ENVIRONMENT, GREEN AND ENERGY AUDIT REPORT

Maharana Pratapsinh Shikshan Sanstha Mumbai

Anandibai Raorane Arts, Commerce and Science College, Vaibhavwadi

Tal: Vaibhavwadi, Dist.- Sindhudurg – 416810

Affiliated to University of Mumbai

NAAC Reaccredited with 'A' Grade (CGPA: 3.08), ISO 9901:015 Certified

Best College Award (Rural) by the University of Mumbai

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Prepared By

NATURE CLUB AND AUDIT COMMIITEE

Anandibai Raorane Arts, Commerce and Science College,

Vaibhavwadi, Tal- Vaibhavwadi, Dist.- Sindhudurg

Maharashtra-416810

DECEMBER – 2023

CERTIFICATE

ENVIRONMENT, GREEN AND ENERGY AUDIT

Academic Year 2022-23 and 2023-24

This is to certify that, Maharana Pratapsinh Shikshan Sanstha Mumbai, Anandibai Raorane Arts, Commerce and Science College, Vaibhavwadi, Maharashtra-416810 has taking and implementing respectable initiatives for conservation and protection of Environment.

We Nature Club and Audit Committee of Maharana Pratapsinh Shikshan Sanstha Mumbai, Anandibai Raorane Arts, Commerce and Science College, Vaibhavwadi, Maharashtra-416810 have satisfactory and successfully completed the Environment, Green and Energy Audit work based on the continuous site visits, observations, laboratory work and information provided by college from the Academic Year 2022-23 and 2023-24 with support of Principal, IQAC Coordinator, NSS Coordinator, Criteria Coordinator, Concerned Teachers, Heads of Department, staff of Maharana Pratapsinh Shikshan Sanstha Mumbai, Anandibai Raorane Arts, Commerce and Science College, Vaibhavwadi.

Nature Club –

1. Dr. N. R. Hedular
2. Prof. R. P. Kashetti
3. Dr. V. A. Paithane

Principal
Anandibai Raorane Arts, Commerce & Science College, Vaibhavwadi.

Audit Committee

1. Dr. A. R. Dighe –
2. Dr. D. S. Korgaonkar
3. Dr. K. S. Pakhare

Anandibai Raorane Arts, Commerce & Science College Vaibhavwadi

CONTENTS

1. INTRODUCTION

1.1 Environment and Green Audit:

The Environment and Green audit is a process of systematic identification, quantification, recording, reporting and analysis of various components of environmental diversity of college or institution. This 'Green and Environmental Audit' aims to analyse the environmental practices within and outside premises of the college / campus area, which will have to study status of environmental parameters and it's an impact. This audit is a valuable means for a college to determine how and where they are using or consumes the most energy resources or water resources or other resources; then college can consider how to implement changes and make savings. This audit creates health consciousness, environmental awareness, sustainability, values and ethics of nature. The audit provides better understanding of green impact on all stakeholders.

Thus, college evaluates its own contributions towards a sustainable future with the help of audit. As environmental consciousness and sustainability is becoming an increasingly alarming issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent. So, this environment and green audit is assigned to the criteria 7 of NAAC. National Assessment and Accreditation Council (NAAc) which is a self-governing organization of India which declare the institutions as Grade A, B or C according to the scores assigned during the accreditation.

The Environment, Green and Energy audits are based on the major environmental acts/policies of India which are applicable to educational institutions, international norms & environmental best practices. We follow following acts & related regulations / policies:

- The Environment (Protection) Act, 1986
- Water (Prevention and Control of Pollution) Act, 1974
- Air (Prevention and Control of Pollution) Act, 1981
- Energy Conservation Act, 2001
- Hazardous Waste Management Rules-2016
- The Forest (Conservation) Act, 1980
- The Wildlife Protection Act, 1972
- The Indian Forest Act, 1927
- The biological Diversity Act 2002 etc.

1.2 Environment, Green and Energy Audit Process:

A Green Campus is a place where eco-friendly practices and education combine to promote sustainability in the campus. This green audit offers opportunity to take the lead in the

environmental conservation, culture and developing new paradigms by creating sustainable solutions to needs of the mankind in the institution. Environmental audit focuses on the study and status of quality of air, water and wastewater, soil, noise level, solid waste, hazardous waste and its management, wildlife conservation (birds, insects, reptiles etc.) in the college premises as well as at the college outside area.

Green Audits focuses on the green cover or vegetation cover in the college campus area which comprises types of vegetation, scientific details of floral diversity, list of indigenous and exotic (non-native) floral species etc.

Energy Audit focuses on the energy requirement, generation, types of energy, energy losses and its sustainable usage has been implemented by the College Management.

The main goal of audit is to help college / institution up to date on the latest environmental issues and environmental consciousness, so that institution can understand whether performing environment or green audit is a good idea for their institution. The audit assesses various sides of institutional work and determine whether an institution's work and operations impact the ambient air quality, water quality, solid waste pollution and soil health. These audits shall also be help to avoid compliance issues and support to the overall institutional development through green policy document. The audit data can be used to improve workplace eco-friendly, safety and sustainable.

During an environment, green and energy audit, assessors / environment experts followed following steps:

- Review current processes
- Assess effects of process on air, water, soil etc.
- Review potential water, air and soil contamination
- Examine waste production data
- Determine ways to prevent contamination
- Scope of Environmental Awareness

1.3 About College:

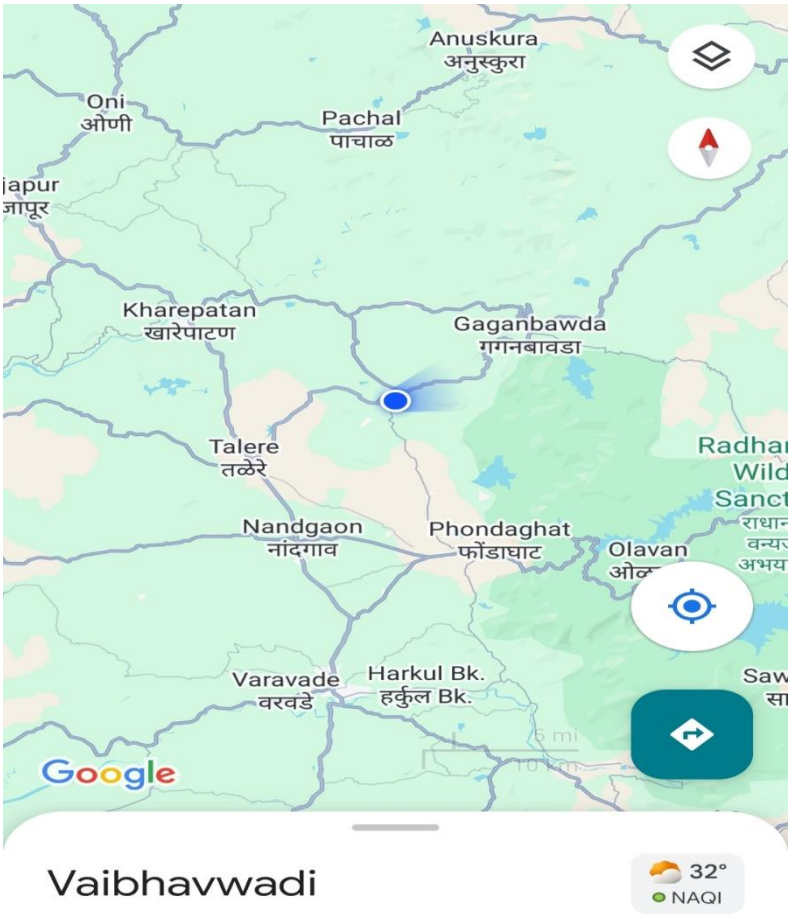
Maharana Pratapsinh Shikshan Sanstha Mumbai's, Anandibai Raorane Arts, Commerce and Science College, Vaibhavwadi, Dist.-Sindhudurg established in 1992 is one of the premier college in Sindhudurg district. Since inceptions, it has been working with a vision providing quality higher education to rural students, empowering them to cope up with the competitive world. It is one of the leading and heritage educational institute. It is Grant-in-Aid College affiliated to University of Mumbai. The college faced 3rd cycle of NAAC Accreditation and obtained 'A' Grade with 3.08 CGPA. The College is awarded as "Best

College Award in Rural" by University of Mumbai and also ISO 9001:2015 certified. Moreover, University of Mumbai has honored the College by conferring status of lead college in Sindhudurg district, PARAMARSH and Paris-Sparsh Scheme. The College has also received grant from PM-USHA and WRC-ICSSR, Mumbai.

The college offers B.A., B.Com., and B.Sc. programs at UG level and PG programs M.Com. (Advanced Accountancy) and M.Sc. (Organic Chemistry and Analytical Chemistry) at PG level. Near about 900 students are admitted to UG and PG courses across Arts, Commerce and Science Faculties. The College is imparting various Skills, Values and Employability proficiency through a number Certificate and Short Term Courses. Apart from teaching-learning our college provides research activities and extension activities like NSS, DLLE, NCC, etc. to the students.

1.4 Location:

The college of Maharana Pratapsinh Shikshan Sanstha Mumbai's, Anandibai Raorane Arts, Commerce and Science College, Vaibhavwadi, Dist.-Sindhudurg located at heart of Sahyadri Ghat. The college is located in the rural area. The distance from Kolhapur is about 74 km and distance from Kankavli is about 40 km. It is geographically located at latitudes 16.492935 and longitude 73.74935 Elevation 62.24 m.



1.5 College Environment Policy:

Maharana Pratapsinh Shikshan Sanstha Mumbai's, Anandibai Raorane Arts, Commerce and Science College, Vaibhavwadi has prepared own environmental policy for all stakeholders. This policy prepared to college staff and students for the environment consciousness and awareness.

a. Policy Statement:

Maharana Pratapsinh Shikshan Sanstha Mumbai's, Anandibai Raorane Arts, Commerce and Science College, Vaibhavwadi has designed 'Environmental (Waste management), Water Management and Green Policy to protect environment and provide healthy teaching learning environment to the students.

b. Policy Objectives:

The main purpose of the policy is identifying and protects environmental values and to create healthy teaching learning environment. Followings are the objectives of the Environment (Waste management) policy.

- To create awareness among students, teachers, non-teaching staff and others stakeholders regarding air quality, ambient noise, greenery, college urban biodiversity and waste management.
- To reduce the plastic waste pollution and maintain tobacco and cigarette free campus.
- To ensure that waste is managed in a way that is consistent with ecologically sustainable.
- To minimize the waste generated from all sources and to recycle the maximum waste and improve the waste management activities and programmers.
- To recycle organic or biodegradable waste convert to compost for campus plantation.
- To reduce health risk and various hazards created due to generation of waste.
- To promote ICT tools in teaching learning process and administrative work and reduce the use of paper.
- To create awareness in all stakeholders through Environmental Slogans on the campus walls and notice boards.

Table – 1 Nature Club & Audit Committee

Sr. No.	Name	Designation
Nature Club –		
1	Dr. N. R. Hedular	Assistant Professor & Head Dept. of Zoology
2	Prof. R. P. Kashetti	Assistant Professor & Head Dept. of Botany

3	Dr. V. A. Paithane	Assistant Professor, Dept. of Botany
Audit Committee -		
1	Dr. A. R. Dighe	Assistant Professor, Dept. of Zoology
2	Dr. D. S. Korgaonkar	Assistant Professor, Dept. of Zoology
3	Dr. K. S. Pakhare	Assistant Professor, Dept. of Chemistry

1.6 Aim and objectives of college:

Maharana Pratapsinh Shikshan Sanstha Mumbai's, Anandibai Raorane Arts, Commerce and Science College, Vaibhavwadi is striving to develop its institution on a self –sustainable basis in the areas of water, noise, energy, waste management, environmental education and cleanliness. The stakeholders of college have to contribute collectively to develop an Environment Friendly and Sustainable Green -Clean Campus and disseminate the concept of eco-friendly & sustainable culture to the nearby community and wherever possible.

- Awareness creations about local, national and global environmental issues among students and employees.
- Reduce and management of environmental pollution emissions for the improvement of environmental performance in the college campus.

The following major environmental parameters and their objectives have been suggested for the making of "Green-Clean and Sustainable" Campus.

a. Climate Change and Energy Conservation:

1. Right action taken to reduce greenhouse gas emissions due to energy consumption and suggest to use of renewable energy source, energy efficient lamps/sensor-based lamps where ever possible like in the college campus corridors, toilets etc.
2. Actions taken to reduce Greenhouse Gas (GHG) emissions.
3. Use of energy efficient equipment's in laboratories/classrooms/canteen, this can range from air -conditioners, refrigerators etc.
4. Regularly monitoring the entry of vehicles in the college in terms of their fuel efficiency/ hybrid/ battery operated vehicles.
5. Promoting students, teaching and no teaching staff for the use of public transport or car polling.
6. Promote to use and harvest more renewable energy i.e. Solar Energy resource in the college campus.
7. To establish environmental emissions inventory in the college premises.

8. Creating awareness by organizing seminars, debates, activities related to climate change, environmental protection, and environmental issues.

9. Promoting scientific projects' experiments in the education system as part of regular curriculum which is related to environmental aspects.

10. To encourage the concept of Eco-Rangers, Green Army / Green Corps/ Green Warriors etc. so as to maximize the student's involvement for the awareness.

b. Water and wastewater Management:

Adopting following measures in campus to reduce water pollution and control on more water consumption.

1. To minimize the water usage and control on misuse of water in the toilets, bathrooms, college canteen areas etc.

2. To control on over usage of water to generate grey water through flushes or drain.

3. To promote for rain water harvesting structures in the old and new building areas in the college campus for water harvesting.

4. To use sensor-based water tabs in all toilets, bathrooms canteen areas which are more water efficient.

5. To use and construct mini wastewater treatment plant for sewage and runoff generated in the college campus.

6. Use of treated and recycle wastewater for watering to the gardening plants, trees etc.in the college campus and sports ground.

7. To display water management instructions /alerts at prominent/relevant locations in the campus.

c. Waste Management:

1. To adopt methods for waste segregation, take appropriate actions to reduce or recycle municipal waste inside the campus.

2. To manage, collect and dispose e-waste appropriately to reduce hazardous waste and its management as per Central Pollution Control Board or State Pollution Control, Board.

3. Actions taken to reduce consumption of plastic in the college campus.

4. To adopt practice "No Plastic" or "Ban on Plastic" in the college campus.

5. To encourage paperless work culture and adopt for recycling/ reuse of paper.

6. To adopt 3 R (Reduce, Reuse and Recycle) solid waste management practice for college sustainability.

7. Showcase waste management instructions/ Slogans / notices/ alerts at prominent/relevant locations in the college campus.

d. Green Cover- Clean Campus:

1. To increase the green cover in and around the college campus area.

2. Adopt indigenous or local plants for the plantation in the college campus which will maintain local birds' diversity.

3. Showcase or scientific naming to plants with botanical details and vernacular details for the awareness.

4. Use of buildup or constructed area for the green cover using climbers, creepers, bushy hanging plants which will maintain temperature in the college campus and look natural.

5. Adopt plant pots donation policy under college environment committee to use maximum plants pots in the corridors, open spaces for

6. Display slogans on plants, greenery etc. in the college campus area.

e. Air and Noise Management:

1. College located at center of the city, so need do create awareness on air pollution and noise pollution in the college and to stakeholders.

2. Due to modern society and students' behavior need to adopt strict rule in the college campus and outside area of the college - "No Honking", "No Horns", "Horns Prohibited"

3. Instruct to all stakeholders there are silence zones where honking is completely prohibited or not to use horn.

4. Instruct to college non-teaching staff or students "Don't use Open Burning practice" of waste papers, garbage, plant waste / litters or garden waste in the college campus.

5. Promote for more greenery in the campus area to control of dust pollution and noise pollution.

6. Use of sound acoustics / absorbing materials in the college rooms for control of sound or noise.

7. Use sound absorbing long and leafy plants for the control of sound and noise pollution.



1.7 College Glimpses:

i) College Main Entrance

ii) Indoor Stadium of College

iii) College Central Library

iv) Computer Lab

v) Language Lab

vi) Canteen

vii) Volleyball Court

viii) Kabaddi Ground

ix) Open Play Ground

x) Botanical Garden

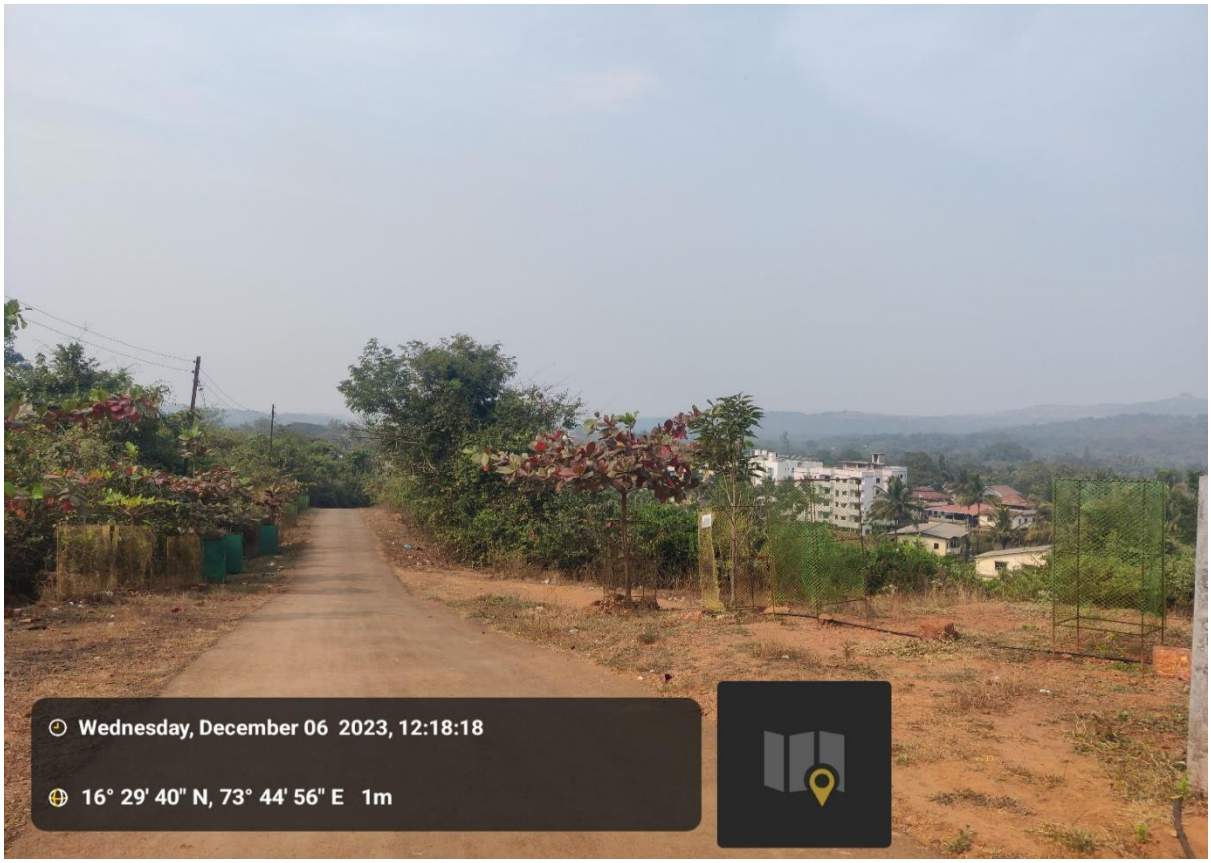
xi) Solid Waste Management

xii) Zoology Garden

xiii) Parking

xiv) Solar Panel

xv) Road to Vaibhavwadi

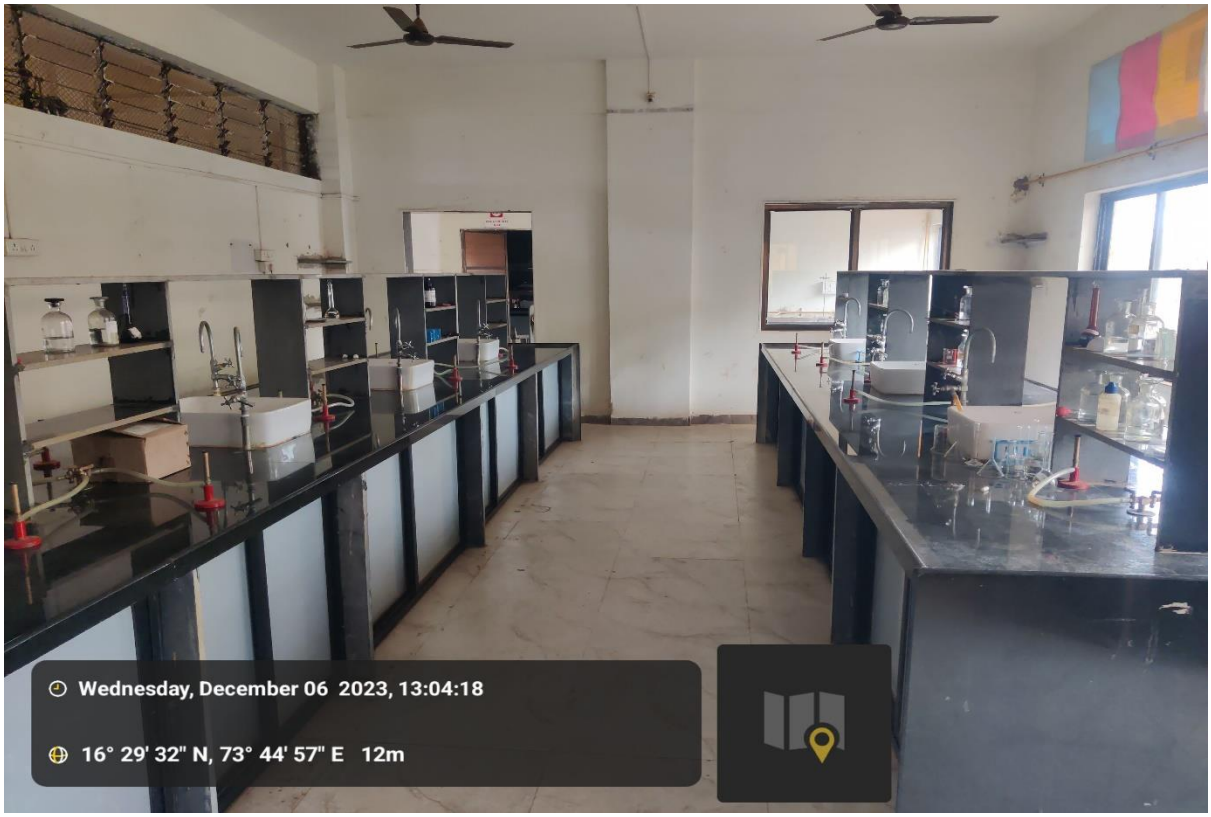


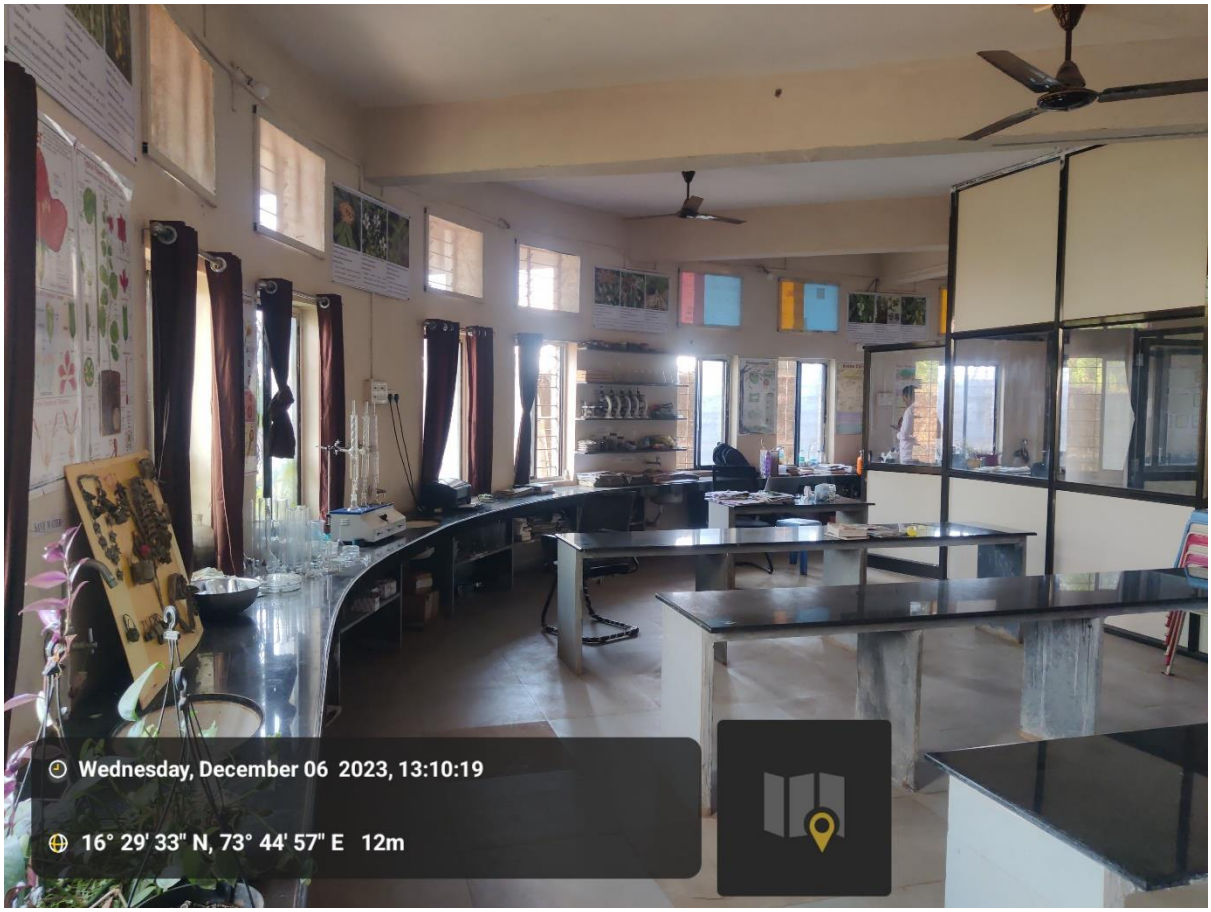
xvi) Rain Water Harvesting Project

xvii) Liquid Waste management

xviii) Drinking Water Plant

xix) Science Laboratories





1.8 ENVIRONMENT AND GREEN AUDIT OBJECTIVES

The main objective of the Environment, Energy and Green audit is to promote the management and conservation of Environment in the College Campus. The purpose of the audit is to identify, quantify, describe and prioritize framework of Environment Sustainability in compliance with the applicable regulations, policies and standards.

The objectives of carrying out Environment and Green Audit are:

- To map the Geographical Location of the college.
- To document the water and waste management of the college.
- To estimate the Energy requirements of the college.
- To document the ambient environmental condition of weather, air, water and noise of the college.
- To introduce and aware students to real concerns of environment and its sustainability.
- To document the floral and faunal diversity of the college.

1.9 METHODOLOGY

In order to conduct the green audit, the methodology included different tools such as

- Preparation of questionnaire for Air, Water, Waste, Energy, Biodiversity etc.
- Preparation of data collection in the given formats.
- Collection of data through primary and secondary methods.
- Physical checking of the campus – includes visit to college campus, offices, classrooms, laboratories, library, sports grounds and various centres.

- Observation and review of the documentation.
- Interactions / interview of key persons and data analysis, measurements and recommendations.

The study covered the following areas to summarize the present status of environment management in the college campus:

1. Green area management
2. Water management
3. Energy Conservation
4. Waste management
5. E-waste management
6. Biodiversity conservation

1.10 OBSERVATIONS

Major Green and Environmental Initiatives of the college

- College has organized a guest lecture to students on to create nature and environmental awareness.
- A guest lecture on World Wild Life Week Celebration.
- Environmental and Social activities such as tree plantation, blood donation, cycle rally for save fuel and international yoga day was also celebrated.
- Every time all students and NSS, NCC and DLLE volunteers were participated in the college campus cleanliness drive, plantation drive organized at college.
- No plastic, No Tobacco rally organized by every year and oath taken by NSS volunteers.
- Vivekvahini section organized workshop on Eco Friendly Ganesh Festival to create environmental awareness among the students.
- NSS Volunteers organized the awareness rally was arranged Swachh Bharat Abhiyan.
- NSS volunteers organized Tree Plantation was done in the college campus.
- Organized college campus cleaning activity
- Construction of Band on River
- Celebration of Mountain day to create awareness and importance of mountain among the students.
- Notebook making and distribution to school students (Waste to Best Program)
- Organization of workshop on “Organic Farming”
- Celebration of Tiger day, Sparrow day, mangroves day, etc. for wildlife conservation.
- Organization of study tour / excursion.

Some selected photographs

1. Tree Plantation

2. Tree Plantation

3. Construction of Band on River

2.0 PLANTATION AND GREEN AREA COVER

The Department of Botany, Zoology, Nature Club and NSS unit of the college, every year organizing plantation drive and planting many indigenous tree species in the college campus. Green area or plantation comprises the plant, greenery and landscaping in the college campus to enhance the college ecosystem and environment of the college campus area. The plantation in college have increased the quality of life, not only in college campus but also the surrounding area in term of temperature control, contributing to improving air quality, soil conservation, water conservation and biodiversity conservation especially habitat for birds and insects, wild animals etc.

This plantation activity helps to increase the green beauty and attraction of the stakeholders in the college campus. The college having diverse with a variety of plant species planted from establishment of the college to till date which are performing a variety of environmental and ecological functions. Most of the plant species are planted under various plantation programs or drives. Thus, plantation will help to increases the faunal diversity especially avifauna (Birds) and also maintains food chains and food webs. Most of the birds are dependent on these trees' species they mainly preferred trees for food and shelter.

The beauty of the college campus is due to only evergreen trees, flowering plants, indoor and outdoor plants, creepers etc. Various types of plants planted which Nectar of flowers and plants is a favourite of birds and many insects. Leaf – covered branches keep many animals,

such as birds and squirrels, out of reach of predators. Thus, the college has been playing a significant role in maintaining the environment of the entire surrounding area of college.

2.1 Plant Diversity

Campus Flora prepared by Dr. V. A. Paithane ***(Annexure - I)***

In the prepared campus flora of college all details are gives such number of varieties of plants, insects, mammals as well as advantages of biodiversity.

Some selected photographs of green activity

College 2 wheeler and 4 wheeler parking

Zoology garden

Botanical garden

Tree Plantation activity

College and surrounding greenery

2.2 Recommendations:

- Promote environmental awareness as a part of course work in various curricular areas, independent student research projects, and involve students in the community service. Eg. Mazi Vasundhara, Swachh Bharat Mission etc.
- Promote local or indigenous plants for plantation which can maintain college biodiversity.
- Avoid plantation of exotic plant, trees, creepers, shrubs and grass species in college campus.
- Considerations for selection of plant species:

  1. Economically and environmentally important plant species.

  2. Plant species which shows higher adaptability to local climatic and edaphic conditions.

  3. Plant that enhances the aesthetics of the surrounding areas

  4. Plant that serves as nesting, feeding and breeding site for fauna

  5. Plants having maximum ability of fixing carbon emission / sequestration

  6. Plants species having high fodder and fuel value

  7. Plants species having importance in soil binding and water conservation.
- Organize workshops or training programs for the students on local biodiversity and on the values of medicinal plants

- Conduct internal audit to ensure that implementation of activities for the environment planned for the year, action is taken on the basis of audit report, recommendation and findings.
- Celebrate every year 5th June as 'Environment Day', wildlife week and plant trees on this day to make the campus greener.
- Establish Green library for the students.
- Prepare five-year planation Programme /Plan in consultation with environment experts, management and students.
- Organize exhibitions like plant painting, flower painting, flowers, posters etc.

3.0 WATER MANAGEMENT

Water is very important resource for all the stakeholders. Vaibhavwadi facing the problem of water crises. On this basis college has to focus on the conservation of water and water recycle and reuse management practices in the campus using scientific methods. Water is a natural resource and all living things are depending on water. We need to use water wisely to ensure that drinkable water is available for everyone, now and in the future. Water auditing is conducted for the evaluation of facilities of water requirement, sources and facilities for treatment and its reuse.

3.1 Observations

In college campus following main uses of water

Main water uses in the campus

- Drinking
- Cleaning
- Toilets
- Garden

3.2 Water Requirement:

The main source of water is ground water using borewell based on student strength and staff.

- Student strength in year 2022-23: **870** and 2023-24: **863**
- Teaching Staff in year 2022-23: **37** and 2023-24: **38**
- Non-Teaching staff in year 2022-23: **14** and 2023-24: **14**
- Average per year **920**

As per NBC 209, BIS, water requirement for the Schools/Educational institutions is for flushing standard is 20 Lts /Head/day and Drinking and Domestic 25 Lts / head per day.

3.3 Without Boarding Facility:

- Drinking: 1.9 lit per head per day
- Flushing: 1.5 lit per head per day
- The potable water treated with RO plant for drinking water treatment plant installed in the college building.

For the garden or lawn, drip facility is provided. The college has rain water harvesting project.

Major Uses / Activities of Water in the College

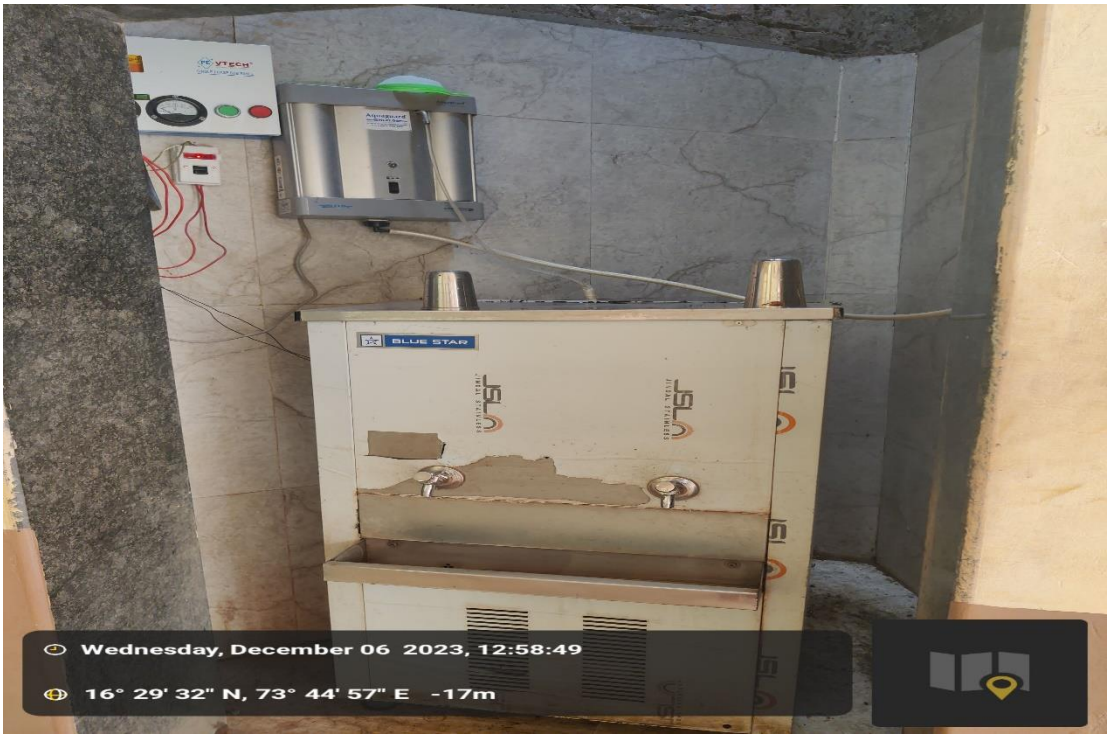
Sr. No.	Activity	Uses Capacity
1	Drinking	1748 lit/day
2	Flushing	1380 lit/day
3	Cleaning	1550 lit/day
4	Garden & Lawn	4500 lit/day
5	Total	9178 lit/day

3.4 Sewage Generation and Treatment:

- About 8.01 KLD sewage generated.
- Treatment system: Septic tank
- No waste water recycling in the campus

Some selected photographs

RO plant in college campus



Septic tank

3.5 Rain Water harvesting

College prepared the rain water harvesting structures for rain water harvesting.

Also recharged bore wells through rain water harvesting.

Institutional Plan:

1. Development of infrastructure at institutional level to divert rain water from roof-tops of the buildings to ore wells on the campus.

2. At present college has started rain water harvesting through roof top of college buildings and connected to the borewell recharge.

3. Create awareness for rain water harvesting among students and other stakeholders.

3.6 Implemented the Rain Water Harvesting

- Water Collection: 3-inch PVC pipes.
- Ground Water Recharging: through borewell.
- Operation and Maintenance: As per requirement.

Rain Water Harvesting Plant

3.7 Recommendation

- Drip irrigation system should be provided in the college for all garden area to minimize water use.
- Use sensor-based toilet flushing tabs and drinking water tabs provided aerators or pressure reducing devices.
- In order to use the treated waste water for flushing a separate plumbing system should be provided.
- Installed sewage treatment plant and recycle the treated water for flushing and gardening.
- Separation of grey and black water should be done by the use of dual plumbing line for separation of grey and black water.
- The ground water level and its quality should be monitored regularly in consultation with Central Ground Water Authority.
- Water quality analysis should be carried through Government Institutes, NABL or MOEF accredited laboratory for monthly or quarterly basis.

4.0 ENERGY MANAGEMENT

Energy audit is the key to systematic approach for decision making in the area of energy conservation and management. It attempts to balance the total energy input with its use. This audit would give a positive orientation to the energy cost reduction, prevention, maintenance and quality control programmes which are vital for production and utility activities. This audit focus on variations which occur in the energy cost, availability and reliability of supply of energy, decide on appropriate energy mix, energy conservation equipment etc. The main objective of energy audit is to determine ways to reduce energy consumption or lower operating costs.

4.1 Observations:

- Electricity is supplied from Maharashtra State Electrical Board (MSEB).
- Average energy bill monthly is: Rs. 14000/- to 15000/- per month.
- College starts at morning 8:00 am to 5:00 noon. So college used natural sunlight. The entire campus including common facility centres are equipped with LED lamps and LED tube lights, except at few locations. Awareness board for Energy saving is displayed in the campus.
- Solar Plates are set at the terrace of the college to reduce the energy usage.

Image of solar plate

4.2 Recommendations:

- Adjusting the settings and illumination levels to ensure minimum energy used for desired comfort levels. Design based on flux level calculations.
- Awareness on energy conservation will be raised among the staff and students.
- Constant monitoring of energy consumption and defining targets for energy conservation. Energy monitoring will be done with the help of Energy meters.
- Install maximum solar street light lamp at all location in the campus
- Installation of maximum LED lamps instead of CFL and replacing the old tube lights with the new LED tubes.
- Purchase of energy efficient appliances (CFL FITTINGS)
- Sunscreen films on windows to reduce heating inside the buildings.
- Use of compact fluorescent lamps and low voltage lighting.

5.0 WASTE MANAGEMENT

Today, waste management is the major issue in the colleges. This criterion supports to college making green and clean campus. The reduction of solid waste in the college campus,

need to take efforts on recycling and reuse of solid waste. Need proper segregation at the source. College has to adopt 3R principle for waste management. Waste is collected and segregated properly. Students, faculty, and staff are aware and educated on proper waste management practices such as waste source and disposal, plastic waste, paper waste, food waste, and recycling. Solid waste is divided into two categories: dry waste and wet waste

1. Wet waste: biodegradable waste
2. Dry waste: biodegradable and non-biodegradable waste

5.1 Observations

As per observation, the common waste generated in the campus comprises plant wastes, glass, paper waste, metals, wrappers, plastics, etc. Old newspapers, used papers and journal files, workshop scrap etc. are given for recycling to external agencies (Raddiwala). Glass, metals, plastic and other non-biodegradable wastes are also given to external agencies where they are segregated and disposed/ recycled according to the nature of the waste. The biodegradable waste comprises leaf litter and food waste are decomposed in the composting unit of college. Similarly, plastic waste managed and sends to the recycling vendor. Apart from dry solid waste, the campus generates an average of 50 kgs of organic waste per day and other 10 kg of non-biodegradable. All generated solid waste disposed directly in to the Solapur Municipal Corporation vehicle for proper waste management.

Some selected pic of solid and liquid waste management

5.2 Recommendations

1. Avoid or ban on plastics use in the college campus.
2. Display awareness boards / slogans boards, messages of solid waste management.
3. Reduce the waste generation from students, college staff, departments and offices.
4. Segregate dry and wet waste separately.
5. Segregate hazardous waste and send to hazardous site as per State pollution control Board guidelines
6. Send all recycling waste glass, cans, white, colored and brown paper, plastic bottles, batteries, print cartridges, cardboard and furniture to recycling facility or authorized vendor.

6.0 E –WASTE

E- Waste is becoming a major threat to the whole world. Its toxic emissions mixed with virgin soil and air and caused harmful effects to the entire biota either directly or indirectly. Direct impacts of E-Waste which include release of acids, toxic compounds including heavy

metals, carcinogenic chemicals and indirect effects such as bio magnification of heavy metals in the food chain and food webs.

6.1 Observations

E-waste generated in the college campus is very less in quantity. The E-waste and defective item from computer laboratory is being stored properly. The college management has decided to contact approved E-waste management and disposal facility in order to dispose E-waste in scientific manner.

6.2 Recommendations:

i. Always purchase recycled resources where these are both suitable and available.

ii. Recycle or safely dispose of computers and electrical equipment's.

iii. Use reusable resources and containers and avoid unnecessary packaging where possible

7.0 CONCLUSION

Environment, Green and Energy audit is a scientific and professional approach towards accountability in utilization of resources. This audit is a powerful tool to identify the strength and weakness of college in environment and sustainability area. This audit is helpful to the college and all the stakeholders for the identifying, evaluating and managing environmental risks and improvement in waste management, pollution control, energy, water management etc.

The output of this audit report in each area will be serve as a guide for educating and guide book to the college on the environment related practices and resource usage at the college as well as spawn new activities and innovative practices. The college has taken good initiatives for environmental protection and environmental conservation in the college campus area through environment committee or environmental student's forum. It is seen that this college has done a great work in the environmental awareness in the college and among the students. Appreciating various environmental conservation activities carried out by this college in this assessment period. This report will help to making the college "Green and Sustainable".

Key Observations:

- Executive and implemented objectives of college policy.
- Review and revaluated the policy objectives as per requirement.
- Formed College Environment Management Cell / Forum of the college for the college students.
- Prepared environmental conservation activities every year in the academic calendar.
- NSS, NCC, DLLE and Nature Club taken initiatives to organize trainings and workshops to teachers and students on environmental issues and environmental education.
- College has organized many awareness program on the occasion of Great Personalities and as per Environmental Days Calendar for students, teachers and other stakeholder's.
- Implemented 3 R (Reduce Reuse and Recycle) management systems in the college for making green and clean campus.
- College given preference to natural and renewable energy resources e.g. Solar Energy.
- College has installed Rain Water Harvesting Project.

8.0 REFERENCES:

1. College Annual Reports.

2. College Annual Magazines.

4. College Environment Committee and NSS Section activity reports.

5. College NSS, NCC, DLLE and Nature Club Section Annual Reports.

6. Criteria – VII Green Audit Guidelines - NAAC, Bangalore

7. Questionnaire of Green Audit

9. Wastewater Analysis methods Manuals – CPCB, New Delhi

10. Water Quality Monitoring Methods – American Public Health Association (APHA) 23rd Ed.

Campus Flora

Anandibai Raorane College is located in Vaibhavwadi taluka of Sindhudurg District is bordered by Ratnagiri District, the state of Goa, the Arabian Sea, and to the east across the crest of the Western Ghats or Sahyadris and Kolhapur District. College campus is part of Konkan (Coastal) region, a narrow coastal plain in western Maharashtra which lies between the Western Ghats of India and the Arabian Sea.

Anandibai Roarane college has been started in 1992 to fulfill the education facility of rural students of Vaibhavwadi taluka, Sindhudurg. Though there is development of New College building and Gymnastic stadium and other infrastructural facilities have been built due to introduction of new Science and commerce course, the natural wealth/plant diversity still maintained. The campus occupies 3.9 acres. The campus has a diverse flora of Cryptogams, Pteridophytes, Gymnosperms (Cultivated) and several wild species and cultivated exotic plants of Angiosperms. The botanical exploration is dream for our Dept. of Botany from its establishment in 2014. The college campus endowed with rich floristic diversity, the Dept of botany is maintaining botanical garden within the campus. This campus flora work is not only useful to students of botany but also all the interested students from commerce and arts faculties and local people, nature lovers and naturalist school students of Vaibhavwadi. The plants were collected during last 6years and identified with help of flora of Sindhudurg (B. G. Kulkarni,1988), Flora of Maharashtra Vol- 1 and II (N. P. Singh et.al 2000, 2001), Flora of Maharashtra- Monocotyledons, (P. Lakshminarasimhan, 1996), Flora of Kolhapur (Yadav and Sirdesai, 2002) and various herbarium catalogue.

College campus comes under semi-tropical climate and remains warm and humid in the most of the year and temperatures between 32 °C to 37 and monsoon winds bring heavy rains (average rainfall 3240.10 mm).

Documentation of the species within the campus helps to preserve the Western Ghats flora, ecosystem and human welfare. This campus flora covers all floristic wealth of the campus. Dept of botany hopes this inventory of campus would be immense the first hand information to all students of science disciplines.

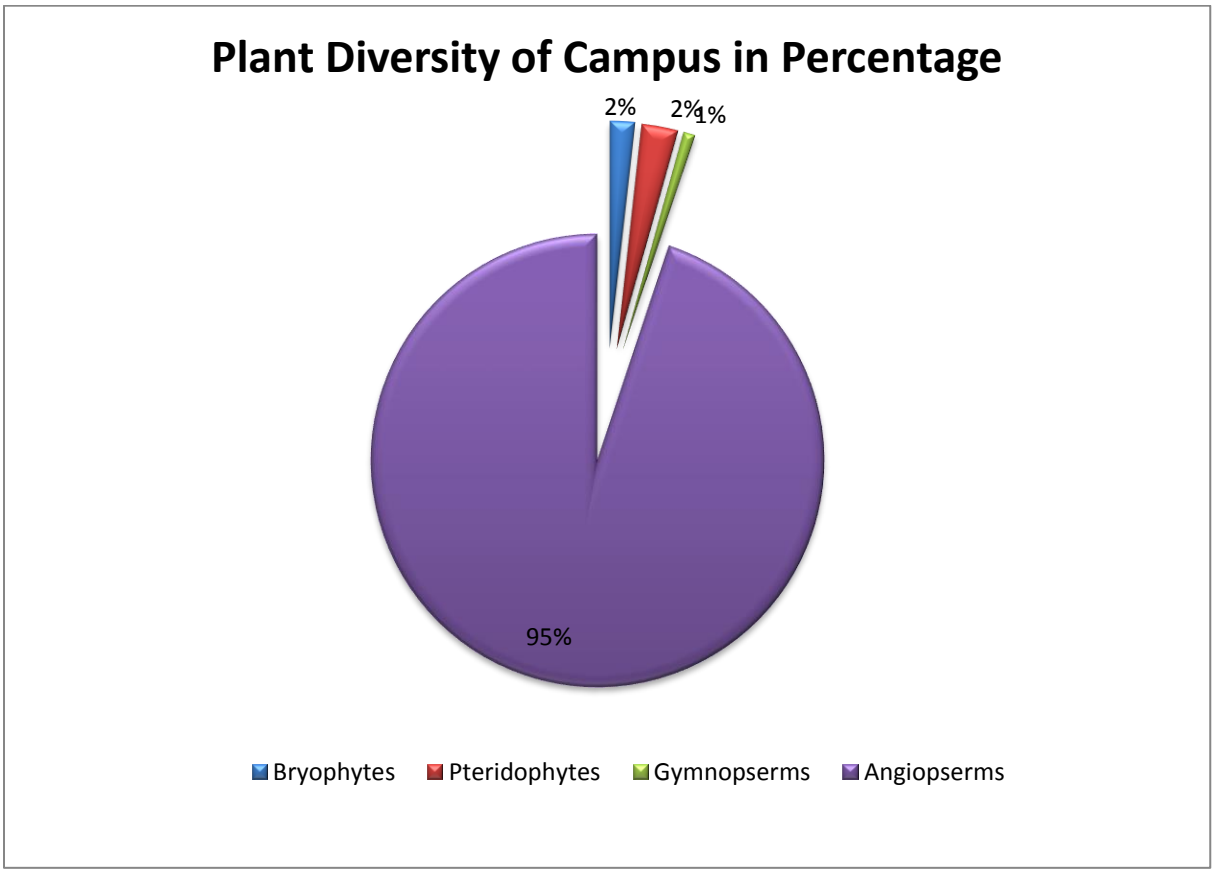
The Anandibai Raorane college campus harbours various plant groups which include cryptogames, flowering plants, ferns, mosses and some algae, but the ennumeration includes all the flora except the algae. Total 118 plant species were documented from the college campus. Deatil accepted botanical names with family names are given in photoplats.

A bigger vision to make this inventory of campus is to study florist and conservation of plant diversity (Rare, endemic, threatened) found on around college and surrounding)

CAMPUS SHOWS FOLLOWING PLANT DIVERSITY

Sr. no.	Plant groups	Number
1	Bryophytes	2
2	Pteridophytes	3
3	Gymnopserms	2
4	Angiosperms	111
Total		118

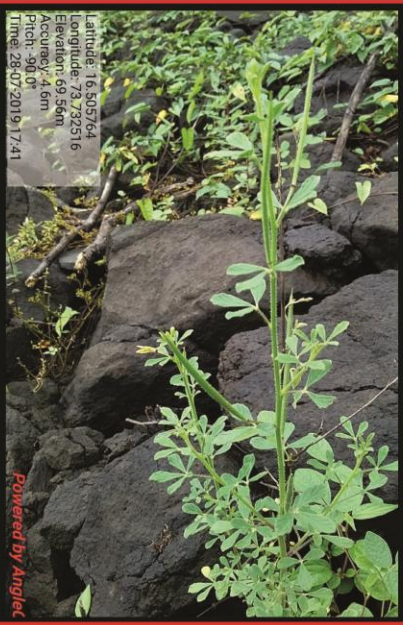
PLANT DIVERSITY PIE CHART



Riccia cristallina **L.**
(Ricciaceae)

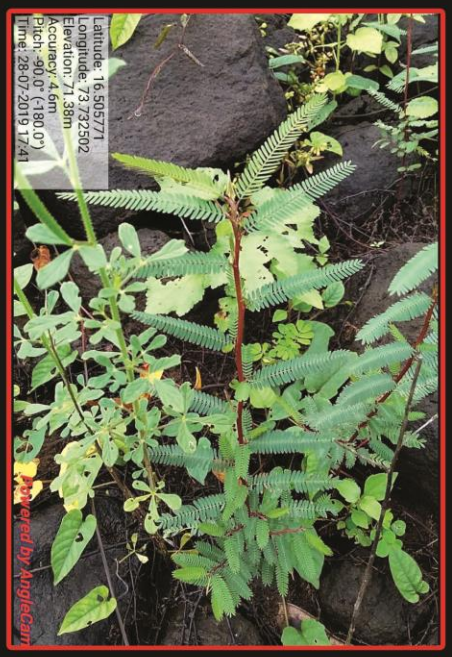
Utricularia purpurascens Grah.
(Lentibulariaceae)
and Eriocaulon eurypeplon Koern.
(Eriocaulaceae)

Triufetta annua L. (Malvaceae)



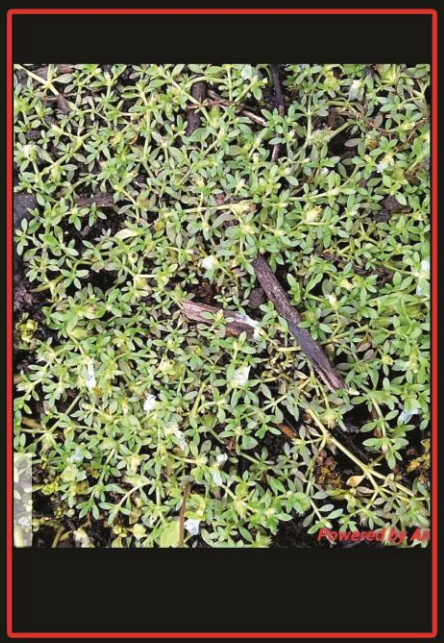
Cleome viscosa L.
(Cleomaceae)

Euphorbia hirta L.
(Euphorbiaceae)

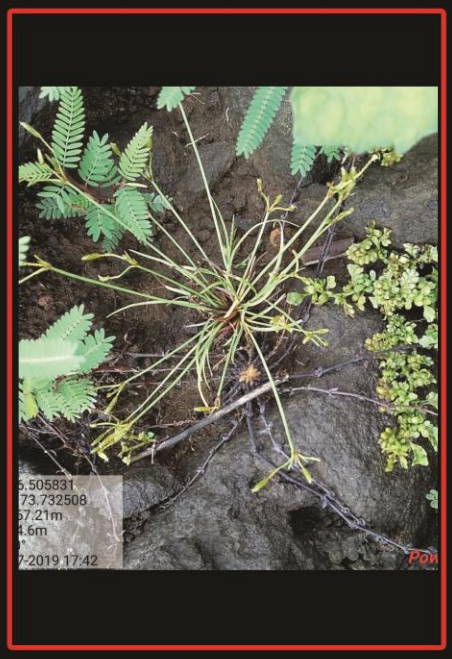


Cassia mimosoides L.
(Ceasalpinaceae)

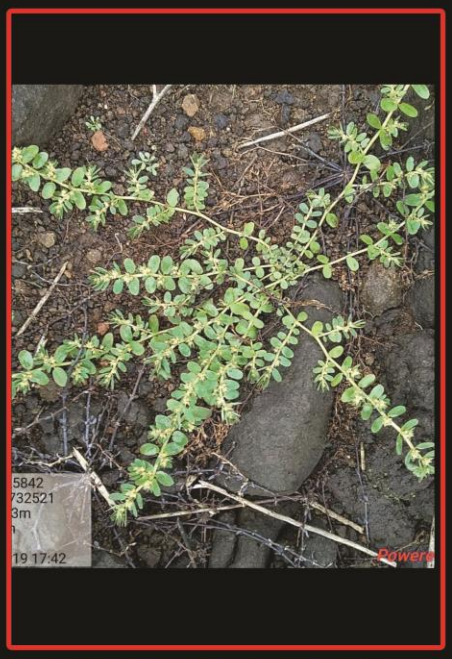
Fimbristylis miliacea(L.)Vahl.
(Cyperaceae)



Portulaca oleracea L.
(Portulacaceae)

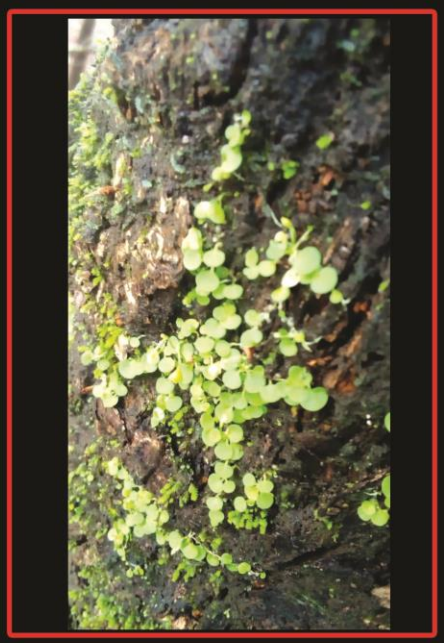


Fimbristylis adenolepis Kern.
(Cyperaceae)



Indigofera linifolia (L.f.) Retz.
(Fabaceae)

Iphigenia indica (L.) A. Gray
(Liliaceae)



Utricularia striatula Smith.
(Lentibulariaceae)

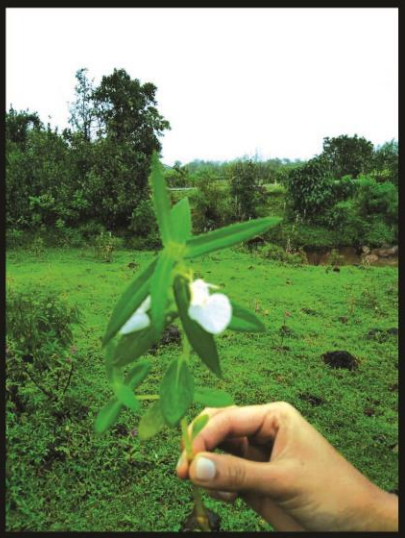
Habinaria foliosa var.gibsonii (Hook.f.) Bennet
(Orchidaceae)

Cynotis sp.
(Commelinaceae)

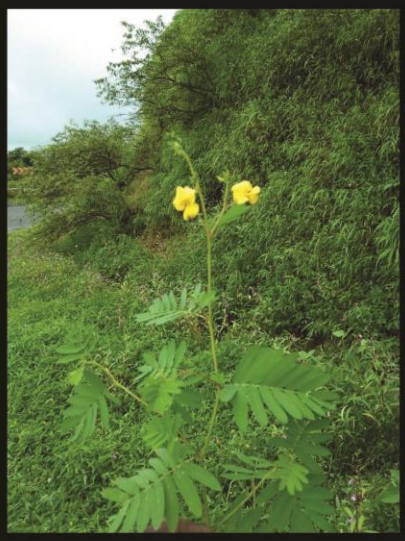
Rauvolfia serpentina (L.) Benth. ex Kurz.
(Apocynaceae)

Impatiens balsamina L.
(Balsaminaceae)

Solanum torvum Sw.
(Solanaceae)



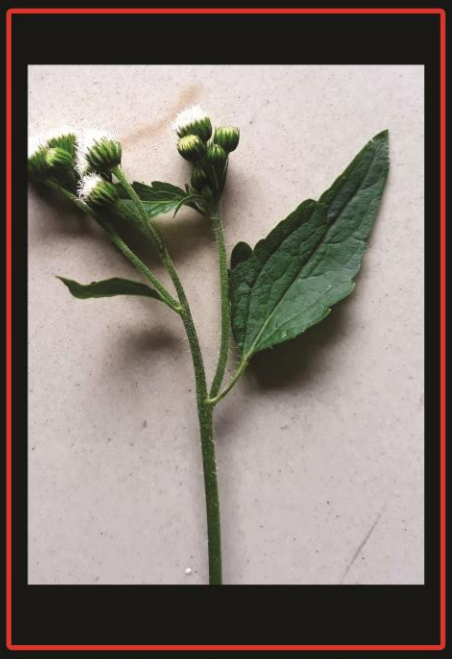
Impatiens balsamina L.
(White coloured forma)
(Balsaminaceae)



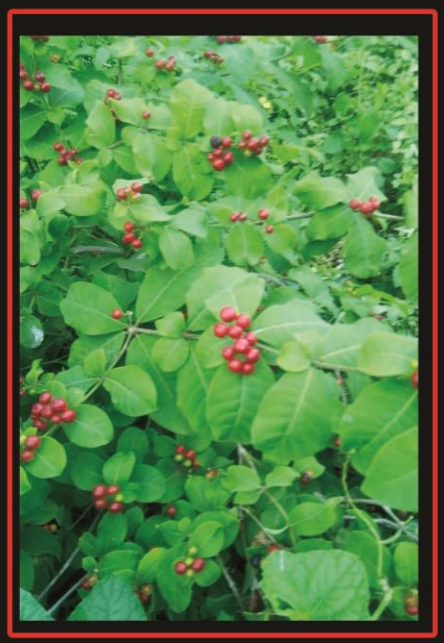
Smithia setulosa Dalz.
Fabaceae

Emblica officinalis Gaertn.
(Euphorbiaceae)

Cassia absus L.
(Ceasalpinaceae)



Chromolaena odorata (L.) R. M. King & H. Rob. (Asteraceae)



Rauvolfia tetraphylla L.
(Apocynaceae)

Curcuma pseudomontana Grah.
(Zingiberaceae)

Kedrostis foetidissima (Jacq.)Cong.
(Cucurbitaceae)

Sida rhombifolia L.
(Malvaceae)

Trichodesma zeylanicum (Burm f.) R. Br.
(Boraginaceae)

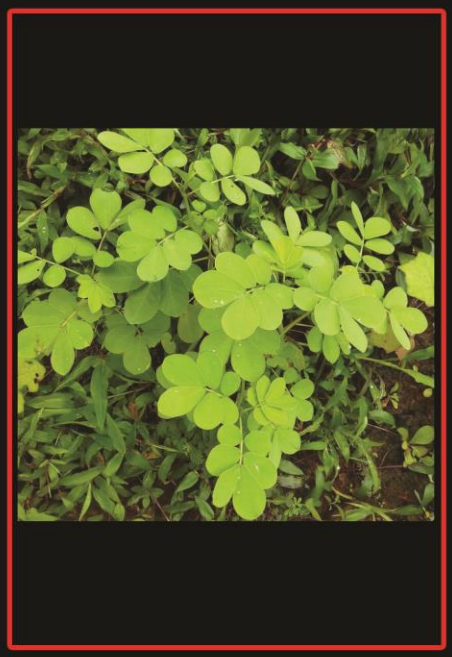
Argemone maxicana L.
(Papavaraceae)

Mimosa pudica L.
(Mimosaceae)

Sphaeranthus indicus L.
(Asteraceae)

Cyperus sp.
(Cyperaceae)

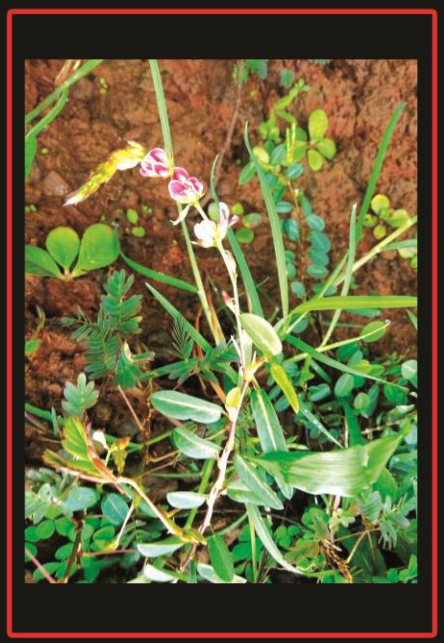
Acacia auriculiformis Benth.
(Mimosaceae)



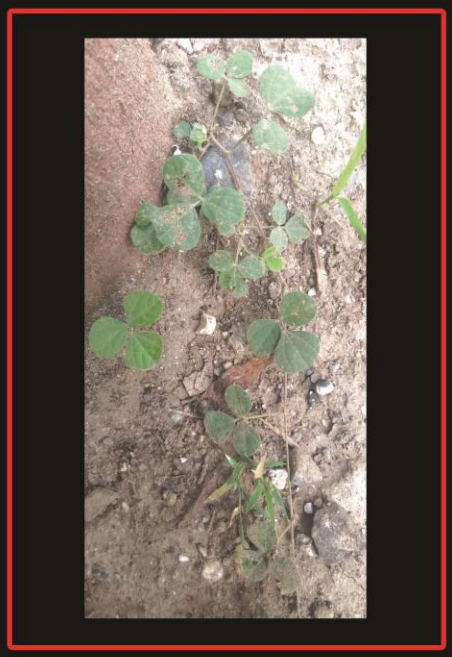
Cassia tora L.
(Ceasalpinaceae)

Eragrostis minor Host.
(Poaceae)

Tabernemontana divaricata (L.)R. Br.
(Apocynaceae)



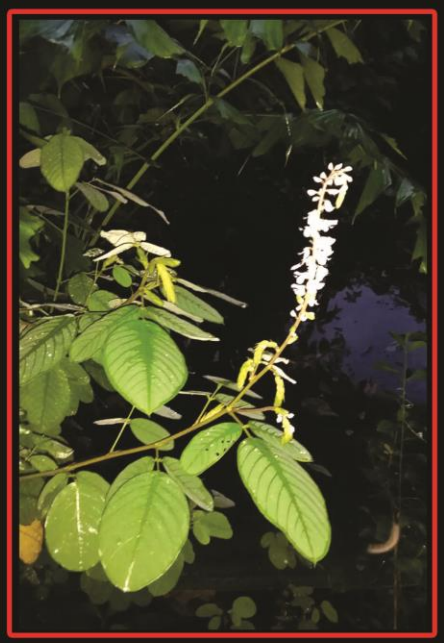
Alysicarpus vaginalis (L.)DC
(Fabaceae)



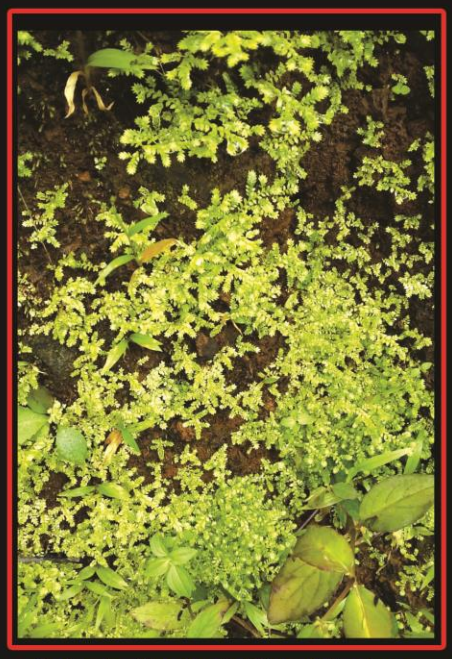
Cajanus scarabaeoides (L.) Du Petit-Thou.
(Fabaceae)

Ipomoea triloba L.
(Convolvulaceae)

Commelina benghalensis L.
(Commelinaceae)

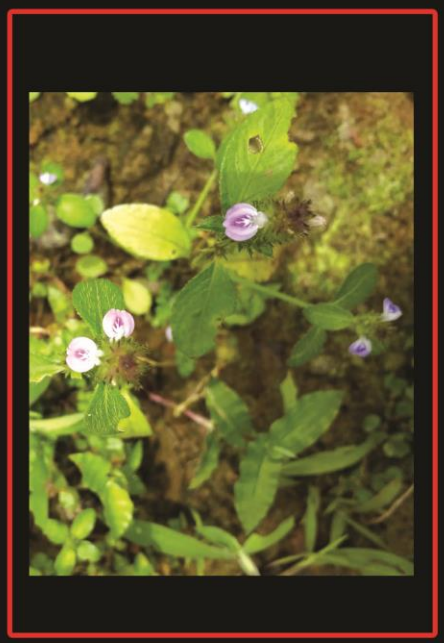


Uraria rufescens (DC.) Schindl.
(Fabaceae)

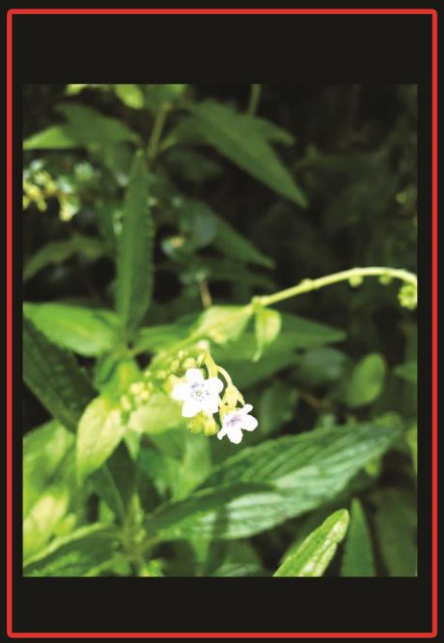


Selaginella ciiaris (Retz.) Spring.
(Selaginellaceae)

Curculigo orchioides Gaertn.
(Hypoxidaceae)

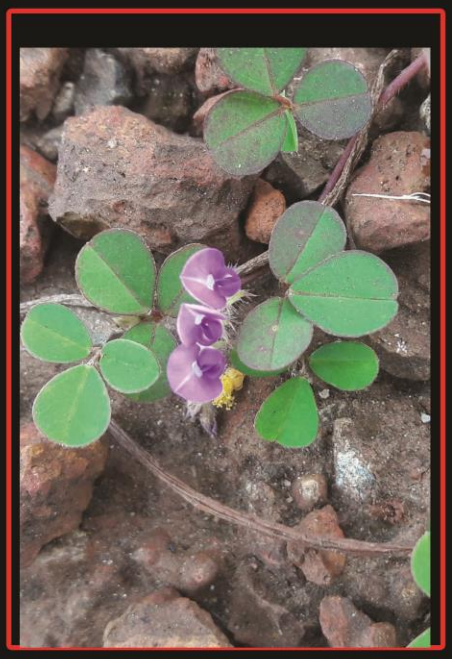


Phaulopsis imbricata (Forssk.) Sw.
(Acanthaceae)



Cynoglossum zeylanicum (Vahl ex Hornem.)
(Boraginaceae)

Cynotis tuberosa (Roxb.) J.A. & J. H. Schult.
(Commelinaceae)



Desmodium triflorum (L.)DC.
(Fabaceae)

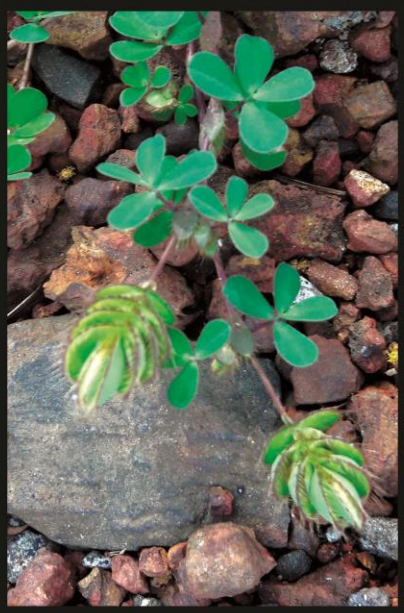
Clerodendrum serratum (L.) Moon.
(Verbenaceae)

Cassia alata L.
(Ceasalpinaceae)

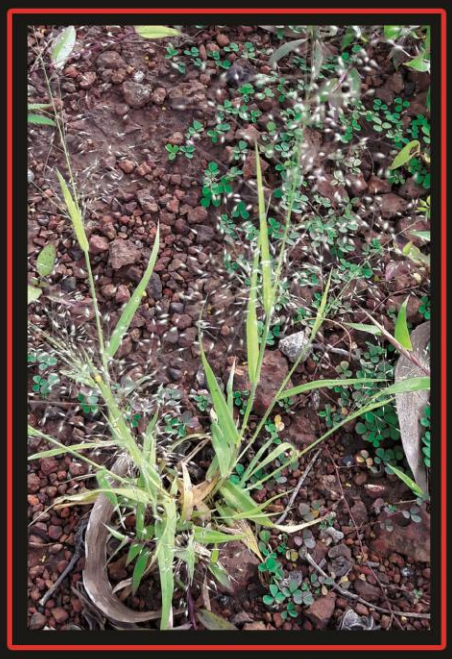
Corchorus aestuans L.
(Malvaceae)

Costus speciosus (Koen.)J. E. Smith.
(Costaceae)

Tephrosia tinctoria (L.) Pers.
(Fabaceae)



Geissaspis cristata Wight & Arn.
(Fabaceae)



Arundinella ciliata (Roxb.) Nees ex Miq.
(Poaceae)

Acyranthes aspera L.
(Amaranthaceae)

Vigna radiata var. sublobata (Roxb.)Verdc.
(Fabaceae)

Indigofera trifoliata L.
(Fabaceae)

Caesalpinia pulcherrima (L.)Sw.
(Caesalpinaceae)

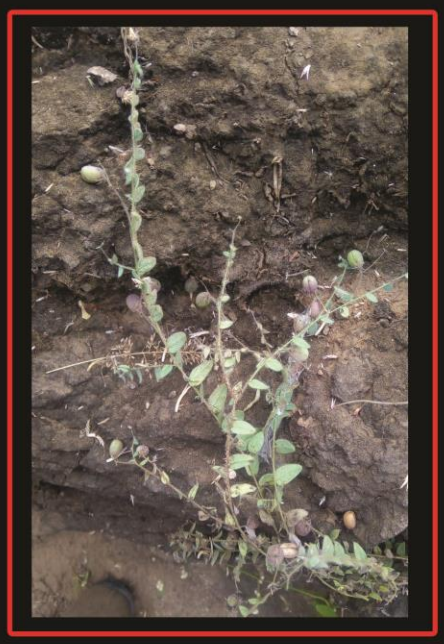
Haemanthus multiflorus (Tratt.) Martyn.
(Amaryllidaceae)

Catharanthus roseus (L.)G. Don
(Apocynaceae)

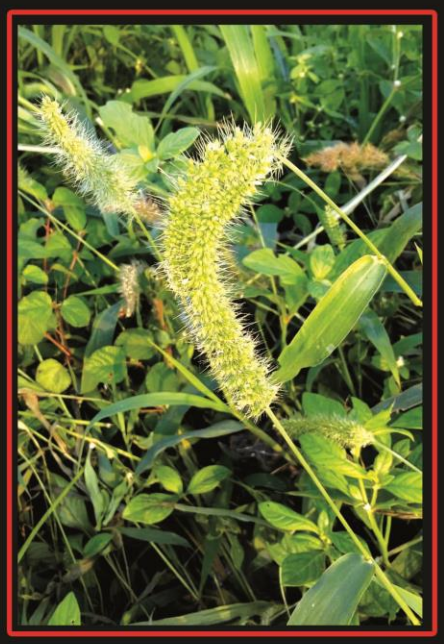
Euphorbia milli Ch.-Des.-Moulins
(Euphorbiaceae)

Crotalaria pallida Ait.
(Fabaceae)

Lepidagathis trinervis Nees.
(Acanthaceae)

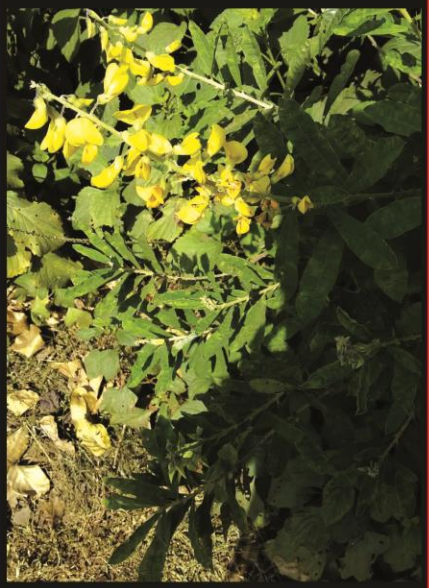


Crotalaria filipes Benth.
(Fabaceae)



Setaria pumila (Poir.) R. & S.
(Poaceae)

Aeschynomene Indica L.
(Fabaceae)



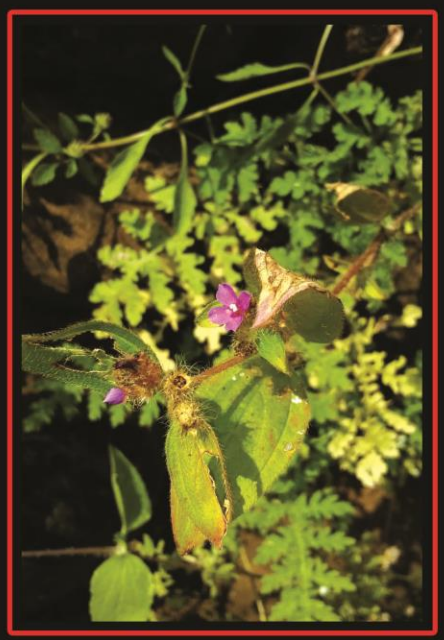
Crotalaria retusa L.
(Fabaceae)

Ludwigia perennis L.
(Onagraceae)

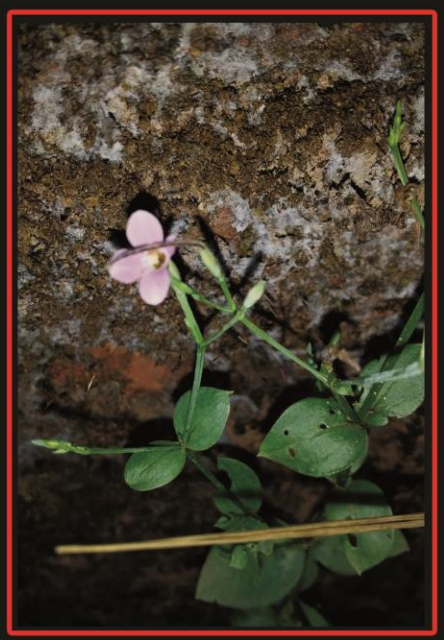
Alysicarpus monilifer (L.) DC.
(Fabaceae)

Rotala rosea (Poir) Cook
(Lythraceae)

Tedehagi triquetrum (L.) Ohashi
(Fabaceae)



Exacum petiolare Griseb.
(Gentianaceae)



Conscora diffusa (Vahl.)R.Br.
(Gentianaceae)

Blumea sp. (Asteraceae)

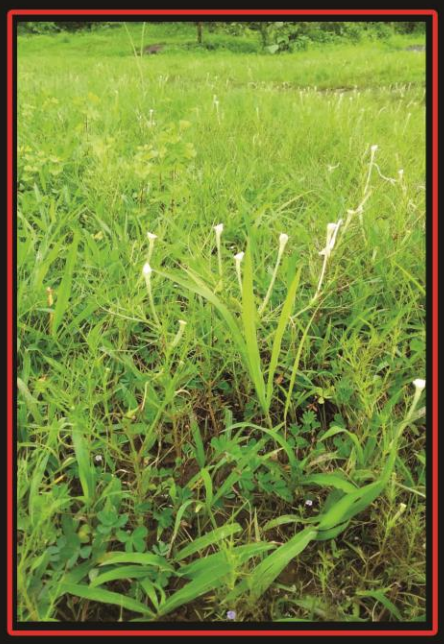
Lindernia ciliata (Colsm.) Pennell (Scrophulariaceae)

Verbascum chinense (L.) Santapau (Scrophulariaceae)

Launaea acaulis (Roxb.) (Asteraceae)

Pteris vitata L.
(Pteridaceae)

Adiantum philippense L.
(Peridaceae)



Rhamphicarpa longiflora (Arn.) Benth.
(Scrophulariaceae)

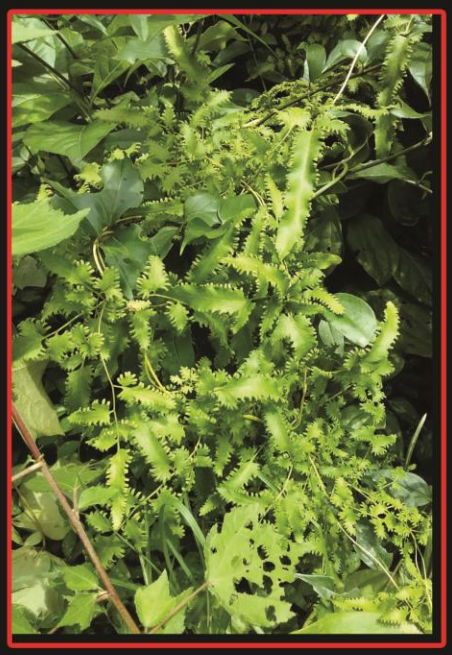
*Impatiens minor (DC.)*Bennet.
(Balsaminaceae)

Hibiscus vitifolia L.
(Malvaceae)

Spermacoce ocymoides Burm f.
(Rubiaceae)

Lantana camara L.
(Verbanaceae)

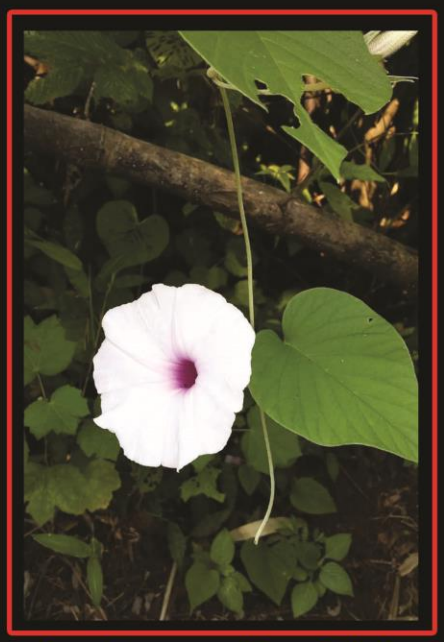
Elephantopus scaber L.
(Asteraceae)



Lygodium flexuosum (L.) Sw.
(Lygodiaceae)

Hyptis suveolens (L.) Poit.
(Lamiaceae)

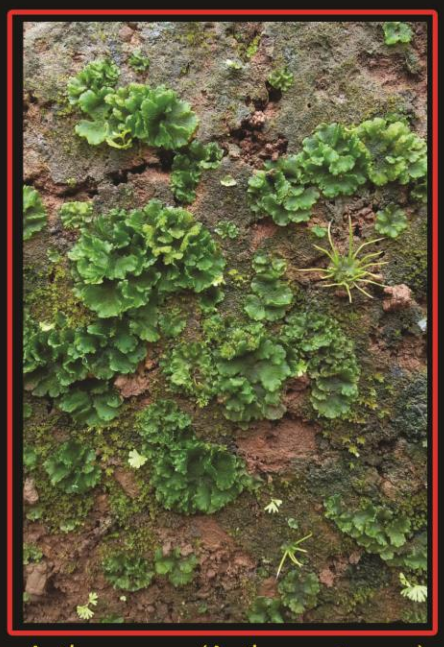
Chrysopogon fulvus (Spreng.)Chhiov.
(Poaceae)



Argyreia nervosa (Burm.f.) Bojer
(Convolvulaceae)

Kyllinga triceps Rottb.
(Cyperaceae)

Amorphophallus commutatus (Schott)Engl.
(Araceae)



Anthoceros sp. (Anthocerotaceae)

Cana indica L. (Cannaceae)

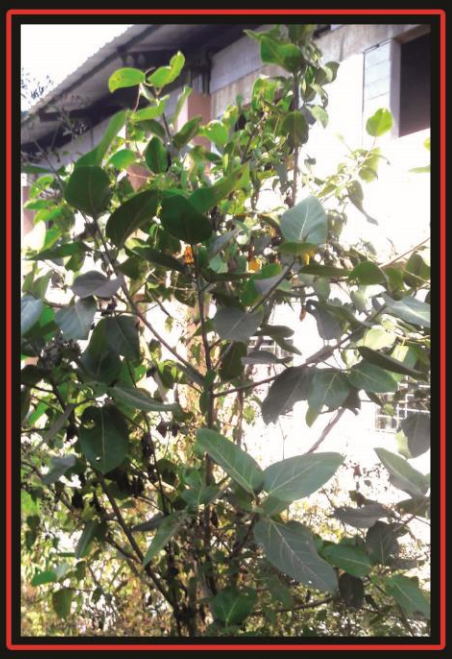
Nephrolepis exaltata (L.) Schott
(Nephrolepidaceae)

Plectranthus scutellarioides (L.) R.Br.
(Lamiaceae)

Epipremnum aureum (Linden ex Andre) Bunting
(Araceae)

Dracaena sp. (Asparagaceae)

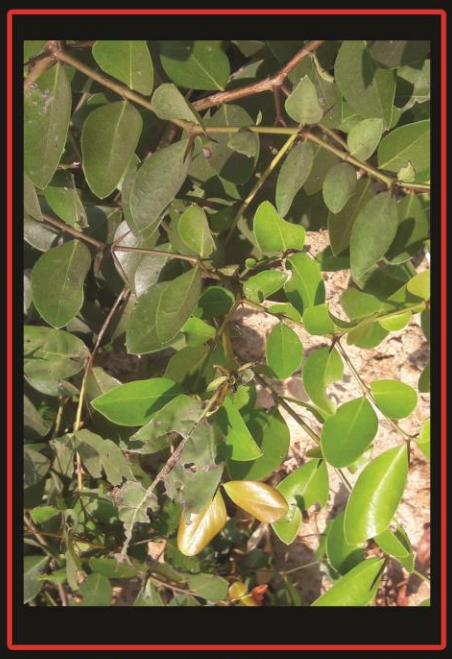
Grewia serrulata DC. (Malvaceae)



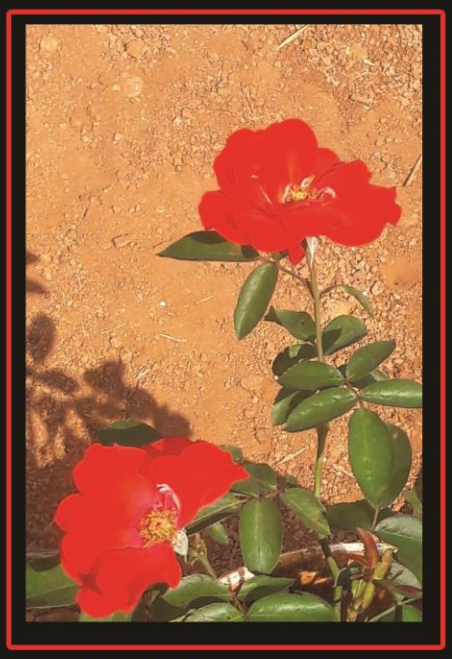
Ficus benghalensis L. (Moraceae)

Ipomoea pes-tigridis L.
(Convolvulaceae)

Cymbopogon citratus (DC.) Stapf
(Poaceae)



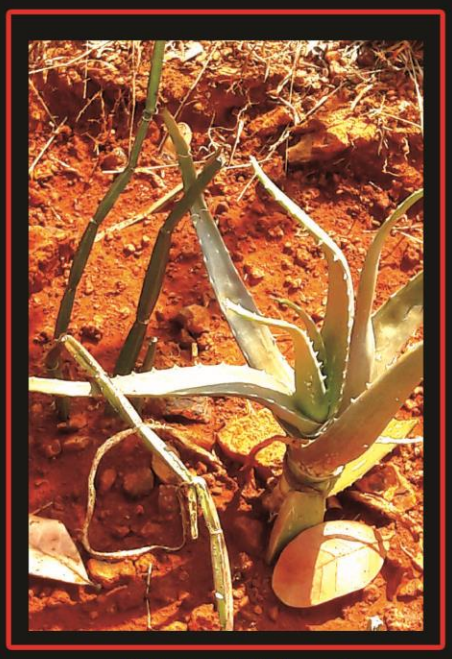
Carissa carandas L. (Apocynaceae)



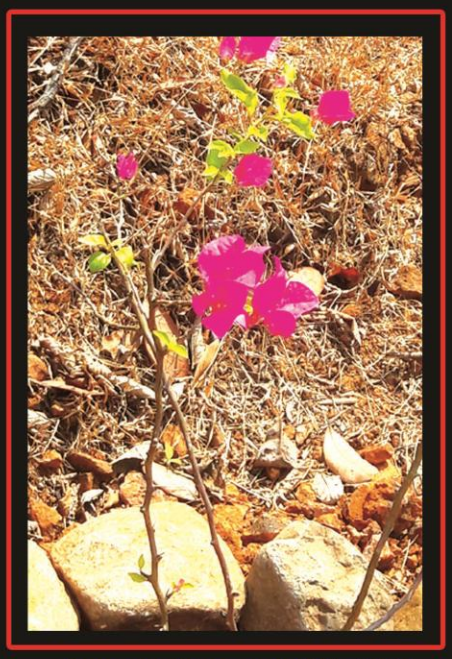
Rosa indica L. (Rosaceae)

Ficus racemosa L. (Moraceae.)

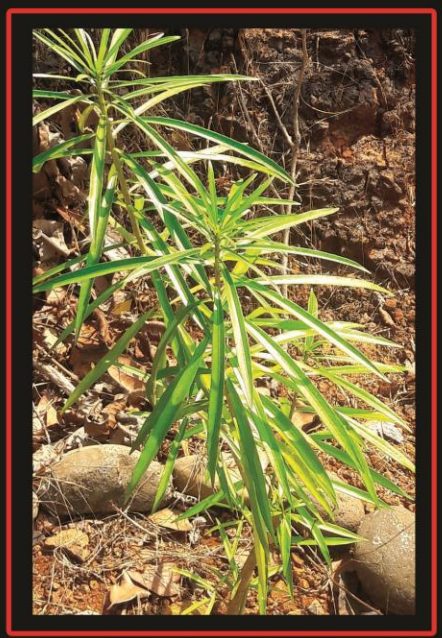
Dianthus barbatus L. (Caryophyllaceae)



Aloe vera (L.) Burm.f.
(Asphodelaceae)



Bougainvillea spectabilis Willd.
(Nyctaginaceae)



Cascabela thevetia (L.) Lippold
(Apocynaceae)

Azadirachta indica A.Juss.
(Meliaceae)

Delonix regia (Hook.) Raf.
(Caesalpiniaceae)

Leucaena leucocephala (Lam.) de Wit
(Mimosaceae)

Holarrhena antidysenterica (L.) Wall
(Apocynaceae)

Roystonea regia (Kunth) O.F.Cook
(Arecaceae)