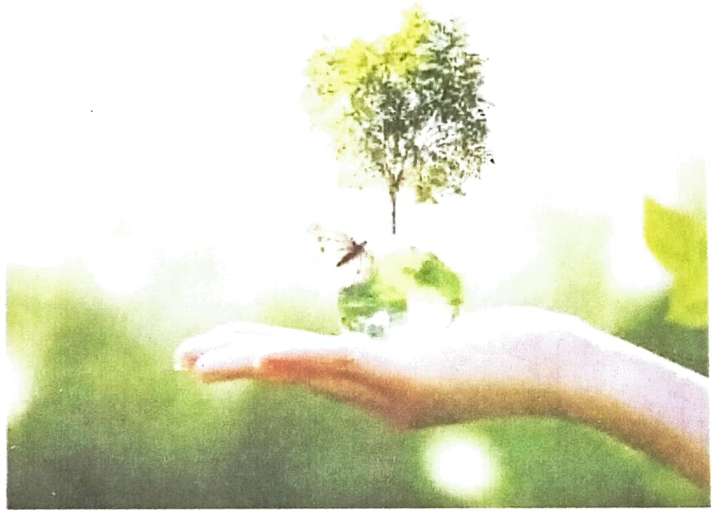
Bidhan Chandra College
Asansol

Environmental Audit
2020 - 2021



Prepared by Eco club Coordinators

Department of Environmental Studies
Department of Zoology
Department of Botany

BIDHAN CHANDRA COLLEGE
ESTD - 1961
Govt Sponsored
ASANSOL

Summary

Rapid environmental degradation at local, regional and global level is leading to different environmental problems. To control different environmental issues such as Global warming, Greenhouse effect, acid rain, and Ozone layer depletion different sustainable development and ecofriendly strategies and management procedures are being adopted everywhere. A common understanding of our natural environment is its underlying environmentalism—a very wide range of political, philosophical and social uprising which advocates several actions and policies within the concern of protecting what nature remains within our virgin horizon. The present decade is considered as our ecosystem restoration decade with our effort to undo our past. It is an important element in creating an equitable and sustainable future for humanity in harmony with nature and natural resources. The term Environmental Audit includes a large number of activities and services.

In this respect, we the faculty members of Bidhan Chandra College, Asansol have initiated and performed the environmental audit so that our institution responds to several environmental challenges and can develop a healthy and eco-friendly environment at our college campus. We deeply adhere to the fact that human beings should be steward of the mother nature and we all have a profound responsibility to protect the earth's resources. Being a renowned institution, it's our responsibility to play a major role in the field of education policy formation as well as sustainable development conditions. The commitment of Bidhan Chandra College, Asansol is to provide sustainable environment for all this Audit is not only significant for our college but also for the others who want to adopt our procedures to build a sustainable environment.

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CHAPTER 1

Introduction

1.1 Introduction to Environmental Audit

Just like Audit is an official inspection of an organisation, corporation, institution or a system's financial situation and account usually by an autonomous independent governing body, an Environmental Audit concerns of the environmental impact, performance and position of a management, company or so. Hence Environmental Audits are very akin to financial Audits but usually involves only environmental factors and limitations.

India became the first country to make Environmental Audits compulsory when The government of India, by its gazette notification [No. GSR 329 €] of March 13, 1992, made it mandatory for all industries to provide annual environmental audit reports of their operations, beginning with 1992-93. It required corporates, industries, managements and institutions to make audit reports based on data and analytics on the amount of resources they are consuming for water, energy and their solid waste management system, land use patterns, the socio-economic status of their system, presence of biodiversity and sanitation facilities among others.

Whilst with the popular belief of Environmental Audits being pertinent only to industries and corporates, Educational Institutions are the driving force behind a country's growth where the young minds learn to live alongside the environment with the aim of protecting it for eternity.

Environmental Audits are a great way to measure the resource consumption of an institution and balance it according to needs, thus saving additional efforts and capital. It facilities a hygienic and healthy environment for the population with its sanitation and solid waste management system promoting recycling initiatives to reduce and improve the existing waste management facilities.

Developing more environmentally sustainable ways of living has become a global concern. Universities and colleges around the world are creating alternative, more sustainable methods to continue to meet their campus's needs, as well as decrease their own environmental footprints. As a progressive step towards these aforementioned ideas, Bidhan Chandra College, Asansol conducts an annual environmental audit.

1.2 Concept

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

Environmental auditing is a management tool designed to provide information on environmental performance to the right people at the right time. An Environmental audit is a systematic means of providing environmental management information

a) To all levels of management
b) For a variety of purposes

Environmental Audits can be categorised as follows

1. A technical review
   Such an Audit will involve the systematic collection of information about the existing and potential impact of the organization's activities on the environment. It'll normally cover pollution control and waste management activities.

2. A management review
   Management review focuses on the management procedures and record keeping alongside gathering information on compliance with the legislation. It will not examine the existing operation on the surrounding environment from a technical standpoint

3. Due diligence review
   It examines the likely cost of implementing pollution control and site remediation actions taking account of existing and future planning.

Synonymous to green audit, the term is also known by different names to different populations whilst a relative concept is considered applicable to most. The most commonly accepted definition of environmental audit is as defined by the International Chamber of Commerce which states it as: A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of helping to safeguard the environment by

(i) Facilitating management control of environmental practices;
(ii) Assessing compliance with company policies, which would include meeting regulatory requirements.

An environmental Audit hence constitutes a management tool comprising of a systematic, documented, periodic and objective evaluation of the performance of the organisation, management system and processes designed to protect the environment with the aim of:

(i) Facilitating management control of practices which may have an impact on the environment
(ii) Assessing compliance with organization's environmental policies.

The regulation specifies that an audit should include at least the following steps:

- Planning of the audit activities, including definition of responsibilities for the audit;
- Review of the environmental protection policy of the company;
- Assessment of the organization; management and equipment:
- Gathering of data and of all relevant information
- Evaluation of the overall performance
- Identification of areas for improvement
- Internal reporting to the top management

Environmental audit can be a useful tool for a college to determine how and where they are using the most energy or water or resources; the college can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Environmental auditing andthe implementation of mitigation measures is a win-win situation for all the college the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Environmental auditing promotes financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers. Thus it is imperative that the college 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. A clean and healthy Environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues.

1.3 Aims & Objectives of Environmental Audit

To improve the environmental quality for future generations, sustainable development, realization of Environmental values and different Environmental management systems or procedure is a necessity. Environmental Audit is required by management to monitor Environmental performance.

- Environmental education through systematic environmental management approach
- Improving environmental standards
- Compliance with Environmental regulations
- Implementations of organizations, Environmental Policies and procedures
- Sustainable use of natural resource in the campus.
- Financial savings through a reduction in resource use
- Curriculum enrichment through practical experience
- Development of ownership, personal and social responsibility for the College campus and its environment
- Enhancement of College profile
- Developing an environmental ethic and value systems in young people
- Energy management, savings and choice
- Raw materials, management, savings, choice and transportation, water management and savings
- Waste avoidance, recycling, reuse, transportation and disposal
- Selection of production processes
- Production planning (designing, packaging, transportation, use and disposal
- Prevention and limitations of accidents

Benefits of Environmental Auditing

A properly implemented environmental audit plan provides a range of benefits for an organisation. These are:

(i) It provides a framework for measuring environmental performance

(ii) It reinforces accountability for the environmental dimensions of corporates, managements, organisations and institutions among others.

(iii) It raises the awareness of the importance and responsibility towards environment.

(iv) It provides valuable information for future planning such as but not limited to pollution control plan, financial plan and other investments.

(v) Understanding how to develop and implement an ISO 14001 EMS
(vi) Recognize the cost saving methods through waste minimizing and managing strategies.
(vii) Authenticate conformity with the implemented laws Empower the organizations to frame a better environmental performance

1.4 About the College

Internationally renowned scholar and the then Vice President of India, Dr Sarvapally Radhakrishnan laid the founding stone of Bidhan Chandra College in Asansol and the College was established in 1961 to serve the growing demands of the Asansol Burnpur industrial region. An initiative of the Asansol Educational Development Committee, Bidhan Chandra College also known as B.C. College named after one of the founding figures of West Bengal Dr. Bidhan Chandra Roy is government sponsored public university situated in Asansol (23°40'36.91"N 86°57'09.67"E). Sri Sasthi Narayan Gorai donated the sum of Rs.1,11,111 to support their noble cause in the establishment of the college. Bidhan Chandra College is currently affiliated to Kazi Nazrul University whilst previously affiliated to the University of Burdwan.

Bidhan Chandra College (Government Sponsored), Asansol, District Paschim Burdwan, West Bengal is a co-educational institution established in the year 1961. The members of the Asansol Educational Development Committee, a Relief and Welfare Society took initiative in founding this college and Sri Sasthi Narayan Gorai donated the sum of Rs.1,11,111 to support their noble cause. The institution owes its name to Dr. Bidhan Chandra Roy – an illustrious son of Bengal and one of the early Chief Ministers, and its foundation stone was laid by Dr. Sarvapally Radhakrishnan, an internationally acclaimed scholar of Indian Philosophy and the then Vice President of India. Since then, we have been one of the major higher-educational institutions of West Bengal affiliated with Kazi Nazrul University and approved by the University Grants Commission.

Currently headed by Dr Falguni Mukhopadhyay, our College believes in its primary stakeholders being the students. All aspects of education focuses on the core values of contribution to national development while fostering global competencies among students. The College admits students from all social milieus and empowers them through intensive mentoring and counselling them

to face the challenges of life and become responsible and sensitized citizens of the country.

The most valuable investment any educational institution can make is "Nurturing Future Leaders". With the continuous rise in expectation of essential leadership standards, Bidhan Chandra College have taken a responsibility for this investment to nurture the Next Generation leaders with a vision to bridge the existing skill gap. With a firm step forward to attain an academic excellence, several Centers of Excellence, computer labs have been setup at the Bidhan Chandra College in association with the top leaders.

The Bidhan Chandra College imparts education to Undergraduates in the following departments:

- Department of English
- Department of Hindi
- Department of Bengali
- Department of Urdu
- Department of History
- Department of Mathematics
- Department of Chemistry
- Department of Physics
- Department of Zoology
- Department of Botany
- Department of Geography
- Department of Political Science
- Department of Economics
- Department of Commerce
- Department of BBA and BCA
- Department of Philosophy

COURSE OFFERED

- Bachelor of Arts (Hons.)
    1. English
    2. Hindi
    3. History
    4. Political Science
    5. Bengali
    6. Urdu
    7. Sanskrit
    8. Philosophy

- Bachelor of Arts(Programme):
  Bengali, History, Political Science, Sanskrit, Urdu, English, Hindi, Philosophy
- Bachelor of Science Honours
  1. Chemistry
  2. Physics
  3. Zoology
  4. Mathematics
  5. Geography
  6. Economics

- Bachelor of Commerce Honours:
  (i) Accountancy
  (ii) Taxation
- Bachelor of Professional studies
  (i) BBA, BCA
- Post-Graduation course
  (i) MA in English

1.5 About the Area where the college is situated

Located at the heart of the metropolitan area of Asansol, Bidhan Chandra College serves a population of almost a million inhabitants. Asansol is a burstling metropolis with a sprawling suburban area located at the western end of West Bengal near the border of Jharkhand. With an urban population of almost 3 million, Asansol is the second largest city of West Bengal just after Kolkata. Perhaps most well-known for its heavy industries based on Iron and Steel, it also serves as a major hub of transportation and commerce.Asansol is the divisional as well as district headquarters of Paschim Burdwan district & situated in the south west corner of West Bengal. Paschim Burdwan district is sort of an extension of the Choto Nagpur plateau. It is located around 200 km from the State Capital, Kolkata. Asansol lies between 23°68'N Latitude and 86°99'E Longitude.

CHAPTER 2

Methodology

2.1 Data Evaluation

- **Pre-Audit Activities**

Select and schedule facilities to audit, based on:

A. Plan the audit

B. Selection of the audit team
   i) Confirm their availability
   ii) Assigning of the Audit responsibilities

C. Scheduling of the audit facility
   - Discussing the audit programmes
   - Acquiring the background information
   - On-site visiting

D. Preparation of the Questionnaire (if necessary)

E. Understanding the scope of audit

F. Determination of the applicable requirements and resource necessities

- **During Audit Process on Site:**

A. Identify and understand management control system
   1. Review background information
   2. Review Audit plan

B. Assess management control system
   1. Analyse the strengths and weaknesses of the internal controls
   2. Adopt Audit Plan and resource allocation

C. Gather Audit evidence
    1. Collect Data
    2. Ensure protocol steps are completed
    3. Review all observations
    4. Conduct further testing if required

D. Evaluate Audit findings
    1. Development of complete list of findings
    2. Assembly of the necessary documents
    3. Integration and summarization of the findings
    4. Evaluate the observations of audit program

- **Post Audit Activities**

A. Issue of the draft report
    1. Correction of the closing report
    2. Distribution of the draft report
    3. Allocation of time for correction

B. Issue of the final report
    1. Correction of the draft report
    2. Highlight requirement for the action plan
    3. Action plan preparation and implementation
    4. Follow up in action plan

2.2 Report Preparation:

1. Produce a draft report of the data collected
2. Produce a final report of the observations and the inference with accuracy
3. Distribute the final report to the management
4. Prepare an action plan to overcome the flaws Keep a watch on the action plan.

2.3 Environmental Auditing Questionnaire

The following Questionnaire was prepared to conduct the Environmental Auditing

Premise of the Questionnaire

- Waste Minimization and Recycling
- Greening
- Energy Conservation

- Water Conservation
- Clean Air
- Animal Welfare
- General Practices
- Classroom Environment

The total population of the Institute:

	Male	Female	Total
Teachers	49	38	87
Students	1612	1665	3277
Non-Teaching Staff(s)	Full timer 15 Adhoc 32	Full timer 02 Adhoc 06	Full timer 17 Adhoc 38
Total	1708	1711	3,419

- Approximate Number of Visitors per day: 5
- Approximate number of total working days in our campus in a year: 270 days
- Where is the campus located?
  The campus is Located near Budha more, Asansol 4
  District: Paschim Bardhaman, West Bengal
- Total area of the Campus: 20.55 acres
- Total area of the college building: 4985.28 metres^2
- Which of the following are available in your institute?

  - Water Reservoir: Available
    Dimensions: 20 ft. × 13 ft. × 6 ft.

  24 hours of municipal water supply is available in the college premise

  - Garden area: Available
  - Play ground: Available
  - Toilets: Available
  - Library: Available
  - Garbage or waste store Yard: Available
  - Laboratory: Available
  - Canteen: Available

BIDHAN CHANDRA COLLEGE ESTD - 1961 Govt Sponsored ASANSOL

- ✦ Hostel Facility
  - Boys: Unavailable
  - Girls: Available
  - Capacity: 30
- ❖ Staff Quarter
  - Teaching Staff Quarter: Available

No of Quarter: 09

  - Non-teaching staff Quarter: Available

No of Quarter: 07

  - Total: 16
- ❖ Rainwater Harvesting Facility: Available

  Dimensions of the reservoirs:

  i) No 1: 25 ft. × 20 ft. × 6 ft.

  ii) No 2: 20 ft. × 20 ft. × 6 ft.
- ❖ Emergency power supply: Available

  2 Diesel Generator
- ❖ Tree Plantation Programme: Organized by several departments, Eco Club, and NSS
- ❖ Animal Welfare Programme: Yes
- ❖ Waste recycling: Available
- ❖ Classroom Environment: Airy and healthy
- ❖ Student Scholarship: Available

A.Kanyashree Scholarship

Kanyashree	No of Students	Scholarship rewarded
K1	1	□ 1000 (per year)
K2	59	□ 25000 (one time)
K3	11	□ 12000 (one time)

B.Swami Vivekananda Merit cum Means Scholarship (SVMCM)

Total no of students awarded: 128

Total amount received for the scholarship: □ 4,56,610

C.Aikyashree Scholarship

Data unavailable

D. Minority Scholarship

Data unavailable

E. Student Free-ship (College)

Total no of students awarded: 203

❖ Which of the following are found near your institute?

1. Municipal dump yard: Yes
2. Garbage heap: No
3. Public convenience: Yes
4. Sewer line: Yes
5. Stagnant water: No
6. Open drainage: No
7. Industry (Mention the type): SAIL (Steel)
8. Bus / Railway station: yes, within 6 km
9. Public halls: Yes, within 4 km

WASTE MINIMIZATION AND RECYCLING

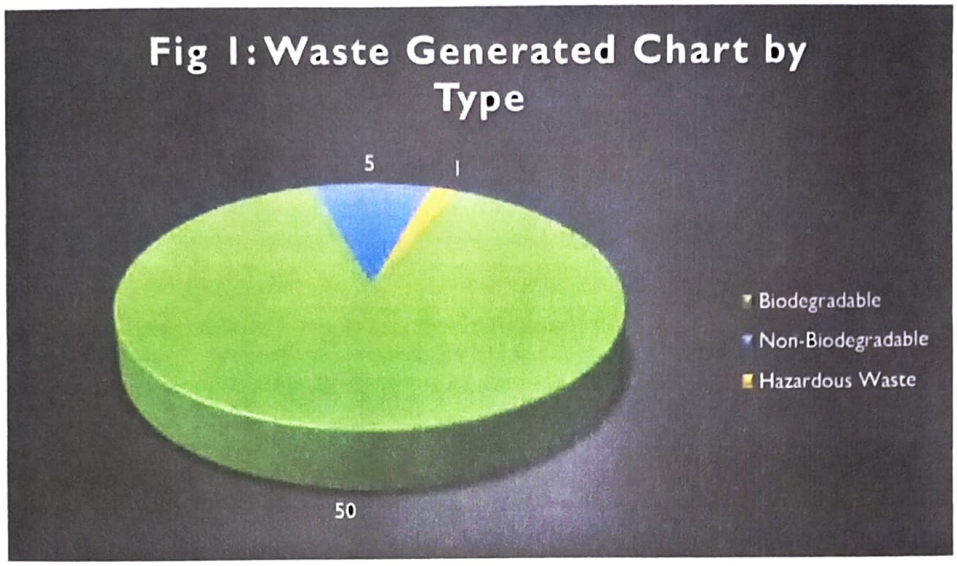
1. Does your institute generate any waste? If so, what are they?

Yes, Solid waste, Canteen waste, paper waste, plastic waste, toiletry waste, Horticulture Waste, domestic waste etc.

2. Approximate amount of waste generated per day (in Kilograms/month)

Biodegradable	Non-biodegradable	Hazardous Waste
50 kg	5 kg	1 kg

BIDHAN CHANDRA COLLEGE ESTD - 1961 Govt Sponsored ASANSOL



3. How is the waste generated in the institute managed?
   - ✓ Composting
     Composting pits are available in campus. Vermicomposting is also practiced
   - ✓ Recycling
   - ✓ Reusing
     Reuse of one side printed Paper for internal communication
   - ✓ Sewage water is discharged to public Sewer. Domestic Waste is given to Municipal Corporation.
   - ✓ Two types of Waste bins are provided at campus viz: -
     a) Biodegradable
     b) Non-biodegradable waste
   - ✓ Horticulture waste is also given to Municipal Corporation.
   - ✓ Incinerator is used for managing sanitary waste.

4. Is recycled paper used in the institute?
   Yes, as in but not limited to academic evaluation, and official works.

5. Is reused paper used in the institute?
   Yes

6. How would you spread the message of recycling to others in the community? Have you taken any initiatives? If yes, please specify.
   Yes, Eco Club carried out numerous activities viz:
   i) Recycling campaigns
   ii) Electronic Waste Management
   iii) Anti-plastic campaigns
   iv) Tree plantation Programme
   v) Sustainable goal and awareness Programme.

7. Can you achieve zero garbage in your institute? If yes, how?
   Yes, as per new waste management rules all kind of waste is managed in an adequate manner without any deviation.

Chapter 3

3.1 Land Use

Bidhan Chandra College is situated at the heart of the Asansol City. Its total campus area is 20.55 acres and college building is situated on 4985.28 m^2. The college is using land for different purposes to facilitate smooth functioning and working. 5 Satellite images represents the Campus area of Bidhan Chandra Colleges since 2001.Source: Landsat Satellites, Maxar Technologies, Google Earth Pro

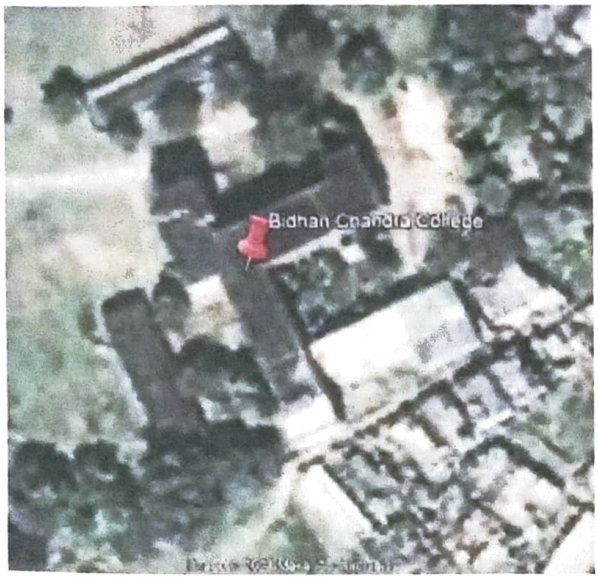


FIGURE 2: SATELLITE IMAGERY TAKEN IN 2001

FIGURE 3: SATELLITE IMAGERY TAKEN IN 2006

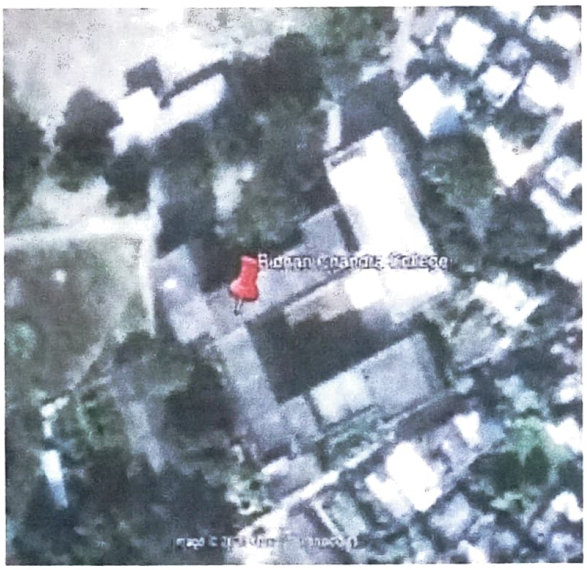


FIGURE 4: SATELLITE IMAGERY TAKEN IN 2010

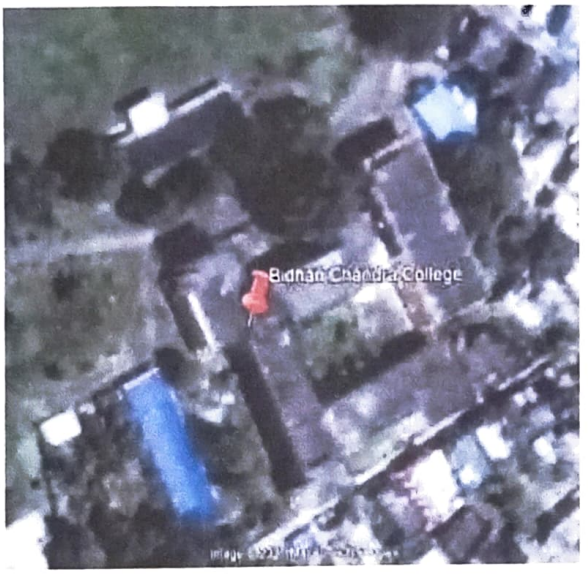


FIGURE 5: SATELLITE IMAGERY TAKEN IN 2015

FIGURE 6: SATELLITE IMAGERY TAKEN IN 2021

The plan below represents the layout of the buildings of Bidhan Chandra College in 2017.

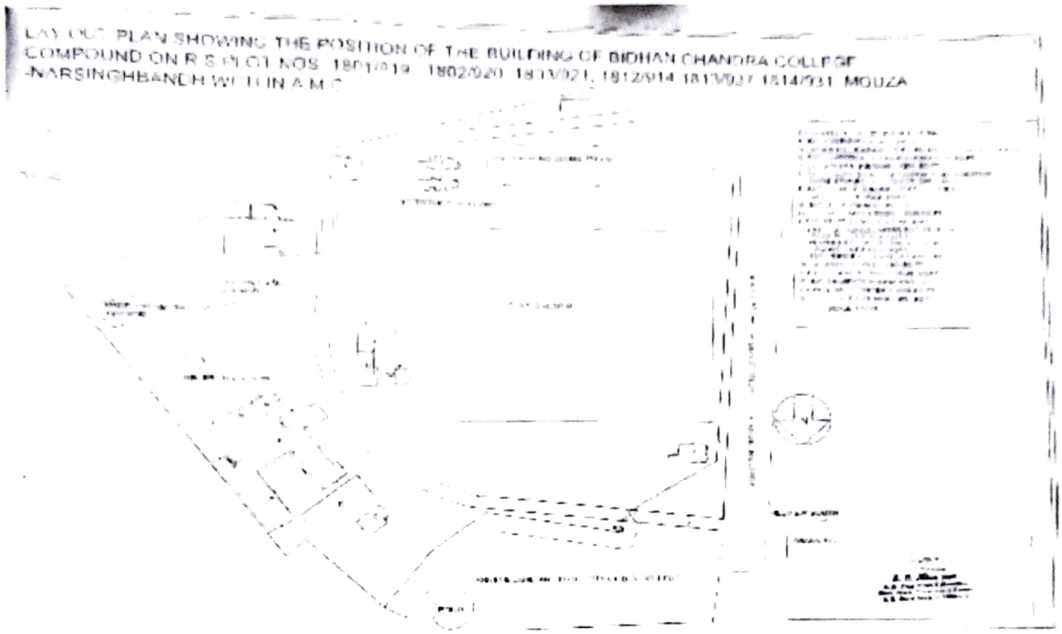


FIGURE 7: LAYOUT PLAN OF BIDHAN CHANDRA COLLEGE

LAND USE PATTERN

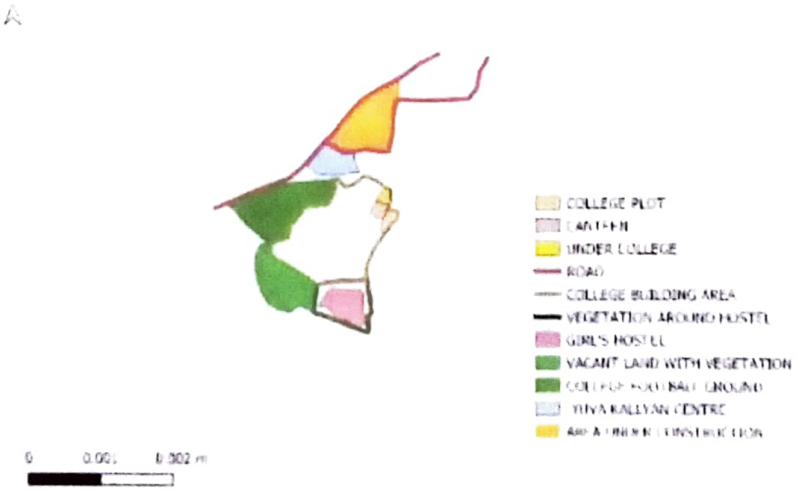


FIGURE 8: LAND USE PATTERN OF BIDHAN CHANDRA COLLEGE

3.2 Energy Audit

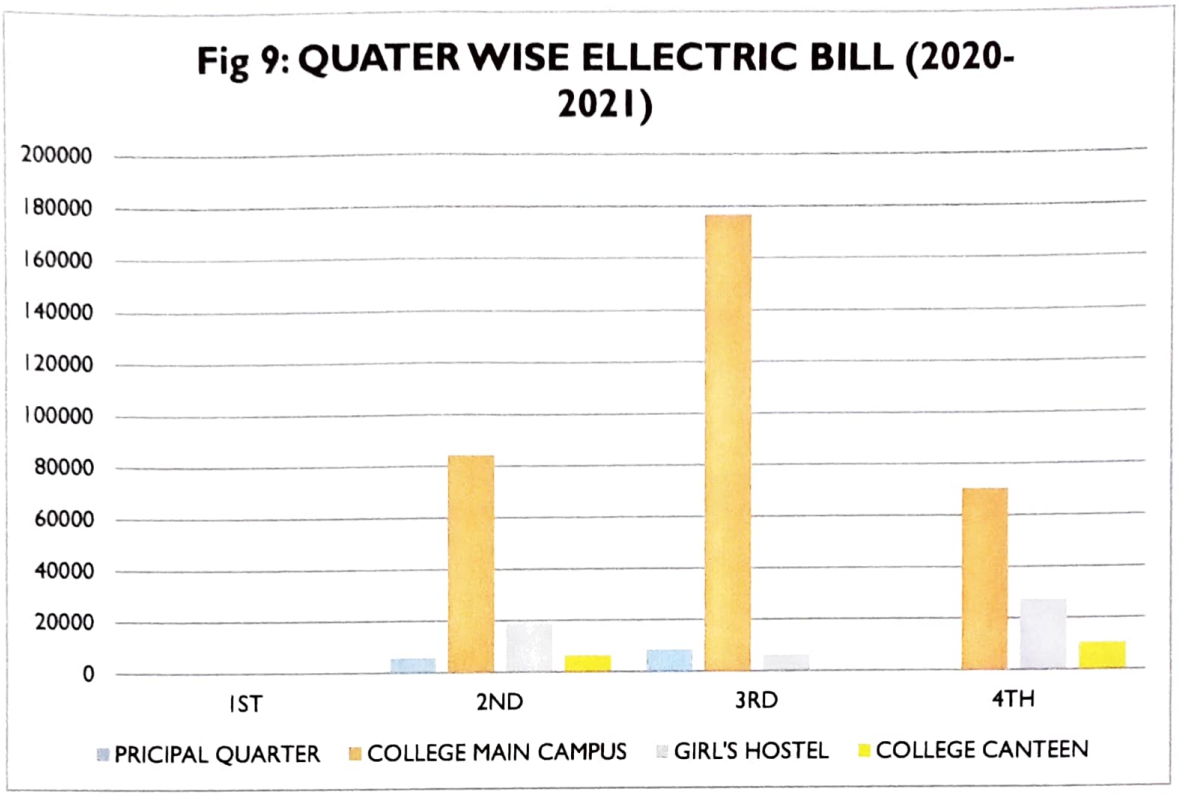
Energy Audit is the systematic approach for decision making in the sphere of energy management. It estimates total energy utilisation in the campus for lighting, Air conditioning, running of laboratories and their appliances, water heating, water pumping and cooking among others.

Fossil Fuel and electricity are major expenses in major organizations today. Efficient energy consumption is crucial for the economic success of all organization. Few ways that we use to conserve in our institution are:

- Electricity is saved by the usage of LED Blub
- LPG is saved by the usage of pressure cookers for cooking food
- We always try to run our computers at power saving mod
- We never use our Air conditioners, computers, weighing balance, printers, etc. in standby mode
- When these are not in use we completely shut them down or switch those off.
- We switch off our electrical appliances immediately after the dispersal of classes and when these are not in use .
- All Streetlights are in sensor based LED energy efficient module.

QUARTER WISE ELLECTRIC BILL (2020-2021)

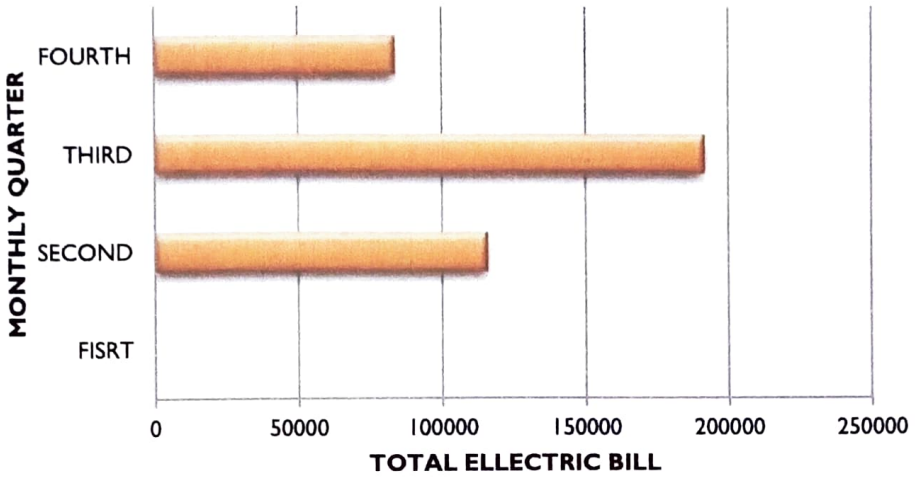
FIELDS	1ST	2ND	3RD	4TH
PRINCIPAL QUARTER	DNA	5790	8390	250
COLLEGE MAIN CAMPUS	DNA	84270	176860	70580
GIRL'S HOSTEL	DNA	19125	6346	27300
COLLEGE CANTEEN	DNA	6564	DNA	10580



QUATERWISE TOTAL ELECTRIC BILL (2020-2021)

QUATER OF MONTHS	TOTAL ELLECTRIC BILL
FISRT	DNA
SECOND	115759
THIRD	191596
FOURTH	83718

Fig 10: QUATERWISE TOTAL ELECTRIC BILL (2020-2021)



ROOM NO	ROOM NAME	SEATING CAPACITY	TUBELIGHT/BULB/LED	FAN
307	SEMINAR ROOM	90	23	18
301	Commerce Programme Classroom	>72	7	07
314	Arts Classroom	>72	11	11
208	Physics Office	-	04	04
209	Physics Lab	-	16	05
302	Commerce Honours Classroom	48	07	07

TWO GENERATORS FOR EMERGENCY PURPOSES

3.3 Water Audit

Water Audit which is also known as water assessment is quite akin to Energy Audit. It's a method to estimate the total uses of water, to reduce losses and to conserve water. Actually water audit is a method for conserving water. The main source of water in our college is municipal water by AMC which is available 24/7 but there is also a water tank of dimensions 20 ft. × 13 ft. × 5 ft. 7 inch for emergency purposes. No leaky taps were identified during the survey. 2 rainwater harvesting ponds are present of dimensions 25 ft. × 20 ft. × 6 ft. and 20 ft. × 20 ft. × 6 ft. respectively to store rainwater and use it for various purposes. Basic uses of water in our campus are drinking, gardening, kitchen purposes, toilets among others. The waste water sewage drain can be found at the back of our campus. We enhance the process of water conservation by the following methods:

- Closing the tap after its use
- Maintenance and monitoring of valves and leakages at regular intervals.
- Rainwater harvesting
- Water conservation awareness for students
- Water recycling system is not present at our college but we think to do so i.e. Store wastewater in wastewater storing tanks and using it after for toilet flushing & gardening.

WATER TANK

Rainwater Harvesting

Rain water harvesting is the accumulation and the deposition of the rain water for reuse onsite. Rain water can be collected from roofs of campus buildings and store in a reservoir or underground reservoir. In future it can be used in different purposes such as gardening, irrigation, toilet flushing and ground water recharge etc. Rain water harvesting is a water conservation method which provides an independent water supply during regional water crisis. It is also free from salinity so it can be used as portable water also.

RAINWATER HARVESTING RESERVOIR

3.4 Waste Management Audit

Due to population explosion and urbanization, the waste generation in India is increasing day by day. Solid waste management is one of the basic services which is arranged and administered by the respective organization and municipal authorities in the nation to enhance the cleanliness of urban areas and also minimize the adverse impact of solid waste on the environment. The main objectives of solid waste management are the maintenance of clean and hygienic conditions and reduction in the quantity of sloid waste which is disposed of in sanitary landfills as well as garbage heap. The management of solid waste is done on the basis of priority listing. Our college follows the sustainable waste management practices by waste minimization, recycling of waste and waste characterization by bin system or waste segregation method. The amount of total Bio-degradable waste is 50 kg per month and Non-Biodegradable waste is 5 kg per month

Our college follows the 5 step waste minimization practices:

- Waste collection
- Waste segregation (segregation of the waste via separate bins as per the waste. Generally biodegradable waste is converted into compost whilst non-biodegradable waste and chemical waste are segregated)
- Waste Transportation (Transportation of the waste from the point of collection to the point of processing. Asansol municipal corporation follows this process after regular intervals. They transport waste under covered conditions to avoid littering)
- Waste Processing (AMC follows the required waste processing procedures)
- Waste disposal (AMC follows the proper waste disposal methods by incineration of waste, deep burial at landfill site and sometimes recycle it)

Biodegradable waste of the college is converted into composting and vermicomposting. Benefits of composting:

- It's practically free of any cost
- It destructs pathogens and kills weed seeds
- Reduces mass, volume and odour
- Reduces the cost of handling and transportation
- It acts as soil conditioner and improves nutrient qualities
- Its efficiency is high

Benefits of vermicomposting

- It also recycles the biodegradable waste
- Low cost procedure or practically free
- It destructs pathogens and kills weed seeds
- Reduces mass, volume and odour

Plastic free zone

India taking all steps to ensure it becomes free single use of plastic by 2022: Parkas Javadekar. Prime minister Modi pledged to make the country free of single use of plastic. So we took several steps in this direction.

A program was organized by the NSS unit and Eco club members of the college on 18 /08/2021. The event commenced at 11:30AM and went on till 2 PM. The main motto of the program was to eradicate the use of plastic. Totally 25 teachers, 15 members and 50 students of the college were actively involved in the program. The NSS volunteers and Eco club members of our college have taken an initiative to organize a program of plastic free around the campus. All the volunteers were divided into two groups and they took the necessary action as follows.

Campaign around the campus.
Holding pluck cards volunteers were reaching all the shops nearby area and made sure the rules and regulations about the usage of plastics are followed. Awareness was made on all the harmful effects of plastic on environment. Volunteers remove all plastic from the campus and they took necessary action around the college area, specially they visit all shops near our college and take all the plastic from those shops and told all shop keeper not to use plastic bags...

All the volunteers cleaned all the plastic papers around our college campus.

Our Initiatives to protect the environment from plastic: -

- Our college will discourage the use of plastic wrappers to bring lunch.
- Students will be encouraged to carry lunch in a steel tiffin box and water in steel/glass bottle.
- We use eco-friendly disposable plates when we arrange any events in our campus.
- We always spread awareness about plastic free environment among our students in college area.

BIDHAN CHANDRA COLLEGE ESTD - 1961 Govt Sponsored ASANSOL

3.5 Biodiversity Audit

3.5.1 FLORA AUDIT

Flora audit is a systematic process of identifying and collection of plant data. Trees play a pivotal role in our ecosystem. So, in order to conserve our biodiversity, we should have knowledge about the plants in our surroundings.

Our college is rich in plants covering an area of almost eight acres. We try to conserve our biodiversity by regular tree plantation program and also try to maintain the existing vegetation. The present study was aimed at determining the vascular plant species richness of an urban green-space- the Bidhan Chandra College campus, Asansol.

For this, the species richness data was obtained by both secondary sources and intensive surveys. The data from the primary and secondary sources resulted in the documentation of 812 species belonging to 542 genera under 124 families, of which 534 species (65.8%) exists today. *Leguminosae* and *Poaceae* were the dominant dicotyledonous and monocotyledonous families respectively and an inventory of all the species recorded is provided. Considering the rapidly changing urban land use in the city, much attention should be paid towards the conservation of these green spaces, for which such studies provide baseline data.

The Campus houses a good number of plants and the perusal of literature reveals that there is no published record on the flora of this campus which represents an interesting floristic composition. The findings of the study may be helpful for further research in Botany or allied disciplines.

Objective

Maintaining existing trees and adding new trees are essential.

Conservation of flora and fauna in our surroundings.

Knowledge about medicinal plants.

Knowledge about economically important plants.

Knowledge about plant-animal interaction.

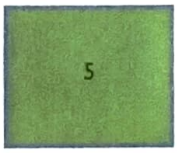
Knowledge about weather and climatic conditions of the surrounding.

PLANT DATA COLLECTION BY QUADRAT METHOD

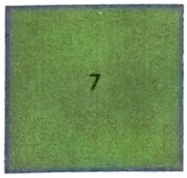
1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30
31	32	33	34	35
36	37	38	39	40
41	42	43	44	45
46	47	48	49	50

25X25 m^2

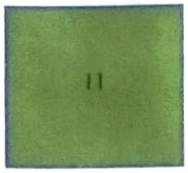
Each square is of 25mx25m, total area of plant vegetation is divided into 50 quadrats, among them the highlighted quadrats are studied because the remaining quadrats contain repeatition of previous species.



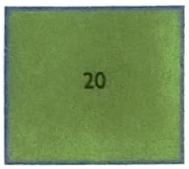
- Swietenia macrophylla
- Annona squamosa
- Syzygiumcumini
- Ixora finlaysoniana
- Tabernaemontana divericata
- Nyctanthes arbor-tristis
- Polyalthia longifolia
- Scoparia dulsis
- Sida cordifolia
- Croton bonplandianum
- Evolvulus nummularius
- Alternanthera sessilis
- Pimenta dioica



- Sterculia foetida
- Ficus benghalensis
- Mangifera indica
- Mimusops elengi
- Acacia auriculiformis
- Sida acuta
- Oldenlandia corymbosa



- Trophis aspera
- Spondias pinnata
- Aegle marmelos
- Neolamarckia kadamba
- Croton bonplandianum
- Crozophora rottleri
- Solanum nigrum

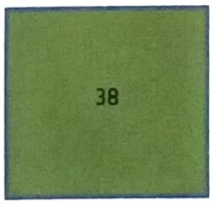


- Peltophorum pterocarpum
- Psidium guajava
- Nerium oleander
- Ixora coccinea
- Hibiscus rosa-sinensis
- Adenanthera pavonina
- Mussaenda erythophylla
- Acalypha wilkesiana
- Kalanchoe pinnata
- Dracena marginata
- Bauhinia acuminata
- Eucalyptus globulus

- Nyctanthes arbortristis
- Curcuma longa
- Ocimum tenuiflorum
- Ocimum sanctum
- Dalbergia sisso
- Kalanchoe pinnata
- Cinnamomum tamala
- Aegle marmelos
- Murraya paniculata
- Phyllanthu semblica
- Hyophorbe lagenicaulis
- Tridax procumbens
- Hyophorbe lagenicaulis

- Pterospermum acerifolium
- Azadirachta indica
- Polyalthia longifolia
- Mangifera indica
- Tectona grandis
- Hyophorbe lagenicaulis
- Acacia auriculiformis
- Trema orientalis

- Adenanthera pavonina
- Polyalthia longifolia
- Psidium guajava
- Nymphaea nouchali
- Dalbergia sisso
- Euphorbia hirta
- Alternanthera sessilis
- Phyllanthus niruri
- Sida acuta



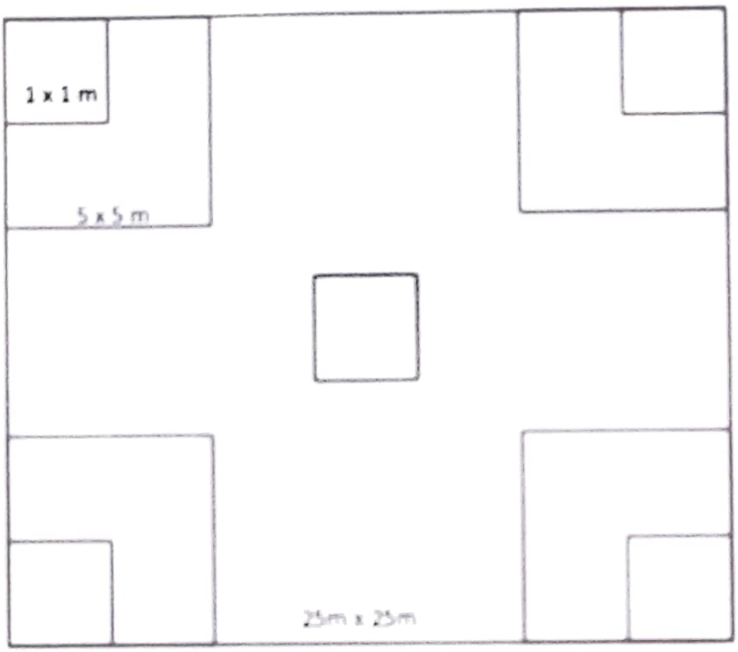
- Cocos nucifera
- Tectona grandis
- Ficus religiosa
- Artocarpus heterophyllus
- Anisomeles indica
- Blumia lasera

- Areca catechu
- Murraya paniculata
- Rosa sp
- Polyalthia longifolia
- Bauhinia variegate
- Peltophorum pterocarpum

- Polyalthia longifolia
- Mangifera indica
- Mimusops elengi
- Codiaeum variegatum
- Dypsis lutescens
- Sida cordifolia
- Sida rhombifilia

Sampling Process

A random sampling with nested quadrat was utilized to study the strata of vegetation. Trees and tree saplings above 5 feet in height were classified as trees during the count. The tree and shrub layers were analysed by quadrat method using the sizes 25 x 25 m and 5 x 5 m respectively and the herbs were analysed by 1 x 1 m Quadrat. Basically a nested quadrat was placed having a size of 25 x 25m (for trees) within which 5 x 5 m quadrat was placed for analysing the shrubs within which 1m x 1m quadrat was placed for the study of herbaceous plant. A total of 50 sampling plots were studied at each forest type with the 5 x 5 m quadrate being inside the 25 x 25 m quadrat. Photographs of different Specimens were collected for identification.



Phyto-sociological analysis

The data for each life form were recorded in the study area which were categorized as trees, herbs and shrubs.

Density

Density is a numerical strength of a species in relation to a unit area. This parameter gives an idea about the dominance and rarity of a species and is

also an indicator of the standing biomass and productivity of the region (Ambashat et al,1995). The percentage of a species with respect to different species in the unit area is called as Relative density. They are calculated as:

Density (D)= Total number of individual of a Species /Total number of quadrat studied

Relative Density (RD) = Density of a Species/Sum of the Densities of all the Species x 100

Frequency:

Frequency is the degree of dispersion in terms of percentage occurrence. In a sampling only the names of the species encountered in the different quadrat are listed. Frequency basically gives us an idea how frequent a species is encountered in the area. The frequency percentage of a species with respect to different species in the unit area is called as Relative Frequency.

Frequency (F%) = Number of Quadrat in which species occurred /Total number of Quadrat Studied x 100

Relative Frequency (RF) = Frequency of a Species /Sum of Frequencies of all Species x 100

Abundance

Abundance is the total number of individual of a species in a sampling area. It basically gives an idea of the occurrence of a species in the Sampling unit. Relative abundance is the percentage ratio between the Abundance of species with that of sum of abundance of all species in the sampling unit.

Abundance (A) = Number of Individual of a species occurring /Total Number of Quadrat Studied

Relative Abundance (A) = Abundance of a Species/
Sum of Abundances of all Species x 100

Basal area

Basal area implies the area covered by the tree which is basically calculated by taking a measurement at breast height i.e. 1.37m of a tree trunk above the ground. Basal area indicates the weight, size, volume and provides information

regarding the proportion of its dominance in the sampling area. Basal area is calculated as;

Basal area (BA) = (CBH)2 / 4Π

CBH: Circumference at Breast height.

Diversity indices

Diversity indices serve as important surrogates for measuring Biodiversity (Sarkar and Margules,2003).

Species Diversity It is the effective number of different species that are represented in a collection of individuals. Species richness and species evenness are the two component of Species diversity. Shannon- Wiener index (1963), incorporates both the parameter and is one of the most widely used index for measuring species diversity in an ecosystem (Ilorkar and Khatri ,2003). Lower the dominance higher is the diversity.

Species Richness

The number of different species represented in a sampling unit or the habitat per unit area is called as Species Richness. Species richness is simply a count of species, and it does not take into account the abundances of the species or their relative abundance distributions (Colwell,2009). Menhinick"s index (1964) and has been used to understand the Species richness.

Concentration of dominance

Simpson index (1949) is used to measure the degree of concentration of dominance of species which basically gives priority to the Dominant species

DATA COLLECTION

LIST OF TREES

SL NO.	BOTANICAL NAME	FAMILY
1	Swietenia macrophylla	Meliaceae
2	Samanea saman	Fabaceae
3	Peltophorum pterocarpum	Fabaceae
4	Tectona grandis	Lamiaceae
5	Sterculia foetida	Malvaceae
6	Dalbergia sisso	Fabaceae
7	Mangifera indica	Anacardiaceae
8	Ficus benghalensis	Moraceae
9	Syzygium cumini	Myrtaceae
10	Annona squamosa	Annonaceae
11	Mimusops elengi	Sapotaceae
12	Ficus religiosa	Moraceae
13	Polyalthia longifolia	Annonaceae
14	Adenanthera pavonina	Fabaceae
15	Ficus virens	Moraceae
16	Bridelia retusa	Phyllanthaceae
17	Pterospermum acerifolium	Sterculiaceae
18	Elaeocarpus ganitrus	Elaeocarpaceae
19	Psidium guajava	Myrtaceae
20	Gardenia jasminoides	Rubiaceae
21	Acacia auriculiformis	Fabaceae
22	Azadirachta indica	Meliaceae
23	Hyophorbe lagenicaulis	Arecaceae
24	Albizia lebbeck	Fabaceae
25	Saraca asoca	Fabaceae
26	Phyllanthus emblica	Phyllanthaceae
27	Trophis aspera	Moraceae
28	Artocarpus heterophyllus	Moraceae
29	Aegle marmelos	Rutaceae

30	Areca catechu	Arecaceae
31	Cocos nucifera	Arecaceae
32	Neolamarckia kadamba	Rubiaceae
33	Spondias pinnata	Anacardiaceae
34	Manilkar ajapota	Sapotaceae
35	Magnolia champaca	Magnoliaceae
35	Magnolia champaca	Magnoliaceae
36	Plumeria rubra	Apocynaceae
37	Ficushispida	Moraceae
38	Eucalyptus globulus	Myrtaceae

LIST OF HERBS

SL.NO.	**BOTANICAL NAME**	**FAMILY**
1	Acalypha indica	Euphorbiaceae
2	Achyranthes aspera	Amaranthaceae
3	Ageratum conyzoides	Asteraceae
4	Alternanthera philoxeroides	Amaranthaceae
5	Alternanthera sessilis	Amaranthaceae
6	Amaranthus viridis	Amaranthusviridis
7	Andrographis paniculata	Acanthaceae
8	Blumea lacera	Asteraceae
9	Catharanthus roseus	Apocynaceae
10	Cleome rutidosperma	Capparidaceae
11	Commelina benghalensis	Commelinaceae
12	Cynodon dactylon	Poaceae
13	Cyperus rotundus	Cyperaceae
14	Eclipta prostrata	Asteraceae
15	Eleusine indica	Poaceae
16	Eragrostis tenella	Poaceae
17	Kyllinga monocephala	Cyperaceae
18	Ocimum sanctum	Lamiaceae
19	Oldenlandia corymbosa	Rubiaceae
20	Peperomia pellucida	Piperaceae
21	Ruellia tuberosa	Acanthaceae
22	Phyllanthus niruri	Phyllantheceae
23	Euphorbia hirta	Euphorbiaceae
24	Lindenbergia indica	Scrophulariaceae
25	Scoparia dulcis	Scrophulariaceae
26	Solanum nigrum	Solanaceae

27	Vandellia crustacea	Scrophulariaceae
28	Vernonia cineria	Asteraceae

LIST OF SHURBS

SL. NO.`	BOTANICAL NAME	FAMILY
1	Ixora coccinea	Rubiaceae
2	Lantana camara	Verbenaceae
3	Sida acuta	Malvaceae
4	Sida rhombifolia	Malvaceae
5	Sida acuta	Malvaceae
6	Tabernaemontana divaricata	Apocynaceae
7	Nerium indicum	Apocynaceae
8	Adhatoda vasica	Acanthaceae
9	Hibiscus rosa-sinensis	Malvaceae

PLANT SURVEY

Scientific Name	Local Name	Family	Numbers
Swietenia macrophylla	Mahogany	Meliaceae	14
Samanea saman	Khirish, Rain Tree	Fabaceae	1
Peltophorum pterocarpum	Radhachura	Fabaceae	12
Tectona grandis	Shagun	Lamiaceae	1
Sterculia foetida	Bakshabadam	Malvaceae	4
Dalbergia sisso	Sisso	Fabaceae	6
Mangifera indica	Aam	Anacardiaceae	15
Ficus benghalensis	Bot	Moraceae	1
Syzygium cumini	Jam	Myrtaceae	6
Annona squamosa	Aata	Annonaceae	2
Mimusops elengi	Bakul	Sapotaceae	1
Ficus religiosa	Peepul	Moraceae	2
Polyalthia longifolia	Debdaru	Annonaceae	12
Codiaeum variegatum	Garden Croton	Euphorbiaceae	8

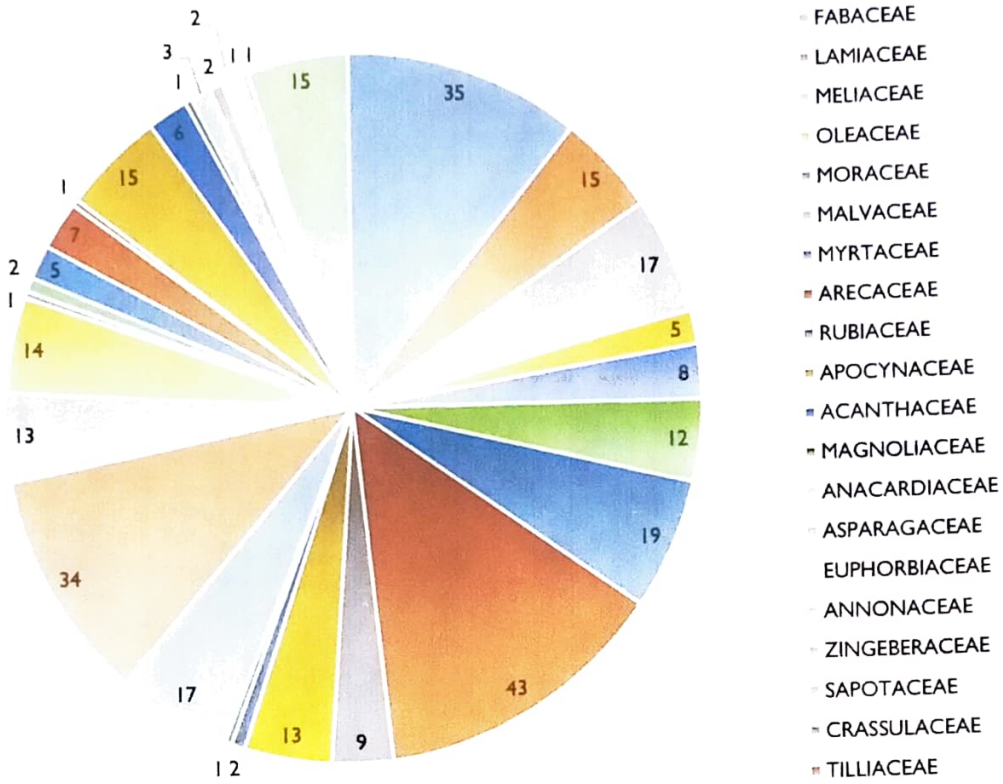
Dracena marginata	Dragon tree	Asparagaceae	24
Kalanchoe pinnata	Pathorkuchi	Crassulaceae	5
Acalypha wilkesiana	Curly Acalypha	Euphorbiaceae	4
Ixora finlaysoniana	Sadarongon	Rubiaceae	1
Trema orientalis	Chikan, Indian nettle tree	Tiliaceae	7
Tabernaemontana divericata	Tagor	Apocynaceae	6
Cinnamomum tamala	Tejpata	Lauraceae	1
Cordyline fruticosa	Baby doll Ti plant	Asparagaceae	10
Terminalia catappa	Indian almond	Combretaceae	1
Adenanthera pavonina	Raktachandan	Fabaceae	1
Ficus virens	Pakur	Moraceae	1
Bridelia retusa	Kosoi, Gilo, Kuhir	Phyllanthaceae	1
Pterospermum acerifolium	Muchkund, Muskanda	Sterculiaceae	2
Elaeocarpus ganitrus	Rudraksha	Elaeocarpaceae	1
Cinnamomum camphora	Camphor Tree	Lauraceae	1
Mussaenda erythophylla	Mussaenda	Rubiaceae	1
Bauhinia variegata	Raktakanchan	Caesalpiniaceae	1
Thuja orientalis	Mandirjhau	Cupressaceae	15
Hibiscus rosa-sinensis	Jaba	Malvaceae	8
Psidium guajava	Peyara	Myrtaceae	9
Gardenia jasminoides	Gardenia	Rubiaceae	1
Nerium oleander	Karabi	Apocynaceae	4
Ixora coccinea	Lal rangan	Rubiaceae	5
Acacia auriculiformis	Akashmoni	Fabaceae	10
Azadirachtaindica	Neem	Meliaceae	3
Hyophorbelagenicaulis	Bottle palm	Arecaceae	33
Bauhinia acuminata	Sadakanchan	Fabaceae	3
Albizia lebbeck	Sirish	Fabaceae	2
Saraca asoca	Ashoka	Fabaceae	1
Phyllanthus emblica	Amloki	Phyllanthaceae	2
Justicia adhatoda	Basak	Acanthaceae	2
Combretum indicum	Madhobilata	Combretaceae	1
Trophis aspera	Sheora	Moraceae	3
Artocarpus heterophyllus	Kathal	Moraceae	1
Aegle marmelos	Bel	Rutaceae	1
Areca catechu	Supari	Arecaceae	7
Cocos nucifera	Narkel	Arecaceae	3
Neolamarckia kadamba	Kadam	Rubiaceae	1
Murraya paniculata	kamini	Rutaceae	3

Spondias pinnata	Aamra	Anacardiaceae	2
Duranta erecta	Duranta	Verbenaceae	15
Manilkara japota	Sabeda	Sapotaceae	1
Pimenta dioica	Allspice	Myrtaceae	2
Magnolia champaca	Swarnochampa	Magnoliaceae	1
Plumeria rubra	Frangipani	Apocynaceae	3
Rosa sp	Rose	Rosaceae	6
Jasminum sambac	Beli	Oleaceae	1
Ficus hispida	Dumur	Moraceae	1
Dypsis lutescens	Areca palm	Arecaceae	14
Eucalyptus globulus	Eucalyptus	Myrtaceae	2
Ocimum tenuiflorum	Krishna tulsi	Lamiaceae	8
Ocimum sanctum	Tulsi	Lamiaceae	6
Nymphaea nouchali	Lal shaluk	Nymphaeceae	1
Cleistanthus collinus	Parashi	Euphorbiaceae	1
Nyctanthes arbor-tristis	Shuili	Oleaceae	4
Curcuma longa	Halud	Zingiberaceae	1

Faunal Diversity inside the campus premises

DATA REPRESENTATION

Fig 11: NUMBER OF PLANT SPECIES



ECONOMICALLY IMPORTANT PLANT

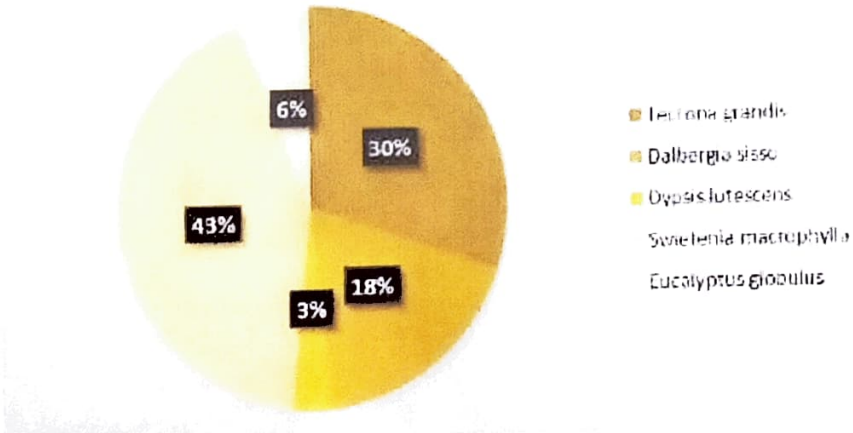
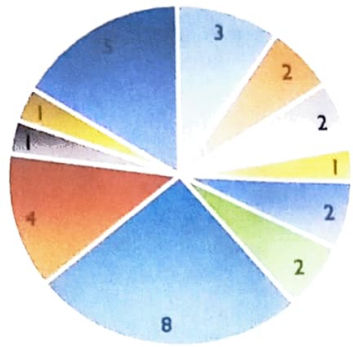


Fig 12: Economically important Plants

Fig 13: MEDICINAL PLANTS



- Azadirachta indica
- Phyllanthus emblica
- Justicia adhatoda
- Aegle marmelos
- Pimenta dioica
- Ocimum tenuiflorum
- Ocimum sanctum
- Nyctanthes arbor-tristis
- Curcuma longa
- Cinnamomum tamala

OUR GREEN CAMPUS

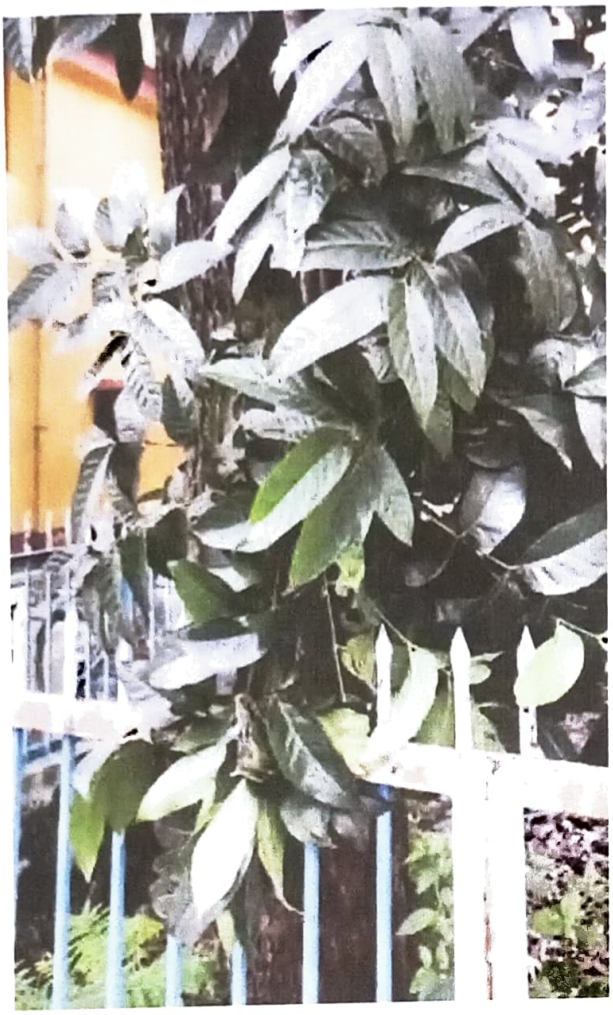
MEMBERS OF OUR GREEN CAMPUS

Sida rhombifolia

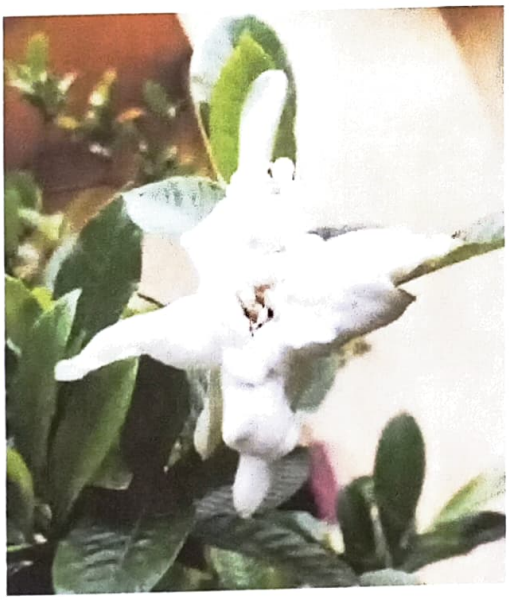
Phyllanthus niruri

Catharanthus roseus

Duranta repens



Swietenia mahagoni



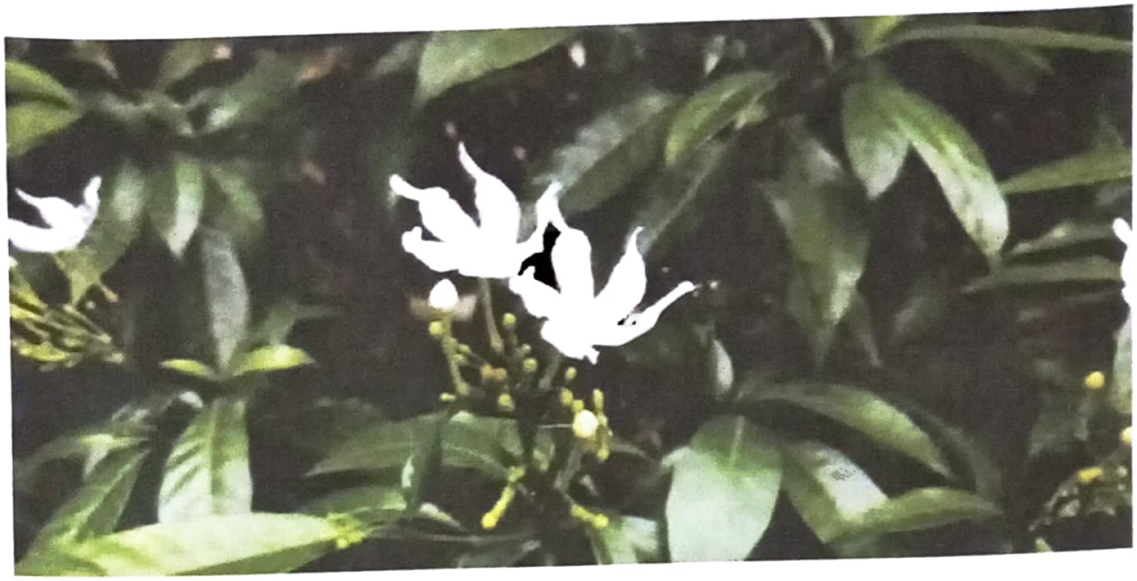
Gardenia jasminoides

Alternanthera sessilis

Euphorbia hirta

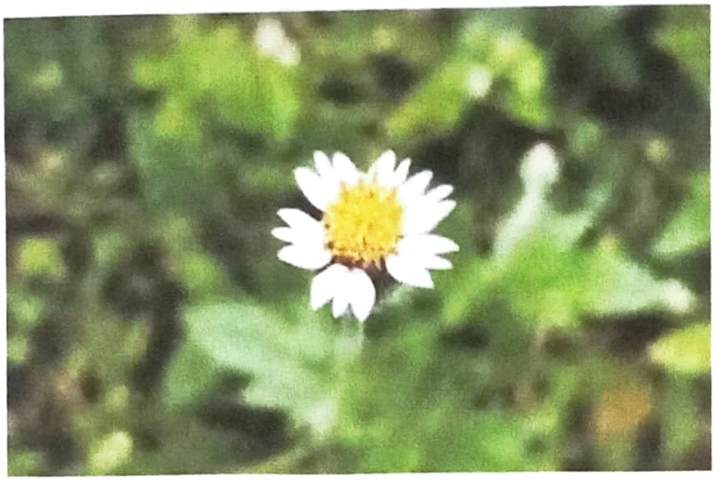
Oldenlandia corymbosa

Bauhinia acuminata

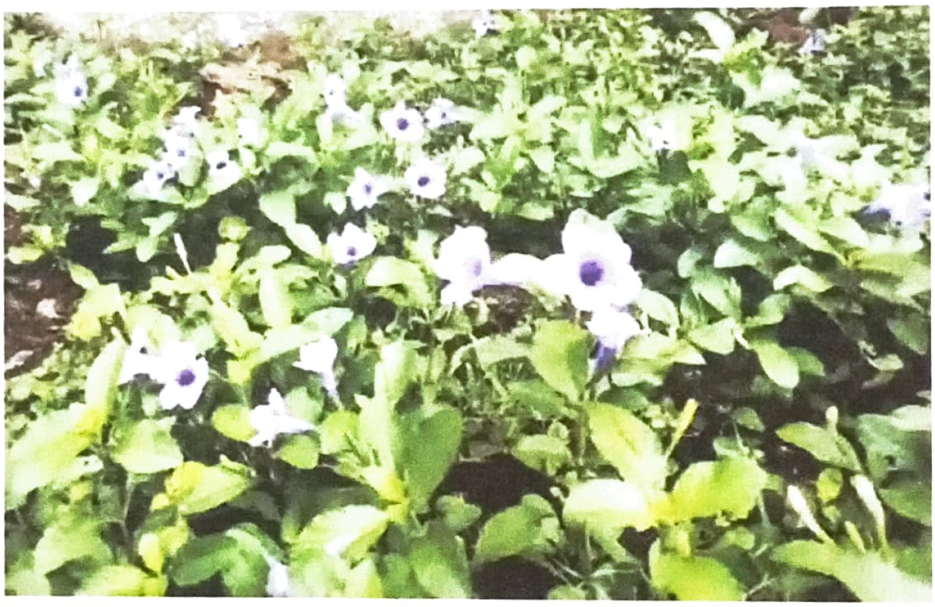


Tabernaemontana divaricate

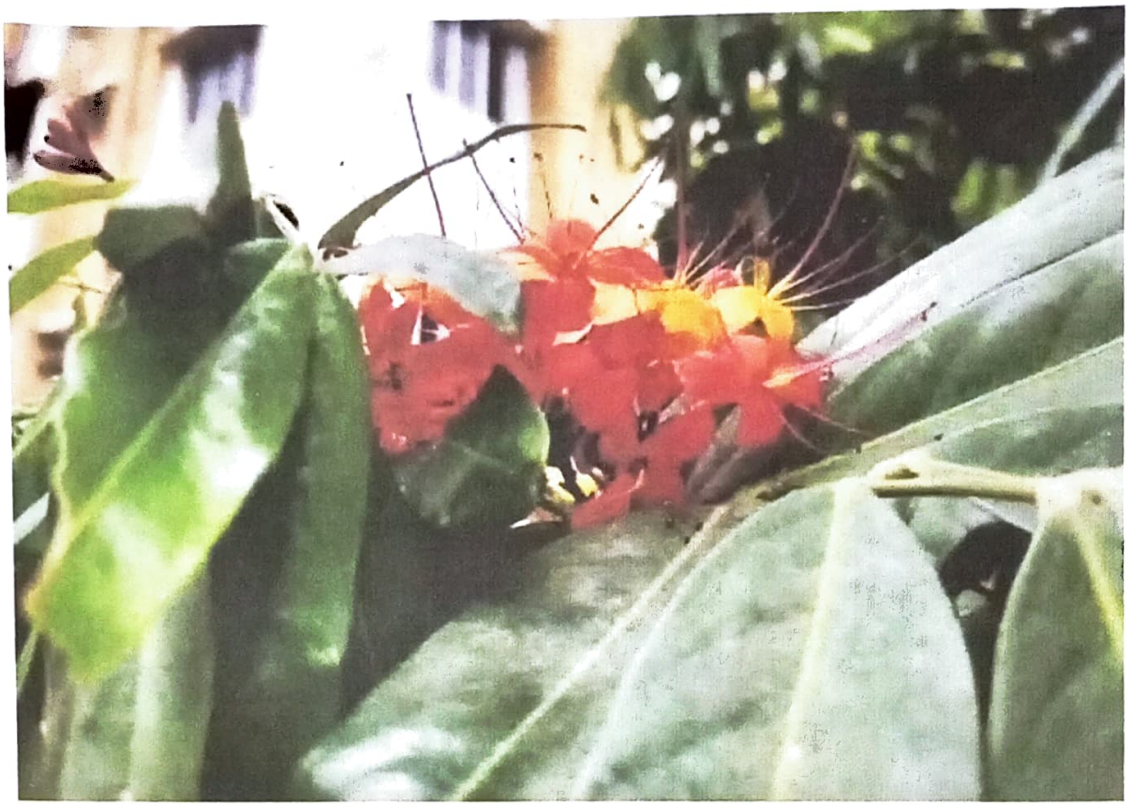
Murraya paniculata



Tridax procumbens



Ruellia tuberosa



Saraca asoca

Polyalthia longifolia

Tectona grandis

3.5.2 FAUNA AUDIT

The famous saying **"Until one has loved an animal, a part of one's so remains unawaken"** describes the Importance of Animals. Animals are the beauty of our nature as well as their behavioural responses are a source of inspiration for many. Without them, our nature is like a flower having no fragrance and no colour.

For maintaining a healthy ecological balance on earth, animals and marine species are as important as humans. Each organism on this earth has a unique place in the food chain that helps contribute to the ecosystem in its own special way. The eco-system is all about relationships between different organisms connected through food webs and food chains. Even if a single wildlife species gets extinct from the eco-system, it may disturb the whole food chain ultimately leading to disastrous results.

Consider a simple example of a bee that is vital for the growth of certain crops due to their pollen carrying roles. If bees get reduced in numbers, the growth of food crops would definitely lower owing to a lack of pollination. Similarly, if a species gets increased in number, again it can have an adverse effect on the ecological balance. As the Nation's growth starts from its educational institutions, where the ecology is thought as a prime factor of development associated with environment. So, a report on faunal diversity of this college was made.

➢ List of Annelids found in the College Campus

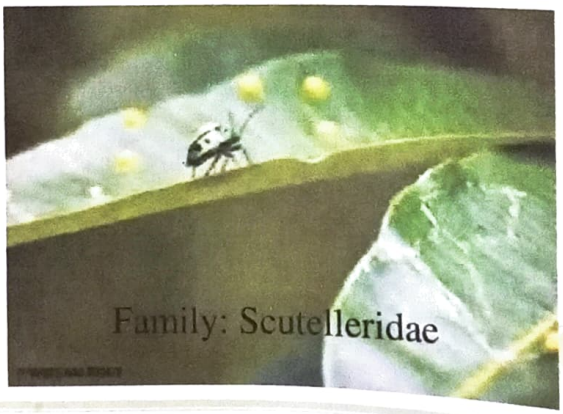
1. *Eiseniafetida* (Common Name: Red Wigglers)
2. *Perionyx excavates*
3. *Phertima sp.*

➢ List of Arthropods found in the College Campus

1. *Rhysida* sp. (Common Name: Common Centiped)
2. *Scolopendra* sp.
3. *Periplaneta* sp.
4. Family: Scutelleridae (Common Name: Jewel Bug)
5. Family: Coccinellidae (Common Name: Lady Bird Beetles)
6. *Culex* sp.
7. *Aedes* sp.
8. Chironomous Larva
9. *Musca domesticus*
10. Family: Scutelleridae
11. Millipeds
12. *Apis*sp.
13. *Cyclops sp.*
14. *Mantis sp.*
15. *Macrotermes*
16. *Papilio demodocus (Lime Butterfly)*
17. *Junonia atlites (Grey Pansy)*
18. *Appias olferna (Black veined albatross)*

19. *Eurema hecabe (Common grass yellow butterfly)*
20. *Diplacode strivialis (Ground skimmer butterfly)*
21. *Acraea terpsicore (Tawny Coaster)*
22. *Kalidasa lanata*
23. *Tutubing kalabaw*
24. *Ceriagrion coromandelianum*
25. *Crocothemis servilia*

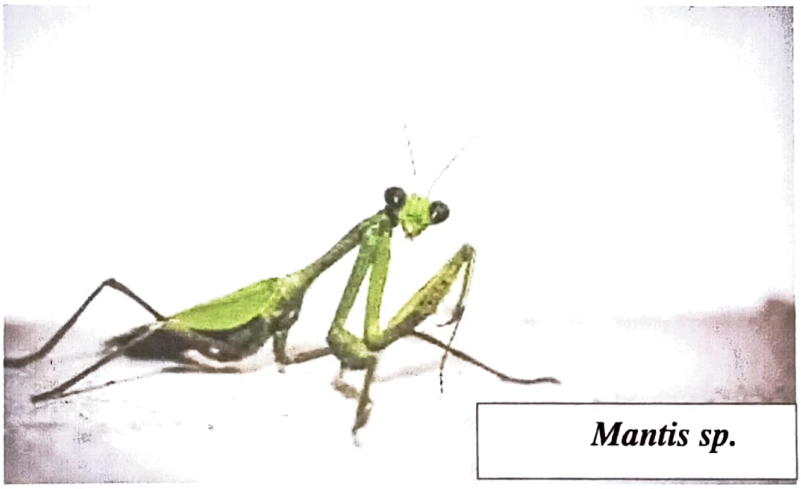
Photographs of a few arthropods at B.C.College campus



Tutubing kalabaw

Crocothemis servilia

Ceriagrion coromandelianum



Mantis sp.

List of Molluscs found in the College Campus

1. *Pila sp*
2. *Achatina sp.*

List of Amphibia Found in the college Campus:

1. *Bufo sp.*
2. *Rana sp.*

List of Reptiles found in the College Campus

1. *Vipera sp.*
2. *Fowlea piscaletor*
3. *Calotes versicolor*
4. *Chamaeleo zeylanicus*
5. *Amphiesma stolatum*
6. *Oligodon arnensis*
7. *Ahaetulla nasuta*
8. *Hemidactylus*

Photographs of Reptile at B.C.College campus

Calotes versicolor

List of Aves found in the College Campus

1. *Columba sp.*
2. *Pycnonotus sp.*
3. *Psittacula sp.*

4. *Passer sp.*
5. *Corvus sp.*
6. *Eudynamys sp.*
7. *Centropus*
8. *Acridotheres*
9. *Spilopelia*
10. *Turdoides*
11. *Cinnyris*
12. *Bubo*
13. *Dicurus*
14. *Upupa*
15. *Copsychus*
16. *Hoopoe*

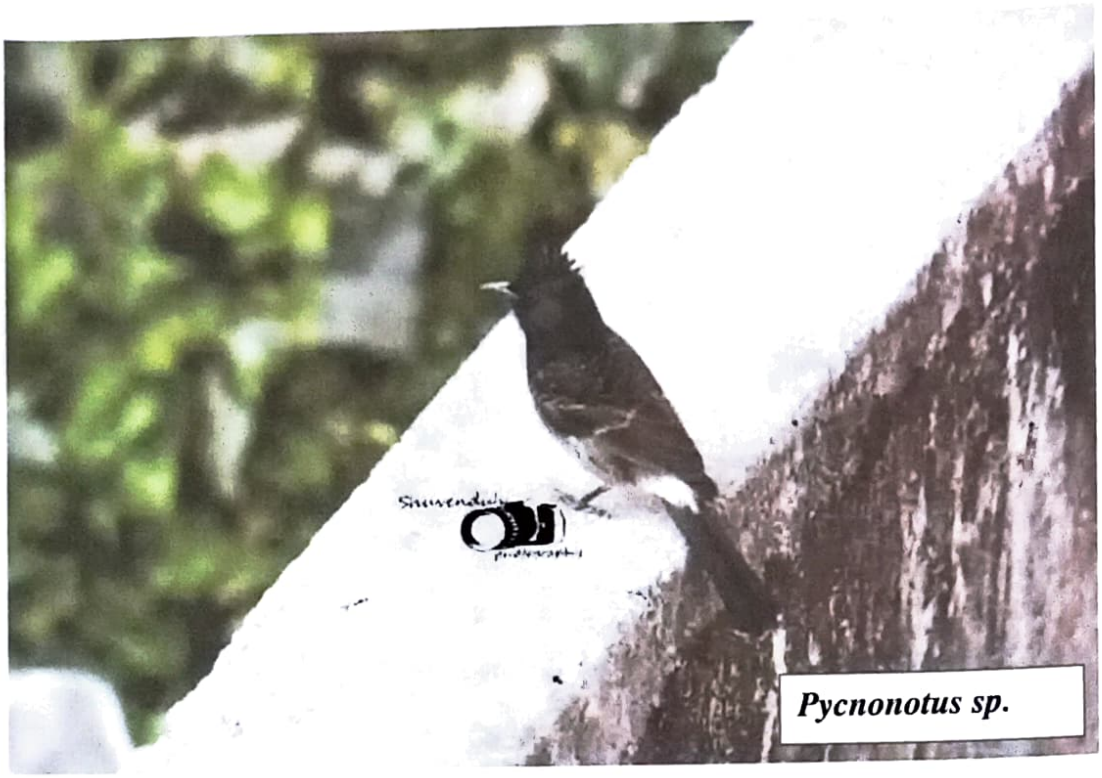
Photographs of a few birds at B.C.College campus

Dicurus sp.

Hoopoe sp.

Acridotheres tristis

Acridotheres ginginianus



Pycnonotus sp.

Copsychus sp.

List of Mammals found in the College Campus

1. *Canis sp.*
2. *Felis sp.*
3. *Funumbulus sp.*
4. *Rattus norvegicus*
5. *Sorex sp.*

Funumbulus sp.

Discussion: The campus of Bidhan Chandra College is rich in faunal biodiversity. The arthropod biodiversity as well as avian biodiversity of this campus is very high which is due to abundance of a lot of trees within the campus. The interaction of the flora and fauna within the campus are depicted in most of the pictures attached with this report.

Limitation: Within this pandemic situation a regular survey of the faunal diversity was not possible. A few specimens were unidentified as the animals sometimes camouflaged within their habitat. As the study was conducted in the day time mostly, the nocturnal animals may have been missed.

3.6 Sanitation Audit

A nations growth starts from the educational institutions and the ecology is a prime factor of development which is associated and regulated by the environment. For a healthy and conducive learning environment, a clean and healthy physical environment is necessary. Environmental factors should be eco-friendly in that respect. To preserve the environment within the campus we follow several procedures and regulations. Sanitation also plays an important role towards a healthy and sustainable environment. Our college is cleaned daily to keep it well maintained and spotless. When college has safe water and toilets, students have a healthy learning environment and girls are more likely to attain when they are on periods. We also provide our students with sufficient number of lavatories with sanitation facilities in every respective floors.

No of toilets and lavatory facilities are as follows:

4. Ground Floor: 4
5. First Floor: 4
6. Second Floor: 4

The sanitary sewers are present which carries sewage from the bathrooms and sink through pipes allowing the waste water to reach the main wastewater pipes.

3.7 Air Audit

Air Audit is also a very integral part of Environmental Audit. It is usually performed to identify Air pollution and Noise pollution on the basis of questionnaire. Our college lies to the interior of the city, a little further from the bustling roads allowing quite few vehicles to get in. The climate is tropical, like Gangetic West Bengal. The weather remains dry during winter (mid-November to mid-February) and humid during summer and rainy season with a range between 50- 90% humidity. Average rainfall ranges from 1500-2000 mm/yr but generally fluctuates from year to year. Rooms are well ventilated as the room to door ratio is proportionately good

ROOM NO	ROOM PURPOSE	SEATING CAPACITY	WINDOWS	DOORS
208	Physics Office	-	2	1
209	Physics lab	-	6	4
210	Physics Dark Room	-	2	2
301	Commerce Programme Classroom	>72	6	4
302	Commerce Honours Classroom	48	4	4
307	Seminar Room	90	7	4
314	Arts Classroom	>72	6	6

Carbon Footprint

1) Establish a system of carpooling among the staff to reduce the number of four wheelers and two wheelers coming to the college.
2) Introduce college bus services to the students and staff.
3) Encourage staff and students to use cycles.
4) Establish a more efficient cooking system to save LPG
5) Usage of generators should be discouraged

Air Quality index of Asansol is 64 as provided by Central Pollution Control Board which is quite satisfactory.

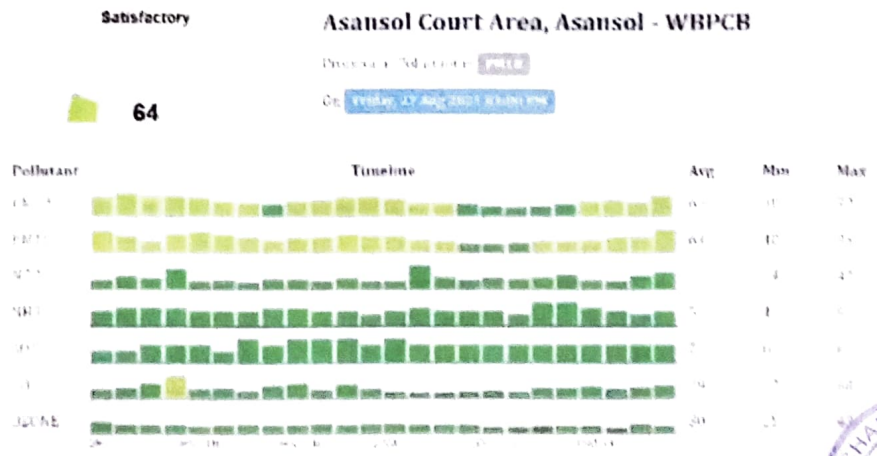


FIGURE 24: AIR MONITORING AT ASANSOL COURT AREA

***Source**: Accuwhether taken at 13.20 27-08-2021*

Air Quality Index of Asansol

POLLUTANTS	AIR QUALITY SCALE	WHO PERMISSIBLE LIMIT(MAX)	ADVERSE IMPACT	STATUS
PM_{10}	81 $\mu g/m^3$	60-120 $\mu g/m^3$ annually	Particulate matter 10 are inhalable particle with a diameter of 10 micrometres. Particles which are larger than 2.5 micrometres can be deposited in air waves thus resulting in health issues. Exposure can result in eyes and throat irritation. Coughing and breathing difficulties including aggravated Asthma. More frequent and excessive exposure can result in more serious health effects.	Unhealthy
$PM_{2.5}$	41 $\mu g/m^3$	60-120 $\mu g/m^3$ annually	Fine particulate matters are inhalable pollutants with a diameter of less than 2.5 mm which can enter the lungs and bloodstreams thus resulting in serious health issues. The most severe impact is on the lungs and heart. Exposure can result in coughing or difficulty in breathing including aggravated asthma, and the development of chronic respiratory diseases.	Poor

SO_2	19 $\mu g/m^3$	60-80 $\mu g/m^3$ annually	Exposure to SO_2 can lead to throat and eye irritation and aggravate asthma as well as chronic bronchitis	Excellent
NO_2	9 $\mu g/m^3$	60-80 $\mu g/m^3$ annually	Breathing in high levels of No2 increases the risk of respiratory problems. Coughing and difficulty of breathing are common and more serious health issues such as respiratory infections can occur with longer exposure	Excellent
CO	253 $\mu g/m^3$	35 ppm	CO is a colourless and odourless and when inhaled at high level causes headache, nausea, dizziness and vomiting. Repeated long term exposure can lead to heart diseases. It also prepares carboxyhaemoglobin which can lead to multicellular damage.	Excellent
O_3	28 $\mu g/m^3$	100 $\mu g/m^3$	Ground level O_3 can aggravate existing respiratory diseases and also lead to throat irritation, headaches and chest pain	Excellent

CHAPTER 4

4.1 Recommendation

The Environmental Audit team has made short term and long-term suggestions for environmental protection. To improve the environmental quality and realization of values of environment and for sustainable development different Environmental Management system or procedure must be needed.

Some recommendations to towards environmental management are as follows:

1. Sensor based energy conservation should be encouraged more.
2. Replacement of conventional ceiling fans with efficient ceiling fans.
3. Replacement of conventional classroom tube lights with LED tube light.
4. It is observed that, there is no proper drainage system in Teaching Staff quarters which is urgently required.
5. Sanitary napkin vending machines is required in girl's common room for girl's student urgent needs. It should be operated by any non-teaching lady staff.
6. Solar energy panels should be installed as alternative energy resources. The public lights within the campus may be run with solar panels.
7. Green habitat concept should be adopted for all the building construction activities of college.
8. Uses of bicycles should be promoted.
9. Separate toilets are required for different abled students.
10. Increase environmental promotional activities for spreading awareness among students in the campus.
11. Propose a system for collection and disposal of waste sorted out as organic and others on a daily basis, managed by the campus administration.
12. Considering contamination of water with coliform bacteria, water purification treatment facilities may be installed within the campus in order to ensure safe drinking water.
13. For water conservation manual water taps should be replaced with auto closed water taps. Drip irrigation for gardens can be initiated. Establish water treatment system to recycle drain water. Create automatic drip irrigation system during summer holidays.
14. All trees in the campus should be named scientifically.

15. Not just celebrating environment day but making it a daily habit. Encourage students not just through words but through action for making the campus green and eco-friendly.
16. College authorities are advised to dispose the e-waste to only government authorized vendors.

4.2 Reference

- ▪The Environment [Protection] Act – 1986 (Amended 1991) & Rules-1986 (Amended 2010)
  ▪Energy Conservation Act 2010.
  ▪The Water [Prevention & Control Of Pollution] Act – 1974 (Amended 1988) & the Water
  (Prevention & Control of Pollution) Rules – 1975
  ▪The Air [Prevention & Control Of Pollution] Act – 1981 (Amended 1987) The Air
  (Prevention & Control of Pollution) Rules – 1982
  ▪E-waste management rules 2016
  ▪Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
  ▪The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules,
  2008 (Amended 2016)
  ▪The Noise Pollution Regulation & Control rules, 2000 (Amended 2010)
  ▪Relevant Indian Standard Code practices
  ▪Internal Records of the Campus
- K.A Subramanian. Dragon flies and Dansel flies of Peninsular India, a field guide(ed.1.0) project life scape PP12 to 35, 2005
- Richards, O.W, Davies, R.G(1977) Imms' General text book of Entomology. Chapman and Hall.
- Peter Stilling Ecology book.
- Elements of ecology by Robert's Smith
- Wikipedia
- For identification – Medicinal plant resources of South Bengal.

  Identify.plantnet.org

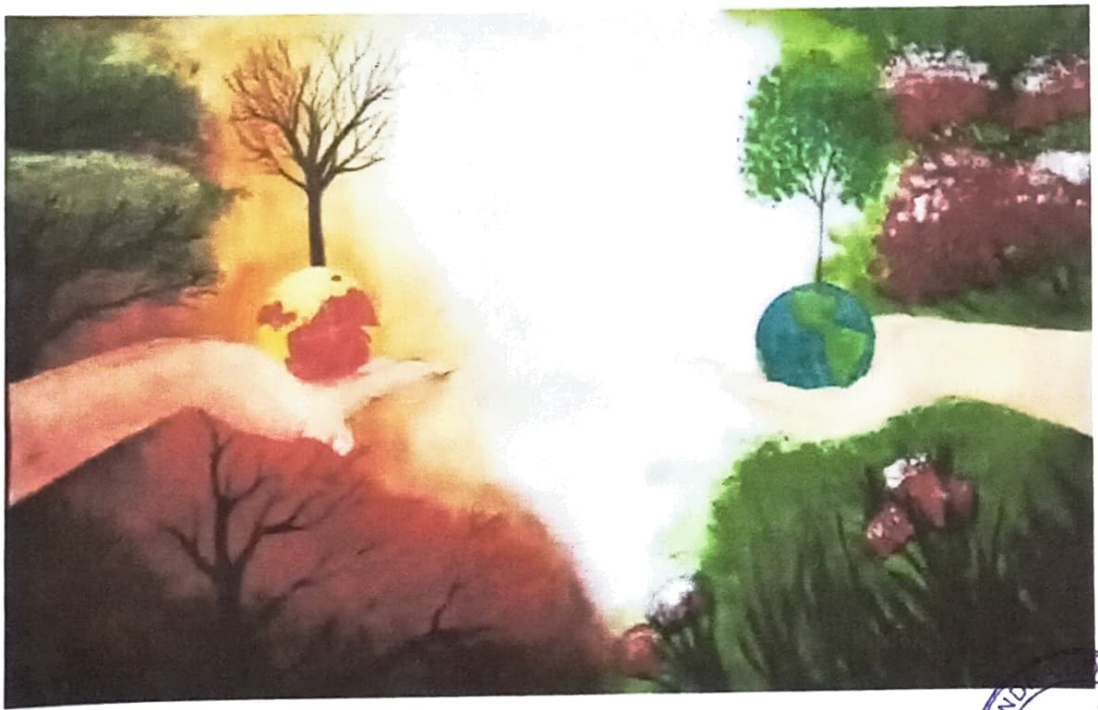
  flowersofindia.net

Debdyuti Sengupta Manjulika Dey
Anwesha Bandyopadhyay
Sagarika Mukherjee.
Subhrajyoti Chakraborty. Gourav Ghoshal,
Souni Sengupta.

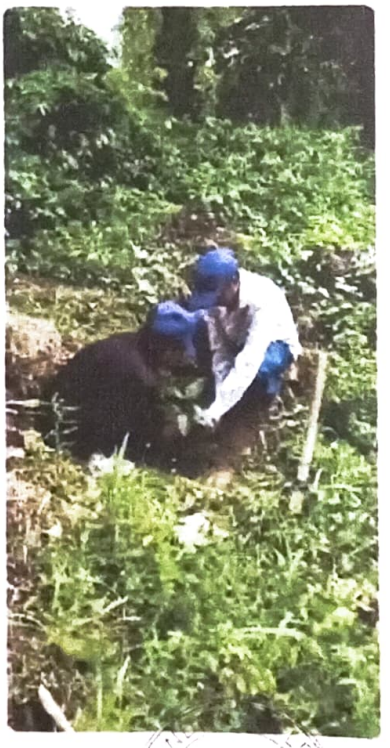
BIDHAN CHANDRA COLLEGE ESTD - 1961 Govt Sponsored ASANSOL

Glimpses of Our Green Campus

Glimpses of our campus

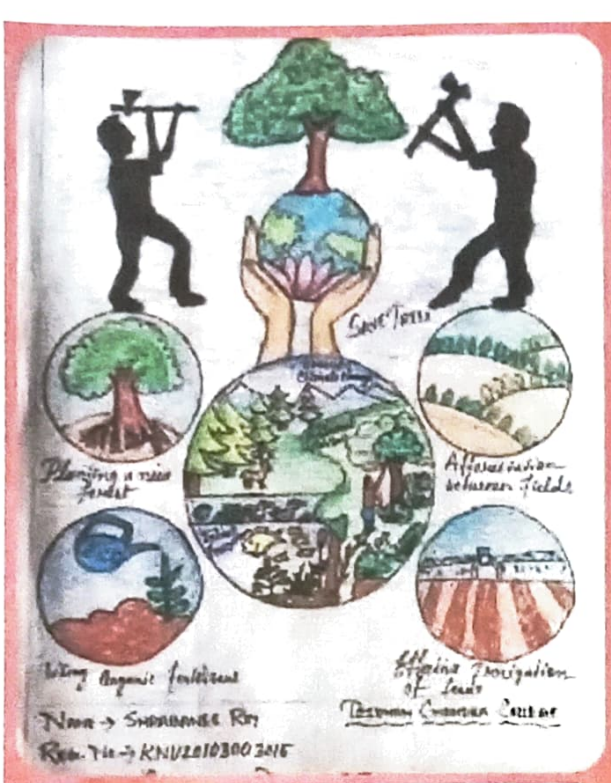


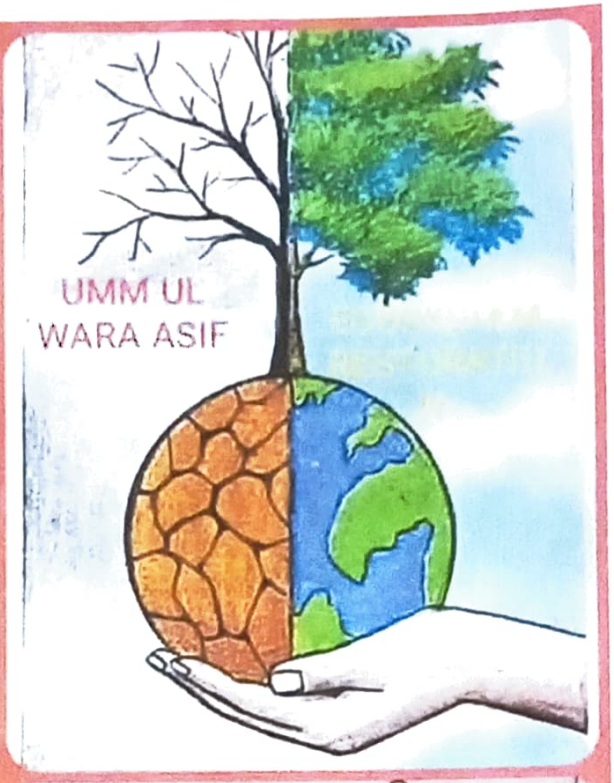
By Eco Club (Eco Warriors) Bidhan Chandra College Asansol

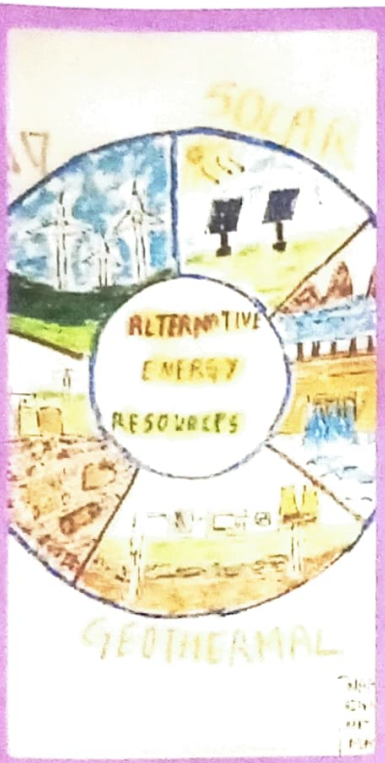


POSTER MAKING COMPETITION

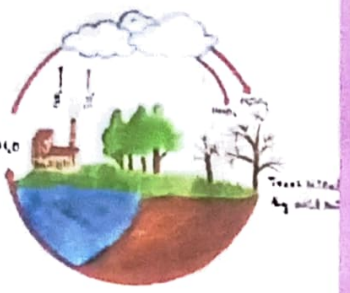
We at the Eco Club organized a Poster Making Competition where we got more than a 100 responses and we have had to make the tough decision to select some of the best creations of our family.







ACID RAIN



Name : Shahabal Praveen

Reg No : KNU2201900 3998

Department : Geography

Ecosystem Restoration

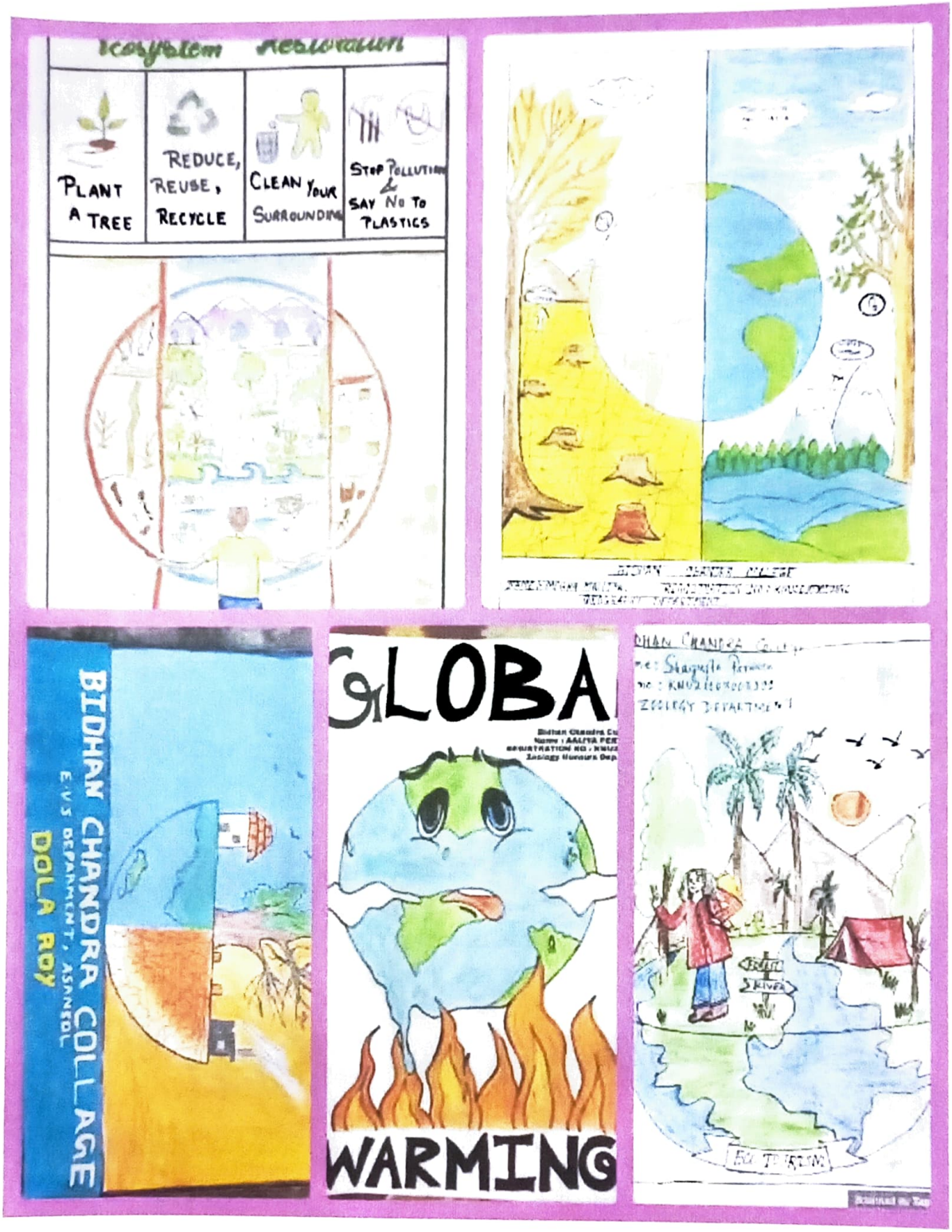
LET US
RESTORE ECO SYSTEM

THE EARTH IS WHAT WE ALL
HAVE IN COMMON!

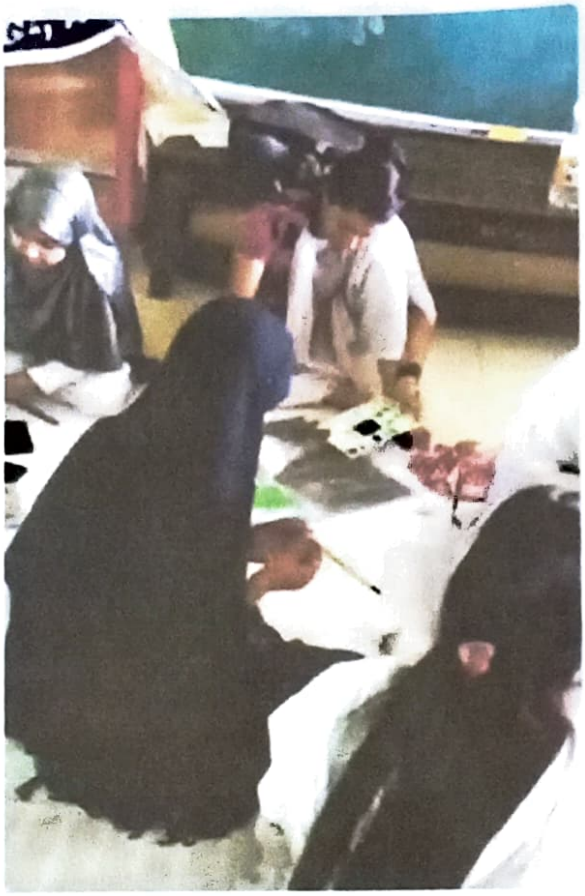
Name : Nnaz Praveen...

Reg No : KNU2201900 3994

Department : Geography...



Different Environment friendly activities performed by the NSS community of our college



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ASANSOL

SWACCH BHARAT ABHIYAAN & CLEANLINESS DRIVE

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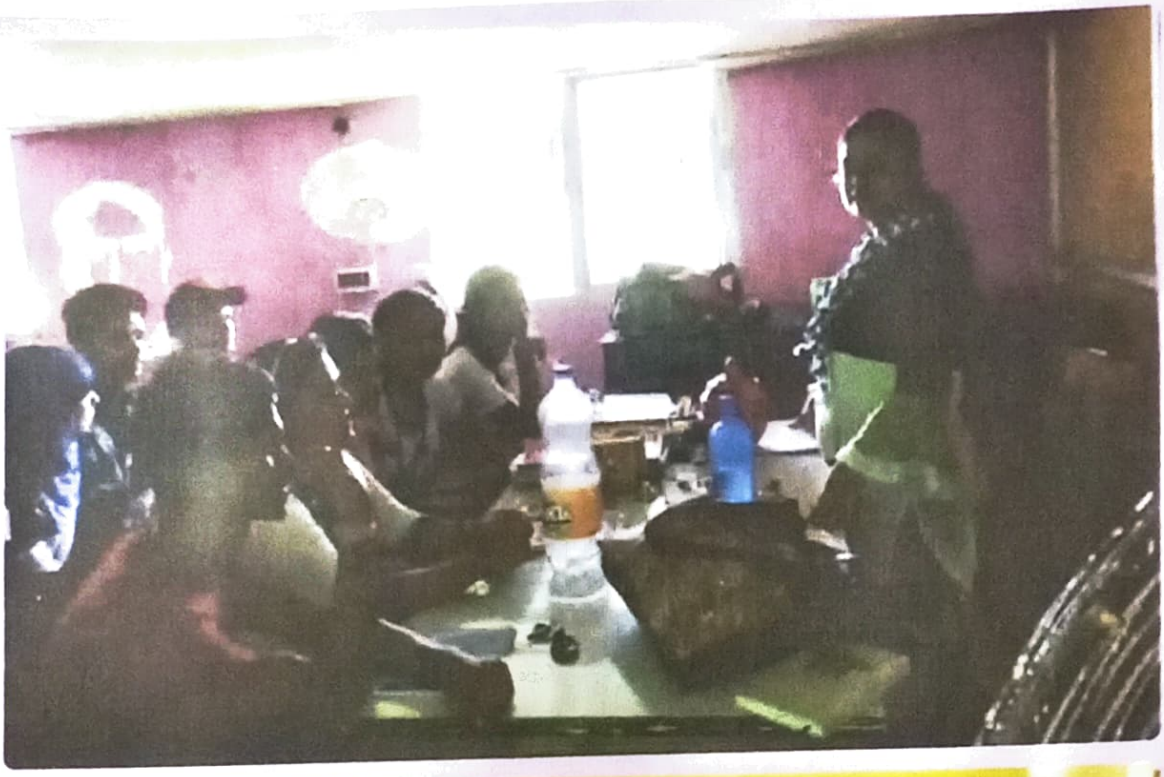

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