Certificate

Of

Environmental Audit

This is to certify that **The Madura College, Madurai,** has conducted a detailed **Environmental Audit** of their campus for the academic year 2021 – 2022 and has submitted the necessary data and credentials for scrutiny. The activities and measures carried out by the College have been verified based on the field visit and reports submitted and were found to be **Good**. The efforts taken by the Management, faculty and students for the care of Environment, Miyawaki Forest development, Water conservation, Waste water & Plastic waste Management and Recycling & Reuse of waste are highly appreciated and commendable.

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THE MADURA COLLEGE

Autonomous Institution
Reaccredited *(3rd Cycle)* with "A" Grade *by* NAAC
(Affiliated to Madurai Kamaraj University)
Madurai – 625 011
TAMILNADU, INDIA

ENVIRONMENTAL AUDIT REPORT 2021-2022

AUDIT/REPORT BY

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ACKNOWLEDGEMENT

We at Alcheme Green Energy Company, Madurai are thankful to the Principal for giving us the opportunity to carry out Environmental audit at The Madura College. Madurai-625 011. Alcheme Green Energy Company team is also thankful to all other supporting Officers / Staffs of the above institute for their wholehearted support, hospitality and the courtesy extended to the Audit team during the course of the visit.

The following officers from Alcheme Green Energy Company under the guidance of Mr. C. Jebaraj, B.Tech., have carried out the Environmental Audit.

Name	Qualifications	Certification Number
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The following staff from the Institution participated in the audit process

Name	Designation
Dr. J. Suresh	Principal
Mr. S. Sivaramakrishnan	Dean (Academics)
Dr. I. Sahul Hamid	Dean (Planning and Development)
Dr. S. Karuppusamy	Assistant Professor of Botany
Mr. P. Kumar	Electrical Supervisor

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Summary of Environment Audit

Environment audit of The Madura College was carried out on 21.11.2022 by Alcheme Green Energy Company. Audit team has gone through the data related to Water and Electrical Energy, Waste generation, Waste Management, Waste Recycling and Reuse, Green Belt Development in and around The Madura College campus. The team also carried out the study of Pollution abatement measures, Rainwater harvesting, Water and Energy Conservation measures taken to reduce the pollution, noise level and maintain Ambient Air quality.

During the visit, it is observed that cleanliness in the campus is well maintained through proper disposal of wastes, utilization of eco-friendly supplies and effective recycling program. The concept of eco-friendly culture is disseminated among the students through various seminars/workshops and community-oriented programs. The Institution strictly follows reduce, reuse and recycle method to limit energy usage and partially replace non-renewable energy sources with renewable energy resources.

The environment audit report is a very powerful and valuable communications tool to use while working with various stakeholders who need to be convinced that systems and procedures in place are suited to cope with natural changes and modifications.

It is hoped that the results presented in the environment audit report will serve as a guide for educating the college community on the existing environment related practices and resource usage at the college as well as spawn new activities and innovative practices.

The audit outputs and recommendations are summarised as follows:

Noteworthy activities

- Development of Miyawaki forest
- Spirulina Cultivation
- Clean, Green and plastic free campus
- Excellent Rainwater collection system to collect entire rainwater inside the College
- Renewable energy utilisation from 25 KW Solar Power Plant

The audit outputs and recommendations are summarised as follows:

- Air pollution impact on Ambient Air quality is negligible since the quantity of fuel used for combustion in the institution is very less
- Noise levels inside the campus are within the prescribed limit

- Very good initiative is taken by the institution for rainwater harvesting
- Lot of initiatives are taken to conserve Water and Energy by the Institution.
- Flow meters are to be provided for better water management
- Total water consumption for The Madura College–67 KL/Day
- Electrical Energy consumption from TNEB GRID alone –1,61,251 units
- Diesel Generator electrical energy consumption- 3,300 units
- Solar Power electrical energy consumption-12,198 units
- Total Electrical Energy consumption is 1,76,749 units

We are happy to submit this detailed Environmental audit report to The Madura College

For Alcheme Green Energy Company

Madurai

1. Introduction

1.1Environmental Policy

The Madura College has well formulated Environmental Policy to guide all its activities.

The main objectives are as follows:

- To promote sound environmental management policies and practices throughout the College activities
- To create awareness among the stakeholders about the conservation of natural resources and preserve them at their best.
- To enhance the quality of natural resources and development of sustainable environments by various promotional activities for national prosperity.
- To establish a baseline information about the available faunal and floral composition and their environment within college premises.
- To implement sustainable resource management practices, based on reduce, reuse and recycle principles
- To adopt fair, ethical and eco-friendly approaches, this incorporates everything from implementation to training of students in the college activities.

The Institution vouchsafes:

- Establishing environment programs that are consistent with commitment to the continual improvement of the environment management system.
- Compliance with applicable environmental policies and prevention of pollution by applying the best available practices

2. WATER

2.1 Water usage at The Madura College

Number of students studied during the academic year 2021-2022: 3501

No of teaching and non-teaching staff- 276

Total number of stakeholder: 3777

Water for College

Total water usage at College -67,000 litres/day

Main water uses in the College are Drinking, Rest Room, Garden and in Laboratory

Water usage per day per stakeholder in the College– 17.7 litres

Water usage at College

Sl. No	Place	Water usage Quantity Litres / Day
1	Drinking	4000
2	Rest room	12000
3	Laboratory Usage	6000
4	Miyawaki Garden & Green Development	36000
5	Canteen	8000
6	Construction	1000
	Total	**67,000**

Waste water generation in the college – 26 KL/day

3. Electrical Energy

TNEB and DG Electrical Energy Consumption - in the year 2021-2022

Sl. NO	Source	Consumption in Units
1	TNEB	1,61,251
2	DG	3,300
	Total	1,64,551

Total Electrical Energy consumption from TNEB grid and DG – 1,64,551 units

Electrical Energy consumption per stakeholder per year – 43.56 units/year

4. FUEL CONSUMPTION

4.1 LPG

LPG gas is used in the college lab for doing scientific practical & Experiments

LPG cylinders used- commercial cylinders of 19 kgs capacity

Total LPG consumption during the year 2021-2022- 3,952 KGs

5. Waste Generations and Management

5.1 Liquid and Solid Waste Generation

Quantity of liquid waste generated:-

- Waste water generation in the College - 26 KL /day

Quantity of Solid waste generated

College

- Biodegradable-–<1 kg/day

Office

- Non-biodegradable –< 0.1kg/day

Open area

- Biodegradable (Dry leaves)- 5-10 kgs / day

Plastic waste

- **Less than** <0.2kg / day

e-Waste

- **Less than 50 kgs / year**

5.2 Waste Management

5.2.1 Liquid waste Management

- RO plant reject from industrial type is used to recharge the open well in the campus
- Waste water generated from kitchen waste are used for gardening

5.2.2 Bio-degradable waste management

Food waste is one of the most challenging issues humankind is currently facing worldwide. When every time food is wasted, the water, energy, time, manpower, fertilizer, fuel, packaging and money put into growing, preparing, storing, transporting, cooking the food is wasted

- ❖ Bio-Degradable and non-biodegradable waste are collected in separate Two -bins system
- ❖ The food waste generated is utilised for bio compost generation and the generated bio compost is utilised for green belt development
- ❖ Leaf-litter waste collected from the campus is used for vermicomposting and the compost is used further for the garden developments within the College.

5.2.3 Plastic Waste Management

- This College has been declared as a ‘Plastic Free’ zone
- Plastic covers are collected separately and disposed properly
- Use of polythene bags, Plastic cups/ straws/ cover/ plates/ are prohibited within the Campus

- Students and staff are advised to bring cloth bags
- All the Stakeholders are motivated to use stainless steel plates.
- Tea/Coffee being served in Stainless steel tumblers
- Plastic waste that comes in through lab equipment's package, empty chemical containers etc. are collected separately and disposed periodically for recycling.

5.2.4 Used Battery Management

- Used batteries are disposed through Buy back method

5.2.5 e-Waste Management

- All electronic machineries are purchased under Buy-Back agreement for proper disposal of e waste to recycler

5.2.6 Other Solid Waste Management

- Solid wastes are generated from damaged furniture are sent to waste wood collection centre. Useful furniture and other wooden materials are made from the waste
- Glass wastes are disposed periodically through municipal waste collection system.

6. Pollution abatement measures

6.1 Waste Reduction

- ❖ Students are instructed not to waste paper while writing examinations.
- ❖ Reusing one side paper where ever possible, printing on both sides of papers
- ❖ In order to reduce the use of paper the following initiative were taken by E - Governance
    - Attendance and fees payments through Educational Resource Management System (ERMS)
    - Submission of e-assignment through email and Google classroom
    - Digitalisation of Staff profiles and details about students in ERMS
  - Online Admission Process – Printing of applications reduced & submission of applications through admission portal of ERMS
  - All inter department communications are through intranet and mobile app.

- Online exams and Optical Mark Recognition(OMR sheet) are conducted to reduce the paper usage.

6.2 Waste Recycling

- The answer scripts after the publication of results are sent for recycling.
- e wastes are collected and sent to authorised recycler.

6.3 Waste Reuse

- Reuse one sided paper
- Reuse Envelopes

6.4 Waste to wealth

- The vermicompost along with enriched microbial compost method is used to digestion process of the Dry Leaves

6.5 Water Conservation initiatives

- RO Plant water rejects are used to recharge the open well in the campus.
- Periodical preventive maintenance are carried out to avoid leakages of water in tap

6.6 Energy conservation activities followed

- Regular monitoring of air conditioners is done in order to maintain a temperature of 24ºC in all the places
- Replacing conventional electrical light fittings with energy efficient Light-Emitting Diode (LED) bulbs is going on as continuous process.
- Switching off the fans and tube lights in the classroom and faculty rooms are done after the working hours
- Staff and Students are made aware of using public transport and individual vehicle usage is reduced to the maximum.
- Periodical maintenance and overhauling of generator is being carried out.
- Periodical maintenance of UPS and Battery systems are carried out.
- The air-conditioners and other electronic and electrical equipments are switched off when not in use.

- Computers are switched to sleep mode or hibernate mode automatically when not in use.
- At the end of every practical session, Computer monitors and UPS are switched off.
- Soft copies are maintained instead of hard copies, to reduce power consumption and paper.
- Work supervisor and electrician regularly check the usage of lights, fans and all other energy sources during and out of the college hours.

7.Green Belt Development

The Madura College , Madurai is overwhelmed with the atmosphere of greenery.The Institution too take meticulous efforts to maintain and retain the Nature given atmosphere with planting of new saplings The campus is lush green with gardens, lawns and plants wherever there is open space

- The eco-friendly ambience of the campus is a noteworthy feature of The Madura College
- Green belt is developed in all possible open area are being converted into greenery
- The Green campus drive is an initiative of the College to protect the environment.
- Environmental awareness rallies are conducted regularly to spread the message of environment preservation.
- All the plant specimens in the campus are identified, recorded and labelled
- Created faunal database within the College campus digitally and printed materials

List of trees in the Madura College campus

Sl.No.	Botanical name	Family	Vernacular name	Total number of individuals
1.	*Aegle marmelos*	Rutaceae	Vilvam	5
2.	*Adenia cordifolia*	Rubiaceae	Adampu	3
3.	*Ailanthes excelsa*	Simaroubaceae	Peenari	2
4.	*Albizia lebbeck*	Mimosaceae	Vagai maram	23
5.	*Annona squamosa*	Annonaceae	Seethamaram	2
6.	*Azadirachta indica*	Meliaceae	Vaembu	134
7.	*Bauhinia variegata*	Caesalpiniaceae	Sivappumantharai	2
8.	*Borassus flabellifer*	Arecaceae	Panai	1
9.	*Cassia siamia*	Caesalpiniaceae	Manjal kondrai	14
10.	*Ceiba pentandra*	Malvaceae	Ilavu	2
11.	*Crataeva religiosa*	Capparidaceae	Mavalingam	3
12.	*Crescentia alata*	Bignoniaceae	Thiruvottukai	2
13.	*Dalbergia lanceolaria*	Fabaceae	Eetimaram	2
14.	*Delonix regia*	Caesalpiniaceae	Alangarakondrai	10
15.	*Erythrina grandiflora*	Fabaceae	Agathi	2
16.	*Guazuma ulmifolia*	Malvaceae	Ruthrakshamaram	5
17.	*Ficus benghalensis*	Moraceae	Aala maram	4
18.	*Ficus religiosa*	Moraceae	Arasa maram	5
19.	*Glyricidia sepium*	Fabaceae	Vivasaya thagarai	2
20.	*Holoptelia integrifolia*	Ulmaceae	Aavimaram	8
21.	*Lannea coromandelica*	Anacardiaceae	Uthiyan	11
22.	*Leucaena latisliqua*	Mimosaceae	Subhapul, Sagundal	5
23.	*Limonia acidissima*	Rutaceae	Vizhamaram	3
24.	*Madhuca longifolia*	Sapotaceae	Iluppai	4
25.	*Millingtonia hortensis*	Bignoniaceae	Pannerpoo	8
26.	*Mimusops elengi*	Sapotaceae	Mahizham	6
27.	*Monoon longifolia*	Annonaceae	Asogamaram	5

28.	*Moringa pterygosperma*	Moringaceae	Murungai	1
29.	*Morinda pubescens*	Rubiaceae	Nuna, Manjanathi	5
30.	*Muntingia calabura*	Malvaceae	Seenipazham	4
31.	*Neolamarckia cadamba*	Rubiaceae	Venkadambu	2
32.	*Parkia biglandulosa*	Mimosaceae	Poopanthumaram	4
33.	*Peltophorum pterocarpum*	Caesalpiniaceae	Perumkondrai	21
34.	*Pithecellobium dulce*	Mimosaceae	Kodukkapuli	2
36.	*Roystonia regia*	Arecaceae	Alagarapanai	2
37.	*Samanea saman*	Mimosaceae	Thoongumoonjmaram	14
38.	*Spathodea campanulata*	Bignoniaceae	Thannerkai maram	2
39.	*Syzygium cumini*	Myrtaceae	Naaval	6
40.	*Tamarindus indica*	Caesalpiniaceae	Puliyamaram	8
41.	*Tectona grandis*	Lamiaceae	Thekku	6
42.	*Terminalia arjuna*	Combretaceae	Neer Maruthu	8
43.	*Terminalia catappa*	Combretaceae	Vdhumai	11
44.	*Thespesia papulnea*	Malvaceae	Poovarasu	3
45.	*Wrightia tinctoria*	Apocynaceae	Vetpalai	3
46.	*Ziziphus jujuba*	Rhamnaceae	Elanthai	1

Total number of Trees **374**

List of shrubs of the Madura College campus

Sl.No.	Botanical name	Family	Vernacular name	Importance
1.	*Abutilon hirtum*	Malvaceae	Thuthi	Medicinal
2.	*Abutilon indicum*	Malvaceae	Siruthuthi	Medicinal
3.	*Cadaba fruticose*	Capparidaceae	Viluthi	Medicinal
4.	*Calotropis gigantea*	Apocynaceae	Erukku	Medicinal
5.	*Cassia auriculata*	Ceasalpiniaceae	Aavarai	Medicinal
6.	*Corchorus capsularis*	Malvaceae	Sanal	Fiber yielding
7.	*Desmanthus virgatus*	Mimosaceae	Vaelipachai	Fodder
8.	*Duranta erecta*	Verbenaceae		Ornamental
9.	*Ecbolium viride*	Acanthaceae	Neelambaram	Medicinal
10.	*Hibiscus micranthes*	Malvaceae		Medicinal
11.	*Hibiscus rosa-sinensis*	Malvaceae	Semparuthi	Medicinal, Ornamental
12.	*Hibiscus tilifolius*	Malvaceae		Medicinal
13.	*Ixora coccinea*	Rubiaceae	Iruvachi, Idlipoo	Ornamental
14.	*Ixora finlaysoniana*	Rubiaceae	Idlipoo	Ornamental
15.	*Justicia adhatoda*	Acanthaceae	Aadathodai	Medicinal
16.	*Nerium oleander*	Apocynaceae	Arali	Ornamental
17.	*Pedilanthes dithymaloides*	Euphorbiaceae	Elaiperandai	Ornamental
18.	*Sesbania bispinosa*	Fabaceae	Kaatagathi	Green manure
19.	*Tabernaemontana divaricate*	Apocynaceae	Nanthiyavattai	Medicinal
20.	*Tecoma stans*	Bignoniaceae	Manjarali	Ornamental
21.	*Vitex negudo*	Verbenaceae	Notchi	Medicinal

List of climbers of the Madura College campus

Sl.No.	Botanical name	Family	Vernacular name	Importance
1.	*Coccinia grandis*	Cucurbitaceae	Kovai	Medicinal
2.	*Pergularia daemia*	Apocynaceae	Vaeliparuthi	Medicinal
3.	*Solanum trilobatum*	Solanaceae	Thuthuvalai	Medicinal
4.	*Dregia volubilis*	Apocynaceae	Perumkurinjan	Edible green
5.	*Ipomoea sepiaria*	Convolvulaceae	Pachilai	Medicinal
6.	*Ipomoea marginata*	Convolvulaceae		Medicinal
7.	*Impomea palmata*	Convolvulaceae		Medicinal
8.	*Merremia tridentata*	Convolvulaceae	Muthiyarkunthal	Medicinal
9.	*Merremia pentaphylla*	Convolvulaceae		Medicinal
10.	*Quiqualis indica*	Combretaceae	Rangoonmalli	Ornamental
11.	*Cayratia rotundifolia*	Vitaceae	Vattakodi	Ornamental
12.	*Cucumis lanata*	Cucurbitaceae	Mithukkai	Fruits edible
13.	*Citrullus colocynthis*	Cucurbitaceae	Peikumatti	Medicinal
14.	*Luffa cylindrica*	Cucurbitaceae	Nuraipeerku	Fruit vegetable
15.	*Aristalochia indica*	Artistalochiaceae	Aaduthinnapalai	Medicinal
16.	*Cardiospermum halicacabum*	Sapindaceae	Mudakathaan	Medicinal
17.	*Mukia maderaspatana*	Cucurbitaceae	Musumusukai	Medicinal
18.	*Telosma cordata*	Apocynaceae	Kodichapangi	Ornamental
19.	*Pentatropis microphylla*	Apocynaceae	Uppukolli	Medicinal
20.	*Tinospora cordifolia*	Menispermaceae	Seethilkodi	Medicinal
21.	*Passiflora foetida*	Passifloraceae	Poonaipidukku	Fruit edible
22.	*Clitoria ternatea*	Fabaceae	Sangupoo	Medicinal
23.	*Rhynchosia hirta*	Fabaceae	Kaatukollu	Medicinal
24.	*Macrtyloma uniflorum*	Fabaceae	Kaatukodi	Fodder
25.	*Tylophora indica*	Apocynaceae	Paalaikodi	Medicinal

List of medicinal herbs of the Madura College campus

Sl.No.	Botanical name	Family	Vernacular name	Importance
1.	*Acalypha ciliata*	Euphorbiaceae	Seemaikuppamani	Medicinal
2.	*Acalypha indica*	Euphorbiaceae	Kuppaimaeni	Medicinal
3.	*Achyranthes aspera*	Amaranthaceae	Nayuruvi	Medicinal
4.	*Aerva lanata*	Amaranthaceae	Kooraipoo	Medicinal
5.	*Alternanthera punchens*	Amaranthaceae	Kanthimullu	Medicinal
6.	*Alternanthera sessilis*	Amaranthaceae	Ponaankanni	Medicinal
7.	*Alternanthera tenella*	Amaranthaceae	Ponnaganni	Vegetable
8.	*Alysicarpus hamosus*	Fabaceae	Ramapundu	Medicinal
9.	*Amaranthus spinosa*	Amaranthaceae	Mullukeerai	Green vegetable
10.	*Amaranthus viridis*	Amaranthaceae	Kuppaikeerai	Green vegetable
11.	*Andrographis paniculate*	Acanthaceae	Siriyanangai	Medicinal
12.	*Anisomeles malabarica*	Lamiaceae	Peimiratti	Medicinal
13.	*Aristolochia bracteata*	Aristalochiaceae	Aadutheedapalai	Medicinal
14.	*Asystasia congetica*	Acanthaceae	Pavalapachai	Medicinal
15.	*Blumea membranacea*	Asteraceae	Narikaranthai	Medicinal
16.	*Blumea obliqua*	Asteraceae	Kaatukarantahi	Medicinal
17.	*Boerhavia diffusa*	Nyctaginaceae	Mukiratai	Medicinal
18.	*Boerhavia erecta*	Nyctaginaceae	Saranai	Medicinal
19.	*Catharanthus roseus*	Apocynaceae	Sudukaatumalli	Medicinal
20.	*Cleome gynandra*	Capparidaceae	Naikadugu	Medicinal
21.	*Cleome tenella*	Capparidaceae	Sirukadugu	Medicinal
22.	*Cleome viscosa*	Capparidaceae	Naivaelai	Medicinal
23	*Commelina benghalensis*	Commelinaceae	Kanavazhai	Medicinal
24.	*Corchorus aestuans*	Malvaceae	Arivaalpundu	Medicinal
25.	*Corchorus tridens*	Malvaceae	Arivalmanaipudu	Medicinal

26.	*Corchorus trilocularis*	Malvaceae	Sanalpundu	Medicinal
27.	*Crotalaria verrucosa*	Fabaceae	Salangaichedi	Medicinal
28.	*Desmodium gangeticum*	Fabaceae	Orilai	Medicinal
29.	*Desmodium triflorum*	Fabaceae	Muvilai	Medicinal
30.	*Digera muricata*	Amaranthaceae	Kadaikeerai	Medicinal
31.	*Dipteracanthus patula*	Acanthaceae	Nethirapudnu	Medicinal
32.	*Euphorbia heterophylla*	Euphorbiaceae	Paalpoondu	Medicinal
33.	*Euphorbia hirta*	Euphorbiaceae	Ammanpacharisi	Medicinal
34.	*Euphorbia rotundifolia*	Euphorbiaceae	Paalpacisire	Medicinal
35.	*Gomphrena serrata*	Amaranthaceae	Vellachi	Medicinal
36.	*Hybanthus enneaspermus*	Violaceae	Orithalthamarai	Medicinal
37.	*Indigofera colutea*	Fabaceae	Sirusayaver	Medicinal
38.	*Indigofera trifoliata*	Fabaceae	Samoolam	Medicinal
39.	*Malvastrum coromandelicum*	Malvaceae	Vattathuthi	Medicinal
40.	*Mollugo cerviana*	Aizoaceae	Parpadagam	Medicinal
41.	*Mollugo nudicaulis*	Aizoaceae	Perumparpadagam	Medicinal
42.	*Mollugo pentaphylla*	Aizoaceae	Purakeerai	Medicinal
43.	*Ocimum tenuiflorum*	Lamiaceae	Thulasi	Medicinal
44.	*Oldenlandia racemosa*	Rubiaceae	Kaatupudu	Medicinal
45.	*Oldenlandia umbellata*	Rubiaceae	Imbura	Medicinal
46.	*Parthenium hysterophorus*	Asteraceae	Visachedi	Allergic
47.	*Pedalium murex*	Pedaliaceae	Perumnereinji	Medicinal
48.	*Peristrophe bicalyculata*	Acanthaceae	Sennaku	Medicinal
49.	*Phyllanthus amarus*	Phyllanthaceae	Keelanelli	Medicinal
50.	*Phyllanthus maderaspatana*	Phyllanthaceae	Melanelli	Medicinal
51.	*Physalis minima*	Solanaceae	Sodakkuthakkali	Medicinal
52.	*Ruellia tuberosa*	Acanthaceae	Vedikai	Medicinal

53.	*Sida acuta*	Malvaceae	Aamuti	Medicinal
54.	*Sida cordata*	Malvaceae	Sirtamutti	Medicinal
55.	*Sida cordifolia*	Malvaceae	Palampasi	Medicinal
56.	*Sida romboidea*	Malvaceae	Peramutti	Medicinal
57.	*Sida spinosa*	Malvaceae	Mullamutti	Medicinal
58.	*Trianthema portulacastrum*	Aizoaceae	Satranai	Medicinal
59.	*Tribulus terrestris*	Zygophyllaceae	Sirunerinji	Medicinal
60.	*Tridax procumbens*	Asteraceae	Vettukayapoondu	Medicinal
61.	*Vernonia cinerea*	Asteraceae	Seethaevi	Medicinal
62.	*Vicoa indica*	Asteraceae	Mukuthipoo	Medicinal

List of grasses and sedges of the Madura College campus

Sl.No.	**Botanical name**	**Family**	**Common name**	**Importance**
1.	*Aristida funiculata* Trin. & Rupr.	Poaceae	Oosipul	Fodder
2.	*Aristida setacea* Retz.	Poaceae	Seevaipul	Brooms making
3.	*Enneapogon schimperanus* Renvoize	Poaceae		Fodder
4.	*Dactyloctenium aegytium* (L.) Willd.	Poaceae	Uppampul	Fodder
5.	*Eragrostis maderaspatana* Bor	Poaceae		Fodder
6.	*Leptochloa obtusiflora* Hochst.	Poaceae		Fodder
7.	*Sporobolus iociados* Nees	Poaceae		Fodder
8.	*Chloris bournei* Rang. & Tadul.	Poaceae	Kattampul	Fodder
9.	*Chloris inflata* Link.	Poaceae		Fodder
10.	*Cynodon dactylon* (L.) Pers.	Poaceae	Arugampul	Fodder

11.	*Perotis indica* (L.) Kuntze	Poaceae	Narivalpul	Fodder
12.	*Tragus roxburghii* Panigh.	Poaceae		Fodder
13.	*Brachiaria distachya* (L.) Stapf.	Poaceae		Fodder
14.	*Brachiaria remota* (Retz.) Hains	Poaceae		Fodder
15.	*Brachiaria semiundulata* Stapf.	Poaceae		Fodder
16.	*Cenchrus ciliaris* L.	Poaceae	Kolukattaipul	Fodder
17.	*Digitaria cliaris* L.	Poaceae		Fodder
18.	*Digitaria setigera* Koeler	Poaceae		Fodder
19.	*Echinochloa colonum* (L.) P. Beauv.	Poaceae	Kuthiraipul	Fodder
20.	*Echinochloa crusgalli* (L.) P. Beauv.	Poaceae	Ottampul	Fodder
21.	*Pennisetum purpureum*	Poaceae		Fodder

MIYAWAKI FOREST INSIDE THE MADURA COLLEGE CAMPUS

Miyawaki is a technique pioneered by the Japanese botanist Akira Miyawaki for urban afforestation. Under this technique various native species of plants are planted close to each other, which ensures their growth upwards is rapid by receiving sunlight from the top. The approach is supposed to ensure that plant growth is 10 times faster and the resulting plantation is 30 times denser than usual.

Miyawaki forest is answer to cities which are turning to concrete jungles. Small patch of forests in multiple locations within the city will act as carbon sink for the city.

The Management of The Madura College jointly with Rotary Club (West) have planted 5500 samples of 110 varieties. The forest is spread out on an area of one acre adjacent to TVS Block and act as green-lung for the region. It helps in promoting the local biodiversity to sustain by planting native species of flora which also harbour the native fauna.

Workshops are being conducted to students to train them on soil amendment and the Miyawaki method of plantation. The maintenance and monitoring of the forest is being done by the students and college staff

List of types of trees planted in Miyawaki Forest

Sl. .No	Common Name	Botanical Name	Family
1.	Toothed leaf limonia	*Naringi crenulata*	Rutaceae
2.	Rubber vine	*Cryptostegia grandiflora*	Apocynaceae
3.	Fish-killer tree	*Barringtonia racemosa*	Lecythidaceae
4.	Water apple	*Syzygium samarangense*	Myrtaceae
5.	Asoka tree	*Saraca asoca*	Caesalpiniaceae
6.	Peanut butter fruit	*Bunchosia argentea*	Malpighiaceae
7.	Pomegranate	*Punica granatum*	Lythraceae
8.	Firebush	*Hamelia patens*	Rubiaceae
9.	Rudraksham	*Elaeocarpus angustifolius*	Elaeocarpaceae
10.	Indian Ash tree	*Lannea coromandelica*	Anacardiaceae
11.	Lasora	*Cordia dichotoma*	Cordiaceae
12.	Red fig	*Ficus carica*	Moraceae
13.	Blue Jacaranda	*Jacaranda mimosifolia*	Bignoniaceae
14.	Black portia	*Thespesia populnea*	Malvaceae
15.	Common Mallow	*Thespesia lampas*	Malvaceae
16.	Sea grape	*Coccoloba uvifera*	Polygonaceae
17.	Conocarpus	*Conocarpus erectus*	Combretaceae
18.	Beggars bowl	*Crescentia alata*	Bignoniaceae
19.	Ficus	*Ficus aurata*	Moraceae
20.	Travelers’s palm	*Ravinala madagascariensis*	Musaceae
21.	Milkwood	*Alstonia macrophylla*	Apocynaceae
22.	Child-life tree	*Putranjiva roxburghii*	Putranjivaceae
23.	Divi divi	*Caesalpinia coriarea*	Caesalpiniaceae
24.	Kaim	*Mitragyna parvifolia*	Rubiaceae
25.	Gian crepe-myrtle	*Lagerstroemia speciosa*	Lythraceae
26.	Rosy trumpet tree	*Tabebuia rosea*	Bignoniaceae
27.	Sappan wood	*Beancaea sappan*	Mimosaceae
28.	African Locust tree	*Parkia biglandulosa*	Mimosaceae
29.	Turkey Berry	*Solanum torvum*	Solanaceae
30.	Beach Gardenia	*Guettarda speciosa*	Rubiaceae
31.	Indan Aloewood	*Aquilaria malaccensis*	Thymelaeaceae

32.	Mexican Lilac	*Gliricidia sepium*	Fabaceae
33.	Terminalia metaly	*Terminalia metallica*	Combretaceae
34.	Dyer's oleander	*Wrightia tinctoria*	Apocynaceae
35.	Yellow oleander	*Cascabela thevetia*	Apocynaceae
36.	Ghaf tree	*Prosopis cinerea*	Mimosaceae
37.	West Indian Cherry	*Malpighia glabra*	Malpighiaceae
38.	West Indian pea	*Sesbania grandiflora*	Fabaceae
39.	Indian Elm tree	*Holoptelea integrifolia*	Ulmaceae
40.	Areca nut	*Areca catechu*	Arecaceae
41.	Bamboo	*Bambusa arundinacea*	Poaceae
42.	Silk cotton tree	*Ceiba pentandra*	Malvaceae
43.	Beechwood	*Gmelina arborea*	Verbenaceae
44.	Mahogany	*Swietenia macrophylla*	Meliaceae
45.	Malabar Neem	*Melia dubia*	Meliaceae
46.	Arjun tree	*Terminalia arjuna*	Combretaceae
47.	Indian Siris	*Albizia lebbeck*	Mimosaceae
48.	Indian Mast tree	*Monoon longifolium*	Annonaceae
49.	Rosewood	*Dalbergia latifolia*	Fabaceae
50.	Silver oak	*Grevillea robusta*	Proteaceae
51.	Paradise tree	*Simarouba glauca*	Simaroubaceae
52.	Teak	*Tectona grandis*	Verbenaceae
53.	Belliric Myrobalan	*Terminalia bellirica*	Combretaceae
54.	Andaman redwood	*Pterocarpus marsupium*	Fabaceae
55.	Sisso	*Dalbergia sissoo*	Fabaceae
56.	Jamun tree	*Syzygium cuminii*	Myrtaceae
57.	Red sanders	*Pterocarpus santalinus*	Myrtaceae
58.	African mahogany	*Khaya senegalensis*	Meliaceae
59.	Big silk cotton	*Bombox ceiba*	Malvaceae
60.	Cinnamon	*Cinnamomum malabatrum*	Lauraceae
61.	Prickly custard apple	*Annona muricata*	Annonaceae
62.	Flame of the forest	*Butea monosperma*	Fabaceae
63.	Gulmohar	*Delonix regia*	Caesalpiniaceae
64.	Cashew	*Anacardium occidentale*	Anacardiaceae

65.	Green Champa	*Artabotrys hexapetalus*	Annonaceae
66.	Black pepper	*Piper nigrum*	Piperaceae
67.	Ebony wood	*Diopyros ebenum*	Ebenaceae
68.	Pink shower	*Cassia javanica*	Caesalpiniaceae
69.	Cherry	*Prunus avium*	Rosaceae
70.	Indian butter tree	*Madhuca longifolia*	Sapotaceae
71.	Spanish cherry	*Mimusops elengi*	Sapotaceae
72.	Orchid tree	*Bauhinia variegata*	Caesapliniaceae
73.	Indian Coral tree	*Erythrina grandiflora*	Fabaceae
74.	Cannonball tree	*Gouropita guianensis*	Lecythidaceae
75.	Indian cork tree	*Millingtonia hortensis*	Bignoniaceae
76.	Indian beech tree	*Pongamia pinnata*	Fabaceae
77.	Alexandrian laural	*Calophyllum inophyllum*	Calophyllaceae
78.	Golden shower	*Cassia fistula*	Caesalpiniaceae
79.	Champak tree	*Magnolia champaca*	Magnoliaceae
80.	Yellow flame tree	*Peltophorum pterocarpum*	Caesalpiniaceae
81.	Rain tree	*Samanea saman*	Mimosaceae
82.	African Tulip tree	*Spathodea campanulata*	Bignoniaceae
83.	Sacred Fig tree	*Ficus religiosa*	Moraceae
84.	Cluster Fig	*Ficus racemosa*	Moraceae
85.	Banyan	*Ficus benghalensis*	Moraceae
86.	Curry leaf	*Murraya koenigii*	Rutaceae
87.	Common jujube	*Zizhiphus jujuba*	Rhamnaceae
88.	Guava	*Psidium guajava*	Myrtaceae
89.	Jack fruit	*Artocarpus heterophyllus*	Moraceae
90.	Madras thorn	*Pithecellobium dulce*	Mimosaceae
91.	Mango	*Mangifera indica*	Anacardiaceae
92.	Neem	*Azadirachta indica*	Meliaceae
93.	Indian Mulberry	*Morinda citrifolia*	Rubiaceae
94.	Ceylon wood	*Manilkara hexandra*	Sapotaceae
95.	Sandal wood	*Santalum album*	Santalaceae
96.	Sapodilla	*Manilkara zapota*	Sapotaceae
97.	Custard apple	*Annona squamosa*	Annonaceae
98.	Singapore Cherry	*Muntingia calabura*	Malvaceae
99.	Tamarind	*Tamarindus indica*	Caesalpiniaceae

100.	Wood apple	*Limonia acidissima*	Rutaceae
101.	Stone apple	*Aegle marmelos*	Rutaceae
102.	Indian Almond	*Terminalia catappa*	Combretaceae
103.	Hairy Fig	*Ficus hispida*	Moraceae
104.	Star gooseberry	*Phyllanthus acidus*	Phyllanthaceae
105.	Indian gooseberry	*Phyllanthus emblica*	Phyllanthaceae
106.	Acid lime	*Citrus aurantifolia*	Rutaceae
107.	Henna tree	*Lawsonia inermis*	Lythraceae
108.	Chinese Chaste	*Vitex negundo*	Verbenaceae
109.	Tree of sadness	*Nyctanthes arbor-tristis*	Oleaceae
110.	Charcoal tree	*Trema orientalis*	Cannabaceae

8.Spirulina Cultivation Unit in the Madura College

Spirulina is very high in protein, very low in calories and cholesterol, and high in minerals (iron, calcium, sodium and magnesium), and phenolic acids, which have antioxidant properties. It is a complete protein source since it contains almost all the essential amino acids (the ones we cannot synthesize by ourselves), though with reduced amounts of methionine, cysteine, and lysine when compared to the proteins of meat, eggs, and milk. It is, however, superior to typical plant protein, such as that from legumes. It offers good digestibility and a low nucleic acid concentration (smaller that 5%).Besides, it contains vitamins A, B, C, E, and K, polyunsaturated fatty acids, carotenoids, and other antioxidants.

Spirulina Cultivation Unit in the Madura College was funded by Madura College Board and maintained by The Department of Biotechnology. Three tanks were constructed. The tank 1 was first inoculated on 24th March 2022. The mother inoculum of Spirulina platentis was received from S S Biotech, Andarkottaram with which MoU was signed. The students of the Biotechnology department are trained to maintain the culture, right from the media preparation, maintaining the culture, harvest and preserving the biomass.

Environmental Benefits

Among the different strategies for mitigating CO2, biological CO2 mitigation through microalgae has recently received considerable attention due to their higher CO2 fixation capability and bioactive substances contained in their biomass. Spirulina being a photosynthetic organism are potent CO2 fixers.

Future Prospect

To motivate students to undertake projects with Spirulina – anti bacterial , antioxidant etc.

To organise extension activities – to conduct workshops to students of other departments and other SHG women

9.Rainwater Harvesting

At The Madura College, rainwater harvesting is done effectively to enhance the ground water
Rainwater harvest area covered-1,05,000 sqft
Rainwater collection sump details-7.6 ft x 4ft x 6 ft -2 Nos
Rainwater recharge pits- 97 x 67 x 8 -2 Nos
50 x 40 x 6- 1 No
120 x 70 x 7- 1 No




10. AMBIENT AIR

10.1 Ambient Air Quality

Flue gas emission sources

- LPG combustion at laboratory and canteen
- Diesel generator at College

Fuel consumption per year

- LPG -3,952 Kgs
- Diesel for generator – 1,100 litres

Fuel consumption per day

- College workings days -180
- Average LPG consumption per day- 21.95 kgs
- Average Diesel consumption per day-6.11 litres

Combustion of LPG is NOT CONTINUOUS process

DIESEL Generator will run only when TNEB grid power fails

Considering the above situation, the quantity of flue gas emission and the impact on ambient air quality from the above combustions are negligible

10.2 Noise level

Noise level inside the campus

Sl. No	Location	Max value in dB	Average Value in dB
1	Main Entrance	78	64
2	Near Commerce Building	65	53
3	Inside Library	57	51
4	Near Miyawaki Forest	62	55
5	Near Cricket stadium	71	64
6	Main Office	70	62

- Diesel Generators (DG) sets do not run on a continuous basis. Only during power failure, DG sets are operated during the working hours of the College.
- Generally Power failure occurs for a very short time period.
- During planned shutdown hours, DGs run continuously based on the load
- Noise disturbance due to DG set is negligible.

11. Audit Findings & Recommendations

Noteworthy activities

- Clean, Green and plastic free campus
- Development of Miyawaki forest
- Spirulina cultivation
- Effective utilisation of Solar energy from Solar Power Plant

The audit outputs and recommendations are summarised as follows:

- Air pollution impact on Ambient Air quality is negligible since the quantity of fuel used for combustion in the institution is very less
- Noise levels inside the campus are within the prescribed limit
- Lot of initiatives are taken to conserve Water and Energy by the Institution.
- Flow meters are to be provided for better water management
- Total water consumption for The Madura College– 67 KL/Day
- Electrical Energy consumption from TNEB GRID alone –1,61,251 units
- Diesel Generator electrical energy consumption- 3,300 units
- Solar Power electrical energy consumption-12,198 units
- Total Electrical Energy consumption is 1,76,749 units

Recommendations

- More Electrical Energy reduction through Solar PV Power Plant Shall be planned
- Flow meter to be installed to know the exact usage of water.
- Training programs in Carbon footprint concepts, Awareness on Global warming & Climate change, E -vehicle usage , Alternative Fuel usage , Renewable Energy shall be given

- Increase the number of display boards on environmental awareness such as no wastage of food, switch off light and fan after use etc
- Register to be maintained for collection, storage and disposal of E waste & used batteries