

Green Auditing of Regional Institute of Education (RIE), National Council of Educational Research and Training (NCERT), Ajmer

Sponsored By

Regional Institute of Education (NCERT), Ajmer



**CSIR – National Environmental Engineering
Research Institute**



April – 2023

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Chapter 1

Introduction

1.1 About the Institute

The Regional Institute of Education, Ajmer formerly known as (Regional College of Education) was established in the year 1963. It was renamed in the year 1995. It is one of the four regional colleges of education established by National Council of Educational Research and Training (NCERT). The other institutes are located at Bhopal, Bhubaneswar and Mysore. The aim of the institute is to look after the educational interest of Northern region, including the states of Haryana, Himachal Pradesh, Punjab, Rajasthan, Uttarakhand, Uttar Pradesh, the National Capital Territory of Delhi, and the Union Territory of Chandigarh, Jammu Kashmir and Ladakh. The partial credit for Ajmer being popular in India as a historical and religious place and educational center goes to the Regional Institute of Education (RIE). The institute is spread over 110 acres having spacious buildings, playgrounds, gardens and laws and farms. It is affiliated to the M.D.S. University, Ajmer. The courses offered in the institutes are recognized by NCTE, New Delhi. It is managed by NCERT.

Departments in the Institute

The Institute consists of four main departments:

1. Department of Education (DE).
2. Department of Extension Education (DEE).
3. Department of Education in Science and Mathematics (DESM).
4. Department of Education in Social Sciences and Humanities (DESSH).

Apart from the undergraduate and postgraduate courses, a higher secondary school called Demonstration school also works inside the campus which serves the institute to carry out innovative research in education and also helps prospective teachers to observe, learn and practice teaching.

1.2. Aims and Objectives of the Institute

The institute was established with an aim to conduct research and provide training and development for school education and teacher education. To prepare quality teachers by conducting in-service training programs. It provides necessary help to the state agency with instructional material for school education and policies and programmes related to the school education. Their vision is to nurture and ensure excellence, quality and inclusive growth in school education and teacher education. The Regional Institute of Education, Ajmer works with a mission to innovate and evolve the ways of emerging scenario in school education by ensuring the implementing, monitoring and evaluating educational programmes and policies of Government of India and NCERT.

1.3. Courses offered

- B.Sc. B.Ed. (Four Year Integrated Programme)

In two groups

1. Physics Science Group (Physics, Chemistry and Mathematics)
2. Biological Science Group (Botany, Zoology, and Chemistry)

- B.A. B.Ed. (Four Year Integrated Programme)
- B.Ed. (Two Year Programme)

In two groups

1. Science and Mathematics Group
 2. Social Science and Language Group
- M.Ed. (Two Year Programme)
 - Ph.D.

1.4. Campus Infrastructure and layout:

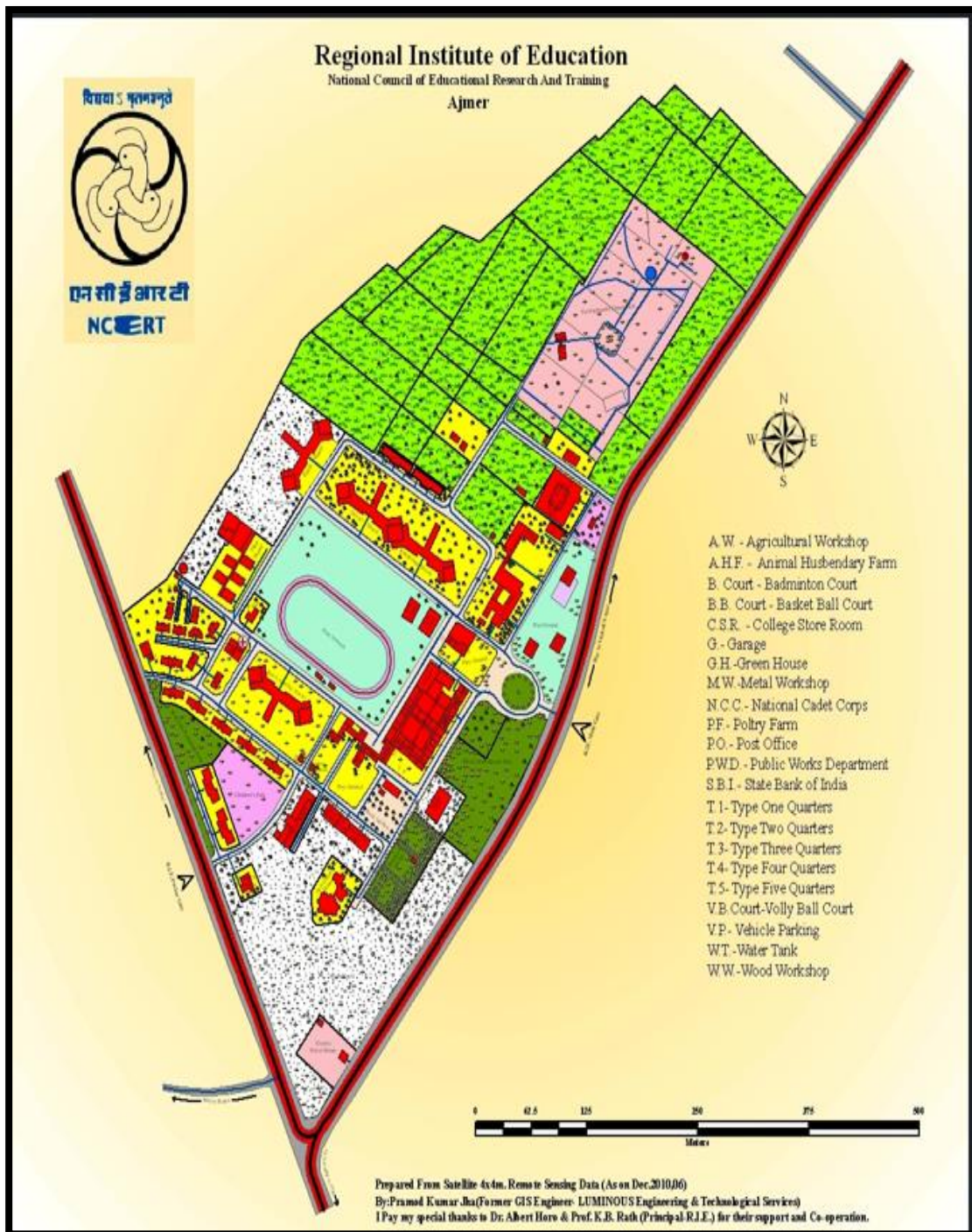


Fig 1.1: Campus layout Map



Fig 1.2: RIE Ajmer around 1 km radius

RIE Campus has a landscape of 125 acres and 34 guntas (5, 05,997.96 sqm). The Area-wise various buildings at Institute are given in Table 1

Table 1.1: Area-wise building at Institute

Sr. No.	Buildings at institute	Covered area	Number of rooms
1.	Administrative Building	2454.99sqm	97 Rooms (45 on the Ground&on2the in the First floor)
2.	Technology Block	1747.17 sqm	47 Rooms
3.	Tarka Kendra Block	1942 sqm	1942 sqm
4.	Institute Library	519 sqm	519 sqm
5.	Demonstration School Pre-Primary Block	736.33 sqm	-
6.	Demonstration School Primary Block	2306.61 sqm	-
7.	Demonstration School High School Block	3819.5 sqm	-
8.	New Block with 5 Classrooms & 5 Faculty chambers	9061.54 sqm	-
9.	Ganga Hostel	5072.46 sqm	185 Rooms
10.	Narmada Hostel	2145.11 sqm	63 Rooms
11.	Saraswati Hostel	3147.5 sqm	75 Rooms
12.	Krishna Hostel	2145.11 sqm	63 Rooms
13.	Kaveri Hostel	2145.11 sqm	63 Rooms
14.	Godavari Guest House	492.38 sqm	12 Rooms
15.	Clinic /Dispensary	204.38 sqm	-
16.	Shopping Complex	82.32 sqm	-
17.	Institute Canteen	229.28 sqm	-
18.	Parking	607.46 sqm	-

- Staff Quarters (Type I – VI) – 101 Nos.
- Playground – Football, Volleyball, Basketball, Tennis, Throw ball, Cricket practice Pitch:
- Horticulture – Coconut, Mango, Tamarind, Sapota
- Cattle sheds – 2
- Rainwater harvesting system

The other buildings of RIE Ajmer are as following

1. College Building
2. First Floor
3. New Science block
4. Ground Floor
5. Platform
6. New Accountant Room
7. Above Accountant Room
8. School building
9. Technology Block
10. Proposed School Building
11. Primary School Room
12. Canteen
13. Maintenance Shed
14. Car Garage
15. Cooperative Store
16. Assembly Hall
17. Cycle Car Parking Shed
18. School Bus Garage
19. Workshop
20. Poultry Shed
21. Cattle Shed
22. Laboratory Shed
23. Additional Classroom
24. Bus Garage
25. Health Clinic
26. Extension of Library
27. Primary School
28. Green House

29. Lab Eco. Park
30. Guard Room
31. CPWD Service Centre
32. New Library Building
33. Bank/ post office
34. Substation/ shop/ std.
35. New Car / motor cycle stand
36. New Girls Hostel(Sarasvati hostel)
37. Pre- Primary School
38. Residential Area for Staff members

1.5. Land use data including build-up area and plantation area:

115.34 acres are used for building and plantation areas. The various buildings are following in sq. meter is given in Table 1.2

Table 1.2: Build up area of various buildings of RIE

Sr. No.	Building Name	Build up area (in sq. ft.)	Build up area (in sq. mtr.)
1.	College Building	27230	12674
2.	First Floor	20219	
3.	New Science block	10820	
4.	Ground Floor	10820	
5.	Platform	264	
6.	New Accountant Room	351	
7.	Above Accountant Room	890	
8.	School building	13863	
9.	Technology Block	7263	
10.	Proposed School Building	3072	
11.	Primary School Room	4614	
12.	Canteen	2700	
13.	Maintenance Shed	882	
14.	Car Garage	768	
15.	Cooperative Store	1153	
16.	Assembly Hall	10010	
17.	Cycle Car Parking Shed	1833+1095+1090= 4018	
18.	School Bus Garage	1453	
19.	Workshop	720	
20.	Poultry Shed	1300	
21.	Cattle Shed	1540	
22.	Laboratory Shed	491	
23.	Additional Classroom	2703	
24.	Bus Garage	1016	
25.	Health Clinic	2758	
26.	Extension of Library	5495	
Total		136373 sq. feet	
27.	Primary School	-	1829
28.	Green House	-	135
29.	Lab Eco. Park	-	135
30.	Guard Room	-	36
31.	CPWD Service Centre	-	123
32.	New Library Building	-	450
33.	Bank/ post office	-	220
34.	Substation/ shop/ std.	-	92
35.	New Car / motor cycle stand	-	220
36.	New Girls Sarasvati hostel	-	9520
37.	Pre- Primary School	-	917
38.	Residential Area for Staff		21823.30
Total			48174.30

1.6. Facilities

Library

The Institute has a well-equipped and well managed Library and Documentation Centre. Members of the faculty and staff, students and research scholars of the Institute, members of staff at Demonstration School and the participants of various programmes take advantage of the facilities made available by the library. The Institute also subscribes to about 64 journals/periodicals, both Indian and foreign.

The library also offers various services, such as procuring books from other libraries on Inter-Library Loan, Photostat facility at nominal charges and provides following up-to-date computerized information to the staff and the students.

- Computerization of circulation services using Bar-coded Library cards.
- LIBSYS Software platform for Retro-conversion.
- On-line Public Access Catalogue Search Service.
- Multi-media Corner.

Library Services

- Content Service
- Providing New Arrivals List
- News Papers Clipping
- Internet Service
- Photocopying/ Scanning
- Document Delivery
- Campus Infrastructure and layout

A State of Art Studio

RIE Ajmer Studio has developed for E-Content development. Studio has analog recording facility. The studio has got broadcast standard reverberation time and sound proofing. Audio/Video recording, editing and mixing are done on this console.

Smart Class Rooms

RIE Ajmer has Five Smart Class Room fully equipped with public address system, LCD

projectors playback /recording facilities for audio/video at real time.

Conference Hall

RIE Ajmer has one Conference Room fully equipped with public address system, LCD projectors playback facilities for audio/video.

Computer Centre

The Computer Centre comprised of two labs. It has having 50 of PCs fully loaded with all essential software's and internet connectivity. The Computer Centre opens from 9 A.M. to 5.30 P.M. on every working day.

Access Right

All students, faculty members and employees of the Institute are eligible to access the Computer Centre as per their need within 9A.M. to 5.30P.M.

Services

It follows an Open Access System

- Internet facility
- Computer assistance
- Printing & scanning
- Information to the users.

Rules and Regulations

The Computer Centre may be used by the following categories of members.

- Members of the Institute (Students and Staff)
- Persons doing research or working for a project under the guidance of any member of the teaching staff of the Institute.

Sports Facilities

Physical recreation through games and sports has been an important part of the Institute since its inception. Games like football, cricket, Badminton and tennis. Today, the Institute has some of the best facilities in a number of games and sports and awards proficiencies in 10 games. The tradition continues, as students of the institute keep making use of the marvelous sports facilities to excel in

sports and games. In order to motivate the students and to get them interested in sports.

- **Facilities:**

- Common Main Play Ground for:

- Cricket
- Football
- Standard Track for Athletics

- 2 Badminton Court (Indoor)

- 1 Tennis Court

- 1 Basketball Court

- 3 Volley ball Court(outdoor)

- 2 Table Tennis (Tables in Boys and Girls Hostel)

- 1 Roman Ring & 2 Parallel Bars fixed in the Main Play Ground

- 1 Multi-Purpose hall for yoga and Extra Activities

- 1 Open Gym with 21 different exercise station

Hostel

Most of the students of the institute (B.Sc. B.Ed, B.Ed and M.Ed.) reside in the hostels situated on the campus. The hostel rooms are furnished with beds, tables, chairs, fans and electrical fixtures. Each hostel has a kitchen, a dining hall, recreation and common room with the facilities of T.V. For this purpose there are five hostels. The rooms are used to accommodate both the regular students and the participants coming to the RIE to attend the various extension programs. The RIE staff has also been provided with a large number of quarters of different types.

- **Boys Hostel**

1. Tilak Hostel
2. Ranjit Hostel

- **Girls Hostel**

1. Laxmibai Hostel
2. Rana Pratap Hostel
3. Shivaji Hostel
4. Saraswati Hostel

Dispensary

Regional Institute of Education has got one Dispensary, running under the charge of a Medical Officer, for providing Medical facilities to the students and members of RIE, Ajmer. It also provides medical facilities to the students of Demonstration Multipurpose Sr. Secondary School, Ajmer and Primary School which are integral parts of RIE, Ajmer.

Bank

There is one bank on-campus the State Bank of India (S.B.I.). The bank provides Centralized Banking Services, Internet Banking and A.T.M. facilities. The bank is located at corner near the post office. The A.T.M. of S.B.I. is also on-campus- near the bank branch. Apart from these, many banks have branches and A.T.M. facilities in the town, that is, off-campus.

Guest House

1. Dr, Bhimrao Ambedkar Guest House
2. Dr. A.P.J. Abdul Kalam Guest House, and
3. Dr. Sarvapalli Radhakrishna Guest House

A Guest House having six double seated rooms has been newly constructed at the campus. Each of the room has an attached toilet with hot and cold-water facility. All rooms are serviced by an emergency generator set. All AC rooms and suites are also provided with color televisions with cable connection. It also has a well-equipped seminar room to facilitate the organization of different activities and programs of the institute.

Post Office

The campus has a post office within its premises which is situated near the SBI Bank. The post office is well equipped and caters to the needs of the students and the faculty, as well as the non-residents of the campus. The post office works on all weekdays from 9 A.M. to 5 P.M.

RIE Canteen

The Institute's canteen is being maintained by canteen runner and he is keeping clean environment and serving delicious food as customer want. "All happiness depends on a leisurely breakfast".

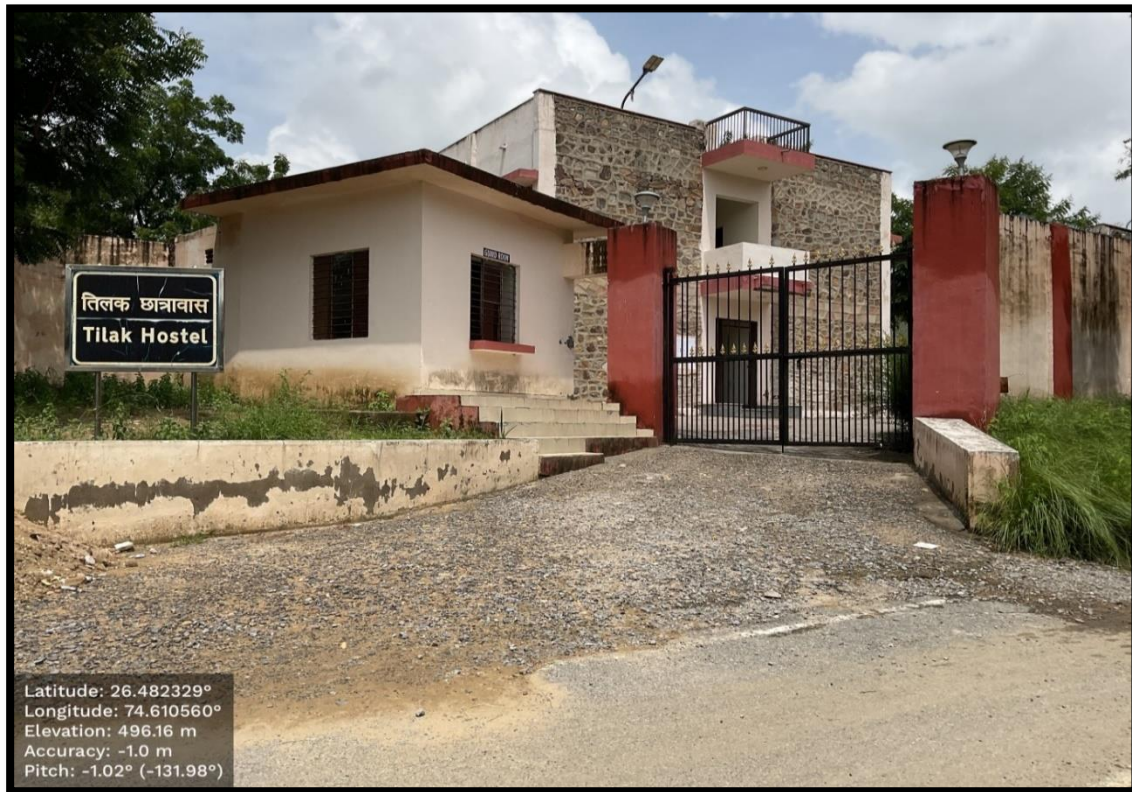


Fig 1.3: Tilak Hostel (Boys hostel)



Fig 1.4: Shivaji Hostel (Girls hostel)

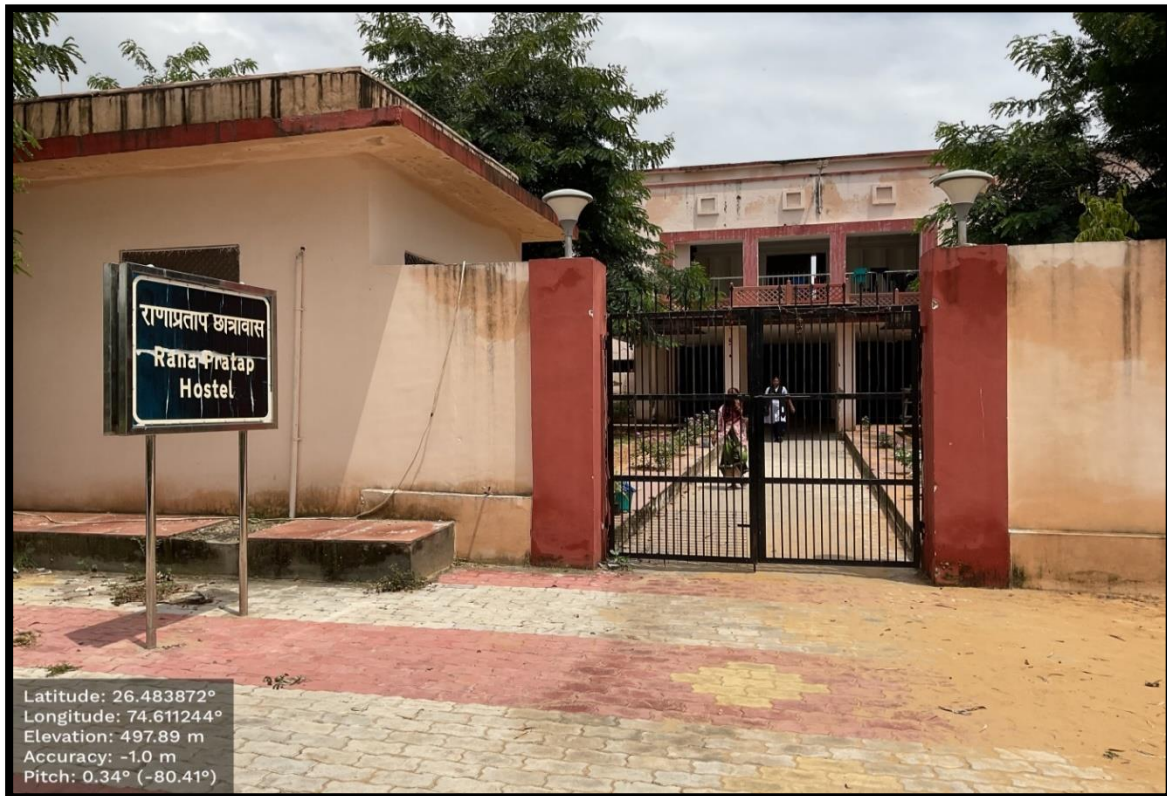


Fig 1.5: Rana Pratap Hostel (Girls hostel)



Fig 1.6: Laxmi-Bai Hostel (Girls hostel)



Fig 1.7: Book Bank of RIE



Fig 1.8: Library of RIE



Fig 1.9: Chemistry Laboratory of RIE



Fig 1.10: Girls common room



Fig 1.11: Boys common room



Fig 1.12: Dispensary of RIE

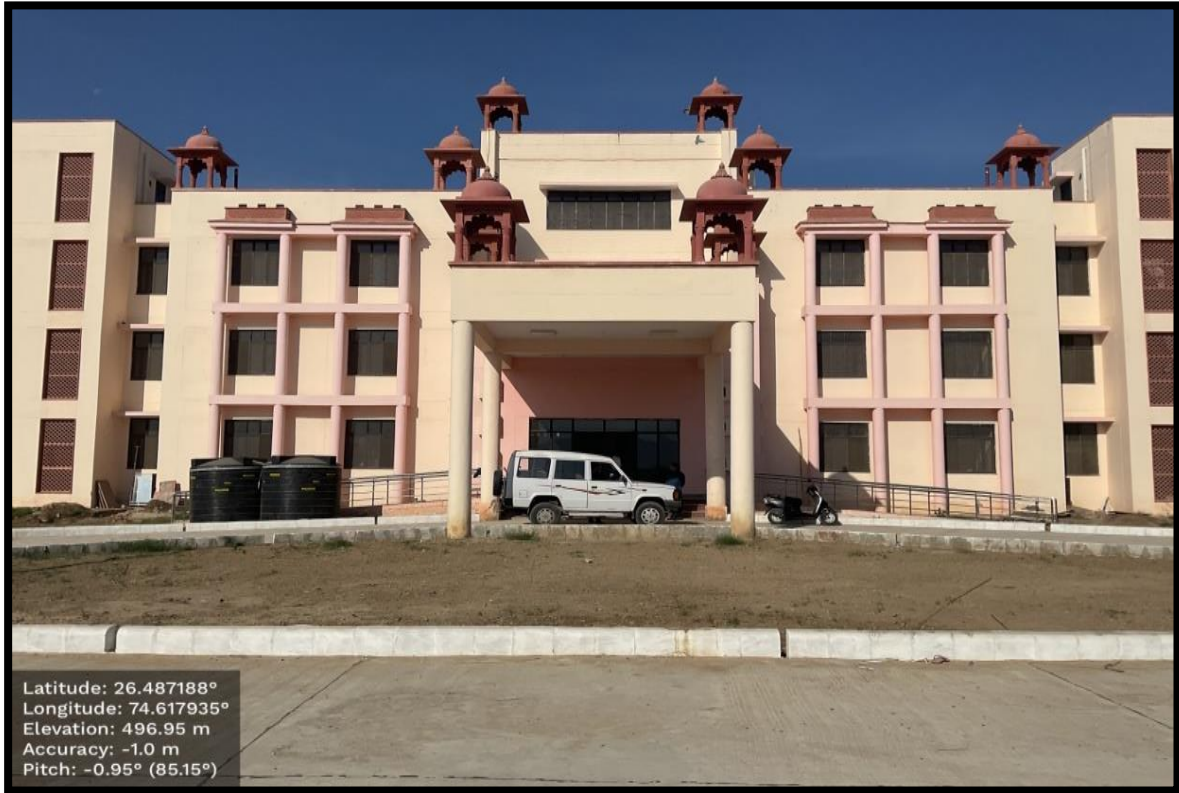


Fig 1.13: Main building of RIE Campus



Fig 1.14: Assembly Hall of RIE

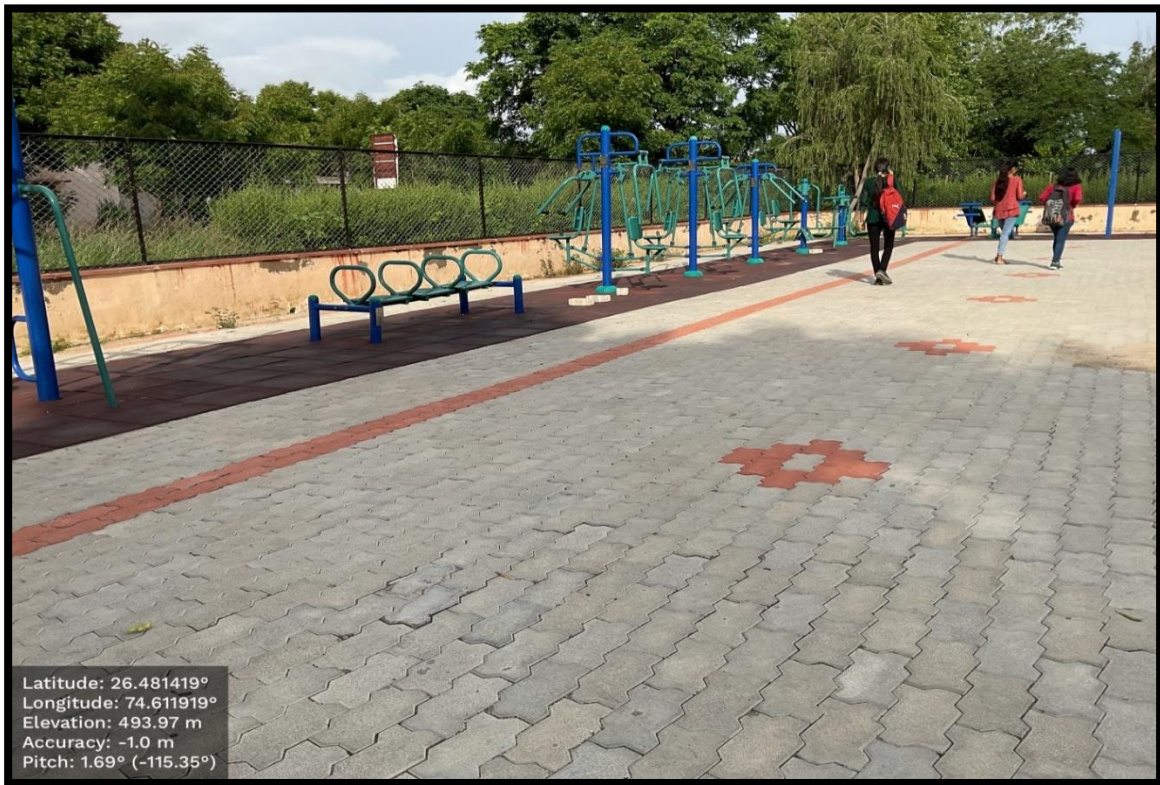


Fig 1.15: Gym Park of RIE



Fig 1.16: Campus canteen

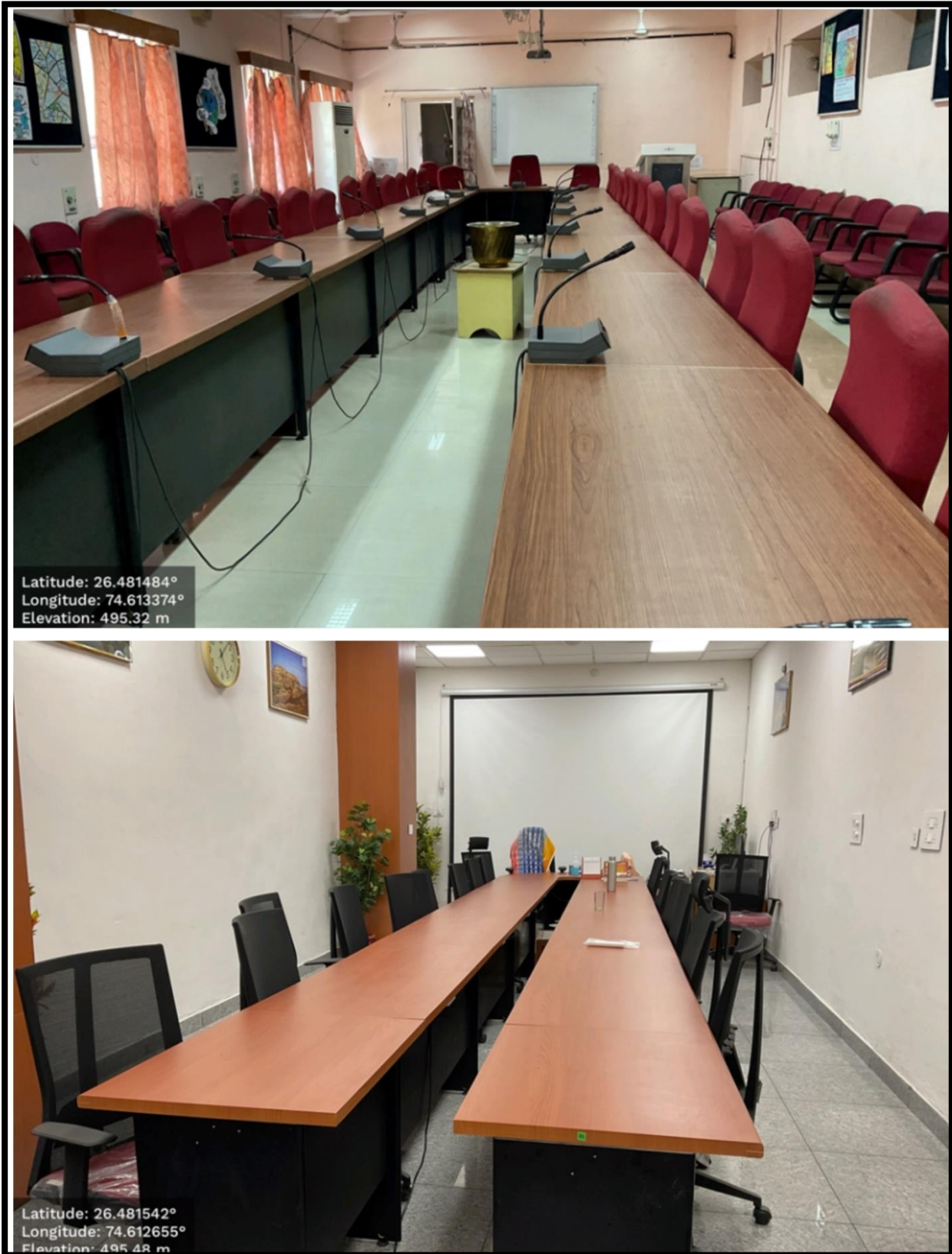


Fig 1.17: Conference hall of RIE



Fig 1.18: Sports court of RIE Campus (basketball, table tennis, cricket, and, football)



Fig 1.19: Parking of RIE



Fig 1.20: Bank of RIE Ajmer



Fig 1.21: Post Office of RIE Ajmer

Chapter 2

Pre-Audit Stage

2.1. Scope and Goals of Green Audit

An environment that is clean and healthy promotes learning and is conducive to learning. Several initiatives are being made worldwide to address the problems with environmental education. A green audit is the most effective and sustainable method of handling environmental issues. It is a type of professional care that each person who is a component of an economic, financial, social, or environmental aspect is responsible for. Doing a green audit on college and institute campuses is essential because it raises students' awareness of the benefits of doing so for the environment and helps them develop into responsible citizens. As a result, green auditing is required at the institute and college levels.

2.2. Benefits of Green Audit

- Improved resource management
- To provide the basis for improved sustainability
- To create a green campus
- Identify ways to reduce costs by managing and decreasing waste
- To create a plastic-free campus and evolve health consciousness: Recognize the cost-saving

methods through waste minimizing and managing

- Identify the current and upcoming complications: Verify compliance with the laws in effect.
- Offer organizations the tools they need to design greater environmental performance: Enhance awareness of environmental obligations and guidelines
- Promote environmental awareness by using a systematic approach to environmental management and raising environmental standards.
- Setting benchmarks for environmental protection measures
- Reducing resource usage to save cost
- Developing social and personal responsibility for the institution and its surroundings
- Improvement of institute profile
- Evolving an environmental ethic and value systems in youngsters
- Green auditing should become a vital tool in the management and monitoring of environmental and sustainable development activities of the institute

2.3. Target Areas of Green Audit

A process for resource management includes a green audit. The actual value of green audits lies in the fact that they are conducted at predetermined intervals and that the results might show improvement or change over time, even though the fact that they are individual events. The eco-campus idea primarily emphasizes the effective use of water and energy to reduce waste production or pollution and maximize economic efficiency. All of these factors are evaluated as part of the educational institution's green audit procedure. Eco-campus prioritizes the reduction of emissions, secures a cost-effective and reliable energy supply, promotes personal responsibility, increases energy efficiency, lowers institute consumption of water and energy, lessens waste sent to landfills, and incorporates environmental concerns into all agreements and services deemed to have a significant environmental impact. Water, energy, waste, air, and noise of the green campus are the focus areas of this green audit.

2.3.1 Audit of Water Management

Water is a natural resource that is essential to all living things. While freely accessible in many natural settings, potable water is less easily accessible in urban areas. To guarantee that everyone has access to drinkable water both now and in the future, we must utilize water responsibly. More than 180 litres of water can be lost daily from a little drip from a leaking tap; that is a lot of water to lose—

eight toilet flushes' worth. Water pollution and aquifer depletion are occurring at completely unheard rates. So, it is crucial that any organization that cares about the environment evaluate its methods for using water. Water auditing is done to assess raw water intake facilities and identify facilities for water treatment and reuse. The concerned auditor examines the appropriate approach that may be used to balance the supply and demand for water. Any institution that cares about the environment must therefore examine its water usage procedures.

2.3.2. Audit of Energy Management

Although energy cannot be seen, we know it exists because we can observe its effects, such as heat, light, and power. Energy use, energy sources, energy monitoring, lighting, appliances, and automobiles are all included in this indication. Electricity use is undoubtedly a crucial component of campus sustainability, thus its inclusion in the assessment doesn't call for any justification. Energy auditing focuses on ways to conserve energy and reduce spending on using that could lead to environmental damage. So, it is crucial that any institution that cares about the environment evaluate its methods for using energy.

2.3.3. Audit for Waste Management

Pollution from waste causes a lot of litter in our communities, which can harm our well-being and is unpleasant. For birds and other animals, plastic bags and discarded ropes and strings can be quite deadly. This indicator includes waste generation and disposal, recycling, and waste of plastic, paper, and food. General waste and hazardous waste are the two categories into which solid waste can be separated. General wastes comprise items that are typically thrown out in households and schools, such as garbage, paper, cans, and glass bottles. Waste that poses a risk to human health or the environment, such as gasoline and cleaning products, is referred to as hazardous waste. Unscientific landfills could contain dangerous chemicals that seep into the ground and water systems and emit greenhouse gases that contribute to global warming.

Moreover, solid waste frequently contains unused materials that may be recycled, repaired, or reused to provide better services. So, a sustainable college must reduce its solid waste output. The auditor diagnoses the current waste disposal practices and makes recommendations for the most effective solutions to the issues. Therefore, it is crucial that any institution that cares about the environment analyze its waste management procedures.

2.3.4. Audit of Green Campus Management

The loss of habitat, pollution, over-consumption, and invasive species are, unfortunately, severe threats to biodiversity. The alarming rate of species extinction has an impact on both the delicate balance of nature and human quality of life. Without this diversity among living things, ecological systems and processes would fail, which would have negative effects on all types of life, including humans. Both newly planted and old trees reduce the atmospheric concentration of carbon dioxide. In addition to supporting better public health and enhancing cities' aesthetics, trees have a significant ecological impact on urban environments. A single mature tree may remove as much as 48 pounds (4.535 x 10⁻³ tonnes) of carbon dioxide from the atmosphere in a year and release it as oxygen. One tree produces enough oxygen to meet human needs for one day. Hence, all the trees on campus are working hard to make the air better for us while you are busy studying and working to obtain those good scores. Trees can also affect one's mental health. Studies have shown that trees significantly lower stress.

2.4. Methodology

The purpose of the audit was to ensure that the practices followed on the campus are by the Green Policy adopted by the institution. The criteria, methods, and recommendations used in the audit were based on the identified risks. The methodology comprises preparing and filling out a questionnaire, physically inspecting the campus, watching and reviewing the document, interacting with the people who are responsible, analyzing the data, taking measurements, and making recommendations. The three-step methodology used for this audit consisted of:

1. Data Collection
2. Data Analysis
3. Recommendations and Management Plans

2.4.1 Data Collection

In the preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, survey communication with responsible persons, and measurements. The following steps were taken for data collection:

- The team went to each department, center, Library, canteen, etc.
- Data about the general information was collected by observation and interview.

2.4.2. Data Analysis and Recommendations

Based on data analysis findings and observation results, some recommendations for reducing electricity and water use were suggested. The proper management of waste was also recommended. For the sake of community health, fossil fuel use must be decreased. A questionnaire was used to examine the above target areas that are specific to the institution. Five categories of questionnaires were distributed which are given in pre-audit questionnaires.



Fig 2.1: Interaction and discussion between green audit team and institutes members



Fig 2.2: Discussion between green audit team and institutes members during field visits

2.4.3. Pre Audit Questionnaires

The major pre-audit questionnaires are based on the following topics:

1. Water
2. Energy
3. Waste
4. Green Campus

Other is Air, noise, and ecology (flora and fauna) of RIE.

Questionnaires

1. List the uses of water in the Institute.
2. What are the sources of water in the Institute?
3. How does your Institute store water?
4. If there is water wastage, specify why.
5. How can the wastage be prevented/stopped?
6. What are the uses of wastewater in the Institute?
7. What happens to the water used in your labs? Whether it gets mixed with groundwater?
8. The number of water coolers?
9. The number of water taps?
10. The number of bathrooms in staff rooms, common, hostels?
11. The number of toilets, and urinals?
12. Does your institute harvest rainwater?
13. Is there any water management plan in the institute?
14. Are there any water-saving techniques followed in your institutes? What are they?
15. List the usage of energy in the institute. (Electricity, electric stove, kettle, microwave, LPG, fire-wood, Petrol, diesel, and others).
16. Electricity bill
17. Is there a generator facility in the Institute?
18. How many CFL bulbs have the Institute installed?
19. How many tube lights and fans are installed in the Institute?
20. How many air conditioners are installed in the Institute?
21. How much electrical equipment including weighing balance is installed in the Institute? Mention the use (Hours used/day for how many days in a month)
22. How many TV, CCTV, and computers are there in the institute?
23. Which of the following are found near your Institute? Municipal dump yard, Garbage heap,

Public convenience, Sewer line, Stagnant water, Open drainage, Industry – (Mention the type),
Bus / Railway station, Market / Shopping complex / Public halls

24. Does your Institute generate any waste? (E-waste, Hazardous waste (toxic), Solid waste, Dry leaves, Canteen waste, Liquid waste, Glass, Unused equipment, Medical waste if any, Napkins, Others (Specify)
25. Is there any waste treatment system in the Institute?
26. How is the waste generated in the Institute managed by composting, recycling, reusing, or other methods?
27. Do you use recycled paper in Institute?
28. Is there a garden in the Institute?
29. Do students spend time in the garden?
30. List the numbers of each plant species in the garden.
31. List the species planted by the students, with numbers.
32. Whether you have displayed the scientific names of the trees on the campus?
33. Is there any plantation on your campus? If yes specify the area and type of plantation.
34. Is there any medicinal garden in the Institute? If yes how much area?
35. Who is in charge of the gardens in your Institute?
36. Are you using any type of recycled water in your garden?
37. Do you have any composting pits in the institute?
38. What do you doing with the vegetables harvested?
39. Is there any botanical garden on your campus? If yes give details of campus flora.
40. Give the number and names of the medicinal plants on the campus of the institute.
41. Have any threatened plant species been planted/conserved?
42. What is the type of vegetation in the surrounding area of the Institute?
43. Is there any nature awareness program conducted on campus?
44. What is the involvement of students in green cover maintenance?
45. What is the total area of the campus under tree cover? Or under a tree canopy?
46. Total Number of vehicles used by the students of the institute.
47. Mention the usage of cycles, two-wheelers, and cars.
48. The number of persons using common transportation?
49. The number of visitors with vehicles per day?
50. The number of generators used per day (hours)? Give the amount of fuel used per day.
51. Suggest the methods to reduce the quantity of use of fuel used by the students/teacher non-teaching staff of the college

Chapter 3

Post-Audit Stage

3.1. Post-Audit Stage

Any green audit must have proof that supports its conclusions in the form of records and facts that can be independently verified. To make sure that past actions, activities, events, and procedures are carried out correctly and by system requirements, the audit process aims to track past actions, activities, events, and procedures periodically. Green audits are a step in the process. The actual usefulness of green audits lies in the fact that they are conducted at predetermined intervals and that the results might show improvement or change over time, despite the fact. There is always some amount of subjectivity in an audit, even when policies, processes, documented systems, and objectives are used as a test in green audits. The goal of any green audit is to evaluate the efficiency of the environmental equipment and management. Each of these elements is essential to ensuring that the campus' environmental performance reaches the targets specified in its green strategy. The degree of success or failure of the campus environmental performance will depend on how well each individual is operating and how well integration goes.

3.2. Observation

3.2.1. Water

1. Uses of water in the Institute.

The places where the is water is used.

- For Drinking Water in Hostels and Campus.
- For Horticulture Work.
- Day to day routine work in Hostels and Institute.

2. What are the sources of water in the Institute?

The Following Sources are mentioned below: -

- Government Supply from PHED, Govt. of Rajasthan.
- Various Bore well and wells in the Institute.

3. How does your Institute store water?

- There are two big size underground water tanks. Each capacity is two lakh litre.
- There are 15 Small underground water tanks in each hostel, Institute and School Building.
- There are 338 Nos. of 500 & 1000 Litre water tanks are installed on roof top of the Institute building, campus, hostels, guest houses, DM School, primary section, pre- primary section and Dispensary of this Institute.

4. If there is water wastage, specify why.

No wastage of water.

5. How can the wastage be prevented / stopped?

Not applicable

6. What are the uses of wastewater in the Institute?

Institute has already prepared to store wastewater in a tank and after the storage of wastewater institute uses it for horticulture work.

7. What happens to the water used in your labs? Whether it gets mixed with ground water?

Due to uses of hazardous chemicals institute does not store wastewater, which was used in labs of the institute. The wastewater is separately disposed into the sewerage line.

8. Number of water coolers?

There are total 31 Nos. of water cooler installed at various locations on the campus.

9. Number of water taps?

The total number of taps are as follows

Sr.No.	Name of Location	Quantity
1.	Institute Building	55
2.	DM School	26
3.	Institute Library	11
4.	Pre- Primary School	22
5.	Primary School	32
6.	Laxmi Bai Hostel	78
7.	Tilak Hostel	107
8.	Ranjeet Hostel	158
9.	Shiva Ji Hostel	133
10.	Rana Pratap Hostel	132
11.	Saraswati Hostel	349
12.	Dr. A.P.J. Guest House	31
13.	Dr. S.R.K. Guest House	85
14.	Type- 6 Quarter	23
15.	Type- 5 Quarter	96
16.	Type- 4 Quarter	203
17.	Type- 3 Quarter	115
18.	Type- 2 Quarter	112
19.	RIE Dispensary	18
20.	Canteen	04
21.	Assembly Hall	05
Total		1795

10. Number of bathrooms in staff rooms, common, hostels?

Number of bathrooms are as follows:

Sr. No.	Name of Location	Quantity
1.	Laxmi Bai Hostel	12
2.	Tilak Hostel	12
3.	Ranjeet Hostel	41
4.	Shiva Ji Hostel	14
5.	Rana Pratap Hostel	14
6.	Saraswati Hostel	32
7.	Dr. A.P.J. Guest House	07
8.	Dr. S.R.K. Guest House	26
9.	Residential quarter	75
Total		233

11. Number of toilet, urinals?

Number of toilets/ urinals are as follows:-

Sr.No.	Name of Location	Quantity
1.	Institute Building	28
2.	DM School	15
3.	Institute Library	08
4.	Pre- Primary School	07
5.	Primary School	10
6.	Laxmi Bai Hostel	14
7.	Tilak Hostel	14
8.	Ranjeet Hostel	50
9.	Shiva Ji Hostel	16
10.	Rana Pratap Hostel	16
11.	Saraswati Hostel	40
12.	Dr. A.P.J. Guest House	09
13.	Dr. S.R.K. Guest House	27
14.	Type- 6 Quarter	04
15.	Type- 5 Quarter	16
16.	Type- 4 Quarter	24
17.	Type- 3 Quarter	16
18.	Type- 2 Quarter	16
19.	RIE Dispensary	05
20.	Canteen	01
21.	Assembly Hall	03
22.	Common Toilets Outside the Buildings and Gate	06
Total		345

12. Does your institute harvest rainwater?

Yes, the institute is already prepared water tanks to store rainwater and other wastewater in the institute the water is used to harvest the plants and trees in the Institute.

13. Is there any water management plan in the institute?

As per Point No. 12

14. Are there any water-saving techniques followed in your institutes? What are they?

Institute has prepared a pond in a Theme Park of this institute to store rainwater and a pipeline between Rana Pratap and Shivaji Hostel.

3.2.2. Energy

1. List the usage of energy in the institute (Electricity, electric stove, kettle, microwave, LPG, fire-wood, Petrol, diesel, and others).

- 1) Institute has installed 414KW solar plant for meeting its energy requirements. List the usage of energy in the institute. (Electricity, electric stove, kettle, microwave, LPG, fire-wood, Petrol, diesel etc.).
- 2) Electrical appliances are used in campus and in residential area of the institute.
- 3) Electric Kettle is used for preparing tea and other items in the Principal Secretate.
- 4) Microwave is used in labs for practical purposes.
- 5) LPG is used in labs for practical purposes.
- 6) Diesel and Petrol are used in the institute generator and vehicles.

2. **Electricity bill**– ₹ 17,413.50 per month KW/per month (Fig 3.1 a,b)

3. Is there a generator facility in the Institute?

Yes, the generator capacity is 160 KVA.

4. How many CFL bulbs have been installed by the Institute?

Sr No.	Location	Quantity
1.	Type- 5	160
2.	Type- 4	180
3.	Type- 3	96
4.	Type- 2	98
	Total	534

5. How many tube lights, fans have installed in the Institute?

The following details are mentioned below: -

Sr No.	Location	Tube light	Fan
1.	Institute Building	746	363
2.	DM School	288	188
3.	Pre- Primary School	102	45
4.	Primary School	132	70
5.	Laxmi Hostel	213	77
6.	Tilak Hostel	168	109
7.	Ranjeet Hostel	141	62
8.	Shiva Ji Hostel	163	101
9.	Rana Pratap Hostel	163	101
10.	Sarasvati Hostel	594	271
11.	Dr. A.P.J. Guest House	82	27
12.	Dr. Sarvapalli Radha Krishnan Guest House	43	58

13.	Dr. Bheem Rao Ambedkar Guest House	16	39
14.	Type-6	15	8
15.	Type-5	56	56
16.	Type-4	120	120
17.	Type-3	80	64
18.	Type-2	64	48
19.	RIE Dispensary	12	17
20.	RIE Canteen	12	06
21.	Assembly Hall	18	12
22.	Theme Park	21	06
	Total	3249	1848

There are total 3249 tube lights and 1848 fans installed in the institute. There are total 325 street lights and 125 mass lights installed at the institute.

6. How many air conditioners are installed in the Institute

The following details are mentioned below: -

Sr.No.	Location	Quantity
1.	Institute Building	145
2.	DM School	28
3.	Primary School	02
4.	Dr. A.P.J. Guest House	10
5.	Dr. Sarvapalli Radha Krishna Guest House	27
6.	Dr. Bheem Rao Ambedkar Guest House	16
7.	Type- 6	02
8.	RIE Dispensary	02
9.	RIE Canteen	02
	Total	234

There are total 234 Air Conditioners with three stars of power saving rate has been installed at the institute.

7. How much electrical equipment's including weighing balance are installed in the Institute laboratory? Mention the use (Hours used/day for how many days in a month).

There are 50 electrical equipments approx. The average usage of electrical equipment's are approx. 06 Hours/day or approx. 22 days/month.

8. How many TV, CCTV and computers are there in the institute?

The following details are mentioned below:

Sr. No.	Item Name	Quantity
1.	Television	49 Nos.
2.	CCTV	58 Nos.
3.	Computers and Laptops	295+28=323 Nos.

3.2.3. Waste

1. Which of the following are found near your Institute?

Municipal dump yard, Garbage heap, Public convenience, Sewer line - 1, Stagnant water, Open drainage, Industry – (Mention the type), Bus / Railway station, Market / Shopping complex/ Public halls.

These are nearby being following: -

- Public convenience
- Sewer Line
- Anasagar lake
- Open drainage

2. Does your institute generate any waste? (e-waste, hazardous waste (toxic), solid waste, dry leaves, canteen waste, liquid waste, glass, unused equipment, medical waste if any, napkins, others (Specify):

Yes, the followings are mentioned:

- Dry leaves: - Institute has prepared five vermicomposting pits for its decomposition process
- Canteen waste- The canteen waste has been given to the municipal corporation
- E- waste- E-waste is being sold to the concerned agency.

3. Is there any waste treatment system in the Institute?

No.

4. How is the waste generated in the institute managed?

Institute has a system of composting the dry leaves into vermicompost which is used as a fertilizer for the plants growing in the institute.

5. Do you use recycled paper in Institute?

No

6. How you manage the waste papers?

Managed through auction.

7. How you manage the old or spoiled books of library?

The old books are donated to the nearby study centres. The institute has donated 1000 old books.

3.2.4. Green Campus

1. Is there a garden in the Institute?

Yes. The institute has many gardens for the recreation of students, faculty and Staff. The Institute also maintains an environment education theme park for creating awareness among students.

2. Do students spend time in the garden?

Yes.

3. List the numbers of each plant species in the garden.

A large number of plants species are present in the campus (Given in Table 3.10).

4. List the species planted by the students, with numbers.

On different occasions, students planted seedlings in the garden.

5. Whether you have displayed the scientific names of the trees on the campus?

Yes, we displayed a large number of name plates with QR code

6. Is there any plantation in your campus? If yes specify the area and type of plantation.

Yes, planted horticultural, medicinal and aromatic plants in the garden.

7. Is there any medicinal garden in the Institute? If yes how much area?

Yes. we have a medicinal garden in the theme park situated on the campus (Table 3.12)

8. Who is in-charge of gardens in your institute

Civil work section looks after all the gardens.

9. Are you using any type of recycled water in your garden?

Yes, is it used in the garden.

10. Do you have any composting pits in the institute?

Yes already two composting pits are there

11. What do you do with the vegetables harvested?

The horticultural harvest distributed among the residents of campus.

12. Is there any botanical garden in your campus? If yes give details of campus flora.

Yes, the institute has theme park. Details has given in Table 3.10.

13. Give the number and names of the medicinal plants in campus of the institute.

It is given in Table 3.8.

14. Any threatened plant species planted/conserved?

Institute has numbers of threatened/endangered species as given in the (Table 3.9).

15. What is the type of vegetation in the surrounding area of the Institute?

In and around RIE, Ajmer predominant species are xerophytic in nature.

16. Is there any nature awareness program conducted in the campus?

Yes. The institute has various programs like Prakrati Mela, Wildlife Week and Van Mahotsav etc.

17. What is the involvement of students in green cover maintenance?

Involvement of students in the green cover maintenance through Prakrati Mela, Van Mahotsav and plantation by students on different occasions

18. What is the total area of the campus under tree cover?

Almost three fourth part of the area is covered under tree canopy.

3.2.5. Use of Vehicles

- **Total Number of vehicles used by the students of the Institute.**

Approximately 01%. For resident students the vehicles are not allowed to keep.

- **Mention the usage of cycles, two wheelers and cars.**

Staff attending the institute and staying outside uses cars and two wheelers but the number is very meager.

- **Number of persons using common transportation**

Very less i.e. 05% to 10%

- **Number of visitors with vehicles per day?**

50-55 per day

- **Number of generators used per day (hours). Give the amount of fuel used per day.**

There is only one generator used by the institute only during need and not required daily.


- The institute banned motorcycles for students who are without licenses. The institute encourages the cycle among the students. This is a very good activity of RIE Ajmer for making campus pollution-free and reducing carbon footprint.

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वर्तमान मीटर नं./ प्रकार / स्थिति	यूनिट			Current Meter Reading (वर्तमान पठन)		Previous Meter Reading (गत पठन)						Reading Diff. (पठन अंतर)	MF (गुणांक)	Trans. Loss (ट्रांसफार्मर लॉस)	Total Consumption (कुल उपभोग)																																																						
		Date (तिथि)	Reading (पठन)	Date (तिथि)	Reading (पठन)																																																																
10685445	KWH	01.03.2023	109462.00	01.02.2023	108207.00	1255	3.000		3785																																																												
	KVAH		112552.00		110961.00	1291			3873																																																												
	MDI KVA Exp.		13.20		0	13.20			42.6																																																												
	Exp. KWH Generation		185212.00		181474.00	3738	40.000		11214																																																												
8341597		01.03.2023	14391.25	01.02.2023	13845.25	546			21840																																																												
बिल अवधि 02.02.2023 to 01.03.2023 दिन: 28 कुल माह: 0.9966 Units Rate (₹/Unit) Amount (₹) 7,449- 2.17- 16,164.33- पिछली खपत का ब्यौरा Bill Period बिल अवधि KWH Units / उपभोग 02.01.2023 To 01.02.2023 6,282 02.12.2022 To 01.01.2023 4,869 02.11.2022 To 01.12.2022 4,041 02.10.2022 To 01.11.2022 3,567 02.09.2022 To 01.10.2022 8,502 02.08.2022 To 01.09.2022 6,942		Current Demand Detail / वर्तमान मांग विवरण 1) रवाई शुल्क (₹) 24852.71 2) विद्युत खर्च (₹) 16164.33- 3) डिमांड सरचार्ज (₹) 4) पावर फैक्टर सरचार्ज (+) प्रोत्साहन (-) / शॉट केपेसिटी सरचार्ज (3%) (₹) 0 5) अनधिकृत उपभोग राशि (₹) 6) सी.टी. / पी.टी. किराया (₹) 896.94 7) ट्रांसफार्मर किराया (₹) 8) भ्रूल सरचार्ज (₹) 1289.54 9) रिबेट (i) (ii) वोल्टेज (₹) (iii) सोलर/सिक्केटर/ग्रामीण रियायत (₹) 10) अन्य (₹) 11) निगम राशि (क्रम सं. 1 से 10) (₹) 10874.86 12) विद्युत शुल्क (₹) 8634.6 13) जल संरक्षण उपकर (₹) 14) नगरीय उपकर (₹) 564.75 15) कुल वर्तमान मांग (₹) 20074.21 (क्रम सं 11 से 14) एडजस्टमेंट - डेबिट (+) / क्रेडिट (-) का ब्यौरा Code Principal(₹) ED(₹) WCC (₹) UC(₹)																																																																			
मुद्राधिकारिता धरने विद्युत अनुदान योजना → मासिक अनुदान 50 युनिट से कम होने पर विद्युत बिल तब तक नि:शुल्क है। → मासिक अनुदान 100 युनिट होने पर 50 युनिट का विद्युत शुल्क बाक एवं तब युनिटों पर 3.00 रु प्रति युनिट का अनुदान है। → अन्य सभी धरने उपभोक्ताओं को 150 युनिट तक 3.00 रु प्रति युनिट का अनुदान एवं आयामी 151 से 300 युनिट तक 2.00 रु प्रति युनिट तक अनुदान है। मुख्यमंत्री किसान मित्र ऊर्जा योजना → मुख्यमंत्री द्वारा समायोजन (बर्फीक और शायरफ) युनिट उपभोक्ताओं को प्रति माह 1000 रु. का आर्थिक अनुदान		विद्युत अधिनियम 2003 की धारा 135 के अंतर्गत विद्युत चोरी करना अपराध है, जिसमें जुर्माना या तीन वर्ष की सजा अथवा दोनों का प्राधान्य है। नियत तिथि तक भुगतान न करने पर उक्त अधिनियम की धारा 56 के अंतर्गत 15 दिवस के बाद विद्युत कनेक्शन काटने की कार्यवाही की जाएगी। E-mail: customercare.tpadl@tatapower.com अनैतिक और भ्रष्टाचार संबंधित शिकायत मोबाइल नंबर (WhatsApp सुविधा): 7412079477 ई-मेल: Vigilance.tpadl@tatapower.com																																																																			

Fig 3.1 (a): Electricity Bill

TPADL TP AJMER DISTRIBUTION LIMITED (A TATA Power Company & Franchisee of AVVNL)		Bill of Supply for Electricity		हेल्पलाइन नंबर 7412012222 / 1800-180-6531 (टोल फ्री नंबर)					
सबडिवीजन नाम और पता: जोनल मैनेजर D V - TPADL, VAISHALI NAGAR POWER HOUSE, AJMER, PHONE NUMBER : 7412012222									
नाम व प्रिमियन	एम डी आई रीडिंग (kW/KVA)	142.50	सीए नं.	806000007471	बिल जारी तिथि				
बिलिंग पता	पावर फेक्टर	0.995	के. नं.	110414000254	बिल नं.				
जोनल इंस्टीट्यूट ऑफ एजुकेशन अजमेर	औसत मासिक उपभोग (पूर्व वित्त वर्ष) (KWH)	23,248.00	विद्युतीकरण तिथि	01.07.2001	87004817087				
आपूर्ति पता	सप्लाय वोल्टेज (KV)	11.000	अमानत राशि (₹)		नियत भुगतान तिथि				
REGIONAL INSTITUTE OF EDUCATION AJMER Ajmer	मीटरिंग वोल्टेज (KV)	11.000	ऊर्जा खपत	502970	29.03.2023				
मोबाइल नं.	शहरी / ग्रामीण		मीटर		नियत भुगतान तिथि तक देय राशि (₹)				
ईमेल	एम आर यू नं.	D5M109C01	कनेक्शन प्रकार	Permanent	159083.00				
रबीकृत लोड (KW/HIP)	वाकिंग सीकवेन्स	0557-2	टेरिफ वर्ग	ML_HT4	नियत भुगतान तिथि के पश्चात देय राशि (₹)				
कॉन्ट्रैक्ट डिमांड (KVA)	घोल नं.		बिल आधार	READING	162264.66				
बिलिंग डिमांड (kW/KVA)			बिलिंग स्थिति	REGULAR					
Arrears/Refund बकाया / वापसी (₹)	Adjustment समायोजन (₹)	Current Demand वर्तमान मांग (₹)	Subsidy सब्सिडी (₹)	LPSC- विलम्ब भुगतान सर्चार्ज (₹)	Net Amount Payable कुल देय राशि (₹)				
0.96		159082.02		0.02	159,083.00				
गत भुगतान (₹)	336034.00	गत भुगतान तिथि	03.03.2023	विवादित राशि (₹)					
वर्तमान मीटर नं. / प्रकार / स्थिति	यूनिट	Current Meter Reading (वर्तमान घंटा)		Previous Meter Reading (गत घंटा)		Reading Diff.	MF	Trans. Loss	Total
X0685446	KWH KV/AH MDI KVA Exp.KWH Generation	Date (तिथि)	Reading (पढ़न)	Date (तिथि)	Reading (पढ़न)	(पढ़न अंतर)	(रुपांक)	(ट्रांसफार्मर लॉस)	(कुल उपभोग)
8341598		01.03.2023	473257.00 462688.00 27.50 213307.00 33416.61	01.02.2023	463460.00 472847.60 0 207246.00 31966.61	9797 9841 47.50 6061 1459	3.000		29391 29523 132.5 18183 21750
बिल अवधि 01.02.2023 to 01.03.2023		Current Demand Detail / वर्तमान मांग विवरण							
दिन: 28	कुल माह: 0.9966	1) स्थायी शुल्क (₹)		64120		9) रिबेट (-) (i) वोल्टेज (₹)			
Units	Rate (₹/Unit)	Amount (₹)		90224.4		(ii) सोलर/स्विचर/ग्रामीण रियायत (₹)			
11,208	8.05	90,224.40		3157.85		10) अन्य (₹)			
पिछली खपत का ब्यौरा		3) डिमांड सर्चार्ज (₹)		896.94		11) निगम राशि (क्रम सं. 1 से 10) (₹)			
Bill Period बिल अवधि		4) पावर फेक्टर सर्चार्ज (+) प्रोत्साहन (-) / शॉट केपेसिटर सर्चार्ज (3%) (₹)		6998.53		12) विधुत शुल्क (₹)			
KWH Units / उपभोग		5) अनधिकृत उपभोग राशि (₹)				13) जल संरक्षण उपकरण (₹)			
02.01.2023 To 01.02.2023	45,888	6) सी.टी. / पी.टी. किराया (₹)				14) नगरीय उपकरण (₹)			
02.12.2022 To 01.01.2023	30,978	7) ट्रांसफार्मर किराया (₹)				15) कुल वर्तमान मांग (₹)			
02.11.2022 To 01.12.2022	28,662	8) प्रभुत सर्चार्ज (₹)				159082.02			
02.10.2022 To 01.11.2022	30,123					एडजस्टमेंट - डेबिट (+) / क्रेडिट (-) का ब्यौरा			
02.09.2022 To 01.10.2022	36,438					Code Principal(₹) ED(₹) WCC(₹) UC(₹)			
02.08.2022 To 01.09.2022	41,328								
मुख्यमंत्री धरतु विद्युत अनुदान योजना		मुख्यमंत्री किसान मित्र ऊर्जा योजना		मुख्यमंत्री कृषक अनुदान योजना		विद्युत अधिनियम 2003 की धारा 135 के अंतर्गत विद्युत चोरी करना अपराध है, जिसमें जुर्माना या तीन वर्ष की सजा अथवा दोनों का प्रावधान है। नियत तिथि तक भुगतान न करने पर उक्त अधिनियम की धारा 56 के अंतर्गत 15 दिवस के बाद विद्युत कनेक्शन काटने की कार्यवाही की जाएगी।			
E-mailed		E-mail: customercare.tpadl@tatapower.com		अनेतिक और भ्रष्टाचार संबंधित शिकायत मोबाइल नंबर (WhatsApp सुविधा): 7412079477		ई-मेल : Vigilance.tpadl@tatapower.com			

Fig 3.1 (b): Electricity Bill



M/s. Regional Institute Of Education

Bill To:
Capt. D.P Choudhary Marg, Ajmer-305004, Rajasthan, India

Ship To:
Capt. D.P Choudhary Marg, Ajmer-305004, Rajasthan, India

GSTIN:
Solar Plant Total Capacity (kW): 414.38

SOLAR BILL OF SUPPLY
- February 2023

Bill No: S1102/TS/23/1916
Bill Date: 06-Mar-2023
Bill Start Date: 01-Feb-2023
Bill End Date: 28-Feb-2023
HSN Code: 27160000

YOUR BILL OVERVIEW

Due Date: 05-Apr-2023
Late Payment Penalty: 1.25% / Month
Total Amount

Rs 1,84,857

SUMMARY OF CONSUMPTION

57,949.00	28	2,069.61	4.99
Total Billed Units	Days	kWh/Day	kWh/kWp/Day

BREAKUP OF CURRENT BILL

	Units(kWh)	Tariff(Rs/kWh)	Amount(Rs)
Generation	54,680.00	3.190	1,74,429.20
Adjustment(kWh)	0.00	3.190	0.00
Deemed Generation	3,269.00	3.190	10,428.11
Solar Charges			1,84,857.31
Electricity Duty			0
GST @0%			0
Total Charges			1,84,857.31

Remarks:

For any queries contact here **1800 3000 1345**

Equals

Current Bill Amount

Rs 1,84,857.31



+
Late Penalty Charges

Rs 0.00

PAYMENT DETAILS

Bank Name: State Bank Of India
(38358211640)
A/C No: 38358211640
IFSC Code: SBIN0001593

Authorized Signatory:
Mr. A V Rajasekhar


 Digitally signed by
A V RAJA SEKHAR
Date: 2023.03.06 19:38:48 IST
Location: Hyderabad
 

This Bill is generated on behalf of
VSV Renewables Private Limited

Registered Office: 3rd Floor, Plot No.N46, H.No.4-9-10, HMT Nagar, Hyderabad-500076, Telangana, India
GSTIN: 36AAGCV2149G1ZA

*This is a system generated invoice.*Please consider our environment before printing this email. Print double sided whenever possible.

Fig 3.2: Solar Bill

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वन स्वास्थ्य अभियंत्रिकी विभाग, अजमेर (राज.)
पानी-पाव (उपयोक्त)

“पानी बचाओ, बिजली बचाओ, सबको पानी”

जल उपभोग विवर		क्रम सं.	सेवा क्रमांक	खाता संख्या	मुद्रण खाता संख्या	क्षेत्र सं.	श्रीर	उपयोक्त	मार्ग
उपयोक्त का नाम व पता		35	7	38-91-1	38-91-1	S/704	2 C	C	JAN-23
जल उपभोग विवर									
पानी मीटर क्रमांक									
वर्तमान पठन		FE3							
पिछला पठन									
ग्राहक नाम				11					
शुद्ध उपभोग का		27/02/23							
प्रमाणित उपभोग का		28/02/23							
शुद्ध उपभोग का (लीटर में)									
कुल उपभोग (लीटर में)									
अधिकृत उपभोग (लीटर में)									
शुद्ध उपभोग (लीटर में)									
कीमत									
शुद्ध उपभोग (लीटर में)									
कीमत									
कुल उपभोग (लीटर में)									
कीमत									



वन स्वास्थ्य अभियंत्रिकी विभाग, अजमेर (राज.)
पानी-पाव (उपयोक्त)

क्रम सं.	क्रमांक	क्षेत्र सं.	खाता संख्या	श्री	मार्ग
35	7	04	38-91-1	0	JAN-23
अधिकृत उपभोग का					
शुद्ध उपभोग का					
कीमत					

Fig 3.3 :Water Bill

3.3. Major Audit Observations

- The institute has very well-developed greenery inside the campus.
- The air quality inside the campus was moderate.
- The noise levels inside the campus were moderate during the peak hours only.
- The environmental awareness initiatives need to be improved with respect to waste management.
- Vegetable cultivation and composting were observed.
- Green initiative programs need to be strengthened. Campus has strict rules on plastic-free zones.
- Programs for environmental education, solar power generation, and rainwater harvesting need to be strengthened.

3.3.1. Water Audit

- Inside the campus, there are both natural rainwater harvesting and roof top rainwater harvesting system (Fig 3.4). A well to collect the rainwater from Nag hill, nearby the campus during the monsoons which recharge the well, situated in the Theme Park and this water is used for irrigating the plants.
- There are nine wells present in the campus. Out of nine, only six wells are functional.
- The source of drinking water on the campus is supplied by the municipal corporation. The biggest source of drinking water at Ajmer is the Desel Dam.
- The wastewater/sewage water from the offices and the hostels are connected to the municipal drainage lines.
- There is a shortage of supply of water in Ajmer. Only one hour of water is supplied in 48 hours.
- There is a lack of water in Ajmer City. Water is not present even boring 6 feet underground. The tube-well cannot be developed due to salty water present underground.
- There is an underground tank (with a capacity of 500 to 1000 L) in every home in Ajmer city. The total consumption of water on the campus is 50,000 to 60,000 liters on the RIE campus.

3.3.2. Energy Audit

- It has been observed that the awareness-raising procedure for energy conservation was adequate.
- It is important to set goals for reducing fuel, water, and energy usage.
- New energy-efficient equipments has to be used in place of outdated models and inefficient models.
- The campus has implemented regular equipment monitoring and quick problem-solving.
- There is presence of solar plant (414 Kw) in the buildings of campus (Fig 3.9).
- There is decrease in electricity bill on the campus due to solar plant. The bill reduced from 5 lakhs to 1.5 lakhs within 5 years.

Energy Management of clean green power source of Solar Energy (410KWP) is installed by Fourth Partner Energy in 2018 at roof of the institute building (218.8KWP), DMS School building (32.5KWP), primary school building (97.5KWP), Laxmibai hostel (22.1KWP), Shivaji hostel (22.1KWP) and Maharana Pratap hostel (22.1KWP). The energy generation was gained from all the installed solar plant units approximately 3500KWh on ideal temperature 25° C. The consumption is more than a generation because it has only 80% of sanction loads. Excess generation of solar power has transmitted to Tata Power Ajmer Distribution Ltd. Another energy management by using solar powered automatic street light, which work on automatic sensor based circuit and powered by battery. The battery gets charged by solar cell sup in day time.

3.3.3. Waste Audit

- Solid waste management is maintained by big cement garbage pits (Fig 3.8).
- The institute has a proper connection with the local body for routine collection of solid waste from the campus.
- E-Waste: Institute has collaboration with Rajasthan State Pollution Control Board for managing e-waste.
- Plastic waste and Solid wastes: The Institute manages plastic waste and solid wastes regularly with the help of labour.
- Chemical wastes: Hazardous waste such as waste chemicals being managed and disposed of properly. Institute is on the direction to make a partnership with authorized waste recyclers (agencies) to dispose of hazardous chemicals and currently, Institute is disposing the hazardous chemical waste by storing them in big plasticcontainersr properly labeled with the hazardous waste and disposed by the authorities deals into it.
- Wastewater: Campus releases wastewater in the garden for irrigation of horticultural crops.

- **Glass waste:** Packaging instructions for non-contaminated laboratory glassware has given below. Institute shall place non-contaminated glassware in a cardboard box. After that it has to be securely sealed with tape. After that, the box shall be labeled with, “glass and sharps, non-hazardous materials only”, and placed in the trash or directly into a dumpster. By following above instructions, glassware wastes have to be disposed off.

- **Paper management at institution level**
Single side (rough papers) used in day-to-day official drafting work shall be collected by daily wagers and deposited in respective bins. Students can exhibit different models which prepared from waste papers in different exhibition. The packaging paper and paper tea glasses in canteen shall be disposed off in the institute.

- **Sanitary Napkin:** Sanitary napkins generated mainly in the girls' hostels as well as ladies toilets shall be given to the municipal corporation in separate packing for proper disposal.

Table 3.1: Different Wastes Disposal Method

Types of waste	Particulars	Disposal method
E-Waste	Computers, electrical and electronic parts	Managing through Rajasthan State Pollution Control Board
Plastic waste	Pen, Refill, Plastic water bottles and other plastic containers, wrappers, etc.	The Institute manages plastic waste and solid wastes in regularly with the help of manual labour.
Solid wastes	paper waste, paper plates, food wastes	The Institute manages plastic waste and solid wastes in regularly with the help of manual labour.
Chemical wastes	Laboratory waste	Institute is on the direction to make a partnership with authorized waste recyclers (agencies) to dispose of hazardous chemicals
Wastewater	Washing, urinals, bathrooms	Release wastewater in the garden for irrigation of horticultural crops.
Glass waste	Broken glass wares from the labs	Institute places non-contaminated glassware in cardboard box
Sanitary Napkin	Napkin	There are separate bins for disposal of these.



Fig 3.4: Rainwater Harvesting at RIE Campus



Fig 3.5: Water Tanks of RIE



Fig 3.6: Wells present in RIE campus



Fig 3.7: Water Coolers at RIE campus



Fig 3.8: Cement Garbage Pit



Fig 3.9: Solar panel install at RIE

3.4. Weather of Ajmer

3.4.1. Weather Data of Ajmer

Ajmer district is situated in the center of Rajasthan at latitude 26°27 N and longitude 74°44 E. This district is bounded by Pali district to the West, Bhilwara district to the South, Jaipur and Tonk districts to the East and Nagaur district to the North. It covers an area of 8481 km². The climate along with the Ajmer district is subtropical. The climatic conditions are characterized by three season i.e. winter (November-February), summer (March-June) and Mansoon (July-October).

Table 3.2.: Weather of Ajmer for the year 2022

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Temperature °C(°F)	15.2 (59.3)	18.6 (65.5)	24.3 (75.7)	29.9 (85.8)	33 (91.5)	32.2 (90)	28.6 (83.4)	26.6 (80)	27.2 (81)	26.1 (78.9)	21.4 (70.6)	16.7 (62.1)
Min. Temperature °C (°F)	8.5 (47.4)	11.5 (52.8)	16.7 (62)	22.2 (71.9)	26.5 (79.7)	27.2 (80.9)	25.2 (77.3)	23.8 (74.8)	23 (73.5)	19.8 (67.7)	15.1 (59.2)	10.3 (50.5)
Max. Temperature °C (°F)	22.4 (72.3)	25.9 (78.6)	31.6 (88.9)	37.1 (98.7)	39.5 (103)	37.6 (99.6)	32.6 (90.7)	30.2 (86.4)	31.9 (89.5)	32.6 (90.7)	28.3 (82.9)	23.9 (75)
Precipitation / Rainfall mm (in)	6 (0)	8 (0)	5 (0)	6 (0)	9 (0)	46 (1)	165 (6)	150 (5)	59 (2)	10 (0)	7 (0)	2 (0)
Humidity (%)	44%	36%	26%	19%	26%	42%	66%	76%	61%	37%	38%	44%
Rainy days (d)	1	1	1	1	2	5	12	12	6	1	1	0
Avg. Sunny hours (hours)	9.3	10.0	10.7	11.5	12.0	11.7	8.7	7.2	9.4	10.2	9.6	9.3

Ajmer city is located at the edge of the Thar Desert in the West of India and so, the weather of this city experiences a rapid transition from hot summers to chilly winters. Summers usually remain hot in Ajmer and the best period to visit this place is from March to May. The temperature of Ajmer ranges from 30°C-40°C and maximum temperature goes to 42°C. Winters are usually on the chilly side in Ajmer, as minimum temperature may drop to nearly 5°C during this season. The erratically blowing winds add to the bone-chilling cold winters. Monsoon usually arrives in the month of mid-June in most parts of Ajmer. The temperature during this period ranges from 26°C to 34°C.

3.4.2. Air Quality

It is very important to maintain the AQI of our surroundings because; they can increase the risk of heart and respiratory diseases, as well as lung cancer. It raises the danger of heart disease, lung cancer, and respiratory infections. Air pollution exposure, both short-term and long-term, has been linked to negative health effects. Those who are already unwell are subject to more severe effects. In general, AQI levels of 100 or less are considered to be good. Air quality is unhealthy when AQI

values are above 100; initially for some susceptible individuals who are susceptible, then as AQI values rise for everyone.

3.4.2.1 Air Quality Index

The introduction of substances into the air that is harmful to humans, other living things, or the environment, such as chemicals, particulate matter, or biological elements like pollen grains, is referred to as air pollution. Human health impacts from exposure to air pollution include respiratory, cardiac, vascular, and neurological problems. Children are more vulnerable. Monitoring, exposure assessment, dosimeter, toxicology, and epidemiology are examples of scientific methods for evaluating the effects of air pollution on health.

Primary and secondary air contaminants are differentiated. Secondary pollutants are created in the atmosphere, whereas primary pollutants are directly released. Sulfur dioxide (SO₂), which can cause acid rain, is one of the main major pollutants produced by human activities. The most noticeable air pollutants are NO₂, particularly nitrogen dioxide released during high-temperature combustion. Both natural and man-made particles can be found in the air. Health risks are associated with elevated fine particle concentrations in the air. Particulate matter, which is created by diesel engines, power plants, factories, wind-borne dust, wood stoves, etc., is made up of very minute particles of soot, dust, or other substances, including tiny droplets of liquid. They have negative welfare impacts including impaired visibility, atmospheric deposition, and aesthetic problems in addition to having substantial health implications.

Air Quality Index (AQI) is a tool to showcase air quality status. It transforms complex air quality data of various pollutants into a single number and colour. AQI has six categories of air quality. These are: Good, Satisfactory, Moderately Polluted, Poor, Very Poor and Severe. Each of these categories are decided based on ambient concentration values of air pollutants and their likely health impacts. As the AQI increases, an increasingly large percentage of the population is likely to experience health effects.

The measurement of air quality is based on eight pollutants, namely

- Particulate Matter (size less than 10 µm) or
- (PM₁₀) Particulate Matter (size less than 2.5 µm) or (PM_{2.5})
- Nitrogen Dioxide (NO₂)
- Sulphur Dioxide (SO₂)
- Carbon Monoxide (CO)

- Ozone (O₃)
- Ammonia (NH₃)
- Lead (Pb)

The Air Quality Index Descriptor as per US EPA 2008 is given in Table 3.3.

Table 3.3: Air Quality Index Descriptor (U.S.EPA 2008)

Descriptor	AQI	Risk measure
Good	0 to 50	No message
Moderate	51 to 100	Usually, sensitive individuals
Unhealthy for sensitive live groups	101 to 150	Identifiable groups at risk; different groups for different pollutants
Unhealthy	151 to 200	General public is at risk; sensitive groups at greater risk
Very unhealthy	201 to 500	General public is at greater risk; sensitive groups are at greatest risk

3.4.2.2 Air quality of Ajmer

The latest data (April 2023) represented on www.aqi.in on the air quality of Ajmer city shows that the city’s overall air quality is bad. In the AQI calendar, it is between 0-50 which is considered in good condition. In Table 3.4 we can see the air monitoring data of two locations of Ajmer namely Civil Lines and J P Colony. PM_{2.5} is 59 in the air; PM₁₀ is 115 in the air at Civil Lines location. The PM_{2.5} is 42 while PM₁₀ is 98 at the J. P. Colony. The status is poor for Civil Lines location, and it is moderate for J. P. Colony location. As we see the weather condition is sunny mostly throughout the week (Table 3.5). The average temperature this week was counted between 30°C to 33°C (Table 3.5).








Table 3.4: Air monitoring data of Ajmer

LOCATIONS	Status	AQI-IN	PM _{2.5}	PM ₁₀	Temp	Humid
Civil Lines	POOR	110	59	115	29	15
J P Colony	MODERATE	98	42	98	31	15

<https://www.aqi.in/dashboard/india/rajasthan/ajmer>

The air quality forecast of Ajmer city has given in Table 3.5. The AQI for the whole week is in the range of 46 to 121, which is poor. The weather is partly cloudy in Monday, Wednesday, and Thursday while the other day it is sunny.

Table 3.5: Ajmer city air quality forecast

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
AQI	46	79	106	103	121	103	96
Weather	 Partly cloudy	 Sunny	 Partly cloudy	 Partly cloudy	 Sunny	 Sunny	 Sunny
Temp.	30.2°C	31.6°C	32.5°C	31.3°C	33°C	33°C	33.6°C

<https://www.aqi.in/dashboard/india/rajasthan/ajmer>

3.5 Noise quality of Ajmer city

The aim of the World Health Organization (WHO) is to ensure that everyone has access to the best health possible. The word "noise" is derived from the Latin word "nausea," which denotes motion sickness or other uneasy feelings. Noise is made up of sounds that surround us but are not a part of the area being studied. It is also a form of pollution that affects our health, well-being, and work capacity for work. Industries, traffic and cars, construction, and home appliances are all sources of noise pollution. Both direct and indirect consequences of noise are detrimental to our health and unpleasant to our quality of life.

Noise pollution is defined by the World Health Organization (WHO) as noise above 65 decibels (dB). More specifically, noise becomes unpleasant over 120 decibels (dB) and hazardous above 75 dB. As an average noise level over a day, your ear can tolerate noise levels up to 85 decibels. Our hearing can be harmed by sounds louder than 85 dB. The typical decibel range for normal conversation is between 60 and 70. Decibel is sometimes referred to as dB or dB (A).

All transportation systems create noise pollution. With residences created adjacent to factories, they experience noise pollution and its adverse effects. Besides transportation noise, noise can come from factory appliances, power tools, and audio entertainment systems. The secondary data on the noise quality of Ajmer during pre-deepawali day and deepawali day are listed in table 3.6. According to observations, it is clear that, the noise quality of Ajmer is of moderate type.

Table 3.6: Ambient Noise Levels in Leq.dB (A) at Kutchery road during Pre-Deepawali & Deepawali year 2019 & 2020 in Ajmer (CPCB, 2021)

Sr.No.	Location	Pre-Deepawali day		Deepawali day	
		2019	2020	2019	2020
1	Kutchery road (Ajmer)	73	71↓	74	76↑

3.5.2 Measure to reduce noise pollution

In some cases, noise pollution is unavoidable. However, there are ways to reduce noise levels inside the campus.

- Reducing noise from appliances: Items, such as air conditioning units, heaters, fans, and other appliances used in laboratories, can contribute to overall noise levels on the campus. Try turning them off more often or setting a timer, so they only switch on at certain times.
- Repair or replace old machinery: Old appliances, scientific machinery, vehicles, and other items can be louder than newer models. Consider upgrading or replacing noisy household items.
- Sound-proofing: Adding insulation strategically around the classrooms specifically more noise-proof rooms like yoga classrooms can help muffle sounds from other classrooms, playground noise, or outside other activities. Rugs, carpets, and curtains may also help.

3.6 Ecology

3.6.2 Floral Diversity

Floral diversity refers to the diversity of plants occurring in a specific region. It generally refers to the diversity of naturally occurring indigenous or native plants. The word “Flora” comes from the Latin, Flora – the goddess of plants (floris means flower). A total of 215,644 species of plants out of 298,000 predicted have been catalogued on earth till-date. Apart, 8,600 plant species have been recorded from ocean out of estimated 16,600. India, being one of the tropical countries harbors 54,733 species including species of virus/bacteria and fungi. In India, the floral diversity is concentrated in four phytogeographically unique regions, viz., Himalayas, Western Ghats, Northeast India and Andaman and Nicobar Islands. The Indian Flora accounts for 11.4% of the total recorded plant species of the world and about 28% of the plant species are endemic (species confined to a particular geographical region) to India.

Most of the area of Ajmer district under study comes under the semi-arid and arid climate. The climate of Ajmer district varies from arid to sub-humid. The district is largely a semi-arid and the climate is characterized by, Low rainfall with limited rainy days and erratic distribution (Kharwa has no experience of good rain for last 10 years, High level of diurnal and annual temperatures, High wind velocity leading to rapid loss of soil moisture and thus soil erosion. The forest area in Ajmer is distributed across different landscape types, which in turn have shaped the ecological diversity of the region. Several major types of ecosystems and distinct transitional eco-tones are evident in the district. Grassland, thorn forest, and scrublands are the major productive terrestrial ecosystems, while wetlands, rivers, and tanks are providing habitat for aquatic vegetation and dependent fauna.

The institute has well-developed greenery (Fig 3.10). Despite of shortage of water and sandy soil, the institute has developed a good diversity of vegetation. There is presence of variety of flora on the campus (Table 3.7). There are many medicinal plant species on the campus (Table 3.7). Table 3.8 is shown the threatened plant species of RIE campus. There are many trees and plants found in the gardens present on the campus (Table 3.10).

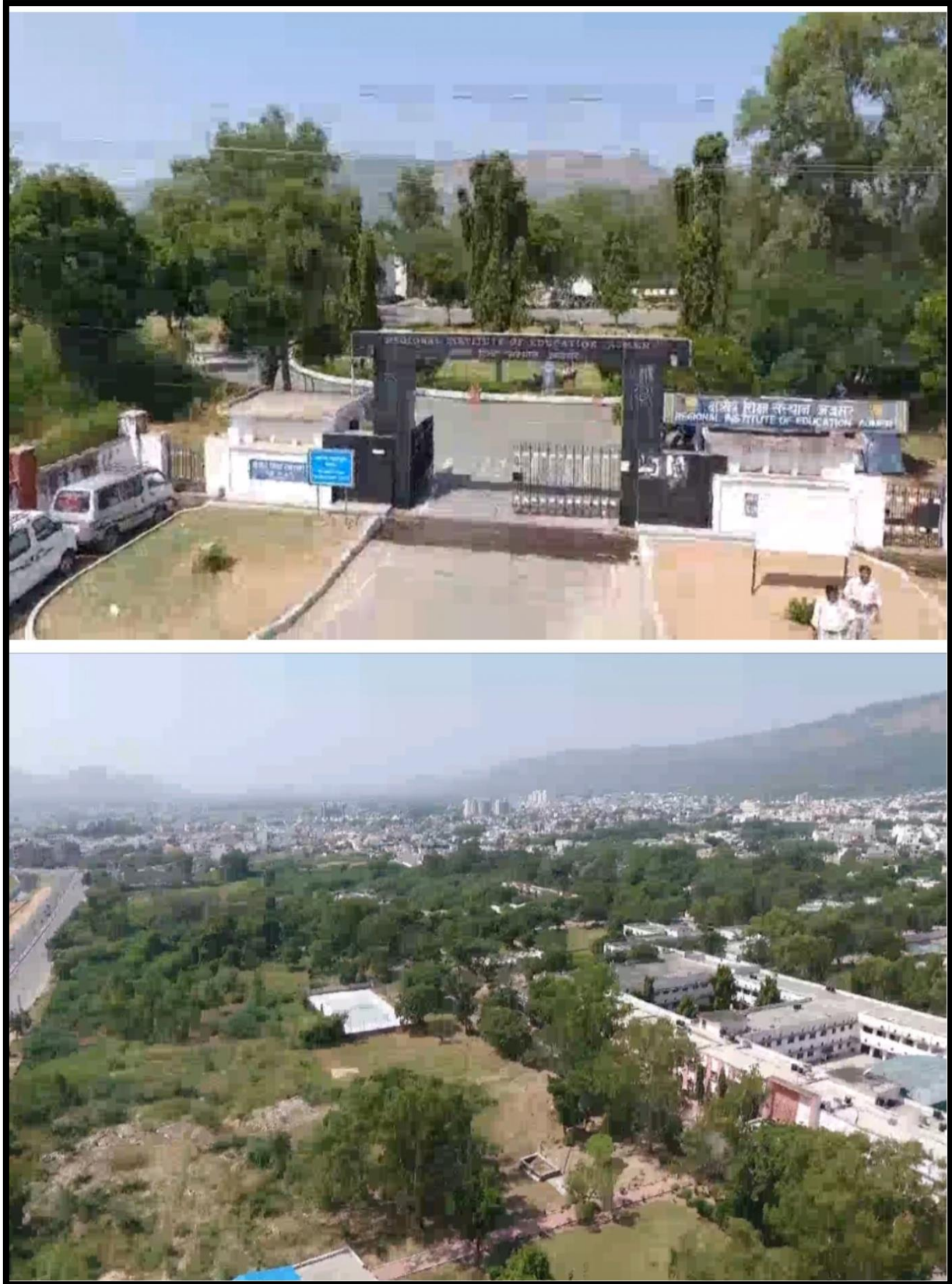


Fig 3.10: Greenery of the campus of RIE (aerial view)



Fig 3.11: Flora of Campus of RIE



Fig 3.12: Green campus management observed by audit team

Table 3.7: Trees of RIE Ajmer Campus

Sr.No.	Botanical Name	Common Name	Family
1	Acacia nilotica	Acacia	Fabaceae
2	Aloe barbadensis	Aloe	Asphodelaceae
3	Phyllanthus emblica	Amla	Phyllanthaceae
4	Psidium guajava	Amrood	Myrtaceae
5	Punica granatum	Anar	Punicaceae
6	Ficus carica	Anjeer	Moraceae
7	Terminalia arjuna	Arjun	Combretaceae
8	Saraca asoca	Ashok	Fabaceae
9	Withania somnifera	Ashwagandha	Solanaceae
10	Vachellia nilotica	Babool	Fabaceae
11	Ziziphus mauritiana	Ber	Rhamnaceae
12	Ficus benghalensis	Baragad	Moraceae
13	Aegle Marmelos	Belpatra	Rutaceae
14	Averrhoa carambola	Karambola	Oxalidaceae
15	Manilkara zapota	Chiku	Sapotaceae
16	Jasminum spp.	Chameli	Oleaceae
17	Holoptelea integrifolia	Chilbil	Ulmaceae
18	Hibiscus rosa-sinensis	China rose	Malvaceae
19	Abrus precatorius	Chirmi	Fabaceae
20	Butea monosperma	Dhak	Fabaceae
21	Cestrum diurnum	Din ka raja	Solanaceae
22	Eucalyptus globulus	Eucalyptus	Myrtaceae
23	Cassia fistula	Golden Shower	Fabaceae
24	Ficus racemosa	Gular	Moraceae
25	Cordia dichotoma	Gunda	Boraginaceae
26	Nyctanthes arbor-tristis	Harshringar	Oleaceae
27	Tamarindus indica	Imli	Fabaceae
28	Syzygium cumini	Jamun	Myrtaceae
29	Cascabela thevetia	Kaner	Apocynaceae
30	Carissa congesta	Kanonda	Apocynaceae
31	Pongamia glabra	Kathkaranj	Fabaceae

32	<i>Prosopis cineraria</i>	Khejari	Fabaceae
33	<i>Rhododendron spp</i>	Khirin	Ericaceae
34	<i>Cymbopogon citratus</i>	Lamongrass	Poaceae
35	<i>Calotropis gigantea</i>	Madar	Apocynaceae
36	<i>Mangifera indica</i>	Aam	Anacardiaceae.
37	<i>Lawsonia inermis</i>	Mehanadi	Lythraceae
38	<i>Jasminum sambac</i>	Mogara	Oleaceae
39	<i>Ajuga bracteosa</i>	Neellatha	Labiataeae
40	<i>Azadirachta indica</i>	Neem	Meliaceae
41	<i>Vitex negundo</i>	Nirgundi	Lamiaceae
42	<i>Ficus religiosa</i>	Peepal	Moraceae
43	<i>Grewia asiatica</i>	Phalasa	Malvaceae
44	<i>Cestrum nocturnum</i>	Rat ki rani	Solanaceae
45	<i>Alkanna tinctoria</i>	Ratanjot	Boraginaceae
46	<i>Ixora coccinea</i>	Rukmani	Rubiaceae
47	<i>Alstonia scholaris</i>	Shaptaparni	Apocynaceae
48	<i>Dalbergia sissoo</i>	Sheesham	Fabaceae
50	<i>Crocus sativus</i>	Singh Keshar	Iridaceae
51	<i>Crinum latifolium</i>	Shukhdarsan	Amaryllidaceae

Table 3.8: List of medicinal plants at RIE, Ajmer campus

Sr.No.	Botanical Name	Hindi name	Family
1	<i>Aegal marmelos</i>	Bael	Rutaceae
2	<i>Azadiarachta indica</i>	Neem	Meliaceae
3	<i>Alstonia scholaris</i>	Saptparni	Apocynaceae
4	<i>Aloe vera</i>	Ghrith Kumari	Asphodelaceae
5	<i>Calotropis gigantea</i>	Madar	Apocynaceae
6	<i>Carissa carandas</i>	Karonda	Apocynaceae
7	<i>Emblica officinalis</i>	Amla	Rutaceae
8	<i>Punica granatum</i>	Pomegranate	Punicaceae
9	<i>Syzygium cumini</i>	Jamun	Myrtaceae
10	<i>Tamarindus</i>	Imli	Cassalpiniaceae
11	<i>Terminalia arjuna</i>	Arjun	Combretaceae

Table 3.9: List of Threatened plant species in RIE, Ajmer campus

S.N.	Botanical name	Hindi name	Common name	Family	Habit
1	<i>Adhatoda bedomnei</i>	Vasaka	Malabar nut	Acanthaceae	Shrub
2	<i>Butea monosperma</i>	Palas	Flame of forest	Fabaceae	Tree
3	<i>Cordia crenata</i>	Pahari Lasora, Gunda	Assyrian plum	Boraginaceae	Tree
4	<i>Commiphora wightii</i>	Guggul	Indian bdellium- tree	Burseraceae	Shrub
5	<i>Euphorbia jodhpurensis</i>	Dudheli	Spurge	Euphorbiaceae	Herb
6	<i>Moringa concanensis</i>	Sehjan	Drumstick	Moringaceae	Tree

Table 3.10: Plants and Trees present in the gardens and parks of RIE Ajmer

Sr. No.	Botanical Name	Common Name	Family	Total number plants
Botanical Garden (Area = 1 Acre)				
1.	<i>Ixora coccinea</i>	Ixora	Rubiaceae	04
2.	<i>Bougainvillea spectabilis</i>	Bougainvillea	Nyctaginaceae	10
3.	<i>Hibiscus rosasinensis</i>	Chine Rose	Malvaceae	50
4.	<i>Asparagus racemosus</i>	Satawari	Asparagaceae	10
5.	<i>Livistona chinensis</i>	Chine Fen Palm	Arecaceae	15
6.	<i>Codiaeum variegatum</i>	Croton	Euphorbiaceae	50
7.	<i>Bryophyllum pinnatum</i>	Patharchatta	Crassulaceae	10
8.	<i>Euphorbia antiquorum</i>	spurge	Euphorbiaceae	15
9.	<i>Nerium oleander</i>	Nerium	Apocynaceae	20
10.	<i>Punica granatum</i>	Pomegranate	Lythraceae	10
11.	<i>Bambusa vulgaris</i>	Bamboo	Poaceae	50
12.	<i>Saraca asoca</i>	Ashoka	Fabaceae	8
13.	<i>Mangifera indica</i>	Mango	Anacardiaceae	01
14.	<i>Prosopis cineraria</i>	Khejari	Mimosaceae	01
15.	<i>Ficus benghalensis</i>	Banyan tree	Moraceae	01
16.	<i>Pithecellobium dulce</i>	Jungel jalebi	Mimosaceae	01
17.	<i>Acalypha wilkesiana</i>	Khaleefa	Euphorbiaceae	05
18.	<i>Dalbergia sissoo</i>	Sheesham	Fabaceae	15
19.	<i>Delonix regia</i>	Gulmohar	Fabaceae	20
20.	<i>Azadirachta indica</i>	Neem	Meliaceae	17
21.	<i>Lawsonia inermis</i>	Mehandi	Lythraceae	100
Principal Garden (0.275 Acre)				
1.	<i>Phoenix sylvestris</i>	Bomex palm	Arecaceae	30
2.	<i>Bombax ceiba</i>	Semal	Malvaceae	05
3.	<i>Livistona chinensis</i>	Chine Fen Palm	Arecaceae	15
4.	<i>Bougainvillea spectabilis</i>	Bougainvillea	Nyctaginaceae	20

5.	<i>Leucas aspera</i>	Sevara	Lamiaceae	05
6.	<i>Ficus benjamina</i>	Ficus Panda	Moraceae	20
7.	<i>Ixora coccinea</i>	Ixora	Rubiaceae	30
8.	<i>Asparagus racemosus</i>	Satawari	Asparagaceae	50
9.	<i>Lilieae Ritgen</i>	Lily	Liliaceae	40
10.	<i>Codiaeum variegatum</i>	Croton	Euphorbiaceae	115
11.	<i>Crinum latifolium</i>	Sudarsan	Amaryllidaceae	45
12.	<i>Rosa rubiginosa</i>	Rose	Rosaceae	30
13.	<i>Callistemon pachyphyllus</i>	Botal Brush	Myrtaceae	02
14.	<i>Nerium oleander</i>	Nerium	Apocynaceae	35
15.	<i>Hibiscus rosasinensis</i>	Chine Rose	Malvaceae	43
16.	<i>Dendranthema grandiflora</i>	Guldaudi	Asteraceae	30
17.	<i>Trachycarpus takil</i>	Tekia palm	Arecaceae	10
18.	<i>Cinnamomum verum</i>	Dalcheeni	Lauraceae	05
19.	<i>Epipremnum aureum</i>	Money Plant	Araceae	10
20.	<i>Drecina sp.</i>	Drecina	Asparagaceae	50
21.	<i>Azadirachta indica</i>	Neem	Meliaceae	25
22.	<i>Ocimum tenuiflorum</i>	Tulasi	Lamiaceae	05
23.	-	Tims Tekia	-	05
24.	-	Bokana	-	10
25.	-	Kamal Cactus	-	20
26.	<i>Euphorbia pulcherrima</i>	Pansetia	Euphorbiaceae	20
27.	<i>Hylocereus undatus</i>	Dragun Fruit	Cactaceae	10
28.	-	Khaleefa	-	10
29.	<i>Euphorbia milii</i>	Euforvia Red and White	Euphorbiaceae	10
30.	<i>Bryophyllum pinnatum</i>	Patharchatta	Crassulaceae	15
31.	<i>Michelia Champaca</i>	Swarn Champa	Magnoliaceae	08
32.	-	Inarmi	-	100
33.	<i>Eucalyptus globulus</i>	Euceliptus	Myrtaceae	10
34.	<i>Gladiolus sp.</i>	Gladia	Iridaceae	1000
35.	<i>Tecoma stans</i>	Ticoma	Bignoniaceae	20
36.	-	Kunj	-	10
37.	<i>Jasminum grandiflorum</i>	Chameli	Oleaceae	05
38.	<i>Cissus quadrangularis</i>	Hadjod	Vitaceae	50
39.	<i>Jasminum sambac</i>	Mogara	Oleaceae	50
40.	<i>Kalanchoe Pinnata</i>	Patharchatta Red	Crassulaceae	50
Gulab Jamun Park (0.275 Acer)				
1.	<i>Rosa rubiginosa</i>	Rose	Rosaceae	45
2.	<i>Syzygium cumini</i>	Jamun	Myrtaceae	30
3.	<i>Gladiolus sp.</i>	Gladia	Iridaceae	500
Visitor Park(0.275 Acer)				

1.	<i>Azadirachta indica</i>	Neem	Meliaceae	10
2.	<i>Delonix regia</i>	Gulmohar	Fabaceae	15
3.	<i>Ficus benghalensis</i>	Bargad	Moraceae	05
4.	<i>Ficus religiosa</i>	Pipal	Moraceae	05
5.	<i>Murraya koenigii</i>	Meetha neem	Rutaceae	02
6.	<i>Dalbergia sissoo</i>	Sheesham	Fabaceae	02
7.	<i>Bombax ceiba</i>	Semal	Malvaceae	03
8.	<i>Syzygium cumini</i>	Jamun	Myrtaceae	10
9.	<i>Plumeria rubra</i>	Nag Champa	Apocynaceae	50
Ramp Park (.250 Acre)				
1.	<i>Crinum latifolium</i>	Sudarshan	Amarylidaceae	07
2.	<i>Dracaena trifasciata</i>	Snek plant	Asparagaceae	25
3.	<i>Azadirachta indica</i>	Neem	Meliaceae	9
4.	<i>Aloe barbadensis</i>	Alovera	Asphodelaceae	200
5.	<i>Bougainvillea spectabilis</i>	Bougainvillea	Nyctaginaceae	50
6.	<i>Cylindropuntia sp.</i>	Cilendreecal Cactus	Cactaceae	100
7.	<i>Plumeria rubra</i>	Nag Champa	Apocynaceae	05
8.	-	Kamal Cactus	-	9
9.	<i>Lilieae Ritgen</i>	Lily	Liliaceae	10
10.	<i>Ficus benjamina</i>	Ficus Panda	Moraceae	05
11.	<i>Codiaeum variegatum</i>	Croton	Euphorbiaceae	07
12.	<i>Livistona chinensis</i>	Chine Fen Palm	Arecaceae	10
13.	<i>Gladiolus sp.</i>	Gladia	Iridaceae	20
14.	-	Hзара	-	10
15.	<i>Jasminum sambac</i>	Mogara	Oleaceae	10
16.	<i>Rosa rubiginosa</i>	Rose	Rosaceae	10
Assembly Garden (.5 Acre)				
1.	<i>Rosa rubiginosa</i>	Rose	Rosaceae	20
2.	<i>Annona reticulata</i>	Seetafal	Annonaceae	01
3.	<i>Platyclusus orientalis</i>	Morpankhee	Cupressaceae	04
4.	-	Kely	-	20
5.	<i>Cylindropuntia fulgida</i>	Glove cactus	Cactaceae	02
6.	<i>Opuntia ficus</i>	Nagfunny	Rosaceae	02
7.	<i>Hibiscus rosasinensis</i>	Chine Rose	Malvaceae	40
8.	<i>Codiaeum variegatum</i>	Croton	Euphorbiaceae	02
9.	<i>Ficus racemosa</i>	Goolar	Moraceae	01
10.	<i>Neolamarckia cadamba</i>	Kadamba	Rubiaceae	01
11.	<i>Psidium guajava</i>	Gwava	Myrtaceae	03
12.	<i>Plumeria rubra</i>	Nag Champa	Apocynaceae	05
13.	<i>Ixora coccinea</i>	Ixora	Rubiaceae	02
14.	<i>Punica granatum</i>	Pomegranate	Lythraceae	05

15.	<i>Mangifera indica</i>	Mango	Anacardiaceae	05
16.	<i>Cordyline australis</i>	Palm	Arecaceae	03
17.	<i>Dracaena fragrans</i>	Drecina	Asparagaceae	01
18.	<i>Nerium oleander</i>	Kanhar	Apocynaceae	10
19.	<i>Opuntia sp.</i>	Cautus	Cactaceae	10
20.	<i>Codiaeum variegatum</i>	Croton	Euphorbiaceae	20
Gol Garden (.15 Acre)				
1.	<i>Platycladus orientalis</i>	Morepankhee	Cupressaceae	05
2.	<i>Ixora coccinea</i>	Ixora	Rubiaceae	4
3.	<i>Saraca asoca</i>	Ashoka	Fabaceae	10
4.	<i>Ficus benjamina</i>	Ficus	Moraceae	30
5.	<i>Crinum latifolium</i>	Sudarshan	Amarylidaceae	20
6.	<i>Hibiscus rosasinensis</i>	Chine Rose	Malvaceae	05
7.	-	Inrme	-	150
8.	<i>Azadirachta indica</i>	Neem	Meliaceae	02
9.	-	Hamala	-	10
10.	<i>Duranta erecta</i>	Yellow Durenta	Verbenaceae	20
11.	-	Kanahar	-	02
12.	<i>Saussurea obvallata</i>	Kamal cactus	Asteraceae	02
13.	<i>Cordyline australis</i>	Palm	Arecaceae	02
14.	<i>Magnolia Champaca</i>	Sawrn Champa	Magnoliaceae	02
Pratap Garden (0.15 Acre)				
1.	<i>Hibiscus rosasinensis</i>	Chine Rose	Malvaceae	50
2.	<i>Azadirachta indica</i>	Neem	Meliaceae	05
3.	<i>Ficus religiosa</i>	Pepal	Moraceae	01
4.	<i>Delonix regia</i>	Gulmohar	Fabaceae	02
5.	<i>Bougainvillea spectabilis</i>	Bougainvillea	Nyctaginaceae	05
6.	-	Inrmi	-	50
7.	<i>Cycas revoluta</i>	Cycus	Cycadaceae	01
8.	<i>Saraca asoca</i>	Ashoka	Fabaceae	01
9.	<i>Rosa rubiginosa</i>	Rose	Rosaceae	25
Shubhash Park(0.15 Acre)				
1.	<i>Rosa rubiginosa</i>	Rose	Rosaceae	25
2.	<i>Codiaeum variegatum</i>	Croton	Euphorbiaceae	02
3.	-	Inrmi	-	30
4.	<i>Bougainvillea spectabilis</i>	Bougainvillea	Nyctaginaceae	04
5.	<i>Hibiscus rosasinensis</i>	Chine Rose	Malvaceae	10
6.	<i>Azadirachta indica</i>	Neem	Meliaceae	05
7.	<i>Delonix regia</i>	Gulmohar	Fabaceae	01
8.	<i>Dalbergia sissoo</i>	Sheesham	Fabaceae	01
9.	<i>Bombax ceiba</i>	Semal	Malvaceae	03

10.	-	Kanhar	-	01
11.	<i>Ocimum tenuiflorum</i>	Tulasi	Lamiaceae	02
12.	<i>Dracaena fragrans</i>	Drecina	Asparagaceae	04

3.6.2. Environmental Theme Park

To promote environmental awareness through interactions, and to bring school children, youth and their teachers to a forum where they can discuss their perspectives on the environmental issues, RIE Ajmer maintained an Environmental education theme park, which is a part of PAC program, namely "Environmental education theme park for strengthening school education programme and training of school children for generating environmental awareness." RIE, Ajmer looks after the educational interest of the northern region of India comprising the states of Haryana, Himachal Pradesh, Jammu & Kashmir, Punjab, Uttar Pradesh, Rajasthan, Uttaranchal, Delhi and Chandigarh. RIE is a regional resource institute for teachers training including environmental education. The theme park is given in Fig 3.13.

To achieve the goals of NCF 2005, i.e. learning about the environment, learning through the environment, and learning for the environment. This program has been taken up with the following objectives:

- To maintain the environmental educational park, which includes aquatic, desert, and terrestrial ecosystems, a medicinal plant conservatory, a center for demonstration of rainwater harvesting, conservation of water and soil, and organic farming.
- To enable the students, teacher educators, and visitors to perform simple environmental educational related activities.
- To educate teachers, students and the community about the need to conserve and protect the environment.

Objectives of Theme Park:

Theme Parks aimed to conserve the integrity and diversity of nature.

- To demonstrate the structure and functions of various ecosystems such as Desert aquatic and manmade.
- To understand the scientific basis of the functioning of greenhouse and it's utilization for growth and development of exotic plants.
- To inculcate environmental related values among students for the conservation of water, natural

composition of atmosphere and other resources.

- During the year 2019-20, they maintain and further develop the existing aquatic ecosystem, desert ecosystem and terrestrial ecosystem. Green house, which will serve both as nursery, demonstrate Hydroponics and other environmental educational related phenomena.
- Medicinal plant conservatory, maintenance and multiplication of important medicinal plant of this region.
- Participants coming for different programs, students of B.Sc. B.Ed. (1st - IVth Year), B.A. B.Ed. (1st - IVth year) and students of Demonstration Multipurpose School (DMS) having first-hand knowledge and experience of environmental education and visiting theme park. Different students of the local school also enjoy and experiences the environmental education.

3.6.2.1. Medicinal Arboreta

Inside the theme park, there is a medicinal arboretum (Fig 3.16). The list of medicinal plants inside the theme park is given in Table 3.12. Medicinal plants belonging to the earliest known health care products that have been used by mankind. In India, the earliest reference to the medicinal value of plant appears in Rig Veda, in which a brief reference to the healing property of plants has been made. However, it is in the Ayurveda that, definite properties and use of drugs and drugs yielding plants have been discussed. In fact, Ayurvedic medicine had its origin from the works of Ayurveda. The later work of Charak and Susruta, namely Charak-Sanhita and susruta Sanhita added invaluable knowledge to the science of medicinal plants.

Most drug plants are found in the tropics growing in wild condition and are mainly used by herb doctors and Ayurvedic vaidyas, who refer to them as Jari-butis. In the light of diverge facts, the curiosity about the sources of the medicines, medicinal plants in most of the cases, has drawn considerable interest among all quarters of the medicinal science.

3.6.2.2. Rose Garden

Inside the theme park rose garden is also present (Fig 3.14). The rose gives its name to the botanical family Rosaceae, of which it may be considered the type, and to the order Rosales. Roses, even from widely separated regions, hybridize readily giving rise to types that overlap the parental forms, and thus make it difficult to determine basic species. They are distributed primarily in the temperate part of the Northern Hemisphere, but some are found above the Arctic Circle and a few at the higher elevations in the Tropics.

There are many gardens present inside the theme park. The list of plants present inside the theme park is given in Table 3.11.

Table 3.11: Plants and trees present in Environmental Educational Theme Park

Environmental Educational Theme Park (8.5 Acer)				
Sr. No	Botanical Name	Common Name	Family	Total number of Plants
Temperate Fruit plant				
1.	<i>Juglans regia</i>	Walnut	Juglandaceae	10
2.	<i>Malus pumila</i>	Apple	Rosaceae	10
3.	<i>Prunus armeniaca</i>	Apricot	Rosaceae	10
4.	<i>Elaeocarpus ganitrus</i>	Rudraksha	Elaeocarpaceae	05
Phalsa garden				
1.	<i>Grewia asiatica</i>	Phalsa	Malvaceae	50
Defence fruit garden				
1.	<i>Phyllanthus emblica</i>	Aonla	Phyllanthaceae	50
2.	<i>Psidium guajava</i>	Guawa	Myrtaceae	70
3.	<i>Punica granatum</i>	Pomegranate	Punicaceae	50
4.	<i>Manilkara zapota</i>	Sapota	Sapotaceae	40
5.	<i>Citrus sp.</i>	Citrus	Rutaceae	60
6.	<i>Cordia dichotoma</i>	Gunda	Boraginaceae	40
7.	<i>Syzygium cumini</i>	Jamun	Myrtaceae	30
Desert Park				
1.	<i>Prosopis cineraria</i>	Khejri	Fabaceae	02
2.	-	Kamal Cactus	-	11
3.	<i>Euphorbia royleana</i>	Thor Cactus	Euphorbiaceae	05
4.	<i>Tripidium bengalense</i>	Munja	Poaceae	02
5.	-	Buy	-	02
6.	<i>Aloe barbadensis</i>	Alovera	Asphodelaceae	70
7.	<i>Zizyphus mauritiana</i>	Ber	Rhamnaceae	10
8.	<i>Opuntia ficus</i>	Nagfani	Rosaceae	10
9.	<i>Dracaena trifasciata</i>	Snake plant	Asparagaceae	100
10.	<i>Cylindropuntia sp.</i>	Cylindrical Cactus	Cactaceae	100
11.	-	Small Arti Cooltrot	-	50
12.	<i>Vachellia nilotica</i>	Babul	Fabaceae	02
13.	<i>Mammillaria elongata</i>	Finger Cactus	Cactaceae	30
14.	<i>Opuntia ficus-indica</i>	Indian Fig	Cactaceae	40
Medicinal plant				
1.	<i>Ficus carica</i>	Anjeer	Moraceae	02
2.	<i>Jatropha curcas</i>	Jatrofa	Euphorbiaceae	15
3.	<i>Terminalia arjuna</i>	Arjun	Combretaceae	02
4.	<i>Commiphora mukul</i>	Gugal	Burseraceae	04
5.	<i>Cymbopogon schoenanthus</i>	Lemon Grass	Poaceae	04

6.	<i>Murraya koenigii</i>	Meetha neem	Rutaceae	04
7.	<i>Azadirachta indica</i>	Neem	Meliaceae	05
8.	<i>Crinum latifolium</i>	Sudarshan	Amarylidaceae	01
9.	<i>Aloe barbadensis</i>	Alovera	Asphodelaceae	02
10.	<i>Bambusa vulgaris</i>	Bans	Poaceae	01
11.	-	Negadh	-	02
12.	<i>Manilkara hexandra</i>	Khirni	Sapotaceae	02
13.	<i>Citrus limon</i>	Neembu	Rutaceae	02
14.	<i>Shorea robusta</i>	Saal	Dipterocarpaceae	01
15.	<i>Mimusops elengi</i>	Maulshree	Sapotaceae	01
16.	<i>Manilkara zapota</i>	Sapota	Sapotaceae	01
17.	<i>Tamarindus indica</i>	Imli	Fabaceae	01
18.	<i>Guilandina bonduc</i>	Kankach	Caesalpiaceae	01
19.	<i>Ficus religiosa</i>	Pepal	Moraceae	01
20.	<i>Abrus precatorius</i>	Chirmi	Fabaceae	01
21.	<i>Santalum album</i>	Chandan	Santalaceae	02
22.	<i>Phyllanthus emblica</i>	Aonla	Phyllanthaceae	01
23.	<i>Aegle marmelos</i>	Beelpatra	Rutaceae	01
24.	<i>Withania somnifera</i>	Ashwagandha	Solanaceae	01
Panchvati Vatika				
1.	<i>Ficus religiosa</i>	Pepal	Moraceae	01
2.	<i>Phyllanthus emblica</i>	Aonla	Phyllanthaceae	01
3.	<i>Ficus benghalensis</i>	Bargad	Moraceae	01
4.	<i>Saraca asoca</i>	Ashoka	Fabaceae	01
5.	<i>Aegle marmelos</i>	Beelpatra	Rutaceae	01
Navgrah Vatika				
1.	<i>Calotropis gigantea</i>	Ankh	Apocynaceae	01
2.	<i>Butea monosperma</i>	Palsh	Fabaceae	01
3.	<i>Senegalia catechu</i>	Kher	Fabaceae	01
4.	<i>Achyranthes aspera</i>	Apamarg	Amaranthaceae	01
5.	<i>Ficus religiosa</i>	Pepal	Moraceae	01
6.	<i>Commiphora mukul</i>	Gugal	Burseraceae	01
7.	<i>Prosopis spicigera</i>	Sami	Mimosaceae	01
8.	<i>Santalum album</i>	Chandan/Durwa	Santalaceae	01
9.	<i>Withania somnifera</i>	Asgandh/Kush	Solanaceae	01
Tirthankaras Vatika				
1.	<i>Ficus benghalensis</i>	Bargad	Moraceae	01
2.	<i>Alstonia scholaris</i>	Saptparn	Apocynaceae	01
3.	<i>Shorea robusta</i>	Saal	Dipterocarpaceae	01
4.	<i>Pinus longifolia</i>	Saral	Pinaceae	01
5.	<i>Callicarpa macrophylla</i>	Priyangu	Verbenaceae	01
6.	-	Priyangu	-	01

7.	<i>Albizia lebbbeck</i>	Shirish	Fabaceae	01
8.	<i>Mesua ferrea</i>	Nagvraksh	Callophylaceae	01
9.	<i>Terminalia bellirica</i>	Bahera	Combretaceae	01
10.	<i>Bauhinia purpurea</i>	Bhalivraksh	Fabaceae	01
11.	<i>Butea monosperma</i>	Palsh	Fabaceae	01
12.	<i>Diospyros melanoxylon</i>	Tendu	Ebenaceae	01
13.	<i>Trichosanthes dioica</i>	Patal	Cucurbitaceae	01
14.	<i>Ficus religiosa</i>	Pepal	Moraceae	01
15.	-	Dadhivarn	-	01
16.	<i>Lagerstroemia parviflora</i>	Nandi	Lythraceae	01
17.	<i>Ocimum tenuiflorum</i>	Tilak	Lamiaceae	01
18.	<i>Mangifera indica</i>	Mango	Anacardiaceae	01
19.	<i>Saraca asoca</i>	Kankeli	Fabaceae	01
20.	<i>Magnolia champaca</i>	Champak	Magnoliaceae	01
21.	<i>Mimusops elengi</i>	Bakul	Sapotaceae	01
22.	<i>Gymnema sylvestre</i>	Meshshrang	Asclepiadaceae	01
23.	<i>Anogeissus latifolia</i>	Dhav	Combretaceae	01
24.	<i>Shorea robusta</i>	Saal	Dipterocarpaceae	01

Table 3.12: Medicinal plants of theme park

Sr. No.	Botanical Name	Common Name	Family	Uses
1	<i>Calotropis gigantea</i>	Madar/Aak	Asclepiadaceae	The milky juice of stem is used in leprosy, dropsy, etc. The dried latex is antispasmodic & an efficient nerve tonic.
2	<i>Azadirachta indica</i>	Neem	Maliaceae	Juice of leaves with honey or salt cures jaundice and intestinal worms. Leaf-paste cures boils, ulcers, skin eruptions swellings & wounds.
3	<i>Withania somnifera</i>	Ashvagandha/Asgand	Solanaceae	Roots are recommended for high cough and in female genetic disorder. It is an important drug in treatment of rheumatic pain, etc. It is also known to stimulate sex impulses and improve sperms.
4	<i>Santalum album</i>	Sandalwood /Safed chandan	Santalaceae	The tree is a sedative & bears cooling effects. Mixed with rice & honey, it relives dysentery and excessive thirst. The paste also relives headache.
5	<i>Datura stramonium</i>	Datura/Dhat oora	Solanaceae	Dried leaves of Datura smoked in pipes cure asthma, whooping cough and bronchitis. Juice of leaves with curd is given in gonorrhoea.

6	<i>Murraya koenigii</i>	Curry leaves/Mithaneem	Rutaceae	Valued as an antioxidant, anti-diabetic, anti-microbial, etc. Commonly used in curries, leaves are used in many other dishes to add flavour.
7	<i>Emblica officinalis</i>	Indian gooseberry/Amla	Euphorbiaceae	Fruits are rich source of Vitamin C and are considered good liver tonic. Used in treatment of hemorrhage, anemia, etc. Leaves are cerebral and gastrointestinal tonic. Root bark is astringent and useful in ulcer.
8	<i>Kalanchoe pinnata</i>	Patharhatta/Bryophyllum	Crassulaceae	Plant paste is applied on forehead to alleviate headache, to cure cuts & wounds. Fresh sap is used for eye diseases. Juice knocks out Staphylococcus and Escherichia coli.
9	<i>Aloe vera</i>	Gheekanvar/Kumari	Liliaceae	Fresh aloe gel is well known for its domestic medicinal value. The gel has property of relieving thermal burns, wound healing, moisturizing and emollient purposes.
10	<i>Punica granatum</i>	Anar/Pomegranate	Lythraceae	Its fruit juice makes excellent drink, which contains potassium, phosphorus and calcium. Juice stimulates appetite and is used in treatment of stomach disorders.
11	<i>Ficus carica</i>	Anjeer/Common fig	Moraceae	Fruit is used fresh as well as dried. Fresh figs are preserved and canned. Figs have a definite laxative property and are good for digestion.
12	<i>Commiphora wightii</i>	Guggal	Burseraceae	Leaves produce resinous sap used in Ayurvedic medicine. Active ingredient in the extract improves thyroid function, increases fat burning activity of the body.
13	<i>Caesalpinia bonduca</i>	Kath karanj	Fabaceae	Twigs used to clean teeth, while the seeds are ground as a condiment, as well as many other uses.
14	<i>Carica papaya</i>	Papaya/Papita	Caricaceae	Fruit has high amount of pectin, which can be used to make jellies. Leaves are used for treatment of Malaria. Tree latex is used for treatment of cuts, rashes, stings and burns.
15	<i>Ficus recemosa</i>	Gular/Umar/Udimbara	Urticaceae	Fruits are useful in the treatment of leucorrhoea, blood disorders, etc. Bark is useful in asthma and piles. Latex is applied externally on chronic infected wounds.



Fig 3.13: Environmental Education Theme Park



Fig 3.14: Rose garden inside the theme park



Fig 3.15: Varieties of rose found in rose garden



Fig 3.16: Medicinal plants of theme park

3.7. Agricultural Practices

3.7.1. Nursery

Preparing plants by different propagation methods like cutting, budding, layering and seed. Example - Kenner, Ashoka, Bauganvelia, Jamun, Rose Kachnar, Neem, Peepal, Banyan, Cactus, croton, Pattherchitta, Lily, Sudershan, Orchid, Tulsi, Ficus, Lalpatti, Yellow durenta.

3.7.2. Hydroponics system

The institute established small hydroponic systems which exhibits before school children in different programs. In this system they are growing vegetable plant like chili and sweet pea. The hydroponics system is given in Fig 3.19.

3.7.3. Vermicompost pit

The institute established 5 vermicomposting pits. The institute prepared organic manure by plant dry waste like dry leaves, cow-dung, grass etc., in the campus. This process is done by students. Synthetic fertilizer were not used for horticultural practice in RIE, rather they only prefer organic manure for campus plants. The vermicompost unit of RIE Ajmer is given in Fig 3.21.

3.7.4. Botanical Garden

The institute has a botanical garden tin which varieties of plants are found such as Ashoka tree. Bottle-brush, Mango tree, Pepal, Banyan, Lillium, croton, Jangali Jalebi, Severa, Cycus, Ficus, Panda, Kaner, China rose, Rose, Jamun, Petunia, Calotropis, Gulmohar, Jhakaranda, Alestonia, Hydrilla, Lentana. Inneremi, Bauganvellia, Nagchampa, Mongera, Christmas tree etc.

3.7.5. Natural resources

RIE have 8 wells for proper irrigation of the plants. These wells were build long back to meet the requirement of water of that area.

3.7.6. Training and pruning of plants

Training, the orienting of the plant in space, is achieved by techniques that direct the shape, size, and direction of plant growth. It may be accomplished by use of supports to which plants can be bent, twisted, or fastened. Pruning is a data compression technique in machine learning and search algorithms that reduces the size of decision trees by removing sections of the tree that are non-critical and redundant to classify instances. Young trees are pruned to train it, to acquire a desired shape. In old trees light heading back is done to stimulate the flowering. In bearing trees light pruning is done to stimulate fresh growth it bearing flower buds on fresh growth.

3.7.7. Irrigation

Irrigation is the artificial application of water to the soil through various systems of tubes, pumps, and sprays. Irrigation is usually used in areas, where rainfall is irregular or dry times or drought is expected. There are many types of irrigation systems, in which water is supplied to the entire field uniformly. The different types of irrigation include- sprinkler irrigation, surface irrigation, drip irrigation, sub-irrigation and manual irrigation.



Fig 3.17: Agricultural Practices of RIE



Fig 3.18: Green House



Fig 3.19: Hydroponics System inside the greenhouse



Fig 3.20: Discussion between audit teams and institute's member inside the Greenhouse



Fig 3.21: Vermicomposting unit at RIE

3.8 Fauna of RIE Campus Ajmer

The term fauna represents all the animal species found in a particular region at a particular time. These are the naturally occurring animal species of the particular area.

India is the world's 8th most biodiverse region with a 0.46 BioD score on diversity index, 102,718 species of fauna and 23.39% of the nation's geographical area under forest and tree cover in 2020 [1]. India encompasses a wide range of biomes: desert, high mountains, highlands, tropical and temperate forests, swamplands, plains, grasslands, areas surrounding rivers, as well as island archipelago. Officially, three out of the 36 Biodiversity Hotspots in the world are present in India: the Himalayas, the Western Ghats, and the Indo-Burma region. To these may be added the Sundarbans and the Terrai-Duar Savannah grasslands for their unique foliage and animal species. These hotspots have numerous endemic species. Nearly 5% of India's total area is formally classified under protected areas.

The institute has diversity of fauna in the 110 acres of campus. The institute is situated near Anasagar lake (Fig 3.22) and this lake is famous for bird sanctuary. The variety of birds and migratory birds comes to this lake. Due to this lake near to the institute, a variety of birds comes to campus of institute. During the field visit, flock of birds was observed on the campus (Fig 3.23).



Fig 3.22: Institute situated near Anasagar Lake



Fig 3.23: Flock of birds observed on the campus



Fig 3.24: Peacocks observed on the campus

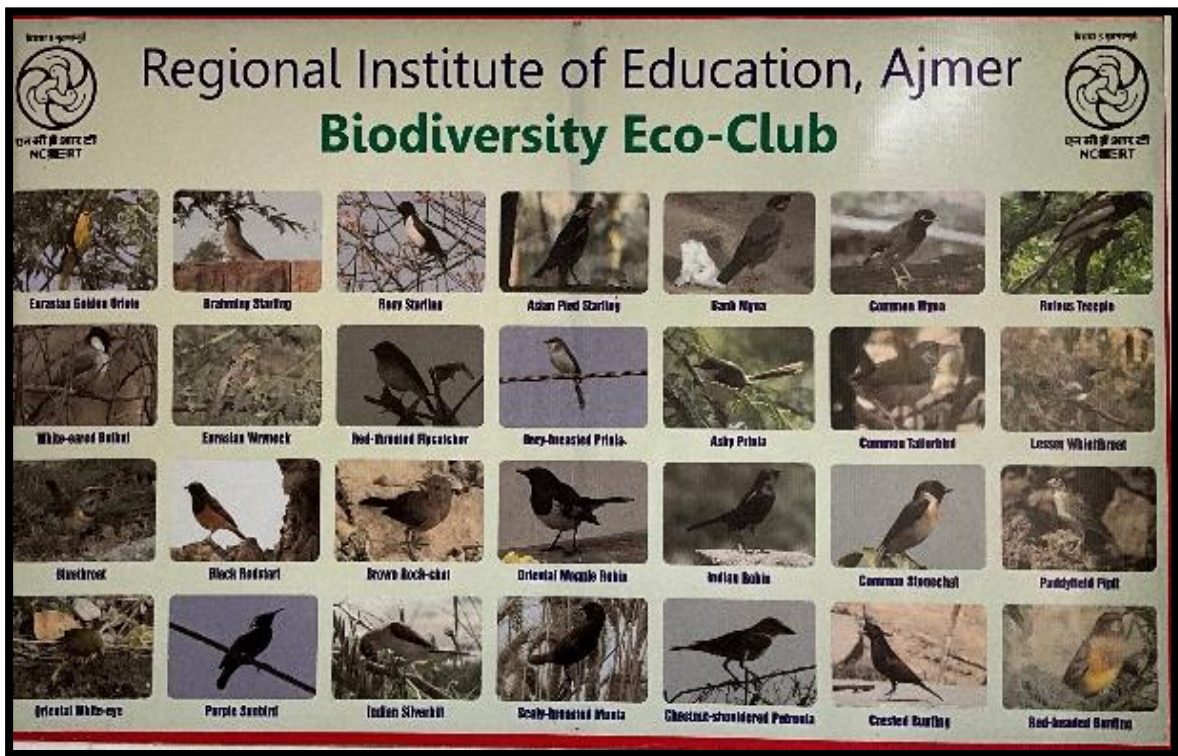


Fig 3.25: Birds of RIE Ajmer



Fig 3.26: Herpeto fauna of RIE Ajmer

Apart from that the campus has great diversity of peacocks. Almost 100 peacocks are present in campus. During the field visits numbers of peacocks were observed on the campus (Fig 3.24). Many birds are reported in RIE Ajmer which is given in Fig. 3.26. A large variety of herpetofauna are also reported in RIE Ajmer (Fig. 3.26).

The details of common fauna found on campus are as follows:

1. **Mollusca**

- Common Name: common garden snail
- Zoological Name: Cornu aspersum
- Average life span: The life span of the adult is 2 to 5years.
- Favorite Food: Snails favor kale, broccoli, lettuce and spinach .However they consume other vegetables as well such as artichokes, carrots, peas, potatoes, zucchini, sweet corn, and peppers.

2. **Insects**

- Common name: Wandering glider
- Zoological name: Pantala flavescens
- Conservational status: Listed as of least concern in the IUCN red list of threatened species
- Average life span: not known because of their high mobility
- Favorite food: Larvae feed on aquatic insects eg. Mosquito, aquatic, may fly larvae, freshwater shrimp. They also eat very small fish and tadpole. Adult eat soft bodied flying insect including mosquitoes, flies, moths, mayflies and flying ants and termites.
- Ecological importance: they play a vital role in maintaining the balance of the ecosystem as they feed on insect and harmful pest in agricultural field.

3. **Reptile**

a. **Lizard**

- Common name: Lizard
- Zoological name: Lacertilia Conservational Status: Not extinct
- Average life span: 10-15 years
- Favorite food: spiders, snails, caterpillars etc.

b. **Snake**

- Common name: Indian cobra
- Zoological name: Naja naja
- Conservational status: According to the IUCN Red List, the Indian cobra is considered to

be a species of least concern.

- Average life span : between about 20 and 30 years
- Favorite food: rodents, lizards, and frogs

c. Snake

- Common name – snake
- Zoological name – *Xenochrophis piscator*
- Conservational status – *Xenochrophis piscator* is commonly encountered species. Its conservation status is least concerned.
- Average life span – 10 years
- Favorite Food – they feed on frogs, toads, fishes etc.

4. Birds

a. Peacock

- Common name: Peacock
- Zoological name: *Pavo cristatus*
- Conservational status: Listed as of least concern in the IUCN red list of threatened species
- Average life span: Average life span of peacock is 15 years.
- Favorite food: Seeds, grains, berries, vegetables and fruits as well as insects, arthropods, small lizards, snakes, frogs and rodents.
- Ecological importance: Peacocks help to maintain the ecological balance by contributing to the food chain and also maintaining its continuity. They eat insects which might otherwise harm the crops, and therefore in this way they help farmers indirectly by controlling the population of insects.

b. Bustard

- Common name: Great Indian Bustard
- Zoological name: *Ardeot mariceps*
- Conservational status: Critically Conservation of Nature's (IUCN) Red List of endangered on the International Union for threatened Species
- Life span: 12-15 years
- Favorite food: grass seeds, the insects like the beetles, grasshoppers, reptiles
- Trophic status: dry grasslands and scrublands Gestational period-27 days

c. Parrot

- Common name - Parrot
- Zoological name - *Melopsittacus unduatus*
- Conservational status - According to the 2019 IUCZ red list 26% of parrot are threa tened with extinction 14% are listed as near threatened
- Life span (average) - 5 - 8 years
- Favorite food - broccoli florets, dark leaves, finely chopped carrots, sweet potatoes and veggies.
- Trophic status - Primary consumers are the organisms that feed on producers.
- Gestation period - between 17 - 20 days

d. Pigeon

- Common name: - Pigeon
- Zoological name: - *Columba livia*
- Conservational status: Not globally threatened. Average life span: - 5 to 6 years
- Favorite food:-they enjoy eating seeds, nuts and vegetables

Mammals

a. Squirrel

- Common name: Squirrels
- Zoological name: *Sciuridae*
- Conservational status: Some species are listed as endangered, threatened, or vulnerable under the International Union for Conservation of Nature (IUCN) Red List, such as the Malabar Giant Squirrel and the Red Squirrel
- Average life span: Generally, smaller species of squirrels, such as the American red squirrel, have a lifespan of around 3-4 years in the wild, while larger species like the gray squirrel can live up to 6-8 years in the wild.
- Favorite food: Squirrels eat a lot of nuts and will eat any type but their favorite nuts include: Acorns, Walnuts, and Pecans.

b. Dog

- Common name: dog
- Zoological name: *Canis lupus familiaris*

- Conservational status: Domestic dogs are not threatened, though some agencies try to protect rare breeds from disappearing.
 - Average life span: 10 – 13 years
 - Favorite food: Feral domestic dogs will eat a variety of foods including animals and fruits.
- Apart from that, there is a natural growing area (15-20 acre) at the campus. The institute has developed this natural growing area as restricted area or undisturbed zone for wildlife mangement (Fig 3.29).



Fig 3.27: Common fauna of RIE Ajmer

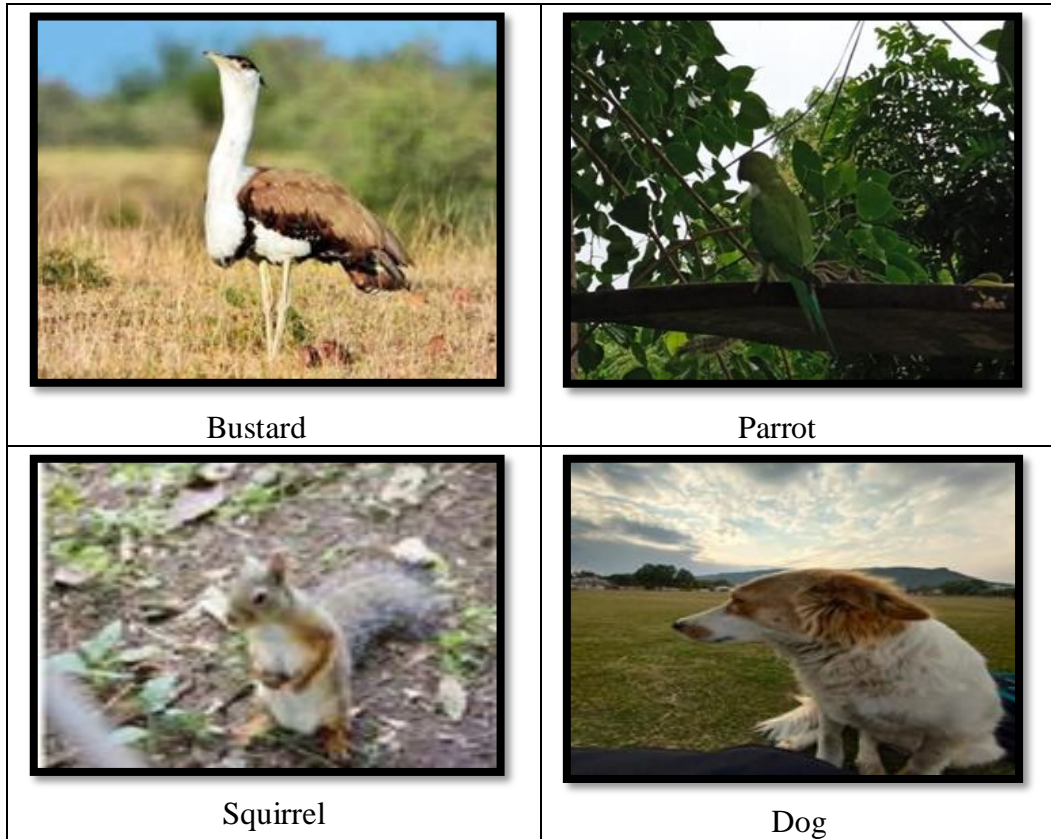


Fig 3.28: Common fauna of RIE Ajmer



Fig 3.29: Unrestricted area for Wildlife Management

3.9 Environment Activity of RIE Ajmer

- There is an ecoclub in institute, in which students of this group participating in many ecofriendly activities, seminars, rally, etc.
- The environment awareness programme celebrated to commorate environment day, ozone day, water day, etc. The Institute celebrated Swacchhta Saptha from 1st Sept- 15th September, 2022 under which various activities such as cleaning drive in the campus, poster making, rally etc. were conducted.



Fig 3.30: Swacchhta Saptha event

- On September 23, 2022, the NCC cadets of the Institute participated in a cleaning drive ‘Puneet Sagar’ at Foy Sagar Lake Ajmer. They also presented street plays to create awareness about clean water bodies and green surroundings.



Fig 3.31: NCC cadets participating in a cleaning drive 'Puneet Sagar'
at Foy Sagar Lake Ajmer

- The Institute organized a three day workshop from February 6-8, 2023 on "Developing Activities Related to Various Environmental Issues". This was followed by the celebration of three day "Prakriti Mela" from February 9-11, 2023 in the Theme Park. The Chief Guest for the inauguration was Mr. Rupender Singh, IGP, Ajmer Range and Prof. Nagendra Singh. Various activities such as drawing competition, slogan writing competition, quiz competition and treasure hunt were organized wherein the students from various invited schools actively participated and the winners of the competitions were rewarded by the Principal of the Institute. The Valedictory Function was graced by Prof. Rajesh Kumar, Head, Department of Environmental Education, Central University, Ajmer and the Prof. K.K.Sharma, Former VC, M60DS University, Ajmer.
- **Prakriti Mela:** The institute organized three days Prakriti Mela every year at the Environmental Education Theme Park of RIE. The institute started this event in 2005. About more than 150 students of various fields participating in this event. The objective of this three days mega event is to strengthen environmental education and to bring school children, youth, and teachers together in an interactive forum to promote environmental

awareness. The programme aims at involving the network of Eco-Clubs. Prakriti mela is a platform for teachers and learners from schools to participate and showcase the work done in the area of environmental education and sustainability, center for demonstration of rainwater harvesting, conservation of water and soil, organic farming etc. The participants will set on example by becoming students in project-based learning related to environment.



Fig 3.32: Prakriti Mela Celebration at theme park of RIE

- The Institute celebrated International Earth Day on April 22, 2022. The theme of the event was “Invest In our Planet”. Poster making competition and a lecture was organized to highlight the value and urgency of climate crises and draw awareness of the students for Earth protection.



Fig 3.33: Earth Day Celebration at RIE

- The birth anniversary of Dr. Vikram Sarabhai was celebrated on August 12, 2022. This was also observed as the National Remote Sensing Day and a quiz on Geo- spatial Technology was conducted along with poster making and slogan writing competitions for the students.



Fig 3.34: Poster making and slogan writing competitions on National Remote Sensing Day

- Institute has organised a Webinar on 'Wildlife of India: Diversity, Conservation & Management'. On this occasion, Dr. Rajkumar Samant has delivered an online extension lecture on 'Forest & Livelihood: Sustaining People & Planet' on 01 October 2021

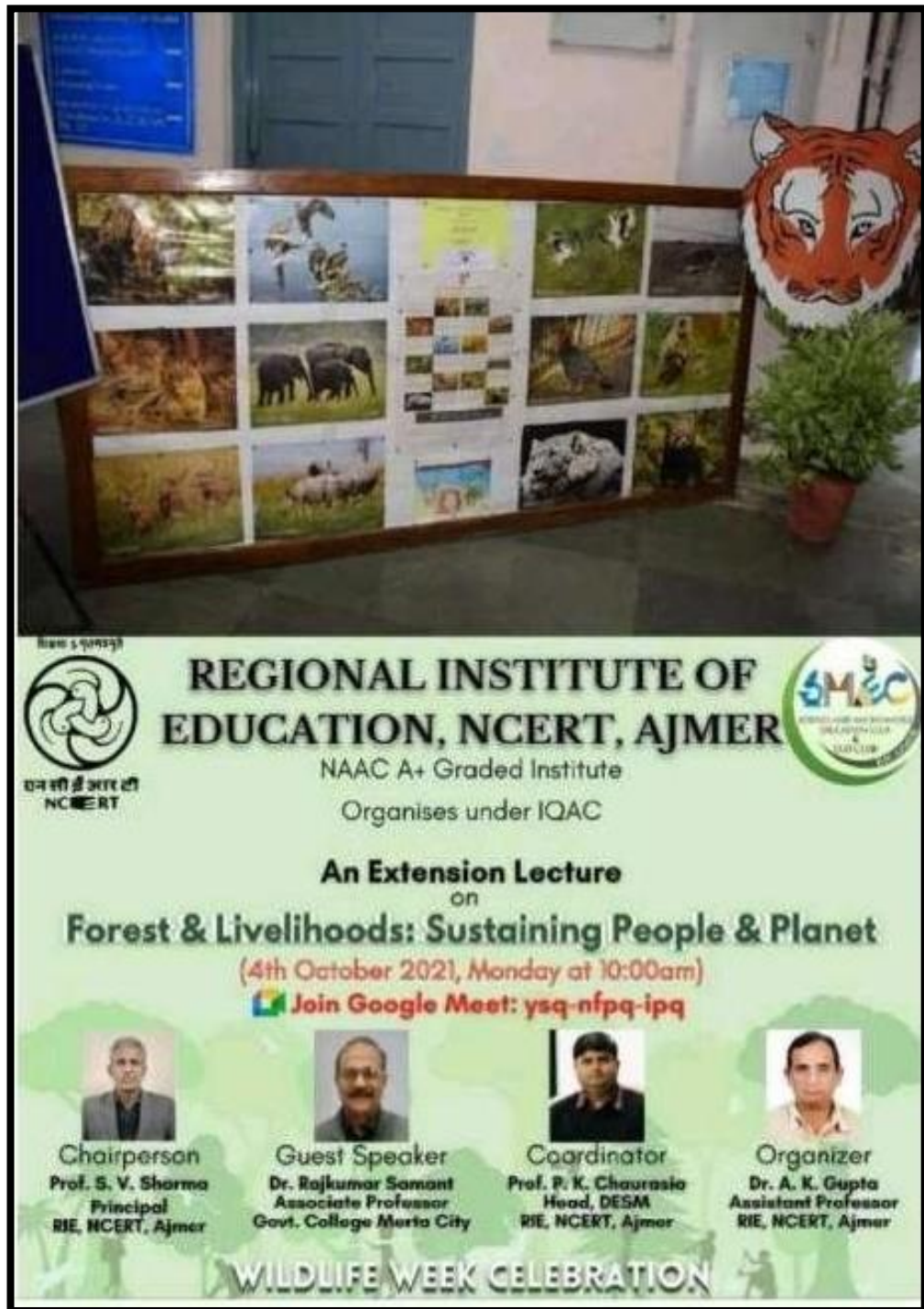


Fig 3.35: Webinar on Wildlife of India: Diversity, Conservation & Management

- Inauguration of a Webinar on awareness among the prospective teachers on environmental issues and concerns by Prof. K.C. Sharma held at 07 - 08 March 2022



Fig: 3.36: Webinar on Wildlife of India: Diversity, Conservation & Management

- Institute has celebrated International Earth Day based on the theme “Invest in our Planet” on 22nd April, 2022.

- The students of Eco-Club of RIE also participating in many activities for protection of birds. They build nest in trees on the campus for birds (Fig 3.38). They keep water pots in different places on the campus for birds. During the field visit, the green audit team also participating in these activities (Fig 3.39)



• Fig: 3.37: International Earth Day celebration at RIE



Fig 3.38: Nest construction for birds



Fig 3.39: Green Audit team and ecoclubs students participating in filling water in pots for birds

3.10 Other Observation

- Science Park on the campus is under construction
- QR code Signases for trees on the campus are under working
- The institute has planned to propose 20-25 acre land for agricultural practices.
- There is one wood workshop present in the institute. The old or damaged furniture of the institute are repaired by their wood workshop
- The institute has plans to develop a pond near the hostel
- The institute doesn't use vegetables and fruits for commercial purposes. They distribute among the students of RIE.

Chapter 4

Recommendations and Management Plans

4.1. Recommendations and Management Plan for RIE

It is important to consider institute management policies and resource-use strategies. For its sustainable development, the institute must have a green policy/environmental policy. The institution's management should be commended for their careful implementation of the environmental policy. The institution should have a procurement policy as well as a policy on awareness training programs.

4.2. Follow-up Management Plans

The process of conducting a green audit produces a significant amount of useful management data. It often takes a lot of time, money, and effort to complete this task, thus it must be justified. It is crucial to guarantee that the audit's conclusions and suggestions are taken into account at the proper level within the campus and that management strategy and implementation

plans have developed as a result of the findings. Follow-up on audits is a step in the larger process of ongoing improvement. Without follow-up, the audit degenerates into a singular occurrence that is quickly forgotten due to the demands of management priorities and the passage of time.

4.3. Environmental Education

The following environmental education program may be implemented in the institute before the next green auditing.

- Training programmes in the management of solid waste, and liquid waste, the establishment of nurseries for medicinal plants, the management of water, vegetable cultivation, tree planting, the management of energy and landscape, pollution monitoring methods, and rainwater harvesting methods.
- Increase the number of informational signs about environmental awareness, such as "plastic-free campus," "save water, save electricity," "don't waste food or water," and "no smoking".
- Promote and expand the environmental clubs.
- Install model rainwater harvesting systems, rainwater pits, herb gardens, medicinal plant gardens, paddy fields, etc. for providing proper training to the students.
- Conduct recycling waste product exhibitions.
- Install a chemical treatment system for laboratory wastewater.
- Concern over carbon emissions.
- Students and Staff members may be made fully aware of the pollution produced by the use of vehicles.
- The carbon consumption awareness program on carbon emission at an individual as well as social level will help to avoid air and noise pollution in the campus due to vehicles.

The green audit supports the process of evaluating performance in the environmental area and is quickly turning into a crucial tool for institutional decision-making. The process of achieving an eco-friendly approach to the institute's sustainable development is aided by the green audit reports. It is hoped that the outcomes of the green auditing report would inspire new initiatives and creative practices while also serving as a guide for educating the institute community about the current environmental practices and resource utilization at the college. Many suggestions are made to reduce the threat of waste management by utilizing scientific and environmentally beneficial methods. In the framework of a green campus, and consequently a sustainable environment and

community development, this could result in a promising future. It has often been demonstrated that the useful recommendations, alternatives, and observations obtained through audits have improved campus administration. Staff members who have been too close to issues or solutions to appreciate the worth of other strategies frequently benefit from an outside viewpoint, vision, and opinion. A green audit report is a very effective and valuable communication tool to utilize when working with different students who need to be convinced that things are functioning smoothly and that systems and procedures are coping with natural changes and alterations that occur.

4.4. Common Recommendations

- Environmental policy to be implemented for the college.
- Purchasing strategy for eco-friendly materials to be implemented
- Environmental Science course to all students may be introduced.
- Introduce the number of seminars and group discussions on environmental education to be increased in the institute.
- Students and staff may be permitted to solve local environmental problems.
- Introduced a gas-saving renovation to the canteen's cooking system
- Methods for the management of water, waste, and energy are to be developed.
- The celebration of environmental programs like ozone day and the environmental day is to be encouraged.
- Recycling of paper may be introduced.
- Incineration plant for disposal of Sanitary Napkin may be implemented in girls hostel

4.5. Criteria wise Recommendations

4.5.1. Water

- Please remove damaged taps and install sensitive taps where necessary. A slow-flow tap shall be installed.
- Rainwater harvesting systems for each building may be installed.
- Water treatment systems maintenance to be done.
- Conducting awareness programs on water conservation to be introduced.
- To control water exploitation, notice boards are to be introduced.
- To record water usage in the college RIE premises, a water meter is to be installed.

4.5.2. Energy

- Solar energy and other renewable sources are to be utilized in the institute.
- Introduce awareness programs about energy conservation for staff and student
- Installed LED monitors in place of laptops and TVs.
- Old fans replaced with more energy-efficient models to be done.
- Try to observe a power-saving day every year.
- Systems for automatic power switch-off to be done.

4.5.3. Waste

- Construction of working biogas plant to be done
- The model solid waste treatment system may be established.
- The practice of waste segregation may be initiated.
- A model vermicomposting plant in the institute may be installed.
- Established a plastic-free campus to be done
- Not to use paper plates or glasses at any campus events.
- Regular visits are to be made to ensure that the generated waste is consistently measured, monitored, and recorded and that the administration has access to the data.
- Solid waste is to be reused or recycled at the maximum possible places.
- Try to recycle the paper waste instead of incinerating or burning or selling it as Raddi.

4.5.4. Green Campus

- Dominant trees in the campus are to be named scientifically.
- A separate area for the planting of trees and medicinal plants is to be established
- Indoor plants in pots in the classroom and on the veranda are to be grown.
- An automated drip irrigation system in time for summer is to be installed.
- Not just celebrate environment day but try to make it a daily habit.
- Indoor plants may be added to the institute's building to make it more attractive.
- Try to motivate students to contribute to making the campus more environmentally friendly through actions as well as words.
- Competitions between departments to increase interest in campus sustainability among students and teaching and non-teaching staff are to be organized.

4.6. Management Plans

4.6.1. Waste Treatment Management

The institute has proper communication with local body for solid waste collection. There is a one or more big cement pit on the campus for garbage collection. The waste takes away by the municipal corporation. The Rajasthan Pollution Control Board has policy of garbage to gold. Due to this reasons, the institute didn't segregate the waste. They are directly thrown the waste in the cement garbage pits. However, it was suggested to constructing big composting bed in the campus for biodegradable waste.

4.6.2. Some Solid waste management methods

a. Landfill

In low-lying areas inside the institute, the waste that cannot be recycled or reused is segregated and spread out in a thin layer. After each layer of garbage, a layer of soil is added.

b. Incineration

Incineration is the process of burning waste under controlled conditions to turn it into incombustible materials like ash and waste gas. The exhaust fumes from this process are treated before being released into the environment since they could be hazardous. This approach is one of the most hygienic ways to dispose of waste because it minimizes the volume of waste by 90%. Occasionally, the heat produced is used to generate electricity. The production of greenhouse gases like carbon dioxide and carbon monoxide makes this process, however, unfavorable to the environment. It is recommended to install an incineration plant for non-biodegradable waste management if possible.

c. Waste Compaction

The waste materials such as cans and plastic bottles are compacted into blocks and sent for recycling. This method makes transportation and positioning simply by preventing metal oxidation and lowering the demand for airspace.

d. Plastic Waste Management

Plastic is particularly problematic since it is not biodegradable and consequently persists far longer than other types of waste. Therefore, try to avoid the use of plastic on campus, and encourage

the use of biodegradable materials as alternatives. Try to achieve the goal of a plastic-free campus. The figure is given below depicts the plastic management plan.

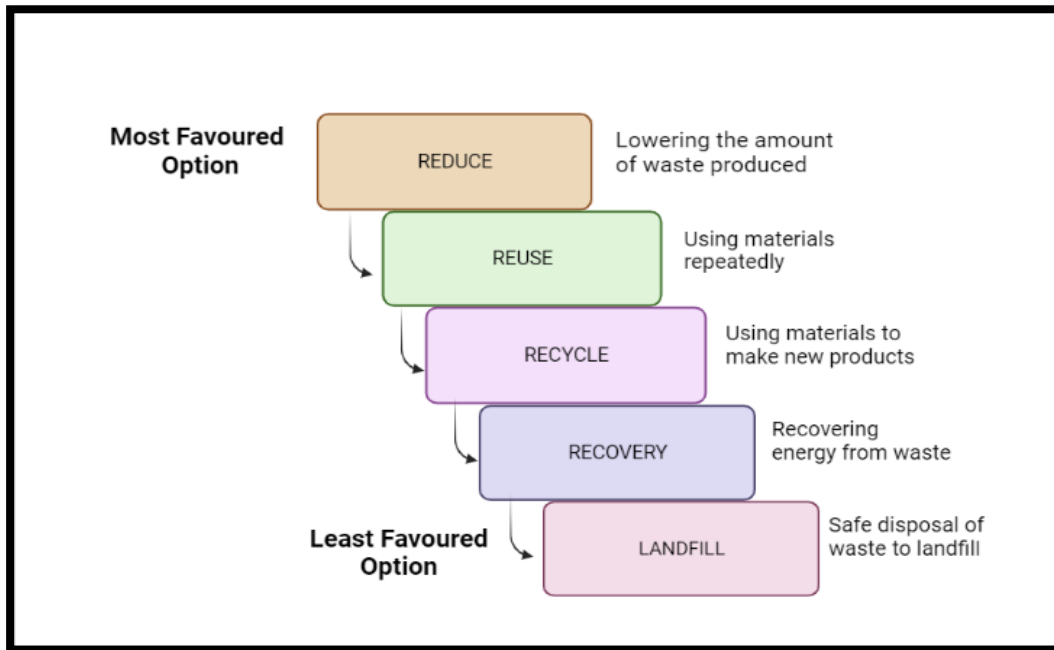


Fig 4.1: Plastic Management Plan for RIE

4.6.3. Biogas Plant

It is recommended to install a biogas plant for solid waste management. A biogas plant is a facility that provides oxygen-free conditions where anaerobic digestion can occur. Simply described, it's a man-made technology that allows waste to be converted into environmentally friendly fertilizers and sustainable electricity.

4.6.3.1. Advantage

The majority of the advantages of biogas plants are environment-related, as they produce renewable energy for domestic and industrial use. This energy can be stored or injected into the electricity grid to minimize dependence on fossil-fuel energy, which can help reduce our carbon footprint.

In other words, biogas plants can aid in the fight against global warming. Emissions of greenhouse gases decrease as household and industrial consumers depend less on energy generated from fossil fuels. In addition, by collecting organic matter and managing the fermentation process, methane emissions are reduced, leading to better air quality.

Communities' reach these results while managing food waste and preventing garbage from ending up in landfills. In addition to other benefits, recycling organic waste implies fewer odors, a lower chance of disease transmission, and protected water bodies. Another benefit of biogas plants is their ability to substitute synthetic fertilizers with digestate, which eliminates the need for them. It recycles several nutrients, including phosphorus, which is necessary for strong crops.

4.7. Wastewater Management

The wastewater is being drained in the main drainage line of the municipal corporation.

4.7.1. Sewage Treatment Plant

Wastewater and sewage are treated in three stages: primary (solid removal), secondary (bacterial breakdown), and tertiary (extra filtration). Both household and commercial facilities produce sewage. It includes liquid domestic waste that is dumped into sewers from sinks, toilets, baths, showers, kitchens, and other locations. Sewage in many places also contains liquid waste from industry and commerce. In the developed world, it is increasingly typical to separate and drains domestic waste into greywater and blackwater. Greywater is water that is produced during daily chores like laundry, dishwashing, and bathing and is more easily reusable. Blackwater, which contains human waste, is produced by toilets.

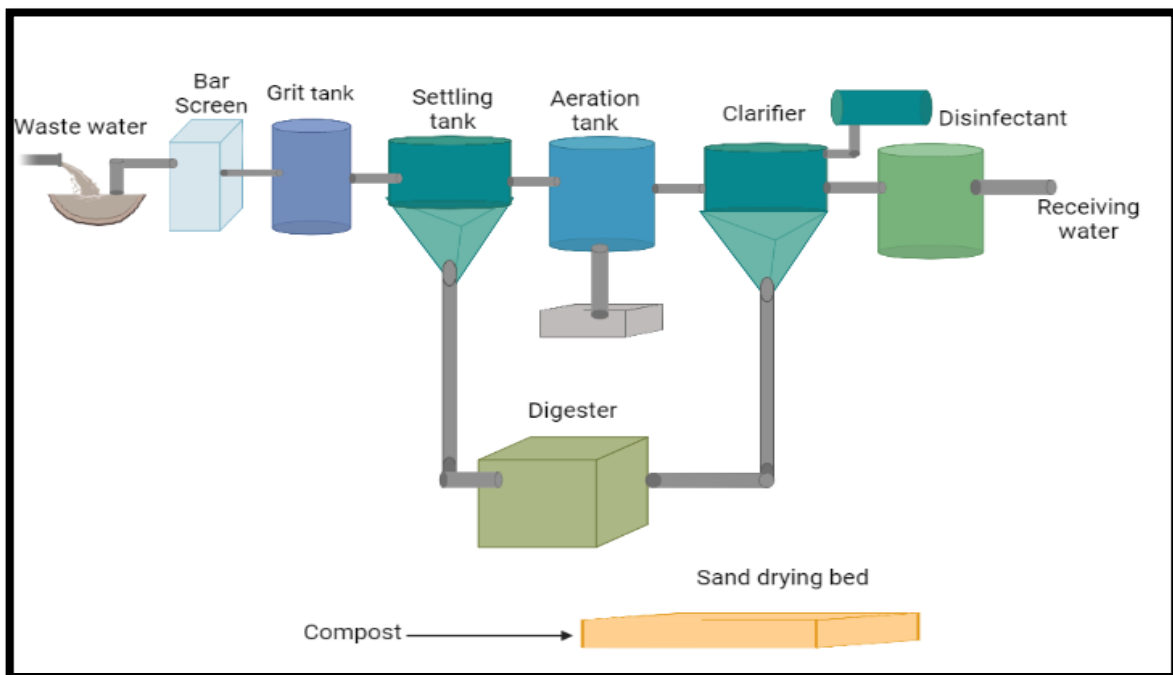


Fig 4.2: Sewage Treatment Plant

a. Primary Treatment

In the primary phases of treatment, sewage is kept in a basin where solids (sludge) can sink to the bottom and oil and lighter substances can rise to the top. The residual liquid can then be sent for secondary treatment after these layers have been removed. Sludge digestion is a distinct procedure used to treat sewage sludge.

b. Secondary Treatment

The removal of dissolved and suspended biological materials during secondary treatment frequently involves the use of microbes in a controlled condition. The majority of secondary treatment systems employ aerobic bacteria, which break down the organic sewage components (sugar, fat, and so on). Some systems use fixed film systems, in which the water travels through filters that have bacteria growing on them. In "activated" sludge, which is used in suspended growth systems, decomposing bacteria are introduced right into the sewage. Since bacteria need oxygen to grow, sewage is frequently mixed with air to speed up decomposition.

c. Sludge Digestion

During primary treatment, sewage sludge that was scraped from the bottom of the settling tank is dealt with separately from wastewater. Several methods can be used to dispose of sludge. First, it can be broken down by bacteria; occasionally, bacterial digestion will result in methane biogas, which can be used to produce power. Sludge may also be condensed, heated to sterilize it, and then used again as fertilizer.

4.7.1.1. Advantages

- Reliable and unlikely to encounter problems with only regular maintenance
- Can be installed even on challenging or compact sites
- Cost-effective over time, with only installation, power, and maintenance to pay for

4.8. Management plan for Good Laboratory Practices

Good laboratory practices shall be applied to laboratories. The laboratory practices are given below.

4.8.1. No food or no drink

1. There are numerous risks associated with eating in the lab.
2. First and foremost, eating or drinking while in the lab can raise your chance of exposure to dangerous substances.

3. Food and drink can make a mess, raising the chance of experiment contamination and even attracting pests.
4. Consuming food or beverages while working in the lab might be a distraction that results

4.8.2 Wear PPE and the appropriate lab attire

1. The proper clothing, including a lab coat, gloves, and eye protection, should always be worn in the lab.
2. When working in the lab, long pants and shoes that completely cover the top of the foot should always be worn.
3. Lab coats will shield your skin and clothing from spills, splatters, and other chemical or biological agent exposures, as well as flames in some circumstances.
4. Your eyes will be shielded from physical or chemical injury by safety glasses or goggles. After mild burns or abrasions, your skin will recover, but your eyes won't. Eye injuries can be permanent, yet safety glasses take about three seconds to put on in a spill or other serious event.
5. Gloves prevent your skin from potentially harmful substances that come into encounter with your hands. However, when gloves are taken off and discarded, exposure may occur.

4.8.3 Proper hygiene

1. Before leaving the lab and after handling any potentially harmful materials wash your hands.
2. Separating personal belongings from lab work. By doing so, a potential exposure route will be closed off and harmful reagents will not be distributed.
3. Applying cosmetics in the lab is not permitted. Applying anything on your face poses a danger of exposure, especially near your mouth or eyes.
4. Skin that is dry and cracked might serve as a pathway for exposure. Keeping your hands' skin healthy with lotion will help you avoid exposure.

4.8.4 Use of proper storage Containers

These rules apply to garbage, storage units, and individual containers.

1. Just with acids in metal containers or HF in glass, storing organic solvents in plastic bottles can damage the bottle. Chemicals must be kept in containers made of non-reactive materials.

2. Large quantities of dangerous chemicals must be kept in fire-rated cabinets. Ideal storage for acids and caustics should be in separate, plastic-lined cabinets to avoid any vapors from reacting with the metal housing. Store chemicals that are known to react strongly when mixed separately.
3. Waste is to be stored in non-reactive containers or containers with non-reactive liners, similar to how chemicals should be stored.

4.8.5 Labelling of Workspace

1. The contents of every container should be marked on the label. This is essential so that anyone entering the lab or working nearby will be aware of any potential dangers. Ideally, any label should be placed stating the potential hazards.
2. Any study procedure that poses a specific risk should be marked accordingly.

4.8.6 Maintain Awareness of the Atmosphere

1. A lab may be a highly hectic place. It's critical to pay attention to your surroundings and the activity going on around you.
2. Work with intention. A distraction-filled environment can also be found in labs. It's crucial to pay attention to what you're doing and try to block out distractions when handling dangerous materials.
3. Don't wear headphones. Although it can be soothing to listen to music while performing repetitive tasks, doing so takes away from one of the five senses that are essential for situational awareness. It is possible to miss the sound of a glass container breaking or a colleague's warning if you are unable to hear what is going on around you.

4.8.7 Chemical Waste Disposal

DO'S

- To determine whether your garbage is hazardous, combustible, corrosive, reactive, toxic, or listed waste.
- Choose a location for the accumulation of chemical waste that is out of the way of regular activities, easily recognized, and secure.
- Label "Hazardous Waste" and the precise names of the waste components on each waste container.

- Store trash in appropriate containers with a screw-top lid that is intact.
- Keep waste bins closed unless you are adding waste to them.
- Separate solvents with and without halogens.
- Keep all chemical waste in secondary containment, which could include a dishpan or lab tray. In case of accident or damage, it only needs to hold the largest container's contents. Secondary containment should be provided for incompatible materials.
- Prevent contamination of container exteriors. If necessary, clean the container.

Don't

- Pour solvents or chemicals down the drain.
- Use a fume hood to vaporize chemical waste.
- Abandon chemicals in the laboratory.
- Mix different waste chemicals carelessly
- Throw chemicals into garbage cans as you assess if the waste is hazardous or not.
- Store chemical wastes for an extended period of time. A chemical waste disposal form should be completed when a container is 95% full. A container not yet full should not be held for more than 9 months.

4.8.8 Different color Bins for waste disposal in a laboratory

It is recommended to use four different color bins in a laboratory for laboratory waste disposal

1. The blue color is for plastic waste.
2. The green color is for paper waste.
3. The yellow color is for glass waste.

4. The red color is for hazardous waste.



Fig 4.3: four different color bins for laboratory

4.8.9 Take part in safety practices

1. Make sure that everyone who uses the lab is familiar with its safety features.
2. Make sure everyone is aware of the location of the closest fire extinguisher, first aid kit, and spill kit.
3. Understand how to exit your building and where to go following a rescue.
4. Plan or participate in a yearly evacuation drill.

Chapter 5

Conclusion

5. Conclusion

The institute has developed very well greenery inside the campus. The soil of Ajmer, Rajasthan is sandy and do not have good water holding capacity. In spite of this, the RIE has maintained their campus green. The institute has also developed a xerophytic flora inside the campus. There is shortage of water in Ajmer City, but RIE has developed a water storage tanks and a system for rainwater harvesting. The management of institute is doing a good job for saving water and also maintained and flourishes greenery of the campus. There is also presence of wells in the campus of RIE. The institute gives training in agriculture to the students of RIE, Ajmer.

The institute is situated near the Anasagar Lake, which is famous for Birds habitat. Due to this reason, a variety of birds has been reported in the campus of RIE. The most abundance birds on the campus of RIE are peacocks. More than 100 peacocks were present in the institute. The campus of RIE is rich in faunal diversity. Many snake's species were also reported in the campus and having good diversity of Herpetofauna. There is also a naturally growing area in the campus; the institute protected this area as unrestricted area or undisturbed zone for wildlife management.

The solid waste was collected by the local body in the institute. The cement pits was constructed at various places for garbage collection. The leaves litter was used for vermicomposting. There are five vermibed in the campus of RIE. The solid waste management was adequate in RIE. However, some recommendations and management plans was suggested (given in chapter 4) for better solid waste management. There was no wastewater management in the institute. For that, sewage water treatment plant was suggested which is given in chapter 4. The institute is also taken initiative in green chemistry laboratory for reducing chemical wastes through miniature-based experiments.

The RIE organizes many environmental related programs in the campus. The institute has developed an Environmental Education Theme Park inside the campus. There is Eco-club present in the institute where, students participate in many ecofriendly activities. The institute organizes environment concern program called 'Prakriti Mela' every year in which more than 22 environmental concern themes were included. There is environmental awareness among students and staff of the institute was observed during the green audit visits.

References

1. Weather and Climate - The Global Historical Weather and Climate Data
<https://tcktcktck.org/india/rajasthan/ajmer>
2. https://en.wikipedia.org/wiki/Regional_Institute_of_Education,_Ajmer
3. https://en.wikipedia.org/wiki/Sewage_treatment
4. <https://www.homebiogas.com/blog/what-is-a-biogas-plant-and-how-does-it-work/>
5. <https://spectro.in/green-audit.html>
6. Environmental Education Theme Park for strengthening school education programme and sensitizing of school children for generating awareness-a programme report by P.K Chaurasia and O.P Meena, 2019-20.
7. https://en.wikipedia.org/wiki/Good_laboratory_practice
8. <https://www.britannica.com/technology/solid-waste-management>
9. <https://www.aqi.in/dashboard/india/rajasthan/ajmer>
10. CENTRAL POLLUTION CONTROL BOARD Ministry of Environment, Forest & Climate Change Website: www.cpcb.nic.in may 2021
11. <https://www.accuweather.com/en/in/ajmer/204111/weather-forecast/204111>.



Working Team