College of Commerce, Arts and Science

Kankarbagh, Patna-800020

(A Constituent Unit of Patliputra University Patna-20)

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ENVIRONMENTAL POLICY

Preamble: The College of Commerce, Arts & Science, Patna, guided by the motto "Vidya Vinayam Cha," recognizes the imperative need to address environmental and energy concerns in our pursuit of knowledge and excellence. We believe that our commitment to a sustainable and eco-friendly campus will not only serve the current generation but also contribute to a greener future.

Context: The global environment and energy landscape is undergoing rapid changes, necessitating our proactive participation in reducing our ecological footprint and optimizing our energy resources. As a responsible educational institution, we understand the significance of aligning our activities with environmental and energy conservation principles.

Purpose: This policy aims to provide a framework for fostering environmental consciousness and energy efficiency within the College of Commerce, Arts & Science, Patna. It seeks to guide our institution towards responsible and sustainable practices in our day-to-day operations and long-term planning.

Scope: This policy applies to all students, faculty, staff, and stakeholders of the college. It encompasses all aspects of college operations, including but not limited to academic, administrative, and infrastructure functions.

Principles and Objectives:

1. **Conservation**: We shall strive to minimize waste, conserve natural resources, and reduce our environmental impact in all college activities.
2. **Sustainability**: Our commitment to sustainability shall be embedded in curriculum development, research, and college culture.
3. **Energy Efficiency**: We shall aim to reduce energy consumption through responsible usage and implementing energy-efficient technologies.

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4. **Eco-Friendly Practices**: The college shall actively promote recycling, the reduction of single-use plastics, and the use of eco-friendly materials.
5. **Awareness and Education**: We shall educate and raise awareness among students, staff, and the community about environmental and energy issues.

6. **Net zero carbon emission**- The government of India and Bihar is currently working on Net zero carbon emission. We shall put efforts to promote activities to achieve **net zero carbon emission** target by 2070 as announced by the Prime Minister of India at the 26th session of the Conference of the parties (COP26) of the UNFCCC in November, 2021.

The college's environmental policy is pursued through the following priority areas:

1. **Water Management-**

1. Water Use Efficiency: The institution should aim to use the least amount of water possible for its activities. This involves implementing efficient water fixtures and equipment, such as low-flow toilets and faucets, and ensuring that water is used judiciously in all processes.

2. Water Conservation Program: Establish a continuous water conservation program to monitor and track water usage. Regularly check for leaks and excessive or unnecessary water use. This program should include setting benchmarks and goals for reducing water consumption.

3. Rainwater Harvesting: Install rainwater harvesting systems in all campus buildings. This collected rainwater can be used for various purposes, including irrigation, flushing toilets, and ground water replenishment. This reduces the dependence on external water sources.

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4. Groundwater Recharge: Support artificial recharge methods and traditional groundwater recharge processes. This helps maintain and replenish local aquifers, ensuring a sustainable supply of groundwater.

5. Leak Reporting and Repair: Encourage everyone on campus to promptly report any water leaks. Establish a system for immediate repair to prevent water wastage. Employ a caretaker or maintenance team responsible for quick action on leak repairs.

6. Efficient Irrigation Techniques: Promote the use of efficient irrigation techniques in landscaping and gardening activities, such as sprinkler or drip irrigation systems. These methods target water delivery more precisely, reducing water wastage.

7. Toilet Choices: Consider building more Indian-style toilets (squat toilets) rather than western-style toilets. Indian-style toilets typically use less water per flush. Ensure that all toilet fixtures are low-flow to minimize water usage.

8. Grease Trap Mechanism: Implement a grease trap mechanism in the college canteen to prevent the release and mixing of grease from liquid waste into the municipal drainage system. This reduces water pollution and helps maintain water quality.

9. Effluent Water Treatment: Treat effluent wastewater from the college canteen to lower the Biochemical Oxygen Demand (BOD) before discharge. This reduces the environmental impact of wastewater and protects local water bodies.

10. Water quality monitoring within campus for emerging contaminants like pharma-waste, microplastics, nanoplastics, carcinogens etc.

11. Wastewater Reuse: Reuse wastewater created by a reverse osmosis (RO) system in washrooms. Treated wastewater can be used for flushing toilets or other non-potable purposes, conserving fresh water resources.

2. **Energy Audit**: Conduct a comprehensive energy audit to identify areas for energy savings and implement recommendations. To conserve energy, the college has adopted various measures, such as replacing CRT monitors with LCD monitors, using LED

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lighting, introducing automatic street lighting control, upgrading air conditioners for energy efficiency, and utilizing transparent glass windows for natural lighting. Centralized UPS systems and generator placement away from classrooms are part of energy-efficient practices.

3. **Renewable Energy Installation**: Explore the feasibility of solar panel installation on campus for clean energy generation. For this, solar panels have been installed in the campus.

4. **Waste Management**: Develop a waste management plan that includes recycling, composting, and reducing single-use plastics. –

   a) Solid Waste Management: The college focuses on reducing waste generation and implementing the 3Rs (Reduce, Reuse, Recycle). Paper waste is collected and sent to scrap dealers for recycling. The use of paper is minimized through digitization of attendance and assessment records. Awareness campaigns address food wastage and minimizing the use of packaged food.

   b) Liquid Waste Management: The college takes steps to minimize water wastage through prompt plumbing repairs, maintaining leak-proof fixtures, and reusing wastewater from the RO system for gardening.

   c) E-Waste Management: The college handles electronic waste responsibly by maintaining AMC for CPUs and monitors, following expert recommendations for disposal, and selling obsolete but workable computers and equipment as scrap. These e-wastes are deposited to the **karo sambhav** team of Patna located at Boring Canal Road.

5. **Curriculum Integration**: Collaborate with faculty to integrate environmental and energy topics into the curriculum.

6. **Awareness Campaigns**: Organize awareness campaigns, workshops, and events to educate and engage the college community in sustainable practices. The college supports awareness campaigns, seminars, workshops, and interactive sessions to

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engage the campus community in the implementation of its Green Campus, Energy, and Environment policies.

7. **Monitoring and Reporting**: Implement regular monitoring of environmental and energy performance, and report progress to stakeholders.

8. **Clean Campus Initiatives**: The college is actively engaged in coordinating cleanliness activities within and beyond the campus, aligning with the vision of the Swachh Bharat Abhiyan. This includes raising awareness about cleanliness and hygiene through regular drives, rallies, and the active participation of students and staff in cleanliness efforts. The college also organizes events and competitions related to the Swachh Bharat initiative and promotes a pledge to maintain cleanliness.

9. **Clean Air Initiatives**: The college encourages the use of public or college transportation to reduce air pollution and limits the entry of private vehicles within the campus. Smoking and the use of tobacco products are strictly prohibited to maintain a smoke-free campus.

10. **Water Conservation through Rainwater Harvesting**: The college is committed to replenishing the groundwater table through rainwater harvesting, aiding in groundwater recharge.

11. **Paperless Operating Procedure**: The college is making efforts to transition to a paperless environment, adopting digitization and reducing paper usage through various measures, such as digital storage, digital communication, and e-assignments.

12. **Plantation drives**: The college organizes annual plantation drives to decrease carbon footprint and enhance the college ambience.

13. **Plastic-Free Campus**: The college strictly enforces a ban on single-use plastics within its premises and promotes the use of eco-friendly alternatives. Sensitization programs

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and initiatives extend to students and stakeholders to ensure a plastic-free campus and raise awareness about the harmful effects of plastic use.

14. Institutionalise committee for continuous monitoring and formulation of Environmental Policy as per changing needs.

This policy reflects our commitment to uphold the values enshrined in our motto, "Vidya Vinayam Cha," by fostering a culture of environmental consciousness and energy responsibility at the College of Commerce, Arts & Science, Patna. It is a testament to our

dedication to creating a more sustainable and eco-friendlier educational environment. Thus, these multifaceted policies and initiatives demonstrate the college's dedication to sustainability, environmental responsibility, and creating a clean and green campus. The college is actively engaged in implementing practices that contribute to a healthier and more environmentally conscious campus community.

Future Action Plan:

- Reduce energy consumption on campus by increasing the use of renewable energy sources, such as installation of more number of solar panels in the campus.
- Implement waste reduction and recycling programs.
- Incorporate environmental sustainability into the curriculum.
- Regularly monitor and report on environmental and energy performance.
- Focus should be on maximum usage of natural light for illumination and ventilation.
- Reduction of e-waste as much as possible before going on to the Replace & Recycle stage.

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- To save energy, employ occupancy sensors in classrooms, hallways, administrative offices, and toilets, as well as sensor-based switches for streetlights and corridor lighting
- Encourage students to work on UG and PG projects related to energy management, energy optimization techniques, and renewable energy harvesting, in order to raise knowledge about energy usage and cost.
- Provide energy management and energy auditing training to staff and students.
- Develop project-based learning methodologies for energy conservation and management courses in collaboration with industry.
- Promote terrace gardens and vertical gardens in the campus.
- Promote organic fertilizers in the campus.
- To activate vermicompost in the college.
- Careful segregation of chemicals from waste water collected from Chemistry department. For this, Effluent Treatment Plant (ETP) should be installed.
- Use of Vermiwash in botanical gardens and lawns.
- Use of self-irrigation systems that would deliver water directly to plant roots so only one gardener required for irrigation.

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Green Audit/Environmental Audit Report

(2022-2023)

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A Report On

Green Audit/Environmental Audit

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Internal Green Audit Team :-

Dr. Santwana Rani, Dept. of Botany

Dr. Rashmi Ranjana, Dept. of Geography

Dr. Smita Kumari, Dept. of Chemistry

Dr. Vidya Yadav, Dept. of Geography

Dr. Akanksha Priya, Dept. of Botany

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Chapter-1

INTRODUCTION

1.1 Green Audit - An Effective Tool for Sustainable Development

Traditionally, we are good and efficient users of natural resources. However, the rapid urbanization and economic development excessive uses of resources like water, soil, chemicals, energy etc. became habitual which led to several environmental issues like greenhouse effect, global warming, ozone depletion, climate change etc. Now, it became necessary to check the process and consumption of more than required resources for our sustainable future. In the era of degraded environment and climate change, there is need of a tool which can identify and regulate the practices in an organization for use of resources in an efficient way. Green auditing or environmental auditing can identify whether practices in an organization are environment friendly and sustainable.

Green audit is a process of systematic identification, quantification, recording, reporting and analysis of environmentally important component and their monitoring in a particular area. Green audit is the most effective and efficient tool to solve environmental problems of 21st century. Through green auditing, environmental activities are regularly monitored within and outside of the concerned sites which have direct and indirect impacts on the surroundings. The green audit can accounts for land use, water resources, energy consumption, waste management.

1.2 Why Green Audit

In the era of environmental poverty, green audit/environmental audit is one of the important effective tool for its eradication. Green audit can identify whether practices of any organization or institution are sustainable and after verification of the process, they can be converted into green and clean. Through the process of green auditing awareness, sensitivity and ethical values about environmental issues can be promoted among all of the stakeholders.

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1.3 Goals and Objectives

Goals of green audit is identification and documentation of green practices of an organization. Green audit can assess the ground reality and after identifying and analysis of environmental risk and other problems appropriate recommendations are also suggested. It also motivates stakeholders for optimized sustainable use of available resources and promotes sensitization towards our environment. The long term goal of green audit is to collect baseline data of environmental parameters for resolving environmental risk.

The goals of green audit can be achieved by different objectives:-

- Examine the current practices which affect the environment.
- Prepare the environmental statement report of green practices.
- Identify and analyze significant environmental issues.
- Identify methods for cost savings through optimum use, conservation and waste reduction.

1.4 Green Audit to an Educational Institution

Higher educational institutions are playing a key role in the development of human resources. In the campus of these institutions, knowledge along with practical aspect percolate among the society through young minds. Therefore, for making environmental consciousness as habit of our society green audit is urgent and now it became mandatory for educational institutions under criterion VII of NAAC. Green auditing helps institutions to understand various environmental issues of the institution and identifying existing gaps towards meeting the objectives of National Environmental Policy and then plan accordingly.

Green audit serves as a valuable tool to create a green campus by efficient resource management and different types of wastes are managed by reduce, reuse and recycle. It empowers the institutions to frame a better environmental policy for reducing their carbon foot print. It enhances the health consciousness and creates sensitization, ethics and values for environmental issues among students, faculties and staffs.

Green audit is helpful in development of ownership and responsibility for environment of campus of college and evaluate their contribution towards a sustainable future. Apart from this green auditing is also necessary for corporate social responsibility of Higher Educational Institutions.

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1.5 About The College

The College of Commerce, Arts & Science, Patna is a constituent unit of Patliputra University, Patna in the state of Bihar. College was established in 1949 by Pt. Indu Shekhar Jha, the founder principal of the college. He established this college by herculean efforts named College of Commerce at P.N Anglo Sanskrit School Campus, Naya Tola, Patna in a rented house. Initially, only I. Com programme was started. Later on, in 1953. Raja of Pali graciously donated lands to the college and then shifted to Rajendranagar, Patna where it is today. At that time the college was affiliated to Bihar University, Muzaffarpur a new university launched in 1952. In the year of 1957, Science education was introduced in the college and after that Arts in 1960 and Law in 1963.

In the year of 20 the name of college changed to College of Commerce, Arts & Science, Patna. From March 2018, it became a constituent unit of Patliputra University, Patna. The college is re-accredited by NAAC with 'A' grade and imparts quality education since it's inception. The college is celebrating Dimond Jubilee year (2023-24) of establishment.

Along with Conventional courses, the college offers Vocational courses; B.C.A, M.C.A, B.Sc.(I.T), M.Sc.(I.T), M.Sc.(Electronics), B.L.I.S, M.L.I.S, Journalism & Mass Communication, B.Sc.(Bio-Technology), M.Sc.(Bio-Technology), M.B.A, B.B.M, B.Com(Self Financing). Add-on Courses are also offered by the college; Nutrition & Dietetics, Clinical Psychology, Medical Lab Technology and Mass Communication (Certificate & Diploma).

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Chapter-2

GREEN AUDIT METHODOLOGY

The methodology of Green audit comprises of physical inspection, observation, interviewing of stakeholders, data collection and data analysis.

Methodology

Pre audit stage

Audit stage

Post Audit stage

2.1 Pre Audit Stage

A pre audit meeting was held and identified the target areas for green auditing. The target areas are; land use & climatic condition, biodiversity, pollution, water resource and management, energy consumption, waste disposal and management.

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2.2 Audit Stage

Green audit was done by audit team with the help of different student groups, faculties and staffs. The green audit started with reaching of audit team to each department and areas in the campus. The faculties, staffs and others were interviewed to get details of uses, frequencies of certain appliances and resources. Few questionnaires were prepared to be used as survey tools. The collected data were further analyzed.

2.3 Post Audit Stage

The post audit stage includes the production of final report. From the outcomes of overall study action plan is prepared to overcome the gaps. A sincere watch on implementation of action plan is also being kept.

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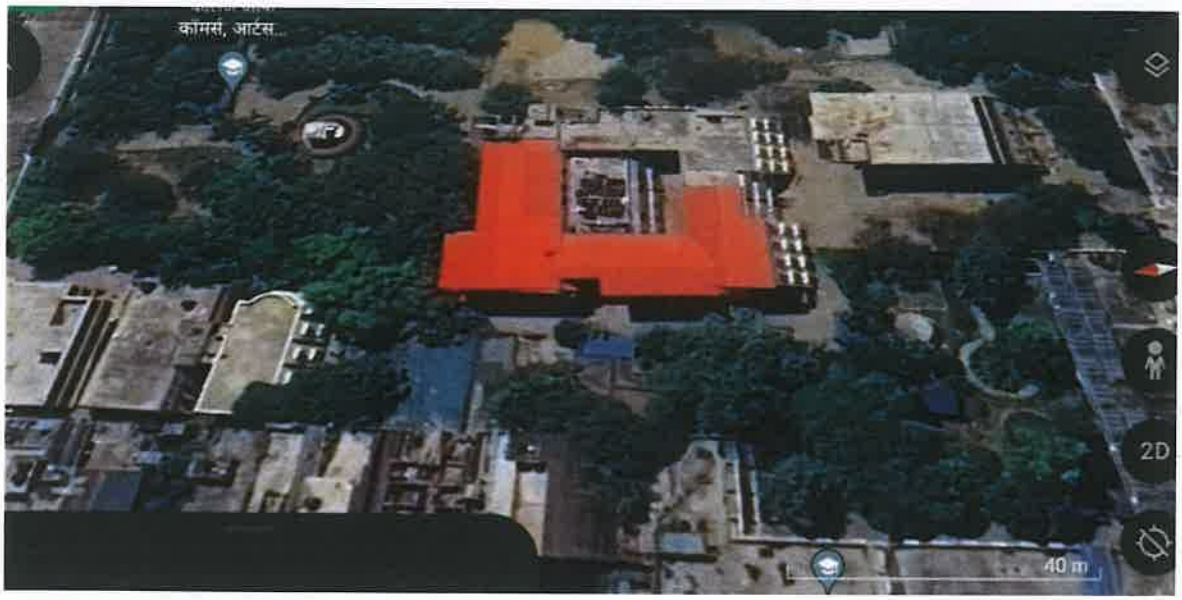
AUDIT REPORT

3.1 Land Use & Climatic Condition Audit

The college is located in front of Rajendra Nagar Terminal Railway Station, Patna in Bihar. Geographically lies between 25.67^0 N and 85.16^0 E. The college has a total 5.83 acre (23836 sq. m) land area. The total build up area is 10896 sq. m which includes academic buildings, administrative building, examination building, auditorium, library, canteen, post office, bank, roads, parking area, waiting area and remaining 12940 sq. m includes garden and green cover. The land of the campus is well utilized and vertical expansion of the campus is going on.



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The built up areas in the campus are-

I. **Academic Buildings** :- There are multi-storey academic buildings; namely Mahatma Gandhi Bhawan, Dinkar Bhawan, CV Raman Bhawan, APJ Kalam technical Bhawan along with few other mid-sized academic buildings.

II. **Administrative Buildings** :- Double storey administrative building; Indushekhar Jha Bhawan is situated in the most northern part of the campus. Principal's chamber, administrative office, IQAC office, Bursar office, a mid-sized conference hall is present in this building.

III. **Auditorium** :- A well equipped and furnished auditorium having a seating capacity of hundreds is situated in the centre of the campus where continuously seminars, conferences, recruitment drives, competitions, cultural activities are held.

IV. **Library** :- A very rich central library is present in the campus where students can sit and study books as well as books are also issued to students. In the academic buildings, departmental library is also functional.

V. **Bank and Post office** :- Near the entrance of the college, there is facilities of bank and post office which provide facilities to students, faculties and staffs of the college.

VI. **Canteen** :- A well maintained canteen with proper hygiene is also available in the campus for students, faculties and staffs.

VII. **Common Rooms** :- Separate common rooms with basic facilities for girls and boys are present in the campus. In girl's common room, sanitary vending machine is installed.

VIII. **Waiting Area** :- A waiting area is available for persons who accompany their wards. Special facilities for senior citizens and differently abled persons are also available.

IX. **Toilets** :- Separate toilets for both girls and boys are available at various locations in the campus.

X. **Sports Ground** :- A small sports ground is available in the campus in which volleyball, kabaddi etc. are regularly organized by the college.

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XI. **NCC & NSS office** :- For overall growth of the students NCC and NSS wing in Mahatma Gandhi Bhawan.

XII. **Sehat Kendra** :- For awareness of mental and physical health in adolescence and youth Sehat Kendra is functioning in Mahatma Gandhi Bhawan.

XIII. **Gardens and Green Cover** :- Most of the area of the college has a lush green flora which adds green cover to the college. Well maintained gardens; botanical garden, NSS garden etc. are present in the campus.

Climatic Condition

The college is located in subtropical zone at the southern Gangatic plain. There are three seasons; Summer, Rainy and Winter. The summer months are extremely hot starts from March to June. Late June to late September are humid rainy season with adequate rainfall. The average rainfall is 120 cm. The winter season includes November to February months. January is the coldest month and temperature falls below 6^0c while May is the hottest month and temperature reaches above 45^0c.

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3.2 Biodiversity Audit

The college is located in subtropical climatic condition and highly fertile alluvial soil is present in the campus. Therefore, sufficient green coverage in the campus can be noticed. Plantation activities are usually undertaken during rainy season along with national festivals, Earth Day, World Environment Day, College Establishment Day, NSS Day etc. Many medicinal plants, herbs, shrubs are planted in the campus. A rich biodiversity is present in the campus which includes various types of flora and fauna.

Table 1, 2, 3 & 4 show the status of floral & faunal diversity in the campus.

Table : 1 List of Trees/ Shurbs/Herbs species which are added in the campus in 2022-2023

Table 1: List of Tree/Shrubs/Herbs species added in the campus (2022-2023)

S.no.	Common name	Botanical name	Quantity
1.	Tulsi	*Ocimum sanctum*	2
2.	Rose	*Rosa sinensis*	5
3.	Giloy	*Tinospora cordifolia*	1
4.	Coleus	*Solenostemon scutellarioides*	1
5.	Periwinkle	*Catharanthus roseus*	1
6.	Foxtail Palm	*Wodyetia bifurcate*	4
7.	Supari	*Areca catechu*	5
8.	Arjuna	*Terminalia arjuna*	5
9.	Gulmohar	*Delonix regia*	2
10.	Sagwan	*Tectona grandis*	5
11.	Thuja	*Thuja occidentalis*	2
12.	Chysenthemun	*Chrysenthemum indicum*	27
13.	Marigold	*Tagetes erecta*	3
14.	Palash	*Butea monosperma*	10
15.	Ashoka	*Saraca asoca*	8

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Table 2: List of Tree/Shrubs/Herbs species added in the Botanical garden (2022-2023)

S.no.	Common name	Botanical name	Quantity
1	Spider lily	*Crinum asiaticum*	2
2	Vicks plant	*Plectranthus tomentosa*	1
3	Karanj	*Pongamia pinnata*	1
4	Elephant apple	*Dillenia indica*	1
5	Lavang	*Syzygium aromaticum*	1
6	Rose	*Rosa sinensis*	4
7	Garden croton	*Codiaeum variegatum*	6
8	Ajwain	*Trachyspermum ammi*	6
9	Snake plant	*Dracaena trifasciata*	3
10	Kalmegh	*Andrographis paniculata*	1
11	Malti	*Combretum indicum*	1
12	Good luck plant	*Crassula ovata*	1
13	Century plant	*Agave Americana*	1
14	Water lettuce	*Pistia stratioes*	1
15	Amla	*Phyllanthus amarus*	3
16	Lemon Grass	*Cymbopogon citratus*	5
17.	Aloe vera	*Aloe barbadensis miller*	5

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Table 3: List of Tree/Shrubs/Herbs species added in other gardens of the campus.

(2022-2023)

S.no.	Common name	Botanical name	Quantity
1	Holy basil	*Ocimum tenuiflorum*	13
2	Rose	*Rosa sinensis*	14
3	Smart weed	*Persicaria species*	17
4	Geranium lemon	*Pelargonium crispum*	16
5	Garden croton	*Codiaeum variegatum*	12
6	Periwinkle	*Catharanthus roseus*	6
7	Chandelier tree	*Pandanus candelabrum*	2
8	Daisy	*Townsendia montana*	3
9.	Hibiscus	*Hibiscus rosa-sinensis*	6
10.	Spider plant	*Chlorophytum comosum*	4
11.	Amla	*Phyllanthus emblica*	3
12.	Bel	*Aegle marmelos*	1
13.	Kamini	*Murraya paniculata*	2
14.	Neem	*Azadirachta indica*	4
15.	Ashoka	*Saraca asoca*	2
16.	Bahera	*Terminalia bellirica*	1

Table 4 : List of Faunal species found in the campus in 2022-2023

S. No.	Common Name	Scientific Name
1.	Crow	*Corvus splendens*
2.	Sparrow	*Passer domesticus*
3.	Parrot	*Psittacula eupatria*
4.	Cuckoo	*Eudynamys scolopaceus*
5.	Pigeon	*Columbia livia*
6.	Plain Tiger butterfly	*Danaus chrysippus*
7.	Grass yellow butterfly	*Eurema hecabe*
8.	Brown butterfly	*Lasiommata megera*
9.	Queen butterfly	*Danaus gilippus*
10.	Garden Tiger Moth	*Arctia caja*
11.	Dragonfly	*Anax indicus*
12.	Housefly	*Musca domestica*
13.	Flower bee	*Anthophera plumipes*
14.	Honeybee	*Apis cerana indica*
15.	Squirrel	*Sciuridae funambulus*
16.	Earthworm	*Lumbricus terrestris*
17.	Black ant	*Camponotus compressus*

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18.	Red ant	*Monomorium pharaonis*
19.	Earthworm	*Lumbricus terrestris*
20.	Lizard	*Hemidactylus frenatus*
21.	Mongoose	*Herpestes edwardsi*
22.	Snail	*Gastropoda*
23.	Mouse	*Mum musculus*
24.	Mosquito	*Culicidae, Culex Anopheles, Aedes*
25.	Cockroach	*Periplaneta orientalis*
26.	Cat	*Felis catus*
27.	Dog	*Canis lupus familiaris*

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3.3 Water Resource Management Audit

Water resource is crucial for survival. It is used in drinking, cooking, cleaning, irrigation in our campus. Several buildings of the campus have overhead water tanks with capacity of 2000 litres. Water purifiers are installed in each departments and offices for drinking purpose. For maximum utilization of water resources, rain water harvesting is done by collecting rain water in rain water harvesting units which is further utilized in watering plants and toilet flushing. Further, ground water is recharged in ground water recharge zone which is established in lowland area of southern-west part of the campus. During monsoon surface runoff accumulate there.

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Table 5 : List of Overhead Water Tank (2022-23)

S.No.	Buildings/ Departments	No. of Overhead Tanks	Capacity of each tank	Power of Pump in kW	Time taken to fill tank & No. of times of Running of pumps Per day	Total time in minutes
1.	Indu Shekhar Jha Administrative Building	1	2000	1	24 Minutes & 3 times	72
2.	Mahatma Gandhi Bhawan	2	2000	1	24 Minutes & 3 times	72
3.	C.V. Raman Bhawan	4	2000	1	24 Minutes & 3 times	72
4.	Dr. N.L. Nadda Vanijya Bhawan	1	2000	1	6 Minutes & 1 times	06
5.	Dinkar Bhawan & Library	2	2000	1	24 Minutes & 3 times	72
6.	Law	1	1000	1	12 Minutes & 2 times	24

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7.	Kautilya Bhawan	2	1000	1	24 Minutes & 3 times	72
8.	Zoology	2	1000	1	24 Minutes & 2 times	48
9.	Biotechnology	1	1000	1	24 Minutes & 1 times	24
10.	Geography & Mass Communication	1	2000	1	24 Minutes & 4 times	96
11.	A P J Kalam technical Bhawan	1	2000	1	24 Minutes & 3 times	72

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3.4 Pollution Audit

The college is situated in the lowland area of Kankarbagh, Patna and very near to railway station. A proposed metro station is also under construction near the college. Patna is one of the most polluted city in Bihar. Our college is also facing different types of pollution.

1. **Water Pollution** :- Water resource is crucial for survival of most of the living beings. Many diseases are caused by polluted water. Water pollution in the campus is monitored regularly by testing different water parameters in chemistry lab. Water purifiers are installed in every department and for drinking water. Water purifiers are installed in every department and admin offices for drinking purpose. Waste water from labs are disposed of carefully and a separate drainage system has developed. Waste water having hazardous chemical are not disposed of in common drainage.

2. **Land pollution**:- Land pollution adversely affects humans, animals and the ecosystem. Due to anthropogenic activities, industrialization, construction works etc. land is being polluted. The contamination of the land are catastrophic for water, soil, air and the whole eco system. So, in the campus we are focusing on proper waste disposal. Separate dustbins are placed throughout the campus for collection of biodegradable and non-biodegradable wastes. Further non-biodegradable waste are collected by PMC for disposal while biodegradable waste are utilized as bio-fertilizer in the campus after vermicomposting. Minimum use of synthetic insecticides, pesticides and fertilizers are practiced in the campus for making soil healthy.

3. **Air pollution**: - Air quality index of Patna is disappointing. The college is situated in the heart of city. In the vicinity of college and also inside the campus construction works are going on. A metro station near to the college is also under construction. Therefore, our campus is also affected by polluted air. But the college has adopted few measures to minimize it. Most of the area of the college has a green cover. For developing further carbon sink, vertical has taken into consideration. Recycled water is sprinkled on the ground especially in summer season to minimize suspended particulate matters in air of campus.

4. **Noise Pollution**: - Noise pollution is that sound energy which has an adverse effect on the health and well-being of human along with other living organisms. The college is situated in densely populated area and there is always heavy traffic near the college.

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Therefore, northern part of the campus is affected by noise pollution on the campus, construction works are going on. So, in few pockets of the campus there is noise pollution. But in most of the parts of campus there is a very calm environment. Most of the students use bicycle, public transport .In order to commute within the campus teachers, staffs and students prefer walking. Silent generators are used for power supply.

3.5 Energy conservation Audit

Energy conservation is one of the most important focus of the college. Energy conservation not only cut the cost but also improve health of environment and contribute in sustainable development. Most of the rooms are well ventilated and sufficient natural lights in rooms. LED bulbs are used and unnecessary extra bulbs are not switch on. Energy efficient appliances, energy star certified AC, refrigerators, water purifier etc. are being used in the campus. The thermostat of AC is maintained up to 24 0 c. All appliances are plug off after their use. Students, Staff and teachers are encouraged for energy conservation. College is also focusing on renewable energy. Solar panels are installed on the roof of Biotechnology Bhawan and plans for more solar panel to be installed in campus. The capacity of the Solar panel is 30KVA which produces power of 30Kw. For energy conservation; college is encouraging use of bicycle, carpooling, bikepooling etc.

Table 6 : Usage of bicycles in the college (2022-23)

Sl. No.	Area	No. of Bicycles
1.	C V Raman Bhawan	20
2.	Kautilya Bhawan	10
3.	Dinkar Bhawan	10
4.	Notice board Area	25
5.	Library	08
6.	Department of Commerce	30
7.	Department of Geography	10
8.	Common Parking Area	75
9.	Others	17
	Total	205

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3.6 Waste Management Audit

A waste management committee is working in college on very concept of reduce, reuse and recycle of wastes. Solid waste generated in campus are biodegradable and non-biodegradable. They are collected separately for proper disposal. Separate dustbins for both types of waste are placed in each department and every corner in the campus. Biodegradable wastes include mostly dry leaves, papers, woods and waste from canteen etc. These are collected by cleaning staff every day and dump to composite site where turn into bio-fertilizer and used into different gardens of the campus. Non-biodegradable wastes like broken chair, table, almirah etc. and e-waste like discarded television, computer, refrigerators and other electronics devices are collected time to time and hand over to agency for recycle and proper disposal. The liquid wastes generated in different labs are firstly diluted and disposed of. Hazardous chemicals are disposed separately and carefully. Single use plastics are avoided in the campus in order to reduce the wastes and protect the environment.

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Chapter 4

GREEN INITIATIVES

4.1 Mitigation and Management of Environmental Degradation

Anthropogenic activities have imbalanced the homeostatis of ecosystem which results degradation of our environment. Higher educational institutes have responsibility to set examples in mitigation and management of environmental degradation as young minds are being trained in these places. Many green initiatives have taken to make each and every stakeholder of the campus environmentally sensitive and responsible person. Some of such practices are as follows :-

(1) Regular plantation and special drive in monsoon season in the campus helps in maintaining homeostats of the ecosystem of our campus and it can be observed by lush green coverage of the campus.

(2) Regular campaigning against single use plastic is going on and there is zero tolerance to such plastics.

(3) In the canteen of campus disposable cups, plates are being used.

(4) Students are encouraged to reuse plastic waste by making planters and other decorative.

(5) From bio degradable waste, bio-fertilizers are being prepared and used in the garden of campus.

(6) Smoking is prohibited in the campus also aware the locality in the vicinity of college about hazards of smoking through awareness campaign.

(7) For energy conservation, solar panels are installed in some of the buildings in the campus.

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4.2 Environmental Awareness and Best Practices

Biotic and abiotic components are integral post of an ecosystem. Human being are one of the biotic component and have capacity to modify ecosystem up to same extent for their comfort one of the major reason of degraded environment is grid of human species. In this context, higher education institutes which shapes youth has noble responsibility to inculcate sensitivity towards all of the resource and turn them into an accountable person for other component of the ecosystem in order to make sustainable planet. In the campus and out of the campus environmental awareness programmer are continually held. The students participate in rallies on environment protection, raise tree in campus cleaning of campus etc. World Earth day, World Environment Day, World Nature Conservation Day, Ozone Day etc. are observed every year.

BEST PRACTICES

1. **Sehat Kendra**- Sehat Kendra of college is continuously organizing awareness about adverse effect of environmental degradation on health.

2. **Waste Management**- A very active waste management is functional in the college which monitors disposal activities in the campus under the policy framed by the committee.

3. **Plantation Drives**- Annually tree planation drives are conducted during monsoon season.

4. **Green Energy**- Solar panel is installed in some buildings and planned to cover maximum area to conserve energy.

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4.3 Recommendations:

In the campus of college many green practices are in pace. After auditing few recommendations are suggested to make greener campus: -

- Environment protections committee under chairmanship of Principal should be formed for framing environment policy, management plan and monitoring of environment related activities in the campus.
- Environment protection club of students like water club, energy club, sanitation club, land club, plantation club etc. should be formed at departmental level and at the time of admission, there is mandatory to join any club of their choice for developing ownership regarding different components of environment.
- Environment protection fund should be formed which would be dedicated to all concerned activities.
- Environment protection calendar should be prepared.
- Waste disposal SOP of the college should be developed.
- Individual carbon foot print should be measured at departmental level and the best student and department should be awarded.
- There should be Double decker parking for bicycle.
- Since, optimum plantation has done in most of the land. So vertical gardening should be done for better carbon foot print.
- Hazardous wastes from chemistry lab should be properly disposed.
- Waste water from water purifier should be reuse.
- Low flow faucets in toilets and common area should be installed to reduce water.
- There is huge potential of solar energy. More solar panels should be installed. Surplus solar energy can also be used night for lighting purpose.
- From bio mass and bio-waste of the campus, bioenergy and valuable bio-products should be extracted.

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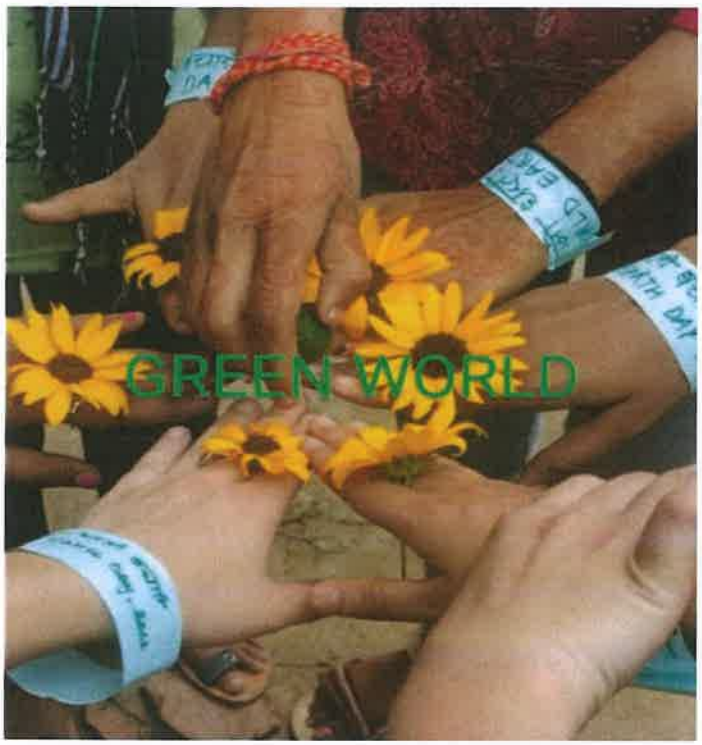
The environment policy of the college is based on the college is based on the principle of "SwasthTan, Swasth man and swasth watawaran". There is a potential of the college campus to Convert into **green Campus .** The need of hours is to join hands of each and every stakeholders in this noble mission.



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Green/Environmental Audit Report

2021-22

College of Commerce, Arts & Science

Patliputra University

Patna - 800020, Bihar

Internal Audit Team Members:

1. **Dr. Rashmi Ranjana-** Head, Department of Geography
2. **Dr. Vidya Yadav-** Department of Geography
3. **Dr. Smita Kumari-** Department of Chemistry
4. **Dr. Akansha Priya** – Department of Botany

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Introduction

Recent years are developed years in term of technology and new innovation but degrading years in term of environment safety. Unsustainable development and ever-growing population is directly or indirectly responsible for the degradation of the environment at local, regional and global level. To counter this, key factors such as stabilizing human population, adopting sustainable technologies, reforestation, and ecological restoration are crucial for a balanced and sustainable future in harmony with nature. For this purpose, the Government of India, through its National Environment Policy, mandates green audits for all organizations to ensure a clean environment. The Environment Protection Act, 1986 by the Ministry of Environment and Forests (MoEF) has made the submission of yearly environmental audit report mandatory for every industry or organization on March 13, 1992. This policy has been formalized by the Supreme Audit Institution, following guidelines from the Controller and Auditor General of India.

The University Grants Commission (UGC) emphasizes a "Green Campus, Clean Campus" mission for higher education institutes. Recognizing the increasing importance of environmental sustainability, the National Assessment and Accreditation Council (NAAC) has integrated Environmental Audit into accreditation methodologies for universities and colleges. As a result, many institutions have initiated Green/Environmental Audits to contribute to environmental responsibility and learning environments. The College management also decided to conduct an environment assessment study as the institute was already very conscious towards the environmental protection from the beginning.

The primary purpose of conducting the green/environmental audit is to assess eco-friendly practices in the campus and generate well-structured audit report to gauge environmental soundness. It involves

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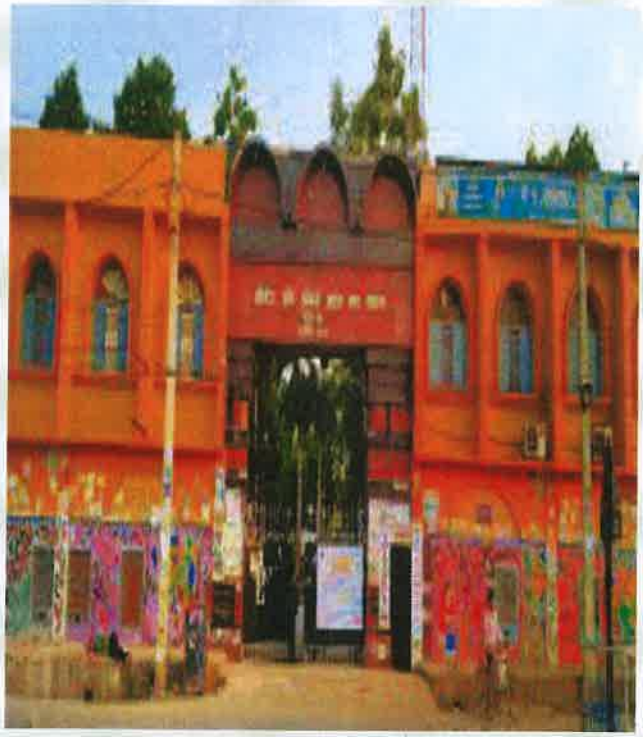
systematically identifying, quantifying, recording, reporting, and analyzing the environmental aspects. It aims to evaluate both internal and external environmental practices that impact the surroundings, particularly focusing on carbon footprint, energy conservation, waste disposal, and tree inventory to measure carbon dioxide (CO_2) sequestration and oxygen release in the campus.

Green audit is an essential tool to assess resource consumption, encourage health awareness, promote environmental ethics, and facilitate a better understanding of the effects of eco-friendly activities in the campus. The importance of self-evaluation in education is highlighted, particularly in relation to environmental sustainability. The rapid urbanization and economic development have led to various environmental issues globally, underscoring the need for adopting a green campus system for sustainable development and reducing atmospheric carbon emissions.



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College and its Vision

One of the oldest academic institutions of Patna, the College of Commerce, Arts & Science was established as 'College of Commerce' in 1949 by Pandit Indu Shekhar Jha on the advice of Dr. Rajendra Prasad, the freedom fighter who later became the first President of Independent India from 1950 to 1962. It was established to impart quality education in the field of Commerce and provide knowledge, ethics and perception to the newly free youths of Bihar. In 1957, the Faculty of Science was opened followed by Faculty of Arts in 1960 and Faculty of Law in 1963. In the persuasion of letter of Education Department, Government of Bihar vide letter no. 15/M1-125/2015-74 dated 16/01/2016 and Magadh University, Bodh Gaya Memo No. VC/Res/06/16 dated 17/01/2016, the name of 'College of Commerce, Patna' was changed as "College of Commerce, Arts & Science", Patna in 2016.[1]

The college has a futuristic vision to provide qualitative education by applying innovative and effective pedagogical modus operandi with dedication and rectitude. Professional courses like MBA, MCA and M.Sc. in Biotechnology and Computer Science; Add-On Courses like Medical Lab Technology (MLT), Nutrition & dietetics and Journalism & Mass Communications; and Vocational courses like BCA, B.Sc. IT, BBA, B LIS, MLIS and PG Diploma in Counseling and Rehabilitation stand testimony to the endeavors of the College. The College has been instrumental in promoting art and culture, social services, sports and extracurricular activities. The institute has a lush green and serene campus conducive to create a peaceful learning atmosphere.

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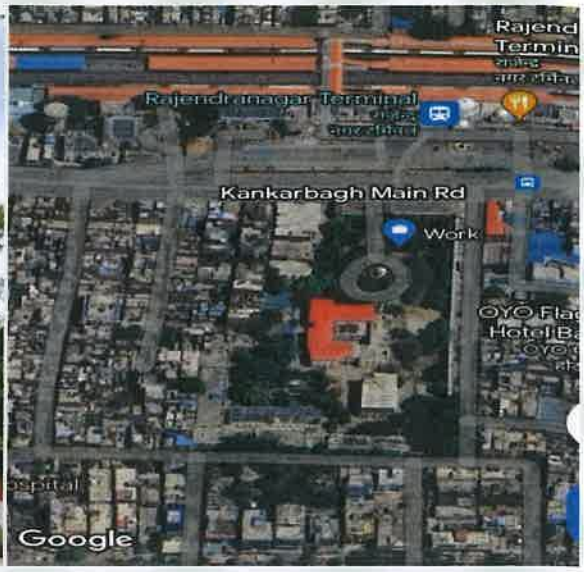

Audit Participants

Total five years of Green/Environmental Audit was done. Each year was audited by one auditor on behalf of the college.

Sl. No.	Name of Auditors	Year
1	Dr. Santwana Rani – Member of the Cultural Committee (Dept. of Botany)	2018-2019
2	Dr. Smita Kumari – IQAC Member & NSS Co-ordinator (Dept. of Chemistry)	2019-2020
3	Dr. Rashmi Ranjana - IQAC Member (Dept. of Geography)	2020-2021
4	Dr. Vidya Yadav - IQAC Member (Dept. of Geography)	2021-2022
5	Dr. Akanksha Priya – IQAC Member (Dept. of Botany)	2022-2023

Objectives

The main aim of the audit is to perform a green/environmental audit of the college campus. Green audit helps to determine the judicious use of energy, water and resources, creates health consciousness and promotes environmental awareness, values and ethics among staff and students. Therefore, the college always tries to implement changes for

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better eco-friendly ambience and make savings. It also aims to analyze environmental practices. Hence, the objectives of the audit are –

- To establish a baseline of existing environmental conditions with focus on natural and physical environment.
- To identify the sources of air, water and noise pollution, water logging, potable water/rainwater usages and waste generation.
- To analyze energy consumption, water usage, green cover, biodiversity and waste generation.
- To create awareness among students regarding environment protection, conservation of biodiversity and its sustainability and reducing the carbon footprint.
- To provide strategies for energy optimization, water and waste management and minimize pollution effects to improve environmental quality for sustainable future.

Scope and Goals of Environment Auditing

The scope and goal of the audit is to conduct a green/environmental audit with respect to biodiversity, green cover, energy & water conservation, pollution and waste disposal.

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Methodology

The methodology includes collection of primary data with the help of questionnaire, physical inspection of the campus and observation, interviewing responsible persons and data analysis. Team members visited every department, building, library, parks, canteen, etc. and collected data. Data analysis was done using appropriate methodology and some steps or suggestions were recommended for reducing energy and water consumption and carbon footprint.

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Audit Report

The urban agglomeration of Patna has a population more than 2 million and density of 1823 person per sq. km. Patna with its better municipal and other facilities than any other cities in Bihar attracts people from all over the state. Students from all over the state migrate to Patna for better education. The diversion of traffic movement in the city has increased the rate of migration and also its social, economic, cultural and political relationships with its countryside.

College of Commerce, Arts & Science has a rural neighbourhood in the east and in the south. Its close vicinity to Rajendra Nagar Railway station, Patliputra Inter-State Bus Terminal (18 September 2020) and National Highway has made it the first choice for admission in different courses for students of nearby villages and towns. But these traffic pockets, congestion and its location in lowland area has led to degradation of ambient environment like pollution of air, water and noise and decrease in open spaces.

Southern expansion of the city is restricted by River Punpun which brings floods and water logging in the low lying southern part where this college is located. Water logging in this area leads to several water born diseases. This college has been also very responsive to the changing situation around and keeps on adjusting to them and functions as a central place of the Southern Patna.

The main reason for our concern about environmental pollution is the adverse effect it has on our health. During the past few decades, there has been a reawakening that health is a fundamental human right, world-wide social goal, essential to the satisfaction of basic human needs and to an improved quality of life and to attained by all people. This green

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audit report assesses the situation of pollution and green cover in the college campus. On the basis of report, college administration has tried to recover the clean environment by plantation drive every year especially during monsoon period and kept the campus pollution free.

Land Use and Climate

Campus land area is 5.89 acres (23836 sq. meters.). Total built up area is 10896 sq. meters and 12940 sq. meters is green and open space including roads and parking area. There is also an auditorium for organizing conferences, seminars, cultural and various other programmes. There is one playground, gymnasium, canteen, health care centre, bank (Central Bank of India Branch) and post office in the campus, animal house for rabbits in Zoology Department and solar panel, biodegradable waste disposal and vermi-composting unit, solid waste management facility, waste water management and rain water harvesting unit in Botony Department.

Patna lies in the zone of transition between the wet tropical climate of Bengal and semi-arid or dry climate of the west. It has a subtropical or monsoon climate which is characterized by hot and dry summer, humid monsoon with oppressive heat and pleasant cold winter with few light showers and early morning fog. It is classified as Cwa by Koppen and Geiger. There are four main season – winter (October to February), spring (February to Mid-March), summer (Mid-March to Mid-June) and monsoon season (Mid-June to September). The hottest month is May. Monsoon Season is quite unpredictable as rainfall is irregular. The city experiences heavy rainfall during July-August which leads to water logging in the campus as it resides in the low land zone of Patna.

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Water Management

Water pollution is a major problem in Patna. The city is surrounded by three rivers which have ecosystems made up of multitude of living organisms including micro-organisms. Natural and anthropogenic sources have caused imbalance in these ecosystems. The result is a foul-smelling waste filled body of water. This change in the chemical, physical and biological quality of water is injurious to its existing, intended or potential uses and threatens the health of humans and aquatic life. Various type of water pollution points to the different sources of pollutants or use. Rain water here contains mainly suspended particulate matters like SPM and RSPM. There is a rain water harvesting unit in the Botany Department. Water collected here is used for watering plants and cleaning.

Surface water originates from rain water and accumulates in the south west part of the college where previously a pond was located to absorb extra water and recharge the ground water. Today the pond is filled to avoid any incident and is used for vermin-composting and green manure during dry summer season. The area is low and surrounded by steel net. It still acts as a ground water recharge zone during monsoon as surface runoff accumulates there. Lotus and many aquatic plants are grown. Ground water is used mainly for drinking, sanitation and cooking purposes. It is extracted by tube wells. Water purifiers are in every department and buildings to provide pure drinking water to all as this part of the city is in lowland and liable to pollution from neighbouring sources for contamination such as latrines, urinals, drains, soakage pits and collections of manure.

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Energy Conservation

There is a **solar panel** on the roof of Botany Department. Administrative of the college aims to achieve 100 percent green energy by installing solar panel on the roof of Administrative building. Energy efficient LED bulbs and tube lights and energy star-certified air conditions, freeze, water purifiers and electronic gadgets are used in the college to save energy. Some **energy saving methods** employed by everyone are-

- Students and staffs are motivated to **switch off** when they leave the classroom or office and use lights only wherever required.
- Teachers and staff of the institute keep the thermostat of the air condition not less than 24 degree C to conserve the energy.
- Electronic devices are unplugged when they are not in use.
- There are many plants, trees and shrubs to keep temperature of the campus lower than its surroundings and to decrease level of carbon dioxide and other pollutants in the campus.
- Rooms are well ventilated.

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Table 1: Overhead Water Tank Energy Consumption 2022

Departments	Number of Overhead Tanks	Capacity	Power of Pump in kW	Time Taken To Fill The Tank*Number Of Running Pump/Day)	Total Time In minutes	Energy Consumption In W (Watt)
Department of Geography	1	2000	1	24 Minutes*4 Times	96	1193.6
C.V. Raman Bhawan	1	2000	1	24 Minutes*3 Times	72	895.2
Department of Zoology	1	2000	1	24 Minutes*2 Times	48	596.8
Kautilya Bhawan	3	2000	1	24 Minutes*5*3 Times	360	4476.0
Department of Law	1	1000	1	12 Minutes*2 Times	24	298.4
Dinkar Bhawan & Library	2	2000	1	24 Minutes*4 *2 Times	192	2387.2
Vanijya Sabhagar	1	500	1	6 Minutes*1 Times	06	74.6
Indushekhar Jha Administrative Building	3	2000	1	24 Minutes*4*3 Times	288	3580.8
Total Energy Consumption						**13502.6**

Waste Management

Most of the institution's solid waste generated are biodegradable and are properly disposed. Dry leaves, papers, wood, packaging papers,

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plywood, etc. are dumped in the composting site to decompose and turn into green/organic fertilizer which is then used in the medicinal-herbal gardens, botanical and other gardens. There are dustbins in every department and every corner of the premises for collecting solid/dry biodegradable and non-biodegradable waste separately. Segregation of waste is done by the cleaning staff every day. Non-biodegradable waste like e-waste includes the waste generated out of discarded television/projector/smart board sets, mobile phones computers, refrigerators, printers and other electronic gadgets. They are collected by an agency.

The best policy college employs is to reduce the amount of waste, recycle it and reuse it to some extent. To achieve this use of plastic is avoided in the premises. Canteen waste are properly collected and disposed off. For girl students and ladies staff, there are napkin vending machines and incinerators in girl's common room and ladies staffroom/toilet.

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Green Cover and Bio-diversity

Every year in the month of **July-August and February,** saplings of many herbal, medicinal and environmentally beneficial trees are planted on with the help of students. NSS and NCC students help in plantation drive. Students are motivated to make pots from wastes or recycle materials. Apart from herbal and medicinal plant garden, administration planned to make a Zen Garden for yoga, meditation and recreation. Every trees and plants are tagged with its scientific name and uses.

Table 2: List of Tree/Shrubs/Herbs in the Botanical garden (2021-22)

Sl.no.	Common name	Botanical name	Quantity
1	Ajwain	Trachyspermumammi	3
2	Century plant	Agave americana	1
3	Curry leaf	Murrayakoenigii	1
4	Garden croton	Codiaeumvariegatum	4
5	Giloy	Tinosporacordifolia	2
6	Good luck plant	Crassulaovata	2

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7	Harsingar	Nyctanthes arbor-tristis	2
8	Jasmine	Jasminumofficinale	2
9	Lemon grass	Cymbopogoncitratus	4
10	Mexican petunia	Ruellia simplex	4
11	Pudina	Menthaarvensis	4
12	Snake plant	Dracaena trifasciata	2
13	Tulsi	Ocimum sanctum	6

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Table 3: List of Tree/Shrubs/Herbs in other gardens (2021-22)

Sl. No.	Common Name	Botanical Name	Quantity
1	Arjun	Terminaliaarjuna	2
2	Ashok	Polyalthialongifolia	1
3	Champa	Plumeriarubra	1
4	Croton	Codiaeumvariegatum	3
5	Gulmohar	Delonixregia	1
6	Guava	Psidiumguajava	2
7	Foxtail palm tree	Wodyetiabifurcata	1
8	Jamun	Syzygiumcumini	1
9	Neem	Azadirachtaindica	1
10	Peela gulmohar/yellow-flame/copperpod	Peltophorumpterocarpum	1
11	Samudraphal	Barringtoniaacutangula	1


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Table 4: List of Tree/Shrubs/Herbs in the Campus (2021-22)

Sl. No.	Common Name	Botanical Name	Quantity
1	Ashok	Saracaasoca	5
3	Rose	Rosa sinensis	14
4	Smart weed	Persicaria species	17
5	Geranium lemon	Pelargonium crispum	16
6	White mugwort	Artemisia lactiflora	8
7	Sissoo spinach	Alternantherasessilis	72
8	Daisy	Townsendiamontana	3
9	Hibiscus	Hibiscus rosa-sinensis	6
10	Persian silk tree	Albiziajulibrissin	3
11	Patricia	Geranium patricia	13
12	Blackboard tree	Alstoniascholaris	4
13	Spider plant	Chlorophytumcomosum	4

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Table 5: List of Fauna in the Campus (2021-22)

Insects, Animals & Birds	Scientific Names
Dog	*Canis lupus familiaris*
House mouse	*Mus musculus*
Butterfly	*Danauschrysippuschrysippus, D. genutia, D. limniaceleopardus*
Brown Butterfly	*Orsotriaenamedus*
Queen Butterfly	*Danausgilippus*
Dragonfly	*Trithemispallidinervis, Macromiapallida, Ceriagrioncerinorubellum*
Black Witch Moth	*Ascalaphaodorata*
Moth	*Aphanostolaatripalpis*
Luna Moth Caterpillar	*Actiasluna*
Caterpillar	*Papiliomachaon*
Millipede	*Scolopendra*
Mealybug	*Ripersiasacchari*
Flower Bee	*Anthophoraplumipes*
Bee	*Apismellifera*
Black bee	*A. mellifera*
Bumblebee	Bombus
Yellow Aphids	Aphis neriiApd
House sparrow	*Passer domesticus*
House crow	*Corvus splendens*
Common myna	*Acridotheres tristis*

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Indian parrot	*Psittaculaeupatria*
Bulbul	*Molpastescafer*
Koel	*Eudynamisscolopaccus*
Pigeon	*Columba livia*
Snail	Achatinoidea
Cockroach	*Periplanetaamericana*
Housefly	*Musca domestica*
Mosquito	*Anopheles, Culex, Aedes*
Earthworm	*Pheretimaposthuma*
Cricket	*Schizodactylusmonstrosus*
Grass Spider	Agelenopsis
Ant	*Polyrhachistubericeps*
Green Aphid	*Aphis pomi*
Army Worm	*Spodopterafrugiperda*
Earwig	*Forficulaauricularia*
Hornet	*Vespa orientalis*
Cotton bollworm	*Helicoverpaarmigera*
Insect	Insecta
Looper caterpillar	*Trichoplusiani*
Lizard	*Hemidactylus*
Termite	*Odontotermesobesus, Microtermesobesi*
Wasp	*Ropalidiaindica*



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Carbon footprint

Plantation is done every year by students, teachers and staffs for reducing the pollution effect and increasing the oxygen level in the campus. Many students, staff and teachers use cycle or walk to reach college and save energy. Some of them use public transport or carpooling. Some of the teachers use laptops to save energy. Students are motivated to avoid red meat and dairy products as they use a large number of natural resources. They are also encouraged to avoid using plastics and disposable cutlery, reduce their shopping and opt for second-hand books or library.

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Mitigation and Management of Environmental Degradation

The trend of pollution is difficult to determine accurately. The main cause of air and noise pollution in Patna is traffic. With the increasing number of automobiles on roads it seems that in future there may be increase in both types of pollution. The levels of SPM and RSPM are increasing more than other air contaminants. In water pollution, total faecal coliform is the main reason of concern. In future, if traffic pollution and seepage of contaminants in water, ground water and soil will not be controlled then pollution will continue to increase. Environmental legislation is the solution which leads to introduction of Control Measures and Cleaner Technology such as introduction of more advanced waste water treatment processes, shift to cleaner fuels and the recycling of potential contaminants.

Therefore, there is a need for regulation of environmental laws and acts to protect our environment and human begins and proper health care system to protect people from diseases. On global level, U.N. conference on Human Environment at Stockholm (1972), United Nations Environment Programme (UNEP), Habitat Conference at Vancouver (1976),UN Water Conference (Mardel Plata) at Argentina (1977), Alma-Ata Conference (1978), World Commission on Environment and Development (1983), UN Conference on Climate Changes in Kyoto, Japan (1997), EPA and Earth Summit at Rio de Janeiro, Brazil (1992), etc. are working to improve the environment by laying down various principles and action plans. WHO is also organizing many health programmes.

In India also many Acts and Rules have been passed for the development of environment and ecology. These environment related legislations are – The Air (Prevention and Control of

Pollution)Act(1981), The Water (Prevention and Control of Pollution) Act (1974),The River Boards Act (1956), The Factories Act (1948), The Indian Fisheries Act (1897), The Indian Forest Act (1927), The Forest Conservation Act (1980), The Environment (Protection) Act (1986), etc.

In Patna, the major Acts and Rules followed by Bihar State Pollution Control Board (BSPCB) are - Water (Prevention and Control of Pollution) Act, 1974; The Water (Prevention and Control of Pollution) Cess Act, 1977; Air (Prevention and Control of Pollution) Act, 1981 and Environment (Protection) Act 1986 under which many rules are being implemented. Bihar State Pollution Control Board along with National Green Corps, eco-task force, Tarumitra, NGOs and many governmental and non-governmental bodies is working towards the goal of clean and green Patna. But there is a need of environmental awareness and civic sense in all section of the society.

College of Commerce, Arts & Science tries to create awareness among students and local community towards environment and environmental problems through conferences, debates, lectures and talks in the college and drama, prabhat pheri, rally etc. by NSS and NCC students on public places. It is putting emphasize on tree plantation, cleanliness programmes, construction of water harvesting structure, recycling of paper, construction of vermi composting pit, organic and medicinal garden, conservation of bio-diversity, etc. for sustainable development of ambient environment.

The college is working to reinterpret religious holidays in environment friendly ways. The students participate in rallies, raise trees in college gardens, clean up garbage dumps, etc. and are on a constant crusade to protect bio-diversity. World Environment Day is observed on 5th June each year. Similarly "Bihar Paryavaran Diwas" is also being

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celebrated on the occasion of the Chhath Puja. Earth Day (22nd April), World Nature Conservation Day (28th July), Ozone Day (16 September), etc. are also observed every year.

'Oxygen belts' has been created in the college. The campaign against the use of plastics and polybags has taken off well. Every effort is made to join hands together for conserving our resources. But these measures cannot check environmental and health threats alone. Therefore urban renewal measures and public participation are very much in need for better environmental health and urban ecology.

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Suggestions for Environmental Conservation

The risk of environmental degradation is increasing day-by-day. So, to improve environmental quality in and around the college some suggestions have been given:

- Public participation is must for all around development.
- Formulation of stringent pollution control legislation.
- Effective implementation with powerful administrative machinery.
- A collaboration and commitment between agencies responsible for health, housing and urban development is very much in need.
- Use of clean fuel, alternative energy, public transport, eco-friendly building materials, good ventilation in buildings, promotion of eco-labeled products, etc.
- Green technologies may also improve the quality of the work environment.
- Proper traffic management, effective mass rapid transport system, proper and regular inspection and maintenance of vehicles.

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- Use of more efficient silencer or exhauster in building making equipments.
- Suppression of noise at the source, use of acoustic enclosures/ silencer and celebrate green festivals by avoiding firecrackers.
- Effective treatment of domestic sewage and modern method of sludge disposal.
- Use eco-friendly products and non-toxic cleaning products in the premises.
- Designing the water supply system to minimize stagnation and back flow as well as provide temperature control to prevent growth of bacteria.
- Recycling and re-use of materials wherever possible.
- Proper infrastructure, better health care, adoption of healthy life style, precautionary measures, nutritional and health education programmes, sanitation etc.

Hence, a careful planning lies ahead. Students and neighbouring communities should be motivated to improvise healthy and clean environment for better health and quality of life. The problem of pollution should be dealt carefully with the help of NGOs, public participation, government and non-government organizations and programmes. There should be greater emphasis on pollution prevention rather than control.

Best Practices

Green Energy : Solar panel is installed on the roof of Botany Department to reduce the carbon footprint, electricity bill and to encourage everyone to promote green energy. This is a clean source of energy which is pollution free.

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Biodiversity (Flora and fauna) Conservation : College has a very green campus including many species of flora and local fauna. Recently, a thorough survey of various trees, plants and herbs has been conducted.

Tree Plantation Drives : Annually tree plantation drive is conducted during monsoon season and important days. Every Guest is honored by tree plantation at Campus. Plant is gifted to every guest instead of bouquets.

Ground Water Recharge and Water Conservation : One units of Rain Water Harvesting System is built in the Botany Department. Open spaces are left for ground water seepage. Water saving push taps fitted in the drinking water zone and the toilets to avoid the wastage. Reuse of RO waste water is also done in the washrooms and plants.

Pollution Reduction : Non-polluting vehicles like cycles are promoted among students. Walking, car-pooling, use of public transport is also encouraged among teachers, staffs and students. Use of clean and green energy, energy conservation methods, water conservation, etc. are also promoted and adopted.

Waste Management : Collection of e-waste by a company is done every year.

Solid waste collection and disposal is also done in the campus every day by cleaning staffs and Municipal Corporation. Reuse and recycling is also done.

General Environmental awareness campaigns are initiated by the campus.

Recommendation

- Environment Policy and effective waste and energy management plan should be prepared for the campus.
- Installation of water meter is important to control water wastage.
- Maintenance of water tanks, pipelines and drainage system should be done more regularly.

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- Harmful chemicals should be stored in designated place and warning signs should be displayed on them.
- Internal inspection system should be developed for various aspects of environment conservation in the campus.
- Environment awareness posters, slogans, etc, should be displayed in the prominent areas of campus.

References

- www.cocaspatna.ac.in

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Green/Environmental Audit Report

2020-21

College of Commerce, Arts & Science

Patliputra University

Patna - 800020, Bihar

College of Commerce, Arts & Science

A Report
on
Green/Environmental Audit

Internal Audit Team:

1. **Dr. Santwana Rani-** Department of Botany
2. **Dr. Rashmi Ranjana-** Department of Geography
3. **Dr. Vidya Yadav-** Department of Geography
4. **Dr. Akansha Priya-** Department of Botany
5. **Dr. Smita Kumari-** Department of Chemistry

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Executive Summary

The future of humanity is heavily dependent on our ability to adapt our lives and agree to a low consumption pattern of living in terms of resources taken from the planet, as well as return to a sustainable development route as soon as possible. According to scientists, the window of opportunity for restoring nature to its long-term state of hosting life forms to develop in its nurturing environs is very small, lasting only until 2030. Within this time, with the willing actions of every citizen, wherever they are, coordinated and directed actions should begin and continue until a balancing stage is reached in which moderate use of resources and mitigation actions for healing the wounds already inflicted, balance positively to a sustainable nature.

Eco campus is a concept used at many educational institutions across the world to make them more sustainable due to their high resource use and waste discharge into the environment. Our College feels that there is an urgent need to address these fundamental environmental issues and reverse the trends. The audit's goal was to confirm that the practices on campus adhered to the institution's Green Policy.

Green auditing of a higher education institution is required as part of Criterion VII (of the seven criteria stipulated) under the Guidelines for Submission of the Mandatory Annual Internal Quality Assurance Report (IQAR) by Accredited Institutions.

Water Conservation, Tree Plantation, Waste Management, Paperless Work, and Alternative Energy are some of the aspects of Green Campus that it works on. With this in mind, the audit's specific objectives were to assess the sufficiency of the environmental management control system as well as the degree to which the Departments are in conformity with the applicable rules, policies, and standards.

Initially, a questionnaire survey was undertaken to learn about the campus' available resources and the resource consumption patterns of the college's students and employees. Water,air and soil samples were gathered from various sites on the college campus and analyzed for their parameters in order to assess the quality of water and soil. The collected data was organized, tallied, and analyzed. Finally, a report referring to environmental management plan with strengths, weaknesses, and suggestions on campus environmental issues is documented.

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1. Introduction:

Analysis of environmental practices on and off the college campus that have an impact on the eco-friendly environment is the main goal of the green audit. The systematic identification, quantification, recording, reporting, and analysis of environmental elements in a collegiate setting is known as a "green audit." It was started with the intention of examining the work being done within the institutions whose operations could assess the health of the local inhabitants and the environment. The green audit provides guidance on how to strengthen the environmental framework and takes into account a number of variables that have influenced how widely it has been used.

1.1 Need for Green/Environmental Auditing:

The process of discovering and evaluating whether an organization's operations are environmentally friendly and sustainable is known as "green auditing." We have historically used natural resources wisely and effectively. But, with the passage of time, everyone has developed a tendency of overusing resources like water and energy. We must now determine whether our processes are using more resources than required. Whether we are handling resources carefully? All such practices are regulated by green audit, which also provides an effective method for utilizing natural resources. Verifying the processes and changing them to green, clean ones is vital in the age of climate change and resource depletion. An approach for it is provided by green audit. Additionally, it raises awareness of the environment among students, faculty, and staff that work in the institution. Additionally, it is the civic responsibility of higher education institutions to make sure that their carbon footprint reduction efforts help to mitigate global warming.

1.2 Goals of Green Auditing:

College has conducted a Green/Environmental Audit with specific goals such as:

i) Identification and documentation of green practices followed by our college.
ii) Identify the strength and weakness in green practices.
iii) Analyse and suggest solutions for problems identified.
iv) Assess the facility of different types of waste management.
v) Increase environmental awareness throughout campus

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vi) Identify and assess the environmental risk.

vii) Motivates students & staffs for optimized sustainable use of available resources.

viii) The long-term goal of the environmental audit program is to collect baseline data of environment

ix) Parameters and resolve environmental issue before they become problem.

1.3 Objectives of Green Auditing:

i) To assess present activities that may have an influence on the environment, such as resource use and waste management.

ii) To recognize and assess important environmental problems.

iii) To establish a goal, vision, and mission for campus-wide green practices.

iv) Implement environmental management in a number of departments.

v) Ongoing evaluation for improved green performance

1.4 Benefits of Green Audit in our Institute:

i) It would contribute to preserving the campus's natural surroundings.

ii) Recognize how waste minimization and energy conservation can save costs.

iii) Give the organization the freedom to develop strategies for improved environmental performance.

iv) It presents a positive picture of the college due to its spotless and lush campus.

2. OBJECTIVE AND SCOPE:

The broad aims/benefits of the green-auditing system would be:

i) Environmental education through systematic environmental management approach

ii) Improving environmental standards

iii) Benchmarking for environmental protection initiatives

iv) Sustainable use of natural resource in the campus.

v) Financial savings through a reduction in resource use

vi) Curriculum enrichment through practical experience

vii) Development of ownership, personal and social responsibility for the College campus and its environment

viii) Enhancement of College profile

ix) Developing an environmental ethic and value systems in young people

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About the college

College of Commerce, Arts & science, Patna, established in 1949, recognized under Sections 2 (f) and 12 (B) of the UGC Act 1956 is a premier constituent College of Patliputra University. College was established by great visionary Late Pt. Indu Shekhar Jha on the advice of Dr. Rajendra Prasad with a pious motive to make quality education accessible for aspiring youths without any discrimination based on socio-cultural-economic grounds. The vision of its great founder Pt. Indushekhar Jha was to make the commerce education accessible to the underprivileged and subaltern students of Bihar, which was rarely available. This revered institution started its journey from a small campus where P. N. Anglo School is located now to its present campus. Flowing in the incessant flow of imparting knowledge and being exposed to the warmth of time, this institution went on incorporating many streams in itself and today in this college education is imparted in the faculties of Sciences, Social Sciences, Commerce, Humanities and Law up to postgraduate levels.It is one of the oldest academic institutions located in the heart of the capital of Bihar, Patna. The College is situated in the exclusive neighbourhood of Rajendra Nagar Railway Terminal and inhabits a 5.89-acre plot campus. The lush green landscape invites an aesthetic charmer and enhances the College atmosphere to an educational eden.

Initially, it was a constituent unit of Magadh University in the name of College of Commerce and was renamed as College of Commerce, Arts & Science in 2016. Later, it became a constituent unit of the Patliputra University, Patna when this university was formed by the Bihar Government on 18 July 2018 after being bifurcated from Magadh University, Bodh Gaya. The College was re-accredited by NAAC as Grade 'A' in its second cycle of accreditation with a CGPA of 3.10 on a four-point scale. After the journey of more than seven decades this institution has achieved its mission and vision to a greater extent for which it was established and it is a matter of great satisfaction that today this institution is acclaimed throughout the state of Bihar for its high academic standards. The College has consistently demonstrated outstanding performance in academics, sports, and Co/extra-curricular activities. It has made significant and unparalleled contributions in terms of producing scholars, bureaucrats, intellectuals, politicians and sportsperson serving in different domains not only in our own country but even at international levels. Vibrant and effective presence of our alumni all over the world at key positions in almost all spheres of life is a testimony of its successful journey.

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College of Commerce, Arts and Science is opportune to have a galaxy of faculties who command a rare distinction in academic excellence at least in Bihar and whose accomplishments in academia is appreciated universally. The college dare claims to set new yardsticks in Bihar as far as quality research and teaching is concerned. Despite certain limitations which are beyond the college domain like space constraints, proper playground, etc., our students have excelled in various sports streams at different levels. No matter whether it is NCC or NSS or any other wing, this college has proven its worth.

This college has excellent infrastructure with automated central library linked to world-wide free information flows and databases, well equipped laboratories and congenial and natural campus ambience and classrooms. However, the volume of publication in peer reviewed journals with high impact factor and citation index is moderate but the quality of research is worth citing. College administration is trying its best to catch it soon and increase the volume of research too. Teaching and research in all faculties of Sciences, Social Sciences, Humanities, Commerce and Law are available up to PG level. Ph. D. Programmes are also available in most subjects. The college offers 13 postgraduate, 17 undergraduate, 07 vocational, 03 Add-on (with certificate, diploma and advance diploma) and 04 professional/self-financed courses. The college aspires to commensurate to the national and global standards in teaching as well as in research.

Our institution visions to develop an educational set up to bring out a transformative change in the society by nurturing high moral and spiritual values in students, giving quality education in multiple disciplines, empowering the society through knowledge and quality research and fostering creativity and entrepreneurship in students and in this way making students a capable global citizen.

All the stakeholders are working hard with full commitment with a mission to develop and maintain a human repository of knowledge, disseminating it among the students and creating new and relevant insights in diverse disciplines through state-of-the-art research. The college retains inspiring facets of its proud history and with an equally sharp gaze, it looks ahead to assimilate the exciting world of new knowledge as they go on unfolding. Our esteemed institution aims to inculcate positive human values in its students and making them capable global citizens, sensitive to human and environmental issues and at the same time quality professionals in their respective fields.

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3. Methodology:

In order to perform the green audit, the methodology that included different tools such as physical inspection of the campus, observation and review of the documentation, interviewing key persons and data analysis, measurement and recommendations were adapted.

Onsite Visit

The Green Audit Team did a site inspection. The main goal of the tour was to analyze the Institute's green cover. On the other hand, their waste management techniques, energy conservation strategies, and so forth were examined. During the visits, samples were collected (water, air, and soil). Water samples were gathered from bore water, and air samples were collected from several locations on campus, Soil samples were taken from the different sites within the campus. Faculty from the chemistry department assisted with sample collecting. The normal methods for sample collection, preservation, and analysis were followed.

Focus Group Discussion

The Focus Group discussions with staff and management focused on several aspects of Green Audit. The conversation cantered on assessing institutional and local attitudes and awareness of environmental challenges.

Energy and waste management

The audit team analyzed the college's energy consumption pattern and waste generation, disposal, and treatment facilities with the assistance of teaching, non-teaching personnel, students, an administrative officer, a building management engineer, and an electrical supervisor. A thorough questionnaire survey method was used for monitoring.

Energy & Waste Management:

The audit team analyzed the energy consumption pattern and waste generation, disposal, and its treatment facilities in the college with the assistance of teaching, non-teaching personnel, students, an administrative officer, a building management engineer, and an electrical supervisor. The monitoring was done using a thorough questionnaire survey method.

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The study covered following areas to summarize the status of environmental management in the campus:

i) Green area management
ii) Energy Conservation
iii) Water Management
iv) Waste management
v) E-waste Management
vi) Environmental Monitoring

4. Observations and Recommendations

i) Green Area Management

This encompasses the plants, greenery, and sustainability of the campus to guarantee that the buildings meet green standards. This also aids in ensuring that the Environmental Policy is established, enforced, and reviewed through the use of various environmental awareness programs.

Detail of Trees & Plants in Campus

Table 1: List of Tree/Shrubs/Herbs species found in the campus (2020-2021)

S.no.	Common name	Botanical name	Quantity
1.	Calendula	Calendula officinalis	2
2.	Petunia	*Petunia species*	3
3.	Rose	*Rosa sinensis*	4
4.	Carnation	*Dianthus caryophyllus*	1
5.	Snake plant	*Dracaena trifasciata*	2

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Table 2: List of Tree/Shrubs/Herbs species found in the Botanical garden (2020-2021)			
S.no.	**Common name**	**Botanical name**	**Quantity**
1.	Rose	*Rosa sinensis*	3
2.	Petunia	*Petunia species*	2
3.	Snake plant	*Dracaena trifasciata*	1
4.	Croton	Codiaeum variegatum	2
5.	Carnation	*Dianthus caryophyllus*	2
6.	Daffodils	*Narcissus pseudonarcissus*	2

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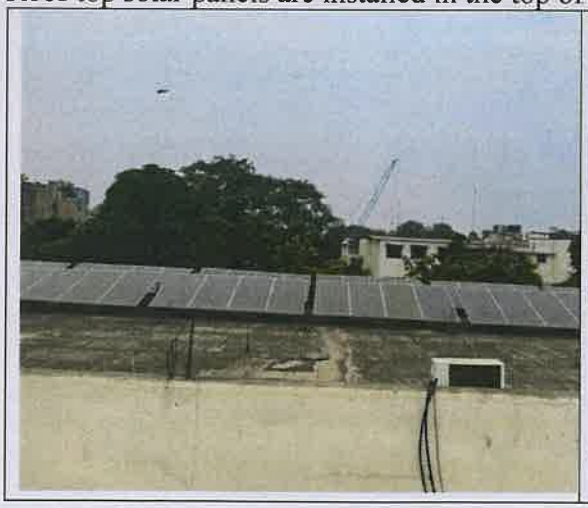
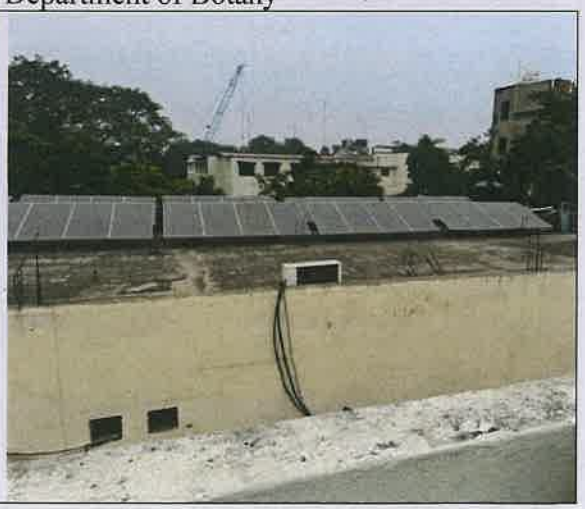
Table 3: List of Tree/Shrubs/Herbs species found in other gardens of the campus.			
S.no.	**Common name**	**Botanical name**	**Quantity**
1	Ashok	*Saraca asoca*	5
3	Rose	*Rosa sinensis*	14
4	Smart weed	*Persicaria species*	17
5	Geranium lemon	*Pelargonium crispum*	16
6	White mugwort	*Artemisia lactiflora*	8
7	Sissoo spinach	*Alternanthera sessilis*	72
8	Daisy	*Townsendia montana*	3

Roof Top Solar Panels:

Roof top solar panels are installed in the top of Department of Botany





Detail of solar cell

Sl.No.	Department	No. of Panels	Capacity
1	Botany	1	25 kW

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Rain water Harvesting:

The rainwater harvesting strengthens the water supply to the campus lakes as well as enhance water in the campus through ground water recharging process.

Sign Boards in Campus:

1. Dustbin image
2. Motivational quotes images

Glimpses of motivational and other images pasted on various location within campus

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Library:

The College library is fully automated and it has a collection of several books and a subscription of e-journals and e-books. Internet browsing and mobile library app is also available.

Auditorium:

Total the college has 3 Auditorium namely Vanijya Sabhagar, Swami Sahjanand Saraswati Sabhagar and Auditorium in Botany Department. The Vanijya Sabhagar Auditorium can accommodate 200 students, Swami Sahjanand Saraswati Sabhagar 60 persons and Botany Auditorium accommodating 100 persons aimed at conducting various departmental functions, academic activities etc.

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Bank and ATM Facility:

Central Bank of India exist within our college premise. ATM Facility (SBI) exist at the entrance gate of the college for the easy accessibility to the students and staffs.

Post Office:

One (1) post office is located within college campus facilitating to college and people outside nearby.

Health Centre:

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Our college has Sehat Kendra which provide medical facilities on campus where students can receive emergency treatment and preventive care.

Gymnasium:

Gymnasium is provided inside the campus facility to encourage physical activity among the students

Waste Management:

There are different types of waste generated in our college like paper, plastic, biodegradable & construction etc.

Conclusion:

Green Audit is an important instrument for monitoring the balance of natural resources and their judicious usage. Green auditing is the process of establishing if institutional operations are environmentally friendly and sustainable. It is a continuous process of identification, quantification, documentation, reporting, and evaluation. Environmentally significant components in a given area are monitored.

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GREEN AUDIT/ ENVIRONMENTAL AUDIT REPORT

(2019-2020)

College of Commerce, Arts and Science

Patna

College of Commerce, Arts and Science

Patna

A Report on

GREEN AUDIT/ ENVIRONMENTAL AUDIT

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1. Introduction:

Green Audit is a systematic process that involves the identification, quantification, recording, reporting, and analysis of various components of an institution's environmental practices. It extends its evaluation beyond the institution's premises to encompass practices that impact the overall eco-friendly atmosphere. By assessing energy consumption, water usage, and resource utilization, Green Audit guides institutions in implementing changes that lead to efficiency gains and cost savings. Moreover, it promotes a heightened awareness of health and environmental issues while instilling values and ethics related to sustainability. This introspective approach not only enhances the understanding of environmental impact among staff and students but also aligns with the notion of institutional self-enquiry, ensuring a responsible contribution toward a sustainable future. Given the pressing environmental challenges arising from rapid urbanization and economic development, the concept of a Green Campus becomes crucial for educational institutes, aiming to drive sustainable development while reducing carbon emissions. This commitment is further reflected in the mandate by bodies like the National Assessment and Accreditation Council (NAAC) for institutions to submit annual Green Audit Reports, and it aligns with the Corporate Social Responsibility of institutions in mitigating global warming through reduced carbon footprints.

Educational institutions serve as the foundation for a nation's growth, imparting not only knowledge but also a crucial awareness of ecology as a pivotal aspect of development intertwined with the environment. In response to this recognition, educational institutions are increasingly embracing eco-friendly concepts to address environmental concerns. Various strategies are being introduced to ensure environmental preservation within campuses, such as energy savings promotion, waste recycling, water conservation, and harvesting. However, the activities undertaken by colleges can inadvertently create adverse environmental impacts.

Environmental auditing serves as a process by which an organization's environmental performance is evaluated against its environmental policies and goals. Green audit, a formal evaluation of a college's environmental impact, is conducted as part of this practice to assess the actual environmental state on campus. By pinpointing areas of high energy, water, or resource consumption, green audits provide colleges with insights for implementing changes that lead to resource savings. Waste type, volume, and disposal methods are also scrutinized, offering opportunities for recycling initiatives and waste minimization improvements.

Green auditing is not just advantageous for resource efficiency; it also has wide-ranging benefits. It fosters financial savings through reduced resource consumption, develops a sense of ownership and responsibility among students and teachers, and promotes environmental awareness, values, and ethics. By assessing their contributions to sustainability, colleges play a vital role in promoting environmental consciousness. This role aligns with the growing importance of environmental sustainability on a national scale.

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Clean and healthy environments create conducive learning atmospheres, with efforts worldwide focusing on environmental education. Despite Environmental Management Systems (EMS) being associated predominantly with industries, adapted systems are emerging globally. A simplified, indigenous monitoring system has been developed to assess the environmental performance of educational institutions. This voluntary scheme, centered around relevant questions, ensures institutions set environmental precedents, educating the younger generation in the process. This user-friendly approach not only contributes to the community but also aligns with the nation's pursuit of environmental sustainability.

2. College and its Perspectives

Green Audit proves invaluable for colleges as it pinpoints areas of significant energy, water, and resource consumption, prompting the consideration of efficiency-enhancing changes. This assessment also uncovers waste nature and quantity, enabling recycling initiatives and better waste reduction strategies. Beyond its pragmatic implications, Green Audit nurtures health awareness and instills values tied to environmental consciousness and ethics. Moreover, it deepens staff and students' comprehension of the impacts of green practices on campus.

Given the mounting significance of environmental sustainability at the national level, higher education institutions' role in environmental responsibility amplifies. Hence, it becomes imperative for colleges to evaluate their role in shaping a sustainable future, harmonizing their practices with society's overarching environmental concerns.

The escalating expansion of urban areas and economic advancement on various scales has spurred environmental and ecological crises. In response, adopting the Green Campus concept becomes paramount for educational institutions. This approach not only advances sustainable development but also plays a pivotal role in curbing atmospheric carbon dioxide levels, contributing to the collective effort against environmental challenges. Green Audit holds particular importance within the framework of NAAC (National Assessment and Accreditation Council), a body that rates institutions as Grade A, Grade B, or Grade C based on evaluation criteria. Furthermore, it aligns with the Corporate Social Responsibility of Higher Educational Institutions by ensuring their active contribution to curbing global warming through initiatives that reduce their carbon footprint.

Hence, the primary objective of the current green audit is to systematically recognize, measure, describe, and prioritize the framework for Environmental Sustainability. This approach is designed to adhere to relevant regulations, policies, and standards governing environmental practices.

3. Objectives

The primary aim of green auditing is to protect the environment and mitigate risks to human well-being. The essential objectives of an environmental audit encompass:

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- Effectiveness of Management Systems: Audits assess how well an institution's environmental management systems and equipment are functioning to achieve sustainability goals.

- Health and Safety: By addressing environmental and safety concerns, audits contribute to reducing risks to human health, enhancing the overall safety and well-being of the campus community.

- Resource Efficiency: Audits help optimize resource management, minimizing wastage and inefficiencies in resource consumption.

- Foundation for Sustainability: Environmental audits establish a solid foundation for enhanced sustainability efforts, guiding the institution's long-term environmental strategies.

- Waste Management: Audits enable the implementation of waste reduction strategies, efficient solid waste management, and water recycling practices.

- Plastic Pollution Prevention: Environmental audits contribute to establishing a campus free from plastic pollution and promoting health awareness among stakeholders.

- Cost Savings: Identifying methods for waste reduction through audits can lead to cost savings, making resource utilization more efficient.

- Challenges Identification: Audits help identify both current and potential environmental challenges, allowing institutions to proactively address issues.

- Environmental Education: Audits facilitate the dissemination of environmental education by implementing systematic management strategies and elevating environmental standards.

- Financial Savings: Reducing resource consumption through audits results in financial savings, as efficient resource use translates to reduced costs.

- Reputation Enhancement: Institutions that actively engage in environmental audits enhance their reputation as responsible and forward-thinking entities.

- Cultivating Environmental Values: Environmental audits contribute to the cultivation of environmental consciousness and a value system among students and the broader community.

This comprehensive list showcases how environmental audits encompass a wide spectrum of positive outcomes, ranging from legal compliance and resource efficiency to health promotion and sustainability. By adopting such practices, institutions can play a significant role in addressing environmental challenges while benefiting the campus community and the larger society.

4. Scope and Goals of Environment Auditing

The concept of Green Audit emerges as a powerful ecological tool to effectively tackle pressing environmental challenges. It operates through a structured and methodical process that entails continuous identification, measurement, documentation, reporting, and oversight of

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environmentally significant elements within a designated area. By adopting this systematic approach, ongoing environmental activities are meticulously tracked both within and beyond specific locations, encompassing direct and indirect impacts on the surroundings. The implementation of a Green Audit is a proactive endeavor for institutions, enabling them to assess critical factors such as energy consumption, water usage, as well as the production of wastewater, solid waste, electronic waste, and hazardous waste.

However, the scope of Green Audit extends beyond practical assessments. It possesses the potential to elevate environmental awareness and understanding, encouraging responsible utilization of resources. By fostering a deeper appreciation for ecological values and ethical considerations, the Green Audit process not only prompts tangible changes but also inspires a collective commitment to responsible environmental stewardship.

In essence, Green Audit serves as a guiding compass, offering pragmatic pathways to enhance environmental conditions. By instilling sustainable practices and fostering a conscientious mindset, it contributes to the broader goal of creating a harmonious coexistence between human activities and the environment. Through its multifaceted approach, Green Audit not only points the way forward but also plays a pivotal role in shaping a more environmentally conscious and responsible future.

5. Methodology

(A). The initial stage of the Audit involved a comprehensive data collection process, characterized by observations, interactions, and discussions with key stakeholders within the university community. These stakeholders encompassed faculty members, administrative personnel, and staff from various departments and sections. The data collection was facilitated through a combination of open-ended and closed-ended questionnaires that were thoughtfully designed to gather pertinent information. These interactions yielded valuable insights that contributed to the comprehensive understanding of the university's environmental practices.

(B). A critical aspect of the audit involved a thorough review of past records and existing policies. This step aimed to comprehend the range of initiatives undertaken by the university to promote sustainable environmental conservation and enhancement. This review entailed a meticulous examination of office registers, visitor logs, purchase records, internal communications, and higher-level documents like those from the Academic Council or Executive Council.

(C). As an integral part of the audit process, the team conducted site inspections across various departments, sections, and university premises. This on-site

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evaluation provided firsthand insight into the diverse activities taking place within the university. The team assessed the state of campus greenery and identified potential areas for improvement. During the visits, different university spaces, including the playground, canteen, library, office rooms, and parking areas, were thoroughly examined to gauge their environmental impact and potential for sustainable practices.

(D). The success of the audit was reliant on engaging the right stakeholders, such as teaching staff from different schools, administrative representatives, personnel from water supply and maintenance departments, electricity department staff, and individuals from the information and communication technology (ICT) sector. Valuable data on water and energy consumption was meticulously collected from various sources as part of this comprehensive approach.

6. Audit Report

A. Land Use and Climatic Data

The land of the college is well-planned and the campus encompasses the following facilities:

1. Sports Facilities: The college offers sports facilities for basketball, football, cricket, and has a dedicated field for NCC activities. This encourages students to participate in physical activities and sports.

2. Auditorium: The 'Vanijya Sabhagar' auditorium provides a space for hosting seminars, conferences, and cultural activities with a large seating capacity, benefiting both academic and extracurricular events.

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3. Gardens and Lawns: The campus features lush green gardens and lawns, contributing to the aesthetics and greenery of the environment.

4. Waiting Areas: There are separate waiting areas for senior citizens and physically challenged individuals, emphasizing inclusivity and comfort.

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5. Toilets: Separate restrooms for both girls and boys are available throughout the campus, ensuring convenience and hygiene.

6. Canteen: A fully functional canteen is on campus, using disposable cutlery to facilitate dining for students and staff.

7. Post Office: The presence of a post office near the entrance provides postal services to both staff and students, making it convenient for mailing and other related activities.

8. Bank: Access to a bank within the campus allows students and staff to perform financial transactions conveniently, such as withdrawing or depositing money.

9. Library: The well-equipped library offers a quiet space for studying and allows students to borrow books related to their subjects, supporting their academic endeavors.

10. Girl's Common Room: The college has a dedicated common room for female students, which is well-maintained and equipped with facilities like a washroom with a napkin vending machine and incinerator, addressing specific needs and comfort.

Overall, the college has created a well-rounded environment that not only focuses on academic pursuits but also provides various facilities to enhance the overall experience of students and staff.

The college takes advantage of the distinct four seasons in the city to organize various cultural activities. This not only adds diversity to the student experience but also allows them to appreciate and celebrate the unique characteristics of each season.

For instance, the "Saavan Mahotsav" held in July and August likely celebrates the monsoon season with cultural events and perhaps even activities related to the rainy season. Mehandi competitions are a traditional and artistic way to engage with the culture and customs during this time.

These seasonal cultural activities can help create a vibrant and enriching college experience, allowing students to connect with their surroundings and celebrate the local culture and climate. Additionally, such events can foster a sense of community and camaraderie among students and staff.

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B. **Energy conservation**

The college is committed to energy conservation and sustainability efforts. Some of the energy-saving initiatives followed by the college are:

1. Star Rated Electrical and Electronic Equipment: The college aims to save energy by using electrical and electronic equipment that has received star ratings. Star ratings are typically awarded to appliances and devices that meet specific energy efficiency standards. Using such equipment can significantly reduce energy consumption and lower operational costs for the college.

2. Solar Panels Installation: In 2018, the college took a major step towards renewable energy by installing solar panels on some of its buildings. Solar panels convert sunlight into electricity, providing a clean and sustainable source of power. This not only reduces the college's carbon footprint but also helps in long-term cost savings as solar energy is renewable and reduces reliance on conventional electricity sources.

By implementing these energy-saving measures, the college is not only contributing to a greener and more sustainable environment but is also setting an example for students and the community in embracing eco-friendly practices and technologies.

Table 1: Distribution of solar panels in the campus

S.no.	Names of the Departments	Capacity Required	Category	Sanctioned load	Area in m squares
1.	Administrative and Arts Block, Psychology Department, college auditorium, Science Block, Botany Department	25	B	20	1542

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C. **Green Cover and Biodiversity**

Biodiversity, which encompasses the rich tapestry of life on Earth, exists in various dimensions: genetic diversity, species diversity, and ecosystem diversity. There are noticeable gradients in species diversity based on latitude, with the equatorial regions boasting the greatest variety. Biodiversity forms clusters in critical zones known as hotspots, where species richness and uniqueness are exceptionally high, underscoring the urgency of their preservation. However, human activities, particularly deforestation, pose a significant threat to biodiversity. Safeguarding biodiversity is vital not only for the stability and resilience of ecosystems but also for the essential services it provides, such as pollination and climate regulation. Moreover, it holds profound cultural and scientific significance, shedding light on the intricate evolution of life on our planet.

The college is actively involved in the preservation of biodiversity, including plant and animal species, as well as microorganisms, within its campus. Maintaining a green cover and supporting diverse flora and fauna can have several environmental and educational benefits. The following table depicts the distribution of flora in the campus.

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Table 2: List of Tree/Shrubs/Herbs species found in the campus (2019-2020)

S.no.	Common name	Botanical name	Quantity
1	Ashok	*Polyalthia longifolia*	2
2	Gulmohar	*Delonix regia*	1
3	Coconut	*Cocos nucifera*	2
4	Peela gulmohar/yellow-flame/copperpod	*Peltophorum pterocarpum*	1
5	Jamun	*Syzygium cumini*	3
6	Champa	*Plumeria rubra*	2
7	Mango	*Mangifera indica*	2
8	Neem	*Azadirachta indica*	2
9	Palas	*Butea monosperma*	1
10	Peepal	*Ficus religiosa*	4
11	Arjun	*Terminalia arjuna*	2
12	Kadamba	*Neolamarckia cadamba*	1
13	Reetha	*Sapindus mukorossi*	1
14	Shahtoot	*Morus alba*	1
15	Jackfruit	*Artocarpus heterophyllus*	1
16	Blimbi	*Averrhoa blimbi*	1
17	Pinwheel plant	*Tabernaemontana divaricata*	2
18	Croton	*Codiaeum variegatum*	4
19	Samudraphal	*Barringtonia acutangula*	1
20	Foxtail palm tree	*Wodyetia bifurcata*	1
21	Guava	*Psidium guajava*	2

In addition to the flora found in the campus of the college, there are two gardens in the college. Table 3 and 4 depicts the distribution of the flora in these gardens and lawns.

Table 3: List of Tree/Shrubs/Herbs species found in the Botanical garden

S.no.	Common name	Botanical name	Quantity
1	Gulmohar	*Delonix regia*	1
2	Roselle	*Hibiscus sabdariffa*	2
3	Kapur tulsi	*Ocimum tenuiflorum*	1
4	Spider lily	*Crinum asiaticum*	2
5	Vicks plant	*Plectranthus tomentosa*	1
6	Elephant apple	*Dillenia indica*	1
7	Neem	*Azadirachta indica*	2
8	Jambiri lemon	*Citrus jambhiri*	2
9	Bamboo	*Bambusa vulgaris*	1

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10	Moulsari	*Mimusops elengi*	2
11	Ashok	*Saraca asoca*	1
12	Mango	*Mangifera indica*	1
13	Kaner	*Cascabela thevetia*	1
14	Kadamb	*Neolamarckia cadamba*	1
15	Guava	*Psidium guajava*	1
16	Rose	*Rosa sinensis*	4
17	Sago palm	*Cycas revoluta*	1

Table 4: List of Tree/Shrubs/Herbs species found in other gardens of the campus.

S.no.	Common name	Botanical name	Quantity
1	Ashok	*Saraca asoca*	17
2	Holy basil	*Ocimum tenuiflorum*	9
3	Rose	*Rosa sinensis*	7
4	Garden croton	*Codiaeum variegatum*	8
5	Periwinkle	*Catharanthus roseus*	6
6	Hibiscus	*Hibiscus rosa-sinensis*	6
7	Blackboard tree	*Alstonia scholaris*	2
8	Guava	*Psidium guajava*	2
9	Helinus	*Helinus integrifolius*	2
10	Spider plant	*Chlorophytum comosum*	3

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D. **Pollution and its Management-**

i) Air Pollution- The campus actively promotes eco-friendly transportation methods to reduce air pollution. Some of the initiatives followed are:

1. Walking and Bicycles: The campus encourages walking and cycling as environmentally friendly modes of transportation. These methods not only reduce air pollution but also promote physical activity and a healthy lifestyle.

2. Carpooling for Teachers: The concept of carpooling is encouraged among teachers. Carpooling reduces the number of individual vehicles on the road, leading to reduced emissions and traffic congestion.

3. Preference for Cycling: The provided data table clearly illustrates that a higher number of students opt for cycling as their mode of transportation within the campus. This preference for bicycles indicates a positive response to the promotion of sustainable and pollution-free transportation methods.

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By actively promoting walking, cycling, and carpooling, the campus is contributing to a cleaner environment and fostering a sense of environmental responsibility among its students and staff.

Table 5: Usage of cycles in the college (2019-2020)

S.no.	Area	No. of cycles
1	Department of Geography	4
2	Parking area	19
3	Notice board garden	14
4	Department of Commerce	13
5	Faculty of Science	10
6	Department of History	4
7	Library	3
8	Department of Economics	6
9	Others	6
	Total no. of cycles	79

ii) Water Pollution- Water pollution is the introduction of substances or forms of energy into a water body, either directly or indirectly, which leads to a change in the water's natural characteristics in a way that negatively impacts its intended or legitimate uses." This pollution typically arises from human activities and results in water that can no longer fulfill certain essential human purposes, such as serving as a source of drinking water, or undergoes a significant alteration that hampers its ability to sustain its ecological communities, including aquatic life. In order to reduce this pollution in the campus, there is a separate system for disposal of hazardous wastes released from science laboratories.

iii) Land Pollution- Waste management and pollution reduction efforts are followed in the campus and aligns with sustainable practices. Some of the initiatives taken are:

1. Segregation of Waste: The placement of separate dustbins for biodegradable and non-biodegradable waste, as well as for dry and wet waste, promotes effective waste segregation. This practice is essential for proper disposal and recycling of different types of waste materials.

2. No Plastic Zone: Designating the campus as a "no plastic zone" is a significant step toward reducing plastic pollution. It encourages the use

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of alternative materials and discourages the harmful environmental impact associated with plastic waste.

3. Disposable Cups and Kulhars: The canteen's use of disposable cups and kulhars (clay cups) instead of plastic or non-biodegradable materials is a sustainable choice. This not only reduces land pollution but also aligns with eco-friendly practices.

By implementing these measures, the campus is actively contributing to waste reduction, minimizing land and plastic pollution, and fostering an environmentally conscious community. These actions help create a cleaner and more sustainable campus environment.

iv) Noise Pollution- A silent campus, where the majority of students opt for two-wheelers, bicycles, or walking as their primary modes of transportation, creates a peaceful and eco-friendly atmosphere. This choice not only reduces noise pollution but also aligns with sustainable and healthy commuting practices. It reflects a conscious effort by the campus community to minimize the environmental impact, promote physical activity, and contribute to a tranquil learning environment. Such initiatives not only benefit the campus but also set an example for responsible and sustainable transportation choices.

E. Water Resources and its Management-

Several buildings of the campus have overhead water tanks with capacity around 2000 litres. The following table shows the number of these overhead tanks and their energy consumption.

Table 6: Overhead Water Tank Energy Consumption 2019-2020

S.no.	Departments	Number of overhead tanks	Capacity	Power of Pump in kW	Time taken to fill the tank*number of running pump/day	Total time in minutes	Energy Consumption in W (Watt)
1.	Geography	1	2000	1	24 minutes*4 times	96	1193
2.	C.V Raman Bhawan	1	2000	1	24 minutes*3 times	72	895.2
3.	Zoology	1	2000	1	24 minutes*2 times	48	596.8
4.	Kautilya Bhawan	1	2000	1	24 minutes*3 times	72	895.2

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5.	Law	1	1000	1	12 minutes*2 times	24	298.4
6.	Dinkar Bhawan & Library	2	2000	1	24 minutes*3 times	72	895.2
7.	Vanijya Sabhagar	1	500	1	6 minutes*1 time	6	74.6
8.	Indushekhar Jha Administrative Building	2	2000	1	24 minutes*3 times	72	895.2
9.	Technical Bhawan	1	2000	1	24 minutes*3 times	72	895.2

The campus's management of water resources through rainwater harvesting and groundwater recharge methods is a sustainable and responsible approach to water conservation. For this, there are two strategies:

1. Rainwater Harvesting Units: Rainwater harvesting involves the collection and storage of rainwater from rooftops and other surfaces. This collected rainwater is then utilized for various purposes such as toilet flushing and landscape irrigation. This method helps reduce the demand for potable water for non-potable purposes, thus conserving precious freshwater resources.

2. Groundwater Recharge Zone: The establishment of a groundwater recharge zone in the lowland area near the Botany Department and Dinkar Bhawan is an effective way to recharge local aquifers. This area serves as a collection point for rainwater and water from various pipes. The collected water is then used for watering plants, contributing to the replenishment of groundwater resources.

Both of these approaches not only reduce the campus's dependence on external water sources but also help prevent water scarcity and promote sustainable water management. They align with eco-friendly practices and demonstrate a commitment to environmental responsibility and conservation within the campus community.

F. Waste Disposal Management-

The waste management practices of the college encompass various types of waste, including biodegradable, non-biodegradable, and e-wastes, reflecting a commitment to environmental responsibility. Here is an overview of the measures taken:

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1. Biodegradable Waste: The college has implemented a system for segregating biodegradable waste from non-biodegradable waste. Green dustbins are placed throughout the campus to collect biodegradable waste, while red dustbins are designated for non-biodegradable waste. Students and staff are encouraged to use these bins correctly. The biodegradable waste is then collected and processed in compost pits to create compost, which is later used as a natural fertilizer for garden plants. This not only reduces waste but also promotes sustainable gardening practices.

2. Non-Biodegradable Waste: Non-biodegradable waste, collected from designated bins, is responsibly disposed of by handing it over to the local municipal authority, Nagar Nigam Patna. This ensures proper waste disposal and prevents the accumulation of non-biodegradable waste within the campus.

3. E-Wastes: The college addresses electronic waste (e-waste) generated by various departments and sections through responsible disposal. E-wastes are sent to 'Karo Sambhav,' a government of India initiative focused on the proper and environmentally friendly disposal of electronic waste. This ensures that electronic waste is managed in compliance with environmental regulations.

4. Sanitary Napkin Machines with Incinerators: The installation of sanitary napkin machines equipped with incinerators reflects the college's commitment to hygiene and responsible disposal of sanitary waste. Incinerators help safely dispose of used sanitary napkins, preventing improper disposal and environmental contamination.

These measures collectively contribute to effective waste management, reduced environmental impact, and a cleaner and more sustainable campus environment. They also set a positive example for responsible waste management practices within the campus community.

1. Mitigation and Management of Environmental Degradation

The college takes proactive steps to promote environmental sustainability and mitigate the impact of human activities on the environment. These eco-friendly practices contribute to a cleaner, greener, and more sustainable campus. The following initiatives has been adopted by our college:

1. Afforestation: Regular tree plantation drives organized by NSS and on important occasions help balance the ecosystem and increase the green cover of the campus. This not only enhances the campus's aesthetics but also contributes to environmental conservation.

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2. Lush Green Campus: The well-maintained gardens and lawns across the campus create a visually appealing and eco-friendly environment, promoting biodiversity and a sense of natural beauty.

3. Use of Disposable Cutleries: Using disposable cutleries in the college canteen is an environmentally responsible choice that reduces the generation of non-biodegradable waste.

4. Air Pollution Control: Strictly prohibiting smoking on campus and promoting cycling and walking as preferred modes of transportation contribute to reducing air pollution, enhancing the overall air quality within the campus.

5. Hazardous Waste Management: Proper disposal of hazardous waste demonstrates responsible waste management practices, preventing environmental harm.

6. Vermicompost Unit: The presence of a vermicompost unit in the Botany department for processing biodegradable waste into organic compost highlights the commitment to sustainable waste management and enhancing soil health through natural means.

7. Solar Panels: The installation of solar panels in some of the campus buildings harnesses renewable energy and reduces reliance on conventional power sources, contributing to both cost savings and reduced carbon footprint.

By adopting these eco-friendly practices, our college not only sets an example for responsible environmental stewardship but also provides a conducive and

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environmentally conscious learning environment for students and staff. These efforts are vital in protecting and preserving our environment for future generations.

2. **Environmental Awareness and Best Practices**

To promote environmental awareness among students and promote sustainable living, some practices our college has adopted are mentioned below.They not only educate students about the importance of environmental conservation but also instill eco-friendly habits. Some of the best practices followed are:

1. Plantation Drives: Conducting plantation drives on important occasions promotes a green campus and fosters a sense of environmental responsibility among students.

2. Waste Disposal: Encouraging students to use designated dustbins for waste disposal helps maintain cleanliness and proper waste management on campus.

3. Eco-Friendly Transportation: Promoting the use of bicycles and walking as modes of transportation not only reduces pollution but also encourages physical activity and reduces carbon emissions.

4. Reducing Plastic Use: Minimizing plastic usage and opting for disposable cutlery in the canteen are steps toward reducing plastic waste, which is a significant environmental concern.

5. No Smoking Zone: Designating the campus as a no-smoking zone improves air quality and creates a healthier environment.

6. Vermicomposting: Utilizing fallen leaves and biodegradable waste for vermicomposting to produce organic manure demonstrates sustainable waste management and soil enrichment practices.

7. Energy Conservation: Switching off lights, fans, air conditioners, and laboratory instruments when not in use contributes to energy conservation and reduces electricity consumption.

8. Water Management: Promptly addressing leaks in tanks and taps minimizes water wastage, a precious resource.

9. Environmental Awareness Drives: Organizing environmental awareness activities such as poster competitions, photo exhibitions, and campus cleanliness drives actively engages students in environmental issues and fosters a culture of sustainability.

These practices not only benefit the campus and its immediate environment but also equip students with valuable knowledge and habits that they can carry forward into their lives, promoting a sustainable and environmentally conscious society.

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7. Recommendations

1. Reduction of Carbon Footprint: Implementing electric vehicles and adopting green computing practices demonstrate a commitment to reducing carbon emissions and energy consumption.

2. Resource Assessment: Conducting thorough assessments of energy, electricity, water, and waste consumption provides valuable data for informed decision-making and resource optimization.

3. No Vehicle Day: Instituting a "No Vehicle Day" promotes fuel conservation and minimizes emissions, contributing to a cleaner campus environment.

4. Awareness Programs: Educating staff members about sustainable resource usage fosters a sense of responsibility and encourages resource efficiency.

5. Long-Term Goals: Establishing long-term goals and addressing ongoing environmental issues ensures sustained progress in environmental sustainability.

6. Environmental Statement Report: Preparing an Environmental Statement Report highlights the institution's green practices and serves as a transparent record of its commitment to sustainability.

7. Public Outreach: Sharing the Green Audit Report with the public raises awareness and invites engagement in environmental efforts, fostering a broader culture of sustainability.

8. Annual Environmental Audit Report: Publishing an annual environmental audit report demonstrates transparency and accountability, providing a clear view of the institution's sustainability achievements.

These recommendations not only benefit the campus environment but also set an example for responsible environmental stewardship and can inspire similar initiatives in other educational institutions and organizations.

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GREEN AUDIT/ ENVIRONMENTAL AUDIT REPORT

(2018-2019)

College of Commerce, Arts and Science

Patna

College of Commerce, Arts and Science

Patna

A Report on

GREEN AUDIT/ ENVIRONMENTAL AUDIT

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1. Introduction:

The current state of environmental degradation at different levels – local, regional, and global – is causing a global issue known as "Environmental poverty." To ensure a fair and sustainable future, certain steps are crucial, like controlling the human population growth, using eco-friendly technologies, planting trees, and restoring nature. One effective approach is the use of green audits, which are systematic ways to check how well an organization follows environmentally friendly practices. This report explores why green audits matter, especially in universities, and how they can help us understand and improve our impact on the environment. By carefully looking at various aspects of the environment, such as energy use, waste disposal, and tree count, green audits show us how eco-friendly we are. This report also talks about the broader effects of green audits, like raising awareness about environmental issues and promoting ethical behavior. With environmental concerns becoming more important, especially in universities, we delve into how universities can make a positive difference by being more environmentally conscious. This connection between education and the environment is important, and we discuss why universities need to adopt eco-friendly practices, especially as cities grow and economies develop.

Green Audit involves a structured process of identifying, measuring, documenting, reporting, and analyzing different aspects of an environment's diversity within different establishments. Its purpose is to assess the environmental practices both within and outside these sites, which influence the overall environmentally friendly atmosphere.

The advancements of the 20th century, marked by modernization and industrialization, have undeniably enhanced human comfort and luxury. However, these developments have come at a cost, leading to excessive use of natural resources, exploitation of forests and wildlife, the generation of substantial solid waste, pollution of precious water sources, and the degradation of the Earth's appearance and habitability. In our time, global awareness has grown around critical issues like global warming, the greenhouse effect, ozone depletion, and climate change. This situation signifies a crucial moment for humanity to embark on the path of sustainable development, responding to what can be seen as an urgent call from our planet.

2. College and its Perspectives

For colleges, Green Audit serves as a valuable tool to identify areas where energy, water, or resources are used most significantly. This analysis allows colleges to consider implementing changes that lead to efficiency and savings. Additionally, Green Audit aids in determining the nature and quantity of waste generated, which can be utilized for recycling initiatives or improving waste reduction strategies. Beyond these practical aspects, Green Audit fosters a sense of health awareness and cultivates values related to environmental consciousness and

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ethics. It also enhances the understanding of how green practices impact the campus among staff and students.

Considering the escalating importance of environmental sustainability on a national level, the role of higher education institutions in relation to environmental responsibility becomes even more prominent. As such, it becomes crucial for colleges to assess their contributions toward a sustainable future, aligning their practices with the broader environmental concerns of society.

The rapid growth of urban areas and economic progress on local, regional, and global scales has triggered various environmental and ecological crises. In light of this situation, embracing the Green Campus concept becomes vital for educational institutes. This approach not only fosters sustainable development but also plays a significant role in mitigating atmospheric carbon dioxide levels.

Green Audit holds particular importance within the framework of NAAC (National Assessment and Accreditation Council), a body that rates institutions as Grade A, Grade B, or Grade C based on evaluation criteria. Furthermore, it aligns with the Corporate Social Responsibility of Higher Educational Institutions by ensuring their active contribution to curbing global warming through initiatives that reduce their carbon footprint.

Hence, the primary objective of the current green audit is to systematically recognize, measure, describe, and prioritize the framework for Environmental Sustainability. This approach is designed to adhere to relevant regulations, policies, and standards governing environmental practices.

3. Objectives

The primary aim of green auditing is to protect the environment and mitigate risks to human well-being. The essential objectives of an environmental audit encompass:

- Assessing the effectiveness of environmental management systems and equipment.
- Validating compliance with relevant national, local, and regulatory laws.
- Reducing risks to human health by addressing environmental, health, and safety issues.
- Enhancing resource management efficiency.
- Establishing a foundation for enhanced sustainability.
- Enabling waste reduction, solid waste management, and water recycling.
- Establishing a campus free from plastic pollution and promoting health awareness among stakeholders.
- Identifying methods for cost savings through waste reduction.
- Identifying current and potential challenges.

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- Disseminating environmental education via systematic management strategies and elevating environmental standards.

- Achieving financial savings by reducing resource consumption.

- Elevating the institution's reputation.

- Cultivating an environmental conscience and value system in students.

4. Scope and Goals of Environment Auditing

The concept of Green Audit emerges as a potent ecological tool to address these environmental challenges. It involves a systematic process of consistently identifying, measuring, documenting, reporting, and overseeing environmentally significant aspects within a specific area. By employing this approach, ongoing environmental activities are closely monitored within and beyond specific sites, considering both direct and indirect impacts on the surroundings. The implementation of Green Audit can serve as a proactive step for institutions to assess their energy consumption, water usage, as well as the generation of wastewater, solid waste, electronic waste, and hazardous waste. Beyond its practical applications, the Green Audit process holds the potential to elevate environmental consciousness and enhance understanding regarding responsible resource utilization. It also fosters awareness of ecological values and ethics. In essence, Green Audit provides guidance on how to enhance environmental conditions, offering a practical way forward.

5. Methodology

The methodology of Green/ Environmental Audit includes physical inspection of the college campus, observation and review of the data collected, interviewing of the concerned persons and data analysis. Thus, the methodology followed for the audit comprised of two points, as follows:

1. Data collection- For collection of data, the audit team reached out to each department or areas physically and collected data from various faculties, administration and staff members. Data about general information was collected by observation and interviews of the concerned persons.

2. Data analysis- The data that was collected was thoroughly analysed for example, data related to water tank capacity, power consumption were calculated whereas, the flora of the campus after being counted were distributed into herbs, shrubs and trees etc.

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6. Audit Report

A. Land Use and Climatic Data

The land of the campus has been well utilized. The land of the college has been utilized as following:

i) Sports- Students of the college participate in various basketball, football matches and cricket. There is a field dedicated to NCC.

ii) Auditorium- A big auditorium, known as the 'Vanijya Sabhagar' has a seating capacity of hundreds, is in the campus where seminars/conferences or various cultural activities are held.

iii) Gardens and lawns- Most of the area of the college has a lush green flora which adds to the green cover.

iv) Waiting areas- Separate waiting areas are build for senior citizens/physically challenged people who accompany their wards.

v) Toilets- Separate toilets for both girls and boys are available at various locations of the campus.

vi) Canteen- The college has a fully functional canteen which uses disposable cutleries.

vii) Post office- Near the entrance of the college, there is a post office. The staff and the students of the college make use of this post office.

viii) Bank- The students and staff of the college has access to the bank where they can easily do their monetary transactions.

ix) Library- Well-equipped library is in the campus where students can sit and study and also can issue books of their concerned subjects.

x) Girl's common room- A separate room for the girl students is built and is well-maintained. The washroom of this room has napkin vending machine with incinerator.

Since the city has an extreme type of climate, the students of the college enjoy all the four seasons distinctly. Various cultural activities are held in each of the season such as, 'Saavan Mahotsav'/Mehandi competition in the month of July and August.

B. **Energy conservation**- The college aims at saving energy by using star rated electrical and electronic equipments. Moreover, Solar panels have been installed in 2018 by M/s Expression Buildtech Pvt. Ltd. on some of the buildings of the college.

Table 1: Distribution of solar panels in the campus

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S.no.	Names of the Departments	Capacity Required	Category	Sanctioned load	Area in m squares
1.	Administrative and Arts Block, Psychology Department, college auditorium, Science Block, Botany Department	25	B	20	1542

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C. **Green Cover and Biodiversity-** Under this domain, the preservation of all types of plant and animal species, including microorganisms, is considered. It encompasses the maintenance of various outdoor elements like gardens, lawns, and trees to promote biodiversity. The college has an optimum green cover as per the land cover of the campus. Various types of flora and fauna are found in the campus. The data for the same is depicted in the following tables.

Table 2: List of Tree/Shrubs/Herbs species found in the campus (2018-2019)

S.no.	Common name	Botanical name	Quantity
1	Ashok	*Polyalthia longifolia*	41
2	Babul	*Acacia nilotica*	4
3	Banyan	*Ficus benghalensis*	3

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4	Gulmohar	*Delonix regia*	4
5	Coconut	*Cocos nucifera*	4
6	Peela gulmohar/yellow-flame/copperpod	*Peltophorum pterocarpum*	
7	Indian Almond	*Terminalia catappa*	11
8	Jamun	*Syzygium cumini*	6
9	Champa	*Plumeria rubra*	4
10	Golden shower	*Cassia fistula*	6
11	Saptaparni	*Alstonia scholaris*	6
12	Mango	*Mangifera indica*	13
13	Neem	*Azadirachta indica*	2
14	Palas	*Butea monosperma*	
15	Peepal	*Ficus religiosa*	9
16	Arjun	*Terminalia arjuna*	4
17	Kadamba	*Neolamarckia cadamba*	8
18	Shisham	*Dalbergia sissoo*	1
19	Teak	*Tectona grandis*	1
20	Rubber plant	*Ficus elastica*	1
21	Ceylon ebony	*Diospyros ebenum*	6
22	Juglans west Indian cedar	*Juglans olanchana*	8
23	Okari nut	*Terminalia kaernbachi*	1
24	Ana tree	*Acacia albida*	4
25	Matoa	*Pometia pinnata*	1
26	Chaste tree	*Vitex glabrata*	1
27	Reetha	*Sapindus mukorossi*	1
28	Tree of heaven	*Ailanthus altissima*	1
29	Himalayan chestnut	*Aesculus indica*	1
30	Nikko maple	*Acer maximowiczianum*	1

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31	Sheesham	*Dalbergia sissoo*	1
32	Purple allamanda	*Cryptostegia grandiflora*	1
33	Amur cork tree	*Phellodendron amurense*	3
34	Shahtoot	*Morus alba*	1
35	Bishop tree	*Bischofia javanica*	1
36	Kassod tree	*Senna siamea*	1
37	Peacock flower tree	*Caesalpinia pulcherrima*	1
38	White fig	*Ficus virens*	1
39	Jackfruit	*Artocarpus heterophyllus*	1
40	Blimbi	*Averrhoa blimbi*	1
41	Pinwheel plant	*Tabernaemontana divaricata*	2
42	Croton	*Codiaeum variegatum*	8
43	Samudraphal	*Barringtonia acutangula*	1
44	Foxtail palm tree	*Wodyetia bifurcata*	1
45	Guava	*Psidium guajava*	2
46	Cluster fig	*Ficus racemosa*	4

In addition to the flora found in the campus of the college, there are two gardens in the college. Table 3 and 4 depicts the distribution of the flora in these gardens and lawns.

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Table 3: List of Tree/Shrubs/Herbs species found in the Botanical garden

S.no.	Common name	Botanical name	Quantity
1	Semal	*Bombax ceiba*	1
2	Gulmohar	*Delonix regia*	1
3	Roselle	*Hibiscus sabdariffa*	2
4	Kapur tulsi	*Ocimum tenuiflorum*	1
5	Trumpet bushes	*Tecoma stans*	2
6	Spider lily	*Crinum asiaticum*	2
7	Vicks plant	*Plectranthus tomentosa*	1
8	Karanj	*Pongamia pinnata*	1
9	Elephant apple	*Dillenia indica*	1
10	Lavang	*Syzygium aromaticum*	1
11	Neem	*Azadirachta indica*	1
12	Falsa	*Grewia asiatica*	1
13	Jambiri lemon	*Citrus jambhiri*	1

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14	Bamboo	*Bambusa vulgaris*	1
15	Rudraksh	*Laeocarpus ganitrus*	1
16	Ashok	*Saraca asoca*	2
17	Mango	*Mangifera indica*	3
18	Kaner	*Cascabela thevetia*	1
19	Kadamb	*Neolamarckia cadamba*	1
20	Jackfruit	*Artocarpus heterophyllus*	1
21	Guava	*Psidium guajava*	1
22	Mountain ebony	*Bauhinia variegata*	1
23	Castor	*Ricinus communis*	1
24	Arjuna	*Terminalia arjuna*	2
25	Mahogany	*Swietenia mahagoni*	1
26	Rose	*Rosa sinensis*	4
27	Sunflower	*Helianthus annuus*	3
28	Sago palm	*Cycas revoluta*	2
29	Areca palm	*Areca catechu*	1
30	Garden croton	*Codiaeum variegatum*	6
31	Jasmine	*Jasminum officinale*	4
32	Duranta	*Duranta erecta*	2
33	Mexican petunia	*Ruellia simplex*	1
34	Curry leaf	*Murraya koenigii*	2
35	Harsingar	*Nyctanthes arbor-tristis*	3
36	Pudina	*Mentha arvensis*	2
37	Ajwain	*Trachyspermum ammi*	1
38	Tulsi	*Ocimum sanctum*	2
39	Giloy	*Tinospora cordifolia*	2
40	Lemon grass	*Cymbopogon citratus*	4
41	Snake plant	*Dracaena trifasciata*	3
42	Kalmegh	*Andrographis paniculata*	1

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43	Malti	*Combretum indicum*	1

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Table 4: List of Tree/Shrubs/Herbs species found in other gardens of the campus.

S.no.	Common name	Botanical name	Quantity
1	Ashok	*Saraca asoca*	25
2	Holy basil	*Ocimum tenuiflorum*	13
3	Rose	*Rosa sinensis*	14
4	Smart weed	*Persicaria species*	17
5	Geranium lemon	*Pelargonium crispum*	16
6	White mugwort	*Artemisia lactiflora*	8
7	Sissoo spinach	*Alternanthera sessilis*	72
8	Garden croton	*Codiaeum variegatum*	12
9	Periwinkle	*Catharanthus roseus*	6
10	Chandelier tree	*Pandanus candelabrum*	2
11	Mango	*Mangifera indica*	4
12	Golden dewdrop	*Duranta erecta*	9
13	Daisy	*Townsendia montana*	3
14	Hibiscus	*Hibiscus rosa-sinensis*	6
15	Persian silk tree	*Albizia julibrissin*	3
16	Red dracaena	*Dracaena marginata*	7
17	Patricia	*Geranium patricia*	13
18	Blackboard tree	*Alstonia scholaris*	4
19	Guava	*Psidium guajava*	4
20	Helinus	*Helinus integrifolius*	4
21	Spider plant	*Chlorophytum comosum*	4

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D. **Pollution and its Management-**

i) Air Pollution- Walking and use of bicycles are promoted in the campus to reduce air pollution. Also, the concept of carpooling is encouraged among teachers. The following table very clearly shows that more number of students use cycles in the campus area.

Table 5: Usage of cycles in the college (2018-2019)

S.no.	Area	No. of cycles
1	Department of Geography	3
2	Parking area	25
3	Notice board garden	12
4	Department of Commerce	10
5	Faculty of Science	7
6	Department of History	3
7	Library	2
8	Department of Economics	4
9	Others	3
	Total no. of cycles	69

ii) Water Pollution- The campus takes proactive measures to address water pollution and minimize its environmental impact. Managing hazardous waste from science laboratories separately is a responsible and essential step in preventing contamination of water bodies. Proper disposal systems for hazardous materials help ensure that potentially harmful substances do not enter the water supply, preserving the quality of water for both human use, such as drinking, and the well-being of aquatic ecosystems. This demonstrates a commitment to environmental stewardship and the responsible use of resources within the campus community.

iii) Land Pollution- Separate dustbins (biodegradable/non- biodegradable) and (dry/wet) are placed throughout the campus for segregation of various kinds of wastes. The campus also ensures a no plastic zone. The canteen also uses disposable cups or kulhars and glasses to reduce land pollution.

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iv) Noise Pollution- The campus is mostly a silent one as majority of the students use two-wheelers or bicycles and most of them also commute by walking.

E. Water Resources and its Management-

Several buildings of the campus have overhead water tanks with capacity around 2000 litres. The following table shows the number of these overhead tanks and their energy consumption.

Table 6: Overhead Water Tank Energy Consumption 2018-2019

S.no.	Departments	Number of overhead tanks	capacity	Power of Pump in kW	Time taken to fill the tank*number of running pump/day	Total time in minutes	Energy Consumption in W (Watt)
1.	Geography	1	2000	1	24 minutes*4 times	96	1193
2.	C.V Raman Bhawan	1	2000	1	24 minutes*3 times	72	895.2
3.	Zoology	1	2000	1	24 minutes*2 times	48	596.8
4.	Kautilya Bhawan	1	2000	1	24 minutes*3 times	72	895.2
5.	Law	1	1000	1	12 minutes*2 times	24	298.4
6.	Dinkar Bhawan & Library	2	2000	1	24 minutes*3 times	72	895.2
7.	Vanijya Sabhagar	1	500	1	6 minutes*1 time	6	74.6
8.	Indushekhar Jha Administrative Building	2	2000	1	24 minutes*3 times	72	895.2

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Management of the water resources is done by two ways.

i) Rain Water harvesting units- The rain water is collected and stored in these rain water harvesting units which is further used for toilet flushing or for landscape irrigation etc.

ii) Ground water recharge zone – There is a lowland area near Botany Department and Dinkar Bhawan where all rainwater and water from various pipes are collected. This water is further used for watering the plants.

F. Waste Disposal Management-

The college generates both biodegradable and non-biodegradable wastes along with e-wastes. Some measures taken by the college are:

i) Biodegradable- There are two kinds of dustbins placed at various places in the campus. Green for the biodegradable and Red for the non-biodegradable wastes. Students and staff of the college are encouraged and advised to throw their wastes in these bins respectively. The biodegradable wastes are collected and are put into compost pits for making compost to use as manures for garden plants.

ii) Non-biodegradable- These are collected from the bins and are handed over to the Nagar Nigam, Patna.

iii) E-Wastes- e-wastes generated from each departments/sections are disposed off to the 'Karo Sambhav' (A government of India initiative).

iv) Sanitary napkin machines are installed with incinerators.

G. Mitigation and Management of Environmental Degradation

Increased human activities leads to environmental degradation. Educational places like schools and colleges can prevent significantly from environment being degraded by following certain environment-friendly practices. Some of the practices adopted by our college are as follows:

i) Afforestation- Regular plantation of trees in the campus helps in balancing the ecosystem and thereby increasing the overall green cover of the campus. For this, regular plantation drives are taken up by the NSS and also on most of the important occasions.

ii) Maintenance of Lush Green campus- All the gardens and lawns of the campus are very well-maintained by the concerned persons.

iii) Disposable cutleries are used in the college canteen.

iv) Smoking is strictly prohibited in the campus and cycling or walking is preferred so as to reduce air pollution.

v) Hazardous wastes are very carefully disposed.

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vi) A Vermicompost unit is placed in the department of Botany for making organic compost from the biodegradable wastes collected from the campus. This is further used for manuring in flowerbeds and other plantations in the campus.

vii) Solar panels are placed in some of the buildings of the campus.

H. Environmental Awareness and Best Practices

In order to create awareness about the environment among students of the college, some of the best practices followed by them are as follows:

i) Plantation drives are performed on most of the important occasions.

ii) Students are advised not to throw garbage anywhere in the campus except the two separate dustbins (Red and Green).

iii) Use of bicycles or walking as a mode of transportation is followed.

iv) Minimum use of plastic in the campus. The canteen of the college also uses disposable cutleries.

v) The campus is a no smoking zone.

vi) The fallen leaves and the biodegradable waste of the campus are collected and put into the vermicompost unit to produce organic manure.

vii) All the fans, lights and Air conditioners are switched off after their use. The instruments used in Science laboratories are also switched off after their use.

viii) Any leakage in tanks or taps are instantly corrected in order to minimize water loss.

ix) Several environmental awareness drives like poster competition, photo exhibition, campus cleanliness drives are encouraged among students.

7. Recommendations

Green audits not only identify areas for change but also drive the shift towards greener and cleaner practices that contribute to the well-being of both the local environment and the planet as a whole. Some of the recommendations are as follows:

1. Reduction of Carbon Footprint:
   - Implementation of electric vehicles on campus to decrease carbon emissions.
   - Adoption of green computing practices in administration and examination processes to minimize energy consumption.

2. Resource Assessment:
   - Comprehensive assessment of energy, electricity, and water consumption.

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- Tracking the disposal of various types of waste: liquid waste, solid waste, hazardous waste, and e-waste.
- Inventory of trees on campus to quantify carbon sequestration and oxygen release.

3. No Vehicle Day:
- Instituting a "No Vehicle Day" on the first Saturday of every month to promote fuel conservation and reduce emissions.

4. Awareness Programs:
- Conducting awareness programs to educate staff members about sustainable resource usage, encouraging optimization of available resources.

5. Long-Term Goals:
- Establishing long-term goals for the environmental audit program, which include collecting baseline environmental data and addressing ongoing environmental issues.

6. Environmental Statement Report:
- Preparing an Environmental Statement Report that outlines the green practices followed by different departments, support services, and administration within the university.

7. Public Outreach:
- Sharing the Green Audit Report with the public to raise awareness and encourage involvement in reducing environmental issues.

8. Annual Environmental Audit Report:
- Considering the possibility of publishing an annual environmental audit report, which provides transparency and accountability regarding the institution's sustainability efforts.

These multifaceted approach underscores the institution's commitment to reduce its environmental impact and can serve as a model for sustainability. By incorporating such initiatives and practices, universities can lead by example and contribute significantly to the global efforts to address environmental challenges.

8. References

i) NEP (2006). National Environmental Policy, 2006. Ministry of Environment, Forest and Climate Change, Govt.

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ACTION TAKEN FOR ENVIRONMENTAL POLICY

The following action were taken for environmental policy of the college:

1. **Water Management-**
   - **i)** Rainwater Harvesting: Rainwater harvesting systems have been installed in all campus buildings. This collected rainwater has been used for various purposes, including irrigation, flushing toilets, and ground water replenishment.

Fig.: Rainwater Harvesting unit installed near Zoology department.

   - **ii)** Leak Reporting and Repair: Immediate repair to prevent water wastage has been done. A caretaker or maintenance team responsible for quick action on leak repairs has been done.
   - **iii)** Toilet Choices: More Indian-style toilets (squat toilets) rather than western-style toilets have been installed as Indian-style toilets typically use less water per flush.

2. **Energy Audit**: The college has adopted various measures, such as replacing CRT monitors with LCD monitors, using LED lighting, introducing automatic street lighting control, upgrading air conditioners for energy efficiency, and utilizing transparent glass windows for natural lighting to conserve energy.

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Fig.: Star rated air conditioners for energy efficiency

Fig.: Installation of LED lights for energy efficiency

3.Renewable Energy Installation: Solar panels have been installed in the campus for clean energy generation.

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Fig.: Solar Panels installed in the campus

4.Bio-degradable and non bio-degradable waste:

Solid Waste Management: The college focuses on reducing waste generation and implementing the segregation of waste into bio-degradable and non bio-degradable wastes by the use of placement of green and blue dustbins in the college campus. The use of paper is minimized through digitization of attendance and assessment records.

Fig.: Placement of separate dustbins for segregation of wastes.

Additionally, we also have a memorandum of understanding (MOU) with DPS, Patna where, waste paper from the college is collected and sent to DPS, Patna. There it is recycled and retreated and the waste paper is converted to reusable paper and sent back to the college. This recycled paper is used in publishing notices/circulars etc. Thus, we are converting waste into national wealth.

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DELHI PUBLIC SCHOOL PATNA

Campus | Telephone | E-Mail

MEMORANDUM OF UNDERSTANDING (MOU)

This Memorandum of Understanding is between Delhi Public School, Patna, hereinafter referred to as "DPS Patna," and College of Commerce, Arts & Science, Patna, hereinafter referred to as "the College."

POINTS OF AGREEMENT

- Both parties share a concern for environmental sustainability and recognize the need to contribute to waste reduction efforts. Therefore, DPS Patna agrees to process waste papers provided by the College.
- The College shall send its used papers to DPS Patna as and when required.
- DPS Patna will efficiently process the waste papers received, ensuring environmentally friendly recycling methods.
- The recycled papers will be returned to the College for reuse in various capacities, such as in-house circulation of notices and rough works.
- Both Institutions acknowledge that this MOU is an attempt to create wealth from waste, promoting sustainable practices and fostering environmental consciousness.

The initiative aims to contribute to environmental sustainability, reduce carbon footprint, and promote responsible waste management practices.

(Signature)
B. Vinod
Principal, DPS Patna
Date:

(Signature) 23.08.23
Prof. Tapan Kumar Shandilya
Principal, COCAS
Date:

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Fig.: Memorandum of Understanding (MOU) between the college and DPS, Patna

Biodegradable Waste: The Botanical garden at the College of Commerce, Arts, and Science, Patna operates a Vermicompost unit, utilizing organic waste generated on campus for vermicomposting and solid waste management. The vermicompost produced serves as a nutrient-rich manure for the Botany garden and other plants on campus. This initiative also provides students with valuable training in vermicomposting, potentially equipping them to manage small-scale industries in the future.

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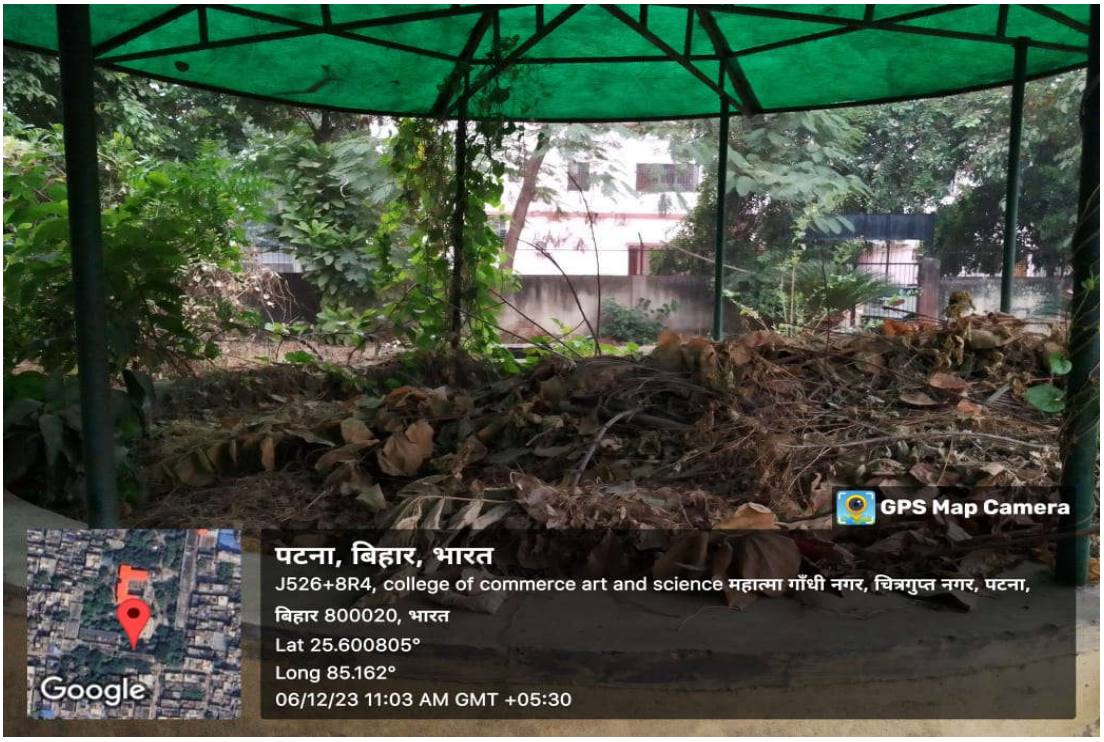

Fig.: Vermicompost in Botany department.

5.E-Waste Management: Electronic waste of the college has been handled responsibly by maintaining AMC for CPUs and monitors, followed expert recommendations for disposal, and selling obsolete but workable computers and equipment as scrap. These e-wastes has been deposited to the **karo sambhav** team of Patna located at Boring Canal Road.

Principal
College of Commerce, Arts & Science
Patna- 800020

Phone 0612-2350136 (O)
E-mail principalcocaspatna@gmail.com
Website www.cocaspatna.ac.in

College of Commerce, Arts & Science

Kankarbagh, Patna – 800 020
(A Constituent Unit of Patliputra University, Patna-20)
NAAC RE-ACCREDITED 'A' Grade, with CGPA 3.10

OFFICE OF THE PRINCIPAL

Ref :- Date :-

TO WHOMSOEVER IT MAY CONCERN

KSPL/BC/2023-24/91

Our office, **College of Commerce, Arts and Science, Patna** has handed over the following e-waste material to Karo Sambhav Pvt. Ltd. for responsible recycling in accordance with the E-Waste (Management) Rules 2022.

We have handed over **400 Kg** of e-waste to Karo Sambhav Pvt. Ltd. on 11th July 2023.
The e-waste given by us comprises the following items: -

Sr. No	ITEW Category as per e-waste (management) rules 2022	Item Description	Quantity of e-waste generated (in Kg)
1	ITEW 2	CPU	110.5
2	ITEW 24	UPS	71
3	ITEW 2	Keyboard	16.35
4	CEEW 4	AC Indoor	9.5
5	ITEW 2	LCD Monitor	53
6	LSEEW 29	Water Purifier	17.4
7	CEEW 4	Stabilizer	19.5
8	ITEW 2	CRT Monitor	38
9	ITEW 17	Projector	12.7
10	ITEW 6	Printer	23
11	LSEEW 13	Fan	6.3
12	ITEW 2	SMPS	1.45
13	LSEEW 21	Mixer	3.75
14	ITEW 2	Motherboard	2.3
15	ITEW 1	Adaptor	10.1
16	ITEW 2	Mouse	1
17	ITEW 12	Telephone	3.5
18	ITEW 2	Hard Disk	0.4
19	ITEW 26	Modem	0.25
		Total Quantity	400 Kg

Authorized Signatory
Place: Patna

Principal
College of Commerce, Arts & Science
Patna- 800020
10/07/2023

Fig.: E-wastes given to Karo Sambhav

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Fig.: Certificate by Karo Sambhav to the college.

6. **Awareness Campaigns**: various awareness campaigns, workshops, and events to educate and engage the college community in sustainable practices have been organized.

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Fig.: Awareness programmes for sustainable practices on World Environment Day

7.Clean Campus Initiatives: The college is actively engaged in coordinating cleanliness activities within and beyond the campus, aligning with the vision of the Swachh Bharat Abhiyan. This includes raising awareness about cleanliness and hygiene through regular drives, rallies, and the active participation of students and staff in cleanliness efforts. The college also organizes events and competitions related to the Swachh Bharat initiative and promotes a pledge to maintain cleanliness.

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Fig.: Cleanliness drive by the students in the college campus.

Fig.: Cleanliness drive by the students in the college campus.

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Bihar State Pollution Control Board (BSPCB) has awarded GREEN SCHOOL PROGRAMME certificate to our college on the basis of our energy and environmental audit report.


BIHAR STATE POLLUTION CONTROL BOARD
DEPARTMENT OF ENVIRONMENT, FOREST & CLIMATE CHANGE, GOVERNMENT OF BIHAR, PATNA
Certificate
OF ACHIEVEMENT
GREEN SCHOOL PROGRAMME
This is to certify that
College of Commerce, Arts & Science
Opposite Rajendra Nagar Terminal, Kankarbagh Rd, Patna, Bihar 800020
has participated in the 'GREEN SCHOOL PROGRAMME' conducted by the Board and has secured a '4-star' rating.
26/12/23
(S. Chandrasekar)
Member Secretary

Fig.: Certificate by the Bihar State Pollution Control Board (BSPB) to the college.

8.Clean Air Initiatives: The college encourages the use of public or college transportation to reduce air pollution and limits the entry of private vehicles within the campus. Smoking and the use of tobacco products are strictly prohibited to maintain a smoke-free campus.

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Fig.: Awareness Programme on NO TOBACCO DAY in the college campus.

Fig: Poster session on NO TOBACCO DAY

9.Paperless Operating Procedure- Digital communication, and e-assignments are encouraged in the curriculum.

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Fig.: Encouragement of digital communication on digital platform.

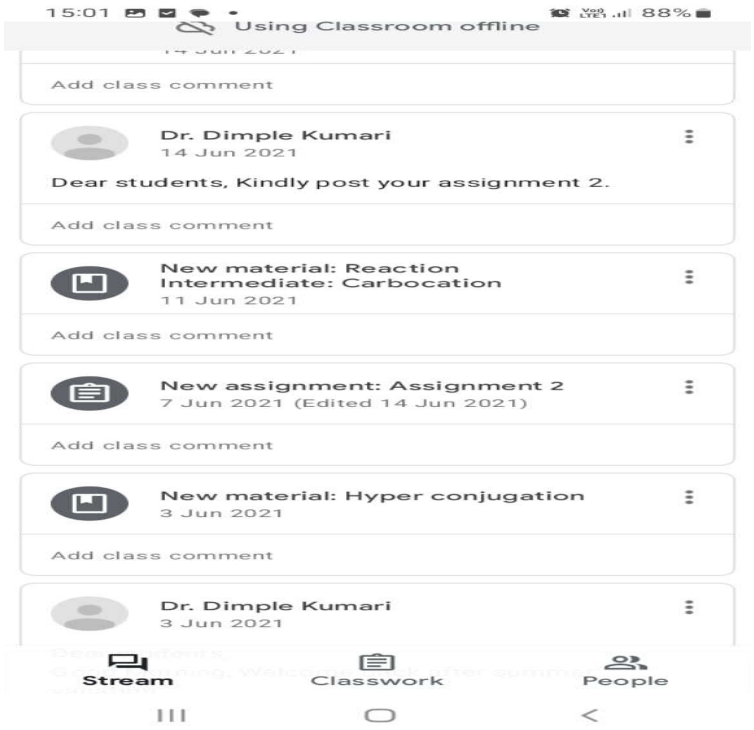

Fig.: E-assignment on Google classroom.

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10.Plantation drives: The college organizes annual plantation drives to decrease carbon footprint and enhance the college ambience.

दैनिक भास्कर, पटना, शनिवार 04 अगस्त, 2018

कॉलेज ऑफ कॉमर्स में [illegible] किया पौधरो[illegible]

पटना|वन महोत्सव पर पेड़ लगाओ पर्यावरण बचाओ [illegible] के तहत कॉलेज ऑफ कॉमर्स के प्राचार्य प्रो. तपन कुमार शांडिल्य ने [illegible] को कॉलेज परिसर में पौधरोपण किया। इस मुहिम के तहत महाविद्यालय परिसर में 100 से अधिक नीम, अमलतास, जामुन, गुलमोहर, अमरूद, आंवला तथा अन्य फलदार वृक्ष लगाए गए। इस मौके पर प्राचार्य प्रो. तपन कुमार शांडिल्य ने कहा कि एक पेड़ सौ पुत्रों के समान होता है और मानव जीवन की रक्षा का एकमात्र साधन है। पौधे लगाकर ही हम वर्तमान और आने वाली पीढ़ियों के लिए धरती को सुरक्षित बना सकते हैं। इस अवसर पर विधायक [illegible] कुमार सिन्हा, प्रो. कौशलेंद्र कुमार सिंह, एनएसएस समन्वयक प्रो. कीर्ति, कुलानुशासक डॉ. मनोज कुमार, डॉ. अनिल कुमार सिंह, छात्रसंघ अध्यक्ष विकास ऑफिसर याद[illegible] यादव आदि भी मौजूद रहे।

Fig.: Newspaper clipping of plantation drive in the campus.

Fig.: A view of the Plantation drive in the campus.

11. **Plastic-Free Campus**: The college strictly enforces a ban on single-use plastics within its premises and promotes the use of eco-friendly alternatives. Sensitization programs and initiatives extend to students and stakeholders to ensure a plastic-free campus and raise awareness about the harmful effects of plastic use.

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