GREEN AUDIT REPORT

2022-23

K.E Society's

Rajarambapu Institute of Technology,

Rajaramnagar, Maharashtra 415414

Prepared by:

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Date: 05/04/2023

CERTIFICATE

This is to certify that the "Elite Eco Solutions and Technologies", Islampur has conducted detailed "Green Audit" of "Rajarambapu Institute of Technology", Rajaramnagar, Maharashtra during the academic year 2022-23. The green audit included Water Audit, Solid Waste Management Audit, Biodiversity Audit, Air and Noise Monitoring, Carbon Footprint, Infrastructure, Site Planning & Outdoor Environment Audit, Health and Wellbeing Audit and Green Campus Initiatives. The performance of institute is exceptionally well to conserve environment and sustainable development. In an opinion and to the best of our knowledge as well as based on available information, present audit gives a true and fair view in conformity with the principles of Green Auditing.

Er. Ankita Patil

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CHAPTER 1

INTRODUCTION

1.1 About Green Audit:

The ever increase in population as well as demand for higher economic growth has led to rapid urbanization along with increase in per capita fuel consumption. This has resulted in several environment and ecological concerns at local, regional, national and global level. In such conditions, adoption of Green Campus System and methodology for sustainable development has become more important than ever.

Briefly, Green Audit can be defined as systematic identification, recording, quantification, verification, analysis and reporting the components contributing to sustainable environment and development. Green Audit process can play an important role in promotion of environmental awareness and sensitization about resource use. It can create consciousness towards ecological values and ethics. Through green audit one can get direction about how to improve the condition of environment. Through this process the regular environmental activities are monitored within and outside of the concerned sites which have direct and indirect impact on surroundings.

Green audit is one of the initiative for such institutes to account their water management, waste management energy management, green campus management, carbon footprint, sanitation methods. Such audit helps the campus to systematically introspect its strengths and weakness relevant to sustainable development, thereby enabling the campus to identify and implement the opportunities for improvement.

1.1.1 Objectives of Green Audit:

The overall objective of green auditing is to help safeguard the environment and minimize risks to human health. Following are the key objectives of an audit:

- To identify current green practices and various sustainability initiatives undertaken by RIT campus.
- To review and verify the physical existence as well as documentation relevant to green practices and various sustainability initiatives.
- To substantiate the compliance of green practices and various sustainability initiatives being followed at the RIT campus in accordance with guidelines of accreditation bodies, if any.
- To identify the scope for further improvement of green practices and various sustainability initiatives, both in qualitative and quantitative terms.

1.1.2 Goals of Green Audit:

Green Audit is conducted with specific goals as:

- Identification and documentation of green practices followed by RIT campus with its strengths and weakness.
- Conduct a survey to know the ground reality about green practices and analyse and suggest solution for problems identified from survey.
- Assess facility of different types of waste management.
- Increase environmental awareness throughout the RIT campus.
- Identify and assess environmental risk and motivates the staff for optimized sustainable use of available resources.
- The long term goal of the environmental audit program is to collect baseline data of environmental parameters and resolve environmental issue before they become problem.

1.1.3 Target Areas of Green Auditing:

1. **Water and Wastewater Audit**: This indicator addresses water consumption, water sources, irrigation, storm water, appliances and fixtures.

2. **Waste Management Audit**: This indicator addresses all types of waste from college and associated amenities. The minimization, safe handling, and ultimate elimination of these materials are essential to the long-term health of the planet.

3. **Biodiversity Conservation**: Biodiversity generally refers to the variety and variability of life on earth. It is a measure of the variety of organisms present in different ecosystems. This indicator addresses all the flora and fauna of the campus.

4. **Ambient Air quality and Noise Monitoring status**: It is the process of assessment of pollutants and noise level present in the atmosphere.

5. **Carbon Footprint:** This aspect is for quantifying the carbon emissions from all the parts of the institution and quantifying how much of it is sequestrated with the help of landscape.

6. **Infrastructure, site planning & outdoor environment Audit:** This indicator addresses overall site planning and layout of campus including building design, green buildings inside the campus, urban heat island effect, transport and mobility.

7. **Health & Overall wellbeing Audit:** This Indicator addresses health & well-being facilities, so as to enhance physical, emotional and spiritual well-being of campus occupants.

8. **Green Campus Initiatives:** This indicator addresses various activities done by campus to maintain environmental sustainability.

1.2 College Profile:

Rajarambapu Institute of Technology (RIT) college is known as College of Engineering at Sakharale, established in the year **1983**. It is located near Islampur, 7 km away from Peth Naka off Pune - Bangalore highway. RIT has a green beautiful campus of **17.71** hectare and the total built up area (including under construction) is **54,859** Sqm. RIT is recognized by **A.I.C.T.E.** And is affiliated to **Shivaji University, Kolhapur**. All eligible UG & PG programs are **accredited/re-accredited by NBA**. RIT was a network institute, under the Union Government of India's prestigious **TEQIP-I&II** program and was supported by the World Bank during 2003-2009 and 2011-2017 respectively. NAAC ``A" Grade in 1st cycle from **2016-2021** and **NAAC "A+"**Grade in 2nd cycle from **2022-2027.** RIT has emerged as a leading technological Institute in Western Maharashtra through its dedicated and disciplined approach to provide quality technical education over a period more than thirty years.

Vision:

- To be globally recognized institute committed to excellence in academics, research, knowledge creation and delivery to develop socially responsible professionals.

Mission:

- To provide innovation and excellence in academic design, delivery and assessment to ensure holistic development of students for employability, entrepreneurship, and higher education.

- To design and keep the curricula updated, based on changing needs of industry and society worldwide, and to provide experiential learning through industry connect.

- To be at the forefront of emerging technological research, innovation and creation of intellectual property to attract talent.

- To retain talent by building relationships based on professionalism, mutual respect, accountability, engagement and integrity.

- To leverage alumni to inculcate leadership skills, social awareness and a passion for lifelong learning to make students socially-responsible global citizens.

- To build and maintain world-class infrastructure, and adopt modern automation technologies for the purpose of organizational efficiency.

- To identify alternate sources of revenue and augment inflows.

Rajarambapu Institute of Technology is an Autonomous institute **9** UG programs: Automobile Engineering, Civil Engineering, Computer Engineering, Computer Science and Information Technology, Computer Science and Engineering, Electrical Engineering, Electronics and Telecommunication Engineering, Mechanical Engineering and Mechatronics Engineering. **10** PG programs: Automotive Technology, Structural Engineering, Construction Management, Computer Science and Engineering, Power Systems and Power Electronics, Electronics Engineering Design Engineering, Mechanical Manufacturing Engineering, Thermal Engineering and MBA, **4** Ph. D. centres and **6** Diploma programs with a total of **4327** students in campus.

Number of students in the College	**4327**
Teaching Staff	**179**
Non-Teaching Staff	**221**
Others	**76**
Total	**4803**

The College build up area given in following Table No 1:

Sr. No	Name of Building	Area in Sq.m
1.	Main Building No. 1	9440
2.	Class Rooms Building	4500
3.	Workshop No. 1	1730
4.	Workshop No. 2	1730
5.	Smithy and Foundry	271.40
6.	Central Store	154
7.	Generator Room	49.40
8.	Vehicle Stand	878.75
9.	Canteen	208.53
10.	Guest House (Old)	348
11.	Mess No. 1 & 2	682.60
12.	Hostel No. 1 (Aryabhatta)	1333
13.	Hostel No. 2 (Bhaskaracharya)	1411.70
14.	Hostel No. 3 (Chanakkya)	1804.70
15.	Hostel No. 4 (Dronacharya)	2200.50
16.	Staff Quarters	670.00
17.	Spark (Servicing Centre)	343
18.	Hydraulics Lab	654

19.	Boiler House	204.60
20.	Civil Store	22.60
21.	Welding Shop	270
22.	Ladies Hostel (Esha)	1482.40
23.	Main Building No. 2	7532
24.	Ladies Hostel (Fairy)	1500
25.	Recreation Hall	270.58
26.	Instruction Building	4700
27.	Structural Lab	640
28.	Continuous Education Center	1040
29.	Ladies Hostel (Haripriya)	2586
30.	Central Library	3000
31.	Staff Quarters 993/2	154
32.	Laundry Building	208
33.	Staff Quarters KNSQ	1300
	Total Built-up Area	**53986.76**

Rajarambapu Institute of Technology, Urun Islampur is situated in Maharashtra at 17°03’48.47” N and 74°16’59.59” E, in the Sangli District.

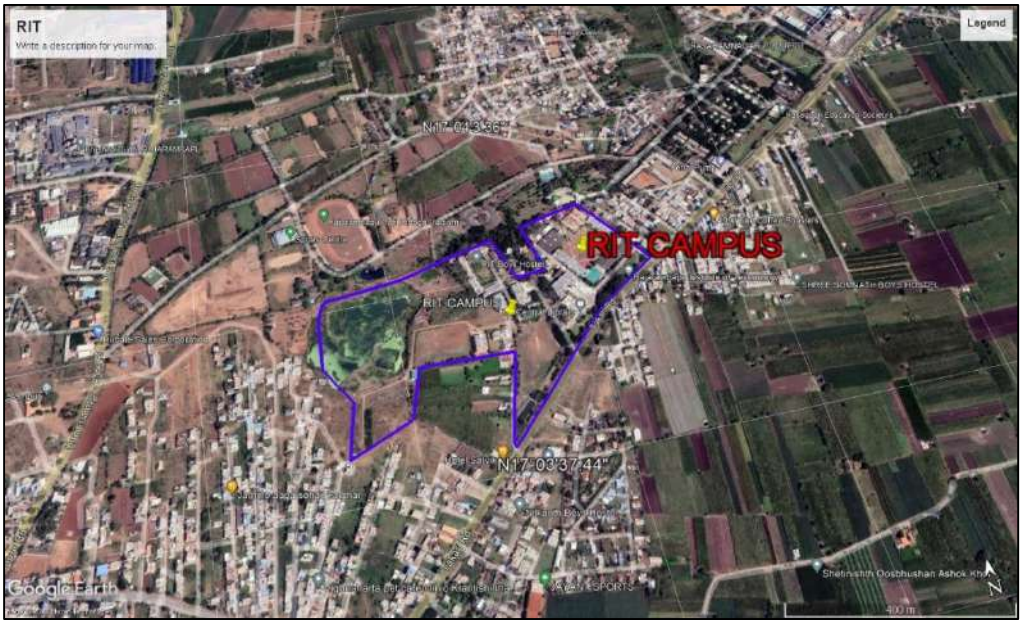


Fig 1: Goggle Earth image of Campus

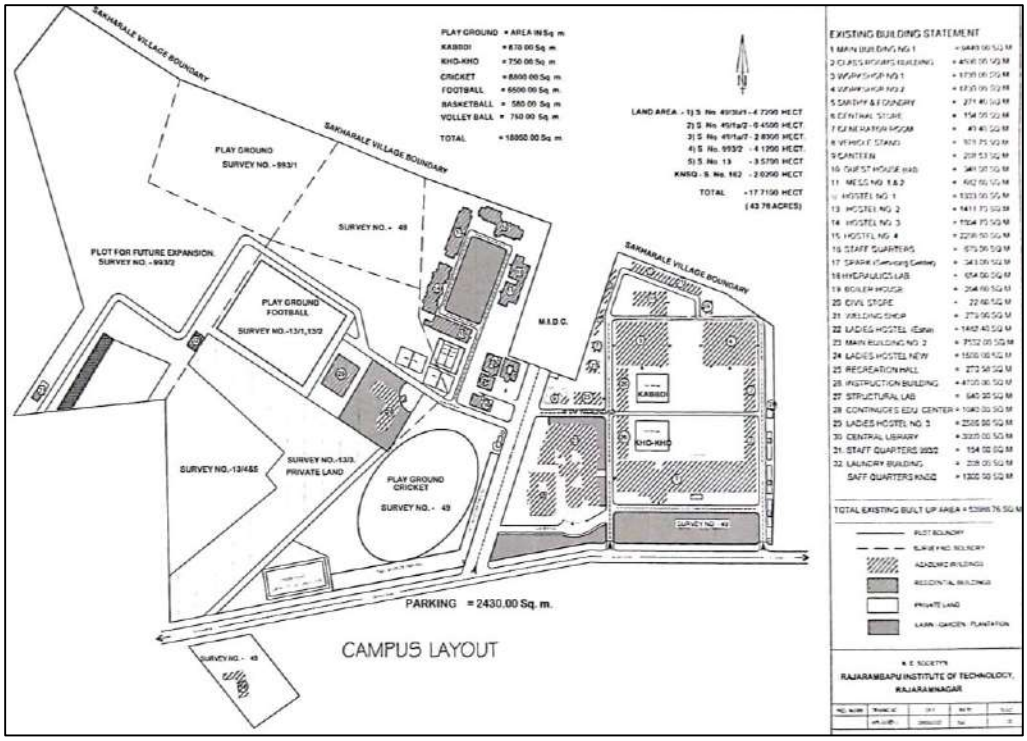


Fig 2: Campus Layout

Awards & Achievements:

- RIT campus recognized as **District Green Champion** for Sangli District for the academic year 2020-21.
- **Sustainable Institutions of India Green Rankings 2023** has certified RIT campus with **"A"** grade and **Gold** Category.
- **Best Paper Award** for the tittle "Improving Sustainability of Existing Building by considering IGBC Norms" in **International Conference on Environmental Sustainability 2023** organized by VJTI Mumbai.
- Under **Unnat Bharat Abhiyan** various projects related to Environment are completed which cost around 7 lakh.
- Institute have received funding of Rs. 53.6 Lakh sanctioned from Rajiv Gandhi Science and Technology Commission Mumbai for the project **"Biodegradable Plastic Packaging, Manufacturing".**
- Institute have received funding of Rs. 2.5 lakh from Kirloskar Corrocoat Pvt. Ltd. for the project **"Solar Tank Coating Machine"**

CHAPTER 2

METHODOLOGY

Green Audit was conducted systematically by using following procedure:

1. Site visit was arranged to whole RIT campus along with responsible staff.
2. Initial discussion is held with Dean of college, HOD of civil department and key staff members of the institute such as NAAC committee members who have been assigned the responsibility of sustainable practices implemented throughout the campus.
3. Further, it was discussed and decided to follow Guidelines of NAAC Criteria for assessment of green initiatives as well as IGBS guidelines for Green Campus.
4. Awareness session was arranged for the staff members of the institute about importance of Green Audit and its contribution in improving the overall environmental performance of the institute.
5. Physical checking of various green initiatives and facilities created through campus tour with NAAC Committee members undertaken was done.
6. Identification of the avenues for improvement in the existing green systems of the institute as well as continual improvement necessary for sustainable development of the institute was carried out.
7. Green audit team discussed the technical and economic feasibility of implementation of new systems with institute's staff members and management.
8. A draft report of all these findings and suggestions was prepared to identify any corrections/improvements.
9. The report was finalized after incorporating the suggestions by respective authorities and final report submitted to the institute.

CHAPTER 3

WATER AND WASTEWATER AUDIT

3.1. Water Audit:

Water is one of the most critical aspect for life to exist and fresh water is a precious natural national resource. With continuous growth in population, per capita availability of utilizable water is going down, whereas the demand is ever increasing primarily due to life style changes and decreasing awareness on water management. It is clearly visible in the society that due to unsustainable use of water resources there is contamination and depletion of the natural water sources which is an alarming situation. Therefore, it becomes paramount to conserve protect and manage the water resources availability and usage so that it is sustainably used within the college campus. Water auditing is conducted to evaluate the quality, availability and usage of water; the facilities available and methods adopted to revitalize and use it so that the resources are intact without leading to deterioration.

3.1.1 Sources of water:

The water utilized in the campus is come from the following sources:

1. **Islampur Municipal Council**
2. **MIDC**
3. **Irrigation Department**
4. **Farm Pond**

3.1.2 Water Storage and Distribution:

The water from these sources is then stored in well, underground storage tank, elevated storage tanks located at various location in the campus. Form these storage the water is then distributed to various departments through pumping.
The water from MIDC is distributed to Hostels, Guest house and the water from the Municipal Corporation is distributed in academic campus area. The water from irrigation department is stored in a well and it is used for irrigation purpose.

3.1.3 Water Consumption in Campus:

Considering all sources of water, total water consumption is calculated as follows:

Sr. No.	Sources	Water consumption in m^3/day	Water consumption in m^3/month
1.	MIDC	36.67	1100
2.	Irrigation Department	85.85	2575.6
3.	Islampur Municipal Council	1.74	52.25
4.	Rainwater Harvesting	1.92	57.5
5.	Grey Water Treatment Plant	1.83	55
6.	Laundry Waste Water Treatment Plant	2.5	75
	Total	**130.51**	**3915.35**

So, Total Water Consumption in per month = 130.51 m^3/day

Total Water Consumption in per month = 3915.35 m^3/month

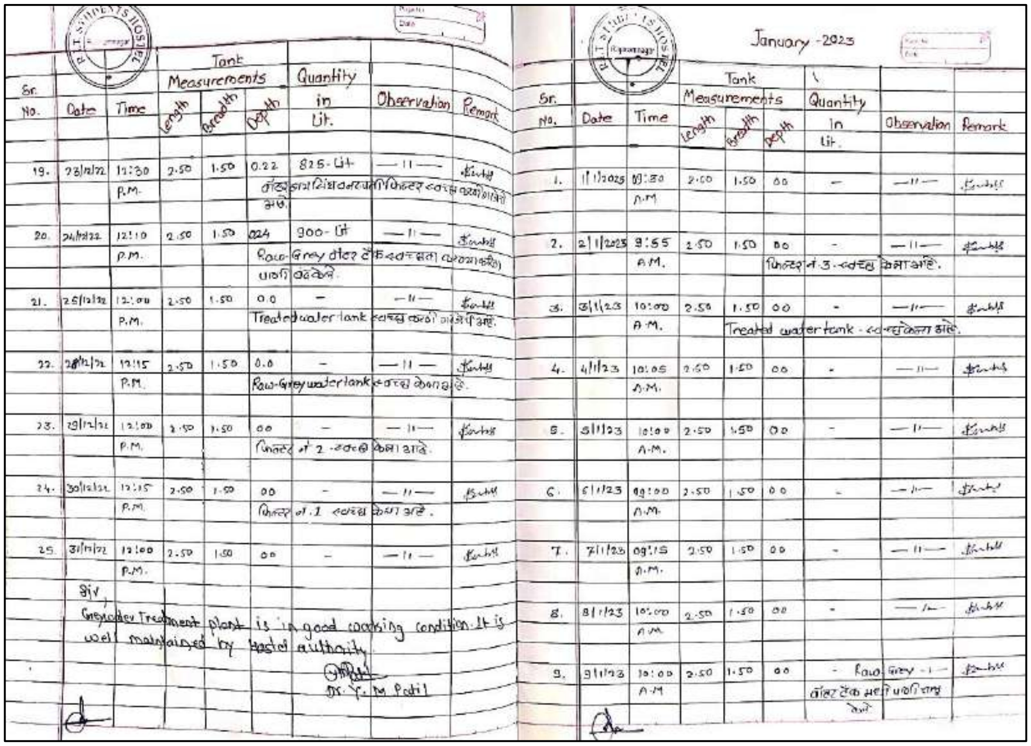
3.1.4 Current Practices for Water and Wastewater management:

1. Wastewater management in campus:

The total wastewater generated in campus is approximately 104408 lit/day. The whole waste water from academic campus is collected and treated water is discharged to municipal drainage line at two different places. Waste water of south portion of residential area is collected at a point and then released to municipal drainage line and half side waste water is released to sugar factories agricultural land. All this water is flow through open drainage lines.

Grey water treatment plant is installed at Boys Hostel for treating wastewater from baths, sinks washing machine and other kitchen appliances. Plant capacity is 4500 lit/day. About 4500 lit water is treated in this treatment plant and remaining water goes to municipal drainage line. Treated water is further used for gardening purpose.

Fig 1: Grey Water Treatment Plant at Boys Hostel

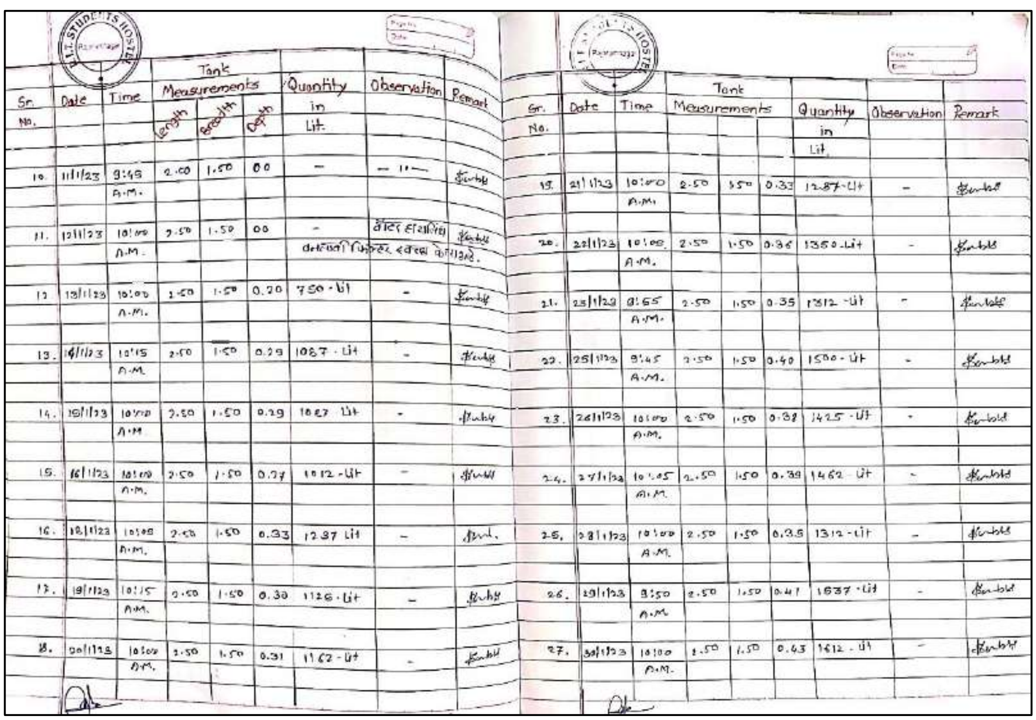


Sr. No.	Date	Time	Tank Measurements Length	Breadth	Depth	Quantity in Lit.	Observation	Remark
19.	23/12/22	12:30 P.M.	2.50	1.50	0.22	825-Lit	—"—	
						[illegible]		
20.	24/12/22	12:10 P.M.	2.50	1.50	024	900-Lit	—"—	
						Raw-Grey [illegible]		
21.	25/12/22	12:00 P.M.	2.50	1.50	0.0	–	—"—	
						Treated water tank [illegible]		
22.	28/12/22	12:15 P.M.	2.50	1.50	0.0	–	—"—	
						Raw-Grey water tank [illegible]		
23.	29/12/22	12:00 P.M.	2.50	1.50	00	–	—"—	
						[illegible] 2 [illegible]		
24.	30/12/22	12:15 P.M.	2.50	1.50	00	–	—"—	
						[illegible] 1 [illegible]		
25.	31/12/22	12:00 P.M.	2.50	1.50	00	–	—"—	

Sir,
Greywater Treatment plant is in good working condition. It is well maintained by hostel authority.
Dr. Y. M. Patil

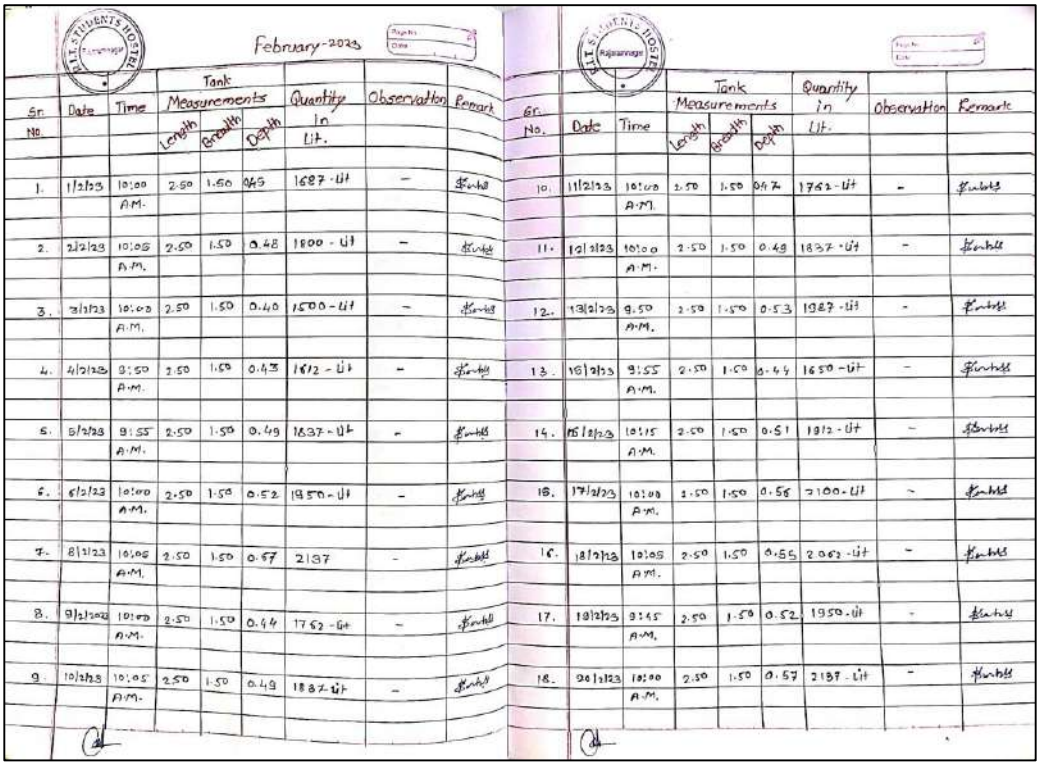
January -2023

Sr. No.	Date	Time	Tank Measurements Length	Breadth	Depth	Quantity In Lit.	Observation	Remark
1.	1/1/2023	10:30 A.M	2.50	1.50	00	–	—"—	
2.	2/1/2023	9:55 A.M.	2.50	1.50	00	–	—"—	
					[illegible] 3 [illegible]			
3.	3/1/23	10:00 A.M.	2.50	1.50	00	–	—"—	
				Treated water tank [illegible]				
4.	4/1/23	10:05 A.M.	2.50	1.50	00	–	—"—	
5.	5/1/23	10:00 A.M.	2.50	1.50	00	–	—"—	
6.	6/1/23	09:00 A.M.	2.50	1.50	00	–	—"—	
7.	7/1/23	09:15 A.M.	2.50	1.50	00	–	—"—	
8.	8/1/23	10:00 A.M.	2.50	1.50	00	–	—"—	
9.	9/1/23	10:00 A.M	2.50	1.50	00	– Raw Grey [illegible]		



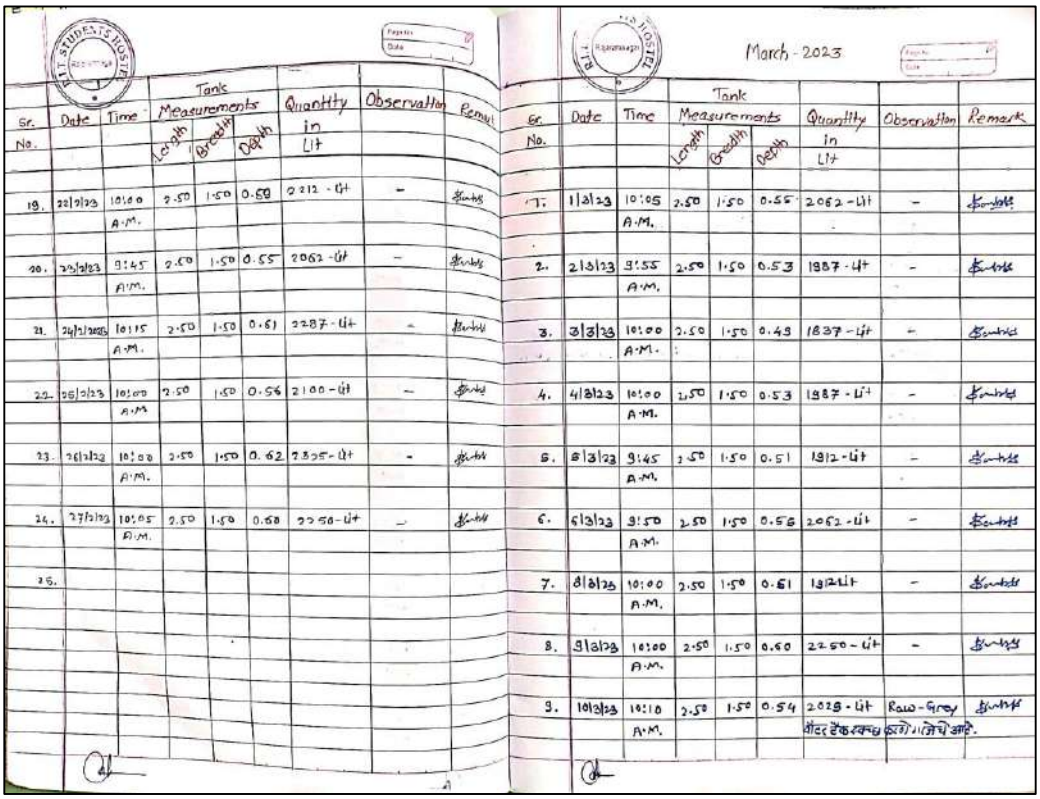
Sr. No.	Date	Time	Tank Measurements Length	Breadth	Depth	Quantity in Lit.	Observation	Remark
10.	11/1/23	9:45 A.M.	2.50	1.50	00	–	—"—	
11.	12/1/23	10:00 A.M.	2.50	1.50	00	–	[illegible]	
12	13/1/23	10:00 A.M.	2.50	1.50	0.20	750-Lit	–	
13.	14/1/23	10:15 A.M.	2.50	1.50	0.29	1087-Lit	–	
14.	15/1/23	10:00 A.M.	2.50	1.50	0.29	1087 Lit	–	
15.	16/1/23	10:00 A.M.	2.50	1.50	0.27	1012-Lit	–	
16.	18/1/23	10:05 A.M.	2.50	1.50	0.33	1237 Lit	–	
17.	19/1/23	10:15 A.M.	2.50	1.50	0.30	1125-Lit	–	
18.	20/1/23	10:00 A.M.	2.50	1.50	0.31	1162-Lit	–	
19.	21/1/23	10:00 A.M.	2.50	1.50	0.33	1237-Lit	–	
20.	22/1/23	10:00 A.M.	2.50	1.50	0.36	1350-Lit	–	
21.	23/1/23	8:55 A.M.	2.50	1.50	0.35	1312-Lit	–	
22.	25/1/23	9:45 A.M.	2.50	1.50	0.40	1500-Lit	–	
23.	26/1/23	10:00 A.M.	2.50	1.50	0.38	1425-Lit	–	
24.	27/1/23	10:05 A.M.	2.50	1.50	0.39	1462 Lit	–	
25.	28/1/23	10:00 A.M.	2.50	1.50	0.35	1312-Lit	–	
26.	29/1/23	9:50 A.M	2.50	1.50	0.41	1537-Lit	–	
27.	30/1/23	10:00 A.M.	2.50	1.50	0.43	1612-Lit	–	

Fig 2: Logbook of Grey Water Treatment Plant –January 2023



February-2023

Sr. No.	Date	Time	Tank Measurements Length	Breadth	Depth	Quantity in Lit.	Observation	Remark
1.	1/2/23	10:00 A.M.	2.50	1.50	045	1687 - Lit	-	Full
2.	2/2/23	10:05 A.M.	2.50	1.50	0.48	1800 - Lit	-	Full
3.	3/2/23	10:00 A.M.	2.50	1.50	0.40	1500 - Lit	-	Full
4.	4/2/23	9:50 A.M.	2.50	1.50	0.43	1612 - Lit	-	Full
5.	5/2/23	9:55 A.M.	2.50	1.50	0.49	1837 - Lit	-	Full
6.	6/2/23	10:00 A.M.	2.50	1.50	0.52	1950 - Lit	-	Full
7.	8/2/23	10:05 A.M.	2.50	1.50	0.57	2137	-	Full
8.	9/2/2023	10:00 A.M.	2.50	1.50	0.44	1752 - Lit	-	Full
9.	10/2/23	10:05 A.M.	2.50	1.50	0.49	1837 - Lit	-	Full
10.	11/2/23	10:00 A.M.	2.50	1.50	047	1762 - Lit	-	Full
11.	12/2/23	10:00 A.M.	2.50	1.50	0.49	1837 - Lit	-	Full
12.	13/2/23	9.50 A.M.	2.50	1.50	0.53	1987 - Lit	-	Full
13.	16/2/23	9:55 A.M.	2.50	1.50	0.44	1650 - Lit	-	Full
14.	15/2/23	10:15 A.M.	2.50	1.50	0.51	1912 - Lit	-	Full
15.	17/2/23	10:00 A.M.	2.50	1.50	0.56	2100 - Lit	-	Full
16.	18/2/23	10:05 A.M.	2.50	1.50	0.55	2062 - Lit	-	Full
17.	19/2/23	9:45 A.M.	2.50	1.50	0.52	1950 - Lit	-	Full
18.	20/2/23	10:00 A.M.	2.50	1.50	0.57	2137 - Lit	-	Full



March - 2023

Sr. No.	Date	Time	Tank Measurements Length	Breadth	Depth	Quantity in Lit	Observation	Remark
19.	22/2/23	10:00 A.M.	2.50	1.50	0.58	2212 - Lit	-	Full
20.	23/2/23	9:45 A.M.	2.50	1.50	0.55	2062 - Lit	-	Full
21.	24/2/2023	10:15 A.M.	2.50	1.50	0.61	2287 - Lit	-	Full
22.	25/2/23	10:00 A.M.	2.50	1.50	0.56	2100 - Lit	-	Full
23.	26/2/23	10:00 A.M.	2.50	1.50	0.62	2325 - Lit	-	Full
24.	27/2/23	10:05 A.M.	2.50	1.50	0.60	2250 - Lit	-	Full
25.								
1.	1/3/23	10:05 A.M.	2.50	1.50	0.55	2062 - Lit	-	Full
2.	2/3/23	9:55 A.M.	2.50	1.50	0.53	1987 - Lit	-	Full
3.	3/3/23	10:00 A.M.	2.50	1.50	0.49	1837 - Lit	-	Full
4.	4/3/23	10:00 A.M.	2.50	1.50	0.53	1987 - Lit	-	Full
5.	5/3/23	9:45 A.M.	2.50	1.50	0.51	1912 - Lit	-	Full
6.	6/3/23	9:50 A.M.	2.50	1.50	0.56	2062 - Lit	-	Full
7.	8/3/23	10:00 A.M.	2.50	1.50	0.61	1912 Lit	-	Full
8.	9/3/23	10:00 A.M.	2.50	1.50	0.60	2250 - Lit	-	Full
9.	10/3/23	10:10 A.M.	2.50	1.50	0.54	2025 - Lit	Raw - Grey पाण्याचे आहे.	Full

Fig 3: Logbook of Grey Water Treatment Plant –February 2023

2. Farm Pond:

College constructed farm found near cricket ground area. The size of the pond from bottom is 43.50 X 13.30 m and top size is 7.00 X 16.80 m while height 2.20 m. The farm pond has capacity of 1500 m^3. When it fills to about 50% of capacity, it helps in recharging of ground water. The water from is used for gardening and flushing purpose.

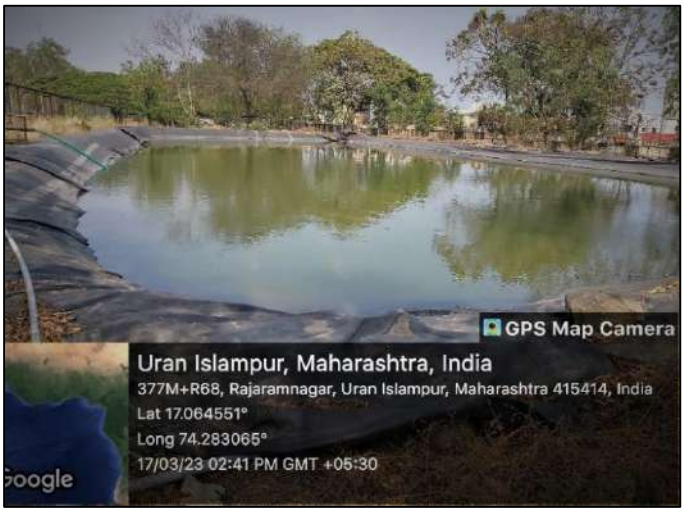


Fig 4: Farm Pond

3. Rainwater Harvesting:

College having 4 Units of Rainwater harvesting system located in College Campus area and Boys Hostel Area. Details are given below:

Table No 1: Rainwater Harvesting Units

Sr. No	Location	Area of catchment in sq. m	Average Annual Rainfall in mm/year	Rainwater precipitation in catchment area lit/ year	Purpose
1.	Hostel Building (Aaryabhatta)	420	819	3,43,980	To recharge bore well and that water used for gardening purpose in hostel area.
2.	Hostel Building (Bhaskaracharya	1030	819	8,43,570	To recharge bore well and

	and Chanakya)				that water used for Sagvan plantation at hostel area.
3.	Campus Area near Gate No.2	936	819	7,67,000	To recharge bore well and that water used for gardening purpose in campus area
4.	Campus Area near Mechanical Building	850	819	7,00,000	To store water in storage tank and that water used for flushing purpose in campus area,

- **Total Area available for Rainwater Collection: 3236 Sq. m.**
- **Total Water Available from Rainwater Harvesting: 26,54,550 lit/year**

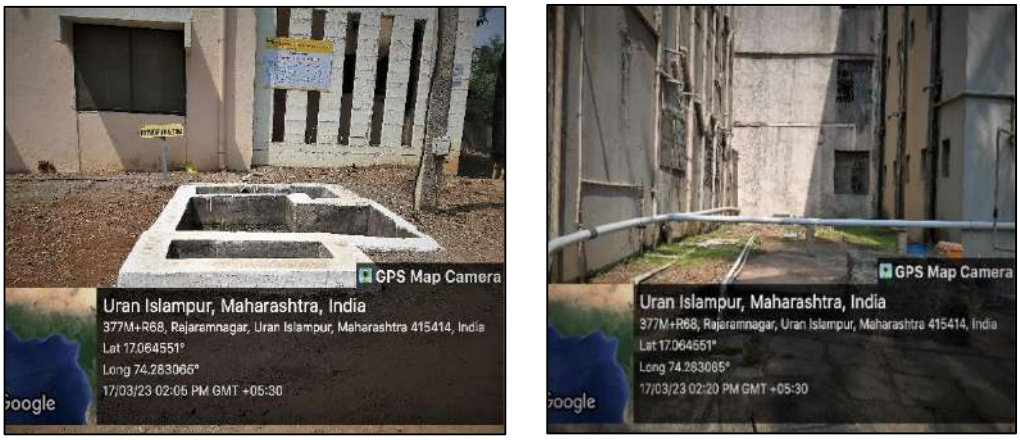


Fig 5: Rainwater harvesting units at Boys Hostel

Fig 6: Rainwater harvesting units at College Campus

4. Drip Irrigation System for Gardening:

College has huge green campus area. Drip irrigation system have been installed at gardens which helps to save water and nutrients by allowing water to drip slowly to the roots of plants. The goal is to place water directly into the root zone and minimize evaporation to save water.

Fig 7: Drip Irrigation in Garden area

5. Laundry Waste Water Treatment Plant:

RIT have designed a treatment plant for laundry waste water, as in college daily approximately 4000 liters of water required for washing of cloths. From this process 3000 liters/day of waste laundry water is produced. The proposed treatment

technology for sewage treatment consists of flocculation-using polymer along with membrane filtration system. In this first treatment process most of the impurities including heavy suspended particles, dirt, toxic dissolved impurities, toxic heavy metals etc. are efficiently removed in the form of sludge or flock. After primary process water sends to next treatment which is filtration. In this process, treated water is sent to sand filter onto which all sludge is separated and clear water sent to next filtration process. After separation of sludge, it is then dried out and various nutrients like N, P, and K are mixed in the dried sludge. The final dried mixture of sludge then utilized as an agricultural fertilizers. In the final process, the clear water is passed through advanced filter so as to remove most of the dissolved impurities. At the final stage the treated water is deodorized and disinfected using well known agents. This treated water either released to farm or garden or it can be reused back for the laundry process.

Fig 8: Laundry Waste Water Treatment Plant

3.2 Recommendations:

- Add **aerators/regulators to taps** to save water it work by simply mixing air into the flow and this reduces the amount of water passing through the tap.
- **Pipes, overhead tanks and plumbing system** should be **maintained** properly to reduce leakages and wastages of water.
- Institute should monitor the building wise consumption of water by **installing water flow meters** for respective buildings.
- Set up college's own **STP** in college and hostels.
- Perform water, energy and waste management **audits** frequently.

- **Automization** of filling of water tank and its **monitoring** should be available in institute.
- The institute should promote use of **biodegradable detergents** and cleaning agents in college and hostel.
- Provide **Rain Water Harvesting system** to all **Girls hostel** and **new construction building.**
- The **Waste Water** from **RO** plant should be **used** for **Gardening purpose.**

CHAPTER 4

SOLID WASTE MANAGEMENT AUDIT

4.1 Solid Waste Audit of Campus:

The term solid waste management mainly refers to the complete process of collecting, treating and disposing of solid wastes. Solid waste can be divided into three categories: bio-degradable, non-biodegradable and hazardous waste. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc. and hazardous wastes include, bulb, batteries, etc. E-waste is among the fastest growing solid waste classes and represents a serious hazard for the environment. Improper disposal of solid waste can create unsanitary conditions, and these conditions in turn can lead to pollution of the environment and to outbreaks of vector-borne disease. We collected the details of solid waste generation using questionnaires and observations and tabulated them below. We also diagnosed the prevailing waste disposal policies and suggested the best way to combat the problems in the recommendations.

4.1.1 Generation of Waste in Campus:

Sr. No.	Type of solid waste generated	Source of Solid waste	Quantity (kg/day)	Quantity (kg/month)	Percentage (%)
1.	Paper Waste	Exam work, Lab work	0.93	27.86	1.77
2.	Plastic Waste	Plastic wrappers, old broken chairs, tables, plastic bottles.	0.95	28.5	1.78
3.	Biodegradable Waste	Hostel mess, Canteens, Cafeteria, Quarters, Gymkhana and Gardens	46.57	1397	87.45
4.	Construction Waste	Construction Work	0.44	13.33	0.83
5.	Glass Waste	Broken glassware, cups and glasses	0.21	6.3	0.39
6.	Other	-	0.71	21.4	1.33
7.	Metal Waste	Construction work, scarp of benches, table, cupboard, cots.	0.25	7.35	0.46
8.	Garden Waste	Leaf litter, lawn	3.08	92.30	5.77

		clippings, garden cuttings, branches and leaves.			
9.	E-Waste Waste	Computers, printer, laptops scanner, internet routers, Xerox machine, fused bulbs and tubes.	0.09	2.8	0.17
10.	Hazardous Waste	DG set, laboratory	0.02	0.6	0.04

So, Total Waste generated kg per day = 53.25 kg/day.

Total Waste generated kg per month= 1597.436 kg/month.

4.1.2 Current Practices of Solid Waste Management:

Waste management reduces the effect of waste on the environment, health, etc. College has given yearly contract to **'Mauli Associates'** to maintain cleanliness and hygiene conditions at indoor and outdoor with **44 workers**. They are using various equipment's like **Scrubber dye, High Pressure Machine, Lawn Mover Machine, Grass Cutting Machine, STP Pump**. **Sweeping** and **Toilet Cleaning** is done **2-3 times** in a day. **Two** different **bins** are provided for **dry** and **wet waste.** Waste from campus is collected into tractor and **disposed to landfill** within the campus.

The highest quantity of solid waste generated is **biodegradable waste** in which biodegradable kitchen waste from hostel mess is utilised for **biogas production**. **Garden waste** is utilised for **composting**. For **paper waste** institute follows **paperless policy**. **Hazardous waste** is handed over to the **vendor** for disposal process. **Construction Waste** from the construction of new building are used for **Landfilling** and **Levelling purpose** near Miyawaki.

For **E- Waste** special policy is made in college-if some parts of computers are in good condition, then these are used in assembling new computers. Such computers are given to school laboratories in nearby villages. The remaining damaged computers are given for e waste **recycling** to an authorised dealer, **'Mahalaxmi E-Recyclers'.** As per the data received by the Mahalaxmi E-Recyclers the college has hand over to them about **8500 kg** and **26 kg** of E-waste on **24th March, 2022.**

Certificate No.	MERPL/21-22/154	Date : 24/03/2022
Date of Material Receipt	23/03/2022	
Weight	8500 Kgs	
Customer Reference No.	Tax Invoie No- 2021-2022/RIT-256	

eRecyclebin

CERTIFICATE OF E-WASTE RECYCLING

This is to Certify that e-waste received for recycling from

K.E. Society's Rajarambapu Institute of Technology
Rajaramnagar, Sakharale (Islampur), Tal. Walwa, Dist. Sangli- 415414

has been safely disposed at our registered facility in an environment friendly manner.

For Mahalaxmi e Recyclers

Pune

Authorized Signatory

MPCB Reg. No. : MPCB/RO(HQ)HSMDA/Autho/20/EW-08 | Date: 11/11/2020

Renewed Reg. No. : BO/MPCB/RO(HQ)/PH/CO/B-2011000614 | Date Issued: 11/11/2020 Valid Till : 31/10/2025

Mahalaxmi E Recyclers Pvt.Ltd. Plot No.77&78,Ramtekadi Industrial Estate,Hadapsar, Pune-411013 | Website : erecyclebin.com

Certificate No.	MERPL/21-22/155	Date : 24/03/2022
Date of Material Receipt	23/03/2022	
Weight	28 Kgs (E-Waste - Tube Light)	
Customer Reference No.	Tax Invoice No-EREGST/116/21-22	

eRecyclebin

CERTIFICATE OF E-WASTE RECYCLING

This is to Certify that e-waste received for recycling from

K.E. Society's Rajarambapu Institute of Technology
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Fig 1: Certificate of E- Waste Recycling

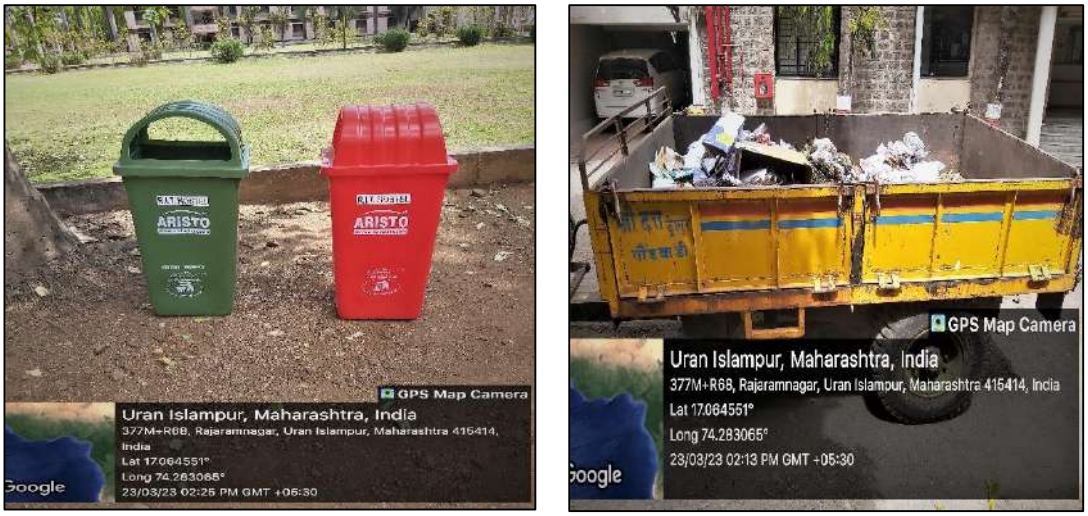
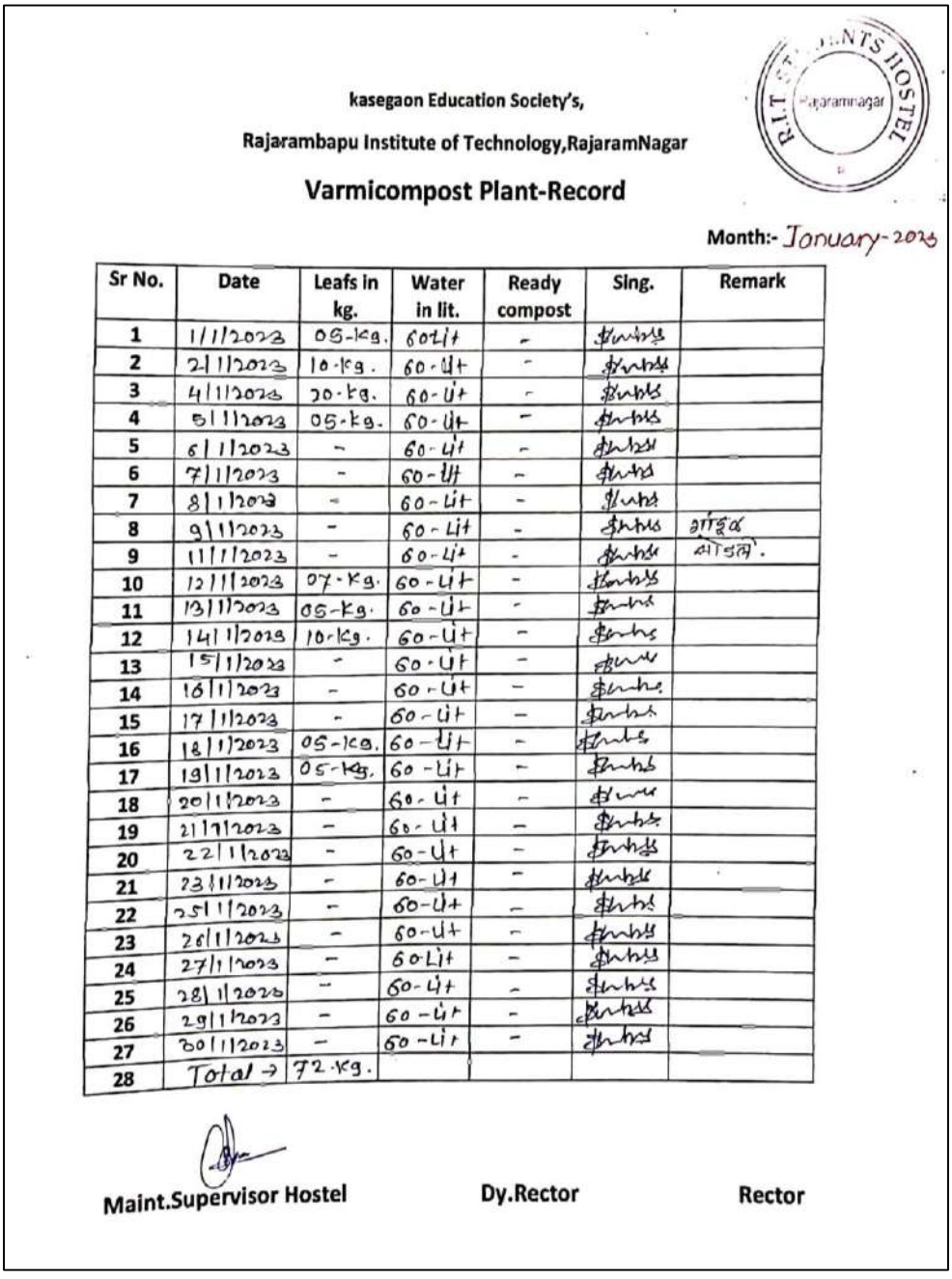


Fig 2: Collection of waste

1. Vermicomposting:

Vermicomposting is the process of composting using worms and is applied in waste management to produce high-quality organic fertilizer. Garden waste is often mixed with other raw materials for vermicomposting. The college have **6 compost pit** each of **2 m^3** located near library, garden area in campus and near boys hostel. The leafy waste is collected from the campus and dumped here for composting process. Approximately **150 Kg of compost** is produced from **each pit**. Compost is used for gardening purpose and new plantation area in college campus.

Fig 3: Composting pit near Library and Hostel



kasegaon Education Society's,

Rajarambapu Institute of Technology,RajaramNagar

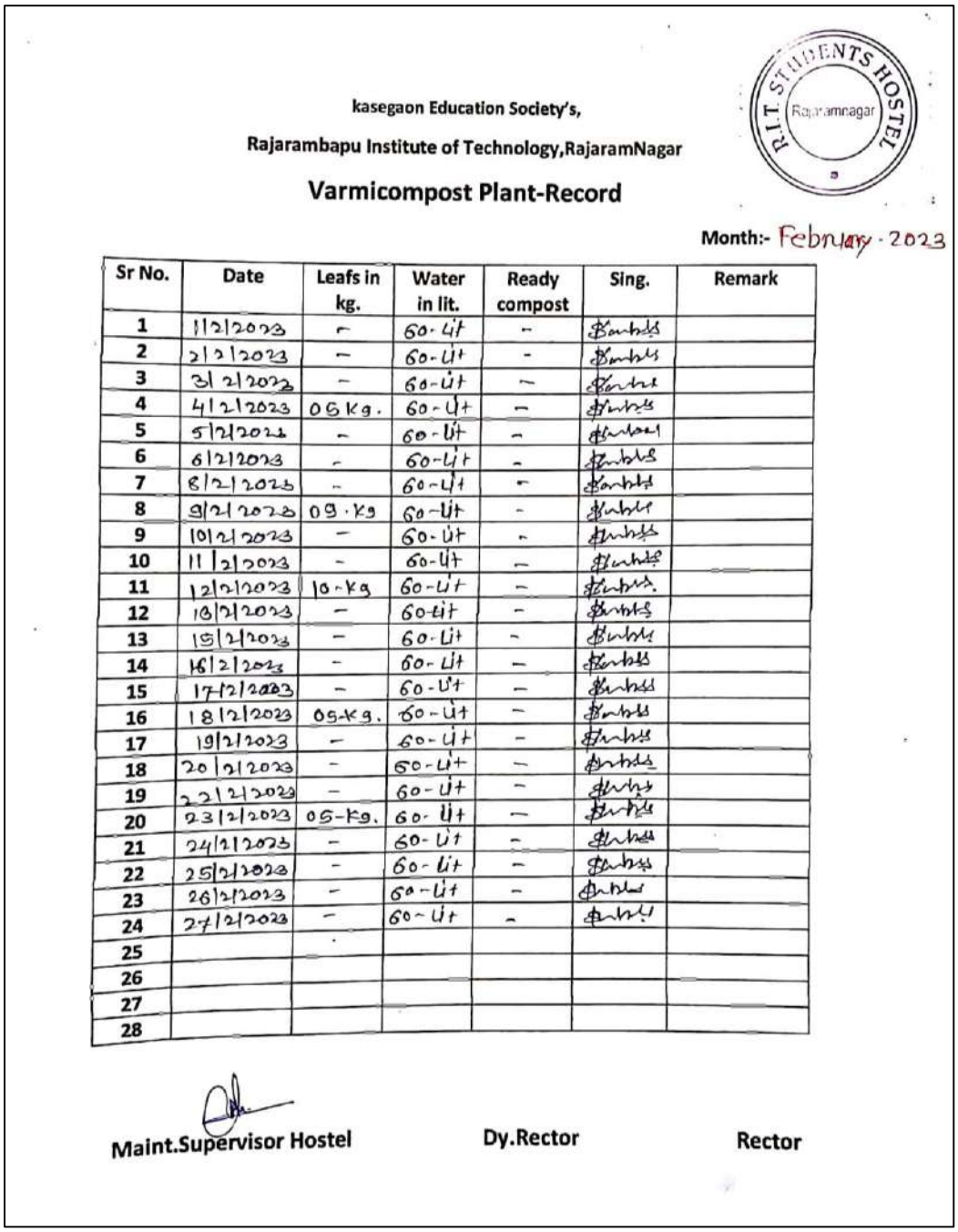
Varmicompost Plant-Record

Month:- January-2023

Sr No.	Date	Leafs in kg.	Water in lit.	Ready compost	Sing.	Remark
1	1/1/2023	05-kg.	60Lit	-		
2	2/1/2023	10-kg.	60-Lit	-		
3	4/1/2023	20-kg.	60-Lit	-		
4	5/1/2023	05-kg.	60-Lit	-		
5	6/1/2023	-	60-Lit	-		
6	7/1/2023	-	60-Lit	-		
7	8/1/2023	-	60-Lit	-		
8	9/1/2023	-	60-Lit	-		ढगाळ वातावरण.
9	11/1/2023	-	60-Lit	-		
10	12/1/2023	07-kg.	60-Lit	-		
11	13/1/2023	05-kg.	60-Lit	-		
12	14/1/2023	10-kg.	60-Lit	-		
13	15/1/2023	-	60-Lit	-		
14	16/1/2023	-	60-Lit	-		
15	17/1/2023	-	60-Lit	-		
16	18/1/2023	05-kg.	60-Lit	-		
17	19/1/2023	05-kg.	60-Lit	-		
18	20/1/2023	-	60-Lit	-		
19	21/1/2023	-	60-Lit	-		
20	22/1/2023	-	60-Lit	-		
21	23/1/2023	-	60-Lit	-		
22	25/1/2023	-	60-Lit	-		
23	26/1/2023	-	60-Lit	-		
24	27/1/2023	-	60-Lit	-		
25	28/1/2023	-	60-Lit	-		
26	29/1/2023	-	60-Lit	-		
27	30/1/2023	-	60-Lit	-		
28	Total →	72-kg.				

Maint.Supervisor Hostel Dy.Rector Rector

Fig 4:Logbook of Vermicomposting- January 2023



kasegaon Education Society's,

Rajarambapu Institute of Technology,RajaramNagar

R.I.T. STUDENTS HOSTEL Rajaramnagar

Varmicompost Plant-Record

Month:- February - 2023

Sr No.	Date	Leafs in kg.	Water in lit.	Ready compost	Sing.	Remark
1	1/2/2023	-	60-Lit	-		
2	2/2/2023	-	60-Lit	-		
3	3/2/2023	-	60-Lit	-		
4	4/2/2023	05 Kg.	60-Lit	-		
5	5/2/2023	-	60-Lit	-		
6	6/2/2023	-	60-Lit	-		
7	8/2/2023	-	60-Lit	-		
8	9/2/2023	09 Kg	60-Lit	-		
9	10/2/2023	-	60-Lit	-		
10	11/2/2023	-	60-Lit	-		
11	12/2/2023	10 Kg	60-Lit	-		
12	13/2/2023	-	60-Lit	-		
13	15/2/2023	-	60-Lit	-		
14	16/2/2023	-	60-Lit	-		
15	17/2/2023	-	60-Lit	-		
16	18/2/2023	05 Kg.	60-Lit	-		
17	19/2/2023	-	60-Lit	-		
18	20/2/2023	-	60-Lit	-		
19	22/2/2023	-	60-Lit	-		
20	23/2/2023	05 Kg.	60-Lit	-		
21	24/2/2023	-	60-Lit	-		
22	25/2/2023	-	60-Lit	-		
23	26/2/2023	-	60-Lit	-		
24	27/2/2023	-	60-Lit	-		
25						
26						
27						
28						

Maint.Supervisor Hostel Dy.Rector Rector

Fig 5: Logbook Vermicomposting- February 2023

2. Biogas Plant:

The food waste generated from the hostel area is approximately **45-50 kg/day**. This waste is treated in the Biogas Plant of **10 m^3** capacity located near Boys Hostel. This anaerobic digester is designed by Appropriate Rural Technology Institute (ARTI), Pune. The digester is constructed using floating gas holder system while the cylindrical shape was adopted to enhance better mixing. It is designed with a crusher stand and pre digester unit, floating biogas digester and slurry outlet. The biogas generated from these plants is then used for cooking in boys hostel mess.

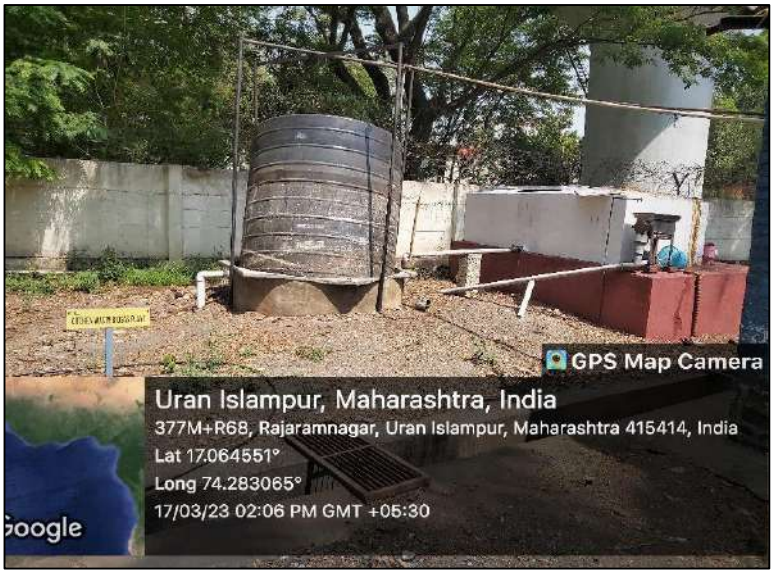
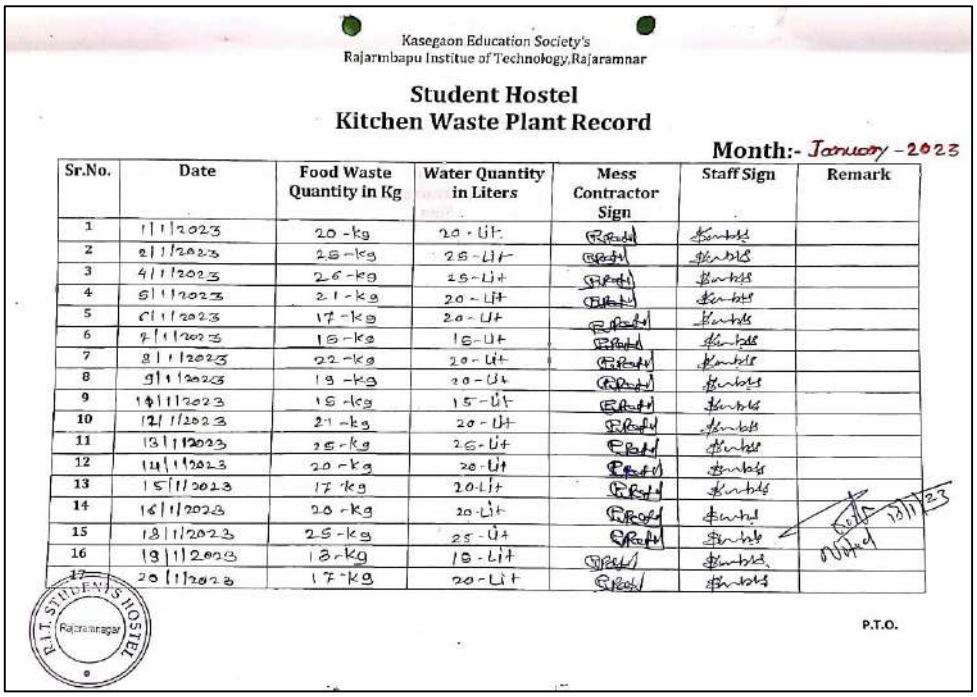


Fig 6: Biogas Plant near Boys Hostel



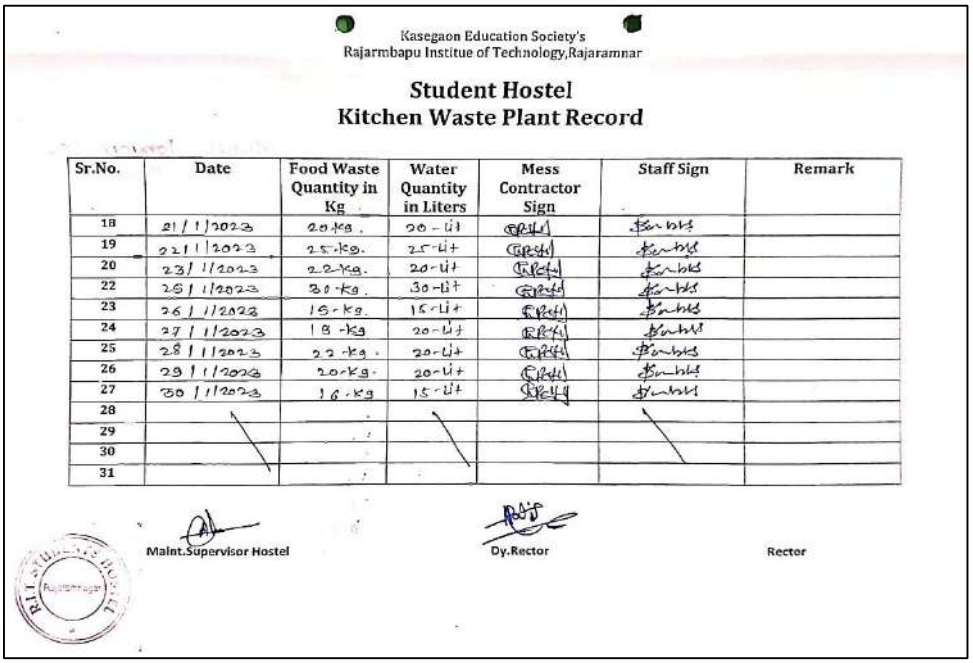
Kasegaon Education Society's
Rajarmbapu Institue of Technology,Rajaramnar

Student Hostel
Kitchen Waste Plant Record

Month:- January -2023

Sr.No.	Date	Food Waste Quantity in Kg	Water Quantity in Liters	Mess Contractor Sign	Staff Sign	Remark
1	1/1/2023	20-kg	20-Lit			
2	2/1/2023	25-kg	25-Lit			
3	4/1/2023	26-kg	25-Lit			
4	5/1/2023	21-kg	20-Lit			
5	6/1/2023	17-kg	20-Lit			
6	7/1/2023	16-kg	15-Lit			
7	8/1/2023	22-kg	20-Lit			
8	9/1/2023	19-kg	20-Lit			
9	10/1/2023	16-kg	15-Lit			
10	12/1/2023	21-kg	20-Lit			
11	13/1/2023	25-kg	25-Lit			
12	14/1/2023	20-kg	20-Lit			
13	15/1/2023	17-kg	20-Lit			
14	16/1/2023	20-kg	20-Lit			
15	18/1/2023	25-kg	25-Lit			
16	19/1/2023	18-kg	18-Lit			
17	20/1/2023	17-kg	20-Lit			

P.T.O.



Kasegaon Education Society's
Rajarmbapu Institue of Technology,Rajaramnar

Student Hostel
Kitchen Waste Plant Record

Sr.No.	Date	Food Waste Quantity in Kg	Water Quantity in Liters	Mess Contractor Sign	Staff Sign	Remark
18	21/1/2023	20-kg.	20-Lit			
19	22/1/2023	25-kg.	25-Lit			
20	23/1/2023	22-kg.	20-Lit			
22	25/1/2023	30-kg.	30-Lit			
23	26/1/2023	15-kg.	15-Lit			
24	27/1/2023	18-kg	20-Lit			
25	28/1/2023	22-kg.	20-Lit			
26	29/1/2023	20-kg.	20-Lit			
27	30/1/2023	16-kg	15-Lit			
28						
29						
30						
31						

Maint.Supervisor Hostel Dy.Rector Rector

Fig 7: Logbook of Biogas- January 2023

Kasegaon Education Society's
Rajarmbapu Institue of Technology,Rajaramnar

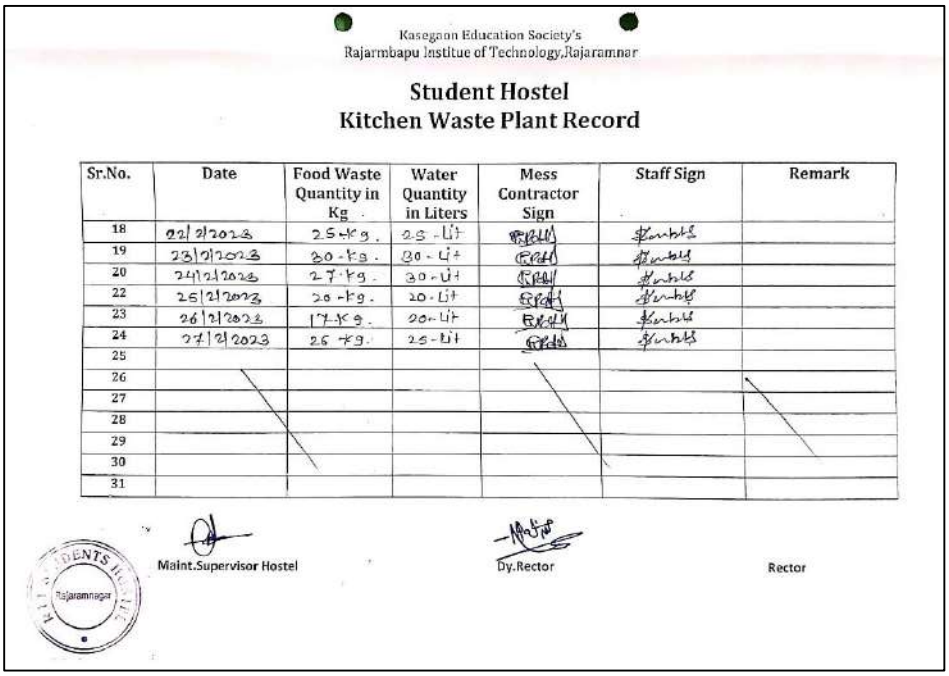
Student Hostel
Kitchen Waste Plant Record

Month:- February-2023

Sr.No.	Date	Food Waste Quantity in Kg	Water Quantity in Liters	Mess Contractor Sign	Staff Sign	Remark
1	1/2/2023	20-kg	20-Lit			
2	2/2/2023	25-kg	25-Lit			
3	3/2/2023	22-kg	25-Lit			
4	4/2/2023	28-kg	30-Lit			
5	5/2/2023	30-kg	30-Lit			
6	6/2/2023	35-kg	35-Lit			
7	8/2/2023	30-kg	30-Lit			
8	9/2/2023	28-kg	25-Lit			
9	11/2/2023	17-kg	20-Lit			
10	12/2/2023	15-kg.	15-Lit			
11	13/2/2023	19-kg	20-Lit			
12	15/2/2023	27-kg	30-Lit			
13	16/2/2023	22-kg	25-Lit			
14	17/2/2023	18-kg	20-Lit			
15	18/2/2023	20-kg	20-Lit			
16	19/2/2023	17-kg	20-Lit			
17	20/2/2023	24-kg	25-Lit			

R.I.T. STUDENTS HOSTEL Rajaramnagar

P.T.O.



Kasegaon Education Society's
Rajarmbapu Institue of Technology,Rajaramnar

Student Hostel
Kitchen Waste Plant Record

Sr.No.	Date	Food Waste Quantity in Kg	Water Quantity in Liters	Mess Contractor Sign	Staff Sign	Remark
18	22/2/2023	25-kg.	25-Lit			
19	23/2/2023	30-kg.	30-Lit			
20	24/2/2023	27-kg.	30-Lit			
22	25/2/2023	20-kg.	20-Lit			
23	26/2/2023	17-kg.	20-Lit			
24	27/2/2023	25-kg.	25-Lit			
25						
26						
27						
28						
29						
30						
31						

R.I.T. STUDENTS HOSTEL Rajaramnagar

Maint.Supervisor Hostel

Dy.Rector

Rector

Fig 8: Logbook of Biogas- February 2023

3. Sanitary Napkin Incinerator:

Approximately **150 kg/month** sanitary waste produced from the Girls Hostel. Improper disposal of such waste can cause serious health effects. College has provided **5 no** on **incinerator** in girl's hostel. It disposes napkins in an environment friendly method by burning the pads and converting it into ash. Produced ash in non-toxic in nature which is used in garden area.

Fig 9: Sanitary Napkin Incinerator

4.2 Recommendations:

- **Segregation** of dry and wet waste should be done properly.
- The campus should work towards zero waste by eliminating generation of waste. Accordingly, a **zero waste plan** for the institute should be created and implemented.
- Ensure use of **biodegradable solid and liquid products** in place of chemical/plastic products, for daily use items.
- **Biogas system** should be **expanded**, possibly to also get external green waste and thus ensuring energy security for the campus also.

- The college should ban use of plastic and campus should be declared as **"Plastic Free Campus".**
- Waste management monitoring and information should be streamlined, and appropriate management information system MIS should be implemented.
- **Resource recovery** should be ensured for all types of non-biodegradable waste.
- A **detailed solid waste management plan** may be prepared for the college, if required with help from solid waste management expert to ensure proper flow, quantification and monitoring of entire waste management system with focus on resource recovery and waste elimination aiming to zero waste.

CHAPTER 5

BIODIVERSITY AUDIT

5.1 Biodiversity Audit in Campus

The objective of biodiversity audit is to assess the extent of activities undertaken and how well overall ecological environment is maintained. Biodiversity is all the different kinds of life form available in a given area—all the variety of animals, plants, fungi, microorganisms like bacteria and large flora & fauna that make up our natural world. Each of these species and organisms work together in ecosystems to maintain balance and support life. The census of Flora and Fauna is the major part of the Green Audit.

Presently, work done for campus is consist all flora, fauna, horticulture, landscaping and overall ecological environment. To maintain biodiversity special project **"Miyawaki Forest"** is done in campus area. At the outset it was observed that the college has involved its staff and students in several knowledge programs, sessions related to biodiversity from time to time, which is commendable. The **total green cover area** in RIT campus is about **10,800 Sq.m** and distributed among various parts of campus area and residential area.

The following flora species found in Campus area during the field assessment details of the species is given in the Table No.1

Table No 1: Flora Species (Campus Area)

Sr. No.	Common Name of plant	Botanical/ Scientific Name	Number	Height (approx. in feet)
1.	Coconut	Cocus Nucifera	32	20
2.	Almond	Prunus Dulcis	16	25-30
3.	Ashok	Saraca Asosa	33	35-40
4.	Palm	Borassus	33	20
5.	Gulmohor	Delonixregia Rafin	22	12-15
6.	Morpankhi	Thuja Occidentalis	73	3-5
7.	Silver Oak	Grevillearobusta	21	35-40
8.	Chandan	Santalum album	03	12-15
9.	Ficus	Ficus Carica	16	5-15
10.	Mango	Mangifera Indica	06	15-20
11.	Kaneri	Cascabelathevetia	15	14-15
12.	Banyan	Ficusbenghalensis	03	35-40

13.	Tamarind	Tamarindus Indica	01	15-20
14.	Jambhal	Syzygium Cumini	01	20-25
15.	Limb	Azadaracta Indica	02	
16.	Bahava	Cassia Fistula Linn	09	35-40
17.	Christmas	Araucaniacolumnaris	08	25-30
18.	Ixora	Ixora Coccinea	24	5-6
19.	Phuljhade	Flowers	17	
Lawn Cover Area- 34611+17850=4873.79 Sq. m Total Trees=335				

The following flora species found in Residential area during the field assessment details of the species is given in the Table No. 2

Table No 2: Flora Species (Residential Area)

Sr. No.	Common Name of plant	Botanical/ Scientific Name	Number	Height (approx. in feet)
1.	Coconut	Cocus Nucifera	141	20
2.	Almond	Prunus Dulcis	21	25-30
3.	Ashok	Saraca Asosa	47	35-40
4.	Palm	Borassus	71	20
5.	Gulmohor	Delonixregia Rafin	04	12-15
6.	Morpankhi	Thuja Occidentalis	62	3-5
7.	Mango	Mangifera Indica	18	15-20
8.	Lemon	Citrus aurantium	02	5-6
9.	Chiku	Achras Sapota	07	10-12
10.	Tamarind	Tamarindus Indica	02	15-20
11.	Jambhal	Syzygium Cumini	01	20-25
12.	Christmas	Araucaniacolumnaris	02	25-30
13.	Humbar	-	03	12-13
14.	Parijatak	Nyctanthes arbor-tristis	02	12-14
15.	Jack Fruit	Atrocarpusintegra	01	15-18
16.	Peepal	FicusReligiosa Linn	02	25-30
17.	Teak	TectonaGrandis Linn	307	50-55
18.	Nilgiri	Eucalyptus globulus	13	30-35
19.	Indian Gooseberry	Emblicaofficianalis	01	12-15
20.	Ixora	Ixora Coccinea	02	5-6
Lawn Cover Area- 1800 Sq.m Total Trees= 709				

Tree plantation is carried out on the occasion of **Maharashtra Krishi Din** or Agricultural Day (1st july, 2022). Total **820 plants** are planted having **36 species** of **wild plants** and **35 species** of **medicinal plants** by institute near **football ground**. The list of newly planted trees seen in the campus is given in the following Table no. 3

Table No 3: List of Newly Planted Tress

Sr. No.	Common Name	Botanical/ Scientific	Number
1.	Ashok	Saraca Asosa	10
2.	Palm	Borassus	40
3.	Mango	Mangifera Indica	10
4.	Kranaja	Pongamia pinnata	10
5.	Kanchan	Bauhinia variegata	10
6.	Gulbhendi	Thespesia populnea	10
7.	Gulmohar	Delonix regia	10
8.	Tamarind	Tamarindus indica	10
9.	Chenduphal	Parkia biglandulosa	10
10.	Jambhul	Syzygium Cumini	10
11.	Jangali Cherry	Prunus avium	10
12.	Tembhurni	Diospyros melanoxylon	10
13.	Almond	Prunus Dulcis	10
14.	Nana	Lagerstroemia microcarpa	10
15.	Nilmohar	Jacaranda mimosifolia	10
16.	Peepal	Ficus Religiosa Linn	10
17.	Pivala chafa	Plumeria acutifolia	10
18.	Guava	Psidium Guajava	10
19.	Pandhari Savar		10
20.	Palas	Butea monsperma Kuntre	10
21.	Payar		10
22.	Padal	Stereospermum colais	10
23.	Jack Fruit	Atrocarpus integra	10
24.	Almond	Prunus Dulcis	10
25.	Boganvel	Bougainvillea	10
26.	Bottle brush	Callistemon	10
27.	Bhokar	Cordia dichotoma	10
28.	Maharukh	Ailanthus excels	10
29.	Royal kashiya	Cassia fistula	10
30.	Long pepper	Piper longum	10
31.	Banyan	Ficus benghalensis	10
32.	wawala	Holoptelea integrifolia	10
33.	Teak	Tectona Grandis Linn	10

34.	Sita Ashok	Saraca asoca	10
35.	Shisham	Dalbergia sissoo	10
36.	Spathodea	Spathodea campanulata	10
37.	Agnimanth	Clerodendrum Phlomidis	10
38.	Arjun	Terminalia arjuna	10
39.	Bidi leaf	Bauhinia racemosa	10
40.	Indian	Phyllanthus emblica	
41.	Adulsa	Justicia adhatoda	40
42.	Undal	Calophyllum inophyllum	10
43.	Curry tree	Murraya koenigii	10
44.	Wood apple	Limonia acidissima	10
45.	Kailaspati	Couroupita guianensis	10
46.	Cadamb	Neolamarckia Cadamba	10
47.	Lemon Grass	Cymbopogon citratus	40
48.	Gulvel	Tinospora cordifolia	
49.	Jaswand	Hibiscus rosasinensis	30
50.	Jarul	Lagerstroemia floribunda	10
51.	Bay leaf	Cinnamomum tamala	10
52.	Tulas	Ocimum tenuiflorum	10
53.	Bahava	Cassia Fistula Linn	10
54.	Bixa	Bixa orellana	10
55.	Bel	Aegle marmelos	10
56.	Bakul	Mimusops elengi	10
57.	Bibba	Semecarpus anacardium	10
58.	Behada	Terminalia bellirica	10
59.	mahogany	Swietenia	10
60.	Parijatak	Nyctanthes arbor-tristis	10
61.	Ramphal	Annona reticulate	10
62.	Red Sandalwood	Pterocarpus santalinus	10
63.	Ratrani	Cestrum nocturnum	10
64.	Neem	Azadirachta indica	10
65.	Lemon	Citrus aurantium	10
66.	Shami	Prosopis cineraria	10
67.	Shikakai	Acacia concinna	10
68.	Custard Apple	Annona Squamosa	10
69.	Betel nut	Areca catechu	10
70.	Simarouba	Simarouba glauca	10
71.	Hadaga	Sesbania grandiflora	10
Total=820			

The list of the birds seen in the campus is given in the following Table no. 4

Table No 4: List of Birds

Sr. No.	Common Name of Bird	Scientific Name
1.	Crow	Corvusbrachyrhynchos
2.	Koel	Eudynamysscolopaceus
3.	Bulul	Pycnonotidae
4.	Hammingbird	Trochilide
5.	Common Woodshrike	Tephrodornispon dicerianus
6.	Eurasian Collared Dove	Streptopeliadecaocto
7.	Parava	-
8.	Sparrow	Passeridae
9.	Pigeons	Columbidae
10.	Red kite bird	Milvus
11.	EurasianSparrowhawk	Accipiter nisus
12.	Parrot	Psittaciformes
13.	Commmon hoopoe	Acridotherestristis
14.	Wood pecker	Picidae
15.	Black headed ibis	Threskiornisme lanocephalus
16.	Cattle egret	Ardeidae
17.	Common Hoopoe	Upupaepops
18.	Green Bee eater	Meropsorientalis
19.	Common hawk-cuckoo	Hierococcyxvarius

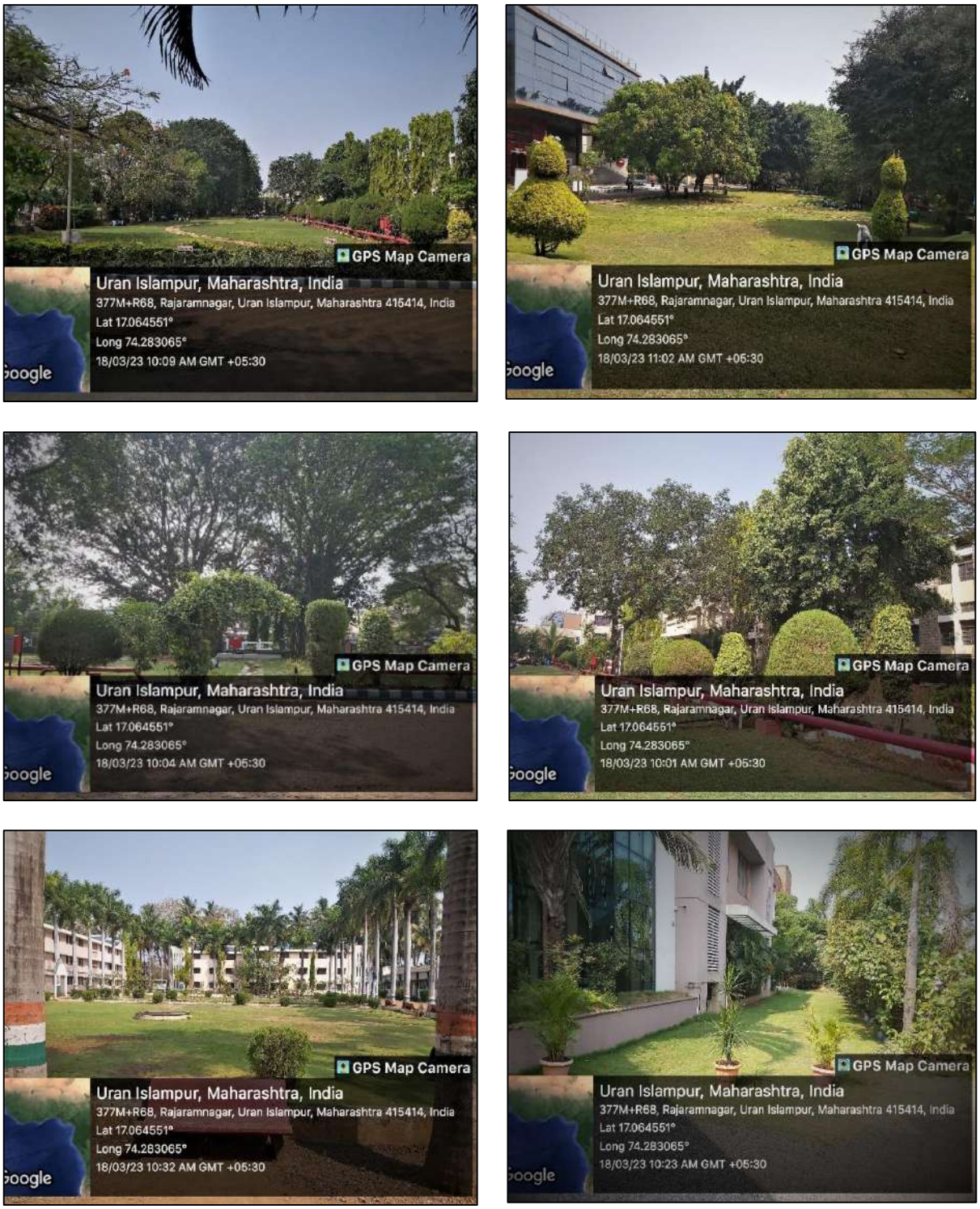


Fig 1: Flora in the Campus

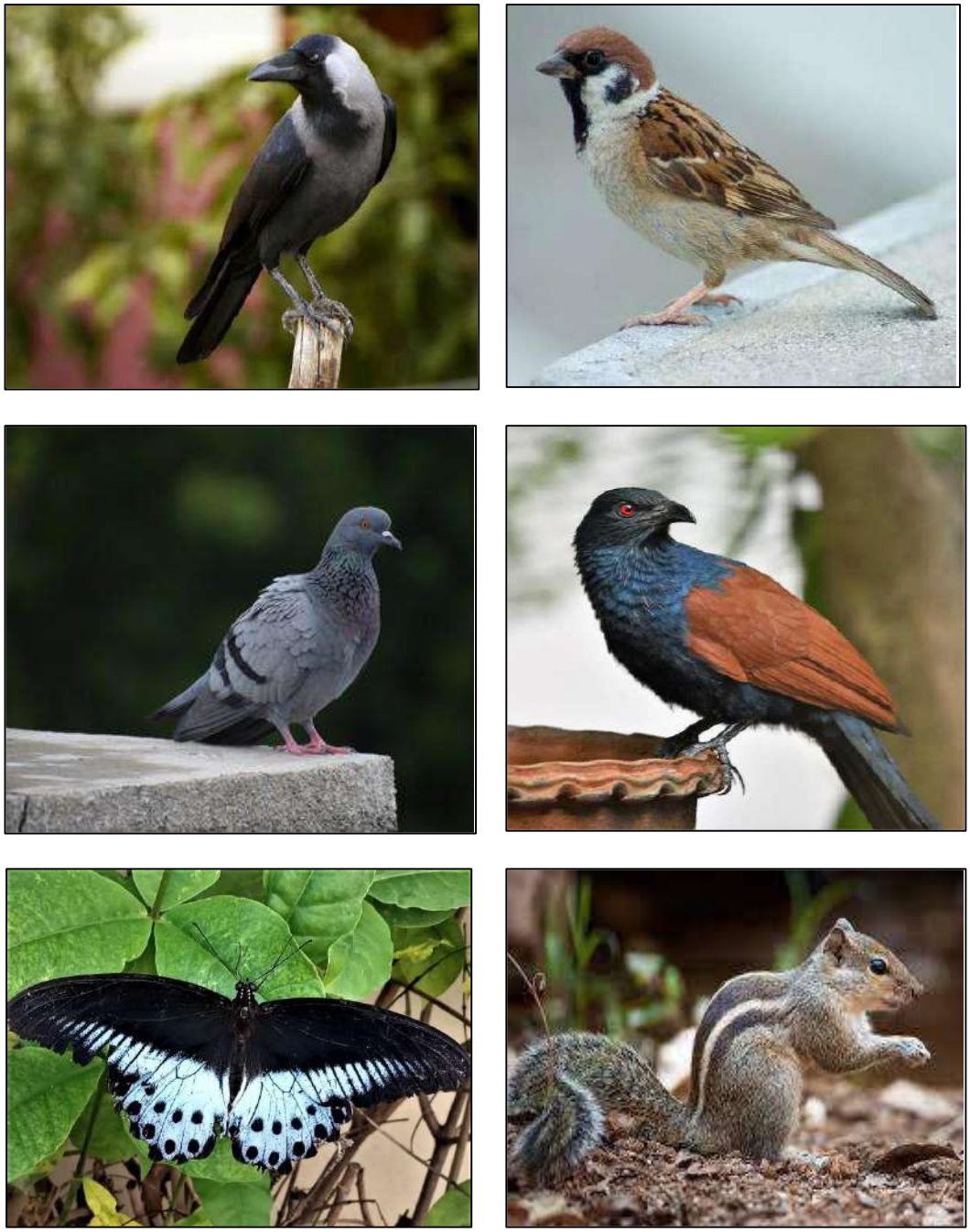


Fig 2: Fauna in the Campus

5.1.1 Miyawaki Forest in Campus:

An efficient technique for creating mini-forests quickly is Miyawaki Forest. It is based on the methods of a Japanese forester and botanist named Akira Miyawaki, an

expert in studying natural forests and restoring their native vegetation. The goals of a Miyawaki technique include improving biodiversity, sequestering carbon, increasing green cover, lowering air pollution, and preserving the water table.

This Concept is followed by the College. Total area covered under this project is nearly **700 Sq.m.** The institute having farm pond for Miyawaki Forest. The various native species like Mangifera Indica, Azadirachta indica, Ficus religiosa, Ficus Benghalensis, Polyalthia Longifolia are planted on this site. **Total 1430 plants** are planted which consist **30 species of high rise plants**, **30 species of medium rise plants** and 30 species of shrub are planted by the Institute in the Miyawaki forest. The forest shows good growth of plants. The planted tree shows 1 to 2 feets height in one year of their growth. The trees selected for the forest are native to the local area and having the great symbiosis with each other. It is assumed that a single tree supports oxygen demand of two people for their life. Thus, these 1430 trees will support the oxygen amount required for 2860 people on and around the campus. The forest will have the good and fast carbon sequestration rate as the forest contains fast growing plants. As the campus possess Miyawaki forest with 1430 plants, these plant will store 31.17 tons of CO2 approximately annually.

Benefits of Project:

- Maximum number of trees can be planted in less space.
- This project is given more importance to cultivate biodiversity.
- Students get information about all plants in minimum space.
- It creates a great habitat for birds and animals.
- Morning or early morning walk provides healthy oxygen and it helps to keep the human body healthy.
- Good food is available for animals and birds.
- Forestation rate is increases by using this technique so life of animals and birds will not be disturbed.
- Forestation rate is increased then the number of wild animals entering the human habitat will be reduced and human damage will be avoided.

Fig 3: Miyawaki Forest

5.2 Recommendations:

- As part of biodiversity, contribution of RIT Campus in **carbon sequestration or biomass** should be **regularly calculated** as a key ―feature of a tree is that trees sequester carbon from atmosphere.
- College should **install Quick Response Code** (QR Code) or RFID for each tree, as the next step in spreading awareness about biodiversity and regularly conduct tree audit and plantation auditing system.
- The effort of **documenting and collecting detailed information of flora and fauna in the Campus** has emerged as one of the innovative endeavours of approaching the current challenges relating to ecology and environmental deterioration. The need to create awareness about various environmental problems, maybe be fulfilled by involving more stakeholders in the biodiversity audit survey.
- Grow up **Vegetable garden and Fruit garden** to attract more fauna.
- Develop a **Butterfly garden** that arouses appreciation towards flora and fauna diversity.
- Provide **Vertical Landscaping** to keeps a building cool in summer and warm in winter thus enabling you to save electricity and also help to create healthy environment.

CHAPTER 6

AMBIENT AIR QUALITY AND NOISE MONITORING

6.1 Ambient Air Quality Monitoring Status:

Ambient air monitoring is the systematic, long-term assessment of pollutant levels by measuring the quantity and types of certain pollutants in the surrounding, outdoor air. Its important part of environmental monitoring. Air quality monitoring is done with the help of **NAQI Standard.**

We recorded different air quality parameter such as Ozone (O_3), Particulate Matter (PM_{10}, $PM_{2.5}$), Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2) and Carbon monoxide (CO) with NAQI at different locations of the campus. The details are given in the following Table No. 1:

Table No. 1: Ambient Air Quality Monitoring Status at different locations

Parameters	**O_3 (ppb)**	**PM_{10} (ug/m^3)**	**$PM_{2.5}$ (ug/m^3)**	**SO_2 (ppb)**	**NO_2 (ppb)**	**CO (ppb)**
Locations						
1. College Campus						
i. Garden Area	53.33	34.99	23.84	2.22	1.65	220.19
ii. Ground Area	53.34	35	23.85	2.21	1.64	220.2
2. Main Building 1						
i. Administrative Office	53.34	35	23.85	2.21	1.64	220.2
ii Entrance Hall	53.34	35	23.85	2.21	1.64	220.2
3. Mechanical Building (Video Conference Hall)	53.34	35	23.85	2.21	1.64	220.2
4. Workshop 1	53.34	35	23.85	2.21	1.64	220.2
5. Main Building 2						
i. CSE Conference Hall	53.34	35	23.85	2.21	1.64	220.2
ii, Main Entrance Hall	53.34	35	23.85	2.21	1.64	220.2
5. Library Building (Each Floor)	53.34	35	23.85	2.21	1.64	220.2
6. Residential Area						

i. Boys Hostel	61.04	39.75	27.19	2.16	1.43	223.47
ii. Girls Hostel	61.01	39.74	27.18	2.16	1.45	223.53
iii. New Girls Hostel	61.04	39.75	27.19	2.16	1.43	223.47
iv. Guest House	61.04	39.72	27.17	2.16	1.44	223.52
7. Gate No 1, & 3	74.37	54.96	38.04	2.51	1.13	276.85
CPCB Standard (ug/m^3)	**100**	**100**	**60**	**80**	**80**	**2**

NAQI for Campus area is 85 and for Residential area is 90.

6.2 Recommendations:

- The precautions like **water sprinkling or use of enclosures** should be made to reduce the particulate matter in air during construction activity.
- Provide **Green Fencing** to overall campus to resist the effect of external agency.
- Need to install **Live Air Quality Display Board.**
- To improve air quality, **barrier wall** should be constructed.
- Use **Dustless Chocks** in classrooms to improve **Indoor air quality.**

6.3 Ambient Noise Monitoring Status:

Noise or sound level monitoring or measurement is a process to measure the magnitude of noise in industries and residential area. Data collected from Noise level monitoring & testing helps us to understand trends and action can be taken to reduce noise pollution. Noise pollution is Low or High-frequency sound that can cause/harm the activity of human life. The sampling was carried out using **Digital Sound Level Meter (MTQ 8055)** in Decibels (dB) in different areas of college campus during office hour. The details are given in the following Table 2

Table 2: Ambient Noise Monitoring Status at different locations

Sr. No.	Locations	Readings Day Time Leq(A) dB	CPCB Day Time Standard
1	College Campus		50dB
i	Garden Area	69.74	
ii	Ground Area	57.74	
2	Main Building 1		
i	Entrance Hall	62.09	
ii	Administrative	65.39	
3	Main Building 2	69.54	
4	Electrical Building	57.37	
5	Mechanical	58.12	
6	Workshop	71.20	
7	Library		
I	Entrance	64.3	
Ii	Reading room	53.79	
8	Gyamkhana	53.6	
9	Canteen	65.61	
10	PG Building	56.66	
11	Boys Hostel	48.02	
12	Girls Hostel	53.66	
13	Staff Quarters	46.51	
14	New Girls Hostel	45.84	
15	Guest House	46.92	
16	College Gate		
	Gate No 1	69.98	
	Gate No 2	70.96	
	Gate No 3	66.78	
17	Generator Off Condition	48.33	
18	Generator On-140KVA	73.12	
19	Generator On-160KVA	73.37	
20	Both Generator On Condition	74.31	

Fig 1: Noise Monitoring

6.4 Recommendations:

- To reduce noise pollution **Sound Acoustic Wall** should be constructed at roadside.
- **Silent zone rules** be followed.
- The noise producing activities should be done during the holidays or after the office hours.
- The contractor should be advised to **use less noisy machines.**
- Equipment's who created noise should have **Dampers and Shock Absorbers.**

CHAPTER 7

CARBON FOOTPRINT

Carbon footprint is the measure of carbon dioxide emissions directly or indirectly caused by an activity or accumulated over the life stages of a product." In other words, "A carbon footprint is the total greenhouse gas (GHG) emissions caused directly and indirectly by an individual, organization, event or product." It is necessary to calculate the carbon footprint of the campus to upgrading the Clean Developmental Mechanism (CDM) in various processes. All the data from the various sources were collected from all the sectors where energy resources are used.

7.1.1 Sources of Carbon Emission in campus

- Electricity used in campus
- Equipment's used – DG set, LPG
- Waste water generation
- Paper Consumption
- Stationary goods
- Solid waste management
- Emissions from regular commuting by faculty, staff or students,

7.1.2 Reducing the Carbon Footprint-

- Installation of solar panels energy generation devices, sensor based energy consumption devices to reduce the electricity footprint of the campus.
- Installation of Rainwater Harvesting, Waste Water Treatment Plant is reduce waste water generation footprint.
- The food waste generated in Boys Hostel is converted into biogas which can be further utilized for hostels kitchen. Also garden waste is converted into compost, so it can overcome the waste management footprint.
- Vehicle entry is restricted in the campus. Only bicycles are used in the campus to overcome the vehicle footprint.
- Vegetative cover available is 10,800 sq.m. It is main carbon sequestration source which reduces the effect of carbon footprint.

Fig 1: Solar Panels

Fig 2: Sensor based Eneegy Consumption Device

7.2 Recommendations:

- Provide **Vertical Gardens** which helps to reduce the carbon footprint of building by filtering pollutants and carbon dioxide out of the air.
- Reduce the **Water Consumption**. It contributes majorly to the total carbon emission.
- Most of the students and teacher should use **Public Transport** instead of personal vehicle.
- Use as much as **Solar Energy Consumption** to overall college.

CHAPTER 8

INFRASTRUCTURE, SITE PLANNING & OUTDOOR ENVIRONMENT AUDIT

This sub-sector audit related to infrastructure particularly focused on reviewing the below activities or process of the institute:

1. Overall site planning and layout.
2. Infrastructure of the institute including building design, green buildings inside the campus, urban heat island effect etc.
3. Transport and mobility.

Following are the observations made under this audit:

1. The college campus has sufficient green area i.e. 10,800 sq.m which keeps campus area cool and college also have more focus on plantation this year college planted 820 new trees. This helps to reduce heat island effect.
2. The topography of the college is such that on the back side of the academic block the natural slope leads to, where the rainwater drainage rushes during high rainfall event.
3. Buildings and the campus is designed in such a way that it is quite airy during summers and has sufficient plants to keep the building cool naturally.
4. The internal campus mobility is pedestrian friendly and college even has e-bicycle facility.
5. Entry of vehicles within the campus is banned so noise and air quality is maintained.
6. All classrooms are having proper natural ventilation and day lightening.

Recommendations:

- Adopt green building rating system like **IGBC GRIHA OR LEED** which will further help in maintaining the campus for different environmental aspects.
- In College Development Committee (CDC) assign one **Environment Expert.**

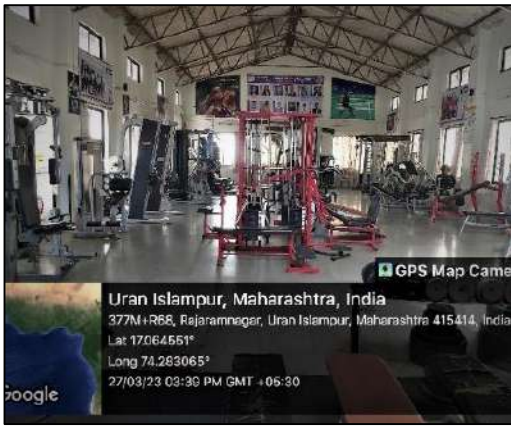
CHAPTER 9

HEALTH AND WELLBEING AUDIT

According to WHO "Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." The audit addresses health & well-being facilities, so as to enhance physical, emotional and spiritual well-being of campus occupants. Health and well-being is a critical component of any green or environment audit. Overall health and well beings of occupants is the most important aspect of Indian Green Building Congress - Campus rating system also. The following are the key observations are made under this audit:

1. College has been found to provide the right and best atmosphere for developing and sustaining an individual and community health and well-being in the best possible way.
2. The institute campus is complete friendly to differently abled and senior citizens.
3. All Basic Amenities are easily and conveniently available in college campus it consist- Guest House, Bank, ATM, Cafeteria, Hospital, Laundry Auditorium, Garden, Saloon, RO water purifier.
4. Health and Well-being facilities available in college are gymnasium, yoga, meditation, indoor games, outdoor games and playground. Additionally college provide, FM radio station, healthcare, and emergency and security facilities within the campus such as Ambulance, First aid, Clinic, Emergency alarm, Surveillance system.
5. As per the government norms Fire Safety System is installed in all the buildings of Academic campus.
6. College also work for other personal, inter-personal and community issues like mental health, anti-ragging, hygiene. Counselling cell is provided in the campus.
7. In the campus strict provision is made to ban Tobacco and Smoking. Banners are displayed in the campus to divert the younger generation away from such addictions.

Bank & ATM



Gym

Basketball Ground

Ambulance

Tobacco Free Campus

Antiragging

Counselling Cell

Fire Safety

Recommendations:

Carry out specific survey on general health and wellbeing of the occupants of the campus to assess the gaps, and check the overall impact of all the programs, support group sessions, overall living and working environment on health and wellbeing of the staff and students.

CHAPTER 10

GREEN CAMPUS INITIATIVES

Due to minimum consideration for environment & sustainability, the world is facing problems of ozone depletion, climate change, water scarcity and sustainable resource management. College organises guest lectures on environmental conservation, biodiversity etc. every year.

College has demonstrated consistent commitment towards nature and environment for the last 18 years. Civil engineering department work for environmental sustainability under **'Unnat Bharat Abhiyan'**. College has **'Renewable Energy Club'** and the **'RIT Nature Club'** and **'Islmapur Ploggers'** which offers wide spectrum of environmental and nature activities and platforms to enhance awareness and exhibit the relationship with nature. The **National Service Scheme (NSS)** of the college undertakes projects for environment, rural development, education awareness, healthcare, etc. Various activities like cleanliness drive, tree-plantation, seminars and workshops are organised by Renewable Energy Club/ RIT Nature Club/ NSS increase the awareness and sensitivity among students and faculty.

1. Unnat Bharat Abhiyan (UBA)

Under UBA institute has adopted following villages for their development in collaboration with District Administration. Various projects related to Organic Farming, Water Management, Artisans, Industries and Livelihood, Basic Amenities and Sustainable Energy are successfully completed for the following villages: 1. Bavachi 2. Bhilawadi 3. Hazarwadi 4. Junekhed 5. Sawantpur.

2. RIT Renewable Energy Club for energy conservation:

In order to create awareness about new and renewable sources of energy among students, in January 2006. RIT has opened Renewable Energy Club under the guidelines provided by Ministry of Non-Conventional Energy Sources. The club has been registered at Maharashtra Energy Development Agency. Following activities are taken under this club:

- Every year this club organizes events like seminars, workshops, expert lectures, poster and essay competition, and field visits to renewable energy projects in the vicinity. Also the club is celebrating Rajiv Gandhi Akshay Urja Diwas on August 20th every year.
- The staff and the students are also given instructions about to save energy by switching off the fans, tubes, computers, etc. when not in use.
- The air conditioners are used only in essential conditions in the institution and laboratories.

- Solar energy panels are used for heating water for bathrooms in hostels. Solar street lights are installed in front of college main building.

3. RIT Nature Club:

With the objective to uphold interest about wildlife and the environment among students the club has been started in 2005. The club works toward creating awareness among students about scientific and economic values of nature. Students get opportunities to serve the objective of protection and conservation of natural environment through various activities of the club like tree plantation, celebrating non-vehicle day in the institute, trekking and PUC testing programs.
The club is celebrating World Environment Day on 5th June every year.

4. Islampur Ploggers:

RIT NSS Vivek Vahini and DLA started one group named as Islampur ploggers. The purpose of this group is picking garbage and jogging. On every Sunday they collect garbage at one location and create awareness about it. Other gropus from Islampur also participated in this activity.

5. Bicycle and E-Bicycle:

5-Bicycles and **5 E-Bicycles** are provided in the campus for internal transport. It is used in only campus and hostel premises.

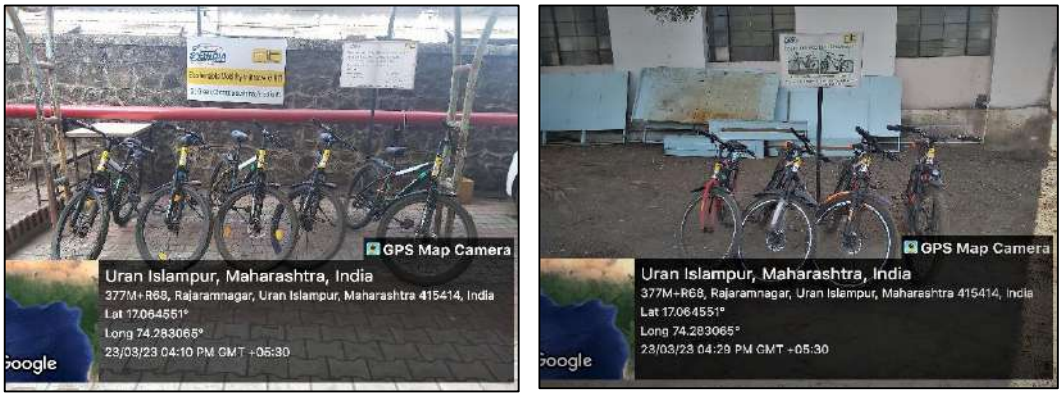


Fig 1: Bicycles and E-Bicycles

6. Sensor Based Energy Consumption Device:

Sensor Based Energy Consumption Device is installed in lobby area of whole campus.

7. Green Initiatives & Awareness Activities by RIT College (2021- 2022):

Sr. No.	Date	Activity	Venue
1.	05/03/2022	Organized Cleanliness Drive with active participation of students, faculty and non-teaching staff.	Ramling Bet Bahe
2.	24/03/2022	Organized 7 day camp by RIT College in which various social activities were held with a sole view of rural development, Environmental activities and value education.	Village Sakharale
3.	24/04/2022	Organized Tree Plantation Drive and Cleanliness Drive with active participation of students.	Village Sawarde
4.	03/06/2022	Celebrated Cycle Day by the students.	RIT Campus
5.	05/07/2022	Organized Tree Plantation Drive with active participation of students, faculty, non-teaching staff and Chief officer and Town planner officer of Islmapur Municipal Council.	Hostel Campus
6.	19/08/2022	Biodiversity Educational visit	Kranti Smruti Van Balawadi
7.	02/10/2022	Organized Cleanliness Drive with active participation of students, faculty and non-teaching staff.	RIT Campus
8.	19/10/2022	Organized Plastic Collection Drive with active participation of students, faculty and non- teaching staff.	RIT Campus
9.	19/10/2022	Create awareness to use khadi products by arranging Khadi Stall with active participation of students, faculty.	RIT Campus

Fig 2: Cleanliness Drive at Ramling Bet Bahe

Fig 3: 7 Day College Camp at Sakharale

Fig 4: Tree Plantation Drive and Cleanliness Drive at Sawarde

Fig 5: Cycle Day celebration at college campus

Fig 6: Tree Plantation Drive at Hostel Campus

Fig 7: Biodiversity Educational visit at Kranti Smruti Van Balawadi

Fig 8: Cleanliness Drive at RIT Campus

Fig 9: Plastic Collection Drive at RIT Campus

Fig 10: Create awareness to use Khadi products at RIT Campus

Recommendations:

- Organize at least three outreach/educational programmes in a year with the involvement of campus occupants, local communities & NGOs, to increase public awareness on environment sustainability and green features of the campus. The outreach/ educational programmes can include, but not limited to, promotional materials (posters, brochures, etc.,), information portals, and awareness programmes.
- Constitute a formal committee/ forum with the involvement of campus occupants, local communities & NGOs, to identify and implement at least two eco-friendly practices/ green initiatives within and outside the campus. The eco-friendly practices/ green initiatives can include, but not limited to, clean & green campaigns on waste segregation & recycling, water conservation, energy conservation, use of public transportation/ bicycles/ carpooling, world green building week, earth hour.
- Institute awards to acknowledge the efforts of campus occupants, local communities, NGOs for implementing eco-friendly practices/ green initiatives.
- Organize earn while learn eco-friendly programmes.
- Ensure participation of students and teachers in local environmental issues.
- Adopt an environment policy for the college.
- Conduct exhibitions for parents and public on environment and sustainable practices.
- Under Environment Science course every year students should do one environment project for campus.

CHAPTER 11

CONCLUSION

Green Audit is the important tool to know the strength and weakness of environmental sustainable practices and to find the way to solve problem regarding it. Green Audit can add value to the management approaches being taken by the college and is way of identifying, evaluating and managing environmental risks. The college in recent years considers the environmental impacts of most of its actions and makes a concerted effort to act in an environmentally responsible manner. Even though the college does perform fairly well, the recommendations in this report highlight many ways in which the college can work to improve its actions and become a more sustainable institution.