GREEN AUDIT REPORT

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&

Student Team

THE MADURA COLLEGE (Autonomous)

MADURAI – 625 011,

TAMIL NADU, INDIA.

Chapter - I

INTRODUCTION

The Madura College (Autonomous), Madurai is one of the premier institutions in the field of higher education in Madurai and was reaccredited by NAAC with A level in 2016-17. The college offers 21 undergraduate courses, 13 post graduate courses, 8 M.Phil and 9 Ph.D. programmes. In additions, the college conducts several certificate courses and diploma programmes to enhance the global competency of students.

In association with government departments, non-governmental organizations and other institutions, the college has undertaken a number of extension and outreach programmes. Activities such as environmental awareness programme, health awareness rally, legal literacy, environmental surveys, etc. were conducted in collaborations with governmental and non-governmental organizations.

In order to bring up a student generation with moral integrity and to promote democratic values, the college organizes talks by experts for the staff and students. The Eco-club highlights the significance of biodiversity, environment and its protection. Health club promotes health and hygiene and also healthy living environment. Democratic principles are followed by the student council are held in the preliminary platform, which helps to articulate democratic and social among the students.

1.1 Vision and Mission statement of the college

MISSION

To produce disciplined, competent, spiritually, socially committed and morally upright students through quality education and research.

MISSION

- To ensure quality education at affordable cost
- To shape and mould students is worthy citizens
- To lay emphasis on moral and spiritual values
- To infuse ethics, values and responsibility
- To provide academic excellence.

The vision and mission of the institution are communicated through the college calendar/handbook, display boards, college magazine, newsletters, websites and brochures to all the stake holders of the college.

The vision and mission of the college are framed in accordance with the objectives of the Higher Education Policy of the Nation. The National Education Policy aimed to develop a deep sense of obligation and to promote human well-being, producing generations with moral in integrity and preserving the values of democracy. The college reviews and modifies its vision and mission in accordance with the changing priorities of National Education Policy. When the college was started in 1882 its aim was to provide higher education in arts and science of the highest standard incurring sound learning, building up character and upholding moral and spiritual values. In order to integrate with the changing national policies, the mission of the college was revised to incorporate the objectives of empowering the students and faculty to face the challenges of modern life, to undertake extension programmes, to promote human values by upholding social democratic principles.

1.2. **Total College area and College Building spread area**

Campus area	46 Acres
Building spread area	263072 sq.ft. (Approximately 6 Acres)

1.3. **Previous NAAC Gradings**

Sl.No.	Phase	Grade	GCPA/%	Year of accreditation	Accreditation period
1.	Phase – I	B^{++}	----	2002	1998-2002
2.	Phase – II	A	3.32	2010	2005-2010
3.	Phase – III	A	3.15	2017	2013-2017

1.4. **Campus infrastructure**

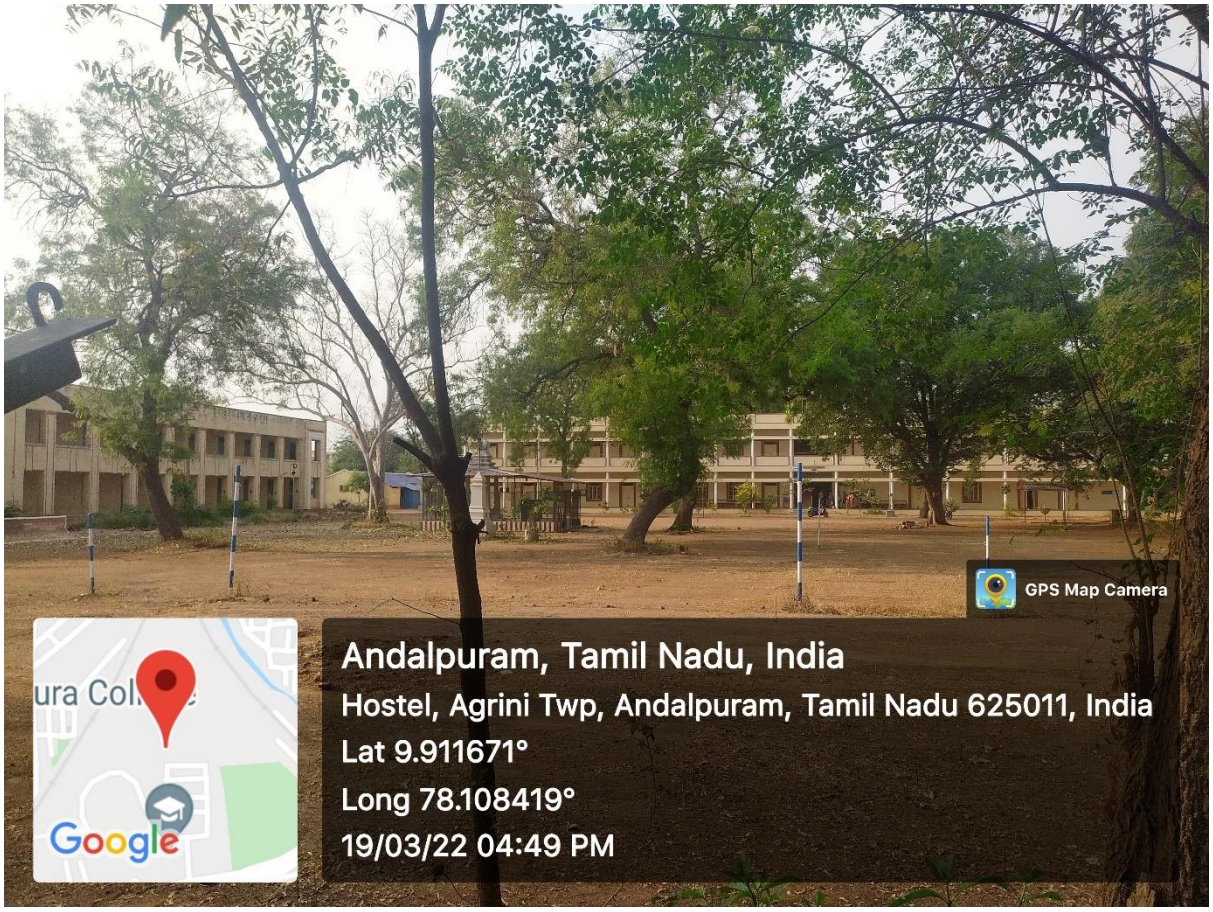
The college, situated centre of the Madurai city besides the Periyar Bust stand on the Tiruparankundram road, is well connected by rail and road. Spread over an area of 46 acres, the college has 23 buildings with 415 class rooms, UG and PG labs, library, computer labs, administrative offices, Principal's room, etc. The following table gives details.

Sl. No	Name of Building	Purposes
1.	A-Block (Main Building)	Secretary office, Principal office, College administration office, SF-office, IQAC office, NAAC office, Botany and Zoology staff rooms, laboratories, Economics and Tamil department staff rooms and class rooms.
2.	B-Block	Chemistry, Mathematics and Physics department staff rooms, laboratories and class rooms.
3.	C-Block	Physics department staff rooms, Chemistry store room, Laboratories and class rooms.
4.	Mohan lab-Choe hall	FIST-Computer lab, seminar hall
5.	Ramanujam Block	Computer labs, class rooms
6.	Computer Science Block	Computer Science staff room, computer lab, class rooms.
7.	L-Block	Botany PG-lab, research lab, student class rooms, SBI-Bank
8.	Sankar Iyer Hall	Class rooms and auditorium
9.	Harvey Library	Central Library
10.	KBR-Block	COE office section, valuation hall, SF-Economics department staff room, SF-Computer Science staff room, class rooms.
11.	TVS-Block	SF-Tamil and SF-English department staff rooms, class rooms
12.	Health Centre	Health centre, ladies launch, class rooms
13.	Saroja Krishnamoorthy Block	Commerce department staff room, smart class room and student class rooms.
14.	Durai Samy Block	Commerce department staff room, E-chamber, class rooms
15.	Seminar Hall	AC-Seminar Hall
16.	PED office	Physical Director office, indoor game rooms
17.	NCC office	NCC office and store room
18.	Seminar (Yoga) Hall	Seminar hall
19.	Canteen	Staff student canteen halls, kitchen, store
20.	Diamond Jubilee Block	Biotechnology, Microbiology, Physics and Chemistry SF-staff rooms, laboratories and class rooms
21.	Open Auditorium	Auditorium
22.	Power room	Power control room
23.	Generator room	Generator room

1.5. **Augmented Infrastructure during post Re-accredited Period**

Sl.No.	Augmented infrastructure	Purpose	Amount (Rs./-)
1.	Diamond Jubilee Block	For SF-Biotechnology, Microbiology, Physics and Chemistry laboratories, student class rooms and staff rooms.	------

The Madura College Board (MCB), management of the college and the governing council is committed in providing improved facility and infrastructure for students and staff which makes the college an ambient environment for research, learning and all the development.



Chapter – II

PRE-AUDIT STAGE

The College Council of the Madura college asked the Principal to find a suitable team to provide training and support regarding Green Audit and the Principal in the Staff Meeting authorised the Eco-Club of the Botany Department to find and conduct the green audit process. After consultation with staff and student team, the Principal along with Eco-Club and IQAC decided to render the expertise of Dr. S. Karuppusamy and his team of the Department of Botany, The Madura College, Madurai.

2.1. Green audit team

Faculty	Designation
Dr. S. Karuppusamy	Assistant Professor, Botany
Dr. N. Janakiraman	Assistant Professor, Botany
Student team	
Ravi Shankar, T.	II. M.Sc. Botany
Ariharan, K.A.	II. M.Sc. Botany
Kathiravan, M	II. M.Sc. Botany
Yogesh, M	II. M.Sc. Botany
Keerthana, S.	I. M.Sc. Botany
Surya, J.	I. M.Sc. Botany
Gayathri, A.	I. M.Sc. Botany
Priya, M.	I. M.Sc. Botany
Indhumathi, B.	I. M.Sc. Botany
Bhuvaneshwaran, M.	I. M.Sc. Botany
Karthik Kumar, K.	I. M.Sc. Botany
Suresh Krishnan, N.	I. M.Sc. Botany
Gowri, E.	I. M.Sc. Botany
Johnsha Devi	I. M.Sc. Botany

Faculty members of Botany for supporting green auditing in the Madura College campus

2.2. Management support

The Madura College Board and the Governing Council of the college extended whole hearted support and commitment in conducting Green Audit during the pre-audit meeting. The management decided to carry-out various environment friendly programmes such as efficient energy and water use practices, energy efficient electronic and computer goods purchase, proper waste disposable methods, water conservation methods, herbal garden, planting tree saplings, distribution of tree saplings to the community, promotion of Miyawaki forest - a project for making artificial arboretum of RET species, observation of environment related days, field trips, eco-club activities so on and so forth. The management is also keen to implement sustainable practices based on findings and suggestions from Green Audit report. The college management is fully committed to inculcate virtues amongst students in conservation and preservation of nature.

2.3. **Scope and Goals of Green Auditing**

Green audit is serving to recognize opportunities to sustainable development of best practices, enhance environmental quality, improve health, hygiene and safety, reduce liabilities and save money and energy, and ultimately achieve values of virtue. Green audits can be a highly valuable tool for college in a wide range of ways to improve their environmental and economic performance and reputation while reducing wastages and operating costs. Once a baseline data is prepared after the auditing process, the data can serve as a point of departure for further action in campus greening. It will also help the college to compare its programmes and activities with other peer institutions, identify areas for improvement and prioritise the implementation of future projects. The data will also provide a basis for calculating the economic benefits of resource conservation projects by establishing the current rates of resource use and their associated attributes. Simple but effective system was devised and applied to prepare a baseline data and monitor the environmental performance of the Madura College, Madurai. The aim of green auditing is to help the institution to apply sustainable development practices and to set examples before the young learning student community.

2.4. **The general and specific objectives**

The general objective of green audit is to prepare a baseline report on biodiversity and other resources, measures to mitigate resource wastage and improve resource quality and sustainable practices.

The specific objectives are;

- To prepare a checklist of floral diversity in and around the college campus.
- To suggest measures to improve biodiversity within the college campus.
- To assess the quantity of water usage within the college campus.
- To find out various sources of organic and solid waste generation and mitigation possibilities.
- To inculcate values of sustainable development practices through green audit mechanism.

2.5. **Target areas of Green auditing**

2.5.1. **Biodiversity Audit**

All plant and animal species - including humans - are bonded together in a complex web of life; we depend upon biodiversity for our survival. Biodiversity is the key to healthy ecosystems and ultimately make a healthy planet. It keeps the air and water clean, regulates

our climate and provides us food, shelter, clothing, medicine and other useful products. Each part within this complex web diminishes a little when one part weakens or disappears. The trees and green plants work hard to keep the air we breathe clean and healthy. Their leaves take in much of the poisonous unwanted carbon dioxide in the air, and replace it with the oxygen we need for healthy living. The key processes of photosynthesis by the plants using sunlight, air and water to prepare carbohydrate which serves the energy molecule of earth planet. When doing this they release oxygen into the air which is vital for all life on earth. The roots of trees dig deep into the earth and hold it together so that the rain and wind cannot wash or blow it away. This is very important as the earth has only a very thin layer (seldom more than one foot) of fertile soil covering it. Hence the assessment and monitoring of green cover is essentially needed for checking the healthy environment.

2.5.2. **Biodegradable and hazardous Waste Audit**

This indicator addresses biodegradable waste from college and canteen, paper waste to hazardous wastes of laboratories and worn-out electric and electronic goods, and plastic wastes. Hazardous materials represent significant risks to human health and ecological integrity. Hazardous wastes are also leached out through the e-waste generated in the campus. They often persist in the environment leaving a legacy of land and water contamination for generations. They also accumulate in the tissues of organisms and become concentrated within food chains, leading to cancer, endocrine disruption, birth defects, and other tragedies. The minimization, safe handling, and ultimate elimination of these materials are essential to the long-term health of the planet.

Chapter – III

POST AUDIT STAGE

3.1. **Green audit process**

3.1.1. **General steps:**

- ✓ Systematic and comprehensive data collection.
- ✓ Documentation with physical evidences.
- ✓ Independent periodic evaluation with regulatory requirements and appropriate standards.
- ✓ Systematic and comprehensive improvement and management of existing system.

3.1.2. **The audit process**:

The present audit is a Pre-audit to collect the details required for external auditing and Pre-audit activities. The pre-audit activities include the following.

1. The sites / area / division that are to be audited, need to be determined and selected.

2. The audited were informed of the date of the audit enabled them to adjust and become used to the concept.

3. The audit scope were identified. The auditee was consulted when establishing the scope.

4. The audit plan was designed in such a way that it accommodated changes based on information gathered during the audit and effective use of resources.

5. Green Audit Committee and assignment of responsibility were established.

6. The chosen working papers were collected. This facilitated the auditor's investigations on the sites.

7. The background information on the facility including the facility' organization, layout and processes, and the relevant regulations and standards, were collected.

8. The background information on the site's historical uses, and the location of soil and groundwater contamination were collected.

9. The pre-audit questionnaire was informed to auditee

3.1.3. **Procedure followed**:

The student team were divided into four groups and under the guidance of Dr. S. Karuppusamy, Eco-Club coordinator, Assistant Professor of the Department of Botany, each group collected data on the assigned topics. The assigned topics were as follows.

- ✓ Identification of Plant species for preparing Bio-diversity component.
- ✓ Analysis of waste generation and disposal.

3.2. **Site inspection**

Site inspection was done by green auditing team of faculty and students. The process of green audit was an enriching environmental awareness programme for the students who participated in the green auditing. The experience of green auditing was a first time experience for most of the students. They shared their expectations about a green campus and gave suggestions for the audit recommendations.

3.3. **Forms and template for green auditing**

The methodology include preparation and getting response of questionnaire, physical inspection of the sites, review and analysis of the relevant data and documents, interviewing persons of end users and peoples in charge, and taking necessary measurements and counts. A

detailed survey was conducted to collect data from the various sources necessary for the audit. A team of students and teachers were formed. The team members repeatedly visited sites where various environment related activities in the institution are going on and collected information.

3.3.1. Data Collection

In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements. The target areas particular to the college was evaluated through a questionnaire circulated to the students for data collection. Five categories of questionnaires were distributed. The formats of these are given below. Survey forms used for the auditing Green Auditing.

The following are the survey forms used for the Green Auditing in the Madura college, Madurai.

3.3.2. **Survey for auditing Green Campus management**

1.	Is there a garden in your college? Area?	
2.	Do students spend time in the garden?	
3.	List the plants in the garden, with approx. numbers of each species.	
4.	List the species planted by the students, with numbers.	
5.	Whether you have displayed scientific names of the trees in the campus?	
6.	Are there any plantations in your campus? If yes specify area and type of plantation.	
7.	Is there any vegetable garden in your college? If yes how much area?	
8.	Is there any medicinal garden in your college? If yes how much area?	
9.	How much water is used in the vegetable garden and other gardens? Mention the source and quantity of water used.	
10.	Who is in-charge of gardens in your college?	
11.	Whether you are using any type of recycled water in your garden?	
12.	List the name and quantity of pesticides and fertilizers used in your gardens?	
13.	Do you have any composting pit in your college? If yes What are you doing with the compost generated?	
14.	What are you doing with the vegetables harvested? Do you have any student market?	
15.	Is there any botanical garden in your campus? If yes give the details of campus flora.	
16.	Name number and names of the medicinal plants in your college campus	
17.	Any threatened plant species planted/conserved.	
18.	Is there a nature club in your college? If yes what are their activities?	
19.	Is there any arboretum in your college? If yes details of the trees planted.	

20.	Are there any fruit yielding plants in your college? If yes details of the trees planted.	
21.	Are there any groves in your college? If yes details of the trees planted.	
22.	Is there any irrigation system in your college?	
23.	What is the type of vegetation in the surrounding area of the college?	
24.	Share your IDEAS for further improvement of green cover.	

3.3.3. **Survey form for auditing waste management**:

1.	What is the total strength of students, teachers and Non-teaching staff in your College?	
2.	Which of the following are available in your College? Give area occupied and number	
	Garden area	
	Garbage dump (number)	
	Playground area	
	Laboratory	
	Canteen	
	Toilets (number)	
	Car/scooter shed area	
	Number of class rooms	
	Office rooms	
	Others (specify)	
3.	Does your college generate any waste? If so, what are they? How much quantity? Number or weight	
	Solid waste	
	Liquid waste	
	Canteen waste	
	E-waste	
	Hazardous waste (toxic)	
	Glass Unused equipment	

	Medical waste if any	
	Others specify	
4.	Is there any waste treatment system in the college?	
5.	Is there any treatment for toilet/urinal/sanitary napkin waste?	
6.	What is the approximate amount of waste generated per day? (in Kilograms) (approx.) Biodegradable non-biodegradable	
7.	How is the waste generated in the college managed? Methods - Composting, Recycling, Reusing, others, specify	
8.	Do you use recycled paper in College?	
9.	Can you achieve zero garbage in your college? (Reduce, Recycle, Reuse, Refuse) If yes, how?	

Chapter – IV

GREEN DIVERSITY OF THE CAMPUS

4.1. 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**

4.2. **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

4.3. 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

4.4. **Lis of** m**edicinal 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	Medicina
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

4.5. **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

22.	*Setaria italica* (L.) P. Beauv.	Poaceae	Ottampul	Fodder
23.	*Setaria verticillate* (L.) P. Beauv.	Poaceae	Ottrampul	Fodder
24.	*Trachys muricata* (L.) Pers.	Poaceae		Fodder
25.	*Iscahne miliacea* Roth	Poaceae		Fodder
26.	*Arndropogon pumilus* Roxb.	Poaceae		Fodder
27.	*Apluda mutica* L.	Poaceae	Mugilpul	Fodder
28.	*Chrysopogon asper* Blatt. & McCann	Poaceae	Ooskattaipul	Fodder
29.	*Heteropogon contortus* (L.) P. Beauv.	Poaceae	Thriugampul	Fodder
30.	*Dimeria fuscescens* Trins	Poaceae		Fodder
31.	*Mnesithea laevis* (Retz.) Kunth.	Poaceae		Fodder
32.	*Cyperus rotundus* L.	Cyperaceae	Poongorai	Fodder
33.	*Cyperus dubius* Rottb.	Cyperaceae	Injikorai	Fodder

4.6. **Review of green auditing reports**

Documents such as water charge remittance bills, laboratory equipment registers, purchase register, and stock registers were examined and data was collected. College calendars, IIIrd phase NAAC self-assessment reports were also verified as part of data collection.

Review policies: Discussions were made with the college governing council members and with the Principal regarding policies on environmental management. The college is very keen in bringing green practices in order to make an environment friendly centre for learning and research. The management is eager to understand the measures practised in greening of campus, disposal of hazardous waste and better waste disposal or recycling methods possible. The management is keen in installation of renewable energy sources and hence bring down the excessive cost and wastage of financial resources.

Prominent flowering trees of the Madura College campus

4.7. **Waste generating points**:

The waste generation and disposal wastes cannot be avoided in any environment. Wastes can be classified as biodegradable and non-biodegradable wastes. Biodegradable wastes include food wastes; which can be easily decomposed by the bacteria in soil. But non-biodegradable wastes are those which cannot be degraded by any organism and remain as such for many years.

Canteen: The food waste generated from the canteen is to be collected and given to vermi compost unit. Plastic waste is generally less generated from the canteen. The plastic waste to be kept at blocks of the vermicompost compound wall.

Library: The most generated waste is paper waste. It is taken for recycling.

Office: Paper waste generated are to be recycled and reused.

Garden: Plastic and paper waste is comparatively less. Fallen leaves are collected and reused in vermicompost unit

Auditorium: The wastes are collected after each programme and dumbed it.

Bathroom: The wastes are collected and burned in an incinerator.

Classrooms: Paper wastes are collected in the waste basket and to be recycled.

Laboratory: The broken glass wastes and the useless instruments are disposed for recycling after thorough washing.

College Premises: Plastic waste generated is usually less. But paper waste is generated in a larger amount.

4.8. **Follow up actions and plans**

Green Audits are exercises which generate considerable quantities of valuable environment and resource management information. The time and effort and cost involved in this exercise is often considerable and in order to be able to justify this expenditure, it is important to ensure that the findings and recommendations of the audit are considered at the correct level within the organisation and action plans and implementation programmes based on the audit findings.

Audit follow up is part of the wider process of continuous improvement. Without follow up, the audit becomes an isolated event which soon becomes forgotten in the pressures of organisational priorities and the passing of time.

The following environmental education programmes may be implemented in the college before the next green auditing:

- Training programmes in solid waste management, liquid waste management, setting up of biodiversity garden, tree management, medicinal plant nursery, green house conservatum, butterfly garden, vegetable cultivation, landscape management, pollution mitigation methods, and water filtration methods.
- Display of environmental awareness board such as – Save water, save electricity, No wastage of food/water, no smoking, switch off light and fan after use, plastic free campus etc.,
- Give priority to environmental clubs and its programmes.

- Set up model rainwater harvesting system, vegetable garden, medicinal plant garden, butterfly garden etc,
- Conduct exhibition on throw away plastic danger, recyclable products etc.
- Display various slogans and pictures to protect environment.
- Different coloured waste bins to segregate waste and its easy collection.

4.9. **Consolidation of audit findings**

Green Audit will create a greater appreciation and understanding of the impact of college's actions on the environment. The Madura College have successfully been able to identify the impacts on the environment through the various auditing exercises. The green auditing exercise have brainstormed and provide insights on practical ways to reduce negative impact on the environment. Participating in this green auditing procedure have gained knowledge about the need of sustainability of the college campus. It will create awareness around the use of the Earth's resources in your home, college, local community and beyond. The Madura College should adopt an Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.

Chapter - V

CONCULSION AND RECOMMENDATIONS

Green Audit is the most efficient way to identify the strength and weakness of environmentally sustainable practices and to find a way to solve problem. Green Audit is one kind of professional approach towards a responsible way in utilising economic, financial, social and environmental resources. Green audits can "add value" to the management approaches being taken by the college and is a way of identifying, evaluating and managing environmental risks. There is scope for further improvement, particularly in relation to biodiversity, waste, energy and water management. The college in recent years consider the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the college does perform fairly well, the recommendations in this report highlight many ways in which the college can work to improve its actions and become a more sustainable institution.

5.1 **Suggestions**

Some of the very important suggestions are:

i) Adopt the proposed Environmentally Responsible Purchasing Policy, and work towards creating and implementing a strategy to reduce the environmental impact of its purchasing decisions.

ii) Increase waste recycling education on campus.

iii) Increase Awareness of Environmentally Sustainable Development- Use every opportunity to raise public, government, industry, foundation, and university awareness by openly addressing the urgent need to move toward an environmentally sustainable future.

iv) Educate for Environmentally Responsible Citizenship - Establish programs to produce expertise in environmental management, sustainable economic development, population, and related fields to ensure that all university graduates are environmentally literate and have the awareness and understanding to be ecologically responsible citizens.

v) Practice Institutional Ecology - Set an example of environmental responsibility by establishing institutional ecology policies and practices of resource conservation, recycling, waste reduction, and environmentally sound operations.

vi) Involve All Stakeholders- Encourage involvement of government, foundations, and industry in supporting interdisciplinary research, education, policy formation, and information exchange in environmentally sustainable development. Expand work with community and nongovernmental organizations to assist in finding solutions to environmental problems.

vii) Collaborate for Interdisciplinary Approaches- Convene university faculty and administrators with environmental practitioners to develop interdisciplinary approaches to curricula, research initiatives, operations, and outreach activities that support an environmentally sustainable future.

viii) Increase reduce, reuse, and recycle education on campus.

5.2 **Recommendations**

i. Installation vermicompost unit, Biogas plant and mushroom cultivation units for recycling of biodegradable wastes.

ii. Installation of Incinerators to dispose sanitary napkins

iii. Dig sufficient rain water pits in the 46 acres campus wherever possible and maintain it regularly.

iv. Set up water recycling unit where the recycled water can be used for gardening in college and canteen.

v. Grow up vegetable garden and medicinal garden and gradually develop it as a nursery.

vi. Develop a butterfly garden that arouse appreciation towards flora and fauna diversity.

vii. Name all the trees and plants with its common name and scientific name with displays attached.

viii. Display boards of check list of flora and fauna diversity of the campus to generate enthusiasm for learners.

ix. Layout 'Green Chemistry' that reduces or eliminates the use or generation of hazardous substances in the design, manufacture and application of chemical products.

x. Organize earn while learn eco-friendly programmes

xi. Conduct exhibitions for parents and public on environment and sustainable practices.

xii. Arrange training programmes on environmental management system and nature conservation.

xiii. Declare the campus plastic free and implement it thoroughly.

xiv. Adopt an environment policy for the college.

xv. Establish an E-waste collection centre in campus.

xvi. Ensure participation of students and teachers in local environmental issues.

xvii. Renovation of cooking system in the canteen to save gas.

xviii. Establish a purchase policy that is energy saving and eco-friendly.

xix. Conduct seminars, workshops and exhibitions on environmental education.

xx. Avoid plastic/thermocol plates and cups in the college level or department level functions.

xxi. Introduce add-on courses eco-friendly income generating to all interested students.

Chapter – VI

CERTIFICATION

Department Of Botany
Madras Christian College (Autonomous)
Tambaram, Chennai – 600 059

Lt. Dr. P. Selva Singh Richard
Assistant Professor

CERTIFICATE

This is to certify that **The Madura College** (Autonomous), Madurai has conducted **GREEN AUDIT** of their campus and has submitted necessary data and credentials for scrutiny. The activities and measures carried out by the college have been verified based on the report submitted and was found to be **satisfactory**. The effort taken by the faculty and students towards environment and sustainability is highly appreciated and commendable.

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