Lokvikas Samajik Sanstha's

M.M. Jagtap College of Arts, Science and Commerce

Mahad, Raigad.

ENVIRONMENT AUDIT REPORT

2022-23

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ENERGY AIR QUALITY WATER WASTE

CONTENTS

1. INTRODUCTION – Environment

1. OVERVIEW

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 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. Eco audit initiatives are the need of the hour across the world due to change in environmental conditions, global warming and increasing human population. 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 be undertaken to reduce the harmful effects to a greater extent. The audit process can minimize the environmental pollution in the campus remarkably which in turn reduces the global warming that affects as a whole. As per the Government law, the environmental legislations should be followed by all the Institutions and Organizations and 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. 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 attentionon 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 balancedexistence, 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 assessment to 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 more amount 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 ManagementSystem (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 youthleadership programmes, green campus practices, social responsibility and Institutional values comprehending the relationship with the ecosystem for a sustainable environment are being evaluated (IGBC, 2021).

Environmental auditing has a critical role to play in ensuring that organizations fulfil their policy commitments to environmental management and performance. Audits can provide key information to senior management on areas of risk, and progress towardsstrategic objectives and targets. This audit is to determine that how well the environmental management systems and equipment are performing. To verify compliance with the relevant national, local or other laws and regulations and to minimize the human exposure to risks from environmental, health and safety problems.

The purpose of the environmental audit is to provide an indication to the management of the improvements while environmental organization system & equipmentare performing. To fulfil this purpose it is essential that audits should be seen as the responsibility of the company. The audit work can be voluntary and for the advantage of the company. The audit work can be done systematically and efficiently by the help of environmental auditing programme. It helps in the proper utilization of natural resources as a whole it improves environmental quality.

Environmental auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. Depending on the types of standards and the focus of the audit, there are different types of environmental audit. Organizations of all kinds now recognize the importance of environmental matters and accept that their environmental performance willbe scrutinized by a wide range of interested parties (Goyal and Gupta, 2014). Environmental auditing is used to

- Investigate
- Understand
- Identify

These are used to help improve existing human activities, with the aim of reducingthe adverse effects of these activities on the environment. . An environmental auditor willstudy an organization's environmental effects in a systematic and documented manner andwill produce an environmental audit report. Environmental auditing is often used as a generic term covering a variety of management practices used to evaluate an organization's environmental performance. Environmental audit is for the impact of the industries and their products on natural resources and environmental quality. It is necessary to have 'Environmental Audit' to ensure sustainable industrial developments. EnvironmentalAudit is a pragmatic management tool, which addresses itself to help an industry or operation, to verify compliance with environmental requirements, to evaluate the effectiveness of the environmental management system, to assess risks and to identify andcorrect environmental hazards. It is the examination of accounts of revenues and costs of environmental and natural resources, their estimation, depreciations and natural resources,

their estimation depreciations and values recorded in the books of accounts. Environmental organization management systems and equipment are performing with theaims of:

i. Facilitating management control of environmental practices.
ii. Assessing compliance with company policies.
iii. Facilitating professional competence

2. ROLE OF EDUCATIONAL INSTITUTIONS IN INDIA

In view of offering eco-friendly atmosphere to the stakeholders, Educational institutions are playing important role which starts from establishing and maintenance of eco-friendly campus without harming the environment. A clean and healthy environment in an Organization determine effective learning and provides a conducive learning environment to the students. Educational institutions are asked both Central and State Governments to give eco-friendly atmosphere to the stakeholders. In addition, all the Educational institutions are asked to save the environment for future generations and to solve the environmental problems such as recycling of solid wastes and wastewaters, plastics usage, napkin disposal water consumption, water harvesting and storage mechanisms, etc. through Environmental Education. Implementing Swachh Bharath Abhiyan Scheme launched by the Indian Government plays by the Educational institutions plays a major role in terms of giving neat and clean environment to tribal, rural and urban people across the country, besides, the regular and conventional activities carried out by Nature club, Eco club, Science club, Fine Arts club, Flora and Fauna club, Youth Red cross unit, etc. Seminar, Conference, Workshop, training and awareness programmes on Biodiversity conservation education, environmental awareness programmes, etc. may be conducted periodically by the Management and Administrative people of an Organization to the stakeholders.

Similar to that of Green campus auditing, Environment auditing is a systematic process and a kind of professional eco-tools and techniques whereby an organization's environmental performance is checked against its environmental policies and compliancesof the Government guidelines. This audit process is definitely useful for the Educational Institutions to maintain the eco-friendly campus in a sustainable manner and can give eco-friendly atmosphere to the students and staff members including Management people, parents, alumni and visitors. It is like an official examination of the environmental effectson an organization's campus as per the Government guidelines. The audit report may be useful to improve the organization's campus significantly by following the recommendations and suggestions given in the report. There are some minor differences between Green campus auditing and Environment auditing with respect to natural and planted vegetation in the campus and carbon footprint in which carbon dioxide level is assessed in the campus in using the number vehicles, electrical energy utilization efficiency and human.

Environmental auditing is a systematic, documented, periodic and objective processin assessing an organization's activities and services in relation to:

1) Assessing compliance with relevant statutory and internal requirements,

2) Facilitating managementcontrol of environmental practices,

3) Promoting good environmental management,

4) Maintaining credibility with the public,

5) Raising staff awareness and enforcing commitment to departmental environmental policy,

6) Exploring improvement opportunities and

7) Establishing the performance baseline for developing an Environmental Management System (EMS). Conducting an environmental audit is no longer an option but a sound precaution and a proactive measure in today's heavily regulated environment. Indeed, evidence suggests that EA 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 inpolicies and practices.

3. ENERGY AND ENVIRONMENT POLICY

PURPOSE

The Environmental and Energy Policies of the college is made to provide an overview of the College's vision to minimize the environmental impacts of its activities and operation and sustainable management of the available resources. The policy statement highlights how the college would pursue environmental best practises and inspire the sustainable use of resources at the community level within and outside college premise. It lays out the concepts, delineate priority areas, and methods for the college's environmental plans' implementation, management, and evaluation. Its goal is to reduce energy and raw materials consumption that could jeopardize the sustainability measures being taken at college level. This policy will communicate the College administration's goals and objectives to College employees, students, and staffs, as well as aid in the creation of a better environment for future generations.

SCOPE

The policy document will aid in the integration of efficiency and environmental consciousness into daily activities, allowing us to better understand our duties and dedication to natural resource conservation and utilisation. Our college has tried to address the issue of sustainability as a part of curricular and extra-curricular activities. We welcome suggestions and promote exchange of ideas to make a more risk-averse, resilient and a sustainable society. We sincerely hope that MMJC College will take the lead in developing new frameworks for understanding the paradigm of sustainable development. We're excited to learn about new approaches that could help put the sustainability drive into action. The College will continue to be an attractive institution for study, research, sponsorship, and collaboration with the government as a result of the legislation and execution of this innovative policy, which will serve as a model for other institutions.

4. PRINCIPLES AND OBJECTIVES

MMJC College is passionate about the environment and has implemented various sustainable environmental initiatives in its campus. Various committees have been constituted to carry out and oversee these tasks. On the academic front we have an independent department i.e. Department of Environmental Sciences for teaching the compulsory course of environmental sciences at graduate level. Apart from that, our college have also duly constituted important committee to assess, manage and implement the college policing in line with sustainable practices for example we have an active Eco-club, garden committee, Plant incubation centre, solid waste management committee, and other clubs/committees actively working at institutional level. We also on an annual basis undertake a mandatory "Green audit" as mentioned in the critera-7 of NAAC. Following are the initiatives that have been taken at the institution levels for promoting awareness among students of all the disciplines about the problems of climate change through academic as well as non-academic outreach activities. We involve different stake-holders of our college in our activities for a broader outreach.

MMJC shall pursue following objectives:

1. Use the semester long course-curriculum to promote education for the multidisciplinary nature of environment and sustainable development.
2. The College will attempt to train its personnel and develop knowledge of environmental issues and the environmental effects of its activities among academic staff, students, and other users.
3. The college's respective committees will formally monitor the work done on sustainability projects/initiatives, measure their progress, and report on their accomplishments.
4. The university will continue to comply with environmental legislation in order to reduce its environmental effect by pursuing a number of goals, including plantation, water management, energy conservation, solid waste management, air quality management, and carbon footprint reduction.
5. Develop and maintain an ISO: 14001 environmental management systems as well as an ISO: 50001 energy management system.
6. Actively collaborate with local groups in the areas of environment, energy efficiency, and sustainable development by engaging in communication with government agencies, municipal corporations, and affiliating colleges.
7. Promote environmental assessment initiatives.
8. Raise awareness about keeping the campus clean and green.
9. Establish sustainable practises on campus and among stakeholders.
10. Ensure the long-term viability and environmental protection of the organisation.
11. Take initiatives that are friendly (clean fuel, renewable resources etc.)
12. Reduction in resource consumption
13. Financial savings via reducing resource use
14. Practical experience which enriches the curriculum
15. Improving/updating the institution's profile

16. Instilling in young people an environmental ethic and value system
17. Conduct audits to identify areas for improvement and make recommendations.
18. Teach sustainable development to students from all disciplines.
19. Promote sustainable development research and knowledge dissemination,
20. Green campuses and support local sustainability efforts, and
21. Engage and share information with worldwide networks
22. Implement carbon-neutral policies.
23. Increased environmental promotional events on campus to raise awareness.
24. Establishment of an environment/green committee to oversee eco-friendly projects on campus and in the surrounding area.
25. Introduce innovative technologies to make efficient use of energy resources.
26. Use of renewable energy sources.
27. Optimize your energy usage and costs.
28. Reduce, Reuse, and Recycle are the three R's.
29. Conduct internal energy audits on a regular basis to find energy-saving options.
30. The Institution Energy Audit/Management Cell manages regular monitoring and follow-up procedures to ensure effective implementation at department levels.
31. To make the Institute a role model in the area of energy conservation, train teachers, non-teaching staff, students, and housekeeping staff.
32. Encourage your faculty members to become Certified Energy Auditors and Managers.
33. Establish relationships with businesses and conduct a comprehensive energy audit.
34. Encourage people from all walks of life to be aware of the importance of energy conservation.
35. Review the Policy at least once a year.

The college's environmental policy will be pursued through the following priority areas:

1. WATER MANAGEMENT

- Use effective management strategies to conserve water and reduce its use.
- Use of least amount of water possible in accordance with its activities, and it will ensure that the water it uses is both provided and disposed of in the purest possible condition.
- A continuous water conservation programme would be implemented to track use, prevent leakage, and remove excessive or unnecessary use.
- Installing rainwater harvesting systems in all campus buildings for ground water replenishment and water self-sufficiency.
- It will also support artificial recharge and the resurrection of traditional groundwater recharge processes.
- Encourage reporting leaks and swiftly repairing them.
- Employing a caretaker to take quick action to stop any water leaking from taps, pipelines, tanks, and toilet flushes, among other things.

- The institution shall promote efficient water use techniques, such as sprinkler or drip irrigation, in its gardening activities.
- Conserve water by building more Indian-style toilets rather than western-style toilets.
- Grease trap mechanism prevents the release and mixing of foil from the college canteen liquid waste in the municipal drainage system.
- The Biochemical Oxygen Demand in the effluent waste water produced by the college canteen is thus lowered.
- In washrooms, waste water created by a reverse osmosis (RO) system is reused.

2. SOLID WASTE MANAGEMENT:

The college will strive to limit waste creation in all possible ways, including reducing the procurement of new materials, reusing and recycling existing materials, and, if this is not possible, disposing of garbage in a manner that has the least environmental impact.

- The usage of plastic is prohibited on campus.
- Waste containers/Dustbins are positioned where they are needed.
- Composting of solid waste from canteens, guest houses, and hostels.
- Hazardous and E-waste must be handled, transported, and disposed of properly.
- Hazardous chemicals and toxic hygienic compounds will be used as little as possible at the college.
- As the final stage in solid waste reduction and a way to turn waste into a resource, the college has committed to a comprehensive recycling programme.
- It will separate, recycle, and utilize its solid wastes, as well as build a waste-to- composting and bio-mass resource recovery programme.
- Engage in the 3Rs of environmental friendliness in a systematic way (Reduce, Reuse and Recycle).
- Collect and recycle paper waste generated on campus in collaboration with scrap merchants.
- Develop a technology-centric educational and administrative strategy to reduce solid waste.
- Supporting the digitization of attendance and internal assessment records reduces the consumption of paper.
- Update the college library's e books and e journals collection to reduce the need for printed books.
- Encourage students and teachers to utilize email to submit assignments.
- Take steps to raise student knowledge about food waste and strategies for reducing it.

- Minimizing the usage of packaged foods, as well as the habit of reusing and recycling non-biodegradable items
- Organizing solid waste management workshops for students.

3. E-WASTE MANAGEMENT

The college assures that its technological use and e-waste output have no negative influence on the environment. The college intends to work toward the following goals:

- More arrangements for the disposal of institutional e-waste.
- Working with e-waste recycling firms to recycle electronic waste.
- Awareness among students about e-waste reduction and environmentally responsible e-waste disposal techniques.
- Encouraging e-waste management initiatives at the departmental and societal levels.

4. AIR QUALITY MANAGEMENT:

- Maintain good green cover to enhance CO2 sequestration from campus.
- On campus, there is a National Ambient Air Quality Monitoring Station (NAMP) of the Maharashtra Pollution Control Board(MPCB), which helps to improve CO2 sequestration.
- No vehicle day in a month to be initiated.
- To reduce dust, open places with lawn and grasses should be used.
-

Clean Air Initiatives: Our students and employees are encouraged to take public transportation. We promote carpooling to college as a way to reduce pollution while also increasing social engagement. Automobile access is restricted on campus in order to discourage the usage of personal vehicles.

Smoking Free Campus: The College prohibits smoking and the use of other tobacco products in accordance with the framework given by the National Tobacco Control Programme (NTCP) 2007-2008. The college's anti-smoking committee guarantees that the anti-smoking policy is followed.

Transport: The College will take steps to reduce the negative consequences of its traffic on the environment. All faculty, staff, and students will be encouraged to walk, ride bicycles, or take public transportation to and from the college, as well as between its campuses and outdoors the campus, and will be discouraged from using single occupancy private vehicles.

5. REDUCE CARBON FOOTPRINTS:

Encourage the implementation of many carbon-reduction measures.

- Energy-efficient green building designs that monitor temperature and outside light.
- Implementing the Reduce, Reuse, and Recycle (RRR) approach to achieve zero waste.
- Green computing to cut down on paper usage.

- On-campus "No Vehicle Day" and the use of electric vehicles.
- Use of energy-efficient lighting and equipment.
- An increase in the amount of greenery on campus.

6. ACQUISITION OF SUSTAINABLE RESOURCES

The institution understands that one of the most important ways it can demonstrate its commitment to environmental stewardship is by making resource purchase decisions. The college will seek to get the most bangs for its buck by balancing immediate and long-term costs, maintenance, life cycle, and environmental costs when acquiring goods and services.

The college's purchasing policy should be strong, requiring the college to seek items and services that cause the least environmental impact in their manufacturing, distribution, packaging, usage, re-use, recycling, and disposal. Avoiding the use of any potentially dangerous substances and encouraging suppliers to commit to improving environmental performance.

7. ENVIRONMENT MANAGEMENT SYSTEM

The college must establish an environmental management system (EMS), such as ISO 14000, and adopt standardised environmental management practises, document their actual use, and get credible third-party verification. The college should promote EMS adoption by prioritising ISO 14000 goods and services in procurement, with the exception of items reserved for the small-scale sector at any given time.

8. ENVIRONMENTAL AUDIT

The institution is committed to meeting the needs of environmental audits and will make every effort to provide training that will benefit both staff and students.

The college will be on the lookout for opportunities to collaborate with auditing organisations and will be informed of future developments in worldwide contexts.

9. ENVIRONMNETAL EDUCATION, TRANING AND AWARENESS

Outreach and education are very important so that all members of the campus community understand the policy's goals and can help in its execution. This is why college supports and encourages awareness campaigns, seminars, workshops, conferences, and other interactive sessions to ensure that the Green Campus, Energy, and Environment policies are implemented effectively.

Environment-centric Student Societies and Department Activities

College encourages all departments, as well as specific student societies such as Green society, NSS, NCC, and others, to hold events, competitions, and training sessions that will result in beneficial environmental changes at the grassroots level. The institution works with departments and student clubs to help students become active environmental protectors and conservationists.

Green Society

Institutional shifts toward sustainability and environmentally friendly behavior have percolated down to students, leading to an increase in Green Society membership. Making the society mandatory will give it a larger platform to communicate the institution's environmental principles and raise awareness. Because obligatory societies need a certain number of hours of effort and dedication, the green initiatives and practices that are part of this strategy will be able to expand rapidly.

Conduct Green Audit

The institution intends to undertake a Green Audit of our college campus on a regular basis to analyze our strengths and weaknesses in order to advance our long-term sustainability goals. A green audit can help you figure out how and where you're wasting the most energy, water, or resources. The college can then think about how to make improvements and save money. It can tell you what kind of garbage you have and how much of it you have. Waste minimization initiatives or recycling projects can be implemented. It will promote environmental principles and ethics while also raising health awareness. It helps students comprehend the implications of environmentally friendly behaviors on campus. Green auditing will help you save money by reducing your resource usage. It is critical that the college assess its own contributions to a long-term future.

Plastic-Free Campus

Since its founding, College has complied with the majority of its responsibilities in terms of solid waste management. In light of the Indian government's decision to ban all single-use plastics due to the harmful effects of plastic use and pollution, the college administration rigorously prohibits the use of single-use plastics in its property in order to make it a "Plastic Free Campus."

Clean Campus Initiatives

In accordance with the objective of the Swachh Bharat Abhiyan, College vowed to aggressively coordinate cleanliness operations both on and off campus. It pledges to keep this programme going. The following is the broad vision:

- Educating students and staff members about the importance of cleanliness and hygiene by staging frequent cleanliness drives. The goal is to encourage them to be proactive in their contributions.
- All community work done by the college's NSS, NCC, and Green Society volunteers will include activities under the Swachh Bharat Abhiyan.
- Staff members will be encouraged to participate in the college's cleaning drive.
- Competitions for posters and slogans, essay writing, spoken word poetry, speeches, and skits on the theme of "Swachh Bharat" will be held.
- To raise public awareness, rallies on topics related to the Swachh Bharat Abhiyan will be held on and around the college campus.
- Remove any waste materials, such as damaged furniture and obsolete equipment.
- Annually administer the promise by students and staff to keep the college

campus and its environs clean.

- Hold workshops on the 3 Rs: trash reduction, reuse, and recycling.
- Make a commitment to manage garbage and keep the campus clean, especially during college events.

Landscaping Initiatives

The environment of a college's campus, like its buildings, can be considered as a tangible manifestation of its values. It is an important aspect of a campus's life, giving opportunities for study, recreation, outdoor activities, relaxation, and aesthetic enjoyment. Green campus landscapes also assist recharge groundwater, control runoff, and purify and cool the air on campus. The landscape is a visual symbol of the school community's dedication to environmental stewardship. Landscape programmes are a fantastic approach to raise environmental awareness because campus landscapes are so visible and accessible.

In campus, there are more than 25 plant species as well as many acres of grass. The landscape of trees and plants provides clean, cool ambience to the visitors, students and staff, as well as a relaxing atmosphere.

College's extensive green cover also supports a diverse range of animals and uncommon birds, in addition to a well-maintained butterfly park within the campus. By organizing regular tree plantation drives and encouraging student groups to host tree planting events, the college pledges to enriching this healthy ecosystem and maintaining the institution's symbiotic relationship with nature.

10. ENVIRONMENTAL AWARDS

Institutions will be given awards for initiatives in rural development, environmental development, and sustainable development, among other things. An annual award for a well- known environmentalist, with at least one category for environmental protection, sustainable development, and so on. Clean and green campus awards will be presented to colleges on an annual basis. Encourage and support environmental, rural development, and sustainable solutions-related technologies and enterprises. Promote and initiate various prizes among and among institutions for strengthening environmental management and sustainable development awareness and implementation.

The college will focus on the following priority areas when pursuing the energy policy:

The MMJC’s energy policy expresses the institution's commitment to energy conservation by defining an energy management protocol for the institution's thermal and electrical energy systems, focusing on sustainable practices in reducing carbon footprint and other environmental impacts in accordance with Energy Conservation and Management standards, in order to maintain an eco-friendly green campus.

11. ENERGY CONSERVATION:

- Wherever possible, reduce the amount of electricity consumed.
- Energy-efficient light bulbs are gradually being replaced.
- Use of renewable energy to power the grid.
- Hostels and guest houses can use solar water heating systems.
- Participating in a "No Vehicle Day" on campus.
- Energy conservation by encouraging the use of natural light.

Renewable Sources of Energy

College is committed to reducing and managing its electricity consumption in a sustainable manner. The college is committed to minimizing non-renewable energy usage by transitioning to clean energy sources such as solar energy for purposes such as lighting the campus.

Energy Saving and Energy Efficient Equipment

We pledge to install environmentally efficient electrical appliances that save energy and cut down on trash. The college believes in adopting environmentally friendly energy sources such as LED lighting.

ACTION PLAN

ENVIRONMENT

- Observance of important days such as ozone day, environment day, earth day, and so on.
- Organize a pollution awareness campaign and take preventative actions.
- Conduct frequent green/environmental audits and take corrective action as needed.
- Ensure that clean campus practices such as correct waste disposal, e-waste campaigns among stakeholders, rain water harvesting, and monitoring judicious water usage are followed up on and updated on a regular basis.
- Activities that promote recycling, reuse, repair, and refurbishment, among other things
- Deliver an invited discussion (at the department/college level) on various policy updates and environmental studies.
- Establishment/revitalization of an Energy Management Cell (instead of energy audit cell)
- Once every six months, do a review of the company's green/renewable energy projects and audit its maintenance records.

ENERGY

- Restructuring the Energy Management Cell with representation from all departments to ensure that the energy management programme is implemented effectively.
- Monitoring and benchmarking resource utilization and waste generation on a regular basis.
- Keep track of and analyze your energy efficiency.

- Establishing short- and long-term goals, as well as conservation methods, in order to meet and exceed zero-carbon Campus objectives.
- Use of energy-efficient equipment with a star rating.
- Maintenance and replacement of additional lights/lighting fixtures with LEDs on a regular basis.
- Maintaining a sustainable approach by extending the life of existing equipment and replacing it with more efficient equipment as necessary.
- Before going on to the Replace & Recycle stage, reduce e-waste as much as possible with good maintenance.
- Make the most of natural light for indoor illumination and ventilation.
- To save energy, employ occupancy sensors in classrooms, hallways, administrative offices, and toilets, as well as sensor-based switches for streetlights and corridor lighting.
- Optimal temperature settings for air conditioners and water coolers are fine-tuned.
- Increase the use of renewable energy by installing a Grid Interactive Solar PV System on campus.
- Appropriate reactive power management maximises demand.
- Encourage students to work on UG and PG projects related to energy management, energy optimization techniques, and renewable energy harvesting, in order to raise knowledge about energy usage and cost.
- Provide energy management and energy auditing training to staff and students.
- Develop project-based learning methodologies for energy conservation and management courses in collaboration with industry.
- The Energy Management Cell should establish well-defined procedures that follow the stages outlined below.
    - Create an energy baseline assessment
    - Define the academic year's energy agenda
    - Develop implementation instructions
    - Review: Follow-up and monitoring
    - A spreadsheet or checklist to keep track of the Energy Management Action Plan's short- and long-term objectives.

5. ENVIRONMENTAL MANAGEMENT PLAN (EMP)

Environmental protection planning is an important component of overall planning and implementation of eco- friendly and green campus of an organization. It is addressingissues ranging from human health and sanitation to various stakeholders of an organization and protection of plants, animals and microorganisms including wildlife habitats.Environmental Management Plan (EMP) is an important integration document between thevarious approvals, authorizations and specific components and/ or activities that are carried out in the campus without harming the environment. EMP is committed to manage its assets with its core values to protect the health and safety of people and the environment and to comply with Environment Health and Safety laws, regulations and Health and Safety standards. A clean environment is important for the success of an organization to save for the future generations to ensure in safe use of air, land, and water resources. The management of an organization should endeavor tocontinually improve our environmental performance and to prevent the environmental pollution. All the stakeholders of the organization are expected to support our environmental goals while providing clean and environment friendly work culture. The main purpose of the EMP is to outline environmental protection measures to be followed during the organization development and to ensure that commitments to minimize environmental effects are met. The EMP should provide a reference document as per the legislative requirements for personnel when planning and/or conducting specific activities in the campus surroundings. In line with the Environment Policy, impact on the physical, chemical and biological environment should be determined along with statutory requirements and other environmental commitments.

Environmental Management Plan and Execution in the Organization sites

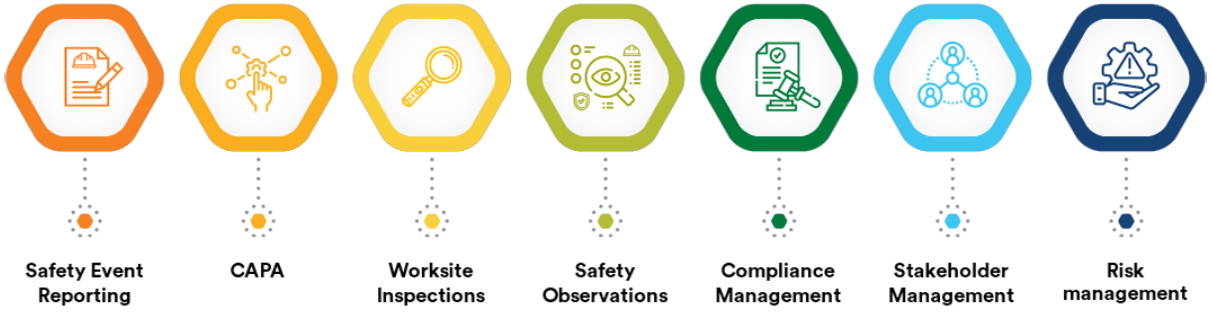
S.No.	Monitoring areas	Parameters Monitored	Monitoring frequency	Reason for monitoring parameters
1.	Dredging	Erosion, landscape, sedimentation, vegetation, disposal of dredging	Continuous	Dredging results in disturbance of Benthic community and causes soil erosion and sedimentation
2.	Marine Ecology	Biodiversity survey and conservation	Continuous	Unmitigated operations may result in loss of biodiversity as per the Indian Biodiversity Act
3.	Vegetation (Flora and Fauna)	Survey of macro and micro plants, animals (mammals, birds, moths, houseflies, reptiles, amphibians,	Continuous	Conservation of macro and micro plant, animals (mammals, birds, moths, houseflies, reptiles, amphibians, termites)
		termites) and soil and air microbial biodiversity		and soild and air microbial biodiversity conservation for future generations through modern technology
4.	Air Emission	O2, CO, CO2, SO2, NO2 level in the open, car parking and indoor areas	Monthly monitoring	Unmitigated operations may result in deterioration of air quality
5.	Solid Waste	Solid waste quality and quantity, solid waste disposal, reuse, solid waste treatment	Monthly monitoring	Compliance of Environmental Laws and Legislative policy
6.	Waste water	Primary, secondary and tertiary pollutants and their recycling, waste water minimization, storage and handling, reuse, treatment before disposal	Monthly monitoring	Minimize the water pollution and to provide quality water as per the Central Pollution Board

7.	Soil	Soil contamination, soil edaphic parameters, soil, gravel and sand composition, water holding capacity, soil erosion	Half yearly	Soil surface and water pollution cause diseases as per the Compliance of Environmental Laws and Legislative policy
8.	Noise	Noise intensity, causes and impact, remedies, standard operating procedure	Monthly monitoring	Uncontrolled noise cause nuisance which affect the health
9.	Occupation al Safety & Health	Safety, health and welfare of people at occupation, measures taken, Fire safety, First aid box, Safety protocol, Hospital facility	Continuous	Department of Occupational Safety & Health
10.	Land reclamation	Soil quality, soil micro and macro elements, soil composition	Half yearly	Legal obligation and structure protection, prevention of soil erosion and sedimentation to the port
11.	Restoration of the sites	Forest vegetation, plant vegetation, visual analysis, Photographic records	Continuous	Maintain the soil fertility and soil original reclamation

6. ENVIRONMENTAL HEALTH AND SAFETY MANAGEMENT SYSTEM

It is outlined the mitigative measures and the best management practices followed in the organization in terms of developing eco-friendly and green campus. It is recommended to carry out a complete assessment and control of all potential hazards and risks arise in the organization without harming the environment. It is to ensure that no significant adverse environmental health and safety impacts by carrying out various infrastructure facilities created to improve the human eco-system of the organization may be implemented. The facility should be designed to include fire protection systems, multiple gas, flame, smoke and low- and high temperature detectors and alarms, and automatic and manual shut-down systems in terms of planning and implementing the bestpractices of environmental health and safety management system.

The high level of automation, regular preventative maintenance, and safeguards the environmental pollution and the provision for safe emergency shut-downs should be should be maximized in the organization. In addition, all the employees and managementpeople should be trained properly in studying about environmental health and safety management system which will be useful for protecting the environment without causing any adverse effect on the environment. All personnel should be will be advised to undertake an extensive workshop as well as training programmes to ensure safe operatingpractices such as safety operations, hazards management, safety and emergency procedures and environmental management (Murdifin *et al*., 2019).

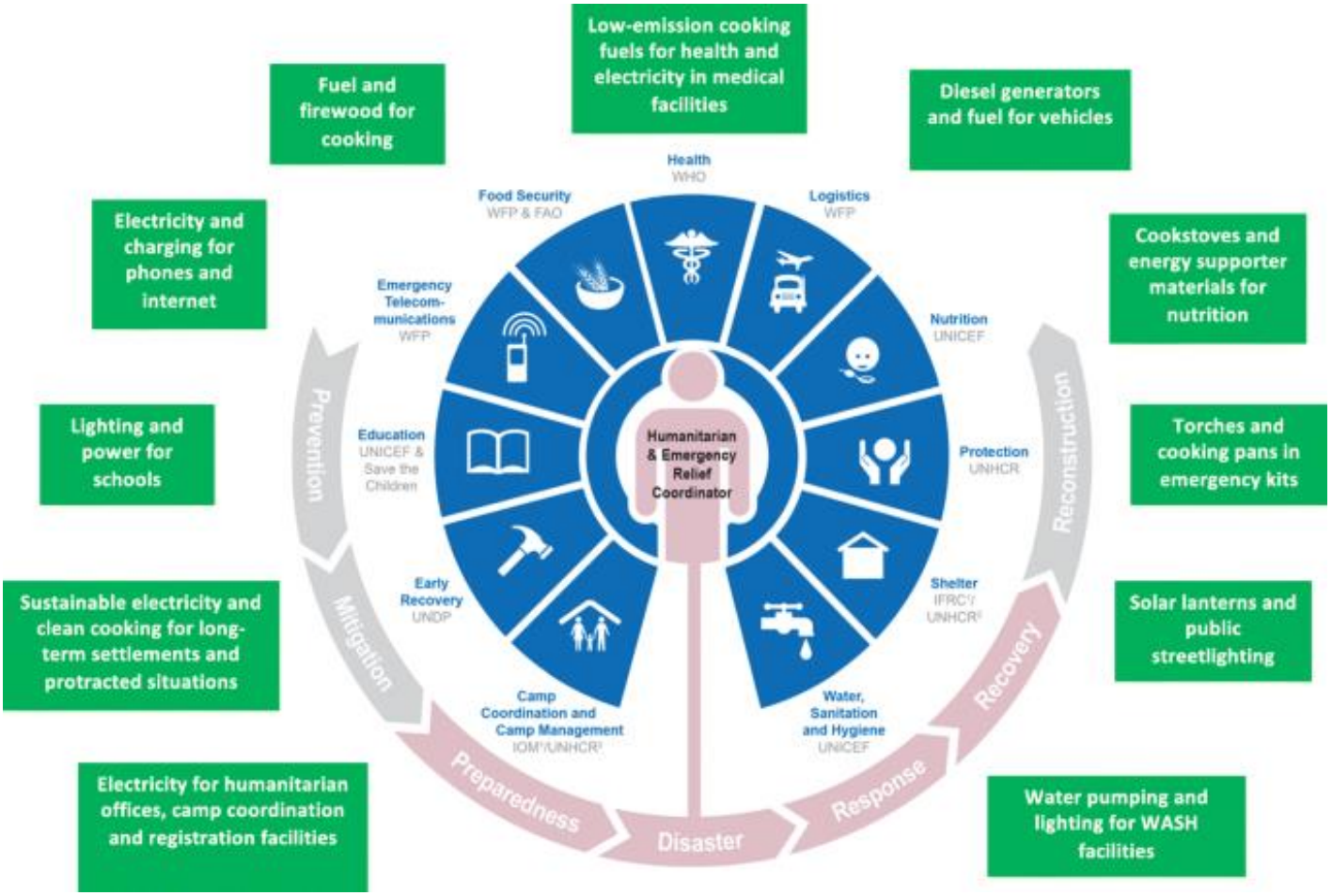


7. Evacuation Plan in Human Eco-system of the Organization

The management of the Organization should ensure the safety measures to the stakeholders which in turn improve the human eco-system of an organization. In the eco-friendly andgreen campus, some of the safety measures should be undertaken. The alarm signals such as Bells, Horns, Sirens, Verbal (i.e. shouting) may be used to begin evacuation of the facility in the organization if any unfavourable situation takes places like uncertain firing, explosion of acids and gasses, earth quake, electrical current circuits explorations and etc. Evacuation map may be prominently displayed throughout the facility. The phone number of Fire stations, Police, Ambulance, State Office of Emergency Services, National Response Centre, Division of Occupational Safety and Health, Regional Water Quality Control Board, Pollution and threatened hazardous management & control board and Nearest Hospital. The internal facility alarms as well as communications systems, where applicable, to notify all facility personnel should be activated. The storage areas and disposal of waste zone, contaminated soil or surface water regions should be demarcated in the organization. The emergency equipment like fire extinguisher, emergency notification and first aid box should be placed in all the dangerous zones to minimize the major environmental impact and problems. It should be developed and practiced a spill clean-up procedure including where to find emergency equipment and how to use it properly should be trained to all the stakeholders.

The chemical handlers, hazardous waste handlers and managers should be annually trained properly by undergoing periodical workshops, conferences, seminars and training programmes so that the latest developments in chemicals disposal methodologies and hazardous management policies development may be understand. The safe method for handling and storage of hazardous materials, Specific hazard(s) of each chemical to which they may be exposed, including route of exposure (i.e. inhalation, ingestion, absorption and etc.) and personnel rescue procedures should be known by the chemical handlers, hazardous waste handlers and managers. An area which is disturbed or polluted by means of

discarding the wastewaters, effluents, solid wastes, biomedical and electronic wastes, plastic wastes, kitchen and food wastes, inert wastes, hazardous waste materials, acids and chemicals may be recovered and restored by clean-up procedures (Nascimento and Filho, 2010). These areas may be stabilized, mulched, reseeded, and fertilized as required. The temporary erosion controls may be removed and permanent landscaping and erosion control measures installed where required as part of final facility reinstatement. It also involves the planting of various vegetation covering trees, shrubs, herbs, climbers, lawns and etc. The revegetation may be performed in compliance with applicable environmental requirements and specifications which include requirements for timber removal, slash disposal, and dust control.



8. WASTE MANAGEMENT PLAN OF THE ORGANIZATION

It provides guidelines and simplify the process of categorizing, quantifying, managing, and disposing of solid wastes in the organization. Waste management is a critical component of organization's operating policies. Waste Management Plan (WMP) includes the proper handling, collection, storage, manifesting, transportation, and disposal/recycling of the solid waste generated without harming the environment. The procedure is designed to assist in an organization wide effort to provide protection to the environment and to comply with environment laws and legislative policies and regulationsregarding proper waste management. The waste management covers solid wastes, biomedical and electronic wastes, kitchen and food wastes, plastic wastes, wastes, wastewater, hazardous waste materials, acids and chemicals. The waste management planhas been developed properly in compliance with environment laws and legislative policiesand regulations (Sharp, 2012; Sharma, 2020).

The organization should monitor and inspectwaste management related facilities and activities directly resulting from executing the scope and amendments of Waste Management Plan. Guidelines for proper handling, categorization, recording, minimization, recycling and disposal of all types of waste associated with organization operations and projects are part of this procedure may be undertaken.

Additionally, abandoned materials and materials intended to be recycled are considered wastes. It should be taken into account while WMP in prepared and executed in the organization. It is very important to understand this concept, because even though something is going to be recycled, it must be managed as a waste until it is actually recycled. The wastes are categorized as hazardous and non-hazardous wastes depending upon the quantum of causing the adverse effect to the environment. The hazardous waste should be disposed properly by ignitability, corrosivity, reactivity, irritability and toxicity behaviours. In ignitability, the flash point should be less than 60°C. Similarly, in corrosivity, the pH should be less than 2.0-3.5 or greater than or equal to 12.5-13.5. Similar to that of ignitability and corrosivity, the reactivity should be inherently unstable under ordinary conditions or when exposed to water. In irritability, when in contact with body the inflammation should not be caused. Toxicity should not cause risk of injury to health of organisms or the environment. Similar to that of hazardous waste management, non-hazardous waste management is very important and may still present hazards to employees who handle them properly.

All recommended safety and handling practices must be followed properly by the Management. The waste production should be eliminated whenever and wherever possible and the material only for its intended purpose on site should be used. Attempts should be made to minimize waste production, reuse the waste materials, recycle waste on site and then dispose of waste through properly designed. All hazardous waste shall be segregatedfrom other types of hazardous wastes as well as non-hazardous wastes at the point of generation of waste (Hertwich, 2005). At all facilities, the types of containers with colourcoding for easy identification should be kept to collect and segregate common wastes across the campus. Food waste shall be collected in separate containers in the campus especially at dining hall, canteen and food courts. All containers must be properly labelled. The label must clearly mention the name or type of waste. Also, if the waste is hazardous,it should be clearly labelled on the container along with its hazardous characteristics (e.g.flammable, toxic, radioactive, etc.).

9. METHODS OF DISPOSAL OF WASTES

Recycling and reuse methods may be adopted to minimize the quantity of wastes that are generated from the organization requiring disposal in a proper way. Some of the wastes can be reused within the facilities while others can only be recycled in the on and off-sites. The recycling of used oils, acids, solvents and chemicals is possible in some of the laboratories; e-wastes and plastic wastes including batteries may be sent back to manufacturer or distributor for recycling. Waste shall not be sold to the unauthorized contractors / companies, who may not have proper recycling facilities, to avoid misuse and to reduce associated liabilities (Singhania and Gandhi, 2015).

On-site Disposal facilities: Burial pits may be created in which buried waste should be covered with a thick layer of soil as 'daily cover' to reduce the environmental problems, such as odour from decaying / degrading waste, spreading of waste into other areas due towind, vermin and disease vector, flies, mosquitoes, etc.

Reserve pits: These pits are used to temporarily store drilling waste, chemical waste, oily sludge and contaminated soil. The pits should be properly designed and lined to avoid soil, groundwater and surface water contamination.

Incineration: Incinerator will also be used for disposal of waste but before burning the trash, plastics, metal, glass and any other items that are not to be burned, should be segregated first. Ash of the incinerator shall be buried in the lined landfill as it may contain heavy metals.

Evaporation Ponds: The evaporation ponds are used to dispose of produced water at some facilities by evaporation. All evaporation ponds should be lined properly.

10. 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. An environmental audit programme is conventionally designed and implemented properly which can enhance an industry's environmental performance in a sustainable manner. It is useful to monitor the scale of optimum utilization of the resources and evaluating the company at National and International levels. The major goals of environment audit are:

a. To safeguard the environment and reduce the threats posed to human health by the Organization.
b. To create awareness among the stakeholders about the importance of environmentaldegradation and conservation as per the Environment Management Systems (ISO standard of 14001:2015) and Environmental Legislations by the Organization.
c. To establish a baseline information about the eco-friendly environment in the campusto the stakeholders for future sustainability.
d. 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 toenvironmental compliance.
e. To conduct outreach programmes to the rural, tribal and urban community people onthe environment damage and conservation.
f. To correlate the flora and fauna with environmental sustainability in the audit sites toprovide a healthy atmosphere to the members of the Organization.
g. 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.

h. To ensuring the legislative compliances and to enable the waste management throughreduction of waste generation, solid- waste and water recycling.

i. To create plastic free campus with the help of management and the stakeholders and to evolve health consciousness among the stakeholders.

j. To suggest for using alternative energy for the conservation of energy resources.

k. To evaluate the wastewater quality and determination of wastewater characteristics & their effects on the living system.

l. To classify the categories of solid waste hazardous waste their sources, quantities & characteristics with respect to the nature of environmental hazards.

m. To introduce and implement the time saving technologies in production as well as providing eco-friendly ambience in an organization following the latest IT based techniques and to minimize the wastes through modern cleaner technologies.

n. To develop 'Water conservation policy', 'Waste management policy' and 'Green campus and Environment policy' by the Organization.

o. To maintains of Labour / Occupational health & medicine followed by proper documentation of environmental compliance status.

p. Regular environmental auditing once in a year will help in producing environmentally educated & technically sound personals.

11. SCOPE AND GOALS OF ENVIRONMENT AUDITING

Environmental auditing is often used as a generic term covering a variety of management practices used to evaluate an Organization's environmental performance. Strictly, it refers to checking systems and procedures against standards or regulations, butit is often used to cover the gathering and evaluation of any data with environmental relevance - this should actually be termed an environmental review. An environmental audit is a type of evaluation intended to identify environmental compliance and management system implementation gaps, along with related corrective actions. In this way they perform an analogous function to financial audits. Environmental auditing is essentially an environmental management tool for measuring the effects of certain activities on the environment against set criteria or standards. Depending on the types of standards and the focus of the audit, there are different types of environmental audit like ISO but not confused with environmental impact assessment. Organizations of all kinds now recognize the importance of environmental matters and accept that theirenvironmental performance will be scrutinized by a wide range of interested parties.

The Management of the Organization (Auditee) should be shown their inherent commitment towards making ecofriendly atmosphere through the Environment auditing and ready to encourage all types of Environment related activities. They should promote all kinds of Environment related activities such as conduct of environment awareness programmes, campus farming, planting trees, and maintenance of greening, irrigation, useof bio fertilizers and avoidance of chemical fertilizers and agrochemicals on the campus etc., before and after the Environment auditing. The management should formulate 'Greenand Environment Policies' based on Environment auditing report. A clean and healthy environment should enhance an effective teaching and learning process and provides a conducive learning environment to the stakeholders (Fachrudin, *et al*., 2019). They should create the awareness on the importance of environment through environmental educationamong the student members. Environment Audit is the most efficient and ecological wayto manage environmental problems.

The waste disposal management covering collection, transport, treatment anddisposal of waste and converting the waste into fertilizing materials should be proper in the organization campus. Dry waste includes paper, cardboard, glass tin cans etc. on the other hand; wet waste refers to organic waste such as vegetable peds, left-over food etc. which will be segregated based on the nature of degradability for recycling through the composting process and converting into a fertilizing material.

12. ENVIRONMENTAL AUDIT SCHEMES AND THEIR COMPONENTS

This particular tool is very important aspect of the environmental audit for the totalmanagement system in terms of its being an asset or a liability for the industry`s environmental performance (Peters and Romi, 2014). Environmental system is with a broad aim for a green environment.

- It helps in reducing all types of solid, water, electronic and biomedical wastes.
- It helps in assessing compliance with regulatory requirement.
- It also helps in prevention control of effect of pollutant in water and soil.
- It promotes relationship between qualified technicians, professionals and individuals,
- State Pollution Control Board, other public authorities and industrial association etc. responsible for the conduct of environmental audit as well as environmental audit schemes
- Environmental Audit Scheme has three following components such as 1) State Pollution Control Board, 2) Internal Auditor Board from the own organizations and
  3) External Auditor Board from Audit agencies.

State Pollution Control Board:- It plays active role in implementing the environmental audit effectively. The steps involved in state pollution control board are mentioned. To prepare format of audit report on all the aspect of environmental protection. The board appoints some internal auditors to prepare industries audit report and then evaluation followed by verification of audit reports. Initiating the action on evaluated report of environmental audit is also equally important in terms of implementation.

Internal Auditor:- The selection of auditor consist of experienced experts from various backgrounds. A qualified auditor should be required as per the rules of State Pollution Control Board with well-equipped laboratory facility for analysis of water and air samples.

External Auditor:- Team should be approved by State Pollution Control Board based of their experience and expertise. Evaluated and verified reports have to send their commentsto State Pollution Control Board for further action.

13. ROLE OF ENVIRONMENTAL AUDIT AND ENVIRONMENTAL MANAGEMENT SYSTEM

One role of an environmental audit is to identify areas for improvement, but an audit does not, in itself, provide the means to implement changes. In order to do this, an environmental audit should be set in the framework of an environmental management system. An environmental management system (EMS) provides a mechanism for systematically managing the environmental effects of an Organization. EMSs provide a framework to:

- Identify the environmental effects and document regulatory requirements
- Set objectives and targets for future environmental performance
- Implement procedures and measures for achieving the objectives and targets
- Undertake audits to assess environmental performance and the effectiveness ofmeasures to achieve the defined objectives and targets.

In order to ensure that any other stakeholders understand the environmental management system usually rely heavily on documentation and verification. Environmental effects, environmental regulations, objectives and targets, and the procedures are usually all documented.

14. TARGET AREAS OF ENVIRONMENTAL AUDITING

- Auditing for Water Management (Wastewaters and Industrial effluents)
- Auditing for Waste Management (Solid, Electronic and Biomedical)
- Auditing for Energy Management (Electrical energy and Fossil Fuel use)
- Auditing for Soil Analysis (Soil health, degradation and conservation)
- Auditing for Carbon Footprint (Electrical, vehicles and human population)
- Auditing for Green Campus facility (Correlated with Green Campus Audit)
- Auditing with the Organization's Management for financial allotment
- Auditing with the Stakeholders for their contribution on environment studies
- Environmental Education and Implementing Swachh Bharath Abhiyan Scheme

15. PROCEDURES FOLLOWED IN ENVIRONMENT AUDIT

Environment Systems Audit

Environmental audit involves monitoring an Organization concerning about the green campus, environment, sanitation and hygiene policies. It is a regular process that is conducted periodically by a regulated entity to check whether an Organization meets the requirements of environmental compliance. The process of environmental audit includes examining, collecting, evaluating, documenting data and analyzing various components related to environmental aspects. The environmental audit possesses the following characteristic features in which various aspects of wastes generation and steps taken by the Organization to reduce both solid andliquid wastes without harming the environment.

- Identification of various sources to generate wastes and types of degradable andnon-degradable wastes in the campus.
- Collection of information related to type of operations, use of various raw materialsand 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 withoutaffecting the environmental health.
- Steps taken to minimize the environmental pollution and degradation by means ofdeveloping internal policy methods.
- Suggestion of cost effective waste management strategies and zero waste dischargein the Organization.
- Creation of awareness among stakeholders on the benefits of reducing wasteswithout damaging the ecosystem.
- Aids in increase of process efficiency and status report with regards toenvironmental compliance and management.
- Converting the waste materials into fertilizing materials by following the methodof recycling and composting processes.

16 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 andhygiene, 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 thecampus as of environmental audit components listed by QCA ISO- EMS checklist.
Step #6: Identified the issues in the campus with respect to the environmental complianceand strengths and weaknesses of the Auditee's Management controls and risks associatedwith the audit.

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

Step #8: Exit meeting held after the audit in which the audit findings with the members ofthe 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.

Step #10: Comparison between the last audit report with the present audit report in whichthe number of suggestions and recommendations were taken into consideration andrectified significantly by the Management.

Step #11: Observed the audit process undertaken by the certifying agency between the last audit and current audit processes, whether the same certifying agency has undertaken theaudit process or not?.

17. 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. Onconducting 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.
- Corporate image and marketing opportunities.
- Concern about the environmental impact of the Organization.
- Development of ownership, personal and social responsibility for the College andits environment.
- Preparation of Environmental management plan and monitoring.
- Assessment of environmental input and risks to the ecosystem.
- Identifying areas of strength and weakness for improvements.
- Evaluation of pollution control status in the campus.
- Verification of compliance with environment laws.
- Assuring safety of plant, environment and human beings.
- Enhancement of loss prevention, manpower development and marketing.
- Budgeting for pollution control, waste prevention, reduction, recycling and reusemethods.
- Providing an opportunity for management to give credit for good environmentalperformance.
- As a whole environmental audit plays an important role in minimizing theenvironmental problem locally, regionally, nationally and internationally.
- Identification of various sources to generate wastes and types of wastes
- Types of degradable and non-degradable wastes in the campus.
- Setting up the target for reduction of wastes and source of waste generation withoutaffecting the environmental health through policy.

18. COMPONENTS OF AN ENVIRONMENTAL AUDIT

Environmental audit has five components, namely:

1) Sanitation and hygiene policy
2) Green and Environment policy
3) Water conservation policy
4) Water management policy
5) Waste management policy
6) Rainwater harvesting policy
7) Environment conservation policy
8) Waste management initiatives
9) Environment management policy
10) Environment monitoring policy

18.1. 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

18.2. 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

18.3. 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

18.4. 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

18.5. 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

18.6. A good environmental audit

- Defines sources, quantifies types of waste being generated
- Collates information on unit operations, raw material, products and water usage
- Highlights process inefficiencies and areas of poor management
- Helps in setting targets for waste reduction
- Permits the development of cost effective waste management strategies
- Raises awareness in the workforce regarding the benefits of waste reduction
- Helps to improve process efficiency
- Assess the quantity of water usage within the company.
- Find out various sources of organic and solid waste generation and mitigationpossibilities.
- Document the waste disposal system
- Bring out a status report on environmental compliance.

- Waste minimization opportunities realized, that contributes to reduction inoperating price.
- Increased worker cognizance of environmental standards and responsibilities.
- Improve employee relations and morale.
- Improve the image of organization and its good will.
- Maintenance of sustainable stage of improvement.

19. ABOUT THE ORGANIZATION

About the Institution:-

"EDUCATION IS NOT PREPARATION FOR LIFE; EDUCATION IS LIFE ITSELF."

Lokvikas Samajik Sanstha's M.M.Jagtap College of Arts, Science and Commerce Mahad is Multi Faculty institution affiliated to University of Mumbai from June 2009-10 at Mahad City which backward, hilly and rural area. Medium of instruction is English as well as Marathi. Institution aims at providing quality education to students and believes in their overall personality development. Institute follows the curriculum designed by the University of Mumbai. The Institute management is very supportive, committed & is a guiding force for the staff. There is a cordial relationship between the Management, Principal and the Staff.

The Institution is vigorously working to become a nodal Centre catering to the diverse needs of the rural locality. The institution is offering three self-financing (Unaided) academic under graduate programme. At present there are 20 faculty members and one fulltime Principal. There is 06 non-teaching staff working in administrative office.

The institution has its website for enhancing the networking and dissemination of information to the students, parents and other stakeholders.

The institution has thus striven hard to impart modern education to the youth of the Konkan Region in spite of various obstacles and barriers. It has successfully acted upon the invaluable suggestions made in the accreditation report while sustaining its irreplaceable traditions and marching towards the realization of its dream through ever widening horizons.

The Vision, Mission and Objectives of College as under:-

Vision- The Empowerment of students for sustainable development by imparting knowledge, information, understanding, ethics and morality through education in the konkan Mofussil, Hilly and backward area.

Mission–Institution commits to provide quality education to promote intellectual, social and cultural enthusiasm amongst its learner and their empowerment to become a good citizen in the emerging knowledge to the society.

Goals & Objectives:-

- To encourage, inspire and motivate the students especially from economically backward class and minority to take up higher education.
- To provide value-based, quality assured, and activity-oriented education.
- To offer an intellectually stimulating environment on the campus.
- To render the teaching-learning process into pleasant, collaborative, Participative, and learner-friendly activity.
- To create a committed generation for sustainable harmony and integration.
- To bridge the dichotomy between rural and urban environments.
- To promote a healthy student teacher relationship.
- To enforce and maintain academic discipline in the campus.
- To maintain the credibility of the examination system.

20. OBSERVATIONS OF THE ENVIRONMENT AUDIT

Plastics use and their impact on the environment The Ministry of Environment, Forest and Climate Change, Government of India has notified the Plastic Waste Management Rules, 2016. A Central PollutionControl Board report indicated that the total annual plastic waste generation in India at a humungous is around 3.3million metric tonnes per year for which the data werecollected from 60 major cities in India. The countrygenerates around 26,000 tonnes of plastic waste a day outof which 60% of plastic produced is recycled. But the problem with plastic is that most of it isn't biodegradable. It doesn't rot, like paper or food, so instead it can hang around in the environment for hundreds of years. More than eight million tonnes of plastic enters the world's oceans each year and most ofthat escapes from land. It is observed that 96% of plastic wastes are collected and segregated by the respective urban bodies in which the recyclable plasticwaste are sold to the recyclers and non-recyclable plastic waste are sent for co-incineration in cement plants. People should be asked to use reusable items and initiate models which allow up-cycling of waste items for better use. This will help reduce plastic waste fromurban local bodies, as well as curb the value for waste among the citizens. Plastic waste management is very important, because plastic destroysfood chains, only 9 percent of the total plastic waste in the world is recycled.

People use plastic bags and plastic ware items every day to hold objects like meals, clothes, grocery and 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 (Lazarevic *et al*., 2010). Most of the plastic items 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 Health Organization (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, animalsand 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 from tiny species to big ones. There is a need to reduce the plastic use to effectively limit plastic waste in the campus (Eriksson *et al*., 2016).

MMJC 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 MMJC insisted the people use eco-friendly bags made from organic materials like plant fibres which are easily decomposable in nature. These effortsare very much essential to keep the environment neat and clean to conserve nature.

21 SOLID WASTE MANAGEMENT PRACTICES AT MMJC

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 or trash. 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 Ministry of Environment, Forest and Climate Change, Government of India has notified the Solid Waste Management Rules, 2016. As per the rules, solid waste means solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste,catering and market waste and other non-residential wastes, street sweepings, silt removedor collected from surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities. As per the rules,the local bodies are responsible for the collection, treatment and disposal of solid wastes. The 'Central Board of Solid Waste Management' is the monitoring authority under the said rules and is responsible for granting authorization to local bodies for processing and disposal of solid waste.

MMJC has a very good solid waste recycling unit which operates a few vehicles to collect wastesusing compostable bags across the campus. Both degradable and non-degradable items are being collected from different Department laboratories, canteens, cafeteria, stationary shops and hostels every day and dumped in the place 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 bins are labelled properly for the indication of degradable and non-degradable items. These biocomposts are utilized for cultivation of plants in the campus and enhance the health of soils and population density of beneficial microorganisms to a greater extend.

21.1.1. Waste Management Practices

Waste management has a common mandate that the "Producer Owns the Responsibility". The community that generates waste should develop more responsibility in handling the waste with more care thus reducing negative impact on the environment. In a study conducted in 2013 by 'M/S Hand in Hand India Ltd.' in MMJC had quantified a daily average of wastes in which food waste is about 37%, recyclable waste is about 27% and other organic waste is about 36%. The study revealed that the solid wastes needs to beprofessionally handled. The solid wastes are collected from different places of MMJC and segregated based on bio-degradable and non-degradable materials subsequently subjected for recycling and degradation processes like composting. Details of the waste management practices in MMJC are 1) Bio-degradable waste handling, 2) Sewage Treatment Plant 3) Bio-gas plant, 4) Disposal of E-Waste and 5) Rain Water Harvesting System. Regarding the foodwastes, a portion of food wastes being pulverized and used in the bio-gas digester and thebalance quantity is sent to piggeries. Organic wastes like dry leaves, vegetable cuttings, etc. are sent for bio-composting.

21.1 Bio-degradable and Non-degradable waste materials Management Practice

For the purpose of segregation of waste (Organic, recyclable, non-recyclable and e- waste) at source and collecting the same in 'Waste Bins' are placed at designated locations in the Campus *viz*. Students hostels, Staff quarters, Department Laboratories and common places.

21.1.2. Disposal of e-Waste at MMJC

The Ministry of Environment, Forest and Climate Change, Government of India notified the E-Waste Management Rules, 2016. Electronic waste or e-waste comprises old and end of life electrical and electronic appliances such as telephones, cellular telephones, computers, laptops, television sets, refrigerators, washing machines, air-conditioners, fluorescent and other mercury containing lamps etc. The rules apply to every Manufacturer, Producer, Consumer, Bulk Consumer, Collection Centre, Dealer, E- Retailer, Refurbished, Dismantler and Recycler involved in the manufacture, sale, traQCAer, purchase, collection, storage and processing of e-wastes or electrical and electronic equipment. As per the Rules, the producer of the electrical and electronic equipment shall be responsible for collection and channelization of e-wastes generated from the 'end-of- life' of their products under Extended Producer Responsibility (EPR).

In compliance to the E-Waste Management Rules, 2016, Government of India, e- waste materials were collected from MMJC are being segregated and then sold to Authorised Agencies which are approved by the Pollution Control Board (PCB) for handling e-waste. Due to this e- waste activity disposal, the e-waste pollution is significantly reduced in the MMJC. However, a proper method of e-waste disposal should be done in coming years in collaboration with Maharashtra State Pollution Control Board as per the E-Waste Management Rules, 2016.

21.2. Construction & Demolition of Waste Management

The Ministry of Environment, Forest and Climate Change, Government of India has notified the Construction and Demolition Waste Management Rules, 2016. These Rules are notified exclusively to manage waste from construction activities. These Rules apply to every waste resulting from construction, re-modelling, repair and demolition of any civil structure of individual or organization or authority, which generates

constructionand demolition wastes such as building materials, debris and rubble. According to the Rules, the local bodies need to ensure proper management of construction and demolitionwastes (Handy *et al*., 2002). State Pollution Control Board is to grant authorization for the waste processing facility and to monitor the implementation of these Rules.

21.3. Hazardous Waste Management

The Ministry of Environment, Forest and Climate Change, Government of India, New Delhi has notified the Hazardous and Other Wastes (Management and Trans boundary Movement) Rules, 2016 under the Environment (Protection) Act, 1986. As per the rules, hazardous waste means "any waste which by reason of characteristics such as physical, chemical, biological, reactive, toxic, flammable, explosive or corrosive, causes danger or is likely to cause danger to health or environment, whether alone or in contact with other wastes or substances". The hazardous waste generator shall follow the steps namely prevention, minimization, reuse, recycling, recovery, utilization including co- processing and safe disposal of hazardous waste (Nascimento and Filho, 2010). The Board of 'Hazardous Waste Management' is taking effective steps in handling and managementof hazardous wastes, its treatment and disposal in an environmentally safe manner.

MMJC has taken pioneering efforts to dispose the hazardous waste properly that are generated from variousDepartment laboratories. Acids, solvents, salts, reagents and cancer-causing substances (carcino chemicals) will cause cancer to the stakeholders those who doing research and/or experiments that are disposed properly. The other carcinogenic materials such as Alcoholic beverages, Areca nut, Asbestos (all forms) and mineral substances (such as talcor vermiculite) that contain asbestos, Coal, indoor emissions from household combustion,Glass wool fibers (inhalable), Leather dust, Ionizing radiation (all types), Solar radiation,X- and Gamma-radiation, Iron and steel founding (workplace exposure), Isopropyl alcohol manufacture using strong acids, Tobacco smoke, second hand, Welding fumes, Wood dust, Painter (workplace exposure), Rubber manufactured materials, Silica dust, Crystalline, in the form of quartz or cristobalite will cause various types of cancer to the students and staff members that are disposed properly as per the guidelines of Nascimentoand Filho (2010). The observation need to be strengthen in terms of proper disposal of hazardous waste without harming the environment and land.

21.2 Vermicompost, Organic and Green manures

Natural or eco-friendly methods should be used to grow plants vigorously in the campus which could reduce the environmental pollution. Use of biofertilizers, organic manures (cow dung, vermicompost and plant wastes and litters) and green manures to grow healthy plants in the medicinal plant garden, kitchen garden and terrace garden should be ensured to keep the campus organic. The plant waste such as fallen leaves, stems, fruits, nuts, seeds and other plant parts should be used to make green manures. A concreteor ground level green manure production unit and vermicomposting units will help to convert all the plant and animal based wastes into green/organic manures . This will be a healthy way of solid litter waste management in the campus.

Minimal use of chemical fertilizers as part of integrated nutrient management system is acceptable but nil use of chemical fertilizers is highly appreciable and also helps to keep the campus more of an organic ecosystem. The soil, air, water and sunlight are the four major natural resources any campus gets. Proper use and conservation of these resources are mandatory in green campus audit sites. Biofertilizers such as Nitrogen fixingbacteria, Potassium and Phosphorus solubilizing bacteria, Potassium mobilizing fungi (VAM), farm yard manure, dried cow dung manure, vermicompost manures and biofungicides and biopesticides are extensively used in of MMJC to cultivate plants. Agrochemicals, chemical fertilizers, pesticides and fungicides are not used. These practices are very well appreciated because air, water and soil pollution due to use of agrochemicals is eradicated which in turn to improve the soil health significantly.

MMJC has plan to establish a small Vermicomposting unit in which all the degradable items such as leaf litters, vegetable wastes obtained from Campus hostels and canteen along with farm yardmanure and dried cow dung manure are used to produce vermicompost. The solid wastes are collected from different places of the campus and segregated based on bio-degradable and non-degradable materials subsequently subjected for recycling and degradation processes like composting materials. Suitable bioinoculants may be used to degrade the solid wastes effectively in the composting unit.

22 Oxygen producing and Carbon dioxide 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 which a large number of oxygen producing and CO_2 absorbing plants are planted in the MMJC. 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 CO_2 absorbing plants available in the campus are Snake plant (*Sansevieria zeylanica*), Gerbera Daisy (*Gerbera jamesonii*), Portia tree (*Thespesia populnea*), Golden tree (*Cassia fistula*), Hop brush (*Dodonaea viscosa*), Malabar plum (*Syzygium cumini*), Sacred fig (*Ficus religiosa*), Veldt grape, devil's backbone (*Cissus quadrangularis*), Flame tree(*Gloriosa superba*), Hoary Basil (*Ocimum americanum*), cuban pink trumpet (*Tabebuia pallida*) and witch weed (*Striga densiflora*). The predominant families of various monocot and dicot plants of oxygen producing and CO_2 absorbing plants found in the MMJC are Acanthaceae, Anonaceae, Arecaceae, Bignoniaceae, Caesalpiniaceae, Combretaceae, Cycadaceae, Euphorbiaceae, Fabaceae, Lythraceae, Malvaceae, Meliaceae, Moraceae, Myrtaceae, Nyctaginaceae, Phyllanthaceae, Polygalaceae, Rutaceae, Rubiaceae, Turneraceae, Verbenaceae and Vitaceae.

Oxygen producing and Carbon dioxide absorbing plants [Sacred fig tree (*Ficusreligiosa*) Indian Sandalwood tree (*Santalum album*)]

23 Establishment of Eco-friendly Campus at MMJC

Eco-friendly literally means earth-friendly or not harmful to the environment. It isvery important in any Organization is concern in terms of protection of earth planet. Thisterm most commonly refers to products that contribute to green living or green practices that help conserve resources like water and energy. Go green concept is the ideal examplesto conserve the environment. Eco-friendly products also prevent contributions to air, water and land pollution to a greater extend. It is being designed to have little or no damaging effect on the environment. Basically, it is all about doing things without harming the environment. Products, events, and services that are eco-friendly lead less cost without harming the earth as well as lead less pollution. Environmentally friendly products are market-oriented products that cause minimal environmental degradation and their production is linked to a product development process that is structured in a way that considers the impacts that can be caused to the environment throughout their life cycle. The harmful activities of humans like deforestation, pollution, global warming is a majorthreat to the environment. Air pollution is caused by solid and liquid particles and certaingases that are suspended in the air. They are more durable, reusable, less toxic, less resource-intensive, and safer for the environment, wildlife, and people.

23.1 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 todevelop an understanding of the environment in which we live and helps to overcome tough environmental troubles affecting nature. In addition, 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 for the Universities and Autonomous Colleges to introducea course in 'Environmental studies' and teach to the students about the ecosystem, pollution and problems associated with the environment. Environmental education refers to organized efforts to teach how natural environments function, and particularly, how human beings can manage behaviour and ecosystems to live sustainably. It is a multi- disciplinary field integrating disciplines such as Biology (Botany and Zoology), Chemistry, Physics, Ecology, Environmental Science & Engineering, Earth Science, Atmospheric Science, Mathematics, and Geography

23.2 Napkin disposal facility

Menstrual Hygiene Management (MHM) is an indispensable part of the Swachh Bharath Mission Guidelines (SBM-G) for adolescent girls and ladies. As instep with MHM hints, 'Safe disposal' method making sure that the process of destruction of used and dirty materialsis performed without human touch and with minimum environmental pollutants and 'Unsafe disposal' method throwing used material into ponds, 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 throwingthem 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 Management of MMJC 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 Campus is taking care of adolescent girls and ladies significantly in their personal hygiene.

23.3 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 airmovement which improves the comfort of occupants. Mechanical (or 'forced') ventilationtends 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 flowof 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 MMJC has a large number of ventilators for effective air circulation.

Ventilation and Exhaust system Facilities in Buildings towards air circulation and heat exchange phenomena at MMJC

23.4 Measurement of Carbon dioxide level in the Campus

The long-term heating of Earth's climate system is changed now-a-days due to a massive increase in global warming and environmental changes including human population and human activities. In addition, primarily fossil fuel burning and an extensive usage increases heat-trapping greenhouse gas levels in Earth's atmosphere which lead to assimilation of carbon dioxide in the atmosphere. Climate change includes both global warming driven by human-induced emissions of greenhouse gases and the resulting large- scale shifts in weather patterns (Sovacool and Brown, 2010). It is playing an important role to act as a global indicator for checking the purity of the atmosphere. In general, a portable CO_2 Analyzer is used to measure the level of carbon dioxide in the atmosphere atdifferent places across the MMJC. The observation showed that the concentration of CO_2 in the atmosphere is found to be low which did not exceeds the critical limit of CO_2. It is furtherrevealed that all the selected locations are having pure air without any air contaminants with good air exchange/circulation in the campus. Some of the places like Bank, Post Office, ATM Centre and Examination Centre are recorded with high level of carbon dioxide level due to student mobilization and the maximum number of electrical items fixed from which the carbon dioxide emission and poor ventilation were observed followed by all laboratories and seminar and auditorium halls (Table 1).

Reference of Set values of CO2 level

- 350-1000 ppm: Typical level found in occupied spaces with good air exchange along with pure air.
- 1000-2000 ppm: Moderate level associated with complaints of drowsiness and poor airquality.
- 2000-5000 ppm: Critical level associated with headaches, sleepiness, and stagnant, stale, stuffy air. Poor concentration, loss of attention, increased heart rate and slight nausea may present.

23.5 Water Management Activities

It is therefore essential that any environmentally responsible institution should examine its water use practices. Water auditing is conducted for the evaluation of facilitiesof raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water (Senior and Brightman, 2015). MMJC is taking enough attemptto manage wastewater that are coming out from various Department laboratories, hostels and canteens. In general,

water management activities are very important in terms of conserving water and its resources for future generations which in turn useful to reduce the land contamination.

23.6 Role of Higher Education Institutions in Water Conservation

- Build consensus on the need for water conservation on campus with students, administration, faculty and other internal as well as external stakeholders.
- Build consensus on the need for water conservation on campus with village residents,village administration, grama sabha and other internal as well as external stakeholder institutions like schools, self-help groups, health centres, village banks, panchayats.
- Facilitate design of specific interventions for making the campus water sufficient and water efficient by following best available standards and accepted parameters.
    - Facilitate design of specific interventions for making the village water sufficient and water efficient by following best available standards and accepted parameters
    - Monitor the existing water management in the campus with participation and transparency
    - Present a step-by-step guide for conserving water on the campus and village
    - Generate case studies on best water conservation practices adopted on the campus andin the villages the campuses are engaged with. These instances can serve as models for other institutions and villages to adopt.
    - The team that would be involved in all aspects of exploring, surveying, fact-finding, recording, planning, taking action and monitoring will also include all relevant stakeholders viz., citizens, student teams, their teachers, village leaders apart from administrative officials concerned in both campuses and villages.
    - One or two interested or environmentally-concerned-inclined faculty members or village community leaders may be given the responsibility to lead the water conservation movement in the respective realms.
    - Water Conservation Initiative can be a successful only if the Head of the Institution ignites the spirit of everybody in the organization. She/he needs to direct the departments, pay attention to the findings of student teams and ensure that their valuable suggestions are followed in letter and spirit by all students, faculty membersas well as administrative, non-teaching and support staff.
    - A motivated leader can bring a sea-change in the system and therefore she/he is the cornerstone of this campaign. An advisory committee may be constituted to guide theinitiative on water conservation.

23.6.1 Physical Appearance and Overall Ambience on Water Conservation

Water Conservation

* Adequacy of Water
* Plumbing adequacy of water taps and Sanitary fixtures
* Water Efficient Toilets
* Dedicated Staff for Water Maintenance
* Dedicated Staff for Water Inspection
* Periodic mending and repairs of leaks in taps and pipes
* Two levels of flushing in all the toilets
* Planting indigenous variety of plants and less water requiring plants
* Organising water conservation workshops to the faculty and students on thecampus

Rainwater Harvesting

* Proposed Installation of rain gauge and rain recording system
* Steps taken for implementing rainwater harvesting inside the campus
* Digging rainwater harvesting pits on the campus
* Educating on Water Harvesting through workshops/seminars

Renovation of Traditional and other Water Bodies/Tanks

* Groundwater recharge & Maintenance of water balance
* Reuse and recharge structures & Preservation of water bodies
* Watershed development & Biomass management
* Land management & Water management

Other Interventions

* Technological and sociological interventions
* Planning, Preparing and Reporting Mechanism
* Appropriate display, publicity, sharing knowledge
* Treating personnel/workers with respect and looking into their welfare
* Adhering to Reporting Mechanisms
* Designated Officer Monitoring and taking Corrective measures for WaterManagement

Leakages

* Leakage represents the largest share of wastage as well as unauthorized water use.
* Each source meter needs to be reviewed for accuracy, either by reviewing availablemeter test results or retesting the meter.
* System valves need to be checked periodically for malfunction. For instance, altitude control valves on storage tanks might be broken or

set improperly, allowing the tank to overflow. These valves need periodic inspection, moreso when there is observed leakage or overflow

* Pressure relief valves which are set too low might cause spill when pressures reachthe high range. These pressure relief valves need to be calibrated accordingly
* When problems are discovered during routine inspections, possible water losses need to be estimated and corrective action can be taken up immediately.

23.7 Water Quantity Estimation

The quantity of water required for municipal uses for which the water supply schemehas to be designed requires following data:

1. Water consumption rate (Per Capita Demand in litres per day per head)
2. Population to be served.

Quantity = Per capita demand x Human population

23.8 Water Consumption Rate

It is very difficult to precisely assess the quantity of water demanded by the public, since there are many variable factors affecting water consumption by various stakeholdersof an organization. The various types of water demands, which a city may have, may be listed into following classes:

23.8.1 Estimation of Water requirements for drinking and domestic use

(Source: National Building Code 2016 BIS)

As a general rule the following rates per capita per day may be considered for domestic and non-domestic needs. For Communities with population 20,000 to 10,000 together with flushing the per capita per day rates may be considered for domestic and non-domestic needs.

100 to 135 lphd (135- Avg) system.

Water requirements calculation

S.No	Educational Institution swater requirements	Domestic use (lphd)	Flushing (lphd)	Total use (lphd)
1.	Without Boarding Facility	25	20	45
2.	With Boarding Facility	90	45	135

23.8.2 Fire Fighting Demand

The per capita fire demand is very less on an average basis but the rate at which thewater is required is very large. The rate of fire demand is sometimes treated as a function of population and is worked out from following empirical formulae:

Per capita fire demand calculation

S.No	Authority	Formulae (P in thousand)	Q for 1 lakh Population)
1.	American Insurance Association	Q (L/min)=4637 - 0.01 □P))	41760
2.	Kuchling's Formula: per capita fire demand	Q (L/min)=3182 □P	31800
3.	Freeman's Formula: per capita fire demand	Q (L/min)= 1136.5(P/5+10)	35050
4.	Ministry of Urban Development Manual Formula	Q (kilo liters/d)=100 P>50000	31623

23.8.3 Factors affecting per capita demand of water consumption:

a. Size of the city: Per capita demand for big cities is generally large as compared tothat for smaller towns as big cities have sewered houses.
b. Presence of industries.
c. Climatic conditions.
d. Habits of people and their economic status.
e. Quality of water: If water is aesthetically $ medically safe, the consumption willincrease as people will not resort to private wells, etc.
f. Pressure in the distribution system.
g. Efficiency of water works administration: Leaks in water mains and services; andunauthorized use of water can be kept to a minimum by surveys.
h. Cost of water.
i. Policy of metering and charging method: Water tax is charged in two differentways: on the basis of meter reading and on the basis of certain fixed monthly rate.

23.8.4 Fluctuations in Rate of Demand

Average Daily per Capita Demand = Quantity Required in 12 Months/ (365 x Population)
If this average demand is supplied at all the times, it will not be sufficient to meet thefluctuations.

Seasonal variation: The demand peaks during summer. Firebreak outs are generally morein summer, increasing demand. So, there is seasonal variation.

Daily variation depends on the activity. People draw out more water on Sundays and Festival days, thus increasing demand on these days.

Hourly variations are very important as they have a wide range. During active householdworking hours i.e. from six to ten in the morning and four to eight in the evening, the bulkof the daily requirement is taken. During other hours the requirement is negligible. Moreover, if a fire breaks out, a huge quantity of water is required to be supplied during short duration, necessitating the need for a maximum rate of hourly supply.

So, an adequate quantity of water must be available to meet the peak demand. To meet all the fluctuations, the supply pipes, service reservoirs and distribution pipes must be properly proportioned. The water is supplied by pumping directly and the pumps and distribution system must be designed to meet the peak demand (Astriani, 2016). The effectof monthly variation influences the design of storage reservoirs and the hourly variations influences the design of pumps and service reservoirs. As the population decreases, the fluctuation rate increases.

Maximum daily demand = 1.8 x average daily demand Maximum hourly demand of maximum day i.e. Peak demand

= 1.5 x average hourly demand
= 1.5 x Maximum daily demand/24
= 1.5 x (1.8 x average daily demand)/24
= 2.7 x average daily demand/24
= 2.7 x annual average hourly demand

23.8.5 Design Periods and Population Forecast

This quantity should be worked out with due provision for the estimated requirements of the future. The future period for which a provision is made in the water supply scheme is known as the design period.

Design period is estimated based on the following:

23.8.5.1 Useful life of the component, considering obsolescence, wear, tear, etc.

23.8.5.2 Expandability aspect in the surrounding area.

23.8.5.3 Anticipated rate of growth of population, including industrial, commercialdevelopments and migration-immigration.

23.8.5.4 Available resources in and around the campus.

23.8.5.5 Performance of the system during initial period.

23.8.5.6 Population density in the organization and its surrounding area

- ***Auditing for Waste Management***

Waste management reduces the effect of waste on the environment, health, and soon. It can also help reuse or recycle resources, such as; paper, cans, glass, and so on. Thereis various type of waste management that include the disposal of solid, liquid, gaseous, orhazardous substances. Pollution from waste is aesthetically unpleasing and results in largeamounts of litter in our communities which can cause health problems. Plastic bags and discarded ropes and strings can be very dangerous to birds and other animals. The most important reason for waste collection is the protection of the environment and the health

of the population. Rubbish and waste can cause air and water pollution. Rotting garbage is also known to produce harmful gases that mix with the air and can cause breathing problems in people. This indicator addresses waste production and disposal, plastic waste,paper waste, food waste, and recycling. Solid waste can be divided into two categories: general waste and hazardous waste. General wastes include what is usually thrown away in homes and schools such as garbage, paper, tins and glass bottles. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals andpetrol. Unscientific landfills may contain harmful contaminants that leach into soil and water supplies, and produce greenhouse gases contributing to global climate change. Furthermore, solid waste often includes wasted material resources that could otherwise bechannelled into better service through recycling, repair, and reuse. Thus the minimizationof solid waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices (Verma *et al*., 2012; Wang *et al*., 2013).

- ***Biomedical Waste***

The Ministry of Environment, Forest and Climate Change, Government of India has notified the Bio-Medical Waste Management Rules, 2016. As per the rules, bio- medical waste means any waste, which is generated during diagnosis, treatment or immunization of human beings or animals or research activities pertaining there to or in the production or testing of biological or in health camps. The bio-medical waste generatorand the operator of the common bio-medical waste treatment and disposal facility (MMJC) shall be responsible for safe handling and disposal of the bio-medical waste. The State Government of Health shall ensure for implementation of the rule in all health care facilities. MPCB shall issue authorization to the health care facilities and MMJC. It shall monitor the compliance of various provisions of the rules. Both central and state Governments have so far authorized a large number of Private and Government hospitals in the State under the rules and have made

agreement with the MMJC for the collection, transport, treatment and scientific disposal of the biomedical waste. The MMJC consists of autoclave, shredder, incinerator and secured land fill facilities.

- ***Climatic condition***

Temperature begins increasing after March. May is the hottest month with near daily maximum temperature of 33˚C and maximum of 25-26˚C. The maximum and minimum temperature may go up to 36˚C and 16.4˚C; respectively. The average rainfall received in the Mumbai district is 2,317mm - 2,514mm, for the past 20 years. Due to the presence of the mountain pass major parts of the district from the south west monsoon in the months from June to August. The rainfall of the south west monsoon is irregular as the masses of clouds are intercepted only very little rain in September. After a warm, humid September, the regular monsoon starts from October lasting till early November. In October north east monsoon sets in heaviest rains are usually or the end of October and throughout November. Out of the total rainfall 25% is received during south west monsoon 49% during October and November and remaining 21% during September.

Environmental conditions of MMJC

Environmental parameters		
1.	Minimum Temperature	20-25°C
2.	Maximum Temperature	30-35°C
3.	Minimum Relative humidity	66-80%
4.	Maximum Relative humidity	7-100%
5.	Annual Average Rainfall	60-70 cm/avg.year
6.	Annual Average Sunshine	3-6 hrs/avg.day
7.	Wind speed	15.2-17.8 km/hr

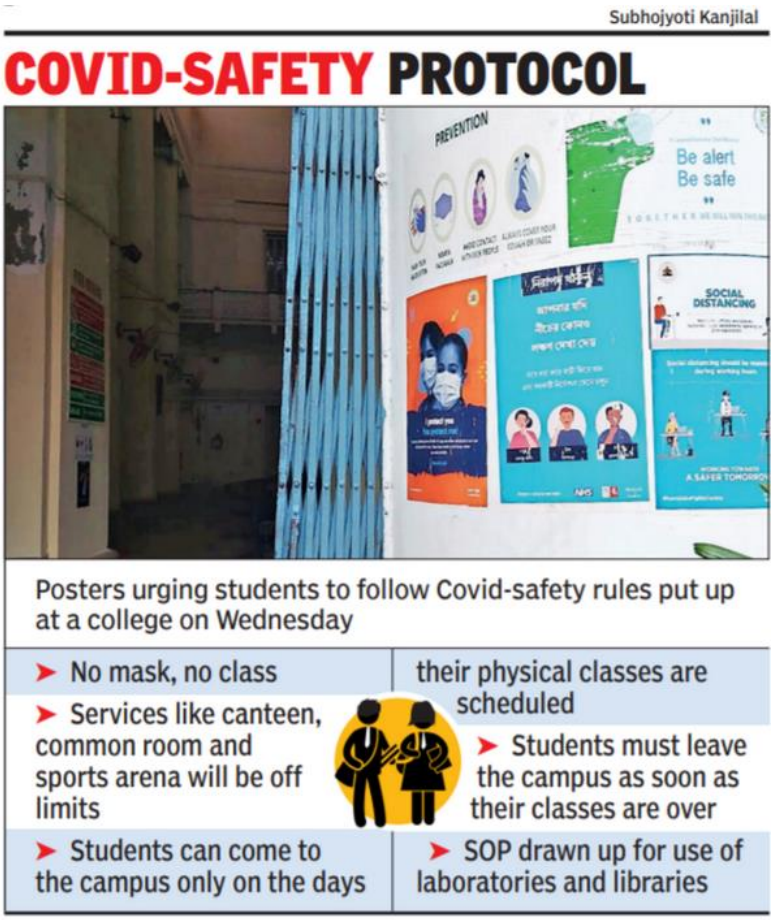
- **Safety measures and Green building conservation code**

The personal and environmental safety measures are very important in colleges buildings for college students and staff members that requires vigilance and awareness. Colleges and Universities work to foster safe environments, but students share responsibility. Now that your student has had some time to acclimate to their new campusand life, it's a good idea to check in about what they do on a daily basis to keep themselvessafe. What is the relationship between their campus and the surrounding area (whether it'srural or urban)? The Management of the Colleges and Universities should extendby supplying good advice and the best safety tools in the campus. The organization shouldhave a police force, escort services, call boxes, first aid box, fire extinguishers, fire alarms, security systems and staffs towards the safety measures. MMJC has very good safety measures as per theGreen building conservation code such as fire extinguisher and fire bell and alarms in all the places. In addition, in all the places, 'Exit',

'Entry' and other sign boards kept across the places to give cent percent safety to the stakeholders.

Safety measures made available as per the Green building conservation code at MMJC

- **COVID-19 protocol set-up and Safety measures at the Organization campus** The novel coronavirus is still spreading across the world and information is changing rapidly. Life as we knew it has changed dramatically since the Government has encouraged the people to practice social distancing by keeping the distance as much aspossible and avoiding crowds in order to help slow the spread of COVID-19. In addition,the Government is advised us to wear face mask and use sanitizers regularly to stay safeand healthy. College Xpress is actively monitoring COVID-19's impact on the college search, financial aid, student life, and more to provide the most up-to-date and accurate information to provide the health environment to the students and staff members. The Management of MMJChas taken enormous efforts to follow the COVID-19 protocols and made available insanitizers, face masks, towels, dustbins for disposing used face masks across the campus. It is also observed that automatic sanitizer systems are made available at campus to give safety measures against the COVID-19 pandemics situation to the students and both teaching and non-teaching staff members.



24. Implementing Swachh Bharath Abhiyan Scheme under Clean India Mission

Swachh Bharath Abhiyan under Clean India Mission is the new initiative and a step towards sanitation, solid waste management and cleanliness to promote cleanliness across India. It is the country-wide campaign applied on a large scale in India for both the rural and urban places, producing needs for the bathrooms and providing hygienic atmosphere amongst the population by household member's was the main purpose of this. This scheme is implemented by the Educational Institutions covering Universities, Colleges and Schools, Government Departments, Companies and Public sectors across the country to give a safe pollution free environment, eliminate the open defecation, improve solid waste management and sanitation and refining drinking water quality to the stakeholders. The initiative is easily attainable by the support of Government employees, management representatives, staff members and students. The students of MMJC conduct more awareness programmes on cleanliness, use of plastics, solid waste management and sanitation and importance of environment to the rural people across Mumbai District of Maharashtra through units. The students collected and disposed of the wastes in the trash by using eco-friendly covers. They created awareness among the rural and urban people to keep the surroundings clean and hygiene. A sizable number of programmes and rallies are conducted periodically during the celebration of various events such as 'Independence Day', 'Republic Day', 'World Environmental Day' and 'Biodiversity Conservation Day' events.

Professional implementation of all the Eco plans in the campus should be done through the Eco clubs, Nature clubs, Science clubs, Youth Red cross units, Fine Arts clubs, Women cell, Associations, Forums, SSL. All the students, members of staff and employers should be mandatory members of the club and should do tree planting and maintenance of greenery in the campus periodically. Conducting frequent seminars, conferences, workshops, awareness rallies, etc. on topics relevant to the environment is necessary to educate and create awareness among the students and staff members. In addition, student's associations, cells, clubs and forums should be the first hand receivers of all the new plans proposed by the Government such as Swachh Bharath Abhiyan and Jal Shakti Abhiyan under Clean India Mission and implement the same in the campus. MMJC has well developed, Swacht Bharath Abhiyan under Clean India

Mission. These bodies are actively involved in tree planting programmes and cleaning the surrounding areas of tribal, rural and urban people across **MMJC is conducting a large number of activitiesto conserve the nature and to teach about the importance of environment to rural, tribal and urban people.**

Awareness programmes on the green campus initiatives and dissemination of greenmotto and pledges are accounted in a sustainable manner. Its benefits and self- sustainability are being projected for wider centric on earth and Ecology conservation. Innovative practices that add up credentials in implementing the green campus which needs to be promoted in the awareness programme to the students and staff members including public domain. Technology driven solutions initiated bythe green campus organization are periodically disseminated and documented successivelyfor propagating the attitude of the green campus in wider masses. MMJC has taken sufficient attempts to disseminate the green campus motto and green pledge as well as awareness programmes such as ‘Don’t cut trees’, ‘Don’t use plastic bags’, ‘Don’t waste waters’, ‘Plastic Free Zones’ and ‘Preserve the Natural Resources’ and etc. among the students and staff members in the campus.

MMJC is implemented the Government schemes (Swatch Bharath Abhiyan under Clean India Mission) to give pure and safe water to rural people and teach the importance of cleanliness of toilets and restrooms to people living in Mumbai. These activities are very important in view of the immediate vicinity to take up developmental activities and conducted Participatory rural appraisal programmes. It is involving the socioeconomic status of the inhabitants, natural resources, traditional knowledge systems, croppingpatterns, etc. of the rural and tribal people living in Mumbai. MMJC is also focusing on the development of women, youth, children and dalits and to identify the extension and training needs of the target group through the Department of Women Studies and Career Guidance. It provides the vocational training to marginal farmers to overcome the problemof seasonal employment. Some of areas identified are goat farming, mushroom cultivation, vermicomposting, bee keeping, ornamental fisheries, organic farming and medicinal plantcultivation.

MMJC helps to develop social commitment and to expose the students to get sensitized to socialrealities and to build a link between the student community and the wider community. It enhances the social interaction, inter-personal communication skills and develop emotional maturity of students. It also helps students in total and integrated personality development. MMJC facilitates to prepare the students for future life, by developing qualities such as cooperation, team spirit, leadership, discipline and development of creative talents including to boost the self-confidence of student.

25. Recommendations for sustainable environment

Steps to Making Your Campus More Eco-Friendly

Environmental concerns might not be at the forefront of students' attention. They are more likely to be busy with essays, research papers, and exams. But everyone needs to make their contribution to a greener living. Colleges have huge waste potentials and may produce a high carbon footprint. So even the smallest efforts to reduce that matter. Some of the actions can be taken by the university, others are up to every student's personal choice. Of course, students might argue that they simply do not have time for that. They are overloaded with written assignments, college tasks, and part-time jobs. It is perfectly understandable that when you are pulling the third all-nighter in one week, it is hard to care about anything else.

Campus-Wide Actions

This section covers the efforts that can be taken by colleges whether it is their initiative or a lobby coming from students.

Recycling Programs

Almost any college has some type of recycling opportunities available at this point. But there is always room for improvement. Recycling is one of the most effective and sustainable ways to reduce waste and help the environment. If the recycling program is not open yet, one can contact local recyclers to ask for advice on how to launch such a program at college. Recycling bins have to be placed in crowded places with high traffic. This way, students can see and use them more.

A great way to endorse recycling is to weigh the materials given and illustrate the impact it makes. Or a college can offer some type of reward system.

Composting Projects

One of the huge problems of any campus is food waste. To eliminate that, a college can start a composting project on their premises. There should be a couple of bins for that. And food compost can be used in a local garden, for example.

Efficient Lighting

The next step is to make electricity use sustainable. The first thing to do is to switch to LED or CFL bulbs that save more energy and last longer. Another option is to set an automatic on/off system so the light is not used when there is no one around. Optionally, a school might go for solar power and produce their own electricity, however, such a shift might take time and big upfront investment.

Endorse Bikes and Public Transport

To reduce carbon emissions, it is better to opt for bikes. Alternatively, use public transport instead of personal cars. College can host a bike rental or share program for students. Or they can simply endorse it and put parking spots for bikes near premises.

Create a Garden

Having a garden on campus is good for several reasons:
It can be used as a learning opportunity and part of the curriculum;
It produces fresh vegetables and fruit;
Working in the garden is known to reduce stress, anxiety, and depression;
It promotes greener living.
There is no reason not to. According to Business Insider, 25 Google offices grow their own food in their gardens. That's an impressive initiative to follow.

Sustainability Classes and Events

Advocating for more sustainable living is also important. Most of the time, people are not aware of the easy ways they can do better. There can be a sustainability class that students can take. A great idea would be to host regular events on the matter as well.
Personal Actions
This section lists the steps each student can take to reduce their footprint and be more environmentally friendly.
Keep Your Campus green Activity

Reduce Paper Use

Some things have to be submitted on paper. But taking notes, for example, is even easier with a laptop or tablet. Get rid of paper agendas as there are plenty of useful apps that are even better in terms of keeping reminders up.

Unplug Devices

Even when not used, plugged-in devices use standby power. Unplug them when you do not need them. Opt for LED lights in your dorm. Do not use excessive lighting as well.

Shop Smarter

One of the contributing factors to global pollution is consumerism. It is hard to resist the temptation to get a great deal sometimes. But one can be more sustainable about their shopping habits. Here are some tips:

Thrift and buy second hand in terms of textbooks, clothes, or devices;
Buy local to reduce the carbon footprint from deliveries/shipping;
Eliminate plastic bags – use paper ones, or, even better, cloth bags;
Look for energy-saving appliances when shopping;
If possible, choose things in recyclable or recycled packaging;
Avoid single-use items, especially plastic kitchenware.

Here is another outstanding idea – re-sell what you do not need. Optionally, you can donate it as well. But if you need money, you can always sell things to people that need them instead of just throwing stuff away.

Try Minimalism

You do not have to go full minimalist mode, but applying several principles might help. For example, there are lots of student deals and offers available. But choose only those you actually need.

When planning your expenses, consider what supplies you need and what is not necessary.

Choose durable items that you won't have to replace every couple of months.

Join a Sustainability Club

There is probably some kind of green organization or club on your campus. You can join it. First of all, it is helpful to have like-minded people around. You can learn from each other, help with resources, and useful links. And it is a great way to meet new friends and keep the motivation to do better.

Secondly, it is useful for lobbying green initiatives in college. For instance, if you have a plan or proposal on how to make the campus more sustainable, you can collect signatures and make a proposal. Colleges are happy to listen and maybe you'll make a great change as a result.

And such things usually look good in the future resume as they show a proactive approach, leadership, goal-setting, and resourcefulness.

Recycle

Even if a recycling program is not available on campus, you can still do it on your own. Search for initiatives and platforms online. Where can you take your plastic or paper waste? Is there a sustainable way to get rid of old appliances if they are broken?

In Summary

Living a greener life doesn't have to be extremely complicated. Even the smallest things matter – for example, avoiding water waste or buying second-hand. The simple rule is to reduce, reuse, and recycle everything. And, in the long run, all of that will save one money as well.

26. Acknowledgement

Environmental audit is carried out to provide an indication to the Management about how the environmental Organization system is performing. As a result the best practicable means can be applied to preserve air, water, soil, plant and animal life from the adverse effect. To conclude an environment audit report, the MMJC is an eco-friendly campus and providing pure atmosphere to the stakeholders and supports the nation as a whole in futuregenerations.

Quality Care Alliance, Thane, Maharashtra is grateful to the Management and Principal of MMJC, for providing us necessary facilities and co-operation during the energy audit process. This helped us in making the audit a success. Further, we hope that the best practices on sustainability followed by the Organization and recommendations and suggestions given by the QCA will boost the new generations to take care of the Electrical energy conservation, Energy saving measures and sustainability incompliance with the applicable regulations, policies and standards in MMJC.

IQAC Co-ordinator
M.M.Jagtap College of Arts, Science and Commerce
At post Mahad- Raigad.

PRINCIPAL
M. M. JAGTAP SENIOR COLLEGE
ARTS, SCIENCE & COMMERCE
MAHAD - RAIGAD.

CERTIFICATE OF AUDIT

Consultancy & Services
qualitycare.in@gmail.com

Cert. No.: QC/EVA/22-23/062

Environment Audit Certificate

This is to certify that

Lokvikas Samajik Sanstha's
M M Jagtap College of Arts, Science & Commerce
Navenagar, Mahad, Dist. Raigad – 401302, Maharashtra, India.
has successfully undergone the "Environment Audit" during the period of Feb to April 2023 under our supervision and the efforts taken by the management and the faculty towards the Eco-friendly campus are highly appreciable.

Certificate issued on : 10 April 2023

Project Head & QEHS Auditor
QUALITY CARE ALLIANCE
QUALITY I ENVIRONMENT I SAFETY I ENERGY CONSULTANTS

An Environment and Energy Consultancy developing healthy and sustainable Environment

End of the report
THANK YOU!!!