

# **GREEN, ENERGY AND ENVIRONMENT AUDIT REPORT**

**RAIPUR INSTITUTE OF TECHNOLOGY, RAIPUR**

**2022-2023**



**RAIPUR INSTITUTE OF TECHNOLOGY**

**ADD. - NH. 06, Chhatauna, Mandir Hasaud, Raipur (C.G) – 492101**

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### Certificate by the Team

This is to certify that the Green Audit Report including Environmental and Energy audit is based on the verification of the facts pertaining to Green Environmental Management of the Institution, during 1<sup>st</sup> July 2021 to 30<sup>th</sup> June, 2022. Further, this is to place on record that the Questionnaire developed for the said Audit has been well responded by the Institution and responses have been authenticated by the Principal.

We have complied with the ethical requirements of the Audit and have reported the findings/observations/remarks in objectivity, without any favour/bias/prejudice.

Members of the Audit Team, under the leadership of Prof. Anil Kumar Sharma, Former Member Secretary, Chhattisgarh Environment Conservation Board, Chairman, IIE(India) Chhattisgarh State Centre, Chairman Institution of Water and Environment, Chhattisgarh put their signatures on this Certificate as under:

**Prof. Anil Kumar Sharma,**  
Former Member Secretary, Chhattisgarh Environment Conservation Board,  
Chairman, IIE(India) Chhattisgarh State Centre,  
Chairman Institution of Water and Environment, Chhattisgarh  
**Leader of the Audit Team**

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### **ACKNOWLEDGEMENT**

### **CONTEXT**

### **CONCEPT**

- ◆ **Introduction**
  - Overview of institute
  - Objectives of the greenaudit
  
- ◆ **Green spaces in the campus and their maintenance**
- ◆ **Present energy consumption and conservation measures**
- ◆ **Present water consumption and conservation measures**
- ◆ **Present fuel consumption and conservation measures**
- ◆ **Environmental management**
- ◆ **Waste collection and disposal**
- ◆ **Efforts to sensitize students and staff**
- ◆ **Some outcomes of all these practices**
- ◆ **Green initiative and social awareness for environmental sustainability**
- ◆ **Future efforts and continuation of these practices**

### ACKNOWLEDGEMENT

Green Audit Team thanks the management of Raipur Institute of Technology, Raipur for assigning this important work of Green, Energy and Environment Audit. We appreciate the co-operation to our entire team for completion of the study in time. Our special thanks for giving us necessary inputs to carry out this very vital exercise of Green, Energy and Environment Audit are attributed to:

- Shri Swaroopchand Jain - Chairman, MES
- Mr. Shailendra Jain - Secretary, MES
- Prof. Anil Kumar Sharma – Former Member Secretary, (CECB)  
Chairman, IIE (India)-Chhattisgarh State Centre  
Chairman, Institution of Water and Environment, Chhattisgarh
- Teaching & Supporting Staff of Collage

We are also thankful to other staff members who have actively involved while collecting the data and conducting field measurements.

## Green Audit

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### CONTEXT

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory from the academic year 2016–17 onwards that all Higher Educational Institutions should submit an annual Green Audit Report. Moreover, it is part of Corporate Social Responsibility of the Higher Educational Institutions to ensure that they contribute towards the reduction of global warming through Carbon Footprint reduction measures.

In view of the NAAC circular regarding Green Auditing, the College Management decided to conduct a Green Audit Evaluation by Green Audit Assessment Team

Green Audit or Environment Audit focuses on the Green Campus, Waste Management, Water Management, Air Pollution & Energy Management etc. being implemented by the College Management.

The concept, structure, objectives, methodology, objectives of the audit are mentioned below.

## Green Audit

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### CONCEPT

The term 'Environmental audit' or 'Green audit' means differently to different people. Terms like 'assessment', 'survey' and 'review' are also used to describe similar activities. Furthermore, some organizations believe that an 'environmental audit' addresses only environmental matters, whereas others use the term to mean an audit of health, safety and environment-related matters. Although there is no universal definition of Green Audit, many leading companies/institutions follow the basic philosophy and approach summarized by the broad definition adopted by the International Chambers of Commerce (ICC) in its publication of Environmental Auditing (1989).

The ICC defines Environmental Auditing as:

*"A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of safeguarding the environment and natural resources in its operations/projects."*

The European Commission, in its proposed regulation on environmental auditing, has also adopted the ICC definition of Environmental Audit. However, the outcome of Green Audit should be established with concrete evidence that the measures undertaken and facilities in the institution under green auditing.

## Green Audit

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### **1. Introduction:**

Rapid urbanization and subsequent technological advancements indicate a change in societal as well as environmental fraternity. Hence, there is a need of green initiative to maintain the sustainability in line with the eco-friendly technological approaches with available habitats. The term “Green” is indicating an eco-friendly sustainable environment. The associated problems being arise due to global warming, depletion of ozone layers, air pollution, water pollution etc. at rural as well as in urban communities.

“Green Audit” is also known as “Environmental Audit” and is the most efficient & ecological methods to administer the environmental issues. In line with the above consideration, a clean and healthy environment is one of the desired pre-requisites in any educational institution. To achieve this, our institute emphasizes on adopting the good green practices and creates environment awareness amongst all its stakeholders with their active participation to make the campus eco-friendly. To make it successful, following strategies have been adopted, such as energy conservation practices, waste management and plantation for making the campus clean, green and healthy. Further college has active NSS club which conducts various activities to increase awareness amongst students such as awareness rallies, different competitions. Further academic activities such as study tours/ visits to biodiversity places, camps: cleaning of campus and the nearby villages on different occasion and projects are also arranged in accordance to imply Greenpolicy.

### **Overview of Institute**

Raipur Institute of Technology, Raipur (RIT) was established by the Mahanadi Education Society in the year 1995 with a mandate of augmenting technical and professional education by setting up series of institutions with modern facilities and excellent academicians to realize the vision of Society. The institute is approved by All India Council of Technical Education (AICTE) and the State Government Directorate of Technical Education, and is affiliated to Chhattisgarh Swami Vivekananda Technical University, Bhilai. Raipur Institute of Technology, Raipur, which spreads over 20 acres of lush green campus enveloped with serene beauty and environment. The College is situated in Naya Raipur at NH 53, Chatauna, Mandir Hasaud, Raipur.

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### Vision

The group looks forward to establishing itself as a premier technical educational institution imparting quality education at the graduate and post graduate levels, to the students pursuing courses of study in areas of industrial requirements and emerging technologies.

### Mission

The Institution dedicates itself to educate and train students to enable them to achieve a perceptible value addition in their technical knowledge and skills, and inculcate a positive attitude towards life; along with enhanced employability, at the time of passing out from the institution, by forging a strong and viable partnership with industries.

### **B.Tech (4 Year Degree Course)**

| S.no | Branch                               | Intake |
|------|--------------------------------------|--------|
| 1    | Biotechnology                        | 60     |
| 2    | Chemical                             | 30     |
| 3    | Civil                                | 90     |
| 4    | Computer Science                     | 90     |
| 5    | Electrical & Electronics Engineering | 30     |
| 6    | Electronics & Telecommunication      | 30     |
| 7    | Information Technology               | 30     |
| 8    | Mechanical                           | 60     |

### **M.Tech (2 Years PG Degree)**

| Branch                         | Specialization                                 | Intake |
|--------------------------------|------------------------------------------------|--------|
| Computer Science & Engineering | Computer Science & Engineering                 | 18     |
|                                | Software Engineering                           | 12     |
| Chemical Engineering           | Environmental Engineering (Inter Departmental) | 24     |
| Mechanical Engineering         | Thermal Engineering                            | 18     |
|                                | Machine Design                                 | 12     |
|                                | Energy Management                              | 12     |
| Electronics Engineering        | Power Electronics                              | 12     |

## Green Audit

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### **Objectives of the GREENAUDIT**

1. Implementing "GOGREEN" with an initiative to make the campus environment friendly with every availability, possibilities, and opportunities.
2. Endeavour to save energy with the available opportunities.
3. Motivating and encouraging everybody to minimize as well as to control pollution from all corners for a sustainable GREEN CAMPUS.
4. A visionary approach to reduce solid and liquid waste with suitable green methods for a sustainable green campus.
5. Adequate health, safety, and eco-friendly practices.
6. An approach to minimize human exposure to risks for the implementation of the health, safety, and eco-friendly practices to adopt green culture and sustainability.

### **Main activities to sustain green performance:**

In order to achieve the above-mentioned objectives, following initiatives have been taken with appropriate action plan.

- Curriculum included with Environmental studies as subject for all students.
- Plantation and tree nurturing in campus.
- Solar panel units.
- Observation of environmental nature awareness days and events through NSS activities.
- Architectural design for natural ventilation and more natural light.
- Use of energy efficient devices.
- Generators.
- Display boards to aware stakeholders to avoid wastage of water and energy.
- Use of minimum prints with utilization both sides of paper.
- Composting.
- Use of recycled waste water for gardens and trees.
- Declaration of No smoking zones in the Institute.
- Promotion of eco-friendly campus and avoid litter



**Figure 1: Campus**

### **2. Green spaces in the campus and their maintenance:**

Trees and plants are of immense importance as they maintain aesthetics and have potential to make ambience living. They have important part in our well-being. A garden might serve as a tranquil retreat in everyday life. There is an accumulated evidence of the influence of the landscapes and plants surrounding the working building on people's health, from the ancient to the present day. These landscapes are acting as 'Healing Gardens'.

Institute has substantial allocation of space for green cover layout resulting in good awning. The garden of the institute is being maintained under supervision with the help of comprehensive set of garden equipment. Campus has the landscaping with diverse level of plants and shady trees. Trimmed away branches, dried leaves are used to mulch the soil and to avoid evaporation after watering. The institute provides all efforts to maintain the surroundings green by adding potted plants and growing plants along the length of the wall compound and planting trees inside the campus. The institute has developed the campus garden having varieties of plants of botanical interest.

#### **Common trees and medicinal plants in campus:**

There are big old trees in various places in campus which are maintained considering their ecological services. These and other species of flowering plants occur in the campus enhancing scenic view. Other flora contributing beauty as well as lush greenery in the campus constitutes

## Green Audit

ornamental plants which add beauty and aesthetics. Along with these plants various medicinal plants are also available in the campus. Some of the commonly available tree species and medicinal plants in campus are as follows:

**Table 1:** Common trees and medicinal plants in the campus

| Sl. No. | Name of the Plant                                 | Common Name  | Origin        |
|---------|---------------------------------------------------|--------------|---------------|
| 1       | <i>Aegle marmelos</i> (L). Corr.                  | Bel.         | Rutaceae      |
| 2       | <i>Agave Americana</i> L. var. <i>Americana</i>   | Ghaypat      | Agaceae       |
| 3       | <i>Alstonia macrophylla</i> Wall. Ex. G.Don       |              | Apocynaceae   |
| 4       | <i>Aloe vera</i> (L). Burm.                       | Korphad      | Asphodelaceae |
| 5       | <i>Aralia papyrifera</i> Hook.                    | Aralia       | Araliaceae    |
| 6       | <i>Araucaria</i>                                  |              | Araucariceae  |
| 7       | <i>Asparagus officinalis</i> L.                   | Shatawri     | Aspargaceae   |
| 8       | <i>Bignonia venusta</i> (Ker.-Gawl.) Malers       | Sankrantvel  | Fabaceae      |
| 9       | <i>Bougainvillea spectabilis</i> wild.            | Boganvel     | Nyctaginaceae |
| 10      | <i>Bryophyllumpinnatum</i> Oken.                  | Panphuti     | Crassuliaceae |
| 11      | <i>Callistemon citrinus</i> (Curtis) Skeel        | Golden brush | Myrtaceae     |
| 12      | <i>Calotropis gigantea</i> (L). R.Br. Rui         | Rui          | Apocynaceae   |
| 13      | <i>Canna orchoides</i> Bailey                     | Kardal       | Cannaceae     |
| 14      | <i>Cassia fistula</i> L.                          | Bahava       | Fabaceae      |
| 15      | <i>Cassia siamea</i> Lam.                         | Kasovel      | Fabaceae      |
| 16      | <i>Citrus aurantifolia</i> (Christm.JDanz.) Swing | Limbu        | Araceae       |
| 17      | <i>Cycas revoluta</i> .                           | Cycus        | Cycadaceae    |
| 18      | <i>Delonix regia</i> (Hook.) Raf.                 | Gulmohar     | Cesalpinaceae |
| 19      | <i>Ficus benghalensis</i> L.                      | Banyan       | Moraceae      |
| 20      | <i>Hibiscus rosa-sinensis</i> L.                  | China rose   | Malvaceae     |
| 21      | <i>Ixora coccinea</i>                             |              | Rubiaceae     |
| 22      | <i>Jasminum auriculatum</i> Vahl.                 |              | Oleaceae      |
| 23      | <i>Kalanchoe pinnata</i> (Lam.) Pers.             | Panphuti     | Crassuliaceae |
| 24      | <i>Lantana camara</i> L.                          | Ghaneri      | Verbanaceae   |
| 25      | <i>Mangifera indica</i> L.                        | Mango        | Anacardiaceae |
| 26      | <i>Mirabilis jalapa</i> L.                        | Gulbakha     | Nyctaginaceae |
| 27      | <i>Nerium indicum</i> Mill.                       | Kanher       | Arocauraceae  |
| 28      | <i>Ocimum tenuiflorum</i> L.                      | Tulsi        | Lamiaceae     |
| 29      | <i>Ocimum</i> sp.                                 | Kapurtulsi   | Lamiaceae     |

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|    |                                     |                    |                       |
|----|-------------------------------------|--------------------|-----------------------|
| 30 | <i>Plumeria alba L.</i>             | <i>Pagoda tree</i> | <i>Apocynaceae</i>    |
| 31 | <i>Pongamia pinnata (L.) Pierre</i> |                    | <i>Fabaceae</i>       |
| 32 | <i>Withaniasomnifera (L.) Dunal</i> |                    | <i>Solanaceae</i>     |
| 33 | <i>Aegalmarmelos( L.)Carr.</i>      | <i>Bel.</i>        | <i>Rutaceae</i>       |
| 34 | <i>Cassia fistula.L.</i>            | <i>Bhava</i>       | <i>Cesalpinaceae</i>  |
| 35 | <i>Jasminumauriculatum</i>          | <i>Jai</i>         | <i>Oleaceae</i>       |
| 36 | <i>Lantana camera L.</i>            | <i>Ghaneri</i>     | <i>Verbanaceae</i>    |
| 37 | <i>Nerium indicum mill.</i>         |                    | <i>Apocynaceae</i>    |
| 38 | <i>Nyctanthesarbortritis L.</i>     | <i>Parijat</i>     | <i>Oleaceae</i>       |
| 39 | <i>Ocimumtenuiflorum</i>            | <i>Tulsi</i>       | <i>Lamiaceae</i>      |
| 40 | <i>Tinosporacordifolia</i>          |                    | <i>Menispermaceae</i> |
| 41 | <i>Vitis quadrangulis</i>           | <i>Khandvel</i>    | <i>Vitaceae</i>       |

**Table 2:** Common animals and birds in the campus

| S. no. | Name of the Fauna            | Common Name     |
|--------|------------------------------|-----------------|
| 1      | <i>Canislupusfamiliaris</i>  | Dog             |
| 2      | <i>Felis catus</i>           | Cat             |
| 3      | <i>Oryctolagus cuniculus</i> | Rabbit          |
| 4      | <i>Cygnus</i>                | Swan            |
| 5      | <i>Sciuridae</i>             | Squirrel        |
| 6      | <i>Rhopalocera</i>           | Butterfly       |
| 7      | <i>Rana tigrina</i>          | Frog            |
| 8      | <i>Lumbricina</i>            | Earthworm       |
| 9      | <i>Testudines</i>            | Turtle          |
| 10     | <i>Cavia porcellus</i>       | Guinea Pig      |
| 11     | <i>Psittaciformes</i>        | Parrot          |
| 12     | <i>Ovis Aries</i>            | Sheep           |
| 13     | <i>Capra Hircus</i>          | Goats           |
| 14     | <i>Cercopithecidae</i>       | Monkey          |
| 15     | <i>Apis</i>                  | Honey Bee       |
| 16     | <i>Formicidae</i>            | Ant             |
| 17     | <i>Coccinellidae</i>         | Ladybird beetle |
| 18     | <i>Chiroptera</i>            | Bat             |
| 19     | <i>Passeridae</i>            | Sparrow         |
| 20     | <i>Acridotheres tristis</i>  | Myna            |
| 21     | <i>Pavocristatus</i>         | Peacock         |
| 22     | <i>Isoptera</i>              | Termite         |
| 23     | <i>Hirudomedicinalis</i>     | Medicinal leech |
| 24     | <i>Lacertilia</i>            | Lizard          |
| 25     | <i>Chamaeleonidae</i>        | Chameleon       |

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|    |                       |             |
|----|-----------------------|-------------|
| 26 | Periplaneta Americana | Cockroach   |
| 27 | Araneae               | Spider      |
| 28 | Scorpionoidea         | Scorpion    |
| 29 | Caelifera             | Grasshopper |
| 30 | Serpentes             | Snakes      |

### Future scope of informative garden development:

- To start Green campus Initiative for the institute
- Naming plants with displaying common and scientific names
- Information of plants in both English and local language
- Increase number of medicinal plants



Figure 2: Plants in campus

### 3. Present Energy consumption and conservation measures:

At present approximate annual need of electricity of the college is 215248 KWH. Electricity utilized for operating various laboratory equipment, computers, lighting, cooling systems such as refrigerator in few rooms, fans and exhausts and copying machines at office and examination room etc. Wherever possible energy efficient devices are being used by the institute. Classrooms are provided with broad windows for natural lighting and ventilation thereby reducing power consumption. In order to save electricity, reduce power consumption aiming to energy compliance and green approach, solar panel systems are installed on the roof top of the institute building.



**Figure 3: Rooftop Solar Panel**



**Figure4: Large windows provided for natural ventilation reducing power consumption**

#### **4. Present water consumption and conservation measures:**

Monthly average water consumption of the Institute is 5000 Liters. Use of water is for toilets, washing, laboratories and gardening. Purified drinking water facility is provided on the campus for students and staff. Institute has facilitated drinking water by Reverse Osmosis (R. O.) processes used throughout the year. Bore wells, which is a natural source of water available for the complete year. Flow of the water is made towards the bore recharge place by using paverblocks. Following measures are being taken to save water:

- Leakages are fixed to reduce waterwaste.
- Drip irrigation is implemented for usage of water in economicalway.
- Pieces of bricks and coir used for filling earthen pots to check water evaporation and mulching of flower beds to reduce waterusage.

### **5. Present fuel consumption and conservation measures:**

Conventional fuel in the form of petrol, diesel is required mainly for institute vehicles and electricity generator and the average monthly consumption of diesel is 2023 L. The separate transport department is in process to carry out regular periodic maintenance of the vehicles. The respective employees are further instructed to drive the vehicles with maximum efficiency at optimum speed to save fuel and avoid overconsumption. Generator set of 3500 W is used during power failures using diesel oil.

### **6. Environmental management:**

The very good location of Raipur Institute of Technology, Raipur (CG) inspires all to remain eco-friendly. Devoid of city environment, the staff and students enjoy the ambience intimately in the college campus. The campus is green and eco-friendly. Plant saplings have been planted in and around the campus to maintain its green landscape. The institute always inculcates the green practices with awareness on the importance of tree to maintain green landscape. Organic Garden is maintained in the college campus. Besides that, the institute puts in conscious efforts to enhance and nurture the eco-friendly environment in the campus. All possibilities of enriching environment are constantly explored and implemented in planned way. About energy utilization and its conservation, continuous awareness is being maintained by all in the campus to reduce the consumption of electricity. The solar panels are installed over the roof to compensate power requirements of the college. Our campus is strictly tobacco free. Waste management is very important to maintain an ecofriendly campus.

### **7. Waste collection and disposal:**

At this institute, activities pertaining to keep the environment green and pollution free are encouraged and best efforts are applied to manage the wastes. The waste management plans are as follows:

#### **Solid Waste Management**

Based on green initiative, our college follows a strong waste management system and strives hard to make the campus pollution free and green. Dedicated staffs are involved in maintaining the

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college campus and hostels clean and tidy. Biodegradable wastes are collected and organically treated. Our college administrative process is strongly supported with paperless run system. Usage of papers is very minimum and generally not wasted. Wherever possible, the communications are sent through email or WhatsApp so that paper usage is avoided at large. Our endeavor is to improve our academic system on maintaining the documents in soft copies. Non-biodegradable wastes such as metals and other scraps are comparatively less in our campus. Wooden wastes are effectively re-used by the in-house carpenter. Our approach is to make it a plastic free campus. The usage of plastics in the campus is generally less. In particular, in cafeteria and hostel mess, the use of plastics is normally avoided and everybody is encouraged to follow the same under the continuous effort through NSS program on making the campus, a plastic free zone. We strive to make our college as a 100% plastic free campus in the near future following Swachhh Bharat initiatives of the Government.

### **Liquid Waste Management**

The institute has a strong inclination towards the water conservation and prevention of water wastage in the campus. The College is in process to contemplate installing the water usages in optimum mode to minimize the waste water generation.

### **E-Waste Management**

Generation of e-wastes in our college is still less. The computers, printers, laboratory equipment etc. are periodically serviced and maintained properly. They are dumped only when they are broken completely which is very less in our campus. Once sufficient quantities of e-wastes are collected, it will be stored securely till further necessary instruction as per statutory norms.

## **8. Efforts to sensitize students and staff:**

### **Awareness creation to avoid misuse of resources**

Institute through its mandatory activities promotes displaying notices of Do's and Don'ts in canteen and various places where water is used. Periodic checkup of conduits for leakages is carried by concerned department in anticipation. Various occasional events are observed for staff and students to commemorate importance of water.

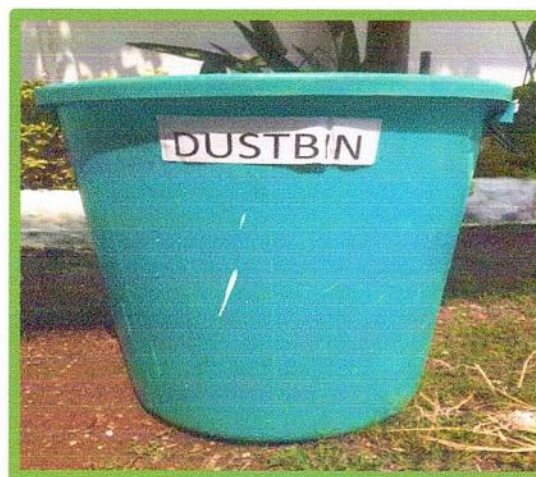
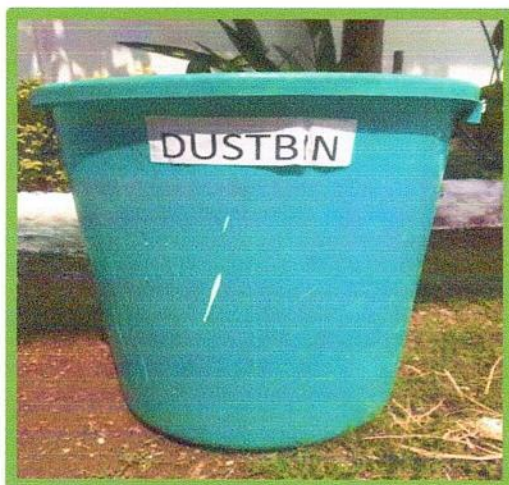


Figure 5:Dustbin in college

### **Awareness in students about environmental issues:**

Awareness in any person is result of education and knowledge. When it is given through explanatory ways using day today illustrations it helps to makes him wise and decisive.

Curriculum of all branches has compulsory environmental subject as per University. It helps to create awareness through education in students and help them to think about environmental problems and green initiatives for sustainable life system and emphasizes understanding relation with nature and its influence on mankind and vice a versa. This helps them to nurture interest in nature and its connectivity to mankind is understood. It builds critical thinking skills and helps students make informed and responsible decisions. Visual aids are used to videos on Environmental issues such as global warming, deforestation, acid rain and with other relevant themes. It help raise awareness in students about environmental issues which depicts through discussion and interactions.

Visual aids help to educate and sensitize students on environmental matters. It also creates eco-friendly attitude among them. Interaction with students about their perspective on these issues and problem solving is carried out.

Further college has established NSS wing through which various programs are organized in order to inculcate the environmental awareness. Listed below are the activities carried out by the institution in order to maintain Green Campus.

- Bright idea on energy conservation or renewable energy on 23/02/2019 and 28/02/2020.

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- Swachhata rally in Chhatauna village on 2<sup>nd</sup> October 2019.
- Dengue awareness rally on 25<sup>th</sup> august 2018 in Chhatauna village.
- Tree plantation program in 24/08/2018.
- Biodiesel plant and biogas plant in college campus.
- Use of non-conventional energy like solar panel at roof top in college building.
- No plastic awareness program on 12/10/2019.
- International conference on “Emerging challenges and issues in environmental protection” on 23<sup>rd</sup> and 24<sup>th</sup> 2014.

### **9. Some outcomes of all these practices:**

- Rise in green cover on campus.
- Water independence in maximum days in the year.
- Awareness in students about conservation of nature and energy utilization, consumption and conservation.
- Decreased fuel usage.
- Decrease in pollution due to decreased fuel usage.

### **10. Green initiative and social awareness for environmental sustainability:**

It is known that Bhabha Atomic Research Center (BARC) is a pioneer Research Institution to reckon with commanding its prestige, fame and credibility worldwide. Its area of research is wide spread, over variety of domains, from coveted atomic energy to agriculture related areas down to biogas under non-conventional energy sources. BARC has active groups for Research and Development in Reactor Technologies, Fuel reprocessing and waste management, Isotope Applications, Radiation Technologies and their application to health, agriculture and environment, Accelerator and Laser Technology, Electronics, instrumentation and reactor control and Materials Science. Strong emphasis on basic and applied research in a number of core disciplines of Science has made synergy between basic research and technology development possible.

It has undertaken an ambitious mission of developments at village level, transforming lives of rural population. In course of dissemination of such technologies to help improved day to day life of our villagers/deprived poor people, BARC has chosen an institution of educational excellence

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namely Raipur Institute of Technology(RITEE), Raipur and signed a Memorandum of Understanding with it for making Chhattisgarh rural population alive to effective technologies to improve their life in real terms.

Inching towards the mission, DTDDF Center of BARC at Raipur Institute of Technology, Near Mandir Hasaud, has undertaken use of following technologies for awareness and training amongst rural population:

- Fluoride detection and associated testing kit
- Soil organic carbon detection and testing kit
- On-line domestic water purifier based on ultrafiltration polysulfone membrane

In addition, an sincere effort is being carried out at the institute followed under DST project to meet up the energy demand for the production of bio-oil / bio-diesel and biogas as a green approach.

Jatropha oil is produced from the seeds of the Jatropha carcass, a plant that can grow in wastelands across India and the oil is considered to be an excellent source of bio-diesel and also it is a non-edible plant. At first step, the jatropha seeds are fed into the oil extraction unit to extract jatropha oil and DOC comes out as the by-product. Then, the oil is sent to the conversion reactor to get crude oil. The seeds are passed through the steam in order to increase the yield of biooil from the seeds. The crude oil is then processed through intensification to get the desired product.

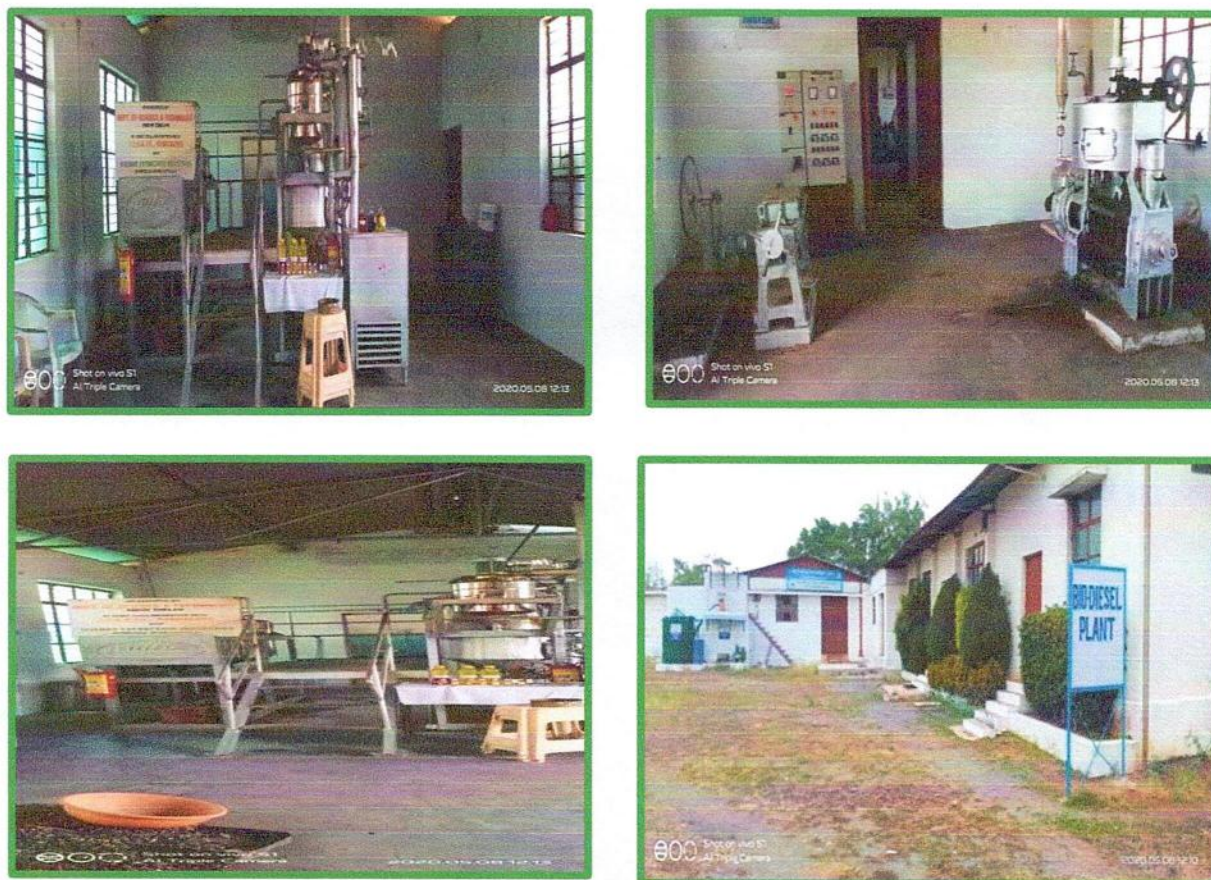
DOC obtained as the by-product from the oil extraction unit is mixed with water and fed into the anaerobic digester. In the digester, through the anaerobic digestion process, biogas is being produced as the main product and sludge as the by-product. The sludge obtained is further used as a soil conditioner. The above effort is in turn showing a Green Philosophy towards the energy demand.



**Figure6: BARC Centre at campus**



**Figure7: Biodiesel Plant location at campus**



**Figure8: Biodiesel Plant at campus**

### **11.Future efforts and continuation of these practices:**

Institute giving its prime importance to Environmental elements and social responsibility strives to improve its green performance continuously. Future endeavor will be for development with resource conservation, recycling, waste reduction, and environmentally sound practices.

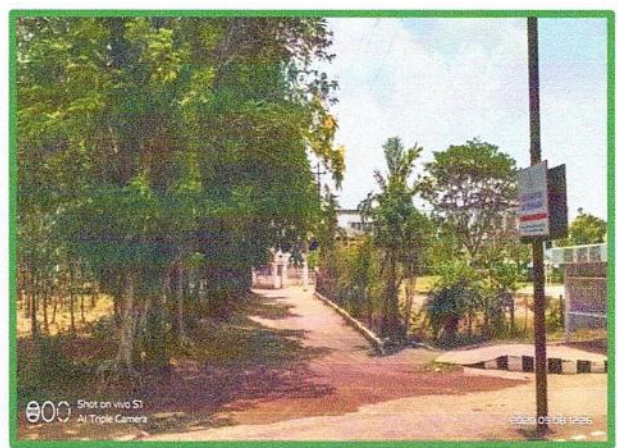
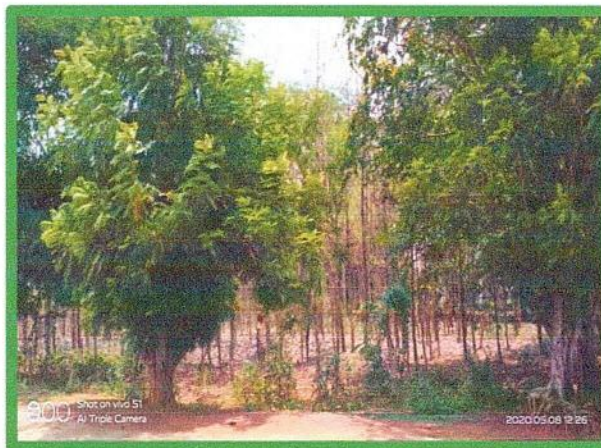
#### **Green Audit recommendations to be implemented**

- Electronic chokes in tubelights
- Replacement incandescent tube lights with LED tubelights
- LCD monitors in place of CRT

## Green Audit

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- Medicinal Plant Committee
- Spring loaded stoppers to minimize water loss
- Mock drills for switching off electrical equipments
- All waste recycling through write off
- Replacement of resistance regulator with electronic regulator



**Figure 9: Trees in the campus**

## Green Audit

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### AUDIT COMMITTEE

| S.no. | Name                                          | Designation                                                                                                                                                                             |
|-------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Prof. Anil Kumar Sharma<br>(External Auditor) | Former Member Secretary, Chhattisgarh Environment Conservation Board<br>Chairman, IIE (India) Chhattisgarh State Centre<br>Chairman, Institution of Water and Environment, Chhattisgarh |
| 2     | Dr. D. Mukhopadhyay                           | Professor & Principal, RIT, Raipur                                                                                                                                                      |
| 3     | Dr. Vaishali Pendse                           | Coordinator & Associate Professor                                                                                                                                                       |
| 4     | Mr. Mukesh Thite                              | Associate Professor                                                                                                                                                                     |
| 5     | Mr. Uma Shankar Patel                         | Assistant Professor                                                                                                                                                                     |
| 6     | Mr. Shiv Kumar Shrivastava                    | Assistant Professor                                                                                                                                                                     |
| 7     | Mr. Niranjana Pandit                          | Assistant Registrar                                                                                                                                                                     |

