

GREEN AUDIT REPORT
of
SIPNA SHIKSHAN PRASARAK MANDAL AMRAVATI'S
Arts Science & Commerce College,
Chikhaldara



Year: 2022-23

Prepared by

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ISO: 14001-2015 Certified (Cert No: 23EEKW20)

GREEN AUDIT CERTIFICATE

Certificate No: ES/SSPMAASCCC/22-23/02

Date: 23/6/2023

This is to certify that we have conducted Green Audit at Sipna Shikshan Prasarak Mandal Amravati's Arts, Science & Commerce College, Upper Plateau Chikhaldara 444807, in the year 2022-23.

The College has adopted following Green Initiatives:

- Usage of Energy Efficient LED Light Fitting
- Maximum Usage of Day Lighting
- Segregation of Waste at source
- Provision of Bio Composting Bed
- Implementation of Rain Water Harvesting Project
- Maintenance of Good Internal Road
- Internal Tree Plantation
- Provision of Ramp for Divyangjan
- Creation of Awareness on Swatcchh & Swastha Bharat by Display of Poster
- Cleanliness Drive under National Service Scheme
- Tree Plantation Drive in the Campus

We appreciate the support of Management, involvement of faculty members and students in the process of Energy Conservation & making the campus Green.

For Engress Services,

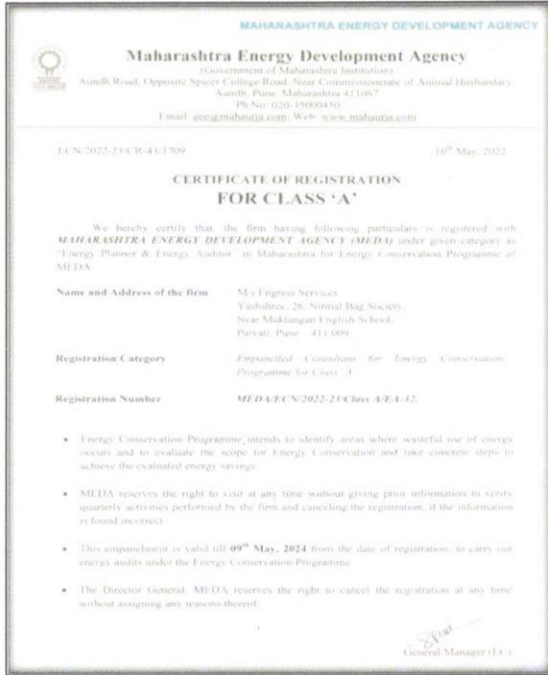


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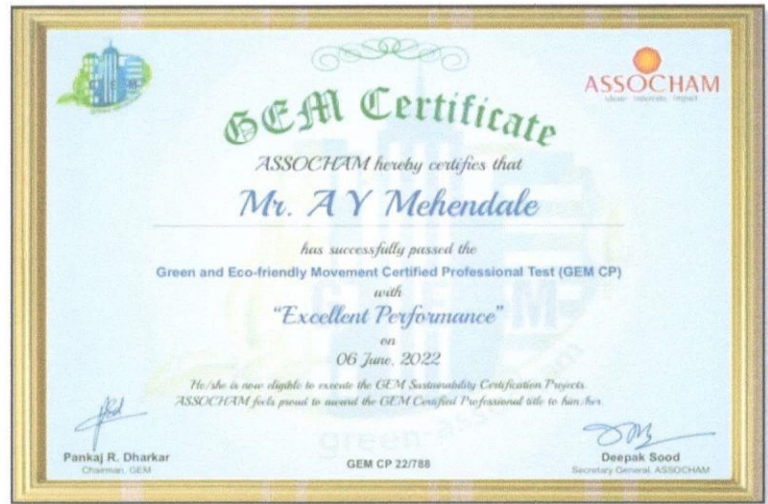
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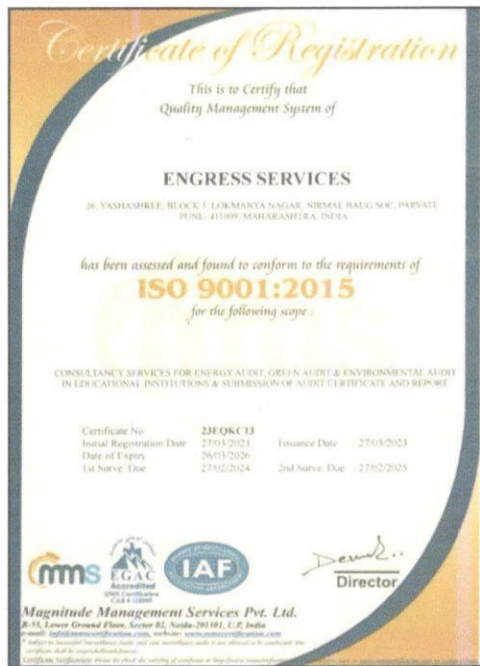
REGISTRATION CERTIFICATES



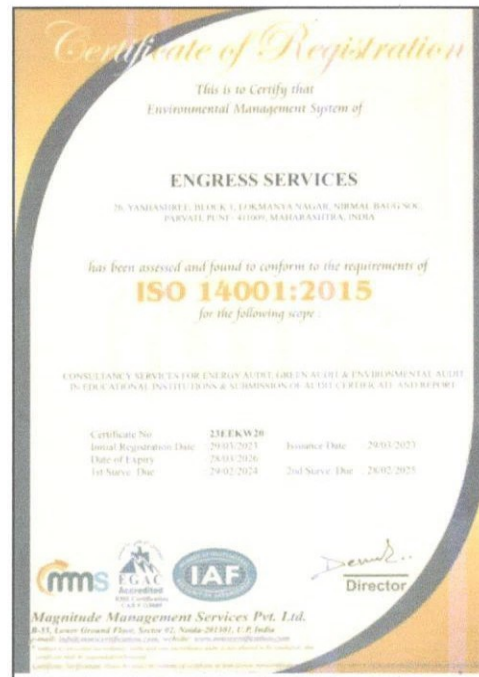
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ISO: 14001-2015 Certificate



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ACKNOWLEDGEMENT

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We are thankful to all faculty members and staff members for helping us during the field study.



EXECUTIVE SUMMARY

1. Sipna Shikshan Prasarak Mandal Amravati's Arts Science & Commerce College, Chikhaldara 444 807 consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

2. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Annual Energy Consumed	7440	kWh
2	Annual CO ₂ Emissions	6.70	MT

3. Usage of Renewable Energy:

- The College has yet to install Roof Top Solar PV Plant.

4. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Bio Composting Arrangement in place
3	Chemical Liquid Waste Management	Provision of Soak Pit
4	E Waste Management	Recommended to dispose through Authorized Agency

5. Rain Water Harvesting:

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.

6. Green & Sustainable Initiatives:

- Maintenance of good Internal Road & Internal Tree Plantation
- Provision of Ramp for Divyangajan
- Display of Poster on Swatcchh & Swastha Bharat
- Cleanliness Drive under National Service Scheme
- Tree Plantation Drive in the Campus

7. Assumption:

- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

8. Reference:

- For CO₂ Emissions: www.tatapower.com

ABBREVIATIONS

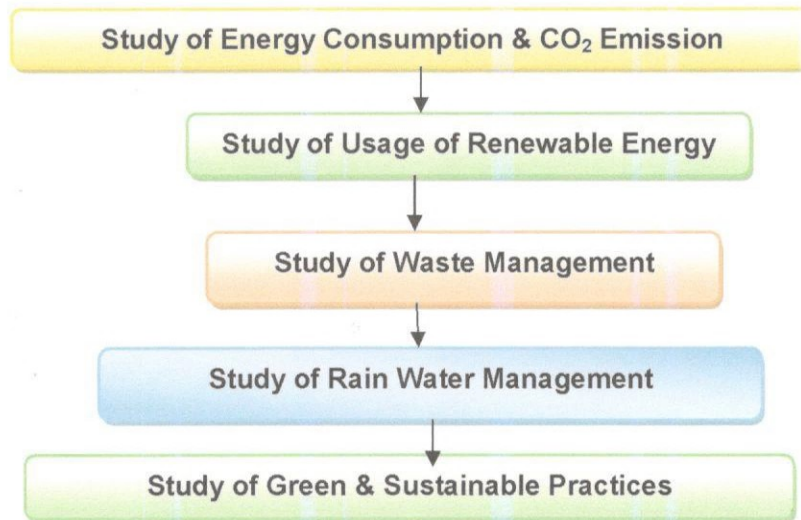
SSPM	Sipna Shikshan Prasarak Mandal
kWh	Kilo Watt Hour
LED	Light Emitting Diode
Kg	Kilo Gram
MT	Metric Ton
CO ₂	Carbon Di Oxide
Qty	Quantity

CHAPTER-I INTRODUCTION

1.1 Introduction:

A Green Audit is conducted at Sipna Shikshan Prasarak Mandal Amravati's Arts, Science & commerce college, Upper Plateau, Chikhaldara.

1.2 Audit Procedural Steps:



1.3 College Location Image:



College Campus

CHAPTER-II

STUDY OF ENERGY CONSUMPTION & CO₂ EMISSION

A Carbon Foot print is defined as the Total Greenhouse Gas emissions, emitted due to various activities. In this we compute the emissions of Carbon-Di-Oxide, by usage of the various forms of Energy used by the College for performing its day to day activities

The College uses Electrical Energy for various Electrical gadgets.

Basis for computation of CO₂ Emissions:

The basis of Calculation for CO₂ emissions due to Electrical Energy is as under

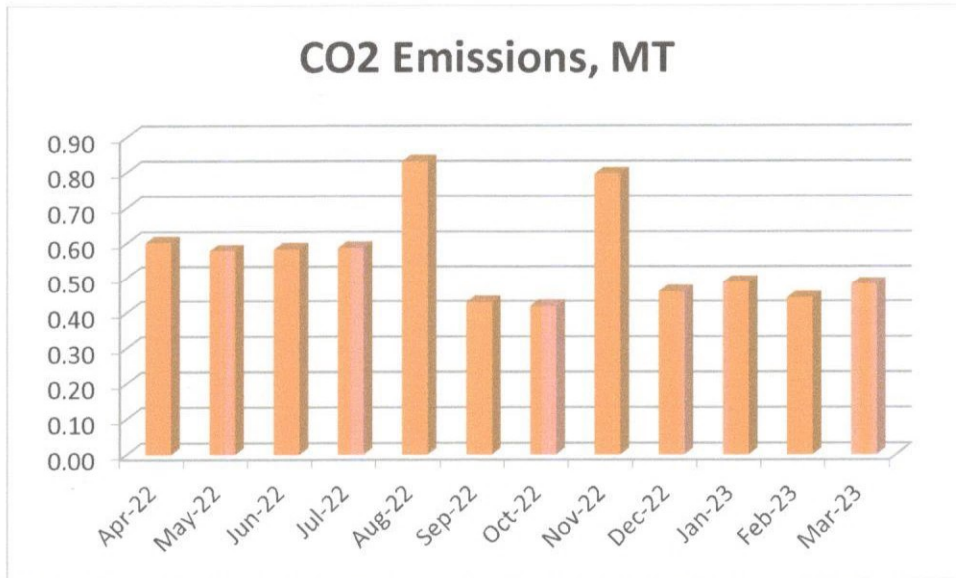
- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

Based on the above Data we compute the CO₂ emissions which are being released in to the atmosphere by the College due to its Day to Day operations

Table No 1: Month wise Energy Consumption & CO₂ Emissions: 22-23:

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Apr-22	668	0.60
2	May-22	642	0.58
3	Jun-22	647	0.58
4	Jul-22	652	0.59
5	Aug-22	924	0.83
6	Sep-22	477	0.43
7	Oct-22	465	0.42
8	Nov-22	885	0.80
9	Dec-22	511	0.46
10	Jan-23	542	0.49
11	Feb-23	492	0.44
12	Mar-23	535	0.48
13	Total	7440	6.70
14	Maximum	924	0.83
15	Minimum	465	0.42
16	Total	620	0.56

Chart No 1: Month wise CO₂ Emissions:



CHAPTER III

STUDY OF USAGE OF RENEWABLE ENERGY

The College has yet to install Roof Top Solar PV Plant.

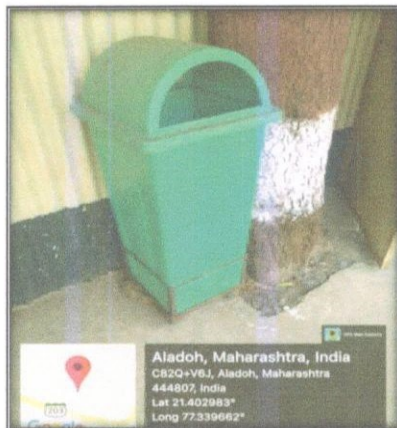


CHAPTER IV STUDY OF WASTE MANAGEMENT

4.1 Segregation Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source. Waste Bins are kept at various locations.

Photograph of Waste Collection Bin:



4.2 Organic Waste Management:

The Bio degradable waste like leafy waste is composted in a Bio Composting Bed.

Photograph of Bio Composting Bed:



4.3 Liquid Waste Management:

For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to a soak Tank which contains layers of sand and activated carbon.

Photograph of Liquid Waste Soak Tank arrangement:



Soak Pit

4.4 E Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.



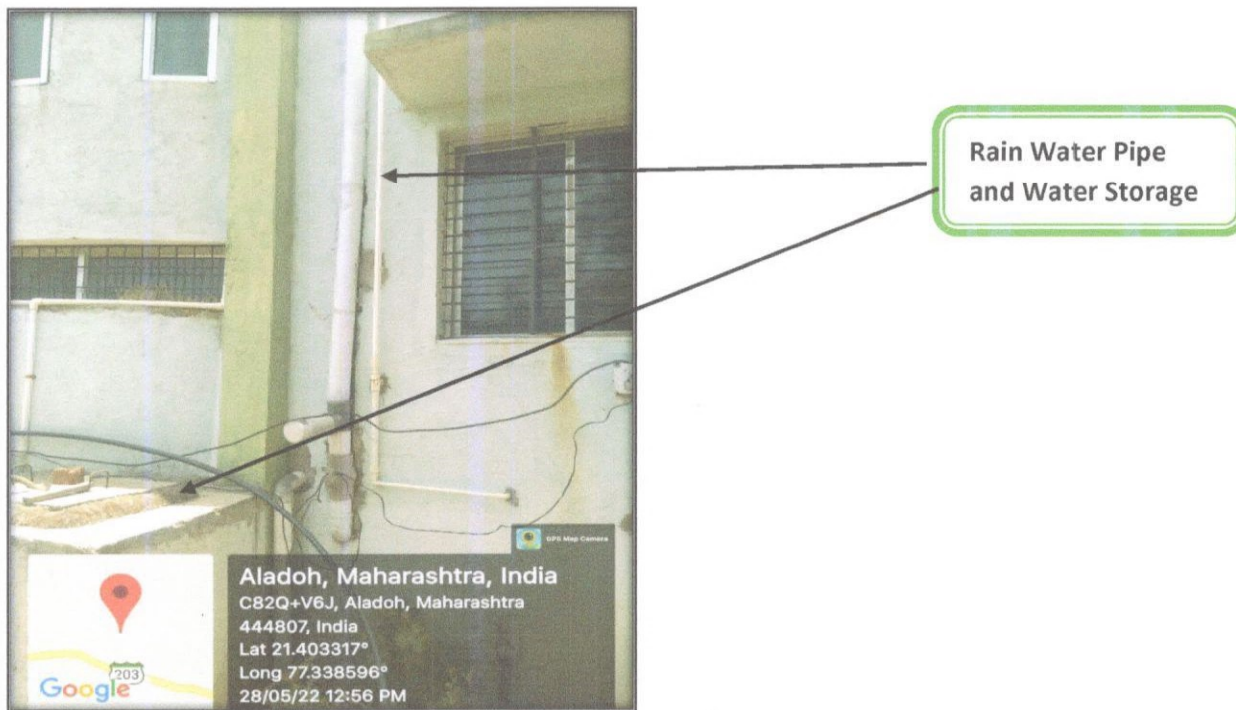
CHAPTER-V STUDY OF RAIN WATER HARVESTING

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.

Water Storage Tank Details:

- Area of Tank: 1939 sq. ft.
- Tank Height: 2 meters
- Water Storage Capacity: 360400 Liters

Photograph of Rain Water Storage Tank Facility:



The Water is used for Girls Hostel & for Gardening purpose.

CHAPTER-VI STUDY OF GREEN & SUSTAINABLE PRACTICES

6.1 Pedestrian Friendly Roads:

The College has well maintained internal road to facilitate the easy movement of the students within the campus.

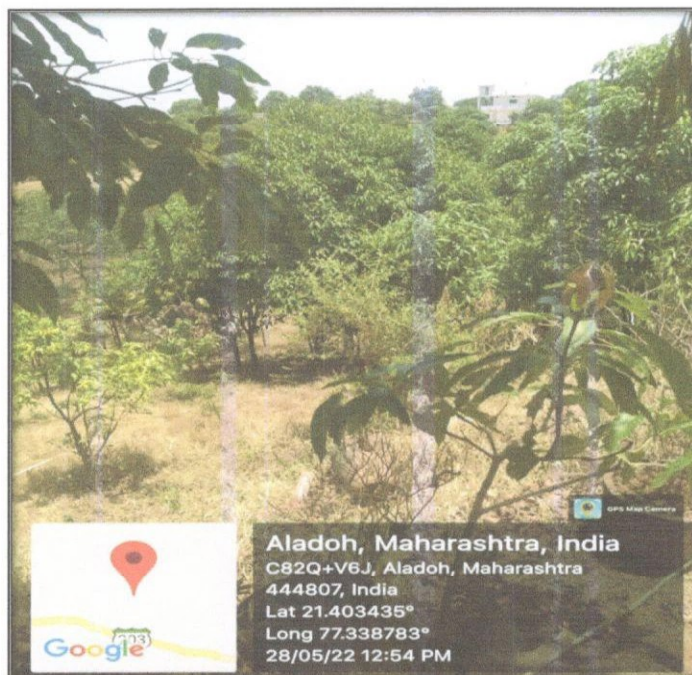
Photograph of Internal Road:



6.2 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

Photograph of Tree plantation:



6.3 Provision of Ramp:

For easy movement of Divyangjan, the College has made provision of Ramp.

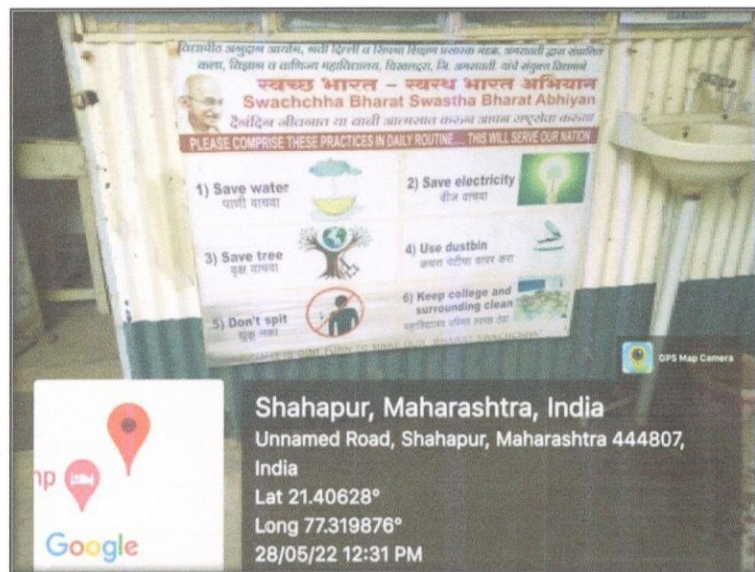
Photograph of Ramp:



6.4 Creation of Awareness on Swatcchh & Swastha Bharat Abhiyan:

The College is creating awareness on importance of Cleanliness, Hygiene and Good Health under the Swatcchh & Swastha Bharat Abhiyan.

Photograph of Poster on Swatcchh & Swastha Bharat Abhiyan:



6.5 Cleanliness Drive:

The College arranged Cleanliness Drive under National Service Scheme.

Photograph of Cleanliness Drive:



6.5 Tree Plantation Drive:

The College arranged Tree Plantation Drive in the College Campus.

Photograph of Tree Plantation Drive:



ANNEXURE-1: LIST OF TREES:

The total Area under Tree Plantation is about 1.5 Acres.

List of Trees:

No	Name of Tree
1	Corkball
2	Wild arecanut
3	Jackfruit
4	Boat
5	Habit
6	Kapok
7	Gulmohor
8	Banyan
9	Fig
10	SilverOak
11	Yellow Flameboyant
12	Frangipani
13	Date Palm
14	Ashoka
15	Beech
16	Guava
17	Sandalwood
18	Mahagony
19	Jambolin
20	Silver Trumpet
21	Carribbean Trumpet
22	Teak
23	Tulip

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ENERGY AUDIT CERTIFICATE

This is to certify that we have conducted Energy Audit at Sipna Shikshan Prasarak Mandal Amravati's Arts, Science & Commerce College, Upper Plateau Chikhaldara 444807, in the Year 2022-23.

The College has adopted following Energy Efficient Practices:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting

We appreciate the support of the Management, involvement of Faculty Members and students in the process of making the campus Energy Efficient.

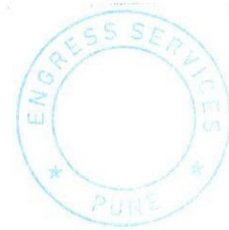
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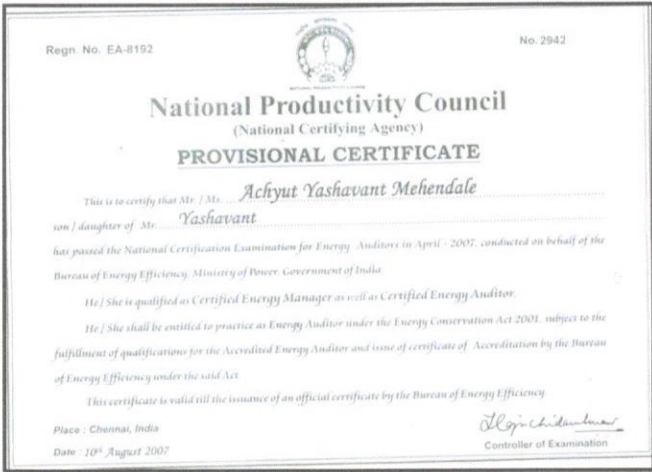
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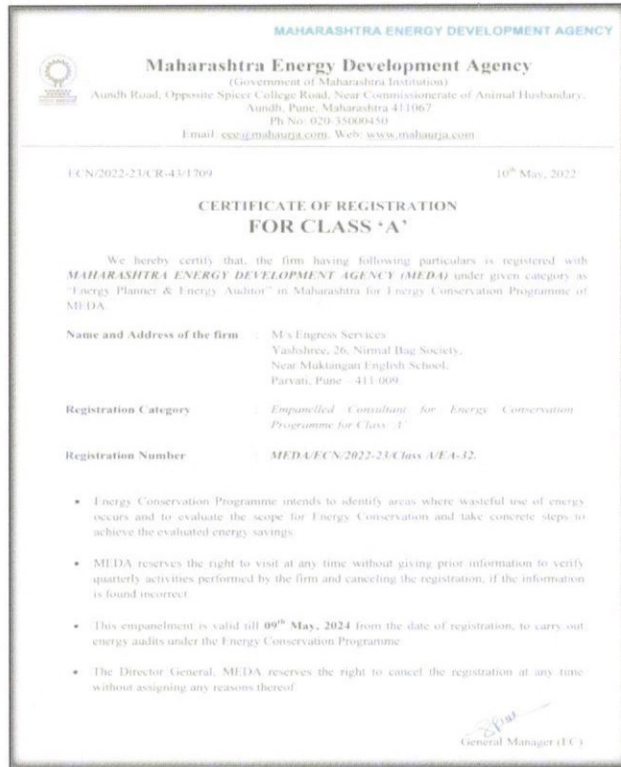
BEE Certified Energy Auditor, EA-8192



REGISTRATION CERTIFICATES



AUDITOR CERTIFICATE



MEDA REGISTRATION CERTIFICATE



ISO: 9001-2015 CERTIFICATE



ISO: 14001-2015 CERTIFICATE



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EXECUTIVE SUMMARY

1. Sipna Shikshan Prasarak Mandal Amravati's Arts Science & Commerce College, Chikhaldara 444 807 consumes Energy in the form of **Electrical Energy**; used for various gadgets, Office & other facilities.

2. Present Connected Load & Annual Energy Consumption:

No	Particulars	Value	Unit
1	Total Connected Load	49	kW
2	Annual Energy Consumed	7440	kWh

3. Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	7440	kWh
2	Total Built up area of College	1500	m ²
3	Energy Performance Index =(1) / (2)	4.96	kWh/m ²

4. Study of % Usage of LED Lighting:

No	Particulars	Value	Unit
1	% of Usage of LED Lighting to Total Lighting Load	35	%

5. Renewable Energy & Energy Efficiency Projects:

- Usage of Energy Efficient LED fittings
- Maximum Usage of Day Lighting

6. Assumption:

1. **1 kWh** of Electrical Energy releases **0.9 Kg** of CO₂ into atmosphere

7. References:

- Audit Methodology: www.mahaurja.com
- Energy Conservation Building Code: ECBC-2017: www.beeindia.gov.in
- For CO₂ Emissions: www.tatapower.com

ABBREVIATIONS

SSPM	:	Sipna Shikshan Prasarak Mandal
MSEDCL	:	Maharashtra State Electricity Distribution Company Limited
FTL	:	Fluorescent Tube Light
LED	:	Light Emitting Diode
kWh	:	kilo-Watt Hour
Qty	:	Quantity
W	:	Watt
PC	:	Personal Computer
MT	:	Metric Ton

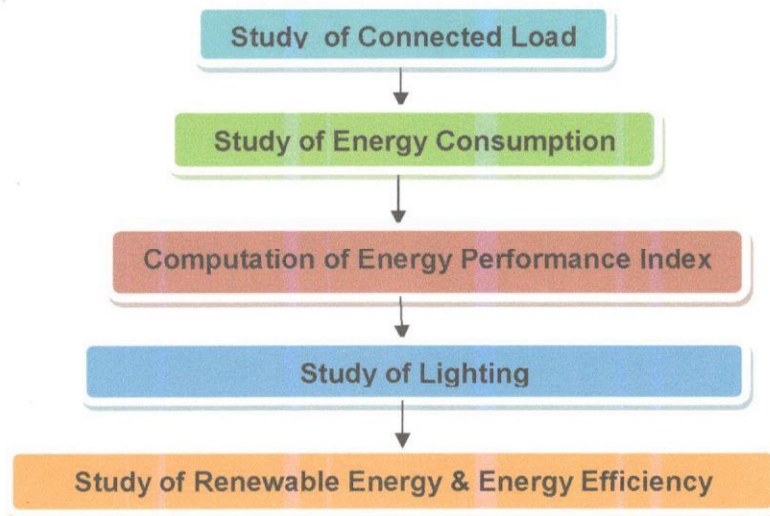
CHAPTER-I INTRODUCTION

1.1 Introduction:

An Energy Audit is conducted at Sipna Shikshan Prasarak Mandal Amravati's Arts, Science & commerce college, Upper Plateau, Chikhaldara. The guidelines followed for conducting the Energy Audit are:

- BEE India's Energy Conservation Building Code: ECBC-2017
- Maharashtra Energy Development Agency (www.mahaurja.com)
- Tata Power: www.tatapower.com

1.2 Audit Procedural Steps:



1.3 College Location Image:



College
Campus

CHAPTER-II

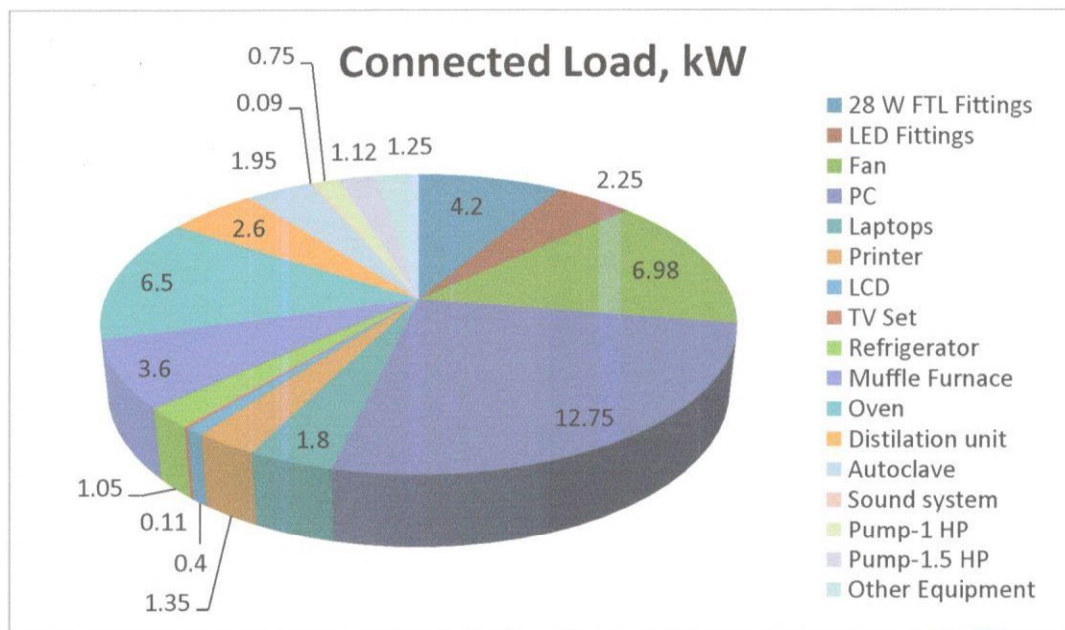
STUDY OF CONNECTED LOAD

In this chapter, we present the details of various Electrical loads as under

Table No 1: Equipment wise Connected Load:

No	Equipment	Qty	Load, W/Unit	Load, kW
1	28 W FTL Fittings	150	28	4.2
2	LED Fittings	150	15	2.25
3	Fan	97	72	6.98
4	PC	85	150	12.75
5	Laptops	20	90	1.8
6	Printer	9	150	1.35
7	LCD	4	100	0.4
8	TV Set	2	55	0.11
9	Refrigerator	3	350	1.05
10	Muffle Furnace	5	720	3.6
11	Oven	10	650	6.5
12	Distillation unit	4	650	2.6
13	Autoclave	3	650	1.95
14	Sound system	1	85	0.09
15	Pump-1 HP	1	746	0.75
16	Pump-1.5 HP	1	1119	1.12
17	Other Equipment	5	250	1.25
18	Total			49

Chart No 1: Details of Connected Load:



CHAPTER-III

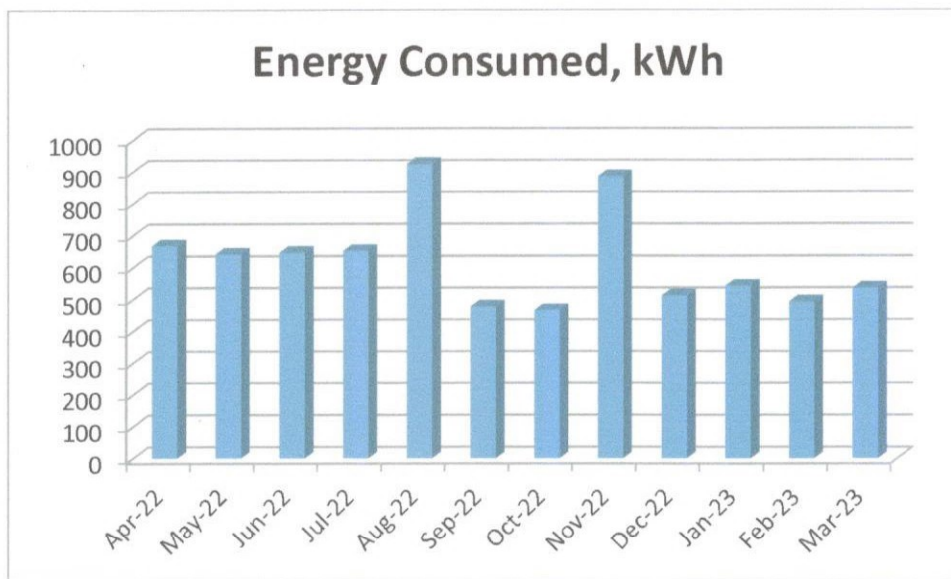
STUDY OF ELECTRICAL ENERGY CONSUMPTION

In this chapter, we present the analysis of last year Electricity Bills.

Table No 2: Electrical Bill Analysis- 2022-23:

No	Month	Energy Consumed, kWh	CO2 Emissions, MT
1	Apr-22	668	0.60
2	May-22	642	0.58
3	Jun-22	647	0.58
4	Jul-22	652	0.59
5	Aug-22	924	0.83
6	Sep-22	477	0.43
7	Oct-22	465	0.42
8	Nov-22	885	0.80
9	Dec-22	511	0.46
10	Jan-23	542	0.49
11	Feb-23	492	0.44
12	Mar-23	535	0.48
13	Total	7440	6.70
14	Maximum	924	0.83
15	Minimum	465	0.42
16	Total	620	0.56

Chart No 2: To study the variation of Month wise Energy Consumption, kWh:



CHAPTER-IV

STUDY OF ENERGY PERFORMANCE INDEX

Energy Performance Index: Energy Performance Index of a Building is its Annual Energy Consumption in Kilo Watt Hours per square meter of the Building

It is determined by:

$$\text{EPI} = \frac{\text{(Annual Energy Consumption in kWh)}}{\text{(Total Built-up area in m}^2\text{)}}$$

Now we compute the EPI for the College as under:

Table No 3: Computation of Energy Performance Index:

No	Particulars	Value	Unit
1	Total Annual Energy Consumed	7440	kWh
2	Total Built up area of College	1500	m ²
3	Energy Performance Index =(1) / (2)	4.96	kWh/m ²

CHAPTER-V

STUDY OF LIGHTING

Terminology:

1. **Lumen** is a unit of light flow or luminous flux. The lumen rating of a lamp is a measure of the total light output of the lamp. The most common measurement of light output (or luminous flux) is the lumen. Light sources are labeled with an output rating in lumens.

2. **Lux** is the metric unit of measure for illuminance of a surface. One lux is equal to one lumen per square meter.

3. **Circuit Watts** is the total power drawn by lamps and ballasts in a lighting circuit under assessment.

4. **Installed Load Efficacy** is the average maintained illuminance provided on a horizontal working plane per circuit watt with general lighting of an interior. Unit: lux per watt per square metre (lux/W/m^2)

5. **Lamp Circuit Efficacy** is the amount of light (lumens) emitted by a lamp for each watt of power consumed by the lamp circuit, i.e. including control gear losses. This is a more meaningful measure for those lamps that require control gear. Unit: lumens per circuit watt (lm/W)

6. **Installed Power Density.** The installed power density per 100 lux is the power needed per square meter of floor area to achieve 100 lux of average maintained illuminance on a horizontal working plane with general lighting of an interior

Unit: watts per square meter per 100 lux ($\text{W/m}^2/100 \text{ lux}$) 100 Installed power density ($\text{W/m}^2/100 \text{ lux}$)

7. **Lighting Power Density:** It is defined as Total Lighting Load in a room divided by the Area of that Room in square meters.

In this Chapter we compute the percentage usage of LED Lighting to total Lighting Load of the College.

Now, we compute the usage of LED Lighting to Total Lighting Load, as under.

Table No 4: Percentage Usage of LED Lighting to Total Lighting Load:

No	Particulars	Value	Unit
1	No of 28 W FTL Fittings	150	Nos
2	Demand of FTL Fitting	28	W/Unit
3	Total Demand of FTL Fittings	4.2	kW

4	No of 15 W LED Fittings	150	Nos
5	Demand of 18 W LED Fitting	15	W/Unit
6	Total Demand of 18 W LED Fittings	2.25	kW
7	Total Lighting Load= 3+6	4.2	kW
8	Total LED Lighting Load= 6	2.25	kW
9	% of LED Lighting to Annual Lighting Load= $(8)*100/(7)$	35	%



CHAPTER-VI

STUDY OF RENEWABLE ENERGY & ENERGY EFFICIENCY

6.1 Usage of Renewable Energy:

- The College has yet to install Roof Top Solar PV Plant

6.2 Energy Efficiency Measures adopted:

- The College has Energy Efficient LED Fittings.

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- Provision of Bio Composting Bed
- Implementation of Rain Water Harvesting Project
- Internal Tree Plantation
- Creation of Awareness on Swatchh & Swastha Bharat by Display of Poster
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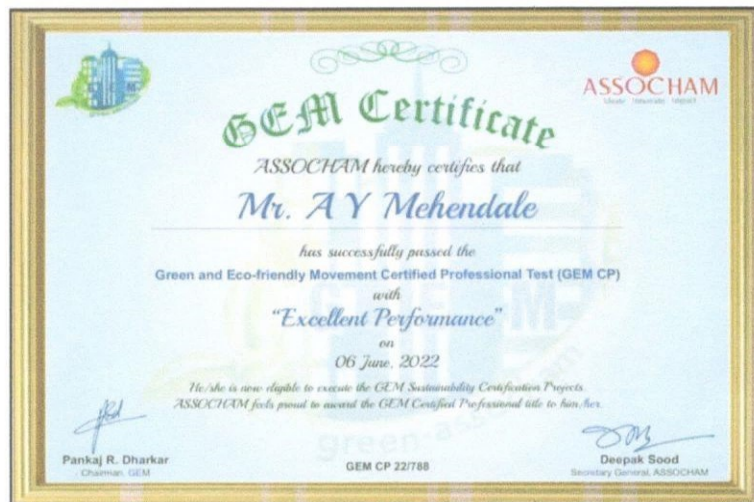
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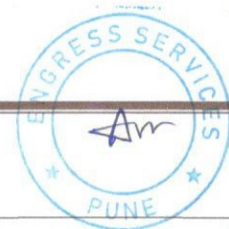
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2. Pollution due to College Activities:

- **Air pollution:** Mainly CO₂ on account of Electricity Consumption
- **Solid Waste:** Bio degradable Garden Waste, Recyclable Waste
- **Liquid Waste:** Human liquid Waste & Laboratory Waste

3. Present Energy Consumption & CO₂ Emission:

No	Particulars	Value	Unit
1	Annual Energy Consumed	7440	kWh
2	Annual CO ₂ Emissions	6.70	MT

4. Renewable Energy:

- The College has yet to install Roof Top Solar PV Plant

5. Indoor Air Quality Parameters:

No	Parameter/Value	AQI	PM-2.5	PM-10
1	Maximum	40	24	31
2	Minimum	36	22	24

6. Indoor Comfort Conditions:

No	Parameter/Value	Temperature, °C	Humidity, %	Lux Level	Noise Level, dB
1	Maximum	28.6	52.1	165	45
2	Minimum	27	51.8	119	39

7. Waste Management:

No	Head	Particulars
1	Solid Waste	Segregation of Waste at source
2	Organic Waste	Bio Composting Arrangement in place
3	Chemical Liquid Waste Management	Provision of Soak Pit
4	E Waste Management	Recommended to dispose through Authorized Agency

8. Rain Water Harvesting:

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.

9. Environment Friendly Initiatives:

- Internal Tree Plantation
- Display of Poster on Swatcchh & Swastha Bharat
- Cleanliness Drive under National Service Scheme
- Tree Plantation Drive in the Campus

10. Assumption:

- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

11. References:

- For CO₂ Emissions: www.tatapower.com
- For indoor Air Quality: www.cpcb.com
- For Various Indoor Air Parameters: www.ishrae.com

ABBREVIATIONS

Kg	:	Kilo Gram
MSEDCL	:	Maharashtra State Distribution Company Limited
MT	:	Metric Ton
kWh	:	kilo-Watt Hour
LPD	:	Liters per Day
LED	:	Light Emitting Diode
AQI	:	Air Quality Index
PM-2.5	:	Particulate Matter of Size 2.5 Micron
PM-10	:	Particulate Matter of Size 10 Micron
CPCB	:	Central Pollution Control Board
ISHRAE	:	The Indian Society of Heating & Refrigerating & Air Conditioning Engineers

CHAPTER-I

INTRODUCTION

1. Important Definitions:

1.1. Environment: Definition as per environment Protection Act: 1986

Environment includes water, air and land and the inter-relationship which exists among and between Water, Air, Land and Human beings, other living creatures, plants microorganism and property

1.2. Environmental Audit: Definition:

An audit which aims at verification and validation to ensure that various environmental laws are compiled with and adequate care has been taken towards environmental protection and preservation

According to UNEP, 1990, "Environmental audit can be defined as a management tool comprising systematic, documented and periodic evaluation of how well environmental organization management and equipment are performing with an aim of helping to regularize the environment"

1.3. Environmental Pollutant: means any solid, liquid and gaseous substance present in the concentration as may be, or tend to be, injurious to Environment.

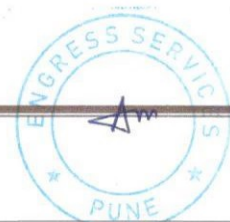
1.4 Audit Procedural Steps:



1.5 College Location Image:



College
Campus



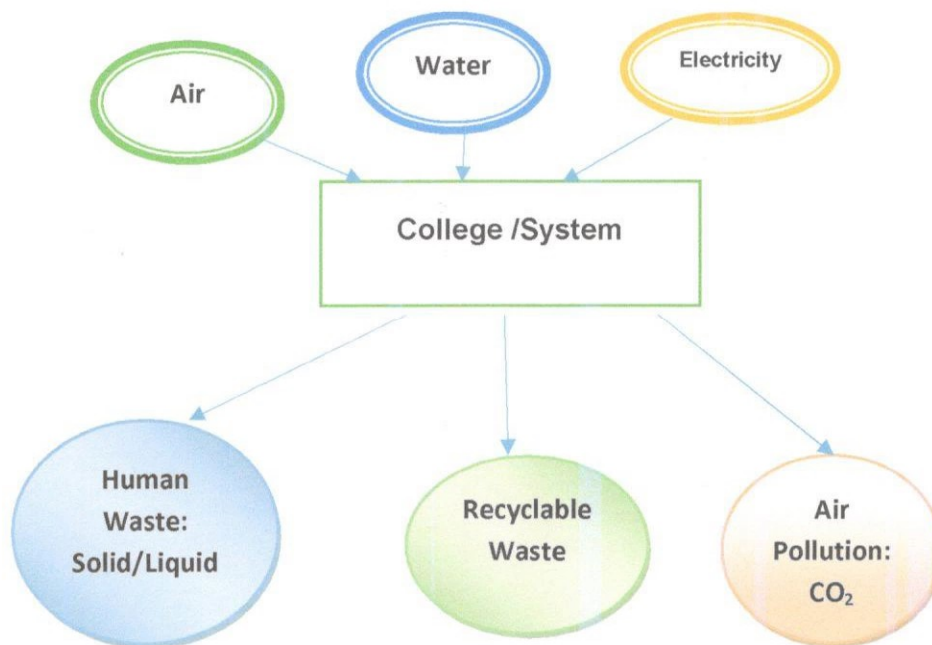
CHAPTER-II STUDY OF RESOURCE CONSUMPTION & CO₂ EMISSION

2.1 The Institute consumes following basic/derived Resources:

1. Air
2. Water
3. Electrical Energy

We try to draw a schematic diagram for the College System & Environment as under.

2.2 Chart No 1: Representation of Institute as a System:



Now we compute the Generation of CO₂ on account of consumption of Electrical Energy. The basis of Calculation for CO₂ emissions due to Electrical Energy are as under

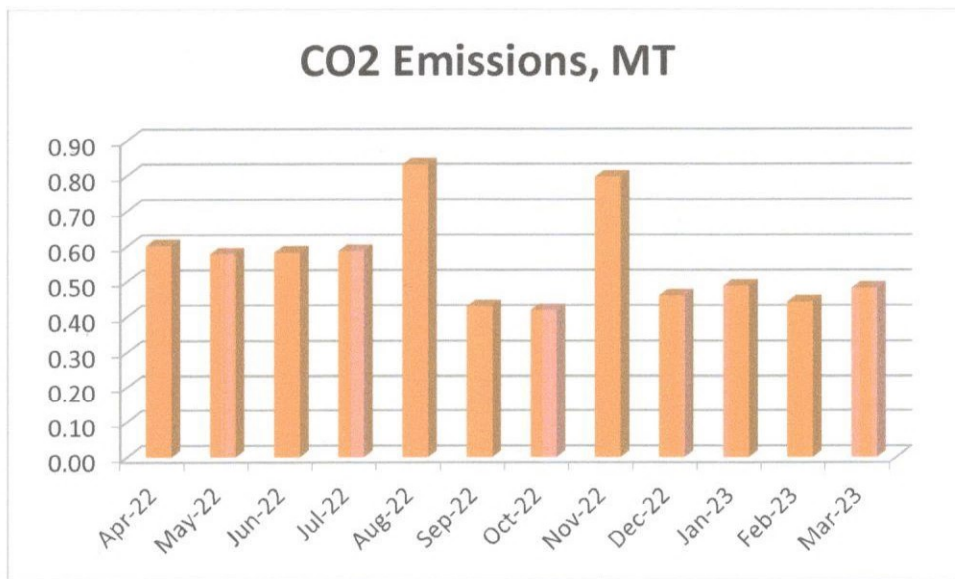
- 1 kWh of Electrical Energy releases 0.9 Kg of CO₂ into atmosphere

Table No 1: Study of Consumption of Electrical Energy & CO₂ Emissions: 22-23:

No	Month	Energy Consumed, kWh	CO ₂ Emissions, MT
1	Apr-22	668	0.60
2	May-22	642	0.58
3	Jun-22	647	0.58
4	Jul-22	652	0.59
5	Aug-22	924	0.83
6	Sep-22	477	0.43
7	Oct-22	465	0.42
8	Nov-22	885	0.80

9	Dec-22	511	0.46
10	Jan-23	542	0.49
11	Feb-23	492	0.44
12	Mar-23	535	0.48
13	Total	7440	6.70
14	Maximum	924	0.83
15	Minimum	465	0.42

Chart No 2: Month wise CO₂Emissions:



CHAPTER III

STUDY OF USAGE OF RENEWABLE ENERGY

The College has yet to install Roof Top Solar PV Plant.



CHAPTER IV

STUDY OF INDOOR AIR QUALITY

4.1 Importance of Air Quality:

Air: The common name given to the atmospheric gases used in breathing and photosynthesis.

By volume, Dry Air contains 78.09% Nitrogen, 20.95% Oxygen, 0.93% Argon, 0.039% carbon dioxide, and small amounts of other gases.

On average, a person inhales about **14,000 liters** of air every day. Therefore, poor air quality may affect the quality of life now and for future generations by affecting the health, the environment, the economy and the city's livability.

Air quality is a measure of the suitability of air for breathing by people, plants and animals.

According to Section 2(b) of Air (Prevention and control of pollution) Act, 1981 'air pollution' has been defined as **'the presence in the atmosphere of any air pollutant.'**

As per Section 2(a) of Air (Prevention and control of pollution) Act, 1981 'air pollutant' has been defined as **'any solid, liquid or gaseous substance [(including noise)] present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment'**

4.2 Air Quality Index:

An **Air Quality Index (AQI)** is a number used by government agencies to measure the **air pollution** levels and communicate it to the population.

We present herewith following important Parameters.

1. AQI- Air Quality Index
2. PM-2.5- Particulate Matter of Size 2.5 micron
3. PM-10- Particulate Matter of Size 10micron

Table No 2: Indoor Air Quality Parameters:

No	Location	AQI	PM 2.5	PM 10
1	Office	36	22	26
2	Env. Science Dept	40	24	29
3	Library	36	22	24
4	Computer Lab	40	24	31
5	Botany Dept	36	22	25
6	Maximum	40	24	31
7	Minimum	36	22	24

CHAPTER V

STUDY OF INDOOR COMFORT CONDITION PARAMETERS

In this Chapter, we present the various Indoor Comfort Parameters measured during the Audit.

The Parameters include:

1. Temperature
2. Humidity
3. Lux Level
4. Noise Level.

Table No 3: Study of Indoor Comfort Condition Parameters:

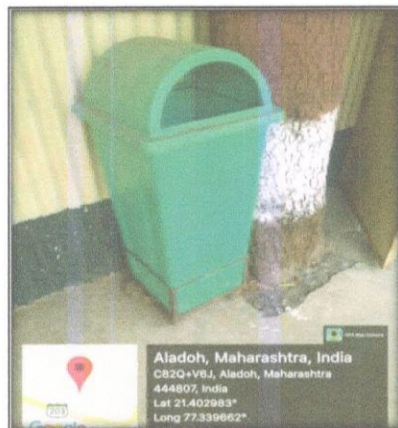
No	Location	Temperature, °C	Humidity, %	LUX Level	Noise Level, dB
1	Office	27	52	127	39
2	Env. Science Dept	27.3	52.1	129	41
3	Library	27.5	51.9	135	43
4	Comp. Lab	28	51.8	165	41
5	Botany Dept	28.6	51.9	119	45
6	Maximum	28.6	52.1	165	45
7	Minimum	27	51.8	119	39

CHAPTER VI STUDY OF WASTE MANAGEMENT

6.1 Segregation Waste at Source:

The recyclable waste, like paper, plastic waste is segregated at source. Waste Bins are kept at various locations.

Photograph of Waste Collection Bin:



6.2 Organic Waste Management:

The Bio degradable waste like leafy waste is composted in a Bio Composting Bed.

Photograph of Bio Composting Bed:

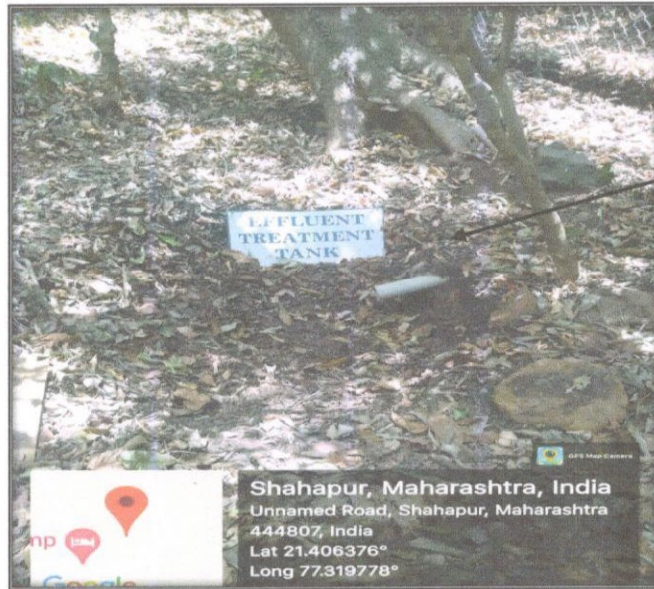


Bio Composting Bed

6.3 Liquid Waste Management:

For treatment of laboratory chemicals, the College has a soak tank wherein the laboratory liquid waste is first mixed with water and then drained to a soak Tank which contains layers of sand and activated carbon.

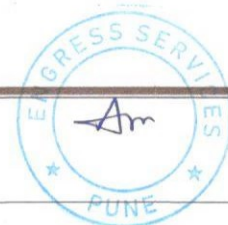
Photograph of Liquid Waste Soak Tank arrangement:



Soak Pit

6.4 E Waste Management:

It is recommended to handover the E Waste through Authorized E-Waste collecting agency.



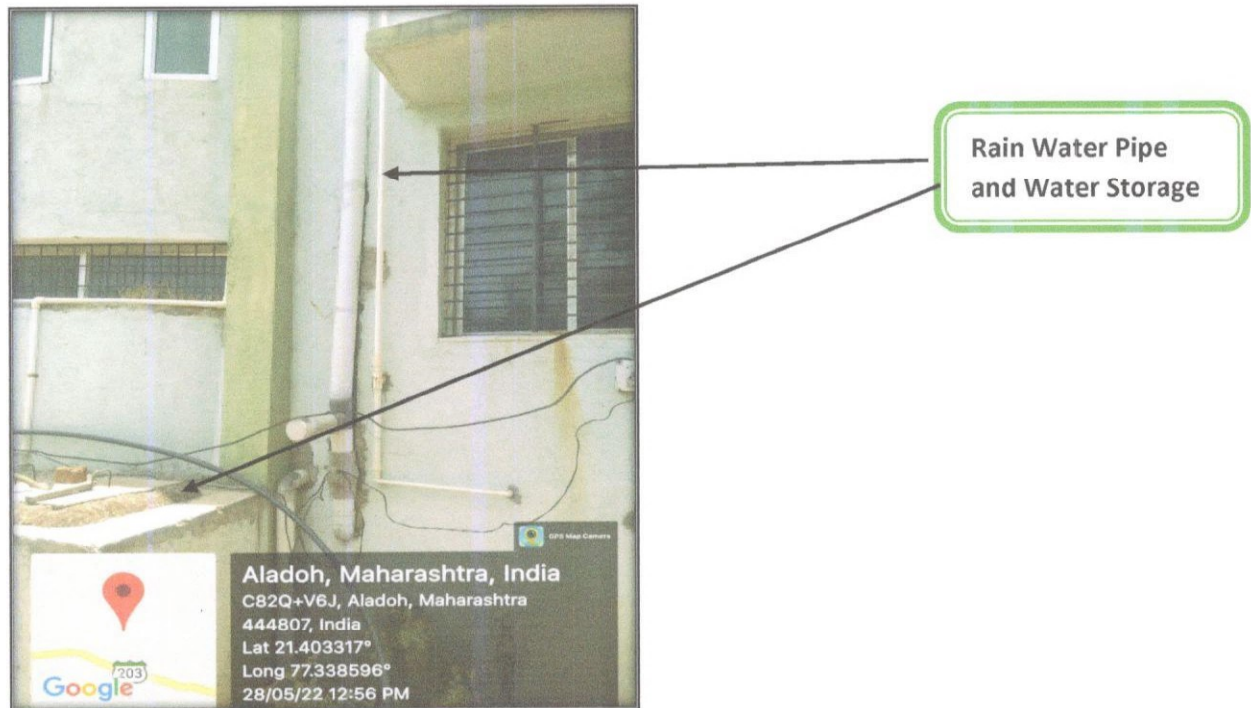
CHAPTER-VII STUDY OF RAIN WATER HARVESTING

The College has installed Rain Water Harvesting Project, wherein the Rain Water falling on the terrace is collected and is stored in a separate Water Storage Tank. The Water is further used for domestic purpose.

Water Storage Tank Details:

- Area of Tank: 1939 sq. ft.
- Tank Height: 2 meters
- Water Storage Capacity: 360400 Liters

Photograph of Rain Water Storage Tank Facility:



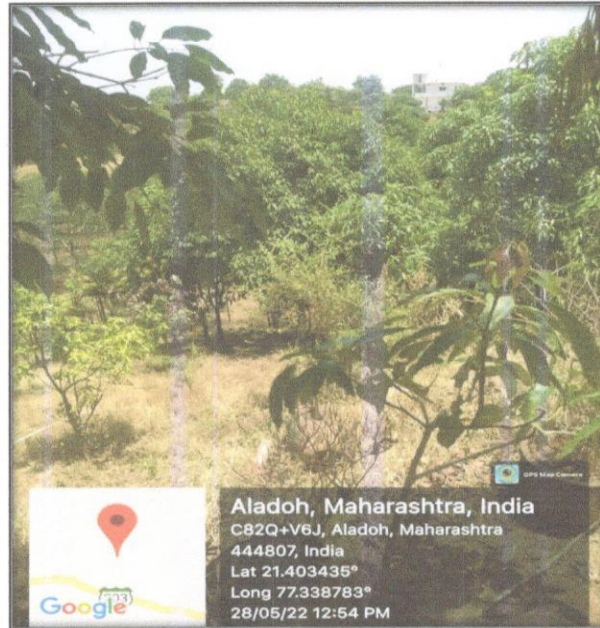
The Water is used for Girls Hostel & for Gardening purpose.

CHAPTER-VIII STUDY OF ENVIRONMENT FRIENDLY INITIATIVES

8.1 Internal Tree Plantation:

The College has well maintained landscaped garden in the campus.

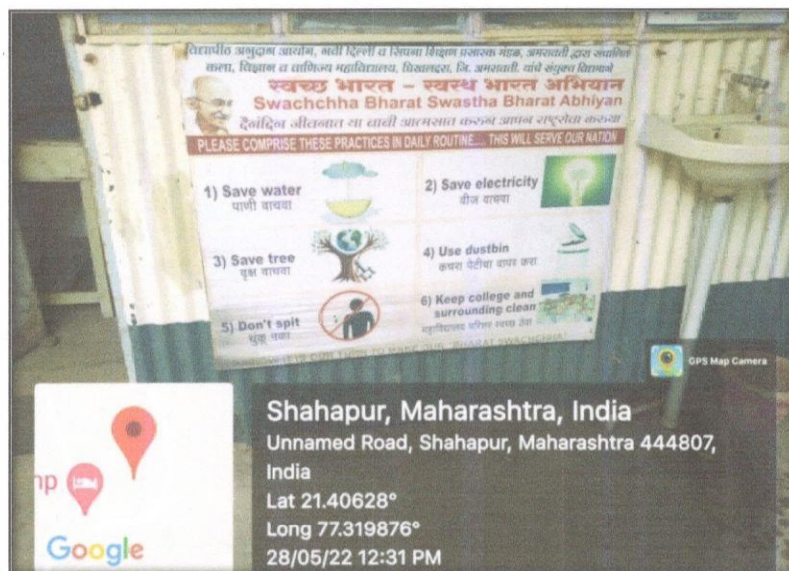
Photograph of Tree plantation:



8.2 Creation of Awareness on Swatcchh & Swastha Bharat Abhiyan:

The College is creating awareness on importance of Cleanliness, Hygiene and Good Health under the Swatcchh & Swastha Bharat Abhiyan.

Photograph of Poster on Swatcchh & Swastha Bharat Abhiyan:



8.3 Cleanliness Drive:

The College arranged Cleanliness Drive under National Service Scheme.

Photograph of Cleanliness Drive:



8.4 Tree Plantation Drive:

The College arranged Tree Plantation Drive in the College Campus.

Photograph of Tree Plantation Drive:



ANNEXURE-I: VARIOUS AIR QUALITY, NOISE & COMFORT STANDARDS:

1. Category Wise Air Quality Index Values & Concentration of PM 2.5 & PM10:

No	Category	AQI Value	Concentration Range, PM 2.5	Concentration Range, PM 10
1	Good	0 to 50	0 to 30	0 to 50
2	Satisfactory	51 to 100	31 to 60	51 to 100
3	Moderately Polluted	101 to 200	61 to 90	101 to 250
4	Poor	201 to 300	91 to 120	251 to 350
5	Very Poor	301 to 400	121 to 250	351 to 430
6	Severe	401 to 500	250 +	430 +

2. Recommended Noise Level Standards:

No	Location	Noise Level dB
1	Auditoriums	20-25
2	Outdoor Playground	55
3	Occupied Class Room	40-45
4	Un occupied Class Room	35
5	Apartment, Homes	35-40
6	Offices	45-50
7	Libraries	35-40
8	Restaurants	50-55

3. Thermal Comfort Conditions: For Non-conditioned Buildings:

No	Parameter	Value
1	Temperature	Less Than 33°C
2	Humidity	Less Than 70%



SATPUDA LANDSCAPE TIGER PARTNERSHIP CONSERVATION HERO AWARD 2022

This certificate is presented to

Dr. Gajanan D Muratkar

for grassroots conservation
work in central India.

Virginia McKenna OBE
Co-Founder & Trustee, Born Free

Professor Claudio Sillero
Chief Scientist, Born Free



The Born Free Foundation is an international wildlife charity devoted to wild animal welfare and compassionate conservation. Born Free takes action worldwide to save lives, stop suffering, rescue individuals and protect threatened species. Thank you for your exceptional contribution to the protection of wild tigers.

Born Free Foundation | bornfree.org.uk | Registered Charity Number 1070906

KEEP WILDLIFE IN THE WILD



Extension Activity report

Academic Year 2022-23

Training to the frontline staff of Protected Areas for Grassland Management



Beneficiary of Training Workshop: Frontline staff and officers of TadobaAndhari Tiger Reserve ,NawegaonNagzira Tiger Reserve , Sahyndri Tiger Reserve, Melghat Tiger Reserve (Maharashtra State) , Valmiki Tiger Reserve (Bihar), Mudumalai Tiger Reserve , Wallanadu Black Buck wildlife sanctuary(Tamil Nadu) , Ratapani Wildlife Sanctuary , Kanha Tiger Reserve (Madhya Pradesh)

Training by : Prof G D Muratkar , Assist. Prof ,
Environmental Science

Academic Year: 2022- 23
Department of Environmental Science

Extension Activity Report

Training to the Frontline Forest Staff

For Grassland Management in Protected Areas of India

1. Title

Training to the frontline forest staff for Grasslands Management in Protected Areas of India.

2. Goal

- To train forest department frontline staff for grassland development and management in Protected Areas of India.
- To develop grazing habitat for herbivores in Protected Areas especially in Tiger Reserve, Sanctuary and National park.

Participants in the field workshop

Sr. No.	Name of Protected Area	Duration	Beneficiaries	Beneficiary Number
1	Melghat Tiger Reserve Maharashtra State	October 2022	DCF, Field Director, RFO, Section officer, Bit guard of tiger reserve	45
2	Sahyandri Tiger Reserve , Maharashtra State	November 2022	DCF, Field Director, RFO, Section officer, Bit guard of tiger reserve	35
3	Tadoba Andhari Tiger Reserve MS	July , September , December 2022 and May 2023	DCF, Field Director, RFO, Bit guard	45

4	Navegaon Nagzira Tiger Reserve, Maharashtra State	December 2022	DCF, Field Director, RFO, Section officer, Bit guard of tiger reserve	25
5	Mudumalail Tiger Reserve, Tamil Nadu	June 23	DCF, Field Director, RFO, Section officer, Bit guard of tiger reserve	40
6	Wallanadu Black Buck Wildlife Sanctuary, Tutthikudi TN	May 23	DCF, RFO, Section officer, Bit guard of tiger reserve	20
7	Elephant Reserve Ambikapur Chattisgarh State	June 2023	CF, DCF, RFO, Section officer, Bit guard of Elephant reserve	85

Concept

Forest Ecosystem in Protected Areas shows distribution of grasslands, the % of forest should be 33% and grasslands 7%, but recently grassland areas are decreasing year by year due to invasion of woody species and invasive weeds. Herbivores require grasslands for grazing, breeding, nesting, hiding habitats for wild habitat management.

Grasses are annual, perennial, soft, coarse, palatable and non palatable. Grasslands are of three types smaller, intermediate and taller. Soil present in forest ecosystem determines composition of grasslands. Fodder value of grasses determined by chemicals, nutrients, fiber % before and after flowering. Grasslands development and management in Protected Areas like Tiger reserve, Sanctuary is important work and to train frontline staff is regular work from 2012.

To know the soil characters, texture, colour and water holding capacity

of soil for grassland development in natural forest areas and degraded areas of forest and lantana removed areas for restoration of grasslands. To manage the grazing, browsing, breeding, nesting or train the frontline staff

- Grasses, weeds and wild leguminous plants identification from forest areas.
- Eradication of weeds from grasses for habitat improvement.
- Brushwood management.
- Geo mapping of grassland.
- Grasses seeds collection, storage.
- Enrichment of grassland.
- Wild legume seeds addition in grassland.
- Soft and course feeder herbivores habitat management.
- Ecological restoration of degraded areas by grasslands development.

The Context

The Protected Areas include Tiger Reserves, National Parks, Wildlife Sanctuaries, the wild life like Herbivores, Omnivores and Carnivores

habited in the protected areas. The grasses are the producers, soil binders, provides chemical energy to the wildlife in the form of fodder species. The protected areas forest are with 2.0 to 4.5% grasses naturally it should be 6-7%. Now recently natural grasslands and relocated areas of the Protected Areas are developing in to good grasslands for the herbivores. Grasslands are the green ground cover of protected areas in forest. The grasses are useful for grazing habitat of wildlife (Herbivores).

The grassland management practices:

1. To give the field training to the forest staff in the natural grasslands and relocated areas of the Protected Areas in each season of the year.
2. To know the exact area of grassland yearwise by demarcation of grassland area by GPS.
3. Grasses identification training to field staff by local names and scientific names.
4. Weeds identification with local names and their flowering season.
5. Browsing species identification with local names.
6. Field training to collect the grasses seeds and wild legumes seeds.
7. Weederadication programmetwo times in a year
8. Grasslands enrichment by seed broadcasting in May - June season.
9. Grasses biomass management practices in mosaic pattern.
10. Wild fruit trees identification and addition in relocated areas.
11. Complete training programmes are organized by the CCF & Field Director of the respective Tiger Reserves in each season.

The practices in the field


1. Grasses identification - October.
2. Weeds identification - August.

3. Wildleguminousplantsidentification–September.
4. Weedsuprootingthreetimesineachyear.
5. Grassesseedscollection–SeptembertoFebruary.
6. Wildlegumesseedscollection–November–December.
7. Grassesseedsadditioninselectedareasforgrasslanddevelopment.
8. Observationofgrasslands.
9. Toknowthecompositionofgrasslands.
10. Brushwoodmanagementtoreducewoodland.
11. Topreparegrasslandmanagementregister.

Results of Extension activity

- CapacitybuildingoffrontlinestaffofProtectedAreas.
- FieldinterventionsforhabitatimprovementinProtectedAreas.
- EHerbarium of grasses and identification.
- Documentation of benchmarks and results.
- Comparative analysis before and after work.
- Ecological restorations of grasslands.
- Improvement in wildlife habitat.
- Frontline staff get trained for grassland management.
- Forest Department in India actively participating in grasslandsmanagement.

Date: 14.06.2023



(Mr.G.D.Muratkar)

G. D. Muratkar

Asst. Professor & H.O.D.
 Dept. of Environmental Science
 Arts, Science & Commerce College, Chikhaldara,
 Dist. Amravati.



ML
 PRINCIPAL
 Art, Science & Commerce
 College, Chikhaldara



Tadoba Andhari Tiger reserve , Maharashtra



Observation of grassland
Composition

Extension Activity Images Academic Year 2022-23



Hands-on training to frontline staff

P.V. RAJA RAO, IFS
APCCF Director &
Secretary, CEFNARM



Telangana State Forest Academy
Government of Telangana,
Dulapally, Hyderabad - 500 100
Land Line (O) : 040 - 29 70 48 96
Mob : + 91 94 40 81 01 66
e-mail : tsfa.hydr@gmail.com
psfi.tsfa@gmail.com

Letter of Appreciation

My Sincere appreciation to Prof. Gajanan Dadaraji Muratkar.

Thank you very much for delivering informative and stimulating session through Zoom Webinar on "Grassland Management" held on 06.08.2022 for KTR Nirmal, Adilabad, Warangal, Karimnagar, Kothagudem & Nizamabad Circles.

It was a splendid presentation besides interaction with frontline staff from the cadre of Forest Range Officers till the level of Forest Beat Officers. You have provided a wide exposure of various kinds of Grass Species along with the good field practice.

Your eloquent sharing on "Grassland Development and Management" is appreciated and they have got benefited from your views and vast experience in this field.

Looking forward to your cooperation for promotion and imparting professional expertise in future as well.

Yours sincerely
[Signature]
SRI P. V. RAJA RAO, IFS
APCCF/Director

To
Prof. Gajanan Dadaraji Muratkar
Head, The Botany and Environmental Science Department of the Arts, Science and Commerce College at Chikhaldara, Maharashtra State

Office of the Conservator of Forests-cum-Field Director, Valmiki Tiger Reserve,
Forest Colony, Pambhig, West Champaran, Bihar 845438
Phone 86254 23151, Email Address: forestconservatorvalmiki@nic.gov.in, forestconservatorvalmiki@gmail.com

Letter No. 2753

Bettiah, Date: 14.9.2022

Sir,

Subject: - Letter of Appreciation

On behalf of Valmiki Tiger Reserve, Bihar, I place on record our sincere appreciation towards Prof. G. D. Muratkar, Grasses Ecologist & Agrastologist, Maharashtra for his invaluable contribution towards improvement of grassland management practices in Valmiki Tiger Reserve. He has conducted field visits and conducted on field training and workshops involving Forest officials from the cadre of Casual staffs, Forest Beat Guards to Field Director on the grassland management, Wild legume Identification, grass seed collection and weed eradication. This will help us to bring visible change in different grassland spread over this Tiger Reserve and we express our gratitude and acknowledge the services rendered by him, and hope for his continuing technical support and guidance in future.

Sincerely Yours

[Signature]
(Dr. Nesamani, K.ITS)
Conservator of Forest-cum-Field Director,
Valmiki Tiger Reserve.

To,

The Principal,
Arts, Science and Commerce College,
Chikhaldara, Amaravati District,
Maharashtra- 444907.

Letter of Appreciations for Training to Frontline Staff for Grassland Management



Government of Maharashtra
Office of The Deputy Conservator of Forests, MTR,
Sipna Wildlife Division, Paratwada
Timber Depot, Paratwada 414505

Office No: Desk-4 Steno/1143/2022-23

Paratwada, Dated: 19/09/2022

Letter of Appreciation

I extend my sincere appreciation and thanks to Professor G. D. Muratkar, Grass Ecologist, Sipna College (ASCC), Chikhaldara for his support in developing grasslands of Sipna. He conducted workshop for over 40 staffs on 15/07/2022 in Semadoh and has been continuously guiding staff for developing the grasslands which are in nascent stage in relocated Pili village. I am very grateful for his contribution and assistance and wish him all the best.

Sincerely Yours,

[Signature]
Divya Bharathi M., L.F.S.
Deputy Conservator of Forests,
Mehlat Tiger Project,
Sipna Wildlife Division,
Paratwada.

To
The Principal,
Arts, Science and Commerce college,
Chikhaldara, Ta - Achalpur,
Dist - Amravati, Maharashtra



**SATPUDA LANDSCAPE TIGER PARTNERSHIP
CONSERVATION HERO AWARD 2022**

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[Signature]
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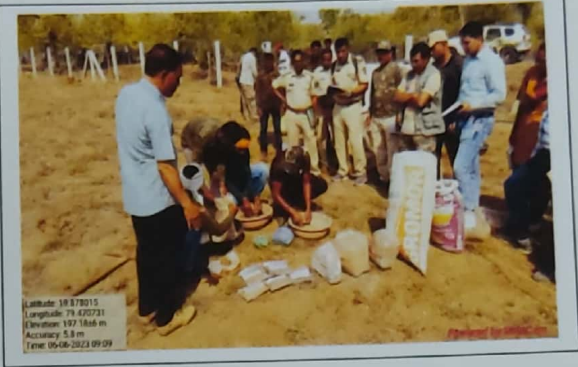
[Signature]
Professor Claudio Silero
Chief Scientist, Born Free





Latitude: 13.677953
Longitude: 79.470179
Elevation: 186.9266 m
Accuracy: 4.8 m
Time: 09-06-2023 09:54

Training to frontline staff for Grassland Management



Latitude: 13.672015
Longitude: 79.420731
Elevation: 197.1866 m
Accuracy: 5.8 m
Time: 09-06-2023 09:09



Latitude: 21.944207
Longitude: 77.230776
Elevation: 1165.9812 m
Accuracy: 11.9 m
Time: 29-05-2023 10:23
Note: field workshop @

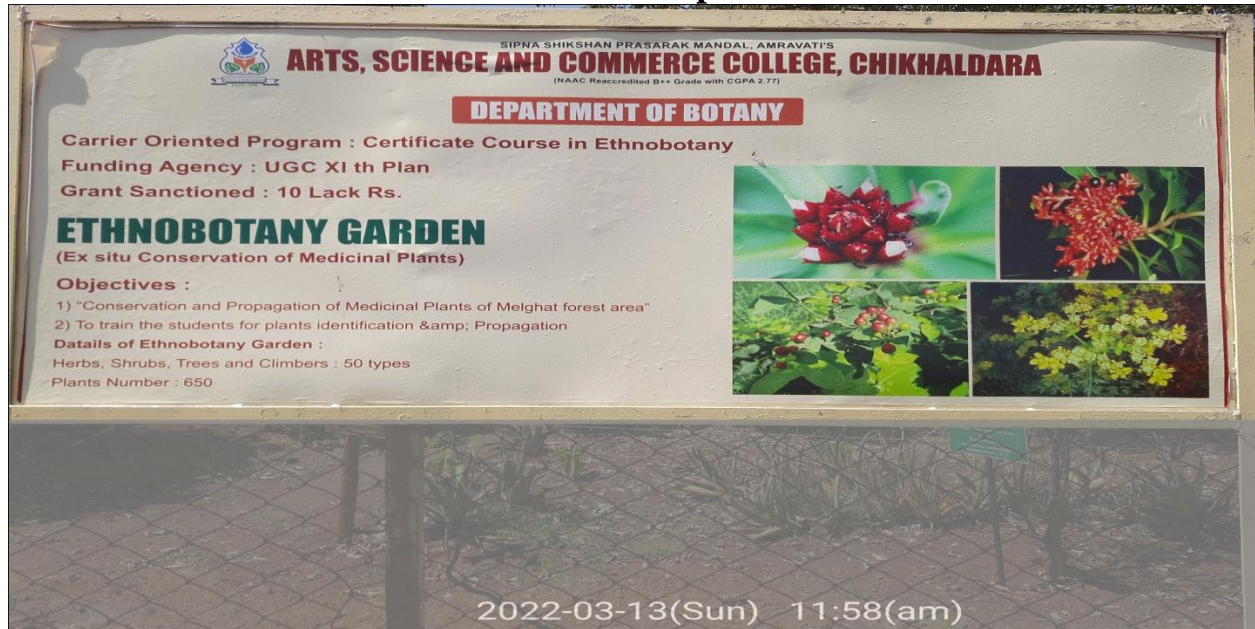


Latitude: 18.430331
Longitude: 72.941909
Elevation: 323.68112 m
Accuracy: 6.0 m
Time: 03-06-2023 13:23
Note: general



Latitude: 20.360193
Longitude: 79.074821
Elevation: 232.9818 m
Accuracy: 11.8 m
Time: 27-05-2023 11:23
Note: Mangrove Grassland

Arts .science and commerce college, Chikhaldara- Botanical Garden at AladohCampus



Prof. G.D.Muratkar giving medicinal plants knowledge to the students of Brijlal Biyani College, Amravati.



Prof. G.D.Muratkar giving information to the students of Vidyabharti Science College, Amravati.



Dr.U.R.Kokate giving information about medicinal plants to the students of Rajarshi Sahu Maharaj Science College, Chandur Rly.

