

# ENVIRONMENT, ENERGY AND GREEN CAMPUS AUDIT



2020-21



## **MOHAMED SATHAK COLLEGE OF ARTS AND SCIENCE**

*(Affiliated to the University of Madras, Approved by UGC & AICTE and Reaccredited by NAAC with B Grade)*

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## Chapter I

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### **Executive Summary**

Green Audit is a process of systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of higher educational institutions. It aims to analyze environmental practices within and outside of the concerned sites, which will have an impact on the eco-friendly ambience. Green audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. It can create health consciousness and promote environmental awareness, values and ethics. To find out the environmental performance of the educational institutions and to analyze the possible solutions for converting the educational campus as eco-campus the conduction of Green Auditing of institution is essential.

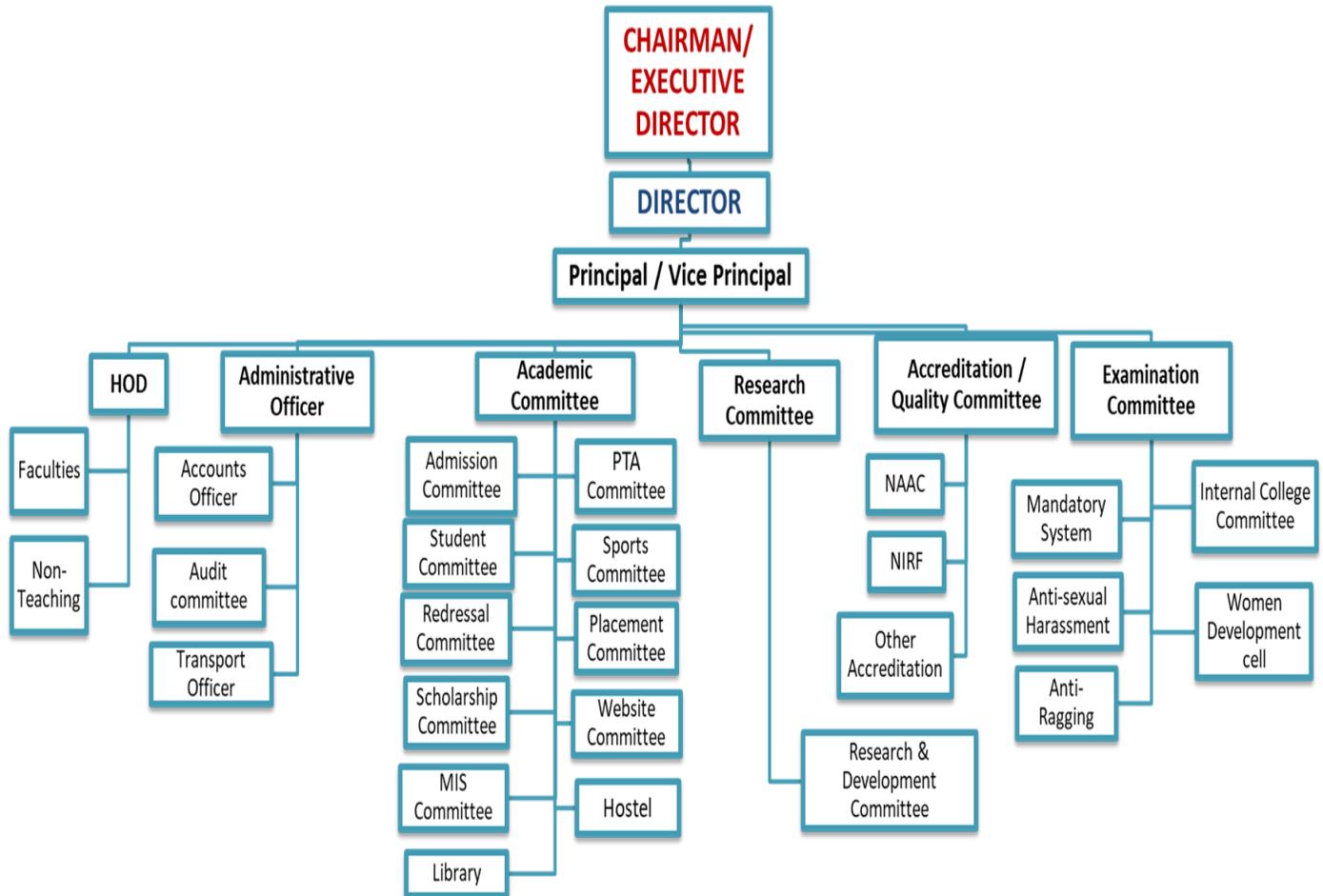
Initially a questionnaire (see annexure A) survey was conducted to know about the existing resources of the campus and consumption pattern of the students and staffs in the college. In order to assess the quality of water, samples were collected from different locations of the college campus and analyzed for its parameters. An online “Environmental Awareness Quiz” of MCQs pertaining to topics in all 5 assessment areas was conducted for students and staff (see Annexure A). Collected data were analyzed and conclusions made. Finally a report pertaining environmental management plan with best practices, suggestions and recommendations on the Environmental, Energy and Green campus are documented. In addition, we have introduced “Sustainability Index” in each area, as a measure of performance. This is only an indicative metric designed to benchmark and improve upon year on year. We plan to fine tune the parameters and metrics from time to time in order to raise the standards continually.

## Background

The Mohamed Sathak Trust established in 1973, registers under society's registration act by Philanthropic Mohamed Sathak family of Kilakarai, Ramanad District, TamilNadu with the noble purpose of helping deprived people from rural and financially challenged background to pursue quality education. The founder Chairman Late Alhaj S.M .Ahamed Jalaluddin motivating force behind the establishment of trust which provide quality education with academic excellence in the field of Engineering & Technology, Architecture, Arts and Science, Paramedical and Management education and training to meet the industrial and societal needs. At present, the trust is running 17 institutions such as Polytechnic, ITI, Arabic, Architecture, Engineering, Teacher Training Institutes, Paramedical courses, Arts& Science colleges and Schools located at Kilakarai, Ramanathapuram and Chennai.

Mohamed Sathak College of Arts & Science (MSCAS) was established in 1991, by the Mohamed Sathak Trust with the sole aim of spreading quality education. A coeducational institution it is affiliated to the University of Madras, and approved by the AICTE. The College situated in Sholinganallur (near Chennai) on the IT corridor offers 20 Undergraduate, 11 Postgraduate, 3 Diploma courses and 6 Research programmes to 5236 students. The courses offered reflect the vast career options today available to the youth, and the curriculum is designed to make them employable the moment they complete the courses and face corporate challenges with the right skills.

**Organogram of the Institution**



## **VISION**

- To serve the social needs and to uplift the living standards of the rural youths by imparting higher education adhering not only to national but also international standards of education and fostering an enduring sense of discipline and single minded dedication to work.

## **MISSION**

- By promoting the college into an institute of Excellence, it aims to serve the rural youth by providing them with easy access to higher education and job opportunities. The college strives towards integrated personality growth of rural students in particular and students at large in which special attention is given to their intellectual, moral and cultural development. It inculcates discipline, higher level of culture and time values of life among the youth.

## **ENVIRONEMNT POLICY**

- MSCAS shall maintain, manage and comply water, energy, solid waste, and carbon foot print in the campus. It conserve natural resources, and sustain eco-friendly environment. Institute will take all measures to implement towards green campus and adopt the awareness and green initiatives beyond the campus too. This will result in safe environment that is a better place to learn and live.

### **The Faculty work in harmony with the students**

- They help in the development of their character
- Counsel and guide them and gradually infuse values of life
- Encourage out-of-the-box thinking

Collaborate with industries and help students to link what they study with real life situations, to make their learning stronger

### **Highlights - about the college**

- MSCAS has produced thousands of Quality and Employable Graduates
- .The College has produced 20 University ranks from various departments for the past two years which shows good academic excellence. Apart from academics students showed outstanding performance in sports also. Student won bronze medal in State level body building championship.

<b>Year</b>	<b>Name of the award / medal</b>	<b>Team / Individual</b>	<b>University / State/National / International</b>
2020-2021	Mr. TamilNadu	Individual- Bronze medal in the 70kg	State- University of Madras
2020-2021	2nd Place	Individual	kanchipuram district silambam competition 2021
2020-2021	Football Tournament	Team	State- University of Madras
2020-2021	Table Tennis Men-Runner Up	Individual	State- University of Madras
2020-2021	Gold medal	Team	State- University of Madras
2020-2021	Gold medal	Individual	International

### Infrastructure Facilities

Physical Structure	Total - in acres
Area of campus	13.0
Built-up Area	10.5
Under Green cover	2.2

Departments	Sq. ft	Nos
Laboratories *	18382.6	34
Conference halls	387	3
Libraries	4936.3	3
Auditorium	5208.4	1
Canteens	402.15	1
Class rooms	1420.56	110
Play areas - indoor	600	1
Play areas - outdoor	108877	1

### Academic Courses (2022-23)

Under Graduate		Post Graduate	
B.Sc.	Computer Science	M.C.A	Master of Computer Application
B.C.A.	Bachelor of Computer Application	M.Sc.	Computer Science
B.Sc.	Microbiology	M.B.A	Master of Business Administration
B.Sc.	Biochemistry	M.Sc.	Applied Microbiology
B.Sc.	Biotechnology	M.Sc.	Biochemistry
B.Sc.	Hotel and Catering Management	M.Sc.	Biotechnology
B.Sc.	Visual Communication	M.Sc.	Applied Electronics
B.Sc.	Electronics& Communication Science	M.Sc.	Mathematics
B.Sc.	Mathematics	M.Com	Commerce
B.Com.	General	<b>M.Phil. &amp; Ph.D.</b>	
B.Com.	Accounting and Finance	M.Phil.	Biotechnology
B.Com	Information System Management	M.Phil.	Microbiology
B.Com.	Computer Applications	M.Phil.	Biochemistry
B.Com	Corporate Secretary ship	Ph.D.	Biotechnology
B.Com	Banking Management	Ph.D.	Microbiology
BBA	Bachelor of Business Administration	Ph.D.	Biochemistry
B.A	English	<b>Evening College Courses (Shift II)</b>	
B.Sc.	Chemistry	B.Sc.	Computer Science
B.Sc.	Home Science-Clinical Nutrition Dietetics	B.C.A	Bachelor of Computer Application
<b>Post Graduate Diploma</b>		B.B.A	Bachelor of Business Administration
1	Gene Manipulation Technology	B.Com	General
2	E-Business Management (for M.B.A)		

## STUDENTS & FACULTY

### The student and faculty strength of the college

Category	Male (in Nos)	Female (in Nos)	Total (2021-22)
○ Students	<b>2876</b>	<b>1278</b>	<b>4154</b>
○ Teaching staffs	68	84	152
○ Non-teaching staffs	37	12	59
<b>Total</b>	2981	1374	4365

## HOSTEL

Hostel	Sq. ft	Nos
Boys	87209	41
Girls	35764	10

A separate hostel for boys and girls is provided. The hostel has a capacity to accommodate 200 students. The spacious mess with a dining hall is provided and kitchen to ensure hassle free eating to the students. Separate seating arrangements have been made for both boys and girls. The hostel mess is run under the supervision of the Management through a private contractor under the guidance of the Principal and the Administrative officer. The parents and the guests are allowed to take food on payment basis.

## INTERNET

The college has high speed internet system LAN connected broadband with a speed of 10mbps. The center also provides scanning and printing facilities. The center is accessible 24 hours free of cost for both the staff and the students.

## LABORATORIES

The college has multi stored buildings with spacious classrooms and the following well equipped laboratories to cater to the needs of the students.

1. Bio-Technology
2. Micro-Biology
3. Physics
4. Chemistry
5. Language

## SPORTS

- The college provides excellence in organizational infrastructure, facilities and coaching to students from all backgrounds to reach their full potential through sport performance.
- To develop sports skills, college provides excellent infrastructure in outdoor and indoor games to build strong sports team.

## TRANSPORT

MSCAS is located close to Chennai city with well-connected public transportation system. The college operate 4 college buses are covers nearly following points from the city:

Route #	From	To
Route 1	Koyambedu	Sholinganallur
Route 2	Perambur	
Route 3	Adambakkam	
Route 4	Royapuram	

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## Chapter II

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### Management Commitment

The Management of the college has shown the commitment towards green auditing during the pre-audit meeting. They were ready to encourage all green activities. The college had already taken several measures to protect environment such as awareness programs on environment, campus greening, solar power plant, plastic ban, rain water harvesting, proper disposal of wastes etc. The management of the college was willing to accept any further recommendations from the audit team with respect to policies, compliances, enhancing efficiencies, conducting programs and conservation.

### Scope and Goals of Green Auditing

A clean and healthy environment aids in effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is an efficient and ecological way to manage environmental problems.

The audit scope covers **Water** (consumption, conservation & disposal), **Solid waste** (generation, segregation and disposal), **Carbon foot print** and steps to reduce, **Energy** (consumption, generation & conservation) and **Green campus** (greenery, techniques & bio diversity)

It is necessary to conduct green audit in college campuses in order to make the management aware of its current status with respect to the environmental aspects as well as update on the latest developments and requirements in terms of environmental compliances and best practices. Apart from this, the involvement of students in the environmental activities and programs of the college along with the audit, aids in shaping them into responsible citizens of the world.

## Objectives of Green Audit

The main objective of Green audit is to assess the environmental quality and the management strategies being implemented. The specific objectives are:

- ✓ To assess the quantity and quality of the water consumed in the college campus
- ✓ To check the measures taken for water conservation
- ✓ To monitor the energy consumption pattern of the college & steps taken for Energy conservation
- ✓ To quantify the liquid and solid waste generation and management plans in the campus
- ✓ To study the implementation of source segregation of waste generated and disposal methods
- ✓ To assess the carbon foot print of the college
- ✓ To assess the measures implemented to reduce Carbon Footprint
- ✓ To survey and verify the campus greenery and gardening techniques
- ✓ To identify the gaps and suggest recommendations to improve all aspects

## Benefits of Green Audit

- Empower the organizations to frame a better environmental performance
- More efficient resource management
- To provide basis for improved sustainability
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing & managing
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and improving environmental standards
- Financial savings through a reduction in resource use
- To create a green campus & Enhancement of college profile
- Developing an environmental ethic and value systems in youngsters
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the college

## Target Areas of Audit

- Environment Auditing - Water Management, Solid waste Management and Carbon Foot Print
- Energy Management Auditing – Energy (Electricity, Diesel Generator, Solar Power plant and Other Energy equipment)
- Green Campus Auditing - Green Campus (Green cover, Bio-Diversity)

## Methodology of Green Audit

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Environment Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks.

The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the documents, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three step process comprising of:

### Data Collection

In data collection phase, exhaustive data collection was performed using different tools such as observation, survey, communicating with responsible persons and measurements. Data collection was done from the primary sources (see Questionnaire in Annexure A)

### Following steps were taken for data collection:

The team visited each Block, Department, Library, Canteen, Gardens, and Campus etc. Data on the general information was collected by questionnaire, observation and interview.

- Water usage and conservation data
- Energy consumption meter readings, connected loads
- Identification of Plants and listing
- Waste generated and segregation at source, measurement methods and disposal

### **Surveys were conducted**

- ✓ To assess the carbon foot print due to travel by students and staff
- ✓ To assess the environment awareness levels among the students and staff (online quiz)

### **Data Analysis**

Detailed analysis of data collected included:

Water usage, quality & treatment; Quantities of solid waste& disposal; computation of energy consumption, analysis of latest electricity bill of the campus, utilization of Solar power generated; Carbon emissions due to vehicular pollution, diesel generator, LPG and any other sources

### **Recommendation**

On the basis of results of data analysis and observations, recommendations have been provided against each section on

- water conservation & treatment
- energy conservation & optimum utilization
- e-waste disposal
- bio-diversity

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## Chapter III

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### **Audit Stage - Planning**

In MSCAS green auditing was done with the collaboration of Trusted SCM and IQAC coordinator. A training program was organized by Trusted SCM to orient the staff on various aspects of green auditing. The green audit began with the teams walking around examining all the different facilities of the college, identifying the different types of appliances and utilities (lights, taps, toilets, fridges, etc.), as well as measuring the usage per item (Watts indicated on the appliance & ISEER star rating) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Solid Waste, Greening, Carbon footprint and Water.

### **Comments on Site Tour**

Site inspection was done along with green audit coordinator. Audit team visited laboratories, libraries, class rooms, garden, college campus, solar power generation fields, play grounds etc. Questionnaires were answered during the site tour. They have shared their expectations about a green campus and gave suggestions for the audit recommendations. Data collected in different intervals were consolidated later.

### **Review of Documents and Records**

Data verification was done with office records. Documents such as electricity bills, Annual report of the college, UGC report, Citizen Consumer Club records etc. were also verified as part of data collection.

### **Review of Policies**

Discussions were made with the college management regarding their policies on environmental management. The management would formulate a revised environment /green policy for the college in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are to be in accordance with the green Policy adopted by the institution.

### **Interviews**

In order to collect information for green auditing different audit groups interviewed office staff, Principal, teaching and non-teaching staff and students of the college. Discussions were held to clarify doubts regarding certain aspects.

### **Site inspection**

College and its premises were visited and analyzed by the audit-team several times to gather information. Campus trees were counted and identified. Playgrounds, canteen, pantry, library, office rooms, class rooms and vehicle parking areas were also visited to collect data. The team also visited washrooms with specific permission; terrace to check water tanks, solar power plant, roof top garden and RO plant; open grounds for rain water harvesting, bore wells, sump, solid waste storage area and disposal methods.

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# ENVIRONMENT AUDIT REPORT

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2020-21

<b><i>I</i></b>	<b><i>WATER MANAGEMENT</i></b>
<b><i>II</i></b>	<b><i>SOLID WASTE MANAGEMENT</i></b>
<b><i>III</i></b>	<b><i>CARBON FOOT PRINT</i></b>



# I. WATER MANAGEMENT AUDIT REPORT

2020-21



## **I. Water Management**

### **Need**

Water which is precious natural resource available with fixed quantum. The availability of water is decreasing due to increasing population of nation, as per capita availability of utilizable water is going down. Due to the ever rising standard of living of people, industrialization, urbanization, demand of fresh water is increasing day by day. The unabated discharge of industrial effluent in the available water bodies is reducing the quality of the sample sources of water continuously. Hence, the national mission on water conservation was declared by the then Hon. Prime Minister appealed to all citizens to collectively address the problem of water shortage, by conserving every drop of water and suggested for conducting water audit for all sectors of water use. A water audit is an onsite survey & assessment to determine and improve efficiency of water use.

### **Audit Parameters**

Following are the key parameters used in water management audit:

1. Sources of water
2. Quality of water
3. Measurement & Consumption
4. Waste water disposal
5. Awareness and communication
6. Best Practices
7. Suggestions/ Recommendations

**Observation and Inferences****1. Measurement (Source, Storage & Usage)**

Source	Nos	Measurement
a) Open well	4	175 Feet
b) Bore well	4	320 Feet
Storage		
a) Water sump (1)	3	36000 Litters
b) Water sump (2)	2	12000 Litters
c) Overhead tank	6	25000 Litters
Usage / Day		25000 Litters

The utilities for water are 2 Hostels, Mess, Canteen, Gardening and RO plant. The Mess & canteen are located inside the college campus.

**2. Water Quality**

- Test report enclosed

**a) Testing of water sources:**

- The water from the open well and bore well sources is pumped and stored in overhead tanks before being fed to the utilities.
- The TDS of this water is tested periodically at the RO plant and is found suitable for usage.
- It is being used as it is for all general purposes like washrooms, canteen and labs for cleaning purposes

### b) Purification methods

- There is a well maintained 2 nos of RO plant of 2000 & 1000 liters capacity. RO water is used for drinking purposes.
- RO Water quality has been tested in a laboratory and test reports are attached.
- The test report shows that all parameters are well within the permissible limits

### 3. Measurement and Consumption

Water Consumption pattern	In liters
1.Hostel (students / liters)	3,500
2.Laboratory	4,000
3.Mess, Canteen (Cooking & Washing)	6,000
4.Gardening	5,000
4.Day's scholars (utilities & drinking)	6,500
<b>Total usage / day</b>	<b>25,000</b>

*Water consumption per-capita ~liters per day*

### 4. Water Conservation

Sl #	Desired conservation methods	Observation
1	<b>Rain water Harvesting (RWH)</b>	Implemented
2	Water level indicators/ controllers	Yet to be done
3	Water Flow meters	Yet to be done
4	Re-cycling of waste water	Implemented
5	<b>No leaky taps/ pipes/ joints</b>	Water taps & pipes are well maintained
6	Automatic taps & urinals	Yet to be done
7	Drip irrigation	Yet to be done
8	<b>Re-use of RO reject water</b>	Implemented

## **5. Waste water disposal**

For recycling of waste water, Sewage Treatment Plant (STP) is implemented. The treated water is used for gardening purpose

## **6. Awareness and Communication**

Trusted SCM conducted a quiz on all topics to the students and staff of MSCAS. The summary of the quiz is in the Annexure 1. Two questions in the quiz were pertaining to Water management. 76% of the answers were correct

The Department of Commerce B.Com ISM have conducted an outreach program to create awareness on “Save Water for the Future Generation” among public pupils on 18-12-2021. The principal, vice principal and IQAC coordinator felicitated the program. Our department H.O.D., Staff members and 30 students were going to Perungudi and create awareness by distributing pamphlets and interacting with peoples. The interaction includes importance of saving water and suggestions to save water.



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SHOLINGANALLUR, CHENNAI-600119



We the  
**DEPARTMENT OF B.COM (ISM)**  
In Association With  
**IQAC**  
Invite you all for an Outreach Program  
Awareness on  
**"SAVE WATER FOR THE FUTURE GENERATIONS"**



**Date : 18/12/2021**  
**Time : 2.00 p.m.**  
**Venue : Perungudi**



**Dr.R.MEGANATHAN**  
Principal

**Dr.A.PURUSHOTHAMAN**  
Vice Principal



**Dr.M.SYED ALI**  
IQAC Coordinator

**Mr. SURESH**  
HOD I/C Department of B.Com(ISM)

*Staff and Students  
from the Department of B.Com (ISM)*

#### 4. Best Practices

- Rain Water Harvesting(RWH) properly implemented
- Sewage Treatment Plant (STP) is in place, however it is not functional
- Implemented RO Plant and treated water is re-cycled
- Water conservation awareness slogans are displayed at water outlets to save water



## II. SOLID WASTE MANAGEMENT AUDIT REPORT

2020-21



## **Solid Waste Management**

### **Need**

Solid waste generation and management is a burning issue. Unscientific handling of solid waste can create threats to everyone. Solid waste management reduces or eliminates the adverse impact on the environment and human health. A number of processes are involved in efficiently managing waste for an organization. It is necessary to manage the solid waste properly to reduce the load on waste management system.

The solid waste audit focused on volume, type and current management practice of solid waste generated in MSCAS campus. The solid waste collected was paper waste, plastic, bio-degradable waste, construction waste, glass waste, electronic (e-waste) and other miscellaneous waste. Solid waste disposal management audit is an on-site survey & assessment to determine and improve efficiency and effective waste disposal system.

### **Audit Parameters**

Following are the key parameters used in waste management audit:

1. Sources of waste generation
2. Types / volume of waste generated
3. Segregation of waste
4. Disposal Mechanism
5. Best Practices
6. Awareness and communication
7. Suggestions/ Recommendations

## Observation and Inferences

### 1. Sources of waste generation

SI #	Source	Types of Waste
1	Students	Paper, Pen, Refill, Plastic water bottles, food waste, paper plates. other plastic materials, washings, Urinals and Electronic parts, Paper plates, Food wastes, sanitary napkins
2	Administration (Staff and Teachers)	Paper, Pen, Refill, Plastic & other plastic materials, Washings, Urinals, broken furniture & glass , E-waste
3	Natural accumulation (Garden, Playground & parking area)	Dry leaves, Paper waste, Paper plates, Food wastes
4	Others (Visitors and construction)	Paper, plastic and construction material wastes

<b>Approximate quantity of waste generated per day (in kg)</b>			
	Biodegradable	Non-biodegradable	Hazardous / others
<b>Office</b>	3kg		
<b>Laboratories</b>	1 kg		
<b>Canteen / Kitchen</b>	10kg/30kg	1kg	

**2. Waste Type & Volume**

Sl #	Category	Types of Waste	Approx. Qty generated - Annually
1	E-Waste	Computer/Computer parts, Electrical/ Electronic appliances	There is no e-waste management system in the college
2	Dry Waste	Plant/Tree Leaves	Less than 1kg/per day
3	Solid Waste	Damaged furniture/glass, pen, paper, cardboard, metal	5 Kg
4	Wet Waste	Food waste (canteen/mess)	10 Kg
5	Hazardous Waste	Chemicals used in laboratories	
6	Bio-medical waste	Sanitary Napkins	12 Kg

**Segregation of waste**

- Bins kept at few places for collection & segregation : Bio-degradable, Plastics, E-waste and Bio-medical waste
- The segregated dry waste is accumulated and handed over to an agency (with whom MSCAS has an MOU) for safe and proper disposal)
- Wet waste is handed over to the municipal body for taking to the compost yard for converting into compost
- E-waste, however, is sold to a local scrap dealer, who may reuse most of the items but also may not safely dispose the rejects

**Best Practices**

- College has banned single-use plastics/ polythene covers in the campus.
- Disposal Process of Laboratory Hazardous chemicals (document enclosed)

## **Awareness & Communication**

- Trusted SCM conducted a quiz on all topics to the students and staff of MSCAS. The summary of the quiz is in the Annexure 1. Two questions in the quiz were pertaining to Solid waste management. 95% of the answers were correct.

## **Suggestions & Recommendations**

- Colored bins with labeling for proper segregation of different types of waste are kept at every floor of the campus
- Reduce use of virgin paper & switch to recycled paper. As a further step move all transactions and communication within the college to electronic mode
- E-waste to be disposed through a recycler
- Bio-gas plant to be installed to leverage canteen / food wastages. Also it helps in reducing carbon foot print
- College to measure the amount of solid waste generated. Only then they can take steps to reduce waste generation
- More awareness programmes to be imitated for students and teaching staffs

## Best Practice Disposal Process of Laboratory Hazardous chemicals

### Biological waste includes

- liquids such as used cell culturing media, supernatant, blood serum, etc., which contain viable biological agents;
- materials considered pathological, petri plates and test tubes with Bacterial and fungal culture
- solid laboratory waste (empty plastic cell culture flasks and petri dishes, empty plastic tubes, gloves, wrappers, absorbent tissues, etc.) contaminated with viable biological agents;
- Laboratory glassware which is suspected to be contaminated with hazardous biological agents.

### Disposal of wastes after treatment

#### **Sterilization and Disinfection**

For safety reasons the biological agents, inactivated by employing either chemical disinfection or steam sterilization procedures

- Autoclaving (steam sterilization) is the preferred and most reliable) method of sterilizing biological waste. Depending on the volume of waste to be sterilized, it may be necessary to extend the duration of exposure to high temperature steam under pressure.

### Liquids containing Bio-Hazardous Agents

- Liquid waste containers withstanding autoclaving temperatures are used during steam sterilization

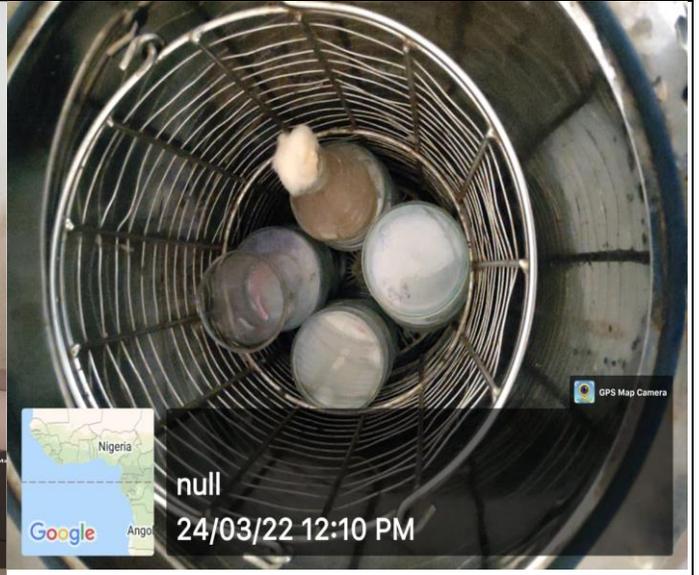
### Solids Containing Bio-Hazardous Agents

Solid laboratory waste like empty plastic cell culture flasks and petri dishes, agar plates, empty plastic tubes, gloves, wrappers, absorbent tissues, large volumes of **agar gel** in disposable petri dishes and tubes etc. known to be, contaminated with viable biological agents were placed in Autoclavable plastic disposable bags and sterilized .These bags of solid waste were closed but not sealed airtight to allow steam penetration before they are placed into the autoclave chamber.

### Disposal

Following (picture demonstrated) steam sterilization or chemical disinfection, innocuous liquids were disposed of via the laboratory drainage system. Flushed with sufficient clean water to purge the drain immediately after disposal of all liquids.

### Disposal Process of Laboratory Hazardous chemicals – explained below:



# III CARBON FOOT PRINT AUDIT REPORT

2020-21



## Carbon Foot Print Management

### Need

The most common greenhouse gases are carbon dioxide, water vapor, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the earth's atmosphere through human activities is commonly known as carbon emissions. The question is what should be done to reduce carbon emissions. Often the challenge lies in choosing just the right approach that will contribute most to the objective. Naturally, the results of these interventions also have to be monitored and assessed. Many colleges want to reduce their carbon dioxide (CO<sub>2</sub>) emissions. But that's not so easy, given that a range of factors determine carbon emissions, including mobility, waste, and energy consumption. So, gaining insight into CO<sub>2</sub> emissions is extremely important.

An important aspect of doing an audit is to be able to measure your impact so that we can determine better ways to manage the impact. *We can determine what our carbon footprint is, based on the amount of carbon emissions created by fossil fuels.* One aspect is to consider the distance and method traveled between home and college every day. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is necessary to know how much the organization is contributing towards sustainable development. As per latest estimates the average carbon emissions per capita in India is 1.9 MT / capita out of this transportation accounts for approximately 15%.

In the case of Educational Institutions, the major sources of carbon emission are diesel generator, cooking gas and vehicles. While vehicles are not driven much within the campus, the total emissions due to travel by students and staff from their home to the campus is an important parameter to be measured.

## Audit Parameters

Following are the key parameters used in carbon emissions audit:

1. Sources, Measurement of Carbon foot print
2. Awareness and communication
3. Best Practices
4. Suggestions and Recommendations

## Observations and Inferences

### **1. Measuring Carbon Foot print**

- Diesel generator: There are 3 DG sets in the campus of capacities 250 KVA, 125 KVA & 100 KVA. Average consumption of 100ltrs of diesel every month.
- Cooking Gas: 20 no's of Commercial LPG cylinders of 19 kg are used in the hostel kitchen, canteen and laboratories. Out of this only 12 cylinders are refilled each year.
- Fire wood: Fire wood is used as an alternate fuel. Mostly waste wood from fallen branches in the college is being used. In addition the college purchases 500 kg fire wood per month
- Vehicular Emissions: Parking is available for 20 bicycles, 40 bikes and 10 cars in the campus. The college runs 10 buses across Chennai city. A survey on travel to college pattern was taken in which 254 students participated. This was to identify their mode of transport and the distance travelled. This has been extrapolated to 794 no's (strength of students & staffs). The following tables reflect the data:

**a) Travel related carbon emissions**

**i. Mode of travel**

Mode of Travel	Students/ Staff - Mode1	Distance 1	Students/ Staff - Mode2	Distance 1	Total distance in kms
Auto	69	490.9	47	58.5	549.4
Bicycle	13	167	1		167
Car	6	92	2	15	107
City Bus	1341	19395.81	71	583	19978.81
College Bus	12	168.6	1		168.6
Hostel	46	68.5	3		68.5
Motor Bike/ Scooter	227	3099	46	22	3121
Share Auto	60	404.7	106	95.5	500.2
Train/ Metro rail	75	1588			1588
Walk from home	96	231.2			231.2
<b>Grand Total</b>	<b>1945</b>	<b>25705.71</b>	<b>277</b>	<b>774</b>	<b>26479.71</b>

**ii. Distance travelled by students to attend college**

Mode of Travel	Students/ Staff	% share	Distance in km	Avg Distance	extrapolated numbers	
					Students/ Staff	Dist in km
Auto	69	3.5%	549	7.96	155	1,233
Bicycle	13	0.7%	167	12.85	29	375
Car	6	0.3%	107	17.83	13	240
City Bus	1341	68.9%	19,979	14.90	3,009	44,837
College Bus	12	0.6%	169	14.05	27	378
Electric Vehicle	46	2.4%	69	1.49	103	154
Motor Bike/ Scooter	227	11.7%	3,121	13.75	509	7,004
Share Auto	60	3.1%	500	8.34	135	1,123
Train/ Metro rail	75	3.9%	1,588	21.17	168	3,564
Walk	96	4.9%	231	2.41	215	519
	<b>1,945</b>		<b>26,480</b>		<b>4365</b>	<b>59,426</b>

### iii. Carbon Emissions due to travel

Mode of transport	Distance per yr*	Fuel used	Kms per ltr	Ltrs per year	No: of persons per vehicle	ltrs per yr per person	CO2 emission in kg per ltr	CO2 kg per year	per capita emissions
Auto	4,93,189	petrol	30	16,440	1	16,440	2.39	39,291	253.73
Bicycle	1,49,914	na							-
Car	96,052	petrol	12	8,004	2	4,002	2.39	9,565	710.36
City Bus	1,79,34,706	diesel	4	44,83,676	50	89,674	2.64	2,36,738	78.66
College Bus	1,51,350	diesel	4	37,837	55	688	2.64	1,816	67.44
Electric Vehicle	61,492	na							
Motor Bike/ Scooter	28,01,679	petrol	50	56,034	1	56,034	2.39	1,33,920	262.88
Share Auto	4,49,023	diesel	30	14,967	4	3,742	2.64	9,878	73.36
Train	14,25,526	electric							-
Walk	2,07,545	na							-
<b>Grand Total</b>	<b>2,37,70,475</b>							<b>4,31,209</b>	<b>98.79</b>

\*\* Actual data received from 440 students & staff. Extrapolated to total population

\* considering 200 working days in a year

\*Zero emissions considered for Electric train as it is clean energy within the city of transport. Emissions during generation of electricity at source have not been considered

#### **Summary (travel based carbon emissions)**

1. 431 tons of Carbon dioxide emissions per year due to travel to the college by students & staff
2. This amounts to 98.79 kgs per person per year.
3. 9% of persons are in the "Zero emission" category
4. 82% of persons use public transport & clean transport for travel

#### **b. Emissions due to usage of Diesel Generator**

Capacity	250 KVA
Diesel consumption per annum (2019-20)	1000 ltrs
CO2 emissions per annum @2.64kg/ ltr	2,640
CO2 emissions in kgs per person per annum	0.60

### c. Emissions due to LPG (used for cooking fuel)

Capacity	19	kgs
No: of cylinders per year	10	nos
Total kgs per year	190	kgs
CO2 per kg	3	kgs
Total CO2 per year	570	kgs
Carbon emission per person per annum	0.13	kgs

**Total emissions of CO2** **434.42 tons**

<b>Per capita Carbon emissions (Travel + Dg set + LPG)</b>	<b>99.52</b>	<b>kgs</b>
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## 2. Awareness & Communication

- Trusted SCM conducted a quiz on all topics to the students and staff of MSCAS. The summary of the quiz is in the Annexure 1. Two questions in the quiz were pertaining to carbon emissions. 79 % of the answers were correct

## 3. Best Practices

- ✓ Usage of bicycles inside the campus is encouraged
- ✓ Pedestrian friendly pathways in the college

## 4. Suggestions / Recommendations

- The college can put up a display board on all the initiatives related to environment including fuel emissions
- Metro rail which is expected up to the college in next 4 years, is likely to reduce the carbon foot print to a large extent

# ENERGY AUDIT REPORT

2020-21



## Need

As per the Energy Conservation Act, 2001, Energy Audit is defined as "the verification, monitoring and analysis of use of energy including submission of technical report containing recommendations for improving energy efficiency with cost benefit analysis and an action plan to reduce energy consumption".

Electricity is the main source of energy to run an educational institution like MSCAS. It takes care of all requirements like lighting, fans, ACs, water motors, RO plants etc.

The scope of audit covers the entire electrical energy requirements of the college, the sources, measurement, consumption, conservation techniques, use of renewable energy and awareness among staff and students. The scope also includes cost benefit analysis of projects done, identification of areas for improvement and recommendations to move towards higher energy efficiency.

### The main goals of energy audit are:

- Reducing energy consumption in a systematic manner by:
  - o Constant monitoring and measurement
  - o Identifying leakages / wastages
  - o Alternate energy efficient methods / products
  - o Creating awareness
    - Becoming self-sufficient in energy generation through sustainable methods like renewable energy
    - Saving environment through efficient energy usage as well as saving energy costs for the institution

### Audit Parameters

Following are the key parameters used in Energy audit:

1. Energy sources
2. Measurement and Consumption
3. Awareness and communication
4. Best Practices
5. Suggestions/ Recommendations

### Observation and Inferences

#### (i) Management Commitment

The Management of the college has shown the commitment towards Energy audit during the pre-audit meeting. The management was willing to formulate policies and take actions based on energy audit report.

#### Analysis of Electrical Load

##### Connected load & Consumption Estimates

Loads	Wattage for one no.	Building/ Dept/ Block name/ number			Total KW	Average usage in Hrs / day	KWH per/day
		A	B	Total nos			
FANS	60	600	600	1200	72.00	8	576.00
Tube Lights	40	700	800	1500	60.00	6	360.00
CFL Tubes	15	15	10	25	0.38	2	0.75
LED Bulbs	18	30	20	50	0.90	2	1.80
LED Tubes	20	6	4	10	0.20	2	0.40
Standalone AC	1500	10	57	67	100.50	8	804.00
Projectors	100	15	9	24	2.40	3	7.20
Computers/Laptops	250	350	194	544	136.00	4	544.00
Printers/Photocopiers	300	20	14	34	10.20	5	51.00
Television	200	3	2	5	1.00	12	12.00
Motor	2000	1	1	2	4.00	2	8.00
					<b>387.58</b>		<b>2,365.15</b>

<u>Airconditioners</u>						
Capacity/ Star Rating	none	1 star	2 star	3 star	4 star	5 star
1 ton	1					
1.5 ton	19					15
2 ton	32					
2.5 ton	NIL					

### EB Meter readings

Meter No		Dec'21	Jan'22	Feb'22	Total units	Total amount
12327739	Units	3939	2346	3161	3,149	
	Amount Rs	37,726.00	25,168.00	31,569.00		31,487.67
8727954	Units	5731	4058	4675	4,821	
	Amount Rs	50,953.00	37,780.00	42,616.00		43,783.00
00922000	Units	2024	1335	1528	1,629	
	Amount Rs	22,491.00	17,109.00	18,582.00		19,394.00
499044	Units	4356	1545	1684	2,528	
	Amount Rs	26,315.00	45,315.00	47,052.00		39,560.67
				<b>Total</b>	<b>1,45,528</b>	<b>11,35,976</b>

- Total units for the year ~1,45,528 & total amount for the year Rs.11,35,976
- Per person consumption 260.25 units

### Converting Tube lights into LED Tube lights

• No: of tube lights	1500
• Cost of LED tubes	300
• Total cost of replacement	4,50,000
• Daily units reduction per light (8hrs per day)	0.16
• Daily units reduction if all lights are replaced with LED	240
• Savings per day	1800
• ROI in days	250

**b) Alternate sources of Electricity**

**1. Diesel Generator**

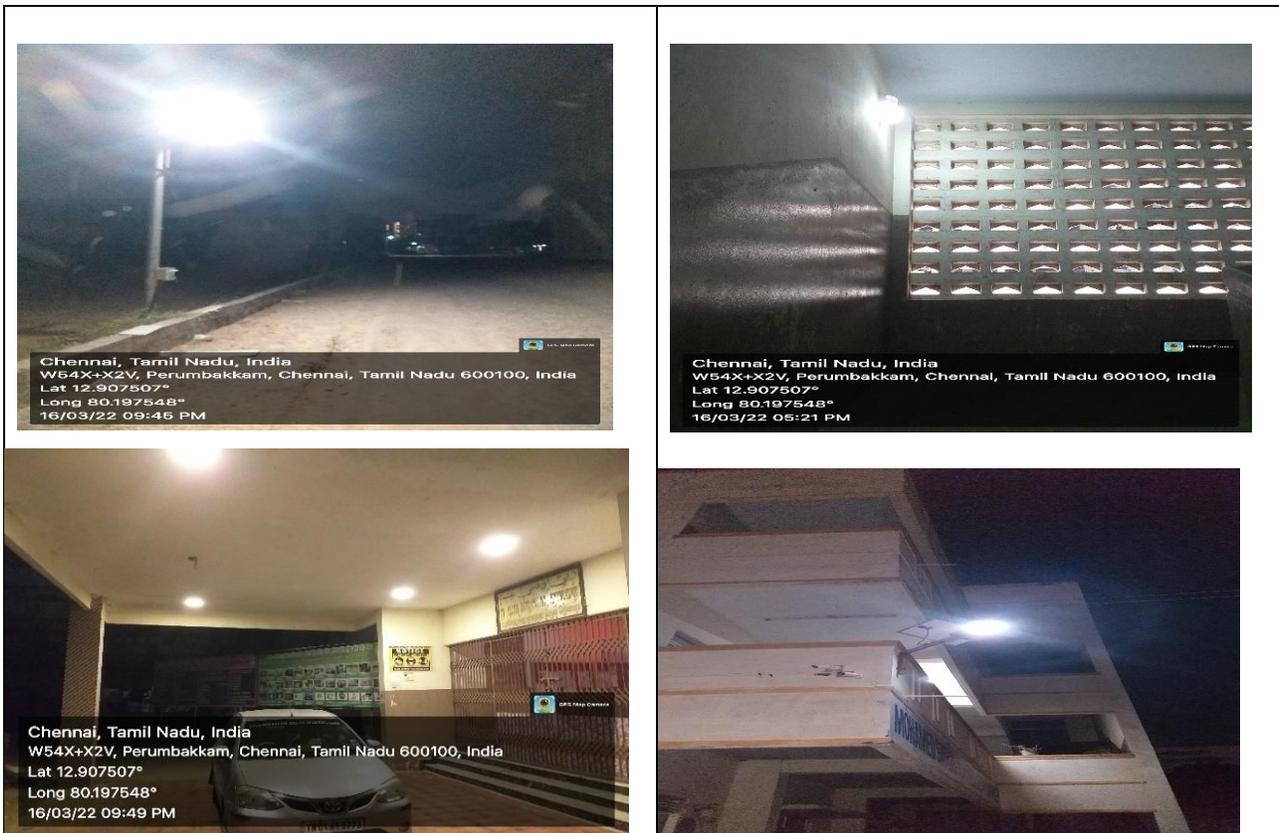
- There are 2 diesel generators of 250 KVA, 62.5 KVA capacities to support the energy needs of the college and hostel during power shutdowns
- The DGs are well maintained for efficient running

**2. Solar power plant - Yet to be implemented**

**(ii) Awareness among students and staff**

- Trusted SCM conducted a quiz on all topics to the students and staff of MSCAS. The summary of the quiz is in the Annexure 1. Two questions in the quiz were pertaining to Energy management. 80% of the answers were correct.

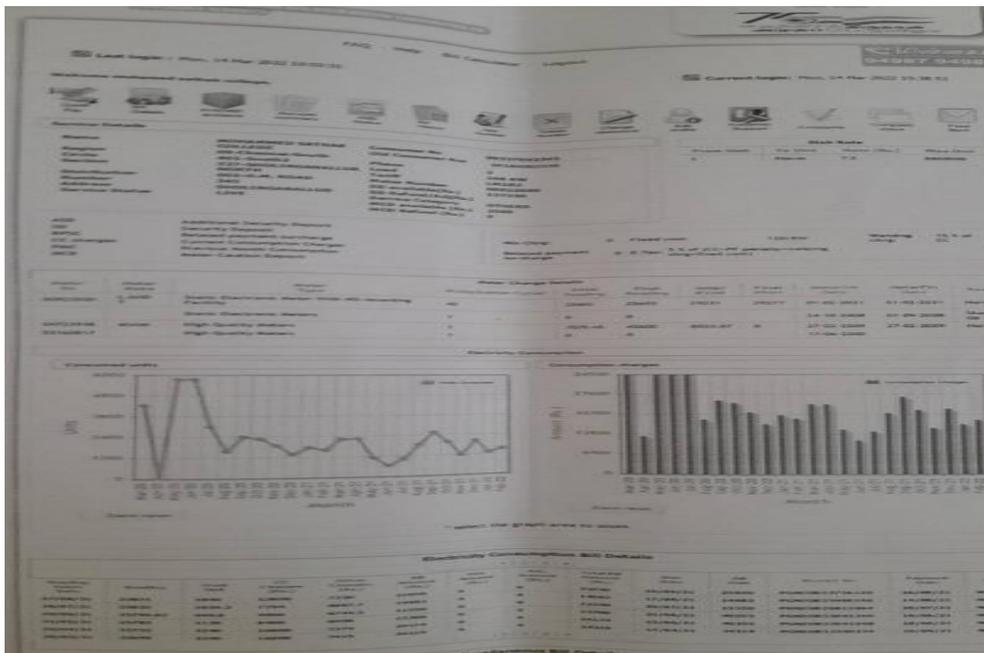
**(iii) Best Practices (Campus LED & Solar Lights)**



#### iv. Suggestion & Recommendations:

- EB consumption to be monitored every month, steps to be taken to reduce consumption
- Tube lights to be replaced with LED lights in a phased manner
- One EB has high fixed charges to be analyzed and corrected
- Roof top solar power plant will help in reducing EB power and also help in environmental protection (by reduction in fossil fuel)
- 5kva grid based solar plant would cost around 3 lakhs, the savings would be 10,000 unit/year, which is equal to Rs.75,000/year, with a payback period of 4 years.

#### v. Electricity Bill card



# GREEN CAMPUS AUDIT REPORT

2020-21



## **Green Campus**

### **Need**

Trees play an important ecological role within the urban environment, as well as support improved public health and provide aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere, and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus. So while you are busy studying and working on earning those good grades, all the trees in campus are also working hard to make the air cleaner for you.

Green Campus is an environment which improves energy efficiency, conserving resources and enhancing environmental quality by educating for sustainability and creating healthy living and learning environments. Green Campus rewards long term commitment to continuous environmental improvement from the campus community.

### **Audit Parameters**

Following are the key parameters used in Green campus:

1. Green cover
2. Identification and classification of vegetation
3. Best Practices
4. Awareness and communication
5. Suggestions and Recommendations

### **Observation and Inferences**

- Total area of campus: 10.5 acres
- Green Cover with trees, flowering plants area: 2.2 sq.ft. (tree canopy)
- Bio-diversity greenery with 20% is covered with trees, herbs & approx.
- Availability of a variety of vegetation including a few large trees has encouraged birds, insects and small animals like squirrels to find refuge in the campus
- Botanical garden work is under progress
- In-house composite manure system in place for garden purpose
- Full-time gardeners are engaged in maintenance of garden
- Regular Green Environment awareness programs are conducted

### **Awareness and communication**

- Displayed plants common name and botanical name
- Trusted SCM conducted a quiz on all topics to the students and staff of MSCAS. The summary of the quiz is in the Annexure 1. Two questions in the quiz were pertaining to Greenery and bio-diversity. 87% of the answers were correct.

### **Best Practices**

- Excellent & well maintained Garden with varieties of trees and plants
- Manure obtained from compost yard which is in turn fed by the organic waste

### **Suggestions & Recommendations**

- Conduct competitions among departments for making students more interested in making the Campus green
- A separate herbal garden or vegetable garden can be developed with student participation.

## Bio diversity

- ✓ Due to the large volume of greenery in the campus, it attracts birds and other species.
- ✓ It is recommended that the institution identify the flora / fauna and record it.
- ✓ A photography contest may be conducted among the students for capture different species.

The following table provides the details of the audited plant species in the campus.

S. No	Plant Name	Common Name	Family	Climber/Herb/Shrub/Tree/Vine
1	<i>Aglaonema commutatum</i> Schott	Chinese Evergreen	Araceae	Herb
2	<i>Alocasia macrorrhizos</i> (L.) G. Don	Giant Taro	Araceae	Herb
3	<i>Aloe vera</i> (L.) Burm. f.	Hybrid Aloe	Asphodelaceae	Herb
4	<i>Aloe vera</i> (L.) Burm. f.	Aloe Vera	Asphodelaceae	Herb
5	<i>Bougainvillea spectabilis</i> Willd.	Bougainvillea	Nyctaginaceae	Vines/ Bushes / Trees
6	<i>Calotropis gigantea</i> (L.) W. T. Aiton	Giant Milkweed	Apocynaceae	Shrub
7	<i>Canna indica</i> L.	Indian Shot	Cannaceae	Herb
8	<i>Caryotaurens</i> L.	Fishtail Palm	Arecaceae	Tree
9	<i>Catharanthus roseus</i> (L.) G. Don	Madagascar Periwinkle	Apocynaceae	Herb
10	<i>Cocos nucifera</i> L.	Coconut Tree	Arecaceae	Tree
11	<i>Dieffenbachia seguine</i> (Jacq.) Schott	Dumb Cane	Araceae	Herb
12	<i>Dypsis lutescens</i> (H. Wendl.) Beentje & J. Dransf.	Yellow Butterfly Palm	Arecaceae	Tree
13	<i>Echinocactus grusonii</i> Hildm.	Golden Barrel Cactus	Cactaceae	Globose Herb
14	<i>Ficus benjamina</i> L.	Weeping Fig	Moraceae	Small Tree
15	<i>Hibiscus rosa-sinensis</i> L.	Shoe Flower	Malvaceae	Shrub
16	<i>Ixora chinensis</i> Lam.	Chinese Ixora	Rubiaceae	Shrub
17	<i>Ixora coccinea</i> L.	Jungle Geranium	Rubiaceae	Shrub
18	<i>Lantana camara</i> L.	Common Lantana	Verbenaceae	Small Shrub
19	<i>Manilkara zapota</i> (L.) P. Royen	Chikoo	Sapotaceae	Tree
20	<i>Monoon longifolium</i> (Sonn.) B. Xue & R. M. K. Saunders	Indian Mast Tree	Annonaceae	Tree
21	<i>Ocimum tenuiflorum</i> L.	Holy Basil	Lamiaceae	Herb
22	<i>Phoenix roebelenii</i> O'Brien	Pygmy Date Palm	Arecaceae	Small Tree
23	<i>Phoenix sylvestris</i> (L.) Roxb.	Silver Date Palm	Arecaceae	Tree
24	<i>Phyllanthus acidus</i> (L.) Skeels	Star Gooseberry	Phyllanthaceae	Tree
25	<i>Phyllanthus emblica</i> L.	Indian Gooseberry	Phyllanthaceae	Tree
26	<i>Psidium guajava</i> L.	Guava	Myrtaceae	Tree

27	<i>Punica granatum</i> L.	Pomegranate	Lythraceae	Shrub
28	<i>Sphagneticolatrilobata</i> (L.) Pruski	Yellow Creeping Daisy	Asteraceae	Herb
29	<i>Strelitzia reginae</i> Bank	Bird of Paradise	Strelitziaceae	Herb
30	<i>Syzygiumcumini</i> (L.) Skeels	Java Plum	Myrtaceae	Tree
31	<i>Terminalia catappa</i> L.	Indian Almond	Combretaceae	Tree
32	<i>Tradescantia spathacea</i> Sw.	Boat Lily	Commelinaceae	Herb
33	<i>Yucca sp.</i>	Yucca	Asparagaceae	Small Tree
34	<i>Ficus religiosa</i> L.	sacred fig	Moraceae	Tree
35	<i>Azadirachta indica</i>	Neem	Meliaceae	Tree
36	<i>Saraca indica</i>	Ashoka	<a href="#">Fabaceae</a>	Tree
37	<i>Terminalia catappa</i>	Almond	Combretaceae	Tree
38	<i>Thespesia populnea</i>	Portia	<a href="#">Malvaceae</a>	Tree
39	<i>Psidium guajava</i>	Guava	Myrtaceae	Tree
40	<i>Bambusa textilis</i>	<a href="#">Bamboos</a>	Poaceae	Herb
41	<b><i>Pongamia glabra</i></b>	Pongam	Fabaceae	Tree
42	<i>Syzygium cumini</i>	Java plum	Myrtaceae	Tree
43	<i>Sphagneticola trilobata</i>	Yellow Creeping Daisy	Asteraceae	Herb
44	<i>Dracaena trifasciata</i>	Snake plant	Asparagaceae	Shrub
45	<i>Acalypha wilkesiana</i>	copperleaf	Euphorbiaceae	Shrub
46	<i>Chlorophytum comosum</i>	spider plant	Asparagaceae	Herb
47	<i>Hernandia nymphaeifolia</i>	lantern	Hernandiaceae	Tree
48	<i>Randia aculeata</i>	white indigoberry	Rubiaceae	Tree
49	<i>Dieffenbachia seguine</i>	Tuftroot	Araceae	Shrub
50	<i>Croton glandulosus</i>	tooth-leaved croton	Euphorbiaceae	Herb
51	<i>Millettia pinnata</i>	Indian beech	Fabaceae	Tree
52	<i>Sesbania sesban</i>	Sesban	Fabaceae	Tree
53	<i>Ixora coccinea</i>	flame of the woods	Rubiaceae	shrub
54	<i>Cyperus esculentus</i>	Yellow nutsedge	Cyperaceae	Herb
55	<i>Samanea saman</i>	Rain tree	Fabaceae	Tree
56	<i>Peltophorum pterocarpum</i>	Yellow Flame	Fabaceae	Tree
57	<i>Ficus benjamina</i> ,	weeping fig	Moraceae	Tree
58	<i>Cerbera manghas</i>	Sea Mango	Apocynaceae	Tree
59	<i>Codiaeum variegatum</i>	<b>croton</b>	Euphorbiaceae	Shrub
60	<i>Caladium</i>	Elephant ear	Araceae	Shrub
61	<i>Dracaena cincta</i>	Dragon Tree	Agavaceae	Shrub
62	<i>Curcuma longa</i>	Turmeric	Zingiberaceae,	Shrub

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*ANNEXURE an Environmental Quiz  
Summary & Data Collection Questionnaire*

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## Environment Awareness Quiz (MSCAS)

TrustedSCM conducted an online quiz (MCQ) to evaluate the awareness levels of students and staff of the college. The results are given below

### Participant Info

		10/10	9/10
No: of participants	847	319	120
Students	805	304	117
Staff	42	15	3
Participants scoring 10/10	319	<b>38%</b>	
Participants scoring 9/10	120	14%	
Average score	7.96		

### Quiz questions and correct responses

Q no.	Quiz Question	Topic	No: of correct answers	% correct
1	Which gas is the highest among fossil fuel emissions?	Carbon footprint	612	72%
2	Which of these is not a fossil fuel?	Carbon footprint	725	86%
3	Which of the following sources of light consumes least energy?	Energy	698	82%
4	Photo-voltaic or PV technology is used to convert which energy into Electrical energy?	Energy	658	78%
5	Which of the following solid wastes is not bio-degradable?	Solid Waste	760	90%
6	Discarded Computer and Mobile phone parts are considered as which category of waste?	Solid Waste	766	90%
7	Which is NOT a method of conserving water?	Water	549	65%
8	When we let out sewage or chemical effluents into a water body (lake, river etc) without treatment, the following does NOT happen:	Water	504	60%
9	Biodiversity is the availability of large variety of plant and animal species. It is found most in...	Green	717	85%

10	Trees provide shade and shelter to birds, insects, squirrels.. they purify the air by absorbing Carbon dioxide and emitting which gas?	Green	755	89%
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Topic category wise correct responses

**Environmental Audit**

1	Water Conservation	1053	1694	62%
2	Solid Waste Management	1526	1694	90%
3	Carbon emissions	1337	1694	79%
	Total	3916	5082	77%

**Energy Audit**

1	Energy Conservation	1356	1694	80%
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**Green Audit**

1	Green cover and bio-diversity	1472	1694	87%
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Trusted SCM appreciates the fact that 38% of the participants gave all correct answers and the average score was 7.96 out of 10

## Data Collection Questionnaire

### a. Water Management

S.No	Questioners	Response
1	What are the sources of water	
2	How many bore-wells? And depth of bore-wells : Nos, Depth(in feet)	
3	Water sump capacity in Liters	
4	Overhead water tank capacity (in liters): Nos,	
5	Quantity of water used per day (in liters)	
6	Are water flow meter installed?	
7	Approx. break-up of water usage	
8	Is RO Plant available? What is the capacity? How much RO water is produced / day	
9	Water usage for Gardening? Which water? How is the watering done? Approx. Qty	
10	Steps taken to conserve water / save water	
11	Is rain water harvesting done? How many pits done across the campus?	
12	Any leaky? Amount of water lost per day?	
13	Amount of water lost / day	
14	Waste water sources	
15	Any use of waste water	
16	Any waste water / effluent from labs? Where is this water let out? Is it treated before letting into ground / drain?	
17	Is quality of treated water tested periodically?	
18	Whether any green chemistry methods are practiced in your labs?	
19	Is there a sewage treatment plant installed? What is the capacity?	
20	If not, how is the sewage water disposed? From clarified water from septic tank is disposed outside of the campus	

### b. Solid Waste Management

<i>How the waste generated in the College is managed?</i>	<i>Yes / No</i>	<i>Remarks</i>
A) Composting/ Vermicomposting		
B) Recycling		
C) Reusing		
D) Other ways		

#### Waste Generated in the college:

S.No	<i>Parameters</i>	<i>Response – Disposal method</i>	<i>Remarks</i>
1	E-waste		
2	Hazardous waste		
3	Solid waste		
4	Dry leaves		
5	Canteen waste		
6	Liquid waste		
7	Glass		
8	Unused		
9	Equipment		
10	Napkins		
11	Others (specify)		
Do you use re-cycled paper in college		-	
Any waste management methods used		-	

#### Different types of Waste generated and Disposal methods:

S.No	<i>Types of Waste</i>	<i>Particulars</i>
1	E-Waste	Computers, Electrical and Electronics parts
2	Plastic waste	Pen, Refill, Plastic water bottles, & other plastic containers
3	Solid Waste	Damaged furniture, Paper waste, Paper plates, Food wastes
4	Chemical Waste	Laboratory wastes
5	Waste Water	Washings, Urinals, Bathrooms
6	Glass Waste	Broken Glass wares from Labs

### c. Carbon Foot Print Waste Management

S.No	Questions	Response
1	What is the total strength of students and teachers in your College?	
2	Total Number of vehicles used by the stakeholders of the college. (per day)	
3	No. of cycles used	
4	No. of two wheelers used (average distance travelled and quantity of fuel and amount used per day)	
5	No. of cars used (average distance travelled and quantity of fuel and amount used/ day)	
6	No. persons using common (public) transportation (average distance travelled and quantity of fuel and amount used per day) :	
7	No. of persons using college conveyance by the students, non-teaching staff and teachers (average distance travelled and quantity of fuel and amount used per day)	
8	Number of parent-teacher meetings in a year? Parents turned up (approx.)	
9	Number of visitors with vehicles per day?	
10	Number of generators used per day (hours). Give the amount of fuel used per day	
11	Number of LPG cylinders used in the canteen (Give the amount of fuel used	
12	Quantity of kerosene used in the canteen/labs (Give the amount of fuel used / day and amount spent).	
13	Amount of taxi/auto charges paid and the amount of fuel used per month	
14	Amount of taxi/auto charges paid per month for the transportation of office	
15	Average amount of taxi/auto charges paid per month by the stakeholders of the college	
16	Use of any other fossil fuels in the college (Give the amount of fuel used per day and amount spent)	
17	Suggest the methods to reduce the quantity of use of fuel used by the stakeholders/students/teachers/non-teaching staff of the college.	

### Fossil Fuel Generation:

Source	Fuel	Usage per day	UOM	Average CO2 generated per unit in KGs
✓ Two wheelers	Petrol		Liters	
✓ Four wheelers	Petrol		Liters	
✓ Public transport	Diesel		Liters	
✓ College transport	Diesel		Liters	
✓ Diesel Generator	Diesel		Liters	
✓ LPG cylinders	LPG		Kg	

Total per day

### d. Energy Management

#### i. Connected Load

Building / Department / Block Nam / No							
Loads	Wattage for one no.	A	B	Total No	Total No of Units	Avg.usage in hrs/day	KWH / Day
Fans							
Tube Lights							
CFL Tubes							
LED Bulb							
LED Tubes							
Central AC							
Standalone AC							
Projectors							
Computers							
Printers							
TVs							
Motor							
Other Equipments							

o KWH Kw / month :

o Energy generation by solar panels : KVSolar cells- kWh/month

#### ii) EB Meter Readings:

METER No	Units Consumed 2019-20	Total Charges 2019-20	Units Consumed 2019-20	Units Consumed 2019-20	Total Charges 2019-20	Units Consumed Apr-Jun '21	Total Charges Apr-Jun '21

**iii) Alternate Source of Electricity**

1. Diesel Generator: Qty, Capacity, Average usage / month, connected load, Diesel consumed each year
2. Solar Power Plant / Wind Turbine: Installed capacity, Month wise units generated since installation
3. Steps taken to conserve energy

**e. Green Campus**

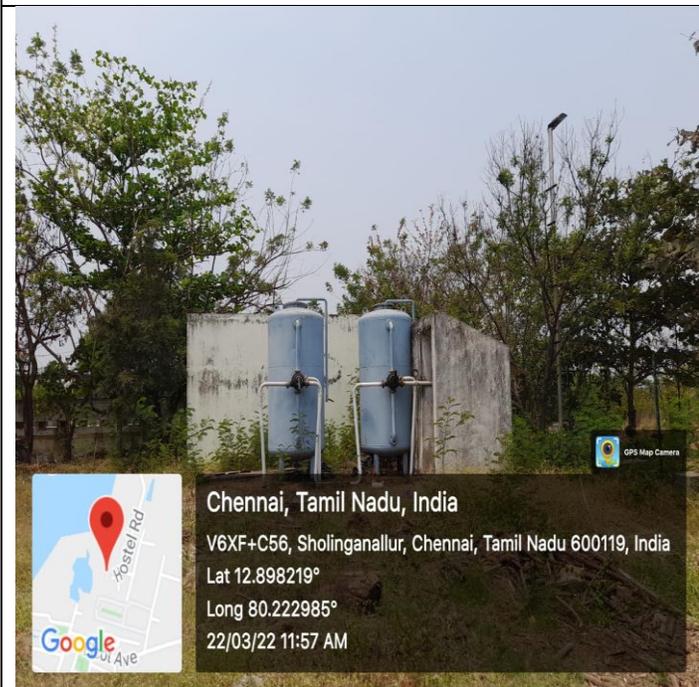
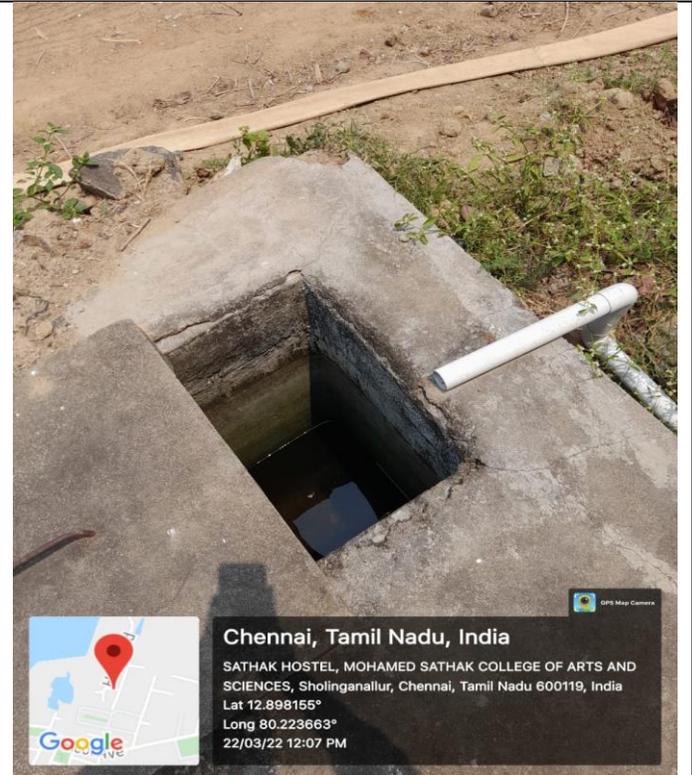
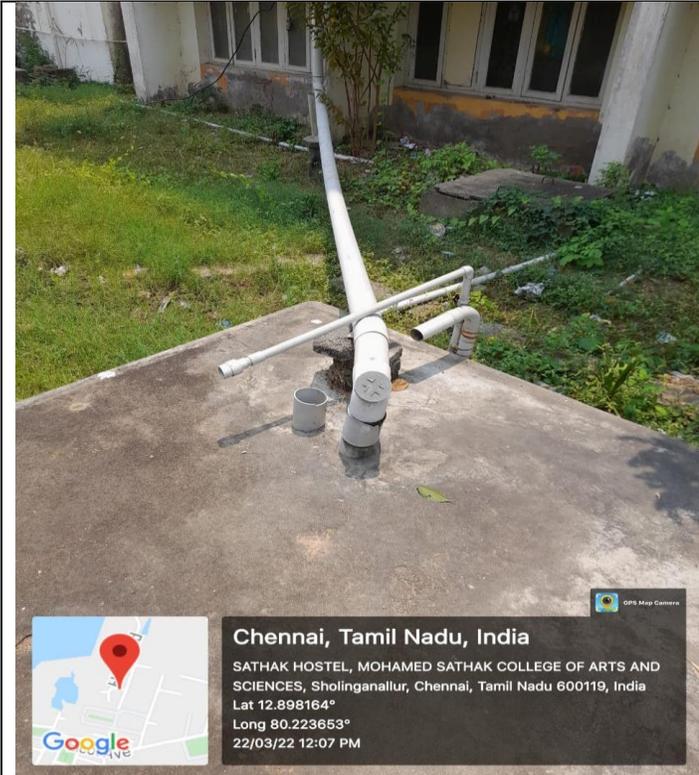
1. Is there a garden in your college? Area?
2. List the plants in the garden, with approx. numbers of each species.
3. Whether you have displayed scientific names of the trees in the campus?
4. How much water is used in the gardens? (Mention the source and quantity of water used).
5. Who is in charge of gardens in your college?
6. Are you using any type of recycled water in your garden?
7. List the name and quantity of pesticides and fertilizers used in your gardens?
8. Do you have any composting pit in your college?
9. If yes what are you doing with the compost generated?
10. Is there any botanical garden in your campus? If yes give the details of campus flora.
11. Give the number and names of the medicinal plants in your college campus.
12. What is the type of vegetation in the surrounding area of the college?
13. What are the nature awareness programmes conducted in the campus? (2020-21)
14. What is the involvement of students in the green cover maintenance?
15. What is the total area of the campus under tree cover? Under tree canopy?
16. Share your IDEAS for further improvement of green cover

**17. List of plants in the campus:**

S.No	<i>Common / Local name</i>	<i>Botanical Name</i>	<i>Classification</i>	<i>No of trees</i>

**ANNEXUREB**  
***PHOTO GALLERY***

## Water Management



## Energy Management

### LED Bulbs



### Solar light





## Green Campus

