



ସରକାରୀ ସ୍ୱୟଂଶାସିତ ମହାବିଦ୍ୟାଳୟ, ରାଉରକେଲା
GOVERNMENT AUTONOMOUS COLLEGE, ROURKELA
Sundargarh, Raghunathpali, Rourkela, Odisha



GOVERNMENT AUTONOMOUS COLLEGE

GREEN AUDIT REPORT

2021-2022

PREPARED BY
EHS ALLIANCE SERVICES

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CERTIFICATE



CERTIFICATE

PRESENTED TO

GOVERNMENT AUTONOMOUS COLLEGE

Raghunathpali, Rourkela, Odisha 769004

Has been assessed by EHS Alliance Services for the comprehensive study of environmental impacts on institutional working framework to fulfill the requirement of

GREEN AUDIT

ACADEMIC YEAR 2021-22

The green initiatives carried out by the institution have been verified on the report submitted and was found to be satisfactory.

The efforts taken by the management and the faculty towards environment and sustainability are appreciated and noteworthy.

A handwritten signature in blue ink, appearing to read 'Uday'.

SIGNATURE



15.09.2022

DATE OF AUDIT

EHS ALLIANCE SERVICES, PLOT A-72, SURYA VIHAR, GURUGRAM, 122001
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ACKNOWLEDGEMENT

EHS Alliance Services would like to thank the management of Government Autonomous College for assigning this important work of Green Audit. We appreciate the co-operation to the teams for completion of assessment.

We would also like to thank **Dr. Lichita Patro (Asst. Professor, Department of Botany) – Audit Coordinator**, for her continuous support and guidance, without which the completion of the project would not have been possible. We are also thankful to other staff members who were actively involved while collecting the data and conducting field measurements.

We are also thankful to

Smt. Rameshwari Bhoi

Asst. Professor - Department of Political Science

Dr. Pratap Kumar Swain

Asst. Professor - Department of Chemistry

Mr. C. P. Ranjan

Asst. Professor - Department of Political Science

Last but not the least, we would like to thank **Dr. Bijaya Kumar Behera - Principal** for giving us an opportunity to evaluate the environmental performance of the campus.



DISCLAIMER

EHS Alliance Services Audit Team has prepared this report for Government Autonomous College based on input data submitted by the representatives of college complemented with the best judgment capacity of the expert team.

While all sensible care has been taken in its preparation, details contained in this report have been compiled in good faith based on information gathered.

It is further informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

If you wish to distribute copies of this report external to your organisation, then all pages must be included.

EHS Alliance, its staff and agents shall keep confidential all information relating to your organisation and shall not disclose any such information to any third party, except that in the public domain or required by law or relevant accreditation bodies.

EHS Alliance staff, agents and accreditation bodies have signed individual confidentiality undertakings and will only receive confidential information on a 'need to know' basis.



Signature

LEAD AUDITOR

CONCEPT AND CONTEXT

The National Assessment and Accreditation Council, New Delhi (NAAC) has made it mandatory from the academic year 2019–20 onwards that all Higher Educational Institutions should submit an annual Green, Environment and Energy Audit Report. Green Audit is assigned to the Criteria 7 of NAAC, National Assessment and Accreditation Council which is a self-governing organization of India that declares the institutions as Grade A, Grade B or Grade C according to the scores assigned at the time of accreditation. 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 an external environment assessment study by a competent external professional auditor. The green audit aims to examine environmental practices within and outside the college campus, which impact directly or indirectly on the atmosphere. Green audit can be defined as systematic identification, quantification, recording, reporting and analysis of components of college environment. It was initiated with the intention of reviewing the efforts within the institutions whose exercises can cause risk to the health of inhabitants and the environment.

Through the green audit, a direction as how to improve the structure of environment and inclusion of several factors that can protect the environment can be commenced. This audit focuses on the Green Campus, Waste Management, Water Management, Air Pollution, Energy Management & Carbon Footprint etc. being implemented by the institution. The concepts, structure, objectives, methodology, tools of analysis, objectives of the audit as below:



INTRODUCTION

Now a days, the educational institutions are becoming more thoughtful towards the environmental aspects and as a result new and innovative concepts are being introduced to make them sustainable and eco-friendly. To preserve the environment within the institution, a number of viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the saving the energy, waste recycle, water consumption reduction, water harvesting and many more...

The activities carried out by the institution can also create adverse environmental impacts. Green audit is defined as an official inspection of the effects a college has on the environment. Green Audit is conducted to evaluate the actual scenario at the institution campus. Green audit can be a useful tool for a university /college to determine how and where they are using the most of the energy or water or resources; the institution can then decide how to implement changes and make savings. It can also be used to determine the nature and volume of waste, which can be used for a recycling project or to improve waste minimization plan.

Green auditing and the application of mitigation measures is a win-win situation for all the institutions, the learners and the mother earth. It can also result in health awareness and can promote the environmental awareness, values and beliefs. It provides a better understanding to staff and students about the Green impact on institution. Green auditing also upholds financial savings through reduction of resource usage. It gives an opportunity to the students and teachers for the development of ownership of the personal and social responsibility. The audit process involves primary data collection, site walk through with the team of university /college including the assessment of policies, activities, documents and records.



OVERVIEW OF THE COLLEGE

The College started as Rourkela Science College from 16 th August, 1961 and was taken over by Government Odisha on 01-07-1963. With the vertical academic growth of the College was conferred with autonomous status in 2002. In the year 2002 the College was accredited by NACC with Grade-B. The College offer variety of Courses at different levels. Besides Art, Science and Commerce at Higher Secondary and Degree levels the College also offers Master Degree in 17 subjects and M.Phil in 03 subjects i.e. Botany, English and Odia. M.Sc in Computer Science, Maste in Commerce, Degree Courses in Computer Science, Electronics and Tele-Communication(ETC), Mathematics with Computer(MTC), PGDCA, PGDCH come uner Self-finance courses. The College also offers various Degree and P. G. level Courses under Odisha State Open University. The College has been also provided separate Rooms for IGNOU Study Centre. As per the Circular of the Department of Higher Education Government of Odisha the College now stands Bi-furcated in to the Government Autonomous College, Rourkela with effect from Academic Session 2001-2002. Ironically the number of staff both teaching and non-teaching have gone-down after it was Autonomous. There by the Classes are engaged by Guest faculty who are engaged time to time.

The College has not received any UGC grant for last three years. Remuneration for non-teaching is paid from the fee collected from the students, as there is no special grant for the Government for this purpose. This has been a hindrance in achieving our mission of academic excellence to make this premier Institute , a centre of quality learning by training the students to be creative and competitive enough to face the challenges of the new millennium.



MISSION & VISION

MISSION

To achieve Academic Excellence by giving impetus and adapting to measures for Enhancing Effective Quality Sustenance and Progression on all key facets of Education. Providing a Dynamic and Conducive Environment for all in order to Inculcate, Infuse, Imbibe, Equip and Disseminate Value Oriented Learning, Creativity, Innovation, Societal Consciousness to achieve Sustainable Livelihood.

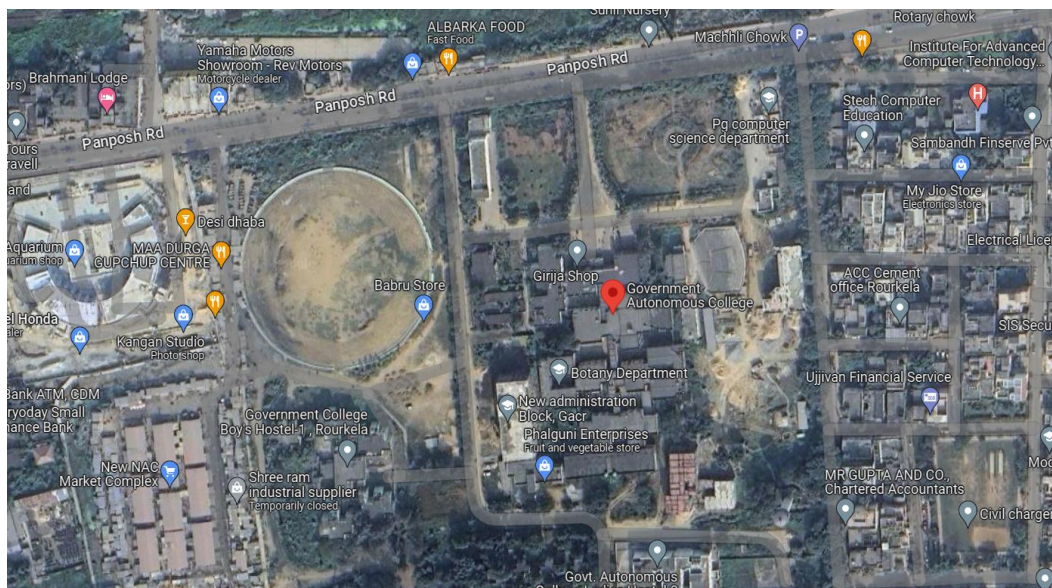
VISION

To achieve Academic Excellence by giving impetus and adapting to measures for Enhancing Effective Quality Sustenance and Progression on all key facets of Education. Providing a Dynamic and Conducive Environment for all in order to Inculcate, Infuse, Imbibe, Equip and Disseminate Value Oriented Learning, Creativity, Innovation, Societal Consciousness to achieve Sustainable Livelihood.

Geo Location

Geo Coordinates from Google maps:

22.2263719, 84.8062211



AUDIT PARTICIPANTS

On behalf of Government Autonomous College

| Name | Designation |
|-------------------------------------|--|
| Dr. Bijaya Kumar Behera | <i>Principal</i> |
| Smt. Rameshwari Bhoi | <i>Asst. Professor - Department of Political Science</i> |
| Mr. Choudhury Pardosh Ranjan | <i>Asst. Professor - Department of Political Science (IQAC Coordinator)</i> |
| Dr. Smruti Snigdha Mishra | <i>Asst. Professor - Department of Chemistry</i> |
| Mr. Sameer Saurava Prusty | <i>Asst. Professor - Department of Zoology</i> |
| Dr. Pratap Kumar Swain | <i>Asst. Professor - Department of Chemistry</i> |
| Dr. Bishwanath Parija | <i>Asst. Professor - Department of Physics</i> |
| Dr. Parbhudutta Mohanty | <i>Asst. Professor - Department of Computer Science</i> |
| Dr. Niranjana Sahu | <i>Asst. Professor - Department of Physics</i> |
| Dr. Lichita Patro | <i>Asst. Professor - Department of Botany</i> |
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| Mr. C. P. Ranjan | <i>Asst. Professor - Department of Political Science</i> |
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| Ms. Usharani Sethi | <i>Asst. Professor - Department of Commerce</i> |

On behalf of EHS Alliance Services

| Name | Position | Qualifications |
|--------------------------|--------------|--|
| Dr. Uday Pratap | Lead Auditor | <i>Ph.D. , PDIS, QCI – WASH, Lead Auditor ISO 14001:2015</i> |
| Ms. Pooja Kaushik | Co-Auditor | <i>M.Sc., Field Expert, QCI – WASH</i> |

EXECUTIVE SUMMARY

Green auditing is an essential step to identify and determine whether the institutional practices are sustainable and ecological. Traditionally, we were upright and efficient users of natural resources. But over the period of time, excessive usage of resources like water, electricity, petrol, etc. have become habitual for everyone especially, in urban and semi-urban areas. It is actually the right time to check if we (our process) are consuming more than required resources? Whether we are using resources sensibly?

Green audit standardizes all such practices and provides an efficient way to use natural resources. In the time of climate change and resource exhaustion it is necessary to re-check the processes and convert then in to green and sustainable. Green audit provides an approach for the same. It also increases overall awareness among the folks working in institution towards the eco-friendly environment.

This is the first attempt to conduct green audit of this campus for fulfilment of NAAC criteria. This audit was mainly focused on greening indicators like consumption of energy in terms of electricity and fossil fuel, quality of soil, water usage, vegetation, waste management practices and carbon foot print of the campus. Initially a questionnaire was shared to know about the existing resources of the campus and resource consumption pattern of the students and staff in the campus.

GREEN AUDIT - ANALYSIS

1.1 GENERAL INFORMATION

1. Does any Green Audit conducted earlier?

No, this is the first external audit organized by the College

2. What is the total strength (people count) of the Institute?

Students

Male: 1032 Female: 1268 Total: 2300

Teachers (including guest faculty)

Male: 48 Female: 58 Total: 106

Non-Teaching Staff

Male: 32 Female: 13 Total: 35

Total Strength

Male: 1112 Female: 1339 Total: 2451

3. What is the total number of working days of your campus in a year?

There are two hundred and twenty four working days in a year.

4. Where is the campus located?

The campus is located at Raghunathpali, Rourkela, Odisha 769004 (India)

5. Which of the following are available in your institute?

| | |
|------------------------------------|----------------------|
| <i>Garden area</i> | <i>Available</i> |
| <i>Playground</i> | <i>Available</i> |
| <i>Kitchen</i> | <i>Available</i> |
| <i>Toilets</i> | <i>Available</i> |
| <i>Garbage Or Waste Store Yard</i> | <i>Available</i> |
| <i>Laboratory</i> | <i>Available</i> |
| <i>Canteen</i> | <i>Available</i> |
| <i>Hostel Facility</i> | <i>Available</i> |
| <i>Guest House</i> | <i>Not Available</i> |

6. Which of the following are found near your institute?

| | |
|--------------------------------------|--|
| <i>Municipal dump yard</i> | <i>Not in vicinity of institute</i> |
| <i>Garbage heap</i> | <i>No Garbage heaps</i> |
| <i>Public convenience</i> | <i>Public convenience is available</i> |
| <i>Sewer line</i> | <i>Approximately 2.0 KM sewer line within campus</i> |
| <i>Stagnant water</i> | <i>No stagnant water</i> |
| <i>Open drainage</i> | <i>No</i> |
| <i>Industry – (Mention the type)</i> | <i>No</i> |
| <i>Bus / Railway Station</i> | <i>Rourkela Bus Stop, Rourkela Junction Station</i> |
| <i>Market / Shopping complex</i> | <i>Available</i> |

1.2 WASTE MINIMIZATION AND RECYCLING

1. Does your institute generate any waste? If so, what are they?

Yes, Solid waste, Canteen waste, paper, plastic, horticulture, laboratories waste, e-waste, etc.

2. What is the approximate amount of waste generated per day? (in Kg approx.)

*Biodegradable waste - 40 Kg
Non-biodegradable waste -5 Kg
Hazardous Waste - 2 Kg
Others < 1 Kg*

3. How is the waste managed in the institute? By Composting, Recycling, Reusing, Others (specify)

Government Autonomous College is using composting for solid waste management, rainwater storage tanks are there for water conservation. Lab waste is managed through defined SOP.

4. Do you use recycled paper in institute?

No

5. How would you spread the message of recycling to others in the community?

College is spreading the awareness about recycling through different activities and campaigns to students, staff and local nearby villages

6. Can you achieve zero garbage in your institute? If yes, how?

Not yet achieved.

1.3 GREENING THE CAMPUS

1. Is there a garden in your institute?

Yes, about 217796.96 sq. ft areas are developed as Gardens.

2. Do students spend time in the garden?

Yes, students spend around 2-4 Hours during winters.

3. Total number of Plants in Campus?

| <i>Plant type with approx. count</i> | |
|--------------------------------------|-------------------------|
| <i>Full grown Trees</i> | <i>544</i> |
| <i>Small Trees</i> | <i>993</i> |
| <i>Hedge Plants</i> | <i>9986</i> |
| <i>Grass Cover sqm</i> | <i>217796.96 sq. ft</i> |

4. Is the College campus having any Horticulture Department? (If yes, give details)

Yes, 2 staff (maali) deployed in horticulture department

5. How many Tree Plantation Drives organized by campus per annum?

*Two plantation Drives are carried out annually.
Survival rate is more than 75%.*

6. Is there any Plant Distribution Program for Students and Community?

No

8. Is there any Plant Ownership Program?

No

1.4 WATER AND WASTEWATER MANAGEMENT

1. List uses of water in your institute

Basic use of water in campus:

Drinking – 59.02 KL/month

Gardening – 509.90 Kl/month

Kitchen and Toilets – 454.66 KL/month

Others – 151.14 KL/month

Hostel – 1876.50 KL/Month

Total = 3051.21 KL/Month

2. How does your institute store water? Are there any water saving techniques followed in your institute?

College stores water in underground and overhead tanks.

Saving Techniques

- *Avoid overflow of water-controlled valves are provided in water supply system.*
- *Close supervision for water supply system.*

3. Locate the point of entry of water and point of exit of waste water in your institute.

Entry - Water comes from Municipal corporation and borewell

Exit- From Canteen, Toilets, Hostel, bathrooms and Labs through covered drainage which is connected to sewer

4. Write down ways that could reduce the amount of water used in your institute

Basic ways:

- Close the taps after usage
- Water Conservation awareness for new students
- Maintenance and monitoring of valves in supply system to avoid overflow, leakage & spillage

1.5 ANIMAL WELFARE

1. List the animals (wild and domestic) found on the campus (dogs, cats, squirrels, birds, insects, etc.)

20+ dogs, 10 Cats, 20+ butterfly species, 100+ Squirrels and 100+ Birds are found in campus. A variety of bird's species and other flora and fauna are available, so institute is doing their bit for bio diversity conservation.

2. Does your institute have a Biodiversity Program or a KARUNA CLUB?

Yes, Government Autonomous College's Eco club "**Youth Red Cross**" actively organizes awareness through various campaigns and activities including seminars, poster competition, etc.

1.6 CARBON FOOTPRINT - EMISSION & ABSORPTION

1. Electricity used per year - CO2 emission from Electricity

$(\text{electricity used per year in kWh}/1000) \times 0.84$
 $= 234725 / 1000 \times 0.84$
 $= 197.17 \text{ tons}$

2. LPG/PNG used per year - CO2 emission from LPG/PNG

$(\text{LPG/PNG used per year in KG}) \times 2.99$
 $= 6574 \times 2.99$
 $= 19.66 \text{ tons}$

3. Diesel used per year CO2 emission from HDS (Diesel)

$(\text{Diesel used per year in litres}) \times 2.68$
 $= 1745 \times 2.68$
 $= 4.68 \text{ tons}$

4. Transportation per year (car) CO2 emission from transportation (Bus and Car)

There are no college owned vehicles
 $= 0 \text{ tons}$

Total CO2 emission per year cumulative by electricity usage + bus and car is 221.50 tons

CARBON ABSORPTION BY FLORA IN THE INSTITUTION

There are 544 full grown trees and 993 semi grown trees of different species, on the campus spread over 217796.96 sq ft.

Carbon absorption capacity of one full grown tree 22 kg Co₂ Therefore Carbon absorption capacity of 544 full-grown trees $544 \times 22 \text{ kg Co}_2 = 11.98 \text{ tons of Co}_2$.

The carbon absorption capacity of 993 semi-grown trees is 30% of that of full-grown trees. Hence the carbon absorption $993 \times 6.8 \text{ kg of Co}_2 = 6.75 \text{ tons of Co}_2$

There are approximately Hedge Plants 9986 of various species being raised in the gardens and grown in the areas where no buildings are built Carbon absorption of bush plants varies widely with their species. Certain bushes absorb very high level of Co₂ where as some others absorb very low level of Co₂. In the absence of a detailed scientific study, 200g of Co₂, absorption is taken per bush (in consultation with Environmental Science specialists). Based on this, total carbon absorption of bushes is $9986 \times 200 \text{ g} = 2.0 \text{ ton of Co}_2$

The lawns on the campus have buffalo grass, Mexican grass and indigenous grass species and cover a total area of 217796.96 sq. ft. Carbon absorption capacity of a 10 sq. ft. area of lawn is 1 g per day Therefore, carbon absorption by lawn area $217796.96 \times 365 \times 0.1 \text{ g Co}_2 = 7.95 \text{ tons Co}_2$ per year.

Grand total of carbon absorption capacity of the campus is 28.67 tons.

GREEN INITIATIVES

- The institution does composting for organic solid waste management.
- There is ban on single use plastic and plastic crockery in the campus.
- College has a separate storeroom for the safe storage of electronic waste. After a certain interval of time college disposes of the E-waste to concerned agencies through the auction process.
- The college has a rainwater storage system for water conservation
- Personal Vehicles (Students) are not allowed in the campus

RECOMMENDATIONS

- Green building guidelines for future expansion projects of the campus.
- Environmental parameters shall be included in purchase policy to achieve a cradle to grave approach for sustainability.
- College should start the use of Sprinklers gardening purpose
- Increase plantation drives in nearby villages, local bodies, NGO and Municipal Corporation in order to balance the carbon emission and absorption.
- Arrange training programmes on environmental management system and nature conservation for schools and local people.
- College should initiate a practice where all guests should be given a planter as a gift rather than a bouquet of flowers. Also, plantation should be carried out in nearby villages.
- Involve lower hierarchy staff in environmental awareness programmes and campaigns.
- Increase in Environmental promotional activities for spreading awareness at the campus.
- To eliminate the spillage and over usage of water in washbasins, urinals and toilet push taps are highly recommended.
- Enhance recycling. This can be done by creating a group where students can recycle books, personal clothes and other materials for needy students. This can be an initiative under the green program.
- Regular workshops related to Plastic free campus, plantation drives, 3R implementation, e-waste collection, menstrual hygiene, etc. should be carried out
- Messages should be displayed at various locations to Aware the People about Energy Savings

CONCLUSION

This audit involves considerable team discussions and meetings with key staff members on a variety of environmental-related topics. The eco club of Government Autonomous College promotes conservation of resources.

Overall 70% of Government Autonomous College is for landscaping. The college makes a significant effort to act in an environmentally responsible manner and takes into account the environmental effects of the majority of its activities. The recommendations in this report suggests some more ways in which the college can work to improve its practices and develop into a more sustainable institution.

It's important to begin a few things, such as initiating sprinklers for irrigation and conservation awareness message display at different locations in campus. Additionally, we strongly advise to increase awareness amongst the students, staff and local societies for 3R principle and conservation of water and energy.

REFERENCE

- The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
- The Petroleum Act: 1934 – The Petroleum Rules: 2002
- The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle Rules:1989 (Amended in 2005)
- Energy Conservation Act 2010.
- The Water [Prevention & Control Of Pollution] Act – 1974 (Amended 1988) & the Water (Prevention & Control of Pollution) Rules – 1975
- The Air [Prevention & Control Of Pollution] Act – 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules – 1982
- The Gas Cylinders Rules – 2016 (Replaces the Gas Cylinder Rules – 1981
- E-waste management rules 2016
- Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
- The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
- The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
- The Batteries (Management and Handling) rules, 2001 (Amended 2010)
- Relevant Indian Standard Code practices

ANNEXURE –ENVIRONMENT CONSCIOUSNESS PHOTOS



Well ventilated
building structure



Well maintained
college campus



Lush green campus



Sports Ground



Library



smart Classes



Well equipped labs



Auditorium



Cafeteria



Hostel



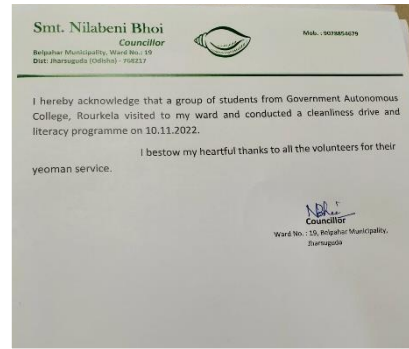
Indoor Plants



Ornamental Plants



Bird nests for biodiversity conservation



Cleanliness drive



Herbal garden



Plantation Drive



Color coded dustbin



Awareness message display

***** **END OF THE REPORT** *****