GREEN AND ENVIRONMENTAL AUDIT REPORT

(2021-2022)

BELDA COLLEGE, PASCHIM MEDINIPUR, WEST BENGAL

CONSULTRAIN MANAGEMENT SERVICES,
LAKE ROAD, KOLKATA

TROPICAL INSTITUTE OF EARTH AND ENVIRONMENTRAL RESEARCH (TIEER),
MEDINIPUR

CONSULTRAIN MANAGEMENT SERVICE
Lake Road, Kolkata, West Bengal, India

TROPICAL INSTITUTE OF EARTH AND ENVIRONMENTAL RESEARCH (TIEER)
Reg. No. S/1L/42578 of 2006-07
Office address: M-10, Bidhannagar, Medinipur-721101, W.B., India

GREEN AND ENVIRONMENTAL AUDIT CERTIFICATE

Academic Year: 2021-2022

This is to certify that Belda College, Belda, Paschim Medinipur, West Bengal has good and healthy eco-friendly environment created for saving Earth and Nature. Tropical Institute of Earth and Environmental Research associated with Consultrain Management Service are satisfied after successful completion of Green and Environmental Audit with moral support of Honorable Principal, IQAC Team, Staff and Students for academic year 2021-2022. This efforts taken by Faculty and Students towards environment and sustainable are highly appreciable and commendable.

(Dr. Binoy Kr. Chanda)
President, TIEER

(Dr. Pranab Sahoo)
Asst. Professor &
Secretary, TIEER

(Mrs. Sanchita Bhattachariya)
ISO-Auditor& CEO, CMS
Auditor for
IS09001, IS014001
& IS050001

(Dr.Sudipta kr. Maiti)
Expert & Member TIEER
Expert
Tropical Institute of Earth

ACKNOWLEDGEMENT

We, The Environment Audit Team thank the management of Belda College for assigning us such an important work on Green & Environmental audit. We appreciate the cooperation to our team for the assigned study, giving us necessary inputs to carry out audit activities.

Our special thanks to:

- Principal of the College
- IQAC Members
- Teaching & supporting staff

AUDIT EXPERT MEMBERS

The Committee members are listed below:

SL. No.	NAME	DESIGNATION	AREA IN INTEREST
1.	Dr. Binoy Kr. Chanda	President, TIEER & Former IC, VU	Environment Science & Climatology
2.	Dr. Pranab Sahoo	Secretary, TIEER & Assistant Professor and HOD, Dept of Geography, S.B. Mahavidyalaya, Kapgari	Climate Change and Environment Management and Biogeography
3.	Mrs. Sanchita Bhattachariya	Consultant, Consultrain Management services, Kolkata, & Member, TIEER, ISO-9001,14001&50001Certified Auditor.	Environment Management
4.	Dr.Swapna Ghorai	Advisory Member, TIEER & Principal, Ramananda College, Bishnupur	Ecology and Environment management
5.	Dr. Sudipta Maiti	Faulty, Dept. of Botany, Raja N.L. Khan Womens' College, Midnapore	Plants Diversity & Carbon stocking, Green Management
6.	Dr. Pravat Kr. Shit	Assistant Professor, Raja N.L. Khan Womens' College, Midnapore	Biodiversity Management, Carbon stocking Measurement
7.	Dr. Mrinmoy Ghorai	Assistant Professor in Zoology, PanskuraBanomali college.	Fauna & Aqua animals and Biodiversity conservation
8.	Dr. Subhendu Ghosh	Asst. Teacher & Expert	Ecology and Environment Management
9.	Sri Ananda Das	Asst. Teacher & expert	Electro physics
10.	Sri Biplob Nayek	Drone Surveyor	Aerial Photography
11.	Sri Sarat Chatterjee	Surveyor	Water and Air Quality Measurement
12.	Sri Sanjib Mahata	Surveyor & Expert in RS &GIS	Map Designer

CONTENTS

1.0 INTRODUCTION :

The term 'Green' stands for Resource balance, Quality environment, Recycled products and Ecofriendly. Green and environmental Audit is a process of systematic, documented, periodic and objective evaluation of components of environmental diversity with the aim of ensuring readiness in eco-friendly environment and conservation of natural resources in its operations. The process starts with systematic identification, quantification, recording, reporting and analysis of components of environmental diversity of the college. Green auditing is a means of assessing environmental performance. Green audit is a valuable means for a College to determine how and where they are using the most energy or water or other resources; the College can then consider how to implement changes and make savings. It can create healthy consciousness and promotes environmental awareness, values and ethics.

1.1 Goals & Objectives:

It aims to analysis environments within and outside of the concerned area, which will have an impact on the eco-friendly atmosphere. It provides staff and students better understanding of Resource management on their area of work.

The Main Objectives of Carrying out of Green Environmental Audit:

- To ensure the performance of the Institution with respect to environmental activities they are involved in, in compliance with existing laws and regulations
- To locate the Green area and the Geographical location of the College – aerial view
- To document the floral and faunal diversity of the College
- To develop and follow the waste management system
- To reduce the energy consumption of the Institution
- To report the expenditure on green initiatives, carbon foot print
- To record the air, water quality of the Institution
- To conserve the natural resources

Areas of Concern:

- WATER MANAGEMENT
- ENERGY MANAGEMENT
- AIR QUALITY AND CARBON FOOTPRINT
- WASTE MANAGEMENT
- E-WASTE MANAGEMENT
- BIODIVERSITY

This Audit has been conducted by a Committee constituted by the Experts & Scientists from different reputed Institutes. The Committee developed a questionnaire for audit based on the regulatory and statutory requirements of Centre as well State. The basic data was gathered and compiled, which the committee analyzed. By and large, the audit reveals a healthy environment inside the **Belda College** campus. The committee has suggested short term as well as long-term suggestions for improved environmental conditions to a higher level and authorities to all stakeholders of the College conform that they will give due attention and utilize opportunities for identified improvements.

Meeting with Hon'ble Principal & IQAC Team

1.2 About the College :

History :

There is an oft-quoted saying in the locality of Belda-**"Belda could not dream of a college without Kedarnath Das".** The day 16th August in the year 1963 is a conspicuous landmark amongst the people of Belda.

Through the untiring and selfless efforts of Kedarnath Das and N.G. Dutta, the then B.D.O. Narayangarh, Belda College was established on that day and Kedar babu became the first founder Secretary of this institution. Belda Satyanarayana Mandir Committee and Deuli Sudhir Primary School Committee came forward to donate handsome money and land without which this institution of higher education would never see the light of the day.

The College is situated in a picturesque site amid the conducive atmosphere of learning. It is away from the din and bustle of the town life. The scenery of bounteous nature, the open face of the blue vault of heaven, the spacious grassy playground adds to the sublime beauty of the college. In the very first day of its inception Kedarnath Das said in his speech, "I have just been able to plant a little sapling for the dissemination of

education and it has the potentiality of growing into a big tree with full blossom if nourished properly and timely in the years to come".

Vision :

Our vision is to transform our college into a centre of excellence in the arena of higher education and contribute to the inclusive development of the country by generating quality human resources. The college aims at the holistic development of the young learners and hopes to mould them into young educated and progressive citizens of the nation who are dependable, honest, committed and possess a sound value system.

Mission :

Our college started its journey in 1963. Since then it has been trying its level best to cater to the needs of the society to establish itself as a premier institution in an underdeveloped district of West Bengal.
Our missions include:-

- To provide quality education to the students.
- To put emphasis on the all-round development of a student's personality and character to make him/her a responsible citizen of the nation who through his/her profession/activities would contribute to the betterment and further progress of mankind.
- To make students worthy of facing the challenges of the competitive world and job market through encouragement and exploration of their potential ensuring their involvement in cultural events and sports.
- To uplift the deprived and academically weak students by empowering them with knowledge.
- To inculcate discipline, patriotism, spirit of mutual co-operation and sense of social responsibility among the students through NCC and NSS programmes.
- To sensitize the students about human rights, gender, environmental and ecological issues through arrangement of seminars, plantation programme, medicinal garden, use of solar energy etc.
- To sensitize the students about issues of nationalism, brotherhood and secularism through various activities and arrangement of programmes on Republic Day, Independence Day etc.
- To contribute to the socio-economic change and sustainable development of the adjoining areas by imparting higher education to rural women and backward class people.
- To contribute to the socio-economic growth of the locality by training the people of neighbouring areas for self-employment and providing the aged of the locality with opportunities of higher education through Distance Education. (Study Centres of NSOU and V.U.).

- To generate and sustain proper academic ambience inside the campus through maintenance of peace, communal harmony, spirit of brotherhood, and optimal use and up gradation of infrastructural facilities.
- To stimulate scientific temper and promote awareness of heritage and culture.
- To focus on extension activities through NCC and NSS units.

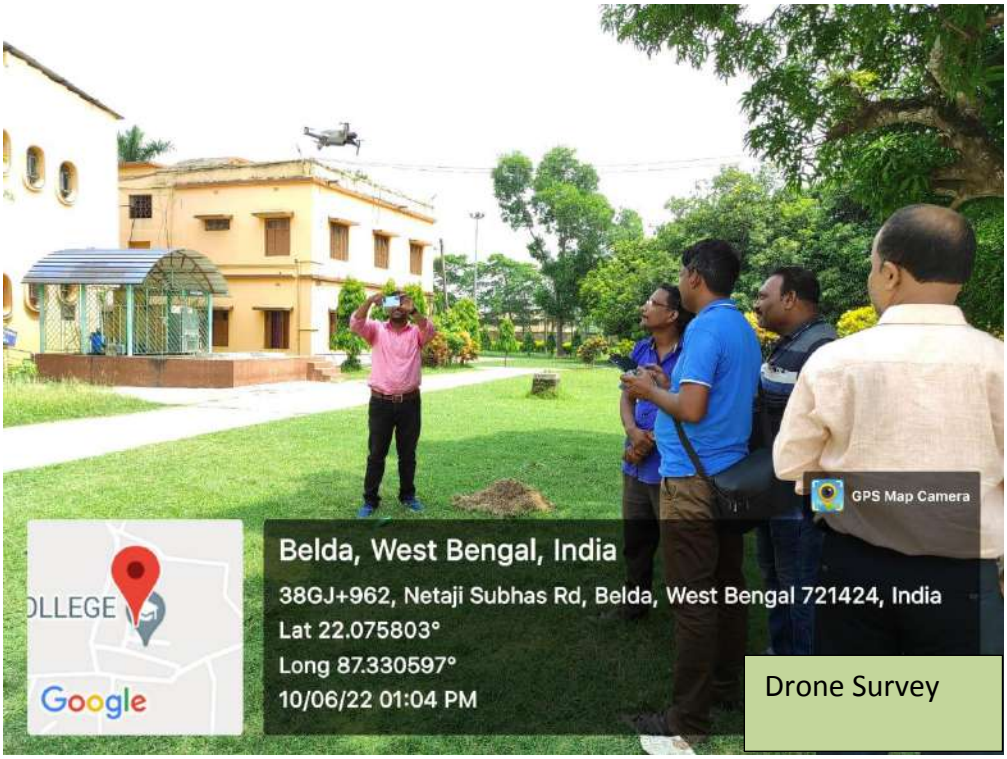
The college is situated slightly away from town with a campus of 11 acres (45,000 m^2) with a built up area of 4 acres (16,000 m^2). The college has its own hostels for boys with a seating capacity of 80 respectively. The college has separate common rooms for boys and girls with facilities for indoor games like carom and chess. Further there is provision for playing outdoor games. There is a in campus canteen offering snacks and beverages. The colleges also have a Netaji Subhas Open University and an IGNOU study center to facilitate distance education.

The college has a well-developed library with about 29000 printed books, more than 6000 journals and periodicals along with internet and computer and photocopying facilities. There is a reading room with a seating capacity of 80 students. There are eleven laboratories with minimum adequate facilities for the laboratory based subjects.

General Information:

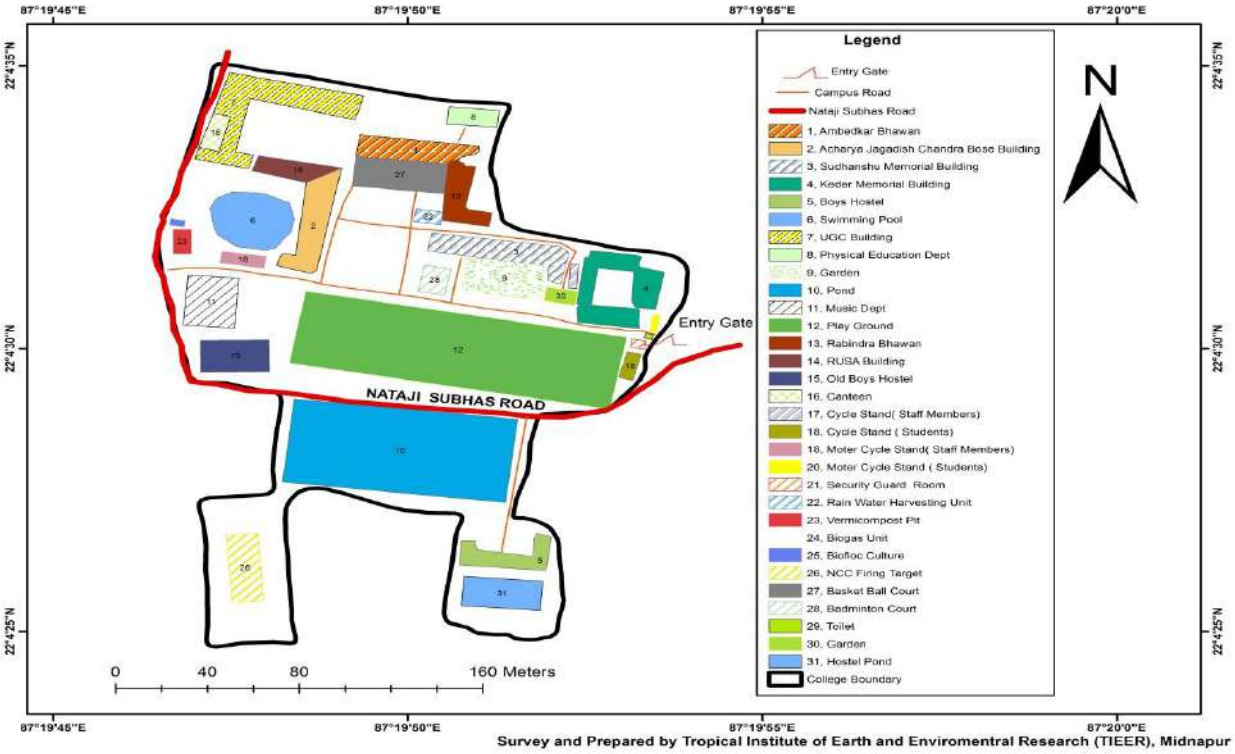
Total area of the college campus – 11 acres,
Building area: 3.95 acres,
Green & Vegetated area: 1.53 acres.
Play Ground & Vacant land area: 4.30 acre
Water Bodies area: 1.22 acre
Departments: Post Graduate -6 and Under Graduate-26
Laboratories: 20
Students: 3860
Teaching Faculties: 128
Non-teaching staff:40
Others stakeholder: 32
Total Stake holders: 4060
Total classrooms: 59
Auditorium /Seminar hall:02
Hostels: 01
Hostel students: 14
Gymnasium Hall /Smart class rooms: 02

Aerial Views of College Premises



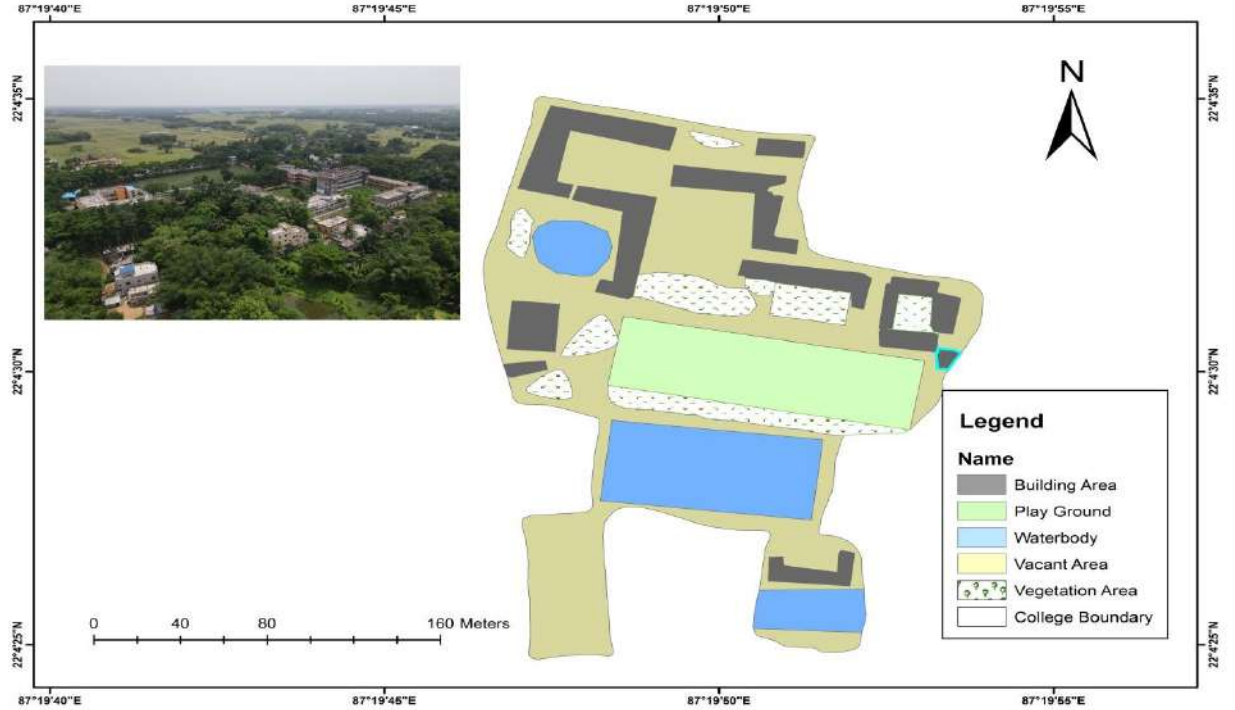
Drone Survey

GUIDE MAP OF BELDA COLLEGE



Survey and Prepared by Tropical Institute of Earth and Enviromentral Research (TIEER), Midnapur

LANDUSE AND LAND COVER MAP OF BELDA COLLEGE



Survey and Prepared by Tropical Institute of Earth and Environmentral Research (TIEER), Midnapur

Table 1 Area Coverage of the College Campus

Area Coverage of College Premises:	Area in Percentage
Building and Construction	35.91
Vegetation Cover	13.91
Playground and Fallow land	39.09
Water Bodies	11.09

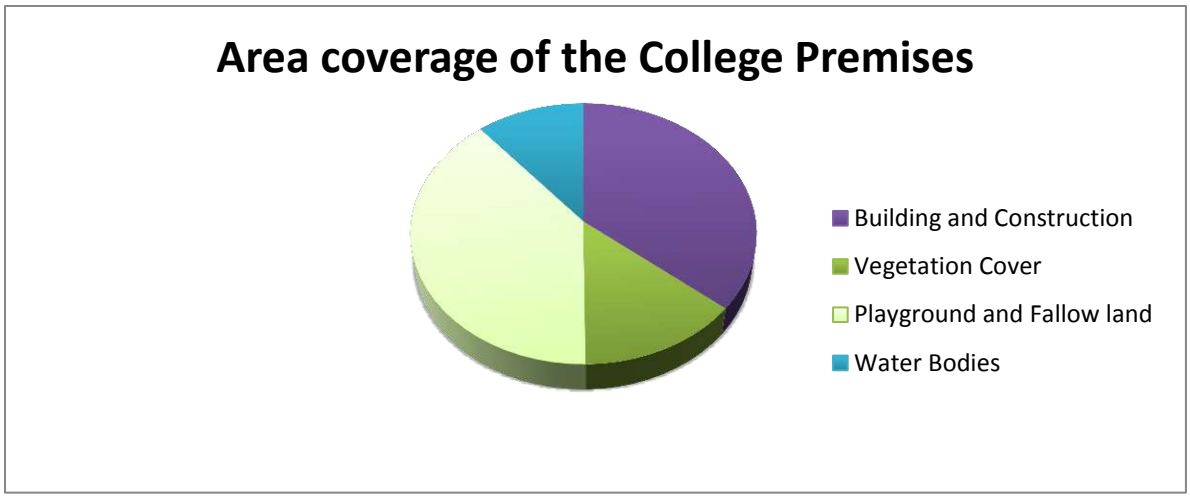


Fig. 1 Area Coverage of College Premises

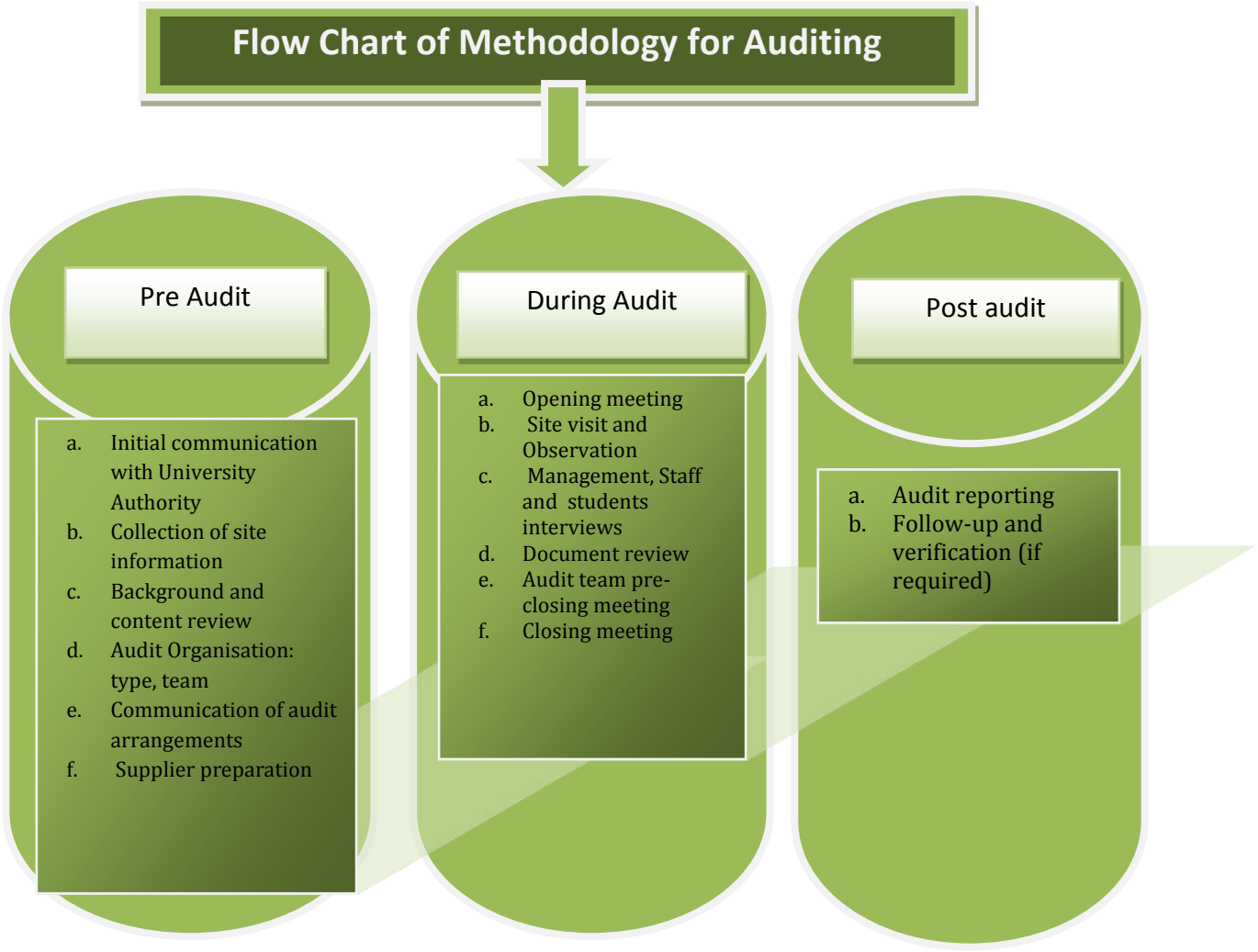
1.3 Purpose of Green and Environmental Auditing:

- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid- waste and water recycling
- To promote plastic free campus and evolve health consciousness among the stakeholders
- To recognize the cost saving methods through waste minimizing and managing
- To empower the organizations to frame a better environmental performance
- To develop an environmental ethics and values systems in youngsters.
- To establish valuable tools and methods for managing-and monitoring of environmental and sustainable development programs.

2.0 PRE-AUDIT STAGE:

2.1 Methodology and Survey Schedules:

The methodology is adopted for this assessment by collecting the information by onsite visit, group discussion, campus survey, enquiry, observation. Perception study and opinion survey are also included in the Auditing Report.



The Audit team started the audit at the College Campus on 10th June, 2022

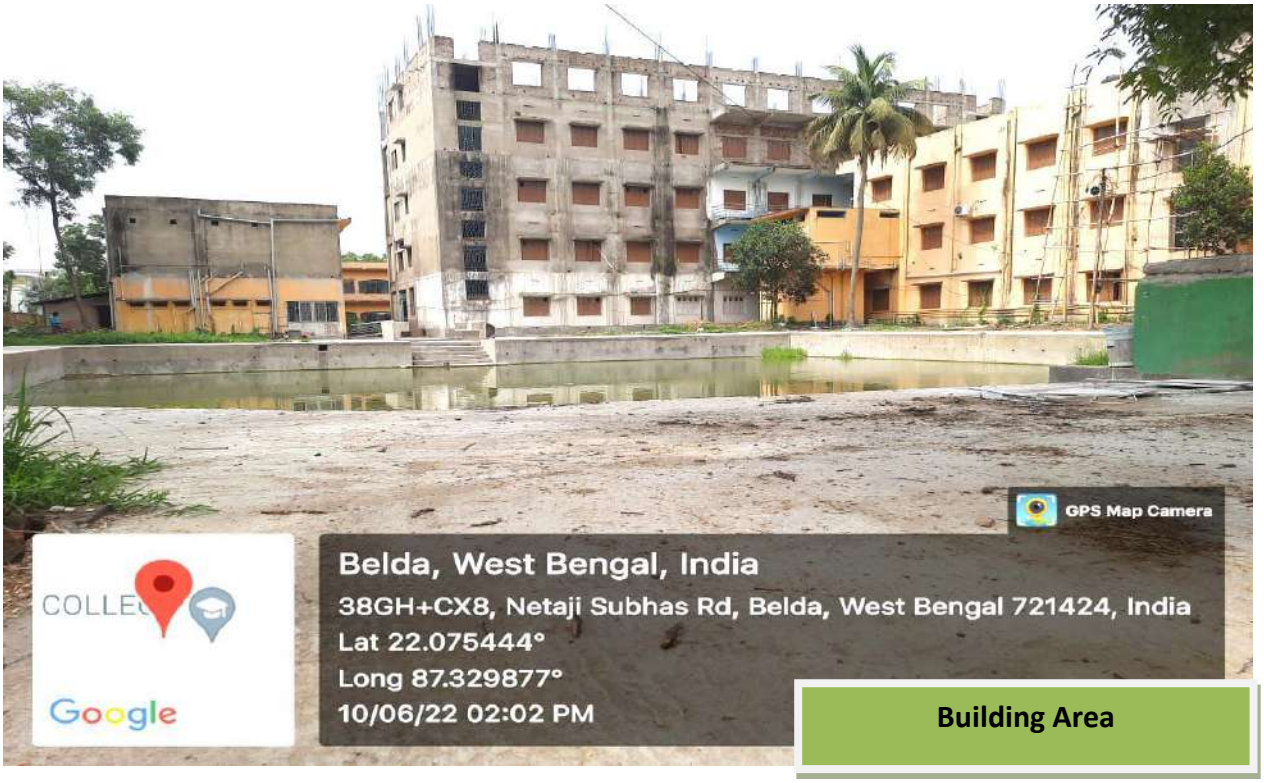
SL.NO	PURPOSE	DATE	REMARKS
1.	Communication with College authority	12th May,2022	Discuss about term and condition
2.	Opening Meeting	1st June,2022	Submitted the survey schedule
3.	Collection information about the College	5th May,2022	Introduced to Administrative Officer
4.	Campus visit , site enquiry and department survey & observation	10th June,2022	Outdoor observation with Drown camera& Photo camera, Laboratory enquiry
5.	Review data and Assessment	20th June,2022	Data generate and drown figures
6.	Pre Closing meeting	22nd June,2022	Meeting with IQAC
7.	Closing Meeting	24th June,2022	Pre-submission of the Report
8.	Submission the audit report	28th June,2022	Submission of the Report

2.2 Site Visit:

1. College and its premises were visited and analyzed by the audit-teams several times to gather information.
2. Campus trees were counted and identified.
3. Medicinal garden, play grounds, canteen, library, All Department, office rooms, Hostels, Canteen and parking grounds were also visited to collect data.
4. Number and type of vehicles used by the stakeholders were counted and fuel consumption for each vehicle was verified with the user.
5. Number of LPG cylinders used in labs, canteen and hostel kitchen were also counted.
6. Water taps were checked. Leakage of a few water taps and over-flow tanks were noticed during the site inspection.

Following steps were taken for data collection:

- Survey to each Department, Laboratories, Library, Canteen etc.
- Data collected by observation and interview.
- Assessment of the environmental condition through measurement



Building Area

2.3 Survey & Data Collection:

- A Questionnaire was developed covering all aspects of Green and Environment aspects for collection of data.
- Arrangement of Drone survey was made available to cover every corner of the college and its neighborhood areas.
- Data Analysis - Calculation of energy consumption, analysis of water reused, waste generation & disposal arrangements.
- Recommendation - On the basis of results of data analysis and observations, some steps for reducing power consumption, water consumption, waste management etc. were recommended.

We have discussed and interacted with different groups like teachers, students and staff to identify the attitudes and awareness towards environmental issues at the institutional, district, national and global level. Data and information were also collected form utility bills, reuse of water, waste management, use of energy-saving devices and e-waste. This information was added to the carbon footprint data, generating a fairly clearer picture of the emissions and impact of the reduction measures undertaken.

Green play Ground

Administrative Buildings

3.0 AUDIT STAGE :

3.1 Campus Survey and Enquiry:

Green and Environmental audit forms part of a resource management process. Total area including neighborhoods was surveyed using Drone and the data derived from this survey was detailed in our report.

Aerial Views of the Structural area

Eco-campus concept mainly focuses on the reduction of contribution to emissions, on the efficient use of energy and water; Minimize waste generation or pollution and also economic efficiency. All these indicators are assessed in process of "Green Auditing of educational institute". Covered areas included in this green auditing are water, energy, air quality & carbon footprint, waste, biodiversity campus.

The Audit covered the following major areas:

1. Water Efficiency and Water Management
2. Energy Efficiency and Energy Management
3. Air Quality and Carbon foot print and Management
4. Waste and Waste Management
5. Biodiversity and Green Zone and management

Enquiry in Geography Lab

Table-2 Total population of the College

Students -	3860 persons
Teaching, Non-teaching and Other Stakeholders	200 persons
Total	4060 persons
Approximate no of visitor (per day)-	15persons

3.2 Water Efficiency and Water Management :

The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water and also proper water management practices along with rooftop rain water harvesting system must be installed in whole campus for recharging ground water and meeting part of the water requirements. It is therefore essential that any environmentally responsible institution examine its water use and Re-use practices.

a	Usage of water	Used water is use for Drinking, Washing, Cleaning, Cooking, Bathing and gardening purpose. The maximum water is use for Bathing and washroom in the college. About 19600 Litre water has been consumed for that purpose.
b.	Consumption of water	About 30850Litre water per day
c.	Water wastage	The leakage and misuse of water is about 300Litre in whole campus. Small drip from a leaky tap, sewage water from pan in toilets and overflow can waste significant amount of water per day.
d.	Water Re-use	Waste water recycle is practiced in the institute as recycle facility is provided. One unit is available here which capacity of the unit is about 150ltr reusable water.
e	Rain-Water Harvesting	One Rain water harvesting unit has been installed.
e	Surface water Harvesting	The surface water bodies are available in college campus. About 1.22 acre area is covered with three ponds.

Table-3 Use of water for Different Purpose of College Premises

Use of water for Different Purpose Per Day	Use in Percentage
Bathing and washroom	63.53
Cooking and washing	2.27
Cleaning and gardening	14.59
Drinking	18.15
Others	1.46

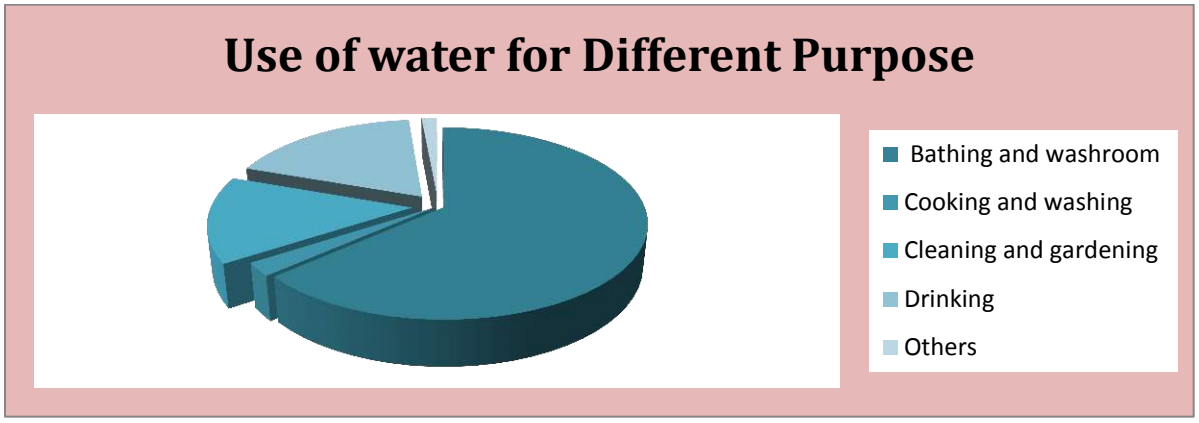


Fig.2 Use of water in Different Purpose Per Day

Sl. No.	Factors	Weightage
1	Quality of Water	H
2	Re-use of water	M
3	Water Harvesting & Recharge	H
4	Use of Surface Water	M

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

Recommendation

Water conservation faucets in washrooms were not seen. Installation of such faucets can save water and will help in minimising the water footprint of the institute. Sanitary wastewater generated from washrooms is connected to sewerage system.

Surface water body (pond)

3.3 Energy Efficiency and Energy Management:

a	**Energy sources**	**Sources of Energy: Conventional Electricity, LPG Gases, Diesel, Petrol, Wooden fuels and Non –conventional Solar energy**
b.	Energy consumption	The usable energy is Conventional and Non-Conventional energy. The used amount of Actual Electricity energy is 47518 (CE-36718 Unit + NCE-10,800 Unit) units for which Actual costing is about Rs. 526480.5. About 22.72% (15kWh Panel) energy is Non-conventional energy which is contributed from Solar Power. The Maximum energy is consumed for Light & Fan amounting to 45% of total consumption.
c.	Usage of LPG	It has been observed that LPG gas cylinders are used in Hostel, Canteen, & Laboratories (55PC/year) for cooking and other purpose. There are Green generators used in the premises.

Table-4 Source of Energy in Percentage

Source of energy	In Percentage
Conventional	77.28
Non -Conventional	22.72

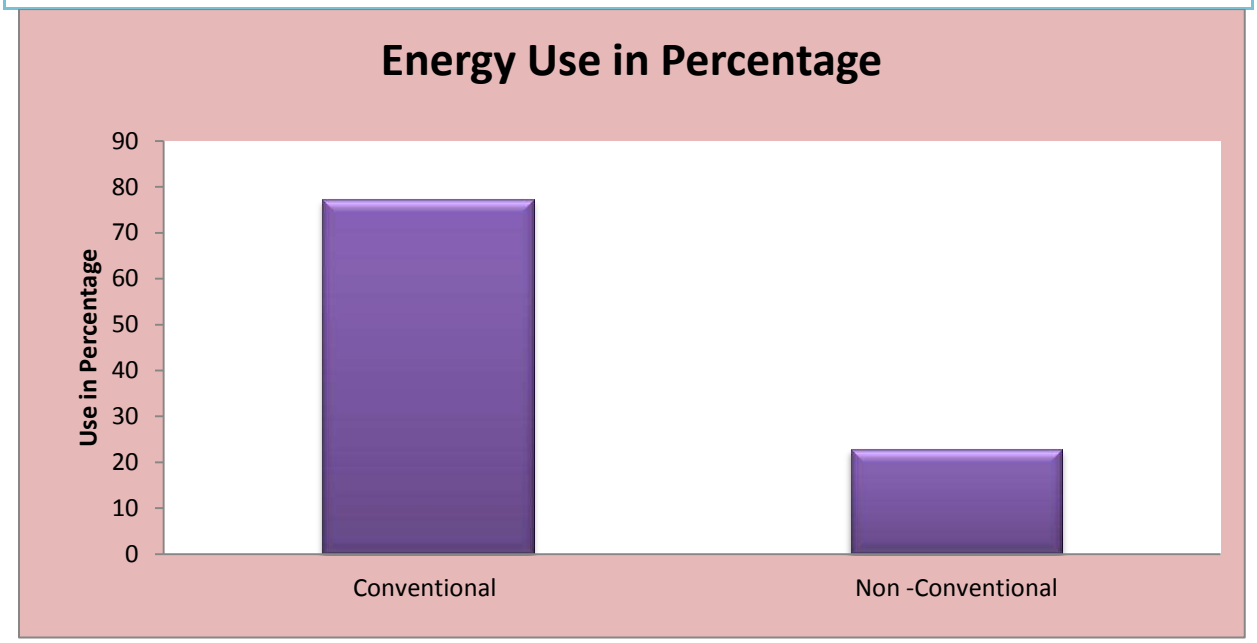


Fig. 3 Use of Energy in Percentage

Source of NCE (Solar Panel)

Table-5 Energy Consumption in different Purpose in Percentage

Energy Consumption in different Purpose	In Percentage
light and fans	45
AC	15
Pump	3.8
Computer and Laboratory	28
Others	8.2

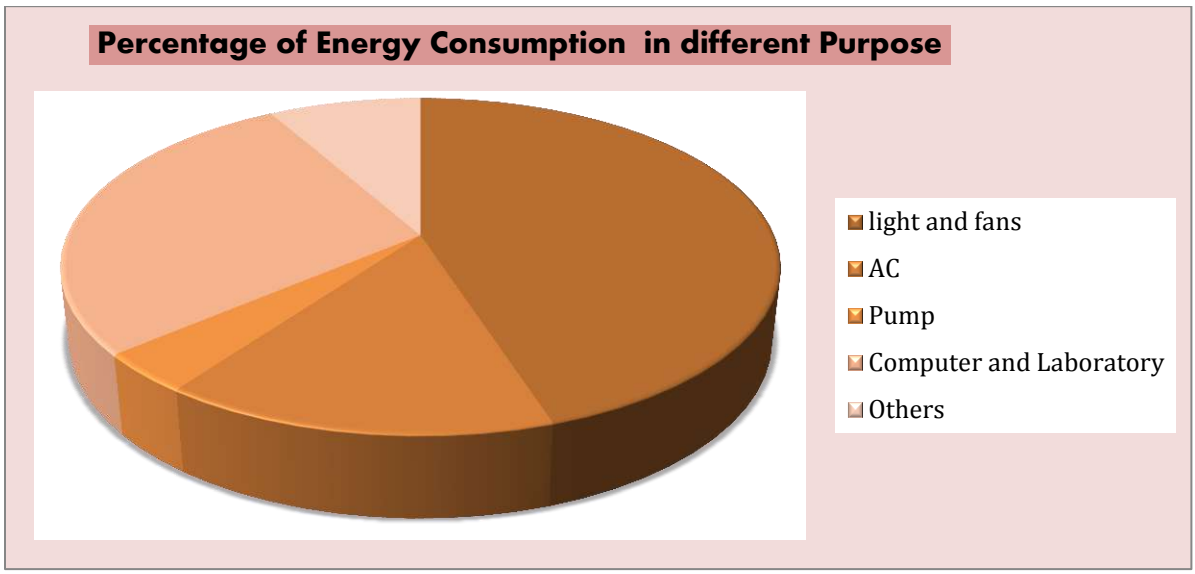


Fig. 4 Percentage of Energy Consumption in different Purpose

Recommendations:

a) Every classroom and lab with central switch board should have a diagram linking place of tube light, fan etc. with corresponding switch. This will ensure that correct fitting is switched on/ off and can save time & unnecessary operation.

b) Installation of automatic lights with sensors can be considered.

c) Standard Operation Procedures (SOPs) should be prepared and followed for green purchasing wherein equipment's with star rating; those using eco-friendly materials; those with safe disposal policy or return to supplier after unused, can be considered.

d) For purchasing new electronic appliances, star rating provided by Bureau of Energy Efficiency (BEE) should be considered. The equipment which has maximum star ratings could be purchased, which will consume less energy, ensure environmental sustainability and also operate at low cost.

e) Usage of light reflectors is recommended as the reflectors can spread light to relatively large areas.

f) Notices/ signage can be put up/ displayed near switches and on notice boards, informing students and staff to switch off all Departments & Sectors when not in use.

g) Use of large percentage renewable energy should be considered.

3.4 Air Quality and Carbon Footprints :

Commutation of stakeholders has an impact on the environment through the emission of greenhouse gases into the atmosphere consequent to burning of fossil fuels (such as petrol, Diesel, LPG Gas). The most common greenhouse gases are Carbon Dioxide, CFC, water vapor, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most leading greenhouse gas, comprising about 214ppm (2019) to the Earth's atmosphere. It undertakes the measure of bulk of carbon dioxide equivalents exhaled by the organization through which the carbon accounting is done. It is observed that the Outdoor air quality is Fresh and comfortable for breathing to human life.

Table-6 Amount of CO_2 (ppm) in different location of the College Campus

Different location of the College Premises	Amount of CO_2 (ppm)
Principal Office	460
Chemistry Lab(U.G)	426
Zoology Lab	440
Research Lab	520

Computer Sci. Lab	470
Geography Lab	490
Library	480
Car Parking Stand	400
Play Ground	355
Canteen	520

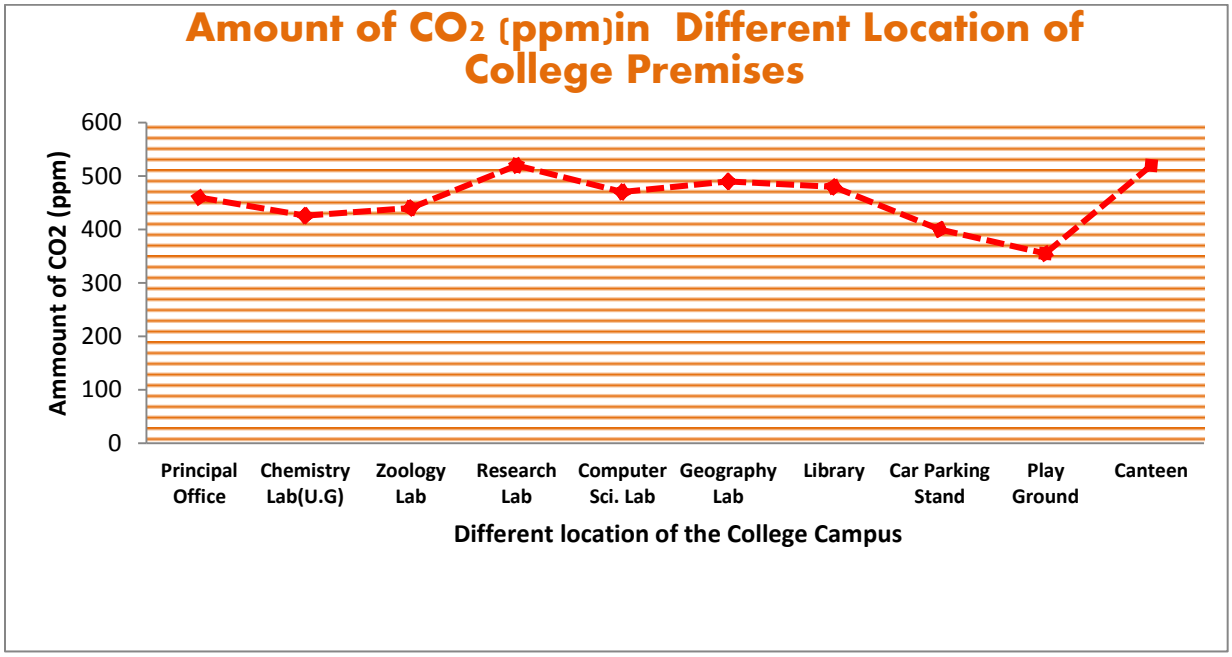


Fig. 5 Amount of CO2 (ppm) in Different Location of the College Premises

Table-7 Amount of CO_2 (ppm) in the air in different location,(College Campus) session 2021-2022

Amount of CO_2 (ppm) in the Air in Different places of the College Premises	**Amount of CO_2 (ppm)**
Outdoor	370
Indoor (Class room)	410
Indoor (Laboratories)	450

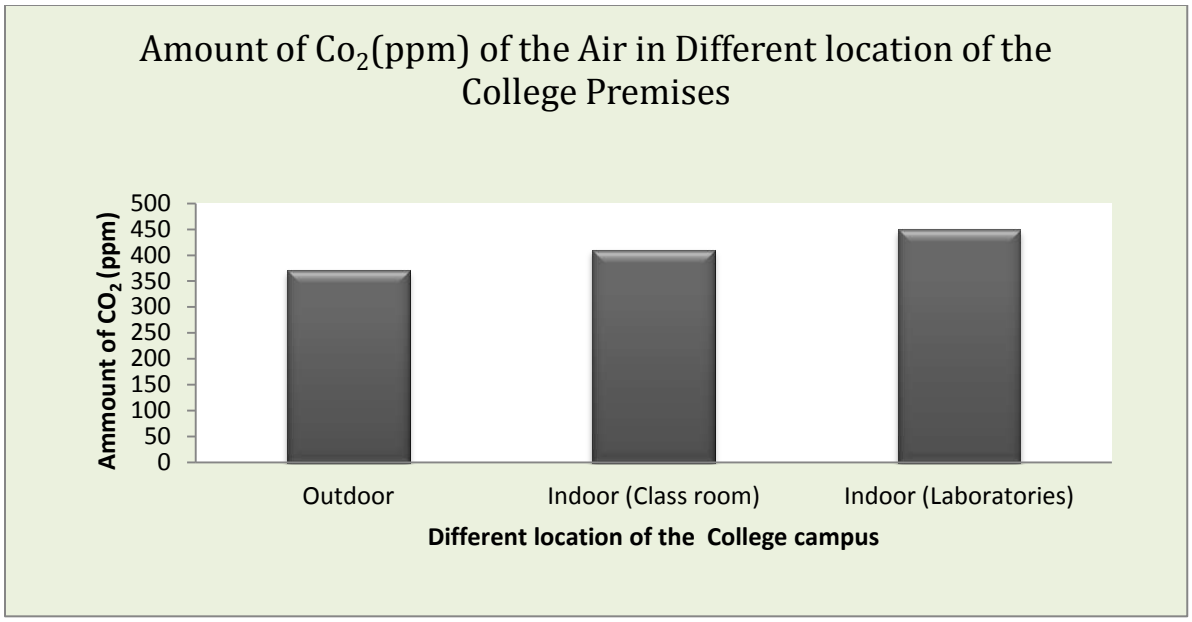


Fig. 6 Amount of Co_2(ppm) of the Air in Different location of the College Premises

Table 8 Amount of O_2 (%) of the Air in Different location of the College Premises

Different location of the College Premises	Amount of O_2 (%)
Principal Office	20.4
Chemistry Lab(U.G)	20.5
Zoology Lab	20.6
Research Lab	19.8
Computer Sci. Lab	20.2
Geography Lab	20.4
Library	20.2
Car Parking Stand	20.6
Play Ground	21.0
Canteen	19.8

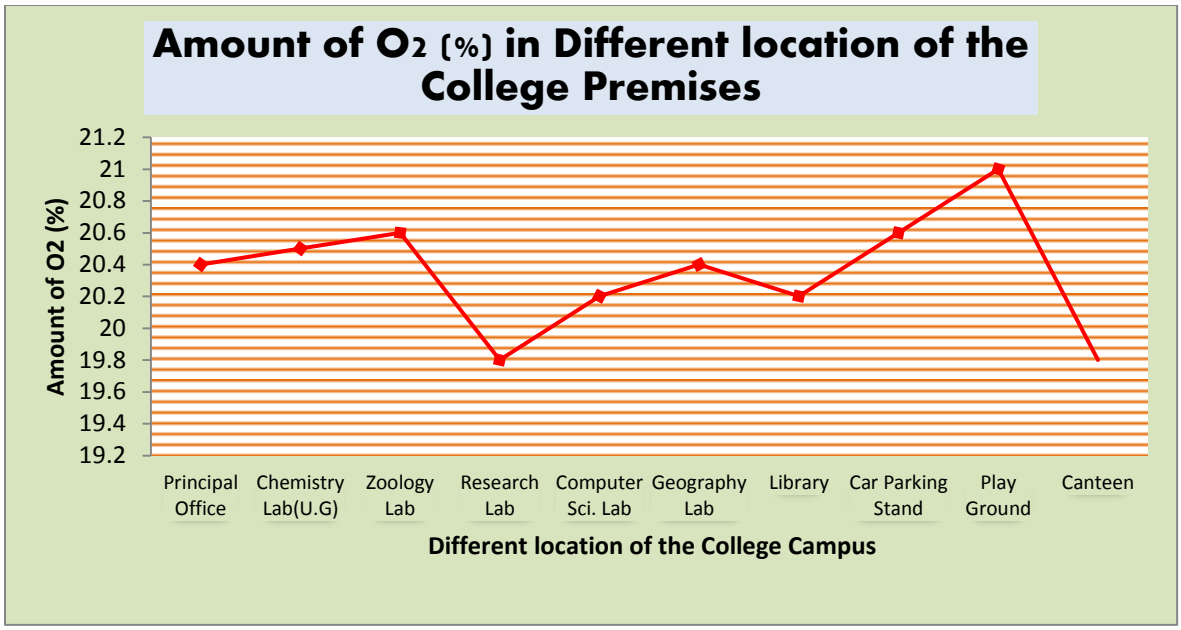


Fig. 7 Amount of O_2 (%) in Different location of the College Premise

Recommendation:

a) Ventilation is achieved by fans in the institute and air conditioners in Official and Lab. places.

b) Heating Ventilation and Air Conditioning (HVAC) system is not installed.

c) No indoor plants were observed in the entire institute. Indoor plants can be plotted not only for the aesthetic appearance but also for health benefits.

3.5 Generation of Waste and Waste Management:

Waste (or wastes) is useless or unusable materials or components which are discarded after principal use. Sometimes, it is a defective article and of no use. In modern outlook waste may be a valuable substance subject to an appropriate operation or action on the waste. With the context of waste management RRR (Reduce, Reuse and Recycle) model may be followed in appropriate fashion.

The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems. It is therefore essential that any environmentally responsible institution examine its waste processing practices. Keeping the objective of the audit the following study will be limited to the waste generated in an academic campus and surroundings.

Table-9 Types of wastes

Type of Wastage	Amount in Kg
Degradable	55
Non degradable	4

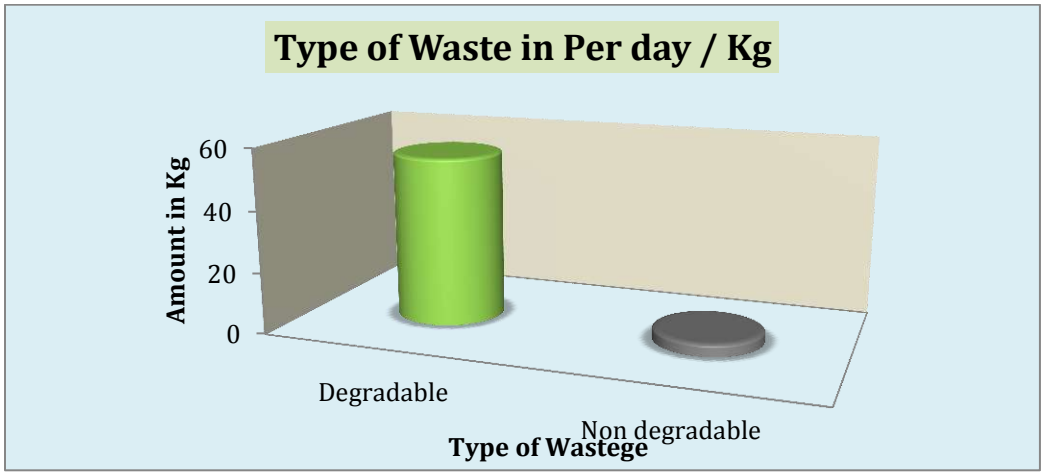


Fig. 8 Type and Amount of Waste per Day in Kg.

The following categories of wastes are generated in the College campus:

a) Solid waste - Waste generated through paper, plastic packaging causes nuisance. Some wastes are generated after various experiments, primarily, chemistry laboratory; broken test tube, glassware are the example.

b) Liquid waste - There are bio-chemical wastes generated through various chemical reactions and biological processes. Generally, these are being drained to nearby Surface water bodies contaminating water and soil. Appropriate means is suggested to adopt scientific liquid waste management practices. These are neutralization, bacterial control, and natural control through plantation.

Table-10 Source of Wastage in Different Sector (per day in Kg)

Source of Wastage in Different Sector(per day in Kg)	Degradable wastage Amount in Kg.	Non Degradable wastage Amount in Kg.
Canteen, Quarter and Hostels	26	2
Office	2	1
Laboratories	3	0.5
Forest and Garden	20	0.25
Others	4	0.25

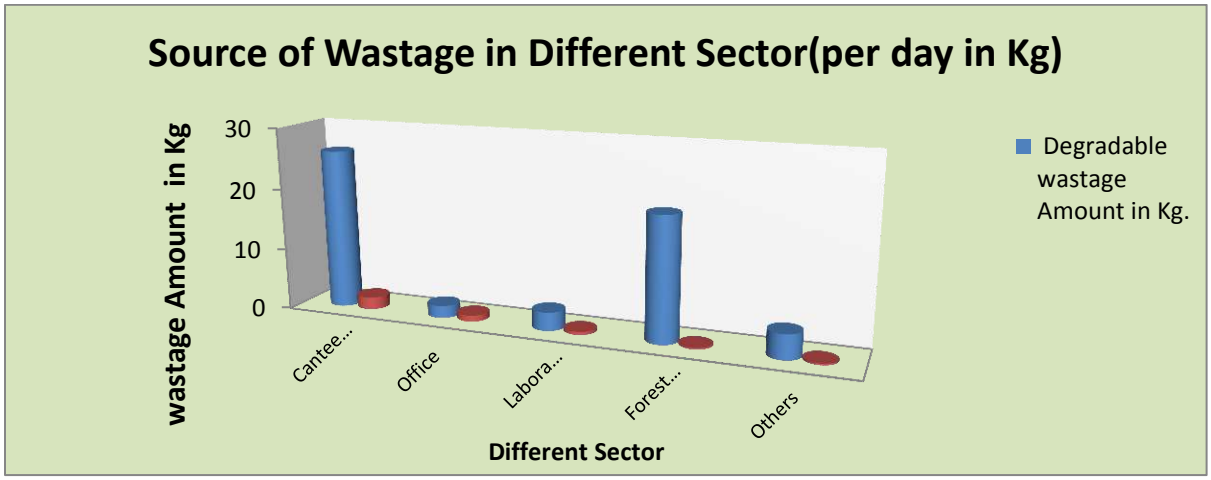


Fig. 9 Source and Amount of Wastage in Different Sector (per day in Kg)

Vermi-Composed Pit

The following are being emphasized during audit of waste management:

a) Name of the waste

b) Category of waste

c) Quantity of waste

d) Hazardous effect of the waste

e) Institutional action and mechanism for waste management

Compliance audit of waste issues:

At the present stage the institute is capable in managing their waste. They are complying with the essential requirements of waste management although suggestions are given for future improvements.

Performance Audit of Waste Issues:

No critical audit issue is there with respect to the waste management.

Implemented wastes management		
Sl.no	Factors/Indicators	Weightage
1	Plastic and Polythene free	H
2	Re-use of papers	M
3	Hazardous effect waste management	M
4	Removal of E-Wastes	M
5	Organic & food waste	M
6	Others solid wastes	M

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

Awareness Slogan

3.6 Auditing for Biodiversity & Green Campus Management:

Unfortunately, biodiversity is facing serious threats from habitat loss, pollution, over consumption and invasive species. Species are disappearing at an alarming rate and each loss affects nature's delicate balance and our quality of life. In one year, a single mature tree will absorb up to pounds of Carbon dioxide from the atmosphere, and release it as Oxygen. The amount of oxygen that a single tree produces is enough to provide one day's supply of oxygen for people. So while you are busy studying and working on earning those good grades, all the trees on campus are also working hard to make the air cleaner for us. Trees on our campus impact our mental health as well; studies have shown that trees greatly reduce stress, which a huge deal is considering many students are under some amount of stress.

About 13.91% area is under greenery and biodiversity zone and 11.09% area is water bodies' also wet land. Biodiversity includes the genetic variability and diversity of life forms such as plants, animals, microbes etc. living in a wide range of ecosystems. Flora and fauna of College campus in Belda College premises is rich.

Table 11 Area Coverage of the College Campus

Area Coverage of College Premises:	Area in Percentage
Building and Construction	35.91
Vegetation Cover	13.91
Playground and Fallow land	39.09
Water Bodies	11.09

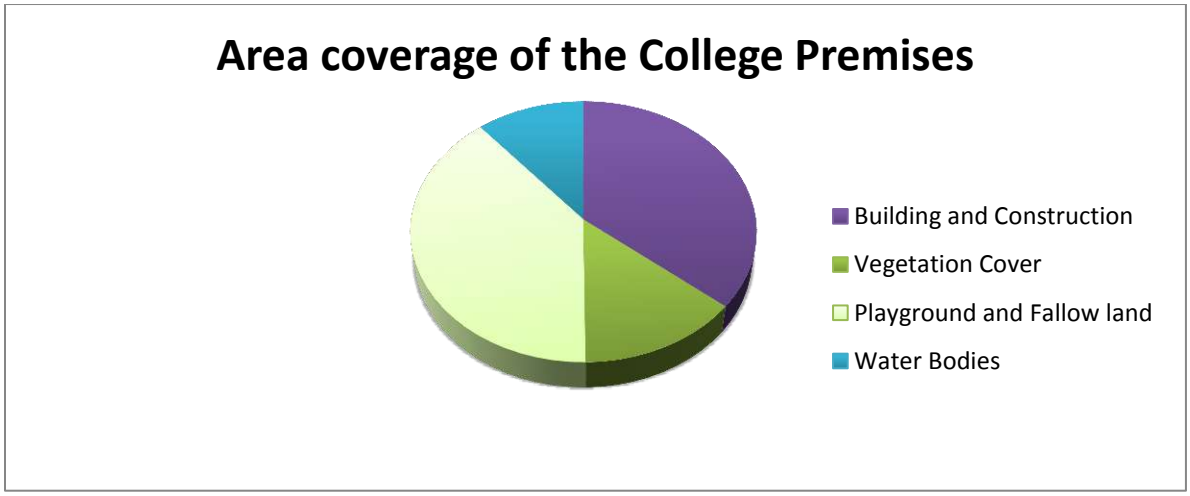


Fig. 10 Area coverage of the College Premises

Biodiversity Study

Plant diversity – The campus of Belda College is lashing green. There are a large pond in the behind of the college and two ponds in the boy's hostel. South side of the campus is a playground. East and south side of the playground is a large and dense (139 m long approx.) plantation of *Anthocephalus cadamba* found. One medicinal plant garden, Susrut Garden is seen which needed restoration (Table -14). A small plantation of *Acacia auriculiformis* is found in back side of campus. Details of treess are given in table - 13. There are two ornamental plants garden (Table – 15 & 16).

The plant diversity study has been done through quadrat method. Two sets of quadrats have been laid in the main campus. For this purpose a standard method has been followed i.e. 10m x 10m for trees, 5m x 5m for shrubs and 1m x 1m for herbs. Data of quadrats are given below (Quadrat – 1 and 2).

Quadrat analysis three girth class of trees are calculated (Table-12). From this data Carbon sequestration potential of trees have been calculated. It is found that from above ground biomass of trees, 3043.5 kg. of carbon has been stocked under quadrats.

Quadrat - 1

Tree Quadrat (10m x 10m)

Sl. No.	Scientific name	GBH (in cm)	Height (in m)
1	*Acacia auriculiformis*	58	12
2.	*Acacia auriculiformis*	87	14
3	*Acacia auriculiformis*	98	14
4	*Acacia auriculiformis*	84	15
5	*Swetenia macrophylla*	44	10

Shrub quadrat (5m x 5m)

Sl. No.	Scientific name	Number of individuals
1	*Ficus hispida*	1
2.	*Streblus asper*	1
3	*Pterocarpus marsupium*	1
4	*Lucina leucocephala*	1
5	*Costus specious*	1
6	*Desmodium gangeticum*	6

Herb quadrat (1m x 1m)

Sl. No.	Scientific name	Number of individuals
1	*Stephania harnandifolia*	1
2.	*Alternanthera sessile*	3
3	*perotis indica*	9
4	*Boerhavia repens*	2
5	*Cyanodon dactylon*	11

Quadrat - 2

Tree Quadrat (10m x 10m)

Sl. No.	Scientific name	GBH (in cm)	Height (in m)
1	*Swetenia macrophylla*	194	20
2	*Swetenia macrophylla*	142	16
3	*Swetenia macrophylla*	132	15

Shrub quadrat (5m x 5m)

Sl. No.	Scientific name	Number of individuals
1	*Alanzium lamarkii*	2
2	*Thevetia sp.*	1
3	*Lucina leucocephala*	2
4	*Vitis quadrangularis*	4
5	*Dioscorea pentaphylla*	6
6	*Phoenix sylvestris*	1

Herb quadrat (1m x 1m)

Sl. No.	Scientific name	Number of individuals
1.	*Stephania harnandifolia*	2
2.	*Amorphphalus sp*	1
3.	*Alocasia esculanta*	2

Table -12 : Carbon sequestration potential of trees of college campus

Sl. No.	GBH Class (in cm)	No. of Trees	Biomass (in Kg.)	Carbon stock (in Kg.)
1	50-100	5	530	265
2	100-150	2	1336	668
3	150-200	1	4221	2110.5

Table -13: List of Trees plants in Belda College campus.

Tree

Sl. No.	Scientific Name	Family
1.	*Alstonia scholaris*	Apocynaceae
2.	*Tectona grandis*	Verbenaceae
3.	*Anthocephalus cadamba*	Rubiaceae
4.	*Acacia auriculiformis*	Mimosaceae
5.	*Swetenia mahogoni*	Meliaceae
6.	*Annona squamosa*	Annonaceae
7.	*Aegle marmelos*	Rutaceae
8.	*Swetenia macrophylla*	Meliaceae
9.	*Bridelia retusa*	Euphorbiaceae
10.	*Polyalthia longifolia*	Annonaceae
11.	*Ficus religiosa*	Moraceae
12.	*Anacardium occidentale*	Anacardiaceae
13.	*Cocos nucifera*	Arecaceae
14.	*Azadirachta indica*	Meliaceae
15.	*Tabernemontana coronaria*	Apocynaceae
16.	*Mangifera indica*	Anacardiaceae
17.	*Tamarindus indica*	Fabaceae
18.	*Dalbergia lanceolaria*	Fabaceae
19.	*Eucalyptus tereticornis*	Myrtaceae
20.	*Emblica officinalis*	Euphorbiaceae
21.	*Ziziphus zuzuba*	Rhamnaceae
22.	*Litchi chinensis*	Sapindaceae
23.	*Schleichera oleosa*	Sapindaceae
24.	*Mimusops elengi*	Sapotaceae
25.	*Psidium guajava*	Myrtaceae
26.	*Citrus medica*	Rutaceae
27.	*Monilcara zapota*	Sapotaceae
28.	*Ficus hispida*	Moraceae
29.	*Streblus asper*	Moraceae
30.	*Artocarpus heterophyllus*	Moraceae
31.	*Ailanthus excels*	Simaroubaceae
32.	*Dypsis lutescens*	Arecaceae

Shrub

Sl. No.	Scientific Name	Family
1	*Punica granatum*	Lythraceae
2	*Duranta repens*	Verbenaceae
3	*Dracaena sp.*	Asparagaceae
4	*Euphorbia mili*	Euphorbiaceae

5	*Codiaeum variegatum*	Euphorbiaceae
6	*Dracaena marginata tricolor*	Asparagaceae
7	*Ficus hispida*	Moraceae
8	*Streblus asper*	Moraceae
9	*Pterocarpus marsupium*	Fabaceae
10	*Lucina leucocephala*	Fabaceae
11	*Costus specious*	Costaceae
12	*Desmodium gangeticum*	Fabaceae
13	*Alanzium lamarkii*	Cornaceae
14	*Thevetia sp.*	Apocynaceae
15	*Vitis quadrangularis*	Vitaceae
16	*Dioscorea pentaphylla*	Dioscoriaceae
17	*Phoenix sylvestris*	Arecaceae

Table – 14: Plants of Susrut Garden (Medicinal Plant Garden)

2a. Tree

Sl. No.	Scientific Name	Family
1	*Terminalia bellerica*	Combretaceae
2	*Emblica officinalis*	Euphorbiaceae
3	*Santalum album*	Santalaceae
4	*Cinnamommum tamala*	Lauraceae
5	*Diospyros malabarica*	Ebenaceae
6	*Pterocarpus santalinus*	Fabaceae
7	*Thuja orientalis*	Cupressaceae
8	*Dypsis lutescens*	Arecaceae
9	*Cinnamommum zeylanicum*	Myrtaceae
10	*Euphorbia tirucali*	Euphorbiaceae
11	*Michelia champaca*	Magnoliaceae
12	*Pimenta dioica*	Myrtaceae
13	*Pinus roxburghii*	Pinaceae
14	*Terminalia chebula*	Combretaceae

2b. Shrub

Sl. No.	Scientific Name	Family
1	*Quisqualis indica*	Combretaceae
2	*Datura metel*	Solanaceae
3	*Acalypha hispida*	Euphorbiaceae
4	*Jatropha gossypifolia*	Euphorbiaceae
5	*Hibiscus rosa-sinensis*	Malvaceae
6	*Adhatoda vasica*	Acanthaceae
7	*Solanum torvum*	Solanacea
8	*Murraya koenigii*	Rutaceae

9	*Ixora coccinea*	Rubiaceae
10	*Justicia gendarussa*	Acanthaceae

2c. Herb

Sl. No.	Scientific Name	Family
1	*Wedelia trilobata*	Asteraceae
2	*Centella asiatica*	Apiaceae
3	*Colocasia esculenta*	Araceae
4	*Curcuma longa*	Zingiberaceae
5	*Alocacia indica*	Araceae
6	*Costus speciosus*	Costaceae
7	*Aloe vera*	Asphodelaceae
8	*Desmodium gyrans*	Fabaceae
9	*Cyperus rotundus*	Cyperaceae
10	*Hygrophila spinosa*	Acanthaceae
11	*Cymbopogon citrates*	Poaceae
12	*Aerva lanata*	Amaranthaceae
13	*Capsicum frutescens*	Solanacea
14	*Barleria lupulina*	Acanthaceae
15	*Bryophgyllum calycinum*	Crassulaceae
16	*Andrographis paniculata*	Acanthaceae
17	*Ocimum sanctum*	Lamiaceae
18	*Bacopa monnieri*	Scrophulariaceae
19	*Clitoria ternatea*	Fabaceae
20	*Paederia foetida*	Rubiaceae
21	*Asparagus racemosus*	Liliaceae
22	*Cissus quadrangular*	Vitaceae
23	*Hemidesmus indicus*	Asclepiadaceae
24	*Ipomoea batatus*	Convolvulaceae
25	*Piper nigrum*	Piperaceae
26	*Gymnema sylvestre*	Asclepiadaceae

Table-15: Plants in KusumKanan (a Garden with Fountain)

3a. Tree

Sl. No.	Scientific Name	Family
1	*Juniperus sp.*	Cupressaceae
2	*Cycas revolute*	Cycadaceae
3	*Thuja orientalis*	Cupressaceae
4	*Dypsis lutescens*	Arecaceae
5	*Oreodo xaregia*	Arecaceae
6	*Aurocari a heterophylla*	Araucariaceae
7	*Murraya paniculata*	Rutaceae

8	*Carica papaya*	Caricaceae
9	*Tabernemontana coronaria*	Apocynaceae

3b. Shrub

Sl. No.	Scientific Name	Family
1	*Ixora coccinea*	Rubiaceae
2	*Agave Americana*	Asparagaceae
3	*Duranta repens*	Verbenaceae
4	*Hibiscus rosasinensis*	Malvaceae
5	*Euphorbia milii*	Euphorbiaceae
6	*Rosa sp.*	Rosaceae
7	*Adenium sp.*	Apocynaceae

Table – 16: Plants in 'Malancha' (a Garden near main gate)

4a. Tree

Sl. No.	Scientific Name	Family
1	*Nerium odorum*	Apocynaceae
2	*Plumeria rubra*	Apocynaceae
3	*Ziziphus zuzuba*	Rhamnaceae
4	*Ixora arborea*	Rubiaceae
5	*Lagerstroemia indica*	Lythraceae
6	*C alliandrae marginata*	Fabaceae

4b. Shrub

Sl. No.	Scientific Name	Family
1	*Allamunda cathartica*	Apocynaceae
2	*Adenium sp.*	Apocynaceae
3	*Gardenia sp.*	Rubiaceae
4	*Gardenia sp.*	Rubiaceae
5	*Campsis radicans*	Bignoniaceae
6	*Aganosma caryophyllata*	Apocynaceae

Faunal Diversity:

Belda College has wide variety of fauna which are support its rich biodiversity. The college campus is the feeding and breeding ground of the many animals. Different types of earth worm, insects (moths, butterfly, wasp, and bees), amphibia, reptilia, birds and mammals are found here and there in the college campus. There is one big, one medium and one

small size pond are present under the college premises. In those ponds there have many indigenous fresh water fishes which are culture, also categorized as ornamental fishes.

Faunal Diversity		
Phylum: Annelida		
Local	Name	Scientific Name
1	Kecho	*Pheretimaposthuma*
2	Joke	*Hirudinaria*sp
Phylum: Arthropoda		
1	Prajapati	*Papilio*sp
2	Moth	*Galleria* sp
3	Moumachi	*Apis*sp
4	Jonaki	*Lampyrisnoctiluca*
5	Arsola	*Periplanetaamericana*
6	Vimrul	*Vespa orientalis*
7	Lalpipra	*Oecophyllasmaragdina*
8	Kakrabicha	*Buthus*sp
9	Tetulbicha	*Scolopendra*sp
10	Kenno	*Julus*sp
11	Pangapal	*Schistoceragregaria*
12	Anopilis masa	*Anopheles* sp
13	Culex masa	*Culex*sp
14	Ades masa	*Aedes*sp
15	Gubrepoka	*Coprislunaris*
16	Pharing	*Orthetrum*sp
17	Wepoka	*Odontotermes*sp
18	Machi	*Muskadomestica*
19	Makarsa	*Nephila*sp
Phylum: Mollusca		
20	Sthalsamuk	*Acatinafulica*
21	Jalsamuk	*Pilaglobosa*
22	Gugli	*Bellamyabengalensis*
23	Jhinuk	*Lamellidensmarginalis*
24	Kath joke	*Limax*sp
Fresh water fishes		
1	Ruimach	*Labeorohita*
2	Katlamach	*Catlacatla*
3	Mrigelmach	*Cirrhinusmrigala*
4	Bata mach	*Labeobata*
5	Kalbose	*Labeocalbasu*

6	Silver carp	*Hypophthalmichthysmolitrix*
7	Grass carp	*Ctenopharyngodonidella*
8	Cyprinuscarpio	*Cyprinuscarpio*
9	Balkurmach	*Glossogobiusgiuris*
10	Magurmach	*Clariasbatrachus*
11	Singimach	*Heteropneustesfossilis*
12	Latamach	*Channapunctatus*
13	Chang mach	*Channagachua*
14	Sholmach	*Channastriata*
15	Koi mach	*Anabasatestudineus*
16	Phaloimach	*Notopterusnotopterus*
17	Tilapia	*Oreochromismossambicus*
18	Pabdamach	*Ompokpabda*
19	Phutimach	*Puntiusticto*
20	Mourlamach	*Amblypharyngodonmola*
21	Techoka or Bostam pona	*Aplocheiluspanchax*
22	Kholsamach	*Colisa*sp
23	Pankalmach	*Mastacembelussp*
24	Dhariamach	*Esomusdanricus*
25	Chandamach	*Chanda*sp
26	Tangra	*Mystus*sp
Class : Amphibia		
1	Kuno bang	*Duttaphrynusmelanostictus*
2	Sona bang	*Ranatigrina*
Class: Reptilia		
1	Loudaga	*Ahaetullanasutas*
2	Jaldhora	*Xenochriphispiscator*
3	Matiali sap	*Elachistodonwestermanni*
4	Jamna sap	*Ptyasmucosus*
5	Godi sap	*Varanus*sp
6	Keute	*Naja*sp
7	Tiktiki	*Hemidactylusflaviviridis*
8	Girgiti	*Calottes versicolor*
9	Kachhap	*Tryonix*sp
Class : Aves		
1	Charaipakhi	*Passer domesticus*
2	Tuntuni	*Orthotomus*sp
3	Satbhaya	*Turdoideseaudatus*
4	Doyel	*Copsychussaularis*
5	Bulbul	*Pycnonotus*sp
6	Kak	*Corvussplendens*
7	Shalik	*Acridotherestristris*

8	Phinge	*Dicrurousadsimilis*
9	Kajalpakhi	*Laniuscristatus*
10	Kat thokra	*Dinopiumbenga*
11	Baspati	*Meropsorientalis*
12	Chotomachranga	*Alcedoatthis*
13	Sadabookmachranga	*Halcyon* sp
14	Lakhsmipancha	*Tyto alba*
15	Kuturepancha	*Athenebrama*
16	Kokil	*Eudynamysscolopacea*
17	Tia	*Pisttacula*sp
18	Gughu	*Streptopeliachinensis*
19	Paira	*Columba livia*
20	Dahuk	*Amaurornisphooniurus*
21	Bak	*Ardeolagrayii*
Class : Mammalia		
1	Katbirali	*Funambuluspennantii*
2	Neul	*Herpestesedwardsii*
3	Mechobiral	*Prionailurusviverrinus*
4	Katas	*Felischaus*
5	Khaksial	*Vulpesbengalensis*
6	Honuman	*Semnopithecus entellus*
7	Chucha	*Suncusmurinus*
8	Indur	*Bandicotabengalensis*
9	Nenhtiindur	*Musmusculus*
10	Badhur	*Pteropus*sp
11	Chamchika	*Pipistrellus tenuis*

Table-17 Green Coverage of the College Premises

Green Coverage of the College Premises	**Area in Percentage**
Native and Natural Vegetation	42
Plantation	20
Agro-Plants	33
Medicinal Plants	5

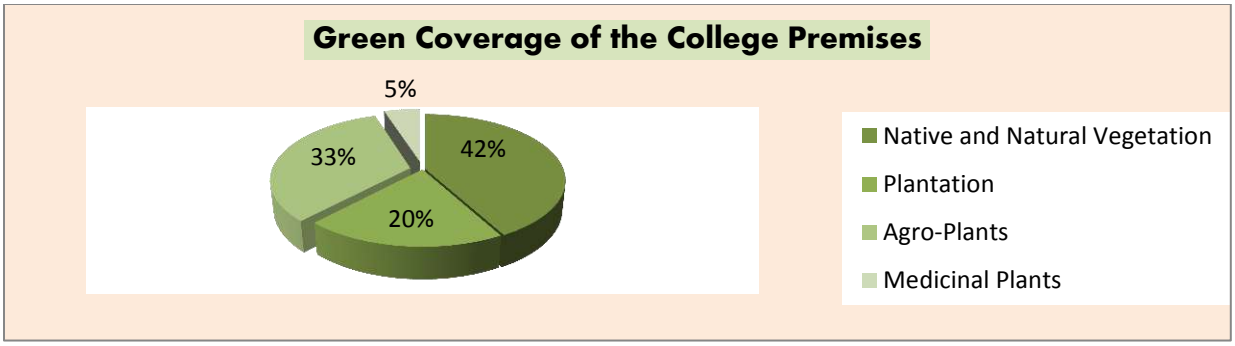


Fig. 11 Green Coverage of the College Premises

Implemented Biodiversity & Green Management		
Sl. No	Factors/ Indicators	Weightage
1	Plants Diversity	M
2	Birds and Insects	M
3	Mammals	M
4	Fishes and Amphibian	M
5	Fungus & Organisms	L

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

3.7 Reviews of Documents and Records:

Documents such as admission registers, registers of Engineering and water charge remittance, furniture register, laboratory equipment registers, purchase register, audited statements, and office registers were examined and data were collected. College calendars, college magazines, annual report of the college and NAAC self-assessment reports, UGC report etc. were also verified as part of data collection.

Green Carpet

Roof Water harvesting unit

Biodiversity observation

3.8 Review of Policies:

Discussions were made with the College management regarding their policies on environmental management. Future plans of the College were also discussed. The management would formulate a revised environment /green policy for the college in the light of green auditing. The purpose of the green audit was to ensure that the practices followed in the campus are to be in accordance with the Green Policy adopted by the institution.

3.9 Interviews:

In order to college information for green auditing different audit groups which are IQAC Cell, Dept. HOD, Teaching and non-teaching staff, students, Students Union, parents and other stakeholders of the College. Discussions were also made with the PTA office bearers to clarify doubts regarding certain points.

4.0 POST AUDIT STAGE :

4.1. Data Analysis and Assessment :

The base of any Green audit and Environmental audit is that its findings are supported by documents and verifiable information. The audit process seeks, on a sampled basis, to track past actions, activities, events, and procedures to ensure that they are carried out according to systems requirements and in the correct manner.

Although Green & Environmental audits are carried out using policies, procedures, documented systems and objectives as a test, there is always an element of subjectivity in an audit. Each of the three components are crucial in ensuring that the organization's

environmental performance meets the goals set in its green policy. The individual functioning and the success of integration will all play a role in the degree of success or failure of the organization's environmental performance.

4.2 Results and Findings:

a) Water -

Water Audit and Assessment (Belda College):

Sl. No.	Object and Parameter	Observation and Finding
1	Source of water	➢ Underground(28500liter) ➢ Surface water(2500litre) ➢ Surface water bodies(1.22 acre)
2	Capacity of water storage (Daily)	➢ Reservoir and Overhead tanks-15000liter ➢ Total amount of used & misused water-31150ltr ➢ Total misuse of water- 300 ltr
3	Amount of used water per day	30850 liter
4	Misuse of water in daily	Leakage, overflow and Misuse- 300 liter
5	Maximum used of water per day – Bathing and Washroom purpose	63.53% (19600liter)
6	Amount of water for used per day-Drinking Purpose	18.15% (5600 liter)
7	Number of Rain Water Harvesting unit	One unit
8	Installation of water reuse units	One unit- 150 liter
9	pH level of drinking water	6.9
10	TDS level of drinking water	120 ppm - 140ppm
11	Use of surface water	2500ltr

b. Energy-

Energy-

- Electricity Consumption (Actual) – 47518 Unit. Rs.- 463300.5/- Per Year
  a) Conventional energy- 36718 Unit. Rs.358000.5/- Per Year
  b) Nonconventional energy-10800 Unit. Cost.-Rs. 105300/- Per Year
  c) Payable cost of electricity – Rs.358000.5/- Per Year
- Fossil fuel consumption per Year:
  a. Number of Gas cylinders used for cooking purpose(Hostels& Canteen) – 52 PC
  b. Number of Gas cylinders used in Chemistry Laboratory - 3PC
  c. Diesel used for green Generator- 30 liter
- Number of Green Generators - 2 Unit

❖Cost of fuel for Generator – Rs. 2700/-
Cost of Gas Cylinder- Rs. 52250/
Cost of Wooden Fuel- Rs. 1500

Energy Audit and Assessment (Belda College)

Sl. No.	Object and Parameter	Observation and Finding
1	Source of energy (conventional)	77.28%
2	Source of energy (Non-conventional)	Solar- 22.72%(15kWh)
3	Total consumption of Electric Power(Actual)	47518 unit
4	The maximum use of Electric Power	Conventional – 77.28%
5	Maximum energy consumption in the purpose	Light and fans – 16523.1unit AC-5507.7 unit
6	Energy Consumption in Computer & Lab.	10281.04unit
7	No. of LPG Gas cylinder for coking purpose	52
8	No. of LPG Gas cylinder used in Laboratories	3
9	Amount of diesel used for green generator	30 liter
10	No. of Computers and use of energy	140 (1.8 Kwh/Day)
11	No. of AC and use of energy	26(195 Kwh/Day)

Energy consumption in different purpose, 2021-22		
1.	Lights & Fans	16523.1 unit
2.	Air Condition	5507.7unit
3.	Lifting of water(HP pump)	1395.28unit
4.	Computer & Dept. Lab	10281.04unit
5.	Others(CCTV,TV, water cooler & others)	3010.88unit

c. Wastes-

- Total Students – 3860 persons
- Other Stakeholders – 32 persons
- Total Stakeholders - 4050 persons
- Departments – PG: 06 UG:26
- Student Hostels - 01
- Office & Building - 05

- Canteen- 01
- Type of Wastes & Management: Biological Wastes Disposal by corporation collection & Bio-fertilizer Unit.
- E-wastes- computers, electrical and electronic parts – Disposal by selling
- Plastic waste- disposal by selling
- Solid wastes – Damaged furniture, Iron & Metal scraps- Disposal by Selling
- Food wastes – Waste Rice, Vegetable, Paper plates- Disposal to municipal waste Collection centers.
- Chemical wastes – Laboratory waste – No treatment
- Waste water – washing, urinals, and bathrooms in soak pits
- Glass waste – Broken glass wares from the labs to municipal waste Collection centers.
- Napkin & Clothes incinerators- Disposal to municipal waste Collection centers.

Waste Audit and Assessment (Belda College)

Sl. No.	Object and Parameter	Observation and Finding
1	Degradable waste	55(Kg/Day)
2	Non degradable	4(Kg/Day)
3	Source of waste (Organic)	Hostels, Canteen and Garden
4	Source of waste (Chemical Waste)	Zoology Lab., Chemistry Lab., Botany Lab. and Micro-Biology lab
5	Plastic waste management	Use of separate dustbin and Established of different waste unit

d) Green Campus-

Green cover of the campus- 1.53 acre area

Free space including Playground-4.30 acre area

Crops cultivated in the campus:

Chilly, Cabbage, Tomato, Spinach, Brinjal, Cauliflower, Ladies finger, Pea and different seasons flowers are produced during different seasons in Hostels Kitchen garden and College premises area.

Table 18 Biodiversity and Green Coverage (Belda College)

Sl. No.	Object and Parameter	Observation and Finding
1	Vegetation coverage area	13.91 % (1.53 Acre)
2	Types of green coverage	➢ Native and Natural Vegetation- 42 % ➢ Medicinal plants-5% ➢ Agro-plants-33%
3	Different types of Animal	➢ Mammals -Five striped Palm Squirrel, Free-ranging Cat, Free-ranging Dog ,Asian Palm Civet, Field Rat, Grey Mongoose, House Mouse ➢ Small Indian Civet, Bengal Fox, Indian gray mongoose, ➢ Birds- Crow, Common Moyna, Pigeon, etc ➢ Insects- Ants, Butterfly, Spider etc.
4	Biodiversity and Green Management Programme	➢ Awareness program arrange by- Dept. of Zoology and Dept. of Botany among the students and Staff through the year ➢ Observation and celebration of environmental days ➢ Maintain the ponds ecosystem & fishes cultivation

Aerial views and Green coverage area

Table 19 Green Coverage of the College Premises

Green Coverage of the College Premises	Area in Percentage
Native and Natural Vegetation	42
Plantation	20
Agro-Plants	33
Medicinal Plants	5

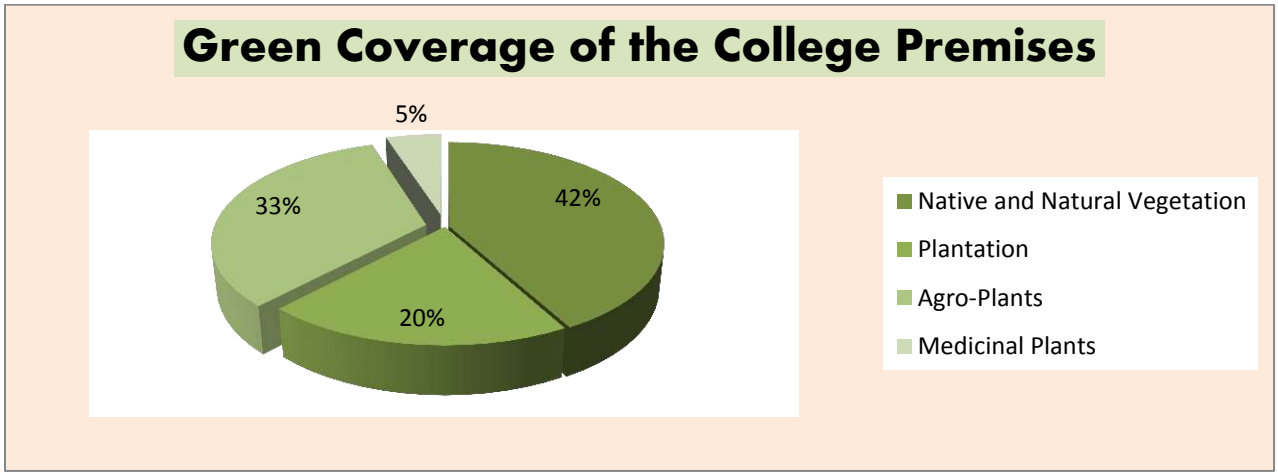


Fig. 12 Green Coverage of the College Premises

Campus farming

Organic vegetable cultivation as interim crop is another plan to be materialized soon. The department of Zoology has been consistently undertaking Fishes cultivation , and Botany department has been planting of flowers and ornaments trees in winter .

Table – 2: Plants of Susrut Garden (Medicinal Plant Garden)

2a. Tree

Sl. No.	Scientific Name	Family
1	*Terminalia bellerica*	Combretaceae
2	*Emblica officinalis*	Euphorbiaceae
3	*Santalum album*	Santalaceae
4	*Cinnamommum tamala*	Lauraceae
5	*Diospyros malabarica*	Ebenaceae
6	*Pterocarpus santalinus*	Fabaceae
7	*Thuja orientalis*	Cupressaceae
8	*Dypsis lutescens*	Arecaceae
9	*Cinnamommum zeylanicum*	Myrtaceae
10	*Euphorbia tirucali*	Euphorbiaceae
11	*Michelia champaca*	Magnoliaceae
12	*Pimenta dioica*	Myrtaceae
13	*Pinus roxburghii*	Pinaceae
14	*Terminalia chebula*	Combretaceae

2b. Shrub

Sl. No.	Scientific Name	Family
1	*Quisqualis indica*	Combretaceae
2	*Datura metel*	Solanaceae
3	*Acalypha hispida*	Euphorbiaceae
4	*Jatropha gossypifolia*	Euphorbiaceae
5	*Hibiscus rosa-sinensis*	Malvaceae
6	*Adhatoda vasica*	Acanthaceae
7	*Solanum torvum*	Solanacea
8	*Murraya koenigii*	Rutaceae
9	*Ixora coccinea*	Rubiaceae
10	*Justicia gendarussa*	Acanthaceae

2c. Herb

Sl. No.	Scientific Name	Family
1	*Wedelia trilobata*	Asteraceae
2	*Centella asiatica*	Apiaceae
3	*Colocasia esculenta*	Araceae
4	*Curcuma longa*	Zingiberaceae

5	*Alocacia indica*	Araceae
6	*Costus speciosus*	Costaceae
7	*Aloe vera*	Asphodelaceae
8	*Desmodium gyrans*	Fabaceae
9	*Cyperus rotundus*	Cyperaceae
10	*Hygrophila spinosa*	Acanthaceae
11	*Cymbopogon citrates*	Poaceae
12	*Aerva lanata*	Amaranthaceae
13	*Capsicum frutescens*	Solanacea
14	*Barleria lupulina*	Acanthaceae
15	*Bryophgyllum calycinum*	Crassulaceae
16	*Andrographis paniculata*	Acanthaceae
17	*Ocimum sanctum*	Lamiaceae
18	*Bacopa monnieri*	Scrophulariaceae
19	*Clitoria ternatea*	Fabaceae
20	*Paederia foetida*	Rubiaceae
21	*Asparagus racemosus*	Liliaceae
22	*Cissus quadrangular*	Vitaceae
23	*Hemidesmus indicus*	Asclepiadaceae
24	*Ipomoea batatus*	Convolvulaceae
25	*Piper nigrum*	Piperaceae
26	*Gymnema sylvestre*	Asclepiadaceae

e) Carbon Footprint-

- Number of Students & Staff using cycles – 520
- Number of persons using cars – 18
- Number of persons uses two wheelers – 48
- Number of students uses Buses - 720
- Number of persons using other transportations –240
- Number of visitors per day – 15
- Number of Students staying in the hostel – 14
- Number of Faculty and staff staying in the quarters – 00
- Average distance travelled by stake holders – 20 kms /day
- Expenditure for transportation per person per day – Rs. 30 /-

4.3 SUMMARY:

I. The environmental awareness initiatives are adequate.
II. The College campus is plastic free and maintained the outdoor air quality.
III. The installation of solar panels, Fire extinguishers training, organic vegetable cultivation, Vermi composting practices are inadequate.
IV. There is Nature club of the College towards its environmental performance for Community development.
V. Indoor air quality of the laboratories is very uncomfortable and inhospitable.

VI. Use of notice boards and signs are inadequate to reduce over exploitation of natural resources.
VII. Programs on green initiatives have to be increased. Campus is declared "Clean Campus"
VIII. Fully carbon foot prints and wastes free zone actions should be taken to maintain this.
IX. Rain water harvesting systems, solar power generation, Bio Gas, Re-use of water environmental education programs have to be fully explored.

Implemented Air Quality management		
Sl No	**Indicator**	**Weightage**
1	Carbon & Smoke free	M
2	Exhaust fans &Ventilation	M
3	Emission of GHGs	M
4	Indoor Plants	L

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

Major Audit Observations		
Sl. No	**Sectors/Indicators**	weightage
1	Water efficiency Audit	H
2	Energy efficiency Audit	L
3	Air Quality & Carbon foot print Audit	M
4	Wastes Audit	H
5	Green & Biodiversity Audit	H

* H denote- Taken management policy level above 60%
** M denote- Taken management policy level 40%-60%
*** L denote-Taken management policy level below 40%

4.4 Environmental Education:

The following environmental education program may be implemented in the College before the next green and environmental auditing:-

- Training programs in solid waste management, liquid waste management, setting up of medicinal plant nursery, water management, vegetable cultivation, tree planting,

energy management, landscape management, and rain water harvesting and water re-use methods.

- ❖ Installation of different captions : No smoking, , switch OFF light and ON after use, plastic free campus etc.
- ❖ Activate the Eco or green clubs
- ❖ Set up Organic vegetable garden, medicinal plant garden, And Indigenous Fish Farm etc. for providing proper training to the students.
- ❖ Conduct exhibition of recyclable waste products

4.5 Common Recommendations

- ✓ Adopt an environmental policy for the college
- ✓ Establish a purchase policy for environmental friendly materials
- ✓ Introduce UGC Environmental Science course to all students
- ✓ Conduct more seminars and group discussions on environmental education
- ✓ Students and staff can be permitted to solve local environmental problems
- ✓ Renovation of cooking system in the canteen to save gas and wooden fuel
- ✓ Establish water, waste and energy management systems
- ✓ Establish a 'Nature Club' for Resources and Green campus management
- ✓ Maintain of Indoor air quality
- ✓ Establish a solar pump house or solar submersible pump

4.6 Criteria Wise Recommendations

Water Audit

- ➢ Remove damaged taps and install sensitive taps is possible.
- ➢ Drip irrigation for gardens and micro irrigation technology can be initiated.
- ➢ Establish the re-use water management methods.
- ➢ Establish rain water harvesting systems for each building and each campus.
- ➢ Establish the more water reuse unit in the Hostel & staff quarter's area.
- ➢ Establish water treatment systems.
- ➢ Awareness programs on water conservation to be conducted.

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Energy Audit

- ✓ Employment of more solar panels and other renewable energy sources.
- ✓ Conduct more save energy awareness programs for students and staff.
- ✓ Replace computers and TVs with LED monitors.
- ✓ More energy efficient fans, tubes and bulb should be replaced.
- ✓ Automatic power switch off systems may be introduced.

Waste Audit

- ❖ Establish a Regular functional bio gas plant.
- ❖ A model solid waste treatment system to be established.

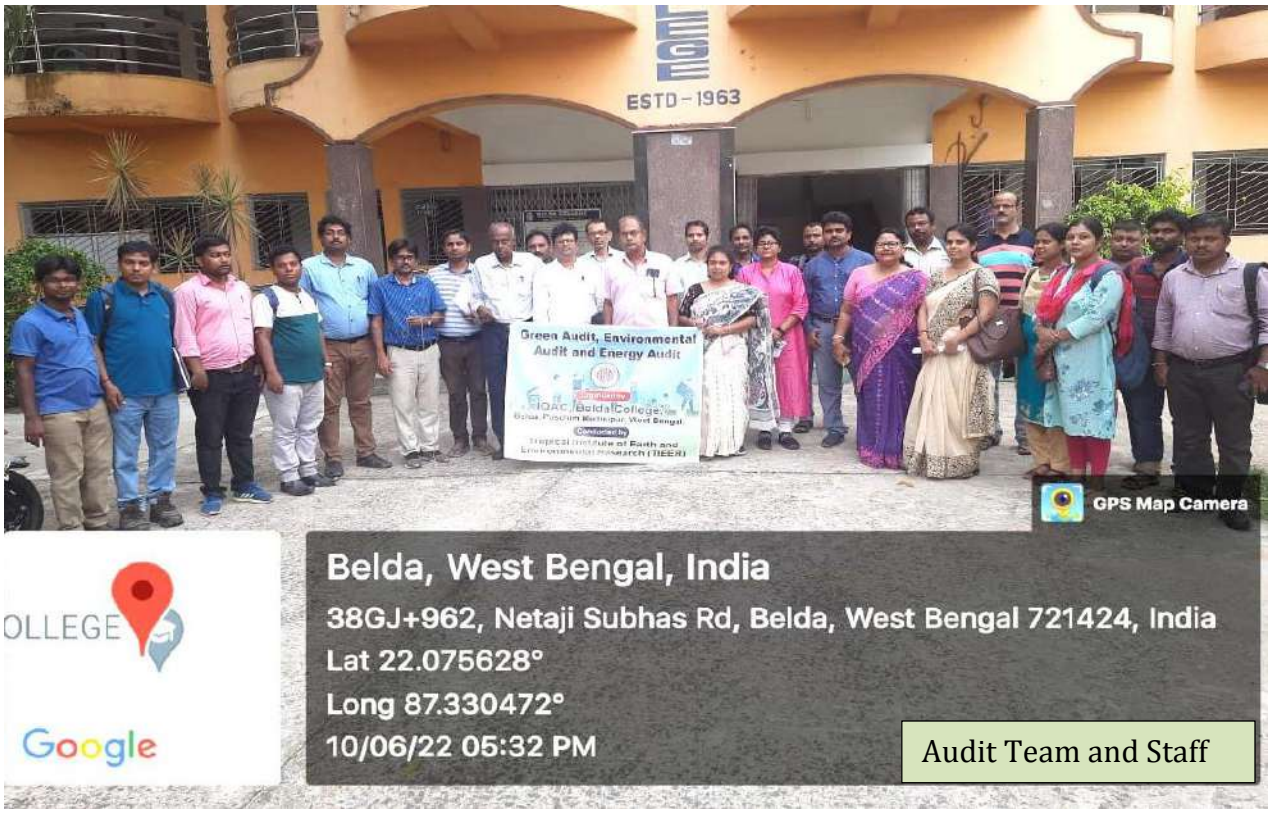
- ❖ Practice of waste segregation to be initiated.
- ❖ Establish of a unit for chemical liquid wastes and Hazardous waste management
- ❖ A model Vermi -composting plant to be set up in the Hostels, canteen and Quarters of college campus.
- ❖ Establish an e-waste management unit

Green Campus Audit

- ✓ All trees in the campus should be named scientifically.
- ✓ Create more space for planting in vacant land.
- ✓ Develop the Herbal and medicinal plants garden for large area
- ✓ Establish a butterfly park.
- ✓ Establish an Orchid ex-situ zone .
- ✓ Develop the Fruits trees area for Birds conservation
- ✓ Grow potted indoor plants at verandah, class rooms and Laboratories.
- ✓ Create automatic drip irrigation system during summer holidays.
- ✓ Not just celebrating environment day but making it a daily habit.
- ✓ Providing funds to nature club for making campus more green
- ✓ Encouraging students not just through words, but through action for making the campus green
- ✓ Conducting competitions among departments for making students more interested in making the campus green.

Carbon footprint Audit

- ❖ Establish a system of carpooling among the staff and visitors to reduce the number of four wheelers coming to the college.
- ❖ Establish the indoor plants in office rooms ,computer lab and other laboratories to CO_2 management
- ❖ Providing more college bus services to the students and staff.
- ❖ Encourage students and staff to use cycles.
- ❖ Establish a more efficient cooking system to save gas.



Audit Team and Staff

Aerial View of Entrance Gate of College premises

Ecological and Healthy Environment in the College Premises

Executive Summary: 2021-22

Environmental Audit is a process of systematic, documented, periodic and objective evaluation of components of environmental diversity with the aim of safeguarding the environment and natural resources. The process starts with the systematic identification, quantification, recording, reporting and analysis of components of environmental diversity and is a means of assessing environmental performance (Welford, 2002). It aims to analyze environments within and outside of the concerned area, which will have an impact on the eco-friendly atmosphere. Green and Environmental audit is a valuable means for an institution to determine how and where they are using the most resources; the institution can then consider how to implement changes and take necessary management measures. It can create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of green impact on their area of work. Environmental auditing and the implementation of mitigation measures is a win-win situation for the institution, the learners and the planet. It can also create health consciousness and promote to holistic approaches to environmental management, awareness, values and ethics. Green and Environmental auditing promote financial savings through efficiency of resource usage. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. If self-enquiry is a natural and necessary outgrowth of a quality education, it could also be stated that institutional self-enquiry is a natural and necessary outgrowth of a quality educational institution. Thus it is imperative that the institute evaluate its own contributions toward a sustainable future. As

environmental sustainability is becoming an increasingly important issue for the nation, the role of higher educational institutions in relation to environmental sustainability is more prevalent.

In Belda College, Paschim Medinipur, W.B the audit process involved initial interviews with the teachers and staffs to clarify policies, activities, records and the cooperation in the implementation of mitigation measures. This was followed by collection of data through the questionnaires, review of records, observation and enquiry of practices and observable outcomes. In addition, the approach ensured that the management and staff are active participants in the Green and Environmental auditing process. The baseline data prepared for the Belda College, Paschim Medinipur will be a useful tool for campus greening, resource management, planning of future projects, and a document for implementation of sustainable development. Existing data will allow the College to compare its programmers and operations with those of peer institutions, identify areas in the need of improvement, and prioritize the implementation of future projects.

The area of the College premises is 11acre out of which about 1.53acre areas is covered by trees, plants etc. and 1.22 acre areas is covered by surface water bodies and wetland. In the present audit report most of the aspects are covered such as tree plantation, awareness about environment programmers, rain water harvesting and plastic free premises. The College has already taken some steps to protect the environment with help of teachers, staff and students under the guidance of Dr. Manabendra Mondal Principal, Belda College, Paschim Medinipur. We expect that the management will be committed to implement the green and environmental audit recommendations. We are happy to submit this green and environmental audit report to the Belda College, Paschim Medinipur,W.B.