS was 1200 and output water was 65. There was a significant reduction in TDS content between input and output water. Like TDS, the other water quality parameters such as pH, biological oxygen demand, chemical oxygen demand, dissolved oxygen, dissolved carbon dioxide and micro and macro elements namely nitrogen, potassium, phosphorus, lead, nickel, arsenic, chromium, etc. may be estimated.

12. Best Practices on Environment Audit Initiatives followed in the Organization

1. SJCASW has 'Eco Club' which is functioning well by both UG and PG students and conducting a large number of awareness programmes related nature conservation and environmental protection.

2. The SJCASW has a Biogas plant for energy efficiency management and to reduce the fossil fuel expenditure as well as impact on the environment.

3. Swachh Bharath Abhiyan under Clean India Mission is implemented effectively towards sanitation, solid waste management and refining drinking water quality to promote cleanliness to rural, tribal and urban people across Krishnagiri District of Tamil Nadu.

4. In compliance to the E-Waste Management Rules (2016), Government of India, e-waste materials are being collected, segregated and then sold to authorized agencies which are approved by the Pollution Control Board (PCB) of Tamil Nadu for disposal of e-wastes which in turn to reduce the e-waste pollution.

5. Reverse Osmosis (RO) units in different buildings are made available to supply RO water to the students and staff members which is periodically tested for the physico-chemical properties. There was a significant reduction in TDS content between input and output water. The input water TDS was 1200 and output water was 65.

6. Natural Ventilation and Exhaust fans are made available in all buildings to replace 'stale' air with 'fresh' air which helps to moderate internal temperatures, reduce the accumulation of moisture, odours and other gases that can build up during the occupied periods.

13. Recommendations for sustainable environment

- A proper steps may be taken to minimize the environmental degradation by meansof developing 'Sanitation and hygiene policy', 'Water conservation policy', 'Waste management policy' and 'Green campus and Environment policy' in collaboration with Governmental and Non-Governmental Organizations.

- Helpline numbers for waste collection may be made available in the SJCASW Campus which may be useful for door-to-door collection of wastes thus avoiding improper disposal by individuals.

- The concept of eco-friendly culture and sensitize the students to minimize the useof plastics, non-biodegradable materials and exploitation of natural resources which pose the environmental hazards may be carried out.

- SJCASW required the solid waste management and wastewater treatment facilities to recycle degradable wastes and to purify the wastewaters using activated-sludge to manage both solid wastes and wastewaters effectively without harming the environment.

- Policy on paper usage may be initiated with certain guidelines to reduce the number of papers that are being used by the students for assignments, mini-projects and final year projects which in turn to reduce 60% usage of paper as a commitment to curb the environmental damage

- A commitment to keeping students in conducting various competitions *viz.*,painting, pencil sketching, rangoli, paste the picture, wealth out of waste, debate on environmental days, essay writing, card making, etc., for the noble cause of environmental protection and nature conservation.

14. Conclusion

St. Joseph's College of Arts and Science for Women (SJCASW), Hosur, Tamil Nadu was a well-established Institute in India in terms of academic activities and social activities extended to rural and urban people. It is observed that efforts are continuously made in providing an eco-friendly atmosphere to the students, research scholars, parents and staff members. The environmental protection initiatives were substantial by means of creating solid waste management, wastewater treatment, and sanitation, rainwater harvesting system and natural vegetation in the SJCASW Campus without harming the environment. SJCASW has some Technology Missions related to 'Green Campus and Environment' sustainability as well. A campus ecosystem was supported a rich biodiversity of flora and fauna which was making a sustainable environment and eco-friendly campus. Swachh Bharath Abhiyan was implemented effectively by the SJCASW Management to promote sanitation and cleanliness to rural, tribal and urban people across Krishnagiri District of Tamil Nadu. To conclude an environment audit report, the

SJCASW was an eco-friendly campus and providing pure atmosphere to the stakeholders and supports the nation as a whole in future generations.

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16. References

Adeniji, A.A. 2008. *Audit and Assurance Services. Lagos: Value Analyst Concept of Green Audit*. New Age International, New Delhi, India.

Aparajita, G. 1995. Environmental Audits- a Mean to Going Green. *Development Alternatives* **5** (4): 7-9.

APHA, 1981. *Standard methods for the estimation of water and wastewater*. Vol. II, 15th edn, Washington, US.

Arora, D.P. 2017. Environmental Audit–need of the hour. *International Journal of Advanced Research in Engineering & Management* **3** (4): 25-31.

Brindusa M. Sluser, Caliman, F.A., Betianu, C. and Gavrilescu, M. 2007. Methods and procedures for environmental risk assessment. *Environmental Engineering and Management Journal* **6** (6): 573-592.

Conde, M.C. and Sanchez, J.S. 2017. The school curriculum and environmental education: A school environmental audit experience. *International Journal of Environmental & Science Education* **5** (4): 477-494.

Fachrudin, H.T., Fachrudin, K.A. and Utami, W. 2019. Education activities to realize green campus. *Asian Social Science*, **15** (8): 18-27.

Gowri, S. and Harikrishnan, V. 2014. Green computing: Analyzing power consumption using local cooling. *International Journal of Engineering Trends andTechnology* **15** (3): 105-107.

Gnanamangai, B.M., Murugananth, G. and Rajalakshmi, S. 2021. *A Manual on Environment Management Audits to Educational Institutions and Industrial Sectors*. Laser Park Publishing House, Coimbatore, Tamil Nadu, India, p. 127.

Haahkim, W. and Yunus, A. 2017. Environnemental audit as an Instrument for environnemental protection and management. *The Business and Management Review* **9** (2): 228-232.

IGBC, 2021. Indian Green Building Council. https://igbc.in/igbc/

Leal Filho, W., Muthu, N., Edwin, G. and Sima, M. 2015. Implementing campus greening initiatives: approaches, methods and perspectives. Springer, London, UK.

Maltby, J. 1995. Environmental audit: theory and practices, *Managerial Auditing Journal*, **10** (8): 15-26. https://doi.org/10.1108/02686909510147372.

Ramachandra, T.V. and Bachamanda, S. 2007. Environmental audit of Municipal solid waste management. *International Journal Environmental Technology and Management*. 7 (3/4) : 369–391.

Tiyarattanachai, R. and Hollmann, N.M. 2016. Green Campus initiative and its impacts on quality of life of stakeholders in Green and Non-Green Campus universities. *SpringerPlus*, **5** (1): 1-17.

Venkataraman, K. 2009. India's Biodiversity Act 2002 and its role in conservation. *Tropical Ecology* **50** (1): 23-30.

WGBC, 2021. World Green Building Council. https://www.worldgbc.org.

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