
ENVIRONMENT, ENERGY AND GREEN CAMPUS AUDIT

2020-21



MOHAMED SATHAK
A. J. COLLEGE OF ENGINEERING
SIRUSERI IT PARK, OMR, CHENNAI 603 103

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Chapter I

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.



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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 A.J College of Engineering (MSAJCE) is established on 5th July 2001 under aegis of Mohamed Sathak Trust, is approved by AICTE New Delhi, and affiliated to Anna University MSAJCES strives to continuously upgrade its facilities to provide quality technical education to meet the industrial and societal needs, by providing skill based training with the state of art facilities. There is scholarship facility for girl students, especially abled students, meritorious students, central sector scheme and financial assistance for economically backward students.

The college is located at 34, Rajiv Gandhi Salai (OMR), Siruseri IT Park, Siruseri, Chennai, The campus spread over 70 acres of greenery environment inside the SIPCOT IT Park, Siruseri. The college is surrounded by multinational IT companies such as TCS, CTS, Intellect, Aspire, Steria, Polaris, FSS, etc. Chennai Government of Tamil Nadu.



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Highlights - about the college

- MASJCE students received 1 Lakh fund and 100th position in All over India among 4000+ participants in Microprocessor Challenge organized by IIT Madras.
- MSAJCE Mechanical branch students secured final stage (127 finalists of NIC 2020 out of 6000 participated teams)
- MSAJCE have secured 2.5 start rating in IIC (Institution's Innovation Council)
- Institute received silver rating in CII survey for Industrial Institute collaboration
- Institution secured ARIIA ranking as band performer
- The College focuses on achieving Academic Excellence and make the Students to become a Self-learner through Co-Curricular and Extra-Curricular activities.
- Over 2 decades of its Academic journey, MSAJCE has produced thousands of Quality and Employable Graduates.

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

ENVIRONEMNT POLICY

- ❖ MSAJCE shall maintain, manage and comply water, energy, solid waste, and carbon foot print management 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.



VISION

- To be an eminent institute for higher education and research through innovative teaching-learning and sustainable practices to meet the industrial and societal needs

MISSION

- To impart quality technical education by transforming students into professionally competent technocrats.
- To nurture the students in all-round sustainable development, for career and self-employability.
- To inculcate critical thinking, professional ethics with civic responsibilities by instilling values.

GOALS & OBJECTIVES

The Research and Development Cell aims to nurture research culture in the College by promoting research in newly emerging and challenging areas of Engineering, Technology, Science and Humanities

- To encourage the students and faculty members to carry out research in the fields of Engineering, Technology, Science and Humanities by providing necessary facilities and infrastructures required for carrying out research
- To create zeal among the students and faculty towards research and innovation and to encourage them to publish their findings in conferences and journals
- To assist the students to apply funding for conducting research under student project scheme to various funding agencies like TNSCST, MSME, IEI (I) etc
- To work closely with the industry to understand their needs that eventually will result in new or improved products, processes, systems or services that can increase the company's productivity and also promote Institute- Industry Collaboration
- To help the government in serving the society by taking up sponsored projects offered by agencies such as TNSCST, DST, AICTE, UGC, ISRO, DRDO, CSIR, DBT etc.
- To enhance the general research capability of budding engineers by way of participating in conferences, seminars, workshops, project competition, etc.
- To organize various workshops/ seminar/ trainings related to promotion of research
- To create awareness about applying for copy rights and filing Patents & IPR



ACADEMIC COURSES

UG Programs

- ✓ B.E Civil Engineering
- ✓ B.E Mechanical Engineering
- ✓ B.E Electrical and Electronics Engineering
- ✓ B. E Computer Science Engineering
- ✓ B.E Electrical and Electronics Engineering
- ✓ B. TECH Information Technology

PG Programs

- M.E Computer Science & Engineering
- M.E Structural Engineering

Infrastructural Facilities		Total Built-up Area 1,07,880 (in Sq.m)	
Sl #	Distribution	No.of rooms	Area in sq.m
1	Class Room	32	2045.12
2	Instructional Area (Lab & Workshop)	25	3071.76 + 1014.61
3	Amenities (Canteen, Stores, Bank, Gym)	3	191.73
4	Hostel – Boys	228	233(need to calculate)
5	Hostel – Girls	1	71
6	Play Ground and Indoor Stadium	1+1	63.91
7	Central Library	1	690.36
8	Administrative office & Principal's Office	1+1	211.59
9	Drawing Halls	2	127.82
10	Computer Centres (I,II,III & IV)	4	586.86
11	Language Lab & Higher Studies Bureau	1	127.82
12	Staff Rooms, Department Libraries	10	341

Physical Structure	Total	Under Green cover
Area of campus in acres	15 acres	20% (3 acres)
Built-up Area (in sq m)	1,07,880 (8 Blocks)	

STUDENTS & FACULTY

Category	Male	Female	Total
• Number of students	560	113	673
• Number of teachers	45	43	86
• Non-teaching staffs	32	3	35
Total	635	159	794

HOSTEL

A separate hostel for boys and girls is provided. The hostel has a capacity to accommodate 500 boys and 100 girls. 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.



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LABORATORIES

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

- Mechanical
- Electrical & Electronics
- Computer
- Workshops
- 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

MSAJCE is located close to Chennai city with well-connected public transportation system.

The college operate 10 college buses that covers nearly all the points from the city

TRAINING AND PLACEMENT

Training and Placement cell is functioning for providing continuous placement and training assistance to the students during their course of study. For improving their employability skills like soft technical, soft skills analytical and logical skills, they are trained by internal trainers and industry experts



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Chapter II

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



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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

Audit Stage - Planning

In MSAJCE 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 environmental /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.



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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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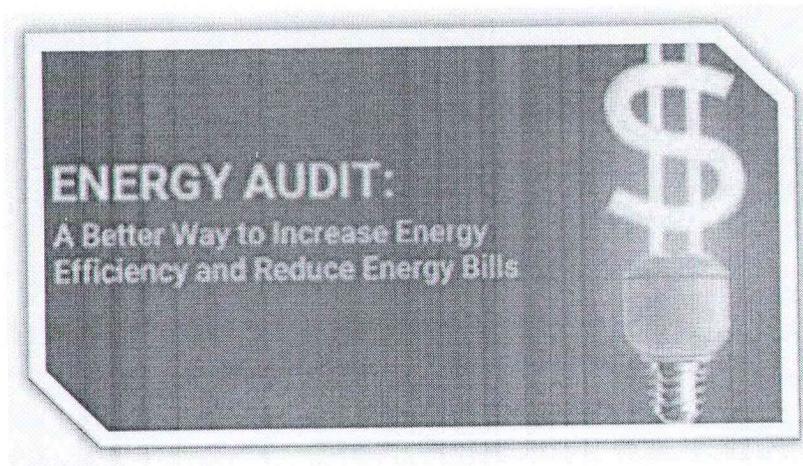
2. Energy Audit



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ENERGY AUDIT REPORT

2020-21



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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 MSAJCE. 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



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Observation and Inferences

(i) Management Commitment

The Management of the college has shown the commitment towards Energy audit during the pre-audit meeting. The institution has consciously taken several steps towards energy efficiency like LED lights and installed a roof top Solar power plant, a renewable and clean energy source to augment their energy needs. The management was willing to formulate policies and take actions based on energy audit report.

(ii) Analysis of Electrical Load

a. Connected load & Consumption Estimates

Loads	Wattage for one.No	Building/Dept/Block name/Number			Total units	Avg usage in Hrs/Day	KWH per/day	% consumption
		Main Building	Hostel	Total nos				
FANS	70	722	277	999	69.93	8	559.44	31%
Tube lights	40	1605	221	1826	73.04	8	584.32	32%
CFL Tubes	11	942		942	10.36	8	82.90	9%
LED Bulbs	20	24		24	0.48	8	3.84	
	60	54		54	3.24	8	25.92	
	18	44		44	0.79	8	6.34	
	9	18		18	0.16	8	1.30	
LED Tubes	20	32	261	293	5.86	8	46.88	14%
Centralised AC 17 ton	17000	3		3	51.00	1	51.00	
Standalone AC 1.5 ton	1500	26	3	29	43.50	2	87.00	
Standalone AC 2 ton	2000	28		28	56.00	2	112.00	
Projectors	230	7		7	1.61	4	6.44	
Computers/Laptops	100	273		273	27.30	8	218.40	12%
printers/Photocopiers	340	23		23	7.82	0.5	3.91	
Television	60	10		10	0.60	3	1.80	
Other Equipment	50	40		40	2.00	2	4.00	
Other Equipment	250	20		20	5.00	2	10.00	
							1,805.48	

- Estimated consumption per day is 1800 units. Fans & Tube lights consume 63% out of this.
- If Tube lights are replaced with 20W LED lights, the power consumption will reduce by around 240 units per day
- Air Conditioners are not star rated. Any new or replacement ACs to be with 5 star rating

EB Meter readings

Year	Units consumed	Amount	Student + staff strength	Units per person/ yr	Observations
2018-19	3,20,196	28,49,744	754	425	
2019-20	2,64,816	23,55,442	660	401	17% reduction in consumption
2020-21	85,838	7,72,542	625	137	covid year

a) Alternate sources of Electricity

1. Diesel Generator

- There are 3 diesel generators of 250 KVA, 125 KVA and 100 KVA capacities to support the energy needs of the hostel as well as the college during power shutdowns
- The DGs are well maintained for efficient running

2. Solar power plant

Installed capacity: 50 KW

Date of installation of Solar Power plant: 15-05-2017

Estimated units generated per day = 5.5 hrs x 50kw = 275 units

Annual estimated units generated = 1 lakh units

Annual savings = Rs.7.5 lakhs @ Rs.7.5 per unit

The solar plant is connected to a load of 111 KW and a Net meter has been installed thus allowing the excess units generated during holidays to be exported to the grid. According to the new solar policy of the TN government, the electricity board would add the exported units to the consumer's credit that can be adjusted against units consumed.



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A recent Net metering bill is shown in the next page:

CONSUMER NAME: A.J. COLLEGE
CONSUMER NUMBER: 0929600412

REGION		09-Chennai-South	PHASE	3	SLAB RATE		
CIRCLE	401-South2	LOAD	111 KW				
SECTION	285-Siruseri	TARIFF	LAZB2				
DISTRIBUTION	004-pitambakkam	METER NUMBER	8727546	From Unit	To Unit	Rate (Rs.)	Max. Unit
SERVICE NUMBER	12	ACCD AS ON Date/SD Available for Refund or Adj.(Rs.)	344726 / NIL	1	Above	7.5	9999999
ADDRESS	NO34, SIPCOT IT PARK, OPP FSS SIRUSERI,	MCD AS ON Date/ MCD Available for Refund or Adj.(Rs.)	2500 / 0	Min. Chrg:	0	Fixd. Cost:	120/KW
SERVICE STATUS	LIVE	SERVICE CATEGORY	OTHERS	BPSC*:	0	Yielding. Chrg:	15%
				E. Tax:		5% (CC + DPF + WD+RDFC)	

Dues To Be Paid Details

Bill Month	Year	Acct. Description	Amount	Due Date	Description
11	2021	23100-CC Charges	48677	20-12-2021	CC CHARGES
		Total:	~ 48677		PAY ONLINE

Monthly Consumption Charge Collection Details

Assessment Date	KWH Reading	KVAH Reading	EXPORT KWH reading	KVAH reading	Maximum Demand	Power Factor	Consumed Unit	CC Charges (Rs.)	Other charges			Assessed Amount (Rs.)	Advance Adjustment Amount (Rs.)	Total Bill Amount (Rs.)	Due Date For Payment	Receipt No	Payment Date	Assessment Status		
									ETAX (Rs.)	WD (Rs.)	EDC/DPF (Rs.)								FC (Rs.)	Total (Rs.)
30/11/2021	299.53	399.61	100.38	130.2	56.76	.78	5380.4	40353	2188.65	0	0	6660848.65	48677	0	48677	20/12/2021	0		NORMAL	
30/10/2021	165.02	276.74	94.06	121.64	55.28	.73	3708.8	27816	1558.8	0	0	66608218.8	32010	0	32010	30/11/2021	32010	FGNICB34249513	20/11/2021	NORMAL
29/06/2021	72.3	100.21	45.71	60.08	55.28	.78	4570	35025	1919.25	0	0	66608579.25	39801	0	39801	20/10/2021	39801	FGNICB33945852	13/10/2021	NORMAL

Meter Change Details

MeterNo	MeterMake	MeterType	MF	New Initial Rdg	Old Final Rdg	New Initial KVAH	Old Final KVAH	New Meter Install Date	Old Meter Removed Date	Reason
04253531	L&T	Static Electronic Meters	40	1873.71	1873.71	2382.52	2382.52	23-07-2009	23-07-2009	Normal
3736826	GEKUS	Static Electronic Meter With MD recording Facility	40	0	26458	0	30350	23-08-2014	23-08-2014	Meter Burnt With Out Final Reading
8727546	AVON	Static Bidirectional Meter	40	.35	11173	.51	13756	24-09-2021	24-09-2021	Normal

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

- Trusted SCM conducted a quiz on all topics to the students and staff of MSAJCE. The summary of the quiz is in the Annexure 1. Two questions in the quiz were pertaining to Energy management. 88% of the answers were correct.

(iv) **Best Practices**

- ✓ Grid connected Roof top Solar power plant -- 50 KW

(v) **Suggestions & Recommendations**

- The Electricity consumption of the institution is comparatively high. Steps to be taken to create awareness among students and staff to reduce wastage
- Monitoring of the 3 EB meters on a daily basis would help in understanding the pattern and analyse the reasons for high consumption.
- Tube lights to be replaced with LED lights in a phased manner
- Air-conditioners purchased newly or replaced must be either 4-star or 5-star rated.
- Solar Panels needs regular cleaning and maintenance for better efficiency
- Ceiling fans to be replaced with BLDC fans, whenever required, for better energy efficiency. Calculations given below:
 - 48" Brushless DC fans come with 5 yr warranty, 35W power @ Rs.5000 (against 70W/ Rs.2000 for the regular fan)
 - With 8 hrs running per day and 35WH saving per hour, it saves 280WH per day
 - Considering Rs.7.5 per unit and a difference cost of Rs.3000, 400 units of power needs to be saved for achieving ROI
 - ROI will be $400\text{kwh}/0.28\text{kwh} = 1428$ days, 4 years max



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3. Environment Audit

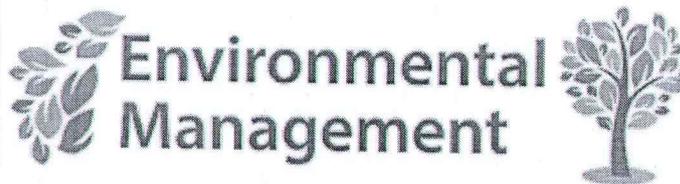


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ENVIRONMENT AUDIT REPORT

2020-21

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



A handwritten signature in blue ink, appearing to be "M. Sathak", is written above the principal's name.

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Chennai-603 103.

I. WATER MANAGEMENT AUDIT REPORT

2020-21



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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. Sources of water

Source	Nos	Depth - feet
a) Open well	2	42 around 30ft diameter

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2. Water Quality

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 RO plant of 1000 liters capacity. RO water per day of 2000 liters is generated for drinking purposes.
- These readings are found to be consistent
- The reject water from the RO plant is collected separately and used for watering the garden
- 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

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

- | | | |
|----------------------------------|---|------------------------|
| ○ Quantity of water used per day | - | 25,000 liters |
| ○ Overhead tank capacity | - | 18 No's, 338,500liters |
| ○ Sump capacity | - | 3 No's, 55,000 liters |
| ○ Water flow meter installed | - | No |



Water Consumption pattern	In litres
1.Hostel (----- students/----litres)	6,500
2.Mess, Canteen (Cooking & Washing)	
3.Construction & Gardening	
4.Day's scholars (utilities & drinking)	4,000
Total usage / day	25,000

Water consumption per-capita ~litres per day

4. Water Conservation

Sl No	Desired conservation methods	Observation
1	Rain water Harvesting (RWH)	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	No leaky taps/ pipes/ joints	Water taps and pipes are well maintained
6	Automatic taps & urinals	Yet to be done
7	Drip irrigation	Yet to be done
8	Re-use of RO reject water	o Implemented

5. Waste water disposal

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

4. Awareness and Communication

Trusted SCM conducted a quiz on all topics to the students and staff of MSAJCE. 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



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5. Best Practices

- Rain Water Harvesting(RWH) properly implemented
- Sewage Treatment Plant (STP) is in place, treated water is used for gardening
- Implemented RO Plant and treated water is re-cycled
- Water conservation awareness slogans are displayed at water outlets to save water

6. Suggestions & Recommendations

- Water consumption to be measured using flow meters. Measurement will help in looking at ways to reduce usage
- To avoid overflowing / wastages from Over Head Tanks, sensor system to be installed
- Automated or Spray type taps could be used to reduce usage/ wastage of water
- Rain water harvesting (RWH) pits to be closed to avoid garbage from outside



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Water Test Report



GESRA LABS INDIA PVT. LTD.
ACCREDITED BY NASL AS PER ISO/IEC 17025 : 2005

Report No: 211239901

Page 1 of 1

Issued To,
M/s. RAM WATER TECHNOLOGIES,
16A, Nehru Street,
Lakshmi Nagar Extn, Porur,
Chennai - 600 116.
Ph: +91 - 9941033777

Submitted Sample
Date of Report : 04.01.2022
Received on : 29.12.2021
Commenced on : 29.12.2021
Completed on : 04.01.2022

Sample Code No : T 21 12 399-01
Sample Name : Water Sample
Sample Identification : Treated Water

Sl. No	Test Parameters	Unit	Result	Requirement Limit as per IS 10500:2018		Test Method
				Accepts Limit (Max)	Permissible Limit in the absence of other source (Max)	
1	Chemical Examination:					
2	pH @ 25°C	=	7.97	6.5 - 8.5	=	Visual (Observability)
3	Colour	Hzet	1.0	5	15	IS 3025 Part 11: 1983 RA 2017
4	Odour	=	Agreeable	Agreeable	Agreeable	IS 3025 Part 4: 2012
5	Turbidity	NTU	0.12	1	5	IS 3025 Part 5: 2018
6	Electrical Conductivity @ 25°C	µS/cm	540	-	5	IS 3025 Part 10: 1994 RA 2017
7	Total Suspended Solids	mg/l	Nil	-	-	IS 3025 Part 14: 2013 RA 2019
8	Total Dissolved Solids	mg/l	334	500	2000	IS 3025 Part 17: 1991 RA 2017
9	Total Hardness as CaCO ₃	mg/l	122	200	500	IS 3025 Part 16: 1991 RA 2017
10	Calcium Hardness as CaCO ₃	mg/l	71	-	-	IS 3025 Part 21: 2009 RA 2019
11	Magnesium Hardness as CaCO ₃	mg/l	41	-	-	IS 3025 Part 40: 1991 RA 2019
12	Calcium as Ca	mg/l	28	75	200	IS 3025 Part 46: 1994 RA 2019
13	Magnesium as Mg	mg/l	19	30	100	IS 3025 Part 40: 1991 RA 2019
14	Phenolphthalein Alkalinity as CaCO ₃	mg/l	Nil	-	-	IS 3025 Part 46: 1994 RA 2019
15	Total Alkalinity as CaCO ₃	mg/l	250	200	500	IS 3025 Part 23: 1996 RA 2019
16	Chloride as Cl ⁻	mg/l	102	250	1000	IS 3025 Part 23: 1996 RA 2019
17	Sulphate as SO ₄	mg/l	37	200	400	IS 3025 Part 24: 1996 RA 2019
18	Total Iron as Fe	mg/l	0.001	0.30	1.00	IS 3025 Part 53: 2003 RA 2019
19	Lead as Pb	mg/l	26.2	-	-	IS 3025 Part 35: 1988 RA 2019
20	Residual Free Chlorine	mg/l	0.2 (DL-2.29)	0.2	1.0*	IS 3025 Part 26: 2011
21	Carbonate Hardness as CaCO ₃	mg/l	122	-	-	IS 3025 Part 21: 2009 RA 2019
22	Non-Carbonate Hardness as CaCO ₃	mg/l	Agreeable	-	-	IS 3025 Part 21: 2009 RA 2019
11	Microbiological Examinations					
1	Coliform	-	Absent	Shall not be detectable in any 100 ml of sample.	-	IS 1522 : 1981 RA 2018
2	E.Coli	-	Absent	Shall not be detectable in any 100 ml of sample.	-	IS 1522 : 1981 RA 2018

* To be applicable only when water is chlorinated; DL-Detectable Limit DL-Detection Limit

Remarks: The Submitted Sample of Water meets the Chemical requirement of Permissible Limit in the absence of other source as per IS:10500:2018 Drinking Water Specification, with respect to the above tested Parameters.

GLPL

Terms and Conditions

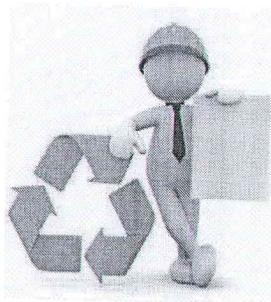
- The Test Results relate only to the items tested.
- This Test Report shall not be reproduced anywhere except in full and in the same format without the written approval of GLPL.
- The tested items will not be retained for more than 15 days from the date of issue of Test Report unless otherwise agreed with the Customer or as required by the applicable regulations.
- The Laboratory's responsibility under this report is limited to proven willful negligence and will in no case be more than the invoiced amount.

(Signature)
ANANDASIGNATORY
ANANDASIGNATORY

(Signature)

II. SOLID WASTE MANAGEMENT AUDIT REPORT

2020-21



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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 MSAJCE 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



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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

2. Types and Volume Generated

Sl #	Category	Types of waste	Approx. Qty generated-annually
1	E-waste	Computers, Electrical appliances and Electronics parts	70 kgs
2	Dry waste	Dry leaves	500 kgs
3	Solid waste	Damaged furniture, Glass, Pen, Paper waste, Cardboard, Metal	1175 kgs
4	Wet waste	Mess/Canteen food waste	1200 kgs
5	Hazardous waste	Chemicals used in laboratories	22 kgs
6	Bio-medical waste	Sanitary Napkin	5 kgs

○ Segregation of waste

- Bins kept at each floor for 1st level of segregation : Bio-degradable, Plastics, E-waste and Bio-medical waste
- The segregated dry waste is accumulated and handed over to an agency (with whom MSAJCE 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.
- Colored bins with labeling for proper segregation of different types of waste are kept at every floor of the campus
- Waste disposal happens through TNPCB authorized agency for safe disposal of all kinds of waste.

○ Awareness & Communication

- Trusted SCM conducted a quiz on all topics to the students and staff of MSAJCE. 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.



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○ Suggestions & Recommendations

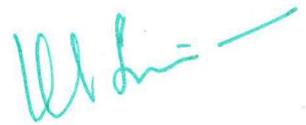
- Reduce use of virgin paper & switch to recycled paper. As a further step move all transactions and communication within the college to electronic mode
- E-waste to be disposed through a recycler
- Bio-gas plant to be installed to leverage canteen / food wastages. Also it helps in reducing carbon foot 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 initiated for students and teaching staffs



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III CARBON FOOT PRINT AUDIT REPORT

2020-21



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Carbon Foot Print Management

Trusted scm 

Need

The most common greenhouse gases are carbon dioxide, water vapour, 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 (CO₂) 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 CO₂ 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



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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:

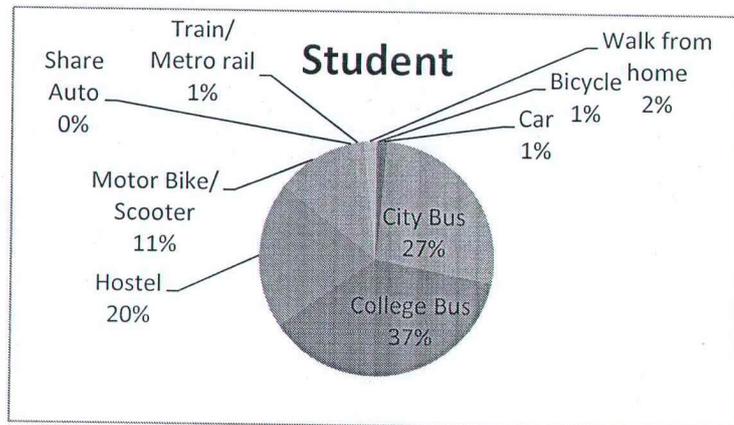
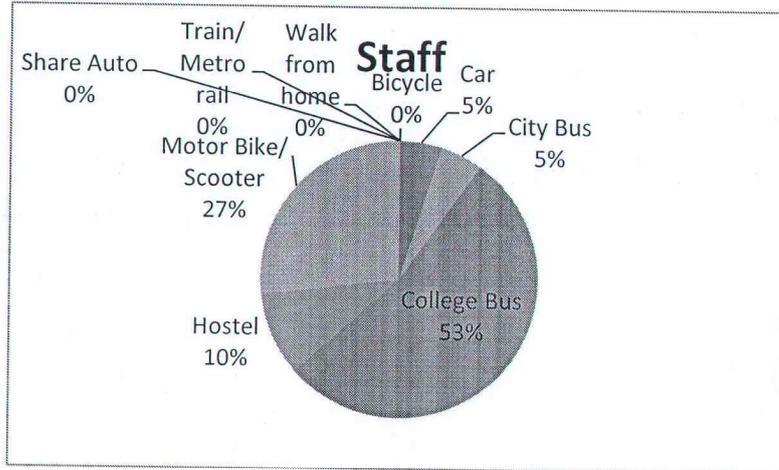
a) Travel related carbon emissions

i. Mode of travel

Mode of Travel	Students/ Staff	% share
Bicycle	1	0.4%
Car	4	1.6%
City Bus	59	23.2%
College Bus	101	39.8%
Hostel	47	18.5%
Motor Bike/ Scooter	34	13.4%
Share Auto	1	0.4%
Train/ Metro rail	3	1.2%
Walk from home	4	1.6%
	254	

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ii. Distance travelled by students to attend college

Mode of transport	No: of students/ staff	One way distance per day	Avg one way distance per student per day	Two way distance per day	Distance per yr*
Bicycle	3	9	3	18	3,600
Car	13	468	36	936	1,87,200
City Bus	184	4,827	26	9,655	19,30,940
College Bus	316	8,568	27	17,136	34,27,192
Hostel	147	-	-	-	-
Motor Bike/ Scooter	106	1,390	13	2,779	5,55,814
Share Auto	3	12	4	24	4,800
Train	9	261	29	522	1,04,400
Walk	13	23	2	46	9,100
Grand Total	794	15,558	20	31,115	62,23,046
			Per student ==>	39.19	7,838

** actual data received from 254 students & staff. Extrapolated to total population

* considering 200 working days in a year

iii. Carbon Emissions due to travel

Mode of transport	Distance per yr	Fuel used	Kms per ltr	Ltrs per yr	No: of persons per vehicle	ltrs per yr per person	CO2 emission in kg per ltr	CO2 kg per yr	per capita emissions
Bicycle	3,600	na						-	-
Car	1,87,200	petrol	12	15,600	2	7,800	2.39	18,642	1,434.00
City Bus	19,30,940	diesel	4	4,82,735	50	9,655	2.64	25,488	138.52
College Bus	34,27,192	diesel	4	8,56,798	55	15,578	2.64	41,126	130.15
Hostel	-							-	-
Motor Bike/ Scooter	5,55,814	petrol	50	11,116	1	11,116	2.39	26,568	250.64
Share Auto	4,800	diesel	30	160	4	40	2.64	106	35.20
Train	1,04,400	electric						-	-
Walk	9,100	na						-	-
Grand Total	62,23,046							1,11,930	140.97

*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



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Summary (travel based carbon emissions)

1. 112 tons of Carbon dioxide emissions per year due to travel to the college by students & staff
2. This amounts to 141 kgs per person per year.
3. 22% of persons are in the "Zero emission" category
4. 85% of persons use public transport & clean transport for travel

b. Emissions due to usage of Diesel Generator

Capacity in kva (3 nos)	250	125	100
Diesel consumption per annum (in litres)	1200		
CO2 emissions per annum @2.64kg/ ltr	3168		
CO2 emissions in kgs per person per annum	3.99		

c. Cooking fuel emissions:

(i) Emissions due to LPG - used for cooking at hostels/ canteen

capacity	19 kgs
no: of cylinders per year	12 nos
Total kgs per year	228 kgs
CO2 per kg	3 kgs
Total CO2 per year	684 kgs
Carbon emission per person per annum	0.86 kgs

(ii) Emissions due to Firewood burning

Firewood purchased per month	500 kgs
Firewood (from fallen branches) - Assumed per month	200 kgs
Total kgs per year	8400 kgs
CO2 emissions per kg of wood burnt	1.65 kgs
Total CO2 per year	13860 kgs
Carbon emission per person per annum	17.46 kgs

Total emissions of CO2	129.64 tons
------------------------	-------------

Per capita Carbon emissions (Travel+DG+Cooking)	163.28 kgs
-------------------------------------------------	------------

2. Awareness & Communication

- Trusted SCM conducted a quiz on all topics to the students and staff of MSAJCE. The summary of the quiz is in the Annexure. The questions in the quiz were pertaining to carbon emissions. 82% of the answers were correct



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3. Best Practices

- ✓ College Transportation is provided through out Chennai using 10 college buses
- ✓ Use of 2-wheeler or 4 wheeler inside the campus is prohibited
- ✓ Usage of bicycles inside the campus is encouraged
- ✓ In the process of arranging EV vehicle for campus tour
- ✓ 85% of the students & staff using either clean transport or public transport
- ✓ Pedestrian friendly pathways in the college

4. Suggestions / Recommendations

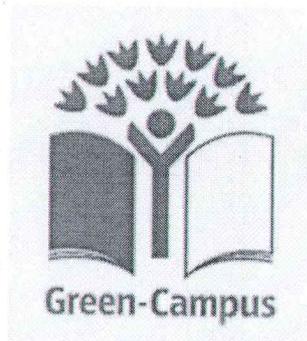
- College to continue and sustain good practices of using public transportation by both students and staff
- The college can put up a display board on all the initiatives related to environment including fuel emissions
- One day in a week can be declared as public transport day, when everyone including the principal travels by public transport or college bus
- As firewood emanates lesser CO₂ compared to LPG, using dry wood from fallen branches within the campus is a good option.
 - However, wood purchased from outside could be sourced from cutting of trees, which has a negative effect on reducing carbon sinks. Hence, it is advised to ascertain the source and take an informed decision.
 - The other problem is the smoke from burning firewood, which could create respiratory issues to the people around. Proper ventilation needs to be ensured.



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GREEN CAMPUS AUDIT REPORT

2020-21



Mohamed Sathak A.J.

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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: 75 acres
- Green Cover with trees, flowering plants area: 44,000 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



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- Botanical garden work is under progress
- In-house composite manure system in place for garden purpose
- Two 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 MSAJCE. The summary of the quiz is in the Annexure 1. Two questions in the quiz were pertaining to Greenery and bio-diversity. 88% 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 and STP sludge from the college

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.



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List of Trees with Botanical and Tamil Name

Sl No	Common name	Botanical name	Tamil name	Category	Qty - nos
1	Palm Tree	Arecaceae	Panai	Tree	12
2	Neem	Azadirachta indica	Veepamaram	Tree	14
3	Coconut Tree	Cocos nucifera	Thenna	Tree	8
4	Drumstick	Moringa oleifera	Murungai	Tree	5
5	Ashoka Tree	Polyalthia longifolia	Asoka	Tree	10
6	Peepal Tree	Ficus religiosa Linn.	Arasa	Tree	4
7	Teak Tree	Tectona grandis	Tekku maram	Tree	4
8	Royal Palm	Roystonea regia	Arasapanai	Tree	10
9	Vilvam Tree (Bilva)	Aegle marmelos	Vilva maram	Tree	2
10	Banana	Musa paradisiacum	Vaazhai	Tree	9
11	Mango	Mangifera indica	Maa	Tree	5
12	Orange	Citrus aurantium	Narthangai	Tree	1
13	Sapota Tree	Manilkara zapota	Sappota	Tree	2
14	Naval Tree	Syzygium cumini	Naval	Tree	12
15	Guava	Psidium guava	Goyya	Tree	6
16	Papaya	Carica papaya	pappali	Tree	6
17	Pear Tree	Pyrus	Prikkāy maram	Tree	1
18	Octopus Tree	Schefflera actinophylla	Octopus maram	Tree	4
19	Mahna Tree	Madhucal longifolia	Ilupai	Tree	2
20	Persian Silk Tree	Albizia julibrissin	Vaakai	Tree	6
21	Ilupai Maram	Madhucal longifolia	Ilupai	Tree	8
22	Yellow Flame Tree	Peltophorum pterocarpum	Medicinal maram	Tree	15
23	Mahogany	Swietenia	Mahōkaṇi	Tree	1
24	Pouruma Tree	Pouroumacecropiiifolia	Pouruma maram	Tree	7
25	Malabar Silk-Cotton	Bombax ceiba tree	Ellava maram	Tree	1
26	Malacca Tree	Phyllanthus spectinatus	Mallacca maram	Tree	1
27	Traveller's tree	Ravenala fan palm	Panai maram	Tree	4
28	Caribbean Royal Palm	Roy stoneaolercea	Bottle palm	Tree	12
29	Henna (Mehndi)	Lawsonia inermis	Marudhani	Plant	4
30	Curry Leaf	Murraya koenigii	Kariveppilai	Plant	2
31	Lemon	Citrus limonium	Elimichai	Plant	3
32	Mint	Mentha arvensis	Pudina	Plant	2



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Sl No	Common name	Botanical name	Tamil name	Category	Qty - nos
33	Miracle Gardent	Codiaeumvariegatum	Croton cedi	Ornamental Plant	2
34	Mangolya	Magnolia Grandiflora	Champaka	Ornamental Plant	4
35	Ornamental Tree	corymbiaficifolia	Alankara maram	Ornamental Plant	1
36	Tulsi / Holy Basil	Ocimumtenuiflorum	Thulasi	Medicinal Plant	15
37	Snake Plant	Sansevieriaroxburghiana	PaambuKatrazhai	Medicinal Plant	10
38	Aloe Vera	Aloe barbadensis miller	Katrazhi	Medicinal plant	10
39	Kuppaimeni Plant	Acalyphaindica	kuppaimeni	Medicinal Plant	25
40	Prickly malvastrum	Malvastrumcoromandelianum	Punnakkukkirai	Medicinal Plant	8
41	Gale Of Wind	Phyllanthusniruri	Gale Of Wind	Medicinal plant	4
42	Little Ironweed	cyanthillium plant	Puvamkuruntal	Medicinal plant	50
43	Succulent Plant	Gibium	Saatruthavaram	Medicinal plant	3
44	Sacred Fig	Ficusreligiosa	Ashwatham	Medicinal Plant	6
45	Long Pepper	Piper longum	thippili	Medicinal plant	5
46	Bamboo	Bamboosaaridinarifolia	moongil	Grass	20
47	Korean Grass	Zoysiatenuifolia	Koriean pull	Grass	30
48	Buwie Buffalo Grass	Boutelouadactyloides	Erumai Pull	Grass	1



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*ANNEXURE an Environmental
Quiz Summary & Data Collection
Questionnaire*



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Environment Awareness Quiz

Trusted SCM 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	325	149	58
Students	304	138	54
Staff	21	11	4
Participants scoring 10/10	149	46%	
Participants scoring 9/10	58	18%	
Average score	8.63		

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	245	75%
2	Which of these is not a fossil fuel?	Carbon footprint	287	88%
3	Which of the following sources of light consumes least energy?	Energy	294	90%
4	Photo-voltaic or PV technology is used to convert which energy into Electrical energy?	Energy	281	86%
5	Which of the following solid wastes is not bio-degradable?	Solid Waste	308	95%
6	Discarded Computer and Mobile phone parts are considered as which category of waste?	Solid Waste	312	96%
7	Which is NOT a method of conserving water?	Water	260	80%
8	When we let out sewage or chemical effluents into a water body (lake, river etc) without treatment, the following does NOT happen:	Water	235	72%
9	Biodiversity is the availability of large variety of plant and animal species. It is found most in...	Green	272	84%
10	Trees provide shade and shelter to birds, insects, and squirrels. They purify the air by absorbing Carbon dioxide and emitting which gas?	Green	297	91%



Topic category wise correct responses

Environmental Audit

1	Water Conservation	495	650	76%
2	Solid Waste Management	620	650	95%
3	Carbon emissions	532	650	82%
	Total	1647	1950	84%

Energy Audit

1	Energy Conservation	575	650	88%
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Green Audit

1	Green cover and bio-diversity	569	650	88%
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Trusted SCM appreciates the fact that 46% of the participants gave all correct answers and the average score was 8.63 out of 10



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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

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

Waste Generated in the college:

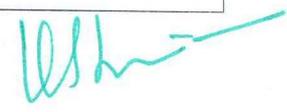
S.No	Parameters	Response – Disposal method	Remarks
1	E-waste		
2	Hazardous waste		
3	Solid waste		
4	Dry leaves		
5	Canteen waste		
6	Liquid waste		
7	Glass		
8	Unused		
9	Equipment		
10	Napkins		
11	Others (specify)		
Do you use re-cycled paper in college		-	
Any waste management methods used		-	

Different types of Waste generated and Disposal methods:

S.No	Types of Waste	Particulars
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.)	


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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.	



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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:

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METER No	Units Consumed 2019-20	Total Charges 2019-20	Units Consumed 2019-20	Units Consumed 2019-20	Total Charges 2019-20	Units Consumed 2019-20	Total Charges 2019-20

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

List of plants in the campus:

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



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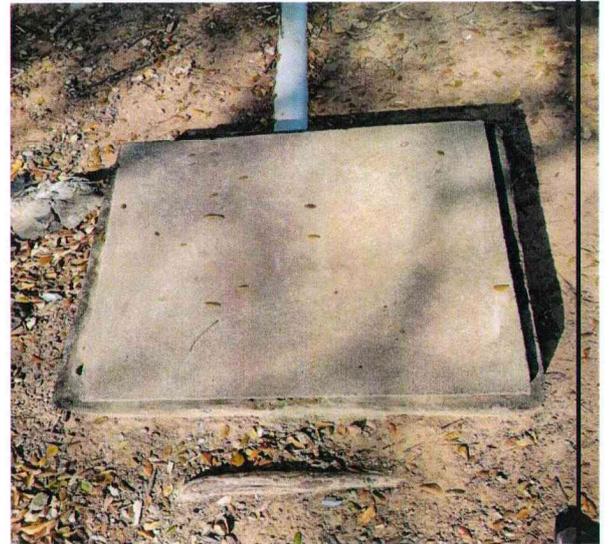
ANNEXURE B **PHOTO GALLERY**



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Water Management



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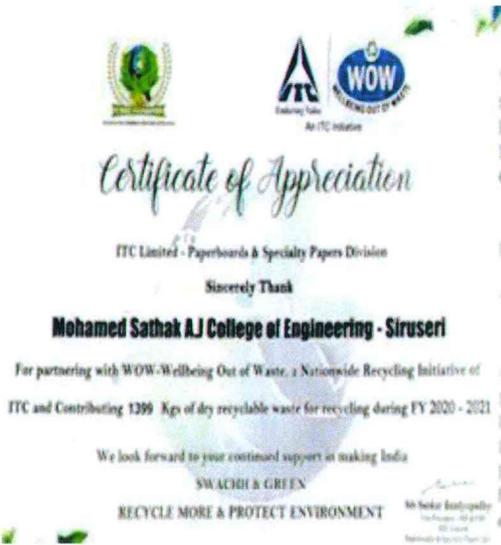
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Energy Management



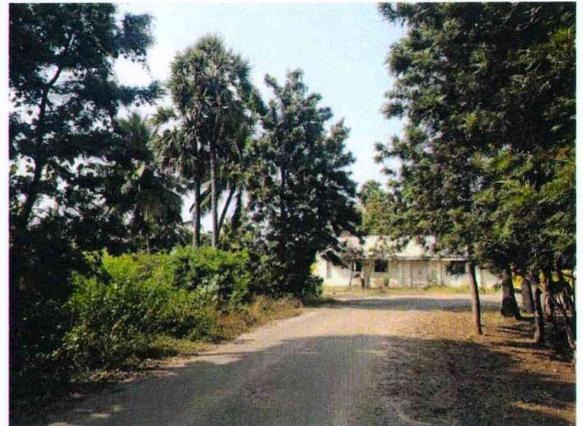
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Solid Waste Management




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Green Campus



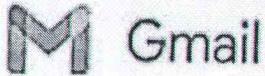
4. Clean and Green Campus Recognitions/Awards



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12/20/21, 2:51 PM

Mohamed Sathak A.J. College Of Engineering Mail - CERTIFICATE OF APPRECIATION FOR TAKING CARBON NEUTRA...



Dr. Senthil <rsk1970@msajce-edu.in>

CERTIFICATE OF APPRECIATION FOR TAKING CARBON NEUTRALITY PLEDGE

sccn.team@gmail.com <sccn.team@gmail.com>

To: rsk1970@msajce-edu.in

Mon, Feb 1, 2021 at 12:17 PM

Cc: team@sccnhub.com, shendo.rajendra@gmail.com

Respected Dr.K.S.Srinivasan,

We really appreciate and Congratulate MOHAMED SATHAK A J COLLEGE OF ENGINEERING for setting an example of taking urgent action on the climate crisis by signing this "Net Zero-Net Zero" Pledge for Carbon Neutral Educational Institutes.

We really appreciate your efforts for taking leadership in making your campus Smart, sustainable and Carbon-Neutral.

We are looking forward to having a great collaboration with you in future endeavors.

Please register your educational Institute with our Global Network to share and exchange ideas for carbon neutrality and sustainable development.

free registration link - <https://sccnhub.com/campus-registration-2/steps/1>

Thanks and Regards,

Team SCCN of TERRE Policy Centre

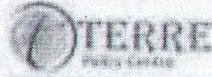
We make you future-ready.

[Note:- CERTIFICATE is attached to this email. Please share a copy of this pledge it with all Board members, staff, students and other stakeholders to inspire them for the Actions]

 MOHAMED SATHAK A J COLLEGE OF ENGINEERING_Certificate for Carbon Neutral Campus.pdf
290K

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NET ZERO - NOT ZERO

PLEDGE FOR CARBON NEUTRALITY

“Be the change that you want to see in this world.”

- Mahatma Gandhi



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Pledge for Carbon Neutral Campus

We, MOHAMED SATHAK A J COLLEGE OF ENGINEERING, are determined to change ourselves by undertaking actions before telling others to act.

- ❖ Recognizing that climate change is a planetary challenge of our generation and the dire need to take urgent actions to mitigate it,
- ❖ Noting that Climate Change is running faster than actions by humanity, pushing the whole planet Earth into the existential crisis,
- ❖ Acknowledging the warning by Intergovernmental Panel on Climate Change (IPCC) to limit the rise in temperature to 1.5 deg C or not more than 2 deg C above the pre-industrial level to avoid the catastrophe,
- ❖ Realizing that only way out of the impending climate crisis is to achieve the carbon-neutrality by 2050 or latest by 2075,
- ❖ Noting the paucity of open and inclusive processes to share and obtain data and information about climate change and the need to counter disinformation related to the seriousness of climate change,
- ❖ Noting the opportunity of partnership offered by TERRE Policy Centre through its Smart Campus Cloud Network (SCCN) to empower and guide us to develop the road-map towards carbon neutrality and its implementation through the digital dashboard and tracking app.

We in our MOHAMED SATHAK A J COLLEGE OF ENGINEERING, endeavour to empower youth's potential for research and innovation. We pledge to become carbon neutrality not later than that stipulated by IPCC, through,

- *Enhancing energy efficiency*
- *Deploying renewable energy*
- *Innovating the sources of energy like hydrogen, waste and others*
- *Encouraging the use of digital technologies for research and information curation,*
- *Enhancing open and inclusive processes to strengthen data and information exchanges*
- *Offsetting carbon dioxide through tree plantation and methods.*

We agree to share the progress and the case studies through SCCN-Dashboard of TERRE Policy Centre by Pledging to become a Carbon-Neutral Campus.

Signed by,

Dr.K.S.Srinivasan,
Principal,
MOHAMED SATHAK A J COLLEGE OF ENGINEERING,
Chennai-603103
12/24/2020



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5. Beyond the Campus Environment Promotional Activities



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Cleaning Activities in Siruseri and Thaiyur Village

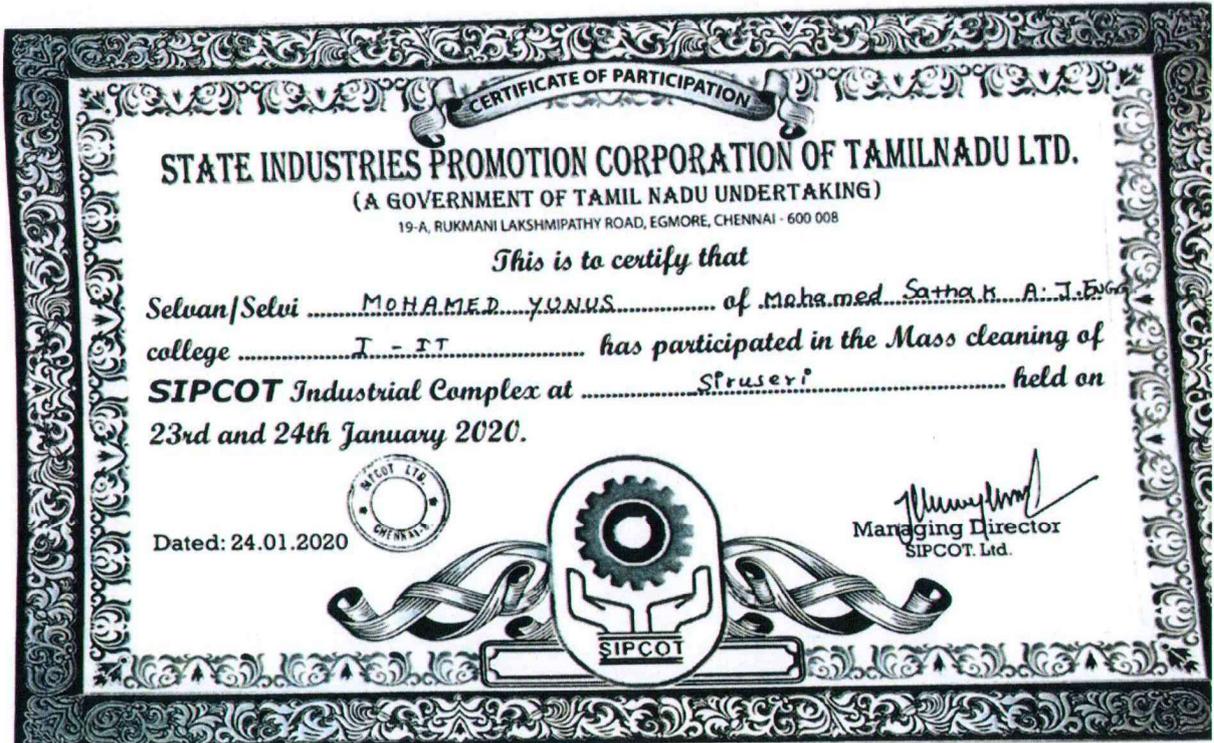


Cleaning Activities in Siruseri and Thaiyur Village



**Certificate Received for Cleaning Activities in Siruseri and Thaiyur Village
from SIPCOT**

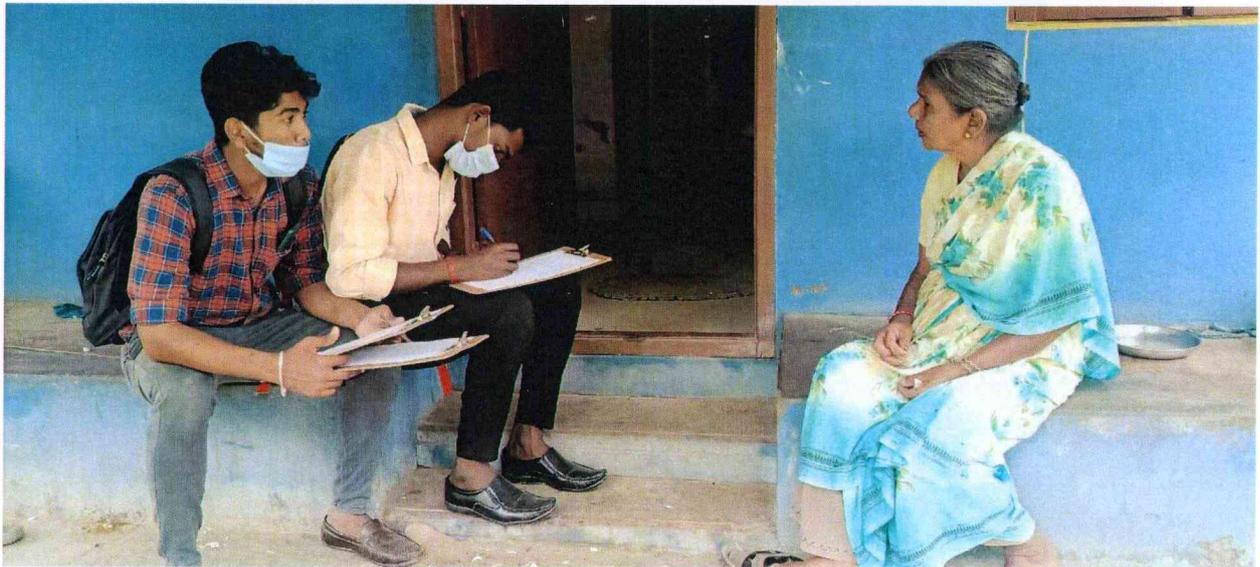
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**Certificate Received for Cleaning Activities in Siruseri and Thaiyur Village
from SIPCOT**



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Individual Survey in Siruseri Village

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