

**ENVIRONMENTAL AUDIT REPORT
BHAIRAB GANGULY COLLEGE**

2020-21

BHAIRAB GANGULY COLLEGE



(Government Sponsored)
'A' Accredited Institute by NAAC
Belgharia, Kolkata-700 056
Phone : (033) 2553 2280 / (033) 2564 3191
E-mail : bhairab1968@gmail.com
Website : www.bhairabgangulycollege.ac.in

Ref. No. _____

Date _____

Acknowledgement

I am happy to go through the comprehensive report prepared by the Environmental Audit Committee members. Every detail of the various aspects of the environment has been taken into consideration. Methodical data collection, cartographic presentation and their interpretation have made this a valuable document to be useful for future assessment and quality up gradation of environmental management issues.

I wish to convey my heartfelt thanks to the external as well as internal members of the Environmental Audit Committee for their relentless efforts to complete this elaborate report within a short period of time.

Dr. Subhranil Som
Principal

Principal
BHAIRAB GANGULY COLLEGE
Belgharia, Kolkata-56

ENVIRONMENTAL AUDIT COMMITTEE

Internal Members:

- Dr. Ajit Kumar Sil, Convener, Environmental Audit Committee, Associate Professor, Department of Geography.
- Dr. Ushri Roy, Assistant Professor, Department of Botany.
- Sri Pritam Roy, Assistant Professor, Department of Botany.
- Dr. Saurav Shome, Assistant Professor, Department of Zoology.
- Sri Suhel Sen, Guest Faculty, Department of Geography.

External Members:

- Prof. (Dr.) Debaprasad Bandyopadhyay, ISI, Kolkata (Retired), Saint Petersburg State University, Distinguished Member Collaborator, La Filologica Por La Causa(USA/Mexico)
- Dr. Ashok Kumar Mallick, Director-Professor and Head, Department of MCH, All India Institute of Hygiene and Public Health (Govt. of India).

Support Staff:.

- Sukanta Roy, Lab Technician, Department of Zoology.
- Joy Ghosh, Lab Technician, Department of Botany.

Student Members (Post Graduate Scholars):

- Anirban Saha.
- Shalini Bose.
- Indrani Sarkar.
- Supriya Das.
- Mouli Mukherjee.

PREFACE

Environmental assessment, from time to time is necessary for understanding the quality of environment existing in the institution. The objective of such assessment is firstly, to know present environmental status of the college campus and to increase awareness among students and staff fraternity and also to encourage nature learning from the campus.

At the initiative of the IQAC of the college, a committee for environmental auditing was set up with internal members comprised of teachers, scholarly associated with research and teaching on different aspects of environment, technicians as support staff and post-graduate students studying environmental geography as their specialization. The external members are renowned educationists and have expertise in related fields. The report is partly based on field work and partly on data obtained through questionnaire supplied to the stakeholders in various departments of the college.

The team acknowledges the whole-hearted support of the Principal, Dr. Subhranil Som without whose initiative and encouragement this could not have been so smoothly done.

The way the IQAC Co-coordinator Dr. Dhananjay Halder has been with us since the beginning deserves thanks and special mention.

Thanks are due to all teachers who have timely returned the questionnaire duly filled in.

Deboprasad Bandyopadhyay

Prof. (Dr.) Deboprasad Bandyopadhyay
ISI, Kolkata (Retired), Saint Petersburg
State University, Distinguished Member
Collaborator, La Filologica Por La Couse
(USA/Mexico)

A.K. Mallick

Dr. Ashok Kumar Mallick,
Director-Professor and Head,
Department of MCH,
All India Institute of Hygiene and
Public Health (Govt. of India).

As

Dr. Ajit Kumar Sil, Convener,
Environmental Audit Committee,
Associate Professor,
Department of Geography.

Dr. Deboprasad Bandyopadhyay
Linguistic Research Unit
INDIAN STATISTICAL INSTITUTE
203, B. T. Road, Kolkata - 700 108

Dr. Ashok Kumar Mallick, M.B.B.S., MD
निदेशक-प्रोफेसर व विभागाध्यक्ष
Director-Professor, & HOD
आर्य एवं शिशु स्वास्थ्य विभाग
Deptt. of M.C.H.
AIH & PH, 110, C. R. Avenue
कोलकाता Kolkata-700073



**INTERNAL ENVIRONMENTAL AUDIT COMMITTEE MEMBERS
(STAFF)**

Ushri Roy

Dr. Ushri Roy,
Assistant Professor,
Department of Botany.

Saurav Shome

Dr. Saurav Shome,
Assistant Professor,
Department of Zoology

Pritam Roy

Sri Pritam Roy,
Assistant Professor,
Department of Botany

Suhel Sen

Sri Suhel Sen,
Guest Faculty,
Department of Geography

J. Ghosh

Joy Ghosh,
Lab Technician,
Department of Botany.

Sukanta Roy

Sukanta Roy,
Lab Technician,
Department of Zoology.



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INTRODUCTION:

In the 21st century, environment management has turned out to be a key issue of concern. Environmental audit is a strategy which can be adopted for the proper maintenance and conservation of the environment. It is a process by which a scientific and systematic identification, recording, reporting, quantification and analysis of several environmental parameters are carried out. The main goal of performing an environmental audit is analysis of environment related practices in the area taken for study. The present study consists of the environmental audit report of Bhairab Ganguly College of Belgharia in Kolkata.

OBJECTIVES:

The main objective of the study is to:

- To prepare a GIS map of the college.
- To understand the scenario of water management, waste management, landscape, built up environment, transportation scenario of the college.
- To gather contemporary knowledge about the current environmental scenario of the college.

METHODOLOGY:

In order to accomplish the task, data was collected from various departments of the college through primary survey. Physical inspection of the campus was carried out to have an insight into the biodiversity of the campus. All data collected were tabulated, analysed and interpreted to arrive at the final results.

The entire methodology of the work was divided into three stages- Pre field, Fieldwork and Post field. During the pre-field phase, literature review and preparation of audit design was done. During the fieldwork, primary data on several environmental aspects were collected from various departments of the college. Field photographs were also taken during this phase. The post-field phase involved documentation, tabulation, graphical representation, analysis and interpretation of the data.

About the College:

Bhairab Ganguly College is an esteemed academic institution situated at the northern fringe of Kolkata metropolis of West Bengal. The college is located at the core of Kamarhati Municipal area with Barrackpore Trunk Road in the west. The college was established on 3rd September 1968, under the initiative of late Jibandhan Ganguly, a renowned philanthropist of Belgharia. The College is proud to possess a huge campus comprising 25 bighas of land (8.33 acres) on which three separate buildings have been erected to provide good infrastructural facilities and to ensure an ambience conducive to the pursuit of quality education. Its unique infrastructure is indeed commendable as the College has maintained an idyllic campus adorned with greenery, flower gardens, football ground, a colossal Indoor

Sports Complex (TorunerSwapna), an Auditorium equipped with the state-of-the-art acoustics system (Alapan), Meteorological Observatory, A History Museum (Heritage), Open Air Theatre (Mukto Mon), Medicinal Garden (NiramoyNikunja), Rain Water Harvesting Scheme (MeghKalas), Butterfly garden, a well-equipped College Gymnasium, new College Canteen, Girls' and Boys' Common Room etc.

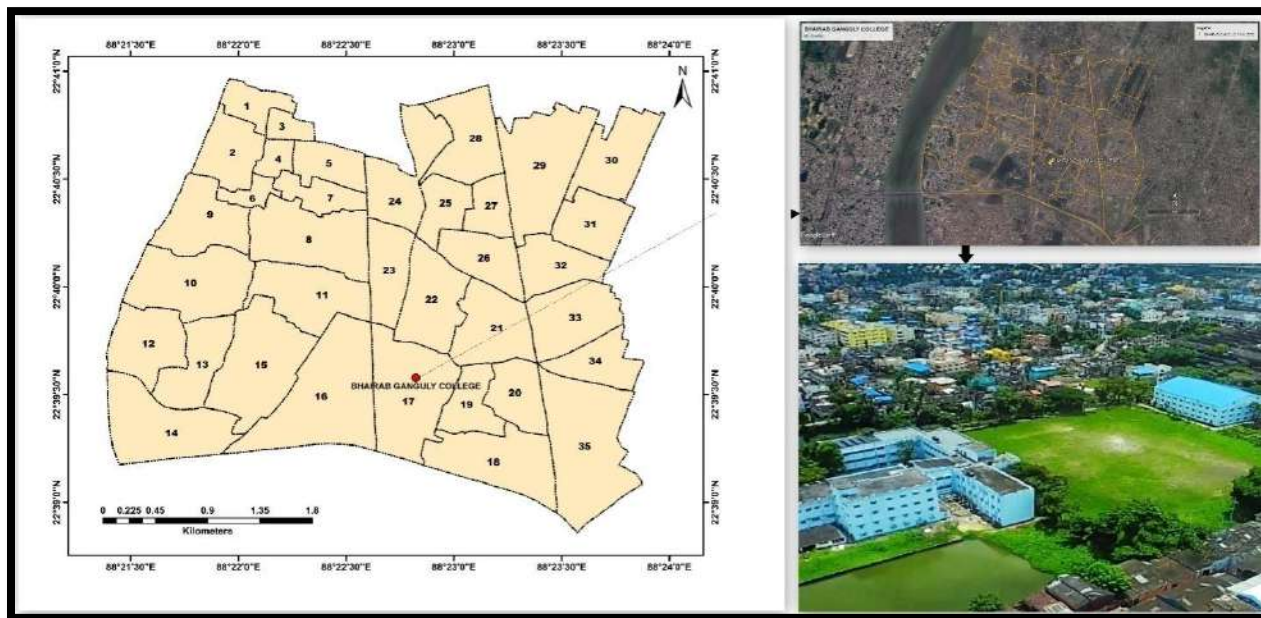


Figure 1: LOCATION MAP OF THE COLLEGE

DATA ANALYSIS AND MAJOR FINDINGS:

1. Water Management:

1.1. Wise use of Water:

Water is precious. Data from 20 departments were collected regarding the wise use of water within various departments of Bhairab Ganguly College. The study revealed that out of 20 departments surveyed, all the departments having water connection, are making wise use of water. None of the departments support wastage of water. Departments of the college always take initiatives to make wise use of water.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Wise use of water	100	00

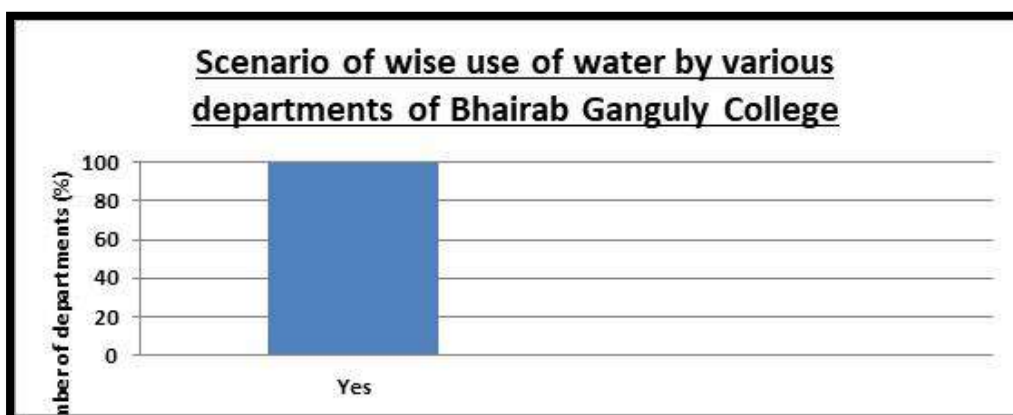


Figure 2: SCENARIO OF WISE USE OF WATER BY VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

1.2. Water Leakage Repair:

Leakage of water pipes is a common problem faced by us in our daily lives. If the leakage is repaired immediately after it is noticed, then wastage of water is avoided. Most of the departments repair water leakages once they are noticed.

1.3. Use of Water purifiers:

Water purifiers ensure safe drinking water supply for the students and teachers. Data collected from 20 departments reveal the fact that about 50% of the departments are making use of water purifiers while the rest of the departments fetch water from central purifiers. Initiatives have been taken by those departments for installation of water purifiers and is under process

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NOT APPLICABLE (%)</u>
20	Use of water purifiers	50	50

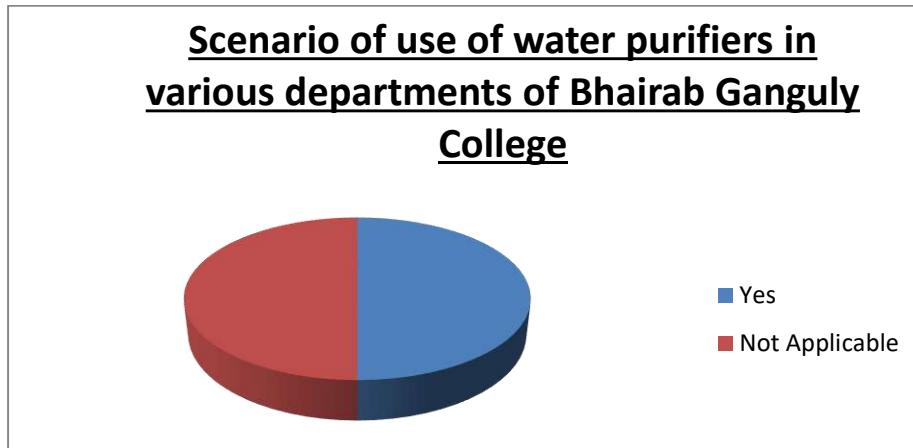


Figure 3: SCENARIO OF USE OF WATER PURIFIERS IN VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

1.4. Availability of Rainwater harvesting facility:

Rainwater harvesting is considered to be a very environmental friendly technique by which rain water can be easily stored and used for various purposes. The rainwater harvesting project is located by the side of the main building in the garden. The project is constructed in close proximity to the walls of the building so that the rainwater easily comes down through the pipes and get stored. There are 4 tanks. Tank 1 and 2 cover an area of about 2476.9 square feet while tank 3 and 4 cover 2420 square feet. Four tanks have a storage capacity of 4000 litres which means each tank has the capacity of 1000 litres. The main objective of the project is to store rainwater and reduce dependency on municipal supply, use the stored water for gardening and toilet purposes, to create awareness among the students and others about the value of water, recharge of groundwater, to improve the ecology of the garden and enrich the biodiversity of the college by attracting different species of birds, butterflies and other animals and finally to exhibit the implementation of the '*JalDharo, Jal Varo*' program of the Government.



Plate 1: Rainwater Harvesting facility of the College

1.5. Provision of Water Coolers:

Water coolers help the water to remain cold and quench our thirst in the hot and sultry summer season. Out of 20 departments, 20% of the departments surveyed are having water coolers while the rest 80% of the departments surveyed do not have the provision of water coolers and depend upon the central water cooling system (CWCF) of the college.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>CWCF (%)</u>
20	Provision of Water Cooler	20	80

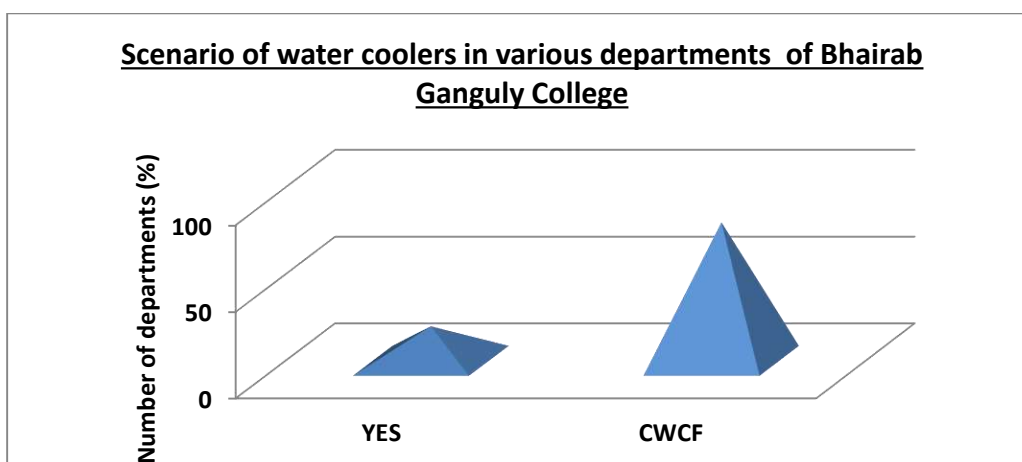


Figure 4: SCENARIO OF USE OF WATER COOLERS IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

1.6. Incidence of Water Pollution:

Water pollution is a serious problem of the present day. Out of 20 departments surveyed, incidence of water pollution has been noted by 35% of the departments while the rest 65% of the departments have not experienced such pollution problems.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Incidence of Water Pollution	35	65

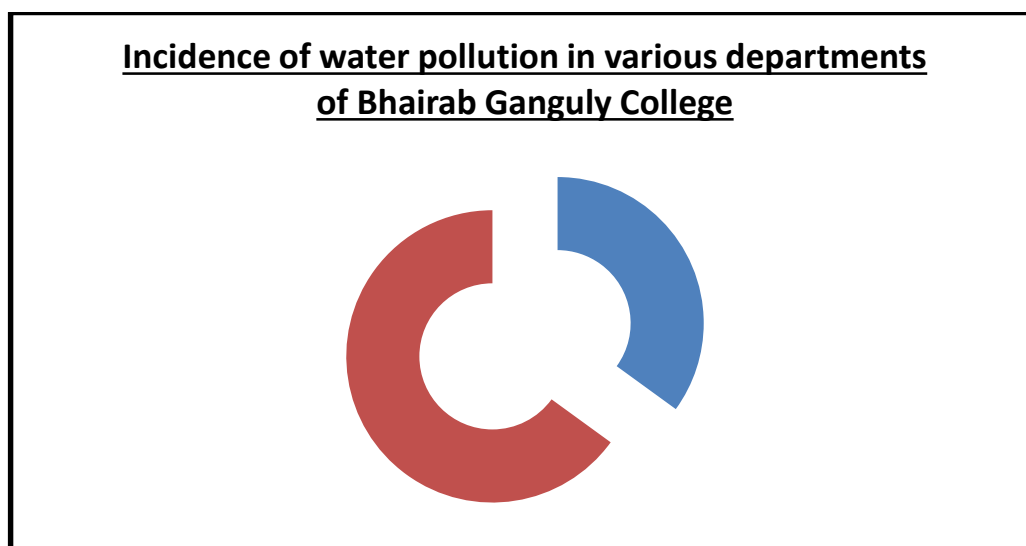


Figure 5: INCIDENCE OF WATER POLLUTION IN VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

1.7. Provision of Water Storage Facility:

Proper facility of storage of water reduces wastage of water. Out of 20 departments, 45% of the departments surveyed have proper water storage facility while the rest 55% of the departments surveyed depend upon the central water storage system facility (CWSF).

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>CWSF (%)</u>
20	Provision of water storage facility	45	55

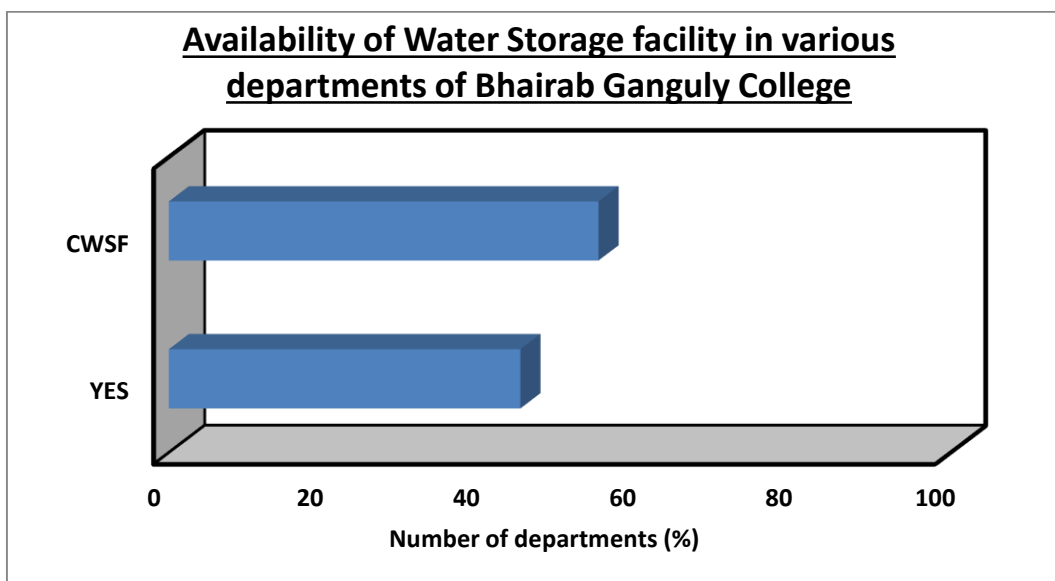


Figure 6: AVAILABILITY OF WATER STORAGE FACILITY IN VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

1.8. Cleaning of Water Tanks:

Cleaning of water tanks at regular intervals keeps the water stored in it clean and ideal for consumption as well as for utilization in different purposes. Cleaning of tanks is done by entrusted persons at regular intervals to ensure supply of clean and safe water to the teachers and the students.

1.9. Water Management Practices:

Water management involves judicious use of water resources. All the departments of the college encourage proper water management practices. Students are instructed by the teachers to turn off the taps if they see them open. All the staffs also keep a vigilant watch in this purpose.

2. WASTE MANAGEMENT:

2.1 Generation of Food and organic waste per day:

The data collected from the 20 departments reveal that 10% of the departments generate high amount food and organic waste per day, 15% of the departments generate medium amount food and organic waste per day, 40% of the departments generate low amount food and organic waste per day and 35% of the departments generate negligible amount of food and organic waste per day. This implies that wastage of food is not a serious problem for the college.

TOTAL DEPARTMENT	PARAMETER	PERCENTAGE OF HIGH	PERCENTAGE OF MEDIUM	PERCENTAGE OF LOW	PERCENTAGE OF NEGLIGIBLE
20	Food/Organic waste/day	10	15	40	35

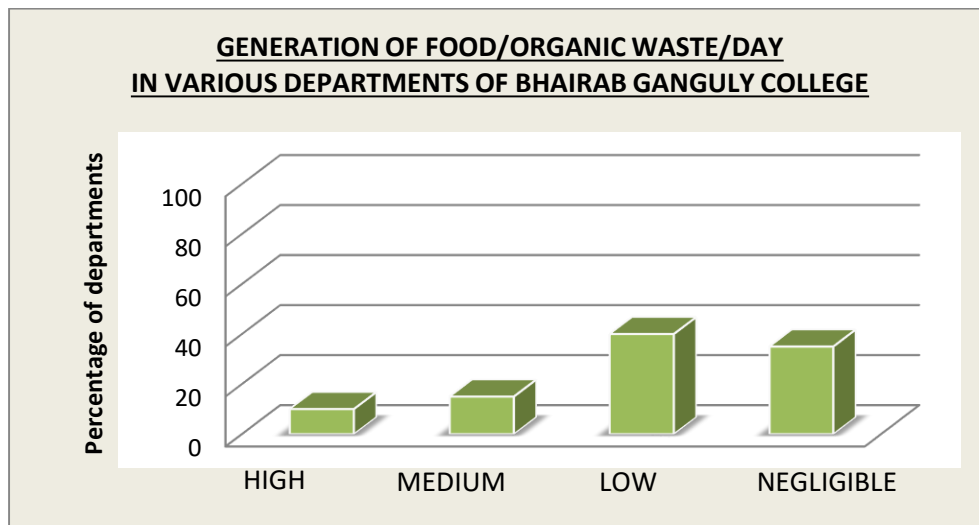


Figure 7: GENERATION OF FOOD/ORGANIC WASTE/DAY IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

2.2. Generation of Non plastic dry waste per day:

On the basis of the collected data from the 20 departments it has been observed that 5% of the departments generate high quantity of non-plastic dry waste per day, 20% of the departments generate medium quantity non plastic dry waste, 35% generate low quantity of non-plastic dry waste per day and 40% generate negligible amount of non-plastic dry waste per day. Non plastic wastes are dumped at proper places and this keeps the college campus clean and tidy.

TOTAL DEPARTMENT	PARAMETER	PERCENTAGE OF HIGH	PERCENTAGE OF MEDIUM	PERCENTAGE OF LOW	PERCENTAGE OF NEGLIGIBLE
20	Non Plastic dry waste /day	5	20	35	40

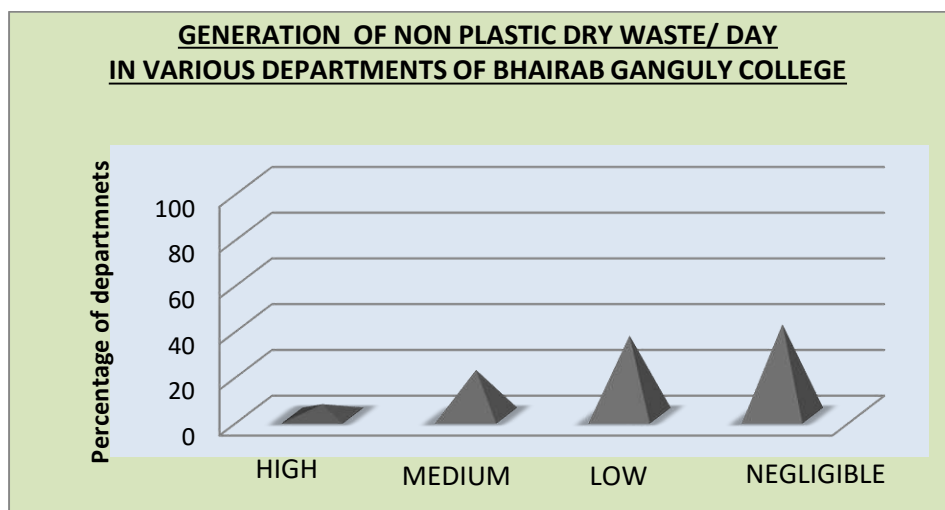


Figure 8: GENERATION OF NON PLASTIC DRY WASTE/ DAY IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

2.3. Generation of Plastic and Thermocol per day:

The data collected from the 20 departments reveal that 10% generate high quantity of plastic and thermocol per day, 15% generate medium quantity of plastic and thermocol per day, 30% generate low plastic, thermocol per day and 45% generate negligible amount of plastic and thermocol per day. Generation of plastic and thermocol wastes are noted mainly during occasions in the college. The college always encourage use of paper plates and paper packets to give food to the students during occasions. In general, the canteen uses aluminium plates and glasses. Tea and coffee are served in paper cups and they are dumped inside the dustbin placed outside the canteen.

TOTAL DEPARTMENT	PARAMETER	PERCENTAGE OF HIGH	PERCENTAGE OF MEDIUM	PERCENTAGE OF LOW	PERCENTAGE OF NEGLIGIBLE
20	Plastic, Thermocol/ day	10	15	30	45

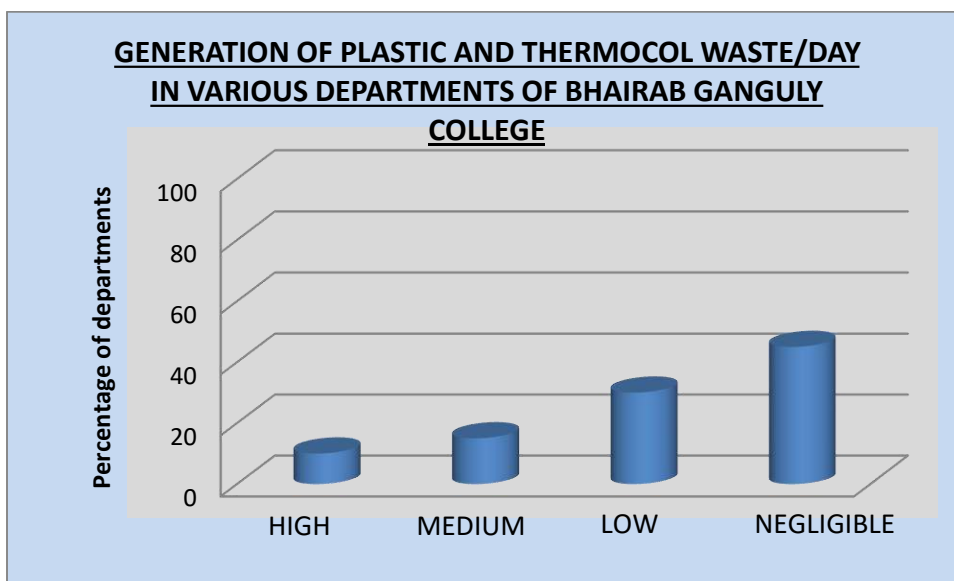


Figure 9: GENERATION OF PLASTIC AND THERMOCOL WASTE/DAY IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

2.4. Generation of Other e-waste:

The data collected from the 20 departments reveal that 5% generate high amount of e-waste, 10% generate low and medium amount e-waste and 75% generate no e-waste. Electronic wastes are generated if there is any malfunction of electronic gadget. In such a case, the malfunctioned gadget is either quickly repaired or replaced with a new one. Hence, the question of generation of electronic waste is not a serious problem.

TOTAL DEPARTMENT	PARAMETER	PERCENTAGE OF HIGH	PERCENTAGE OF MEDIUM	PERCENTAGE OF LOW	PERCENTAGE OF NIL
20	Other (e-waste)	5	10	10	75

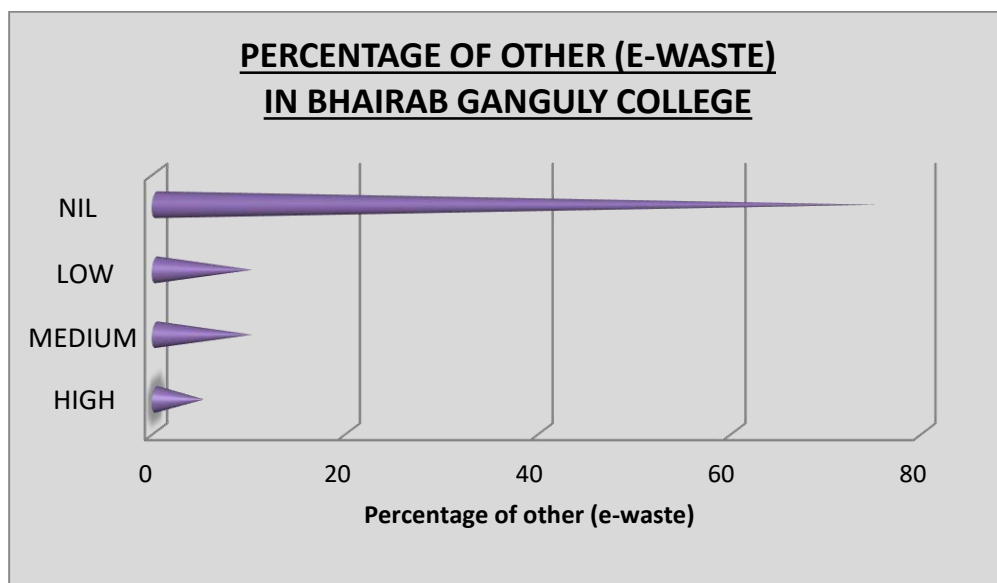


Figure 10: GENERATION OF OTHER (E-WASTE) IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

2.5. Management of organic waste:

The data collected from the 20 departments reveal that 10% carries out high management of organic waste, 5% carries out medium and low management respectively, and 80% organic waste is not a matter of concern as it is produced in insignificant quantity. Organic wastes are mainly used for gardening and the issue of its management and storage is not an issue here.

TOTAL DEPARTMENT	PARAMETER	PERCENTAGE OF HIGH	PERCENTAGE OF MEDIUM	PERCENTAGE OF LOW	PERCENTAGE OF NIL
20	Management of Organic Waste	10	5	5	80

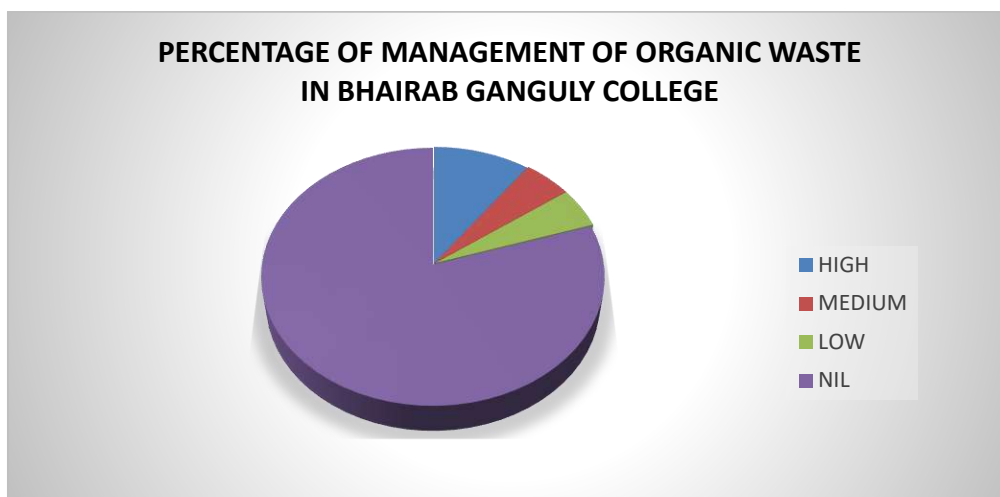


Figure 11: MANAGEMENT OF ORGANIC WASTE IN BHAIRAB GANGULY COLLEGE

2.6 Management of other waste:

As per data collected from the 20 departments it has been found that 10% have high management of other waste, 5% have medium and low management of other waste respectively, whereas 80% have no management of other wastes. Steps are taken to keep the campus clean and tidy and so amount of waste generation within the campus is low.

TOTAL DEPARTMENT	PARAMETER	PERCENTAGE OF HIGH	PERCENTAGE OF MEDIUM	PERCENTAGE OF LOW	PERCENTAGE OF NIL
20	Management of Other Waste?	10	5	5	80

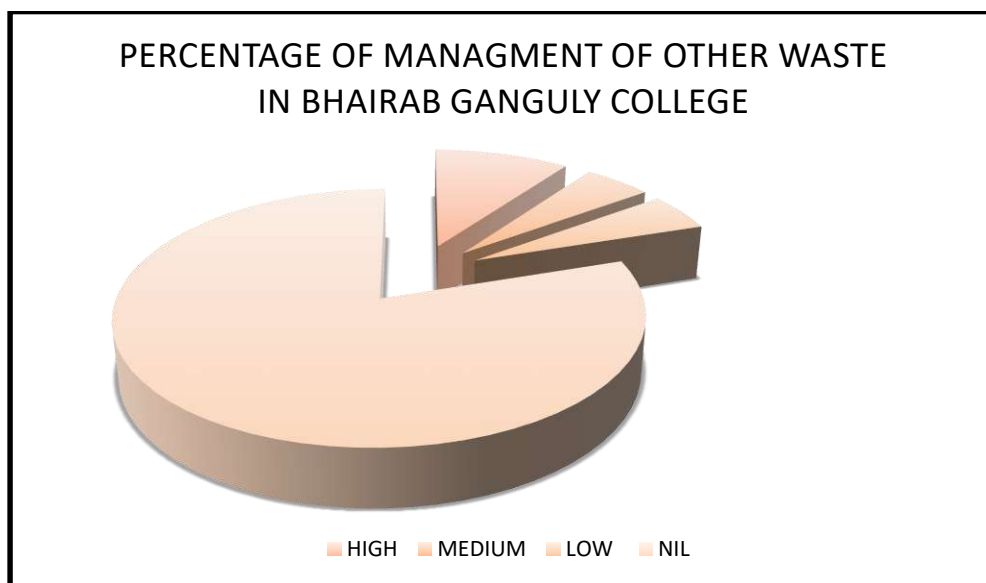


Figure 12: MANAGEMENT OF OTHER WASTE IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

2.7 Availability of Waste dumping bin:

As per the data collected from the 20 departments reveals that 25% have high use of waste dumping pit, 5% have medium use of waste dumping pit, 1% have low use of waste dumping pit and 70% has no use of waste dumping pit. Departments having less or no dumping kit are undertaking tasks for purchase of new dump kits. There is also a provision of a waste dumping pit of length 12 feet, width 6 feet and depth 5 feet near the medicinal garden.

TOTAL DEPARTMENT	PARAMETER	PERCENTAGE OF HIGH	PERCENTAGE OF MEDIUM	PERCENTAGE OF LOW
20	Waste dumping bin	25	5	70

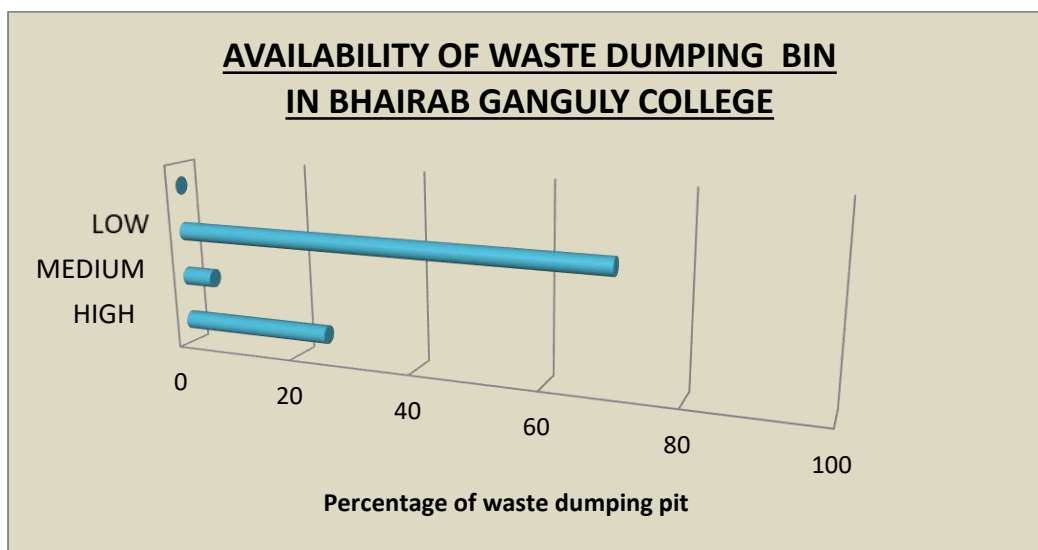


Figure 13: USE OF WASTE DUMPING BIN IN DIFFERENT DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

2.8 Waste management practices:

Proper management of wastes help the college to remain clean and tidy. It also aims for providing a healthy environment to the students. The college always encourage proper waste management. College campus is kept clean by the staff who are entitled to do the task. Students are also advised by the teachers to keep the class rooms clean and tidy. Vigilant watch is kept by the teachers and NTS members of the respective departments. College corridor and office rooms of the college are cleaned at regular intervals by the staff who are entitled with this duty. Toilets are cleaned daily at regular intervals using disinfectants as the issue of student health is considered to be one of the major issue of concern of the college.

3. LANDSCAPE MANAGEMENT:

3.1. Scenario of Green cover:

Attitude towards environment is revealed through the existence of scenario of green cover present in an area. About 75% of the total area of the college is covered with greenery. Series of palm trees can be seen along the side of the road adjacent to the pond. The college is also having a vast expanse of green field which is covered with grass. There is lush green field known as ‘Butterfly Garden’ in-front of the college canteen which is well maintained by the staff entitled to do the duty. There is a vast playground comprised of football ground, space for cricket games and other sports. Wild bushes as well as planted trees enrich the green cover on most sides of the playground and the swimming pool as well. The metalled road gets the shapes of the trees from both sides.



Plate 2: Greenery of Bhairab Ganguly College

3.2. Scenario of Garden cover:

Garden not only helps in the enhancement of the aesthetic value but also helps in increasing the greenery and triggers ecological development. The college is having a butterfly garden that attracts a number of butterflies and a medicinal garden which is enriched with medicinal plants. In front of the main building, on both sides of the pathway, there are flower beds and other exotic plants, neatly designed in colourful settings.

The main garden of the college is situated in the central portion of the college and it is supervised by the college gardener. Seasonal flowers are grown in the garden and they are properly taken care of by the gardener. No student is allowed to pick flowers from the garden. The garden is also well protected by an iron gate with lock and key facility. The garden door remains locked to prevent the entry of animals into it.



Plate 3: College Garden

3.3. Existence of Indigenous trees and plants:

Existence of indigenous trees and plants acts as a reflection of upholding our cultural traditions. Out of 20 departments, 11% departments surveyed stated about excellent growth of indigenous plants and trees, 10% department surveyed stated about good growth of indigenous plants and trees and 79% departments surveyed claimed for about no growth of indigenous plants and trees. However, no department stated about good growth of traditional plants and trees.

TOTAL	PARAMETER	EXCELLENT(%)	GOOD(%)	AVERAGE (%)
20	Existence of indigenous trees and plants	11	10	79

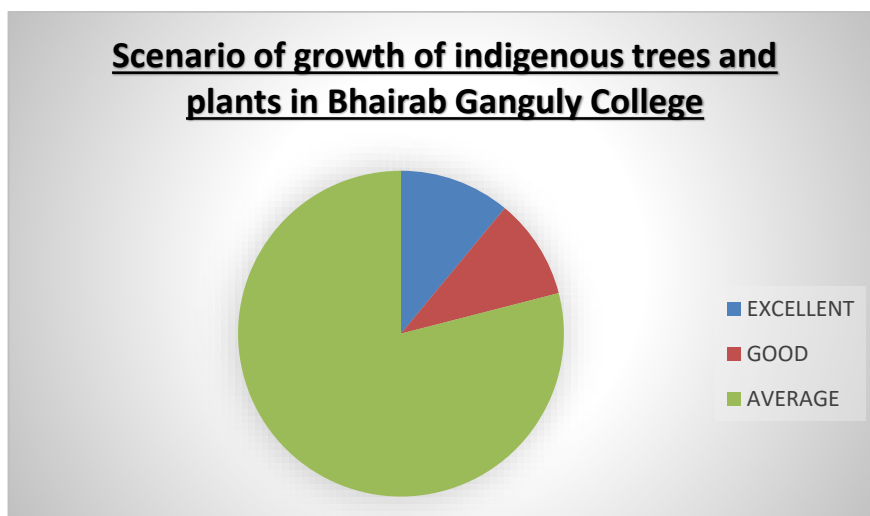


Figure 14: SCENARIO OF INDIGENOUS TREES AND PLANTSIN BHAIRAB GANGULY COLLEGE

3.4. Growth of Exotic Plants:

Plants that are exported from outside are known as exotic plants. They help in enrichment of ecological diversity and beautification. Out of 20 departments, 13% departments surveyed opted for existence of excellent amount of exotic plants, 8% of departments surveyed opted for the existence of good number of exotic plants, 79% departments surveyed stated for the existence of average quality of exotic plants. A few departments have been decorated with their own exotic plants while others enjoy the beauty of the exotic plants of the plant beds close to their departments.

TOTAL	PARAMETER	EXCELLENT (%)	GOOD (%)	AVERAGE (%)
20	Growth of exotic plants	13	8	79

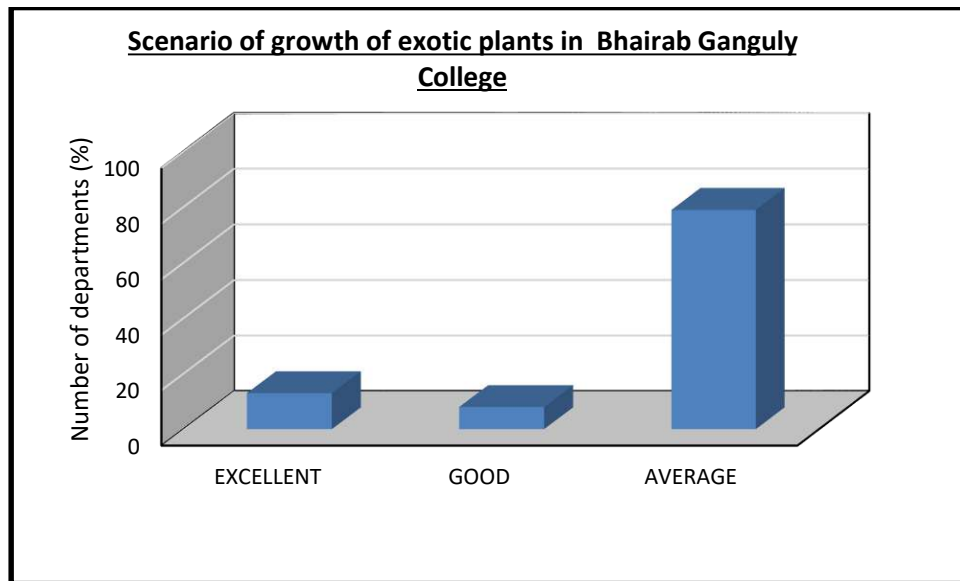


Figure 15: SCENARIO OF EXOTIC PLANTSIN BHAIRAB GANGULY COLLEGE

3.5. Landscape Management:

Out of 20 departments, 11% department surveyed opts for excellent landscape management, 15% departments surveyed stated about average landscape management, 74% department surveyed opted for average landscape management.

TOTAL	PARAMETER	EXCELLENT (%)	GOOD (%)	AVERAGE (%)
20	Landscape management	11	15	74

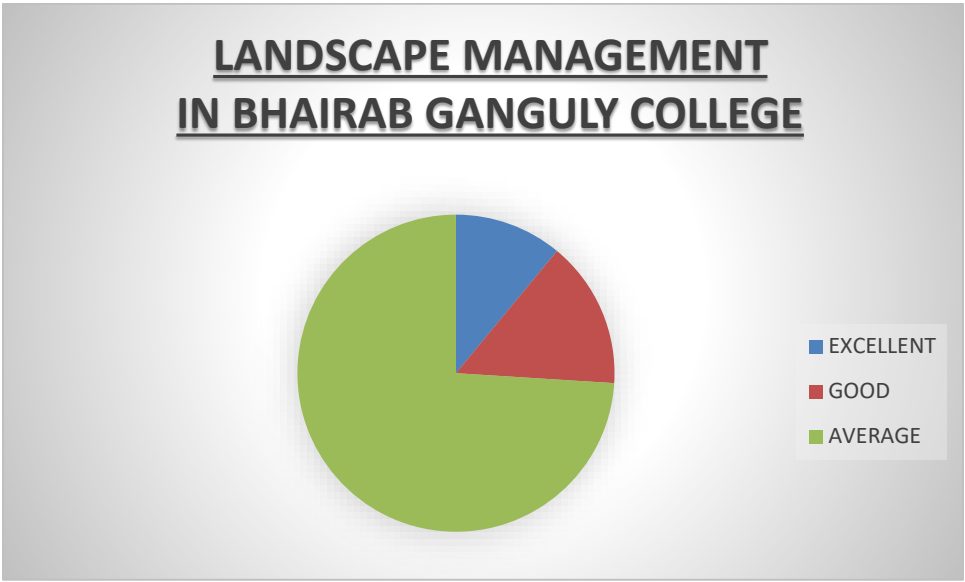


Figure 16: LANDSCAPE MANAGEMENT IN BHAIRAB GANGULY COLLEGE

3.6. Existence of Natural water bodies:

Presence of waterbodies helps in regulation of surrounding temperature specially in summer season and also helps in minimizing the effect of urban heat island. After entering the college campus from the main gate, there is a huge waterbody in the right side. The waterbody helps in bringing about a moderating effect during summer season and helps in maintaining the daily rhythm of land and sea breeze and thus keeps the college campus pleasant. Besides, the college is also constructing a swimming pool.



Plate 4: Aerial view of the college with waterbody

4. BUILT UP ENVIRONMENT:

4.1. Building Type:

Building type is an important parameter in performing environmental audit. Out of 20 departments, 70% of the departments surveyed opined for the availability of good quality of building whereas remaining 30% of departments surveyed opined for an average quality of building type. In areas where, there are problems with the building, repairing work is under process.

<u>TOTAL</u>	<u>PARAMETER</u>	<u>Building type</u>
20	GOOD	14
	PERCENTAGE	70
	AVERAGE	6
	PERCENTAGE	30

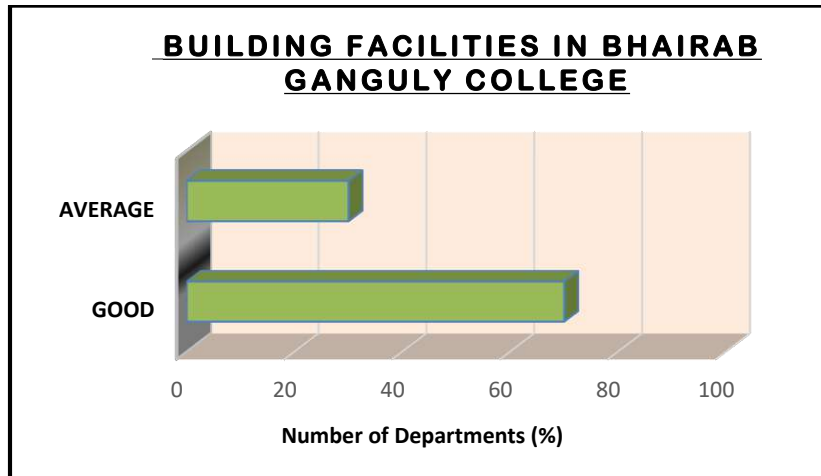


Figure 17: BUILDING FACILITIES IN BHAIRABGANGULY COLLEGE

4.2. Classification of Departments based on area:

On the basis of area in square feet, all the departments of the college were categorized into three classes namely less than 1000 square feet, 1000 to 2000 square feet and more than 2000 square feet. The study revealed that out of 20 departments, 60% surveyed are having area less than 1000 square feet, 30% surveyed are having area greater than 2000 square feet while the rest 10% surveyed are having area between 1000 to 2000 square feet. This shows that most of the rooms of departments are spacious.

<u>Area in Sq feet</u>	<u>No of Departments</u>	<u>PERCENTAGE</u>
<1000	12	60
1000-2000	2	10
>2000	6	30

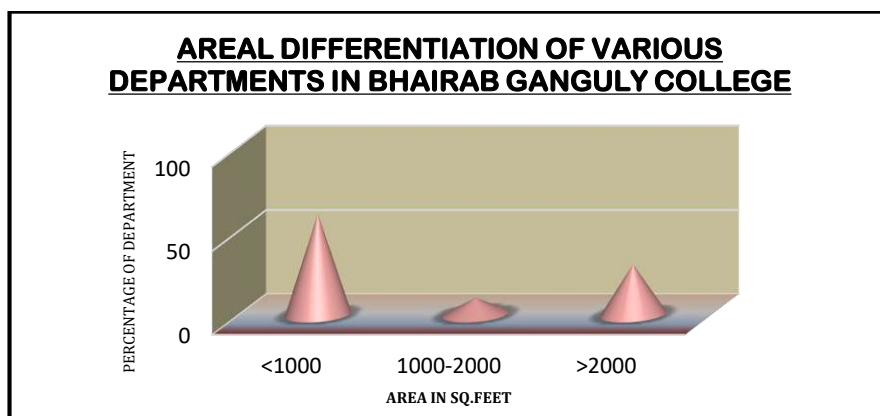


Figure 18: AREAL DIFFERENTIATION OF VARIOUS DEPARTMENTS IN BHAIRAB GANGULY COLLEGE

4.3. Existence of Eco friendly condition in different departments of the College:

Existence of an eco-friendly environment within several departments of a college reflects the attitude of the institution towards the environment. Out of 20 departments, 30% surveyed are having excellent eco-friendly conditions, 5% surveyed is having average eco-friendly conditions, while 65% surveyed is having good eco-friendly conditions. Initiatives have been taken by those departments to inculcate within the students the attitude of eco-friendliness and is under process.

TOTAL	PARAMETER	EXCELLENT (%)	AVERAGE (%)	GOOD (%)
20	Existence of Eco friendly conditions in different departments of the college	30	5	65

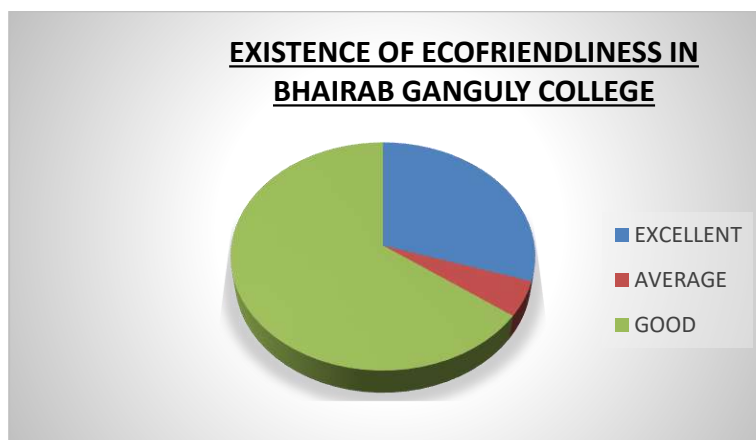


Figure 19: EXISTENCE OF ECOFRIENDLINESS IN BHAIRAB GANGULY COLLEGE

4.4. Provision of Fire prevention in various departments of Bhairab Ganguly College:

Safety from fire accidents is one of the major precautionary step that every building should have installed in it. It is very much mandatory that an educational institution must be equipped with firefighting equipment so that steps to extinguish the fire can be taken in case there is a fire accident. Out of 20 departments, 25% departments surveyed are having good fire prevention provisions, 25% departments surveyed are having medium fire prevention provisions and 50% departments surveyed are having average fire prevention provisions. None of the departments have poor fire prevention provisions. Initiatives have been taken by those departments for installation of water purifiers and is under process. Initiatives have been taken by those departments for installation of fire extinguishing mechanisms and is under process.

TOTAL	PARAMETER	GOOD%	MEDIUM%	AVERAGE%
20	Provision of fire prevention in different departments	25	25	50

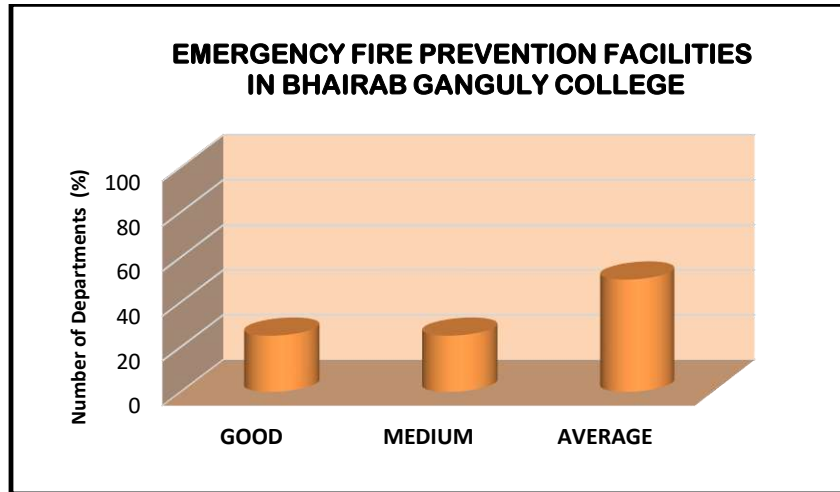


Figure 20: EMERGENCY FIRE PREVENTION FACILITIES IN BHAIRAB GANGULY COLLEGE

4.5. Presence of Aesthetic Appeal:

Out of 20 departments, 45% departments surveyed are having excellent aesthetic appeal, 10% departments surveyed are having good aesthetic appeal, 45% departments surveyed are having average aesthetic appeal. This reflects the initiative of the institution to maintain the aesthetic environment within the college premises.

TOTAL	PARAMETER	EXCELLENT%	GOOD%	AVERAGE%
20	Presence of Aesthetic appeal	45	10	45

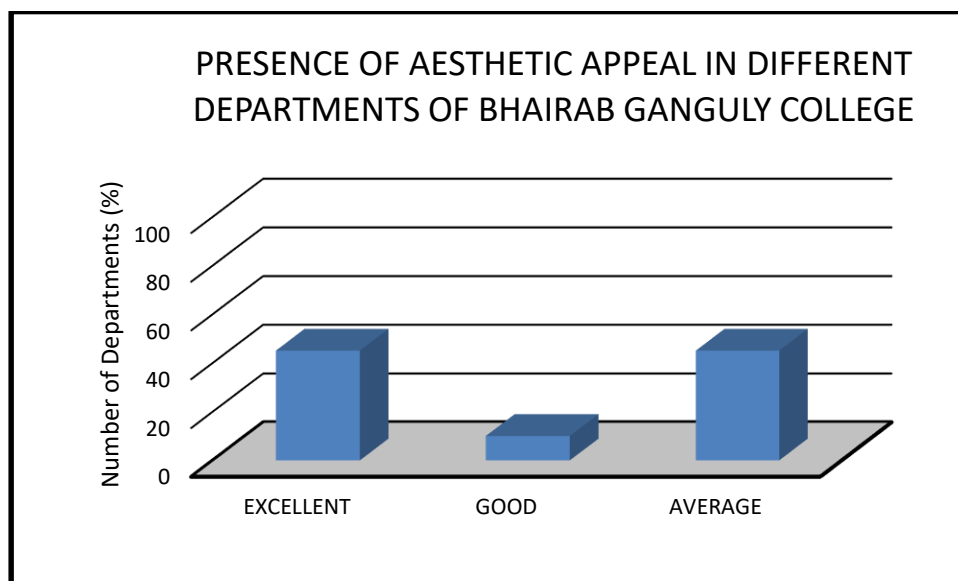


Figure 21: AESTHETIC APPEAL OPPORTUNITIES IN BHAIRAB GANGULY COLLEGE

4.6. Serenity of Class Rooms in different departments of Bhairab Ganguly College:

Serenity of class rooms create an ideal environment for teaching and learning for both teachers and students. The more serene the environment, the better the learning process becomes. Out of 20 departments, 40% departments surveyed have good serenity in their classrooms and 60% departments surveyed have average serenity in their classrooms. However, existence of no or poor serenity in classrooms were reported by none of the departments of the college.

TOTAL	PARAMETER	GOOD (%)	AVERAGE (%)	POOR (%)	NIL (%)
20	Serenity of classrooms	40	60	0	0

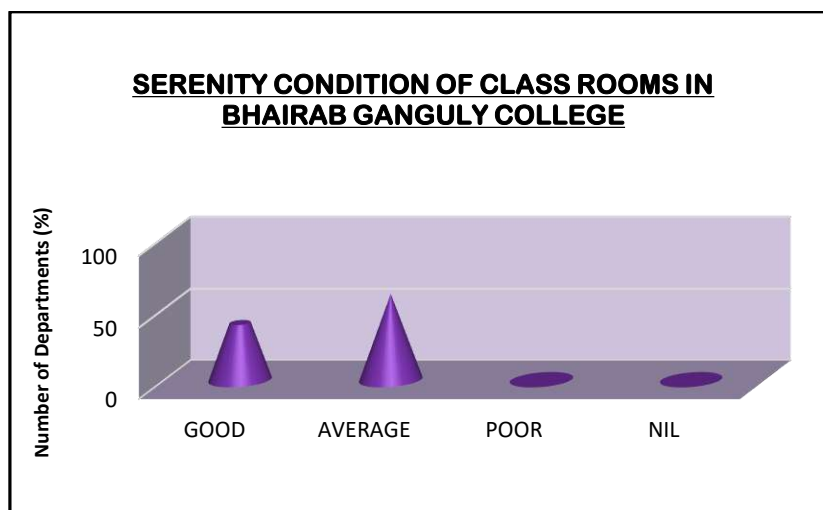


Figure 22: SERENITY CONDITION OF CLASS ROOMS IN BHAIRAB GANGULY COLLEGE

4.7. Provision of Ladies' Rest Room:

Keeping in mind the issues of privacy and security, there must be provision for separate rest room for women. Out of 20 departments, 10% departments surveyed are having excellent provision for ladies' rest room, 5% departments surveyed are having good provision for ladies' rest room and 85% departments surveyed are having average provision for ladies' rest room. No department reported for the non-existence of ladies' rest room. Guaranteeing proper privacy and security of women has always been up-held by the college

TOTAL	PARAMETER	EXCELLENT (%)	GOOD (%)	AVERAGE (%)
20	Provision for ladies' rest room	10	85	5

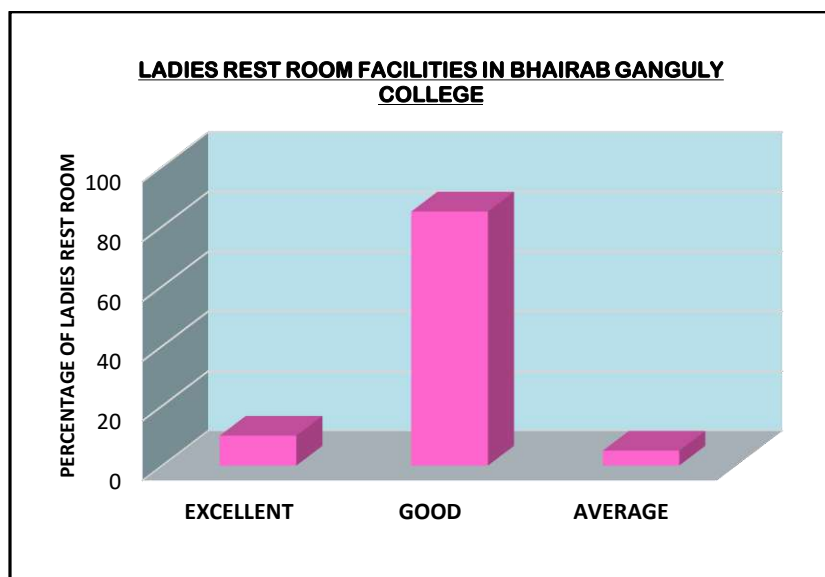


Figure 23: LADIES REST ROOM FACILITIES IN BHAIRAB GANGULY COLLEGE

4.8. Provisions for differently abled persons:

Differently abled person includes those persons who are physically or mentally challenged. Therefore, it is the duty of institution to provide additional facilities to these persons. The college keeps a very close watch in this issue and always ensure the fact that any differently abled person whether a teacher or a student does not have any problem within the college. All college staff are always ready to extend their helping hand to these challenged persons. Vehicles are arranged for differently abled students during examination to reach the exam hall.

4.9. Toilet facility in different departments of Bhairab Ganguly College:

Availability of toilet facility for both men, women and differentially abled person is very much necessary. College is having separate toilet for both male and female students. There are total 20 toilets. It is also having toilets of both western style as well as Indian style keeping in mind the requirement of old aged teachers and differently abled persons who prefer the use of western style to Indian style. College staff are having separate toilet provisions and it is in the Ground floor.

4.10. Provision of Recreation room in different departments of the college:

Recreation helps in refreshing of human minds after long and hard working hours and prepares us for a fresh start. There are separate common rooms for boys and girls and they are equipped with several facilities of indoor sports. The college is having fully air conditioned 12 station gymnasium, indoor sports complex and national standard swimming pool (50 meters) which is under construction. The college is also having an air-conditioned auditorium 'Alapan'. The green and serene environment of the college is itself the place of recreation for the students. During tiffin break or class off time, students play games in the field, gossip with friends in canteen and enjoy a lot of time together. In other words, the college

provides the students an environment where they can have a full test of college life. All these are done by following strict discipline within the campus.



Plate 5: Gymnasium, swimming pool and indoor sports complex of Bhairab Ganguly College

5. TRANSPORTATION:

5.1. Ownership of personal Vehicles:

Transportation acts as one of the backbones of development. BhairabGanguly College is located at a distance of about 1 km from the Belgharia rail station which is located along the Sealdah-Naihati Main Railway line of Eastern Railways. It is also located at a distance of about 950 m from Rathtala on Barrackpore Trunk Road. At present, Baranagar Metro station is also located at its close proximity (about 1.6 km). The members of the college commute to college either by using their personal vehicle or in public transport. The study reveals that out of 20 departments surveyed, members from 25% departments use their own vehicle while the members of rest of 75% departments use public transport to come to college.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Ownership of personal vehicles	25	75

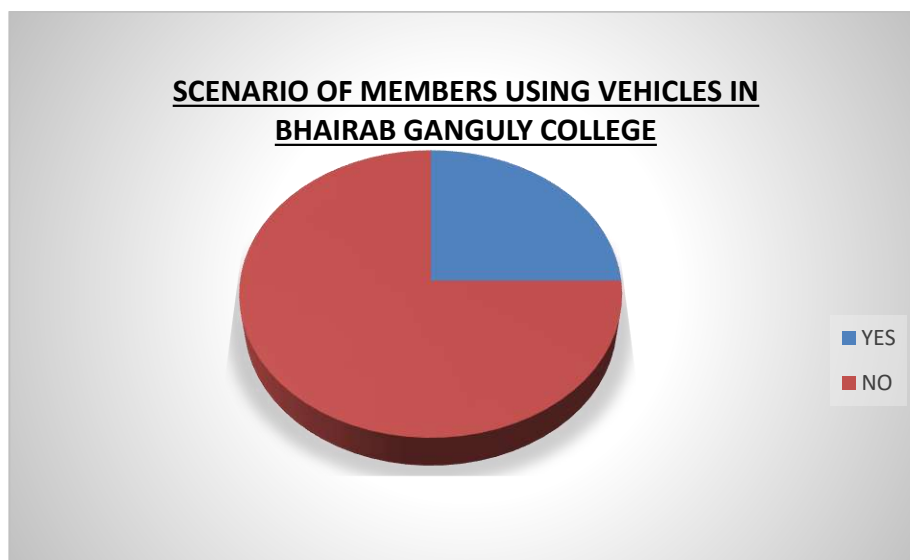


Figure 24: SCENARIO OF MEMBERS USING OWN VEHICLES IN BHAIRAB GANGULY COLLEGE

5.2. Use of bicycles:

Bicycles are considered to be one of the most environment friendly vehicles because it does not run on fossil fuels and hence there is no chance of pollution. It is also one of the means of physical exercise. The survey revealed that out of 20 departments surveyed, members from 25% departments use their bicycle while the members of rest of 75% departments use private vehicles or public transport to come to college and do not use bicycle. Degree of utilization of bicycle is noted among those college members who reside in the local area or in areas of close proximity of the college. Students residing in Kamarhati or Baranagar areas often use bicycle to come to college.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Use of Bicycles	25	75

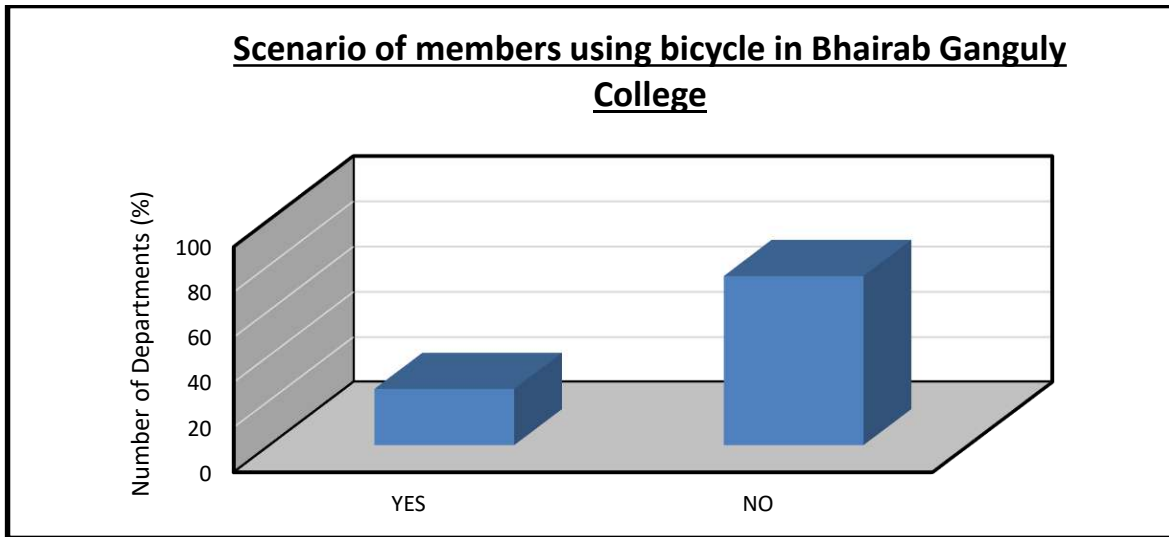


Figure 25: SCENARIO OF MEMBERS USING BICYCLE IN BHAIRAB GANGULY COLLEGE

5.3. Scenario of use of Share Transport facility:

Share transport facility is the sharing of car journeys so that more than one person can travel in a vehicle, and prevents the need for others to have to drive to a location themselves. This saves the fuel consumption and thus benefits the environment. The survey revealed that out of 20 departments surveyed, members from 40% departments use share transport facility while the members of rest of 60% departments do not avail share transport facility. They use private vehicles or public transport to come to college and do not use bicycle. Share transport facility is available in the form of Magic cars that run between Belur and Muragacha and auto-rickhaw along Dunlop-Rathtala- Belghoria rail station. A person can use these share transport facility to reach BhairabGanguly College.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Use of Share Transport facility	40	60

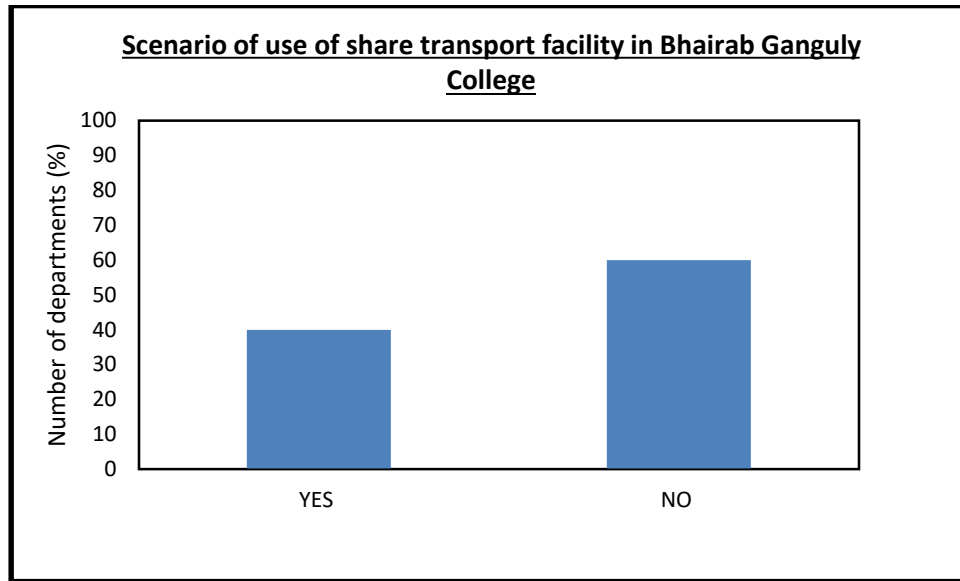


Figure 26: PERCENTAGE OF MEMBERS USING VEHICLE POOLING IN BHAIRAB GANGULY COLLEGE

5.4.Scenario of use of public transport:

Out of 20 departments, in 4 departments less than 25% staff avail public transport; in another 4 departments staff using public transportation fall within the class range of 25 to 50%. But in most of the departments (12) more than 50% staff avail public transportation.

<u>Percentage of Staff</u>	<u>Number of departments</u>
Less than 25%	4
25% to 50%	4
More than 50%	12

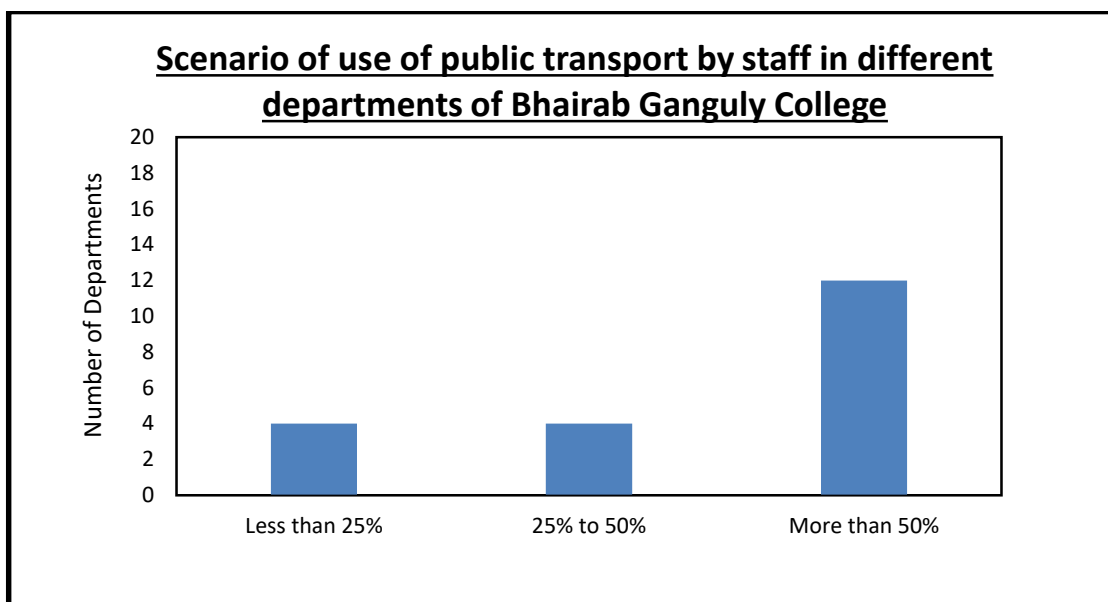


Figure 27: SCENARIO OF USE OF PUBLIC TRANSPORT BY STAFF IN DIFFERENT DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

6. Nature of active participation in Environmental Conservation Programmes by different Departments of Bhairab Ganguly College:

There is a Green club in the college named as ‘BGC Nature Club’ to spread awareness among the staff members and students by the activities related to environmental conservation. Most of the departments (75%) are aware of the necessity to participate in environment related programmes.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Nature of active participation	75	25



FIGURE 28: NATURE OF ACTIVE PARTICIPATION IN ENVIRONMENTAL CONSERVATION PROGRAMMES BY VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

7. Use of animals in different experiments:

Use of animals in different experiments is not encouraged. Out of 20 departments, 15% of departments surveyed use animals in different experiments while 85% of departments surveyed do not use animals in different experiments.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Use of animals in different experiments	15	85

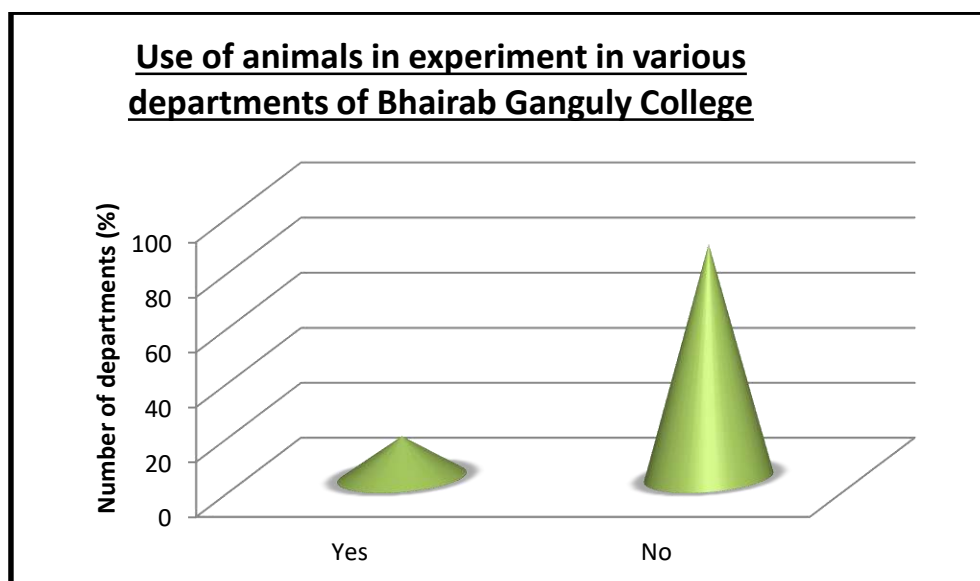


Figure 29: USE OF ANIMALS IN EXPERIMENT IN VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

8. Existence of Ethics Committee in various departments of Bhairab Ganguly College:

Ethics Committee on environment is a committee that makes people aware of the value of each and every living organism within the biodiversity. Out of 20 departments, 15% of departments surveyed have their own Departmental Ethics Committee (DEC) while 85% of departments are concerned with Central Ethics Committee (CEC).

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>DEC (%)</u>	<u>CEC (%)</u>
20	Existence of Ethics Committee	15	85

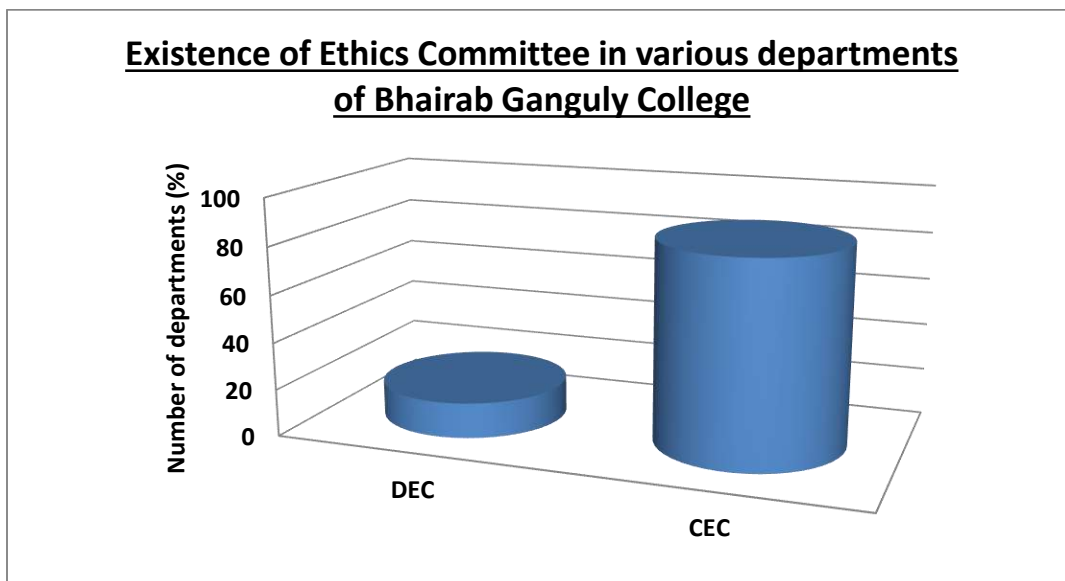


Figure 30: EXISTENCE OF ETHICS COMMITTEE IN VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

9. Environmental Extensions in various departments of Bhairab Ganguly College:

Environmental extension programs also make the students aware of several aspects of the environment. Out of 20 departments, 30% of the departments surveyed have environmental extension programs while the 70% of the departments surveyed do not have such environmental extension programs, but have future plans.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Environmental extensions	30	70

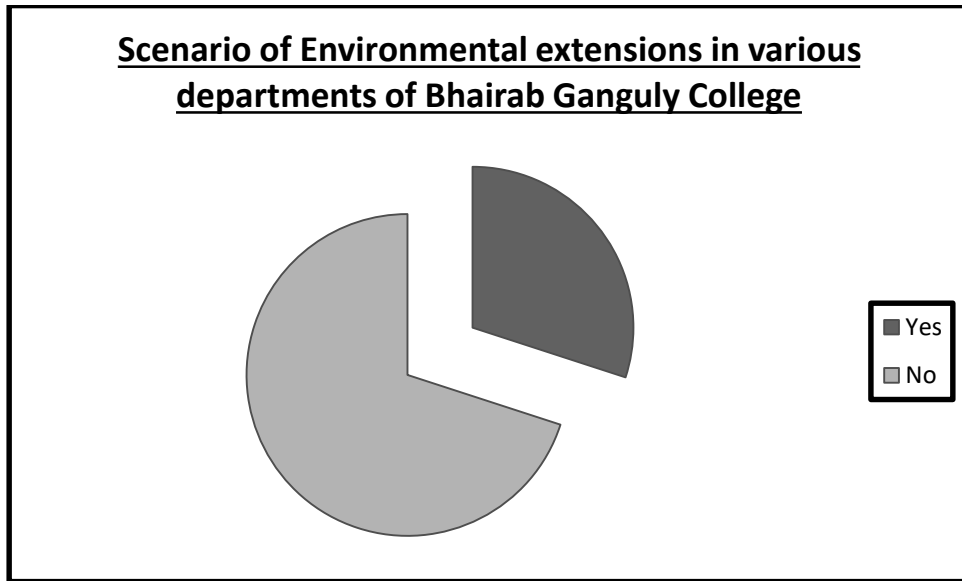


Figure 31: SCENARIO OF ENVIRONMENTAL EXTENSIONS IN VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

10. METEOROLOGICAL OBSERVATORY:

Atmosphere is a component as well as an influential factor of environment. The Meteorological Observatory is equipped with instruments for recording data related to temperature, humidity, rainfall, evaporation, wind direction and speed and radiation. The observatory enables us to know the atmospheric condition of the college and its surroundings.



Plate 6: Meteorological Observatory

11. SOME ECO-FRIENDLY INFRASTRUCTURE:

Solar Power System for Green Energy:

The Photovoltaic cells have been installed on the rooftop. This non-conventional green energy saves fossil fuel based electricity to an extent.



Plate 7: Solar power system for Green Energy

Rainwater Harvesting (Megh Kalas)

Rainwater harvesting facility has been installed in the centrally located garden of the college for watering the flower beds and other plants. The amount of rain water which is harnessed helps in the conservation of water lifted using electric pumps.



Plate 8: Rainwater Harvesting (Megh Kalas)

12. AIR QUALITY STATUS:

Air quality index upto 100 is considered to be satisfactory and according to the latest available air quality data, the AQI for Belgharia is 57. The AQI range is 0 to 500, the lower the AQI, the better is the air quality, the higher is the AQI, the poorer is the air quality.

The presence of Sulphur Dioxide in the air is low which is good. It is 13 nano gram per cubic meter ($13 \mu\text{g}/\text{m}^3$). Presence of particulate matter is also low only 2.8 nano gram per cubic meter ($2.8 \mu\text{g}/\text{m}^3$). However, carbon monoxide level is very high because of the presence of a few factories nearby and road with busy traffic.

Morover, Bhairab Ganguly College is situated a little away from the busy main road with its vast campus and having plenty of greeneries within the college campus which help to preserve air quality better.

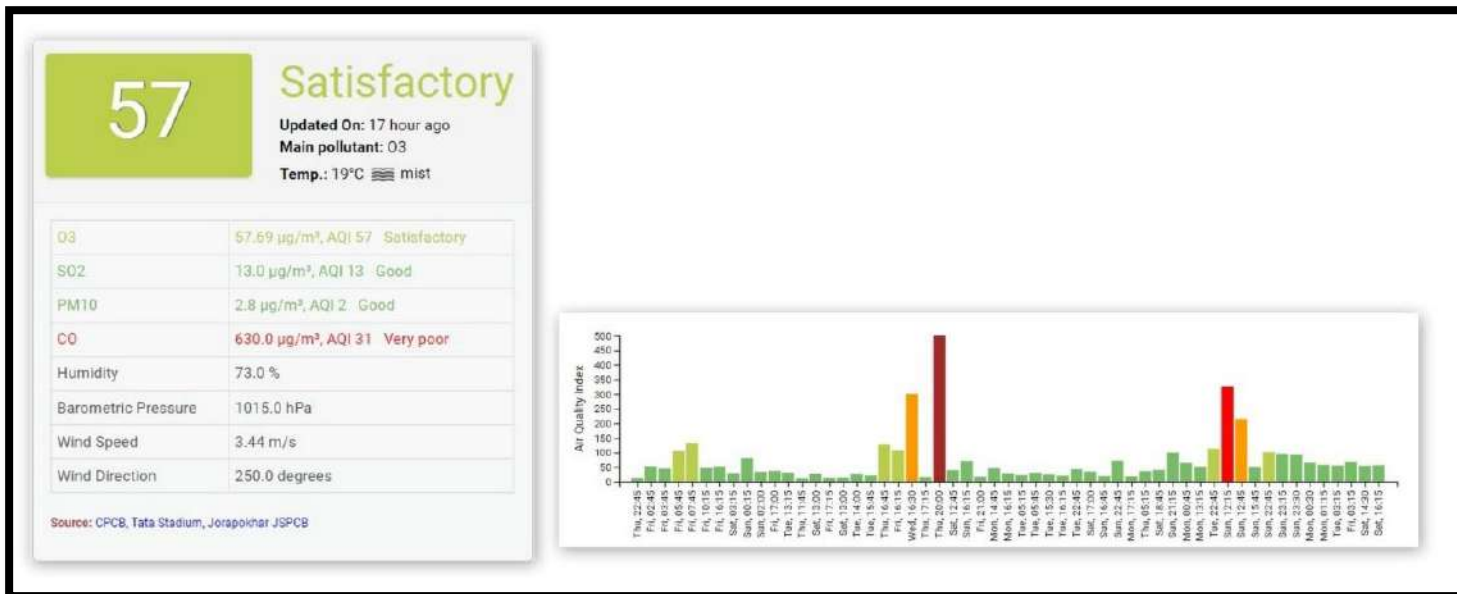


Plate 9: Air quality Index, Belghoria

RECOMMENDATION:

- All out effort needs to be taken to maintain an improved serenity of the classrooms to its highest level.
- Provision of water purifiers needs to be extended to some other departments also. Some more water purifiers to be installed near the College Canteen and near the College gate.
- To ensure that every department has its own waste bin and look after its proper maintenance and disposal.
- Extra care to be given to improve facilities of Girls’ common room. To ensure especially girls’ sanitary hygiene.
- Solar energy may be linked to the main electricity lines for alternating green energy with conventional energy to use its fullest capacity.
- College has a good stretch of open area adjacent to the playground; afforestation activities may be further strengthened.
- For more and more students’ participation in environmental management and conservation practices, awareness campaign, interactive classes and courses may be made a routine practice involving both the teaching and non-teaching members of the College. Neighbourhood participation may also be encouraged, occasionally.

CONCLUSION:

Environment is comprised of physical, biological and cultural elements. Lack of understanding of the interrelationships may be detrimental for environmental health. Anthropocentric approach taking care of all the non-living and living elements is necessary through nurturing, maintenance for the improvement of environmental quality in an institution. Bhairab Ganguly College as a premier educational institution of the state have taken this important task of environmental auditing to attain the objective of protecting environmental health of the institution. Departmental data as well physical, infrastructural and biodiversity data have been prepared and analysed to fulfil this objective.

**ENERGY AUDIT REPORT
BHAIRAB GANGULY COLLEGE**

2020 -2021

BHAIRAB GANGULY COLLEGE



(Government Sponsored)
A Accredited Institute by NAAC
Belgharia, Kolkata-700 056
Phone : (033) 2553 2280 / (033) 2564 3191
E-mail : bhairab1968@gmail.com
Website : www.bhairabgangulycollege.ac.in

Ref. No. _____

Date _____

Acknowledgement

Happy to go through the comprehensive report prepared by the Environmental Audit Committee members. Every detail of the various aspects of the environment has been taken into consideration. Methodical data collection, cartographic presentation and their interpretation have made this a valuable document to be useful for future assessment and quality up gradation of environmental management issues.

I wish to convey my heartfelt thanks to the external as well as internal members of the Environmental Audit Committee for their relentless efforts to complete this elaborate report within a short period of time.


Dr. Subhranil Som
Principal

Principal
BHAIRAB GANGULY COLLEGE
Belgharia, Kolkata-56

ENERGY AUDIT COMMITTEE

Internal Members:

- Dr. Ajit Kumar Sil, Convener, Energy Audit Committee, Associate Professor, Department of Geography.
- Dr. Ushri Roy, Assistant Professor, Department of Botany.
- Sri Pritam Roy, Assistant Professor, Department of Botany.
- Dr. Saurav Shome, Assistant Professor, Department of Zoology.
- Sri Suhel Sen, Guest Faculty, Department of Geography.

External Members:

- Prof. (Dr.) Debaprasad Bandyopadhyay, ISI, Kolkata (Retired), Saint Petersburg State University, Distinguished Member Collaborator, La Filologica Por La Causa(USA/Mexico)
- Dr. Ashok Kumar Mallick, Director-Professor and Head, Department of MCH, All India Institute of Hygiene and Public Health (Govt. of India).

Support Staff:

- Sukanta Roy, Lab Technician, Department of Zoology.
- Joy Ghosh, Lab Technician, Department of Botany.

Student Members (Post Graduate Scholars):

- Anirban Saha.
- Shalini Bose.
- Indrani Sarkar.
- Supriya Das.
- Mouli Mukherjee.

PREFACE

Energy assessment, from time to time is necessary for understanding the status of energy use whether conforming the objective of energy savings and environmental quality maintenance. This is intended to increase awareness among students and staff fraternity and also to encourage energy saving in the campus and at home.

At the initiative of the IQAC of the college, a committee for environmental auditing was set up with internal members comprised of teachers, scholarly associated with research and teaching on different aspects of environment including sustainable energy use, technicians as support staff and post-graduate students studying environmental geography as their specialization. The external members are renowned educationists and have expertise in related fields. The report is partly based on field work and partly on data obtained through questionnaire supplied to the stakeholders in various departments of the college.

The team acknowledges the whole-hearted support of the Principal, Dr. Subhranil Som without whose initiative and encouragement this could not have been so smoothly done.

The way the IQAC Co-coordinator Dr. Dhananjay Halder has been with us since the beginning deserves thanks and special mention.

Thanks are due to all teachers who have timely returned the questionnaire duly filled in.

Debaprasad Bandyopadhyay

Prof. (Dr.) Debaprasad Bandyopadhyay
ISI, Kolkata (Retired), Saint Petersburg
State University, Distinguished Member
Collaborator, La Filologica Por La Cousa
(USA/Mexico)

A.K. Mallick

Dr. Ashok Kumar Mallick,
Director-Professor and Head,
Department of MCH,
All India Institute of Hygiene and
Public Health (Govt. of India).

A.S.

Dr. Ajit Kumar Sil, Convener,
Environmental Audit Committee,
Associate Professor,
Department of Geography.

Dr. Debaprasad Bandyopadhyay
Linguistic Research Unit
INDIAN STATISTICAL INSTITUTE
203, B. T. Road, Kolkata - 700 108

Dr. Ashok K. Mallick
MBBS, MD
निदेशक-प्रोफेसर व विभागाध्यक्ष
Director-Professor, & HOD
संस्कृत एवं विश्व स्वास्थ्य विभाग
Deptt. of M.C.H.
AIH & PH, 110, C. R. Avenue
कोलकाता Kolkata-700073



INTERNAL ENERGY AUDIT COMMITTEE MEMBERS (STAFF)

Ushri Roy

Dr. Ushri Roy,
Assistant Professor,
Department of Botany.

Saurav Shome

Dr. Saurav Shome,
Assistant Professor,
Department of Zoology

Pritam Roy

Sri Pritam Roy,
Assistant Professor,
Department of Botany

Suhel Sen.

Sri Suhel Sen,
Guest Faculty,
Department of Geography

J. Ghosh.

Joy Ghosh,
Lab Technician,
Department of Botany.

Sukanta Roy

Sukanta Roy,
Lab Technician,
Department of Zoology.



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INTRODUCTION:

In the 21st century, environment management including energy use has turned out to be a key issue of concern. Environmental audit is a strategy which can be adopted for the proper maintenance and conservation of the energy. It is a process by which a scientific and systematic identification, recording, reporting, quantification and analysis of several environmental parameters including energy are carried out. The main goal of performing an energy audit is analysis of energy use related practices in the area taken for study. The present study consists of the energy audit report of Bhairab Ganguly College of Belgharia in Kolkata.

OBJECTIVES:

The main objective of the study is to:

- To prepare a GIS map of the college.
- To understand the scenario of energy use and sustainability of energy management in the college.
- To gather contemporary knowledge about the current scenario of energy use in the college.

METHODOLOGY:

In order to accomplish the task, data was collected from various departments of the college through primary survey. Physical inspection of the campus was carried out to have an insight into the energy use of the campus. All data collected were tabulated, analysed and interpreted to arrive at the final results.

The entire methodology of the work was divided into three stages- Pre field, Fieldwork and Post field. During the pre-field phase, literature review and preparation of audit design was done. During the fieldwork, primary data on several energy aspects were collected from various departments of the college. Field photographs were also taken during this phase. The post-field phase involved documentation, tabulation, graphical representation, analysis and interpretation of the data.

About the College:

Bhairab Ganguly College is an esteemed academic institution situated at the northern fringe of Kolkata metropolis of West Bengal. The college is located at the core of Kamarhati Municipal area with Barrackpore Trunk Road in the west. The college was established on 3rd September 1968, under the initiative of late JibandhanGanguly, a renowned philanthropist of Belgharia. The College is proud to possess a huge campus comprising 25 bighas of land (8.33 acres) on which three separate buildings have been erected to provide good infrastructural facilities and to ensure an ambience conducive to the pursuit of quality education. Its unique infrastructure is indeed commendable as the College has maintained an idyllic campus adorned with greenery, flower gardens, football ground, a colossal Indoor Sports Complex (TorunerSwapna), an Auditorium equipped with the state-of-the-art acoustics system (Alapan), Meteorological Observatory, A History Museum (Heritage), Open Air Theatre (Mukto Mon), Medicinal Garden (NiramoyNikunja), Rain Water Harvesting Scheme (MeghKalas), Butterfly garden, a well-equipped College Gymnasium, new College Canteen, Girls' and Boys' Common Room etc.

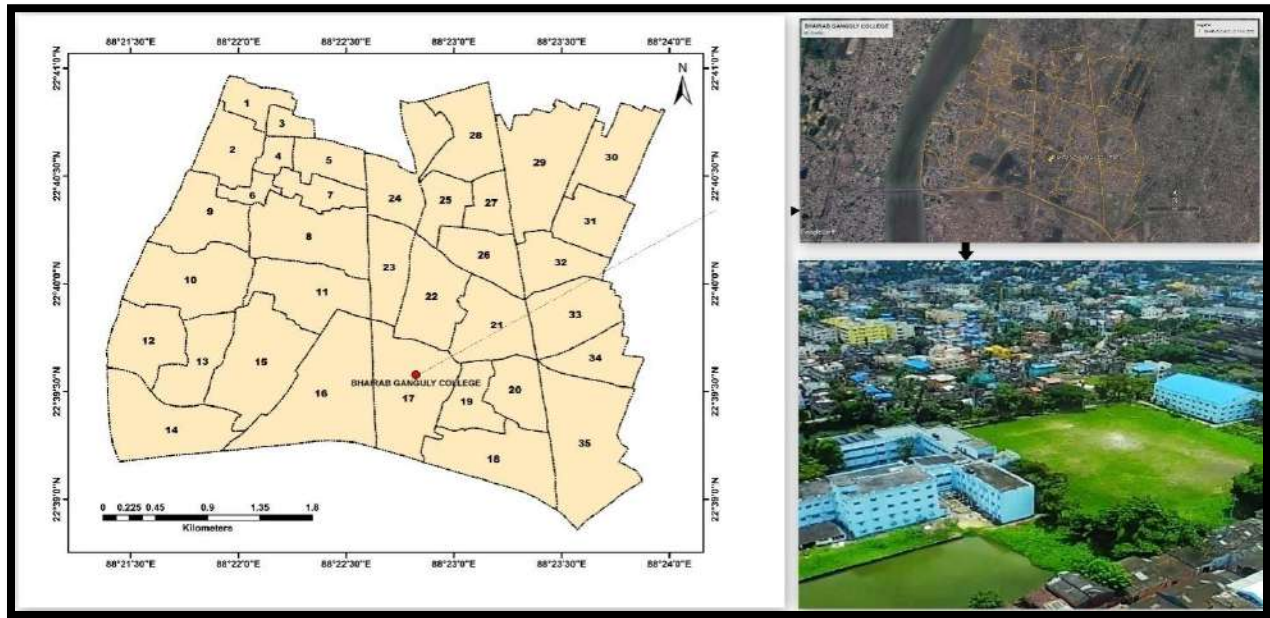


Figure 1: LOCATION MAP OF THE COLLEGE

DATA ANALYSIS AND MAJOR FINDINGS:

1. ENERGY MANAGEMENT:

1.1 Wise use of electricity:

All the departments are very well aware of current status of tubes in their respective rooms. Since too much use of tube lights need more electricity, use of LED lights have become very popular. LED lights help in energy conservation. Out of 20 departments, 45% are having the availability of the LED lights, whereas 55% still use conventional tubes and bulbs. Initiatives have been taken by those departments for installation of LED lights and is under process.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>LED (%)</u>	<u>CONVENTIONAL LIGHTS(%)</u>
20	Provision of LEDs	45	55

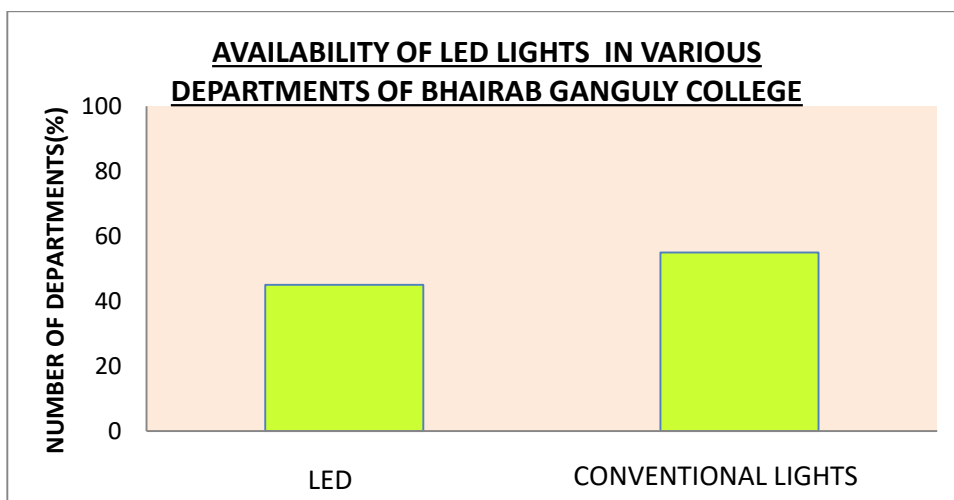


Figure 2: AVAILABILITY OF LED LIGHTS IN VARIOUS DEPARTMENTS OF BHAIKAB GANGULY COLLEGE

1.2 Number of A/C:

The data collected from 20 departments exhibit that 55% are having the availability of A/C whereas 45% are not having any A/C. However, use of A/C in all seasons is not at all encouraged. A/C s are switched on for longer hours only during the very hot and sultry summer months. However, students are advised to switch off the A/C before leaving the class. College is very well aware of the harmful effect of A/C on the environment as it acts as the main source of Chlorofluorocarbon which is an Ozone Depleting Substance (ODS) and hence always encourages the judicious use of A/C.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Presence of A/C	55	45

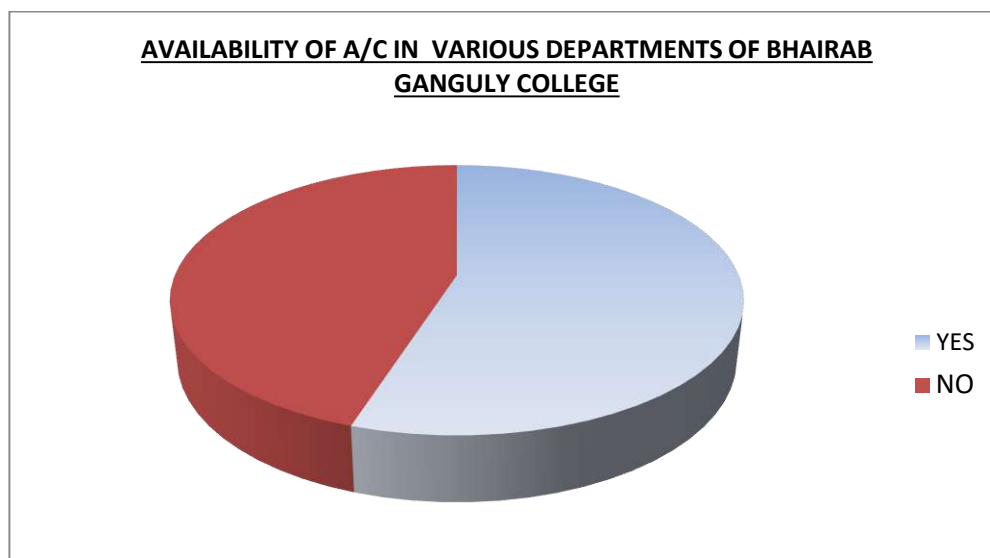


Figure 3: AVAILABILITY OF A/C IN VARIOUS DEPARTMENTS OF BHAIKAB GANGULY COLLEGE

1.3 Number of LCD Projector:

LCD projector makes the learning process very easy for the students. It gives them a visual representation of the topic they are studying. As per the data collected from 20 departments shows that 40% are having the availability of LCD Projector, whereas 60% do not have any LCD projector. Initiatives have been taken by those departments for installation of LCD Projector and is under process.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	LCD projector	40	60

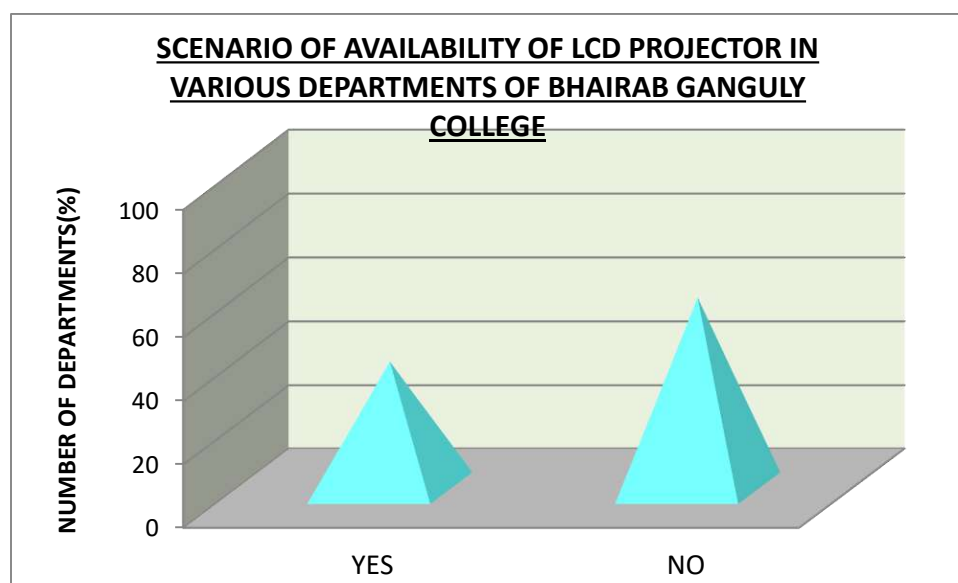


Figure 4: SCENARIO OF AVAILABILITY OF LCD PROJECTOR IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

1.4 Number of Photocopier:

In modern education, photocopier or Xerox machines has become a part and parcel of student life. College teachers often use this machine to make a copy of the notes from the book and give it to the students so that they can get their study material. Thus, presence of a photocopier machine in every department is very essential. Out of 20 departments 35% are having the availability of Photocopier whereas, 65% do not have any Photocopier and they depend upon the photocopier machine available centrally.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NOT APPLICABLE (%)</u>
20	Presence of photocopier	35	65

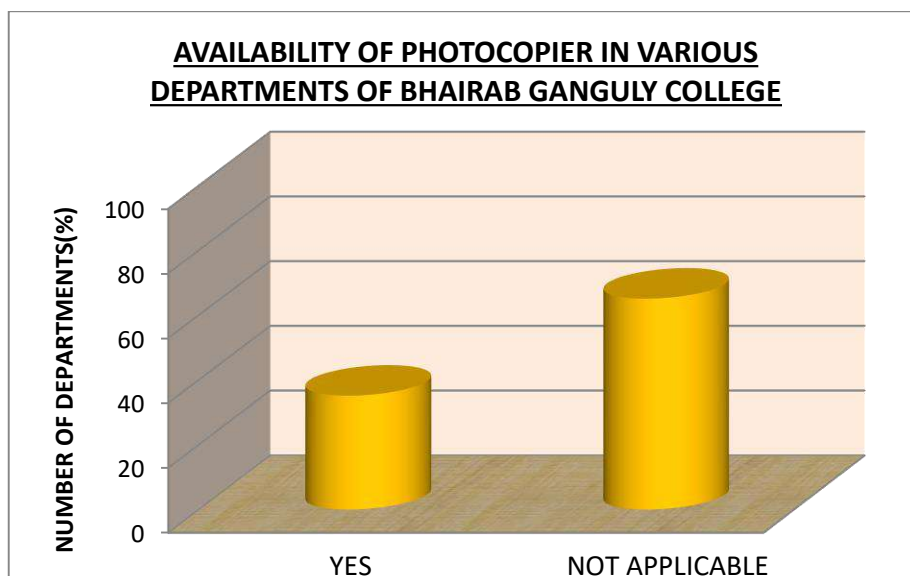


Figure 5: AVAILABILITY OF PHOTOCOPIER IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

1.5 Computers and Printers:

Computers and printers have become essential tools in our daily lives. Computers along with internet connections help the students to connect them with the outside world. Out of 20 departments, 70% are having the availability of the computers and printers, whereas 30% are lacking behind from the availability of the computers and printers and rely on the computer and printer machine available centrally.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Presence of computers and printers	70	30

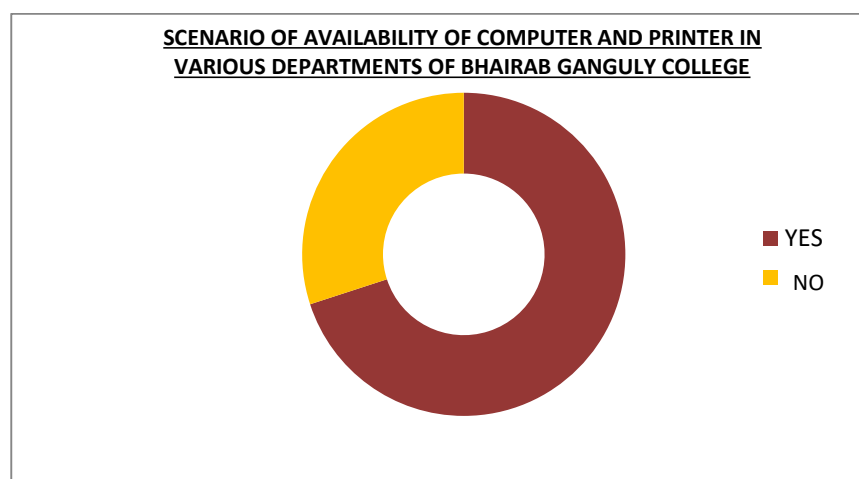


Figure 6: SCENARIO OF AVAILABILITY OF COMPUTER AND PRINTER IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

1.6. Use of Non-conventional energy:

Out of 20 departments, 10% are having the facility of non-conventional energy whereas 90% do not have the facility of non-conventional energy. Departments which do not have non-conventional energy sources are undertaking steps to install this technique in the upcoming years. These departments have advised their students to turn off the lights and fans before leaving the class. The non-teaching staff of all the departments also keep a vigilant watch in this issue and thus they all together are undertaking energy conservation strategies.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Use of non-conventional sources of energy	10	90

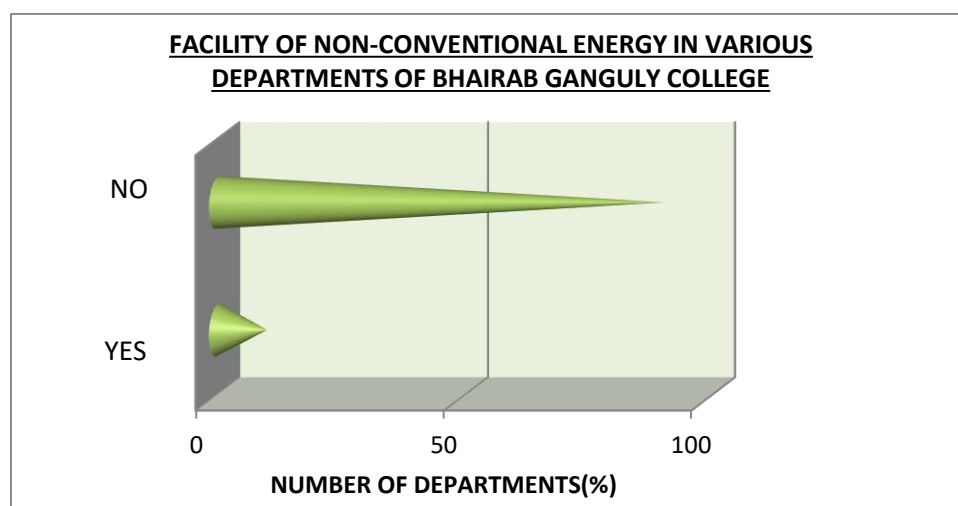


Figure 7: FACILITY OF NON-CONVENTIONAL ENERGY IN VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

1.7 Energy management practices:

Energy management is a strategy which helps in sustainable use of energy sources. Bhairab Ganguly college always pays special attention in energy management which is manifested in the initiative of replacing tube lights with energy conserving LEDs. Students are advised to switch off lights and fans before leaving the class room. Special attention is given by those departments who are having A/C. Strict watch is kept on the issue that the power button of the A/C is properly turned off. In case of any electrical fault, it is immediately repaired. Teachers and NTS staff of the respective departments are highly concerned about the issue. All office staff also practice this policy and switch of the lights, fans, AC and computer machines policy properly before leaving the college and thus ensure no wastage of electric power.

SOLAR POWER SYSTEM, AN ECO-FRIENDLY INFRASTRUCTURE:

Solar Power System for Green Energy:

The Photovoltaic cells have been installed on the rooftop. This non-conventional green energy saves fossil fuel based electricity to an extent.



Plate 1: Solar power system for Green Energy

RECOMMENDATION:

- The first and most important effort that has to be taken is to save as much energy as possible.
- Solar energy may be linked to the main electricity lines for alternating green energy with conventional energy to use its fullest capacity.
- To shift to the use of alternative energy with the objective of saving fossil fuel.
- To encourage the stakeholders to use tools and technology to minimize wastage of energy.
- To encourage the use of fuel-efficient bulbs for energy conservation.

CONCLUSION:

Environment is comprised of physical, biological and cultural elements of which energy is an important part. Lack of understanding of the interrelationships may be detrimental for environmental health and will also act as an obstacle in sustainable use of energy. Bhairab Ganguly College as a premier educational institution of the state have taken this important task of energy auditing to attain the objective of sustainable utilization of energy in the institution. Departmental data have been prepared and analysed to fulfil this objective.

**GREEN AUDIT REPORT
BHAIRAB GANGULY COLLEGE**

2020 -2021

BHAIRAB GANGULY COLLEGE



(Government Sponsored)
'A' Accredited Institute by NAAC
Belgharia, Kolkata-700 056
Phone : (033) 2553 2280 - (033) 2564 3191
E-mail : bhairab1968@gmail.com
Website : www.bhairabgangulycollege.ac.in

Ref. No. _____

Date _____

Acknowledgement

Happy to go through the comprehensive report prepared by the Environmental Audit Committee members. Every detail of the various aspects of the environment has been taken into consideration. Methodical data collection, cartographic presentation and their interpretation have made this a valuable document to be useful for future assessment and quality up gradation of environmental management issues.

I wish to convey my heartfelt thanks to the external as well as internal members of the Environmental Audit Committee for their relentless efforts to complete this elaborate report within a short period of time.

Dr. Subhranil Som
Principal

Principal
BHAIRAB GANGULY COLLEGE
Belgharia, Kolkata-56

GREEN AUDIT COMMITTEE

Internal Members:

- Dr. Ajit Kumar Sil, Convener, Green Audit Committee, Associate Professor, Department of Geography.
- Dr. Ushri Roy, Assistant Professor, Department of Botany.
- Sri Pritam Roy, Assistant Professor, Department of Botany.
- Dr. Saurav Shome, Assistant Professor, Department of Zoology.
- Sri Suhel Sen, Guest Faculty, Department of Geography.

External Members:

- Prof. (Dr.) Debaprasad Bandyopadhyay, ISI, Kolkata (Retired), Saint Petersburg State University, Distinguished Member Collaborator, La Filologica Por La Cousa(USA/Mexico)
- Dr. Ashok Kumar Mallick, Director-Professor and Head, Department of MCH, All India Institute of Hygiene and Public Health (Govt. of India).

Support Staff:

- Sukanta Roy, Lab Technician, Department of Zoology.
- Joy Ghosh, Lab Technician, Department of Botany.

Student Members (Post Graduate Scholars):

- Anirban Saha.
- Shalini Bose.
- Indrani Sarkar.
- Supriya Das.
- Mouli Mukherjee.

Green assessment, from time to time is necessary for understanding the quality of environment existing in the institution. The objective of such assessment is firstly, to know present status of vegetation cover; secondly, to make it sure that there is enough green in the campus, thirdly, the current status of floral and faunal diversities within the terrestrial and aquatic spaces of the college campus, finally, to increase awareness among students and staff fraternity and also to encourage nature learning from the campus.

At the initiative of the IQAC of the college, a committee for green auditing was set up with internal members comprised of teachers, scholarly associated with research and teaching on different aspects of environment, technicians as support staff and post-graduate students studying environmental geography as their specialization. The external members are renowned educationists and have expertise in related fields. The report is partly based on field work and partly on data obtained through questionnaire supplied to the stakeholders in various departments of the college.

The team acknowledges the whole-hearted support of the Principal, Dr. Subhranil Som without whose initiative and encouragement this could not have been so smoothly done.

The way the IQAC Co-coordinator Dr. Dhananjay Halder has been with us since the beginning deserves thanks and special mention.

Thanks are due to all teachers who have timely returned the questionnaire duly filled in.

Debasan Bandyopadhyay

Prof. (Dr.) Debaprasad Bandyopadhyay
ISI, Kolkata (Retired), Saint Petersburg
State University, Distinguished Member
Collaborator, La Filologica Por La Causa
(USA/Mexico)

A.K. Mallick

Dr. Ashok Kumar Mallick,
Director-Professor and Head,
Department of MCH,
All India Institute of Hygiene and
Public Health (Govt. of India).

A.S.

Dr. Ajit Kumar Sil, Convener,
Environmental Audit Committee,
Associate Professor,
Department of Geography.

Dr. Debaprasad Bandyopadhyay
Linguistic Research Unit
INDIAN STATISTICAL INSTITUTE
203, B. T. Road, Kolkata - 700 108

Dr. Ashok K. Mallick
MBBS, MD
Director-Professor, & HOD
Deptt. of M.C.H.
AIH & PH, 110, C. R. Avenue
Kolkata-700073



INTERNAL GREEN AUDIT COMMITTEE MEMBERS (STAFF)

Ushri Roy

Dr. Ushri Roy,
Assistant Professor,
Department of Botany.

Saurav Shome

Dr. Saurav Shome,
Assistant Professor,
Department of Zoology

Pritam Roy

Sri Pritam Roy,
Assistant Professor,
Department of Botany

Suhel Sen

Sri Suhel Sen,
Guest Faculty,
Department of Geography

Joy Ghosh

Joy Ghosh,
Lab Technician,
Department of Botany.

Sukanta Roy

Sukanta Roy,
Lab Technician,
Department of Zoology.



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INTRODUCTION:

In the 21st century, green management has turned out to be a key issue of concern. Green audit is a strategy which can be adopted for the proper maintenance and conservation of the environment. It is a process by which a scientific and systematic identification, recording, reporting, quantification and analysis of several biodiversity parameters are carried out. The main goal of performing an green audit is analysis of biodiversity related practices in the area taken for study. The present study consists of the green audit report of Bhairab Ganguly College of Belgharia in Kolkata.

OBJECTIVES:

The main objective of the study is to:

- To prepare a GIS map of the college.
- To understand the scenario of distribution of flora and fauna and degree of implementation of Green Agenda in syllabus of the college.
- To prepare a document of the floral and faunal diversity of the college.
- To gather contemporary knowledge about the current vegetation scenario of the college.

METHODOLOGY:

In order to accomplish the task, data was collected from various departments of the college through primary survey. Physical inspection of the campus was carried out to have an insight into the biodiversity of the campus. All data collected were tabulated, analysed and interpreted to arrive at the final results.

The entire methodology of the work was divided into three stages- Pre field, Fieldwork and Post field. During the pre-field phase, literature review and preparation of audit design was done. During the field-work, primary data on several biodiversity aspects especially on plant nurturing were collected from various departments of the college. Field photographs were also taken during this phase. The post-field phase involved documentation, tabulation, graphical representation, analysis and interpretation of the data.

About the College:

Bhairab Ganguly College is an esteemed academic institution situated at the northern fringe of Kolkata metropolis of West Bengal. The college is located at the core of Kamarhati Municipal area with Barrackpore Trunk Road in the west. The college was established on 3rd September 1968, under the initiative of late Jibandhan Ganguly, a renowned philanthropist of Belgharia. The College is proud to possess a huge campus comprising 25 bighas of land (8.33 acres) on which three separate buildings have been erected to provide good infrastructural facilities and to ensure an ambience conducive to the pursuit of quality education. Its unique infrastructure is indeed commendable as the College has maintained an idyllic campus adorned with greenery, flower gardens, football ground, a colossal Indoor Sports Complex (TorunerSwapna), an Auditorium equipped with the state-of-the-art acoustics system (Alapan), Meteorological Observatory, A History Museum (Heritage), Open Air Theatre (Mukto Mon), Medicinal Garden (NiramoyNikunja), Rain Water Harvesting Scheme (MeghKalas), Butterfly garden, a well-equipped College Gymnasium, new College Canteen, Girls' and Boys' Common Room etc.

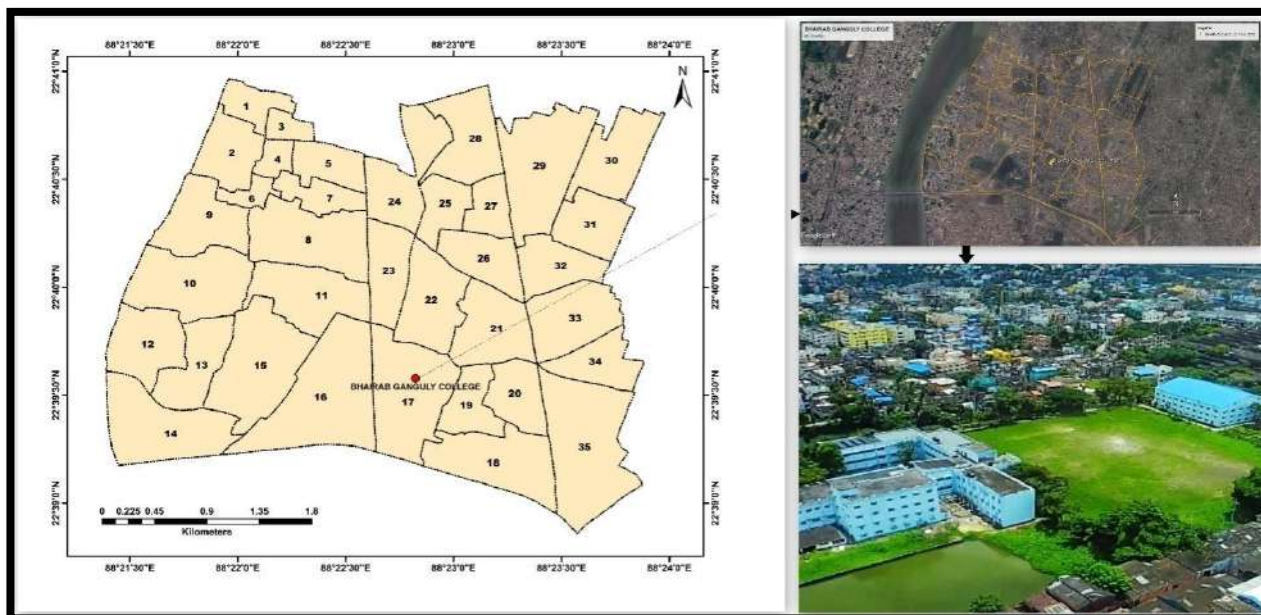


Figure 1: LOCATION MAP OF THE COLLEGE

DATA ANALYSIS AND MAJOR FINDINGS:

1. GREEN AGENDA IN SYLLABUS:

1.1. Introduction of Environmental Education in Syllabus:

Introduction of environmental education in syllabus helps the students to become aware about several issues of the environment and also helps them in understanding the value of Environmental Ethics. Out of 20 departments, 80% of departments surveyed have introduced environmental education in their syllabus while 20% of the departments surveyed have not yet introduced environmental education in the syllabus.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Environmental education in syllabus	80	20

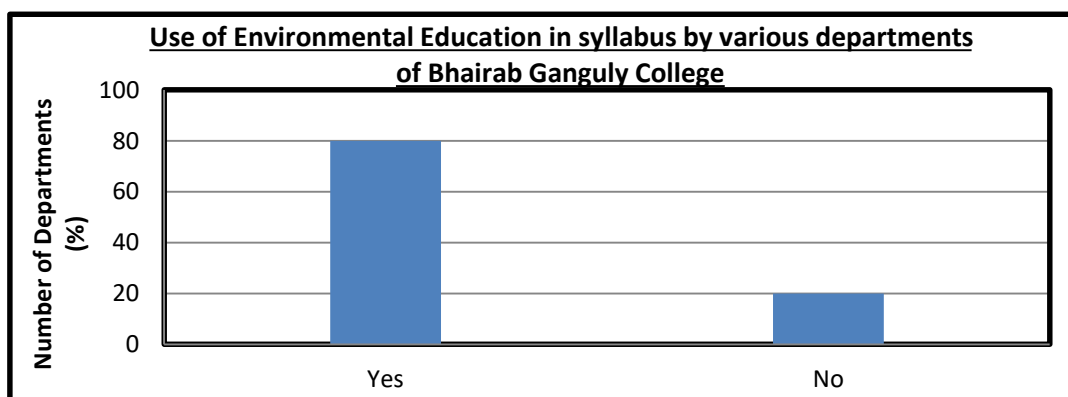


Figure 2: USE OF ENVIRONMENTAL EDUCATION IN SYLLABUS BY VARIOUS DEPARTMENTS OF BHAIRABGANGULYCOLLEGE

1.2. Conduction of Green Research by various Departments of Bhairab Ganguly College:

Green research initiatives help the students to conduct research in the lap of nature which in turn provides them in proper understanding different issues and aspects of the environment. Out of 20 departments, 15% of departments surveyed conduct green research activities while 85% of departments surveyed do not conduct such research programs, but have future plans.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Conduction of Green Research	15	85

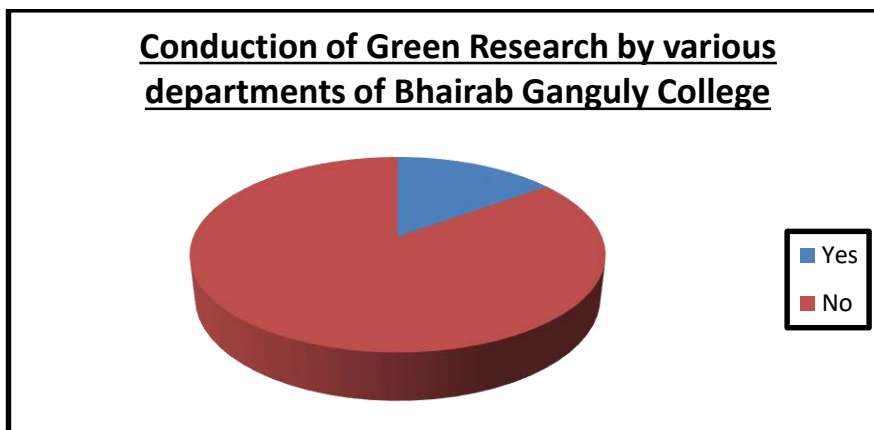


Figure 3: CONDUCTION OF GREEN RESEARCH BY VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

1.3. Nature of active participation in Environmental Conservation Programmes by different Departments of Bhairab Ganguly College:

There is a Green club in the college named as ‘BGC Nature Club’ to spread awareness among the staff members and students by the activities related to environmental conservation. Most of the departments (75%) are aware of the necessity to participate in environment related programmes.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Nature of active participation	75	25

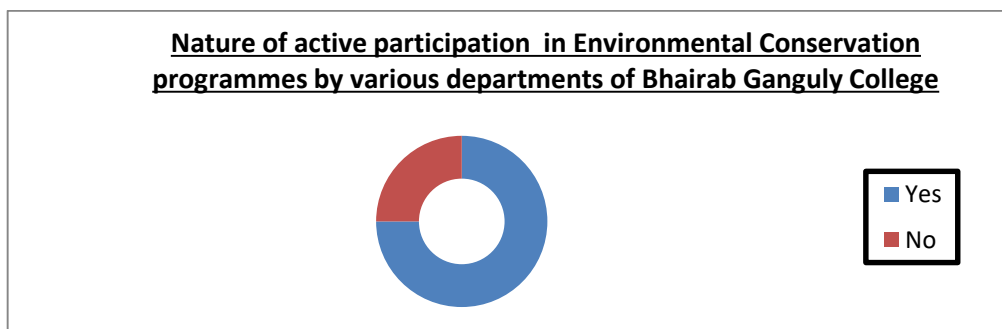


FIGURE 4: NATURE OF ACTIVE PARTICIPATION IN ENVIRONMENTAL CONSERVATION PROGRAMMES BY VARIOUS DEPARTMENTS OF BHAIRAB GANGULY COLLEGE

1.4. Use of animals in different experiments:

Use of animals in different experiments is not encouraged. Out of 20 departments, 15% of departments surveyed use animals in different experiments while 85% of departments surveyed do not use animals in different experiments.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Use of animals in different experiments	15	85

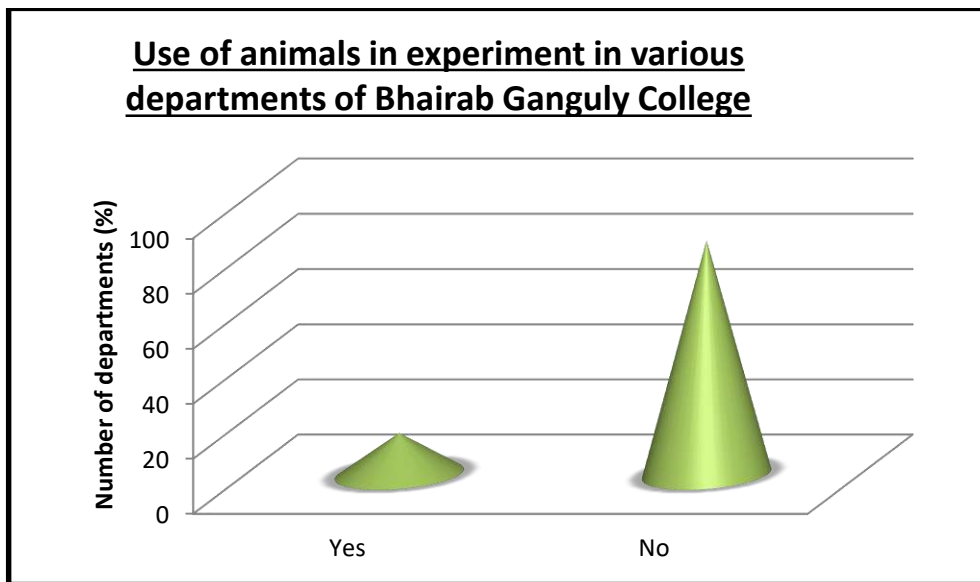


Figure 5: USE OF ANIMALS IN EXPERIMENT IN VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

1.5. Existence of Ethics Committee in various departments of Bhairab Ganguly College:

Ethics Committee on environment is a committee that makes people aware of the value of each and every living organism within the biodiversity. Out of 20 departments, 15% of departments surveyed have their own Departmental Ethics Committee (DEC) while 85% of departments are concerned with Central Ethics Committee (CEC).

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>DEC (%)</u>	<u>CEC (%)</u>
20	Existence of Ethics Committee	15	85

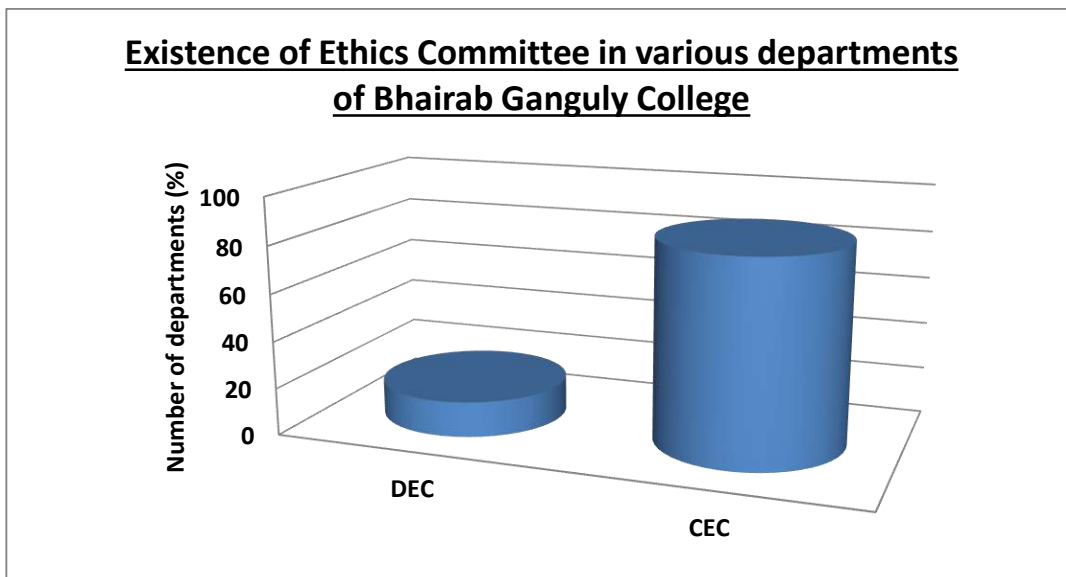


Figure 6: EXISTENCE OF ETHICS COMMITTEE IN VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

1.6. Environmental Extensions in various departments of Bhairab Ganguly College:

Environmental extension programs also make the students aware of several aspects of the environment. Out of 20 departments, 30% of the departments surveyed have environmental extension programs while the 70% of the departments surveyed do not have such environmental extension programs, but have future plans.

<u>TOTAL DEPARTMENTS</u>	<u>PARAMETER</u>	<u>YES (%)</u>	<u>NO (%)</u>
20	Environmental extensions	30	70

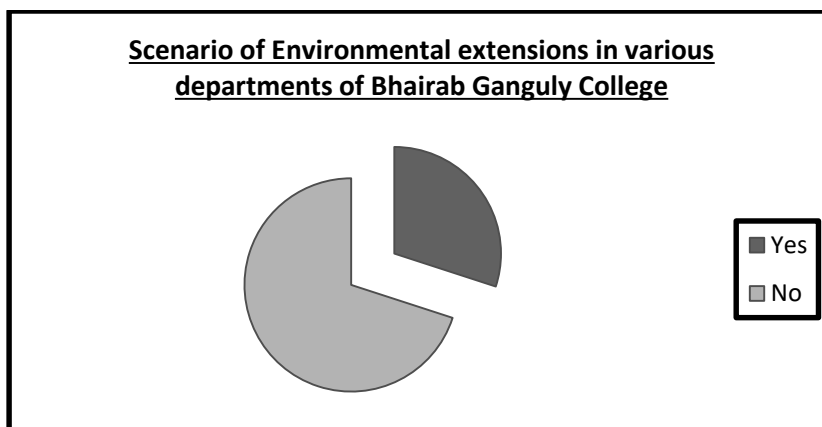


Figure 39: SCENARIO OF ENVIRONMENTAL EXTENSIONS IN VARIOUS DEPARTMENTS OF BHAIRABGANGULY COLLEGE

2. BIODIVERSITY IN BHAIRAB GANGULY COLLEGE:

2.1. Distribution of different Plant types in Bhairab Ganguly College:

Bhairab Ganguly College campus is enriched with several plant types. Through the environmental audit, about 82 plant types were identified. Out of those 82 plant types, 24 are medicinal plants that account for about 29% of the identified types, 43 are other plants accounting for about 53% of the identified types and 15 are flowering plants accounting for about 18% of the identified types.

Total plant	Medicinal plants	Percentage	Other Plants	Percentage	Plants in the flower garden	Percentage
82	24	29	43	53	15	18

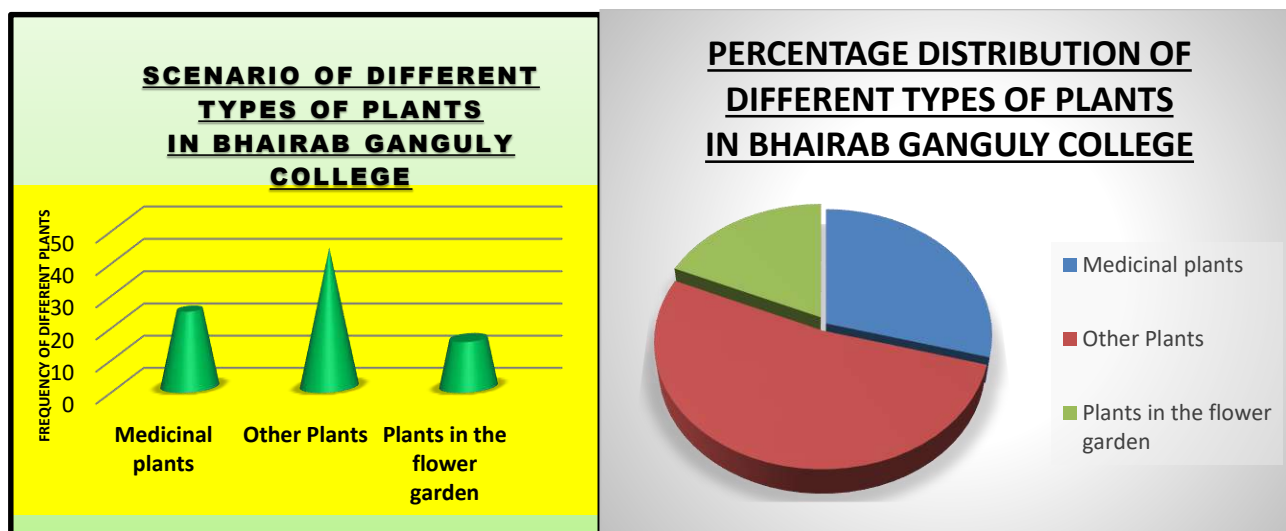


Figure 7: SCENARIO AND PERCENTAGE DISTRIBUTION OF DIFFERENT TYPES OF PLANTS IN BHAIRAB GANGULY COLLEGE

2.2. Distribution of different freshwater aquatic arthropods in the pond of Bhairab Ganguly College:

The pond of Bhairab Ganguly College is enriched with life. Through the survey, about 25 types of aquatic arthropods were identified. Out of 25 arthropods, 4 are abundant accounting for about 16% of total, 13 are common accounting for about 52% of total, 6 belong to the uncommon category accounting for about 24% of total and 2 are rare accounting for about 8% of total.

TOTAL	Abundant	PERCENTAGE	Common	PERCENTAGE	Uncommon	PERCENTAGE	Rare	PERCENTAGE
25	4	16	13	52	6	24	2	8

**DIVERSITY OF FRESHWATER
AQUATIC ARTHROPODS IN THE
POND OF BHAIRAB GANGULY
COLLEGE**

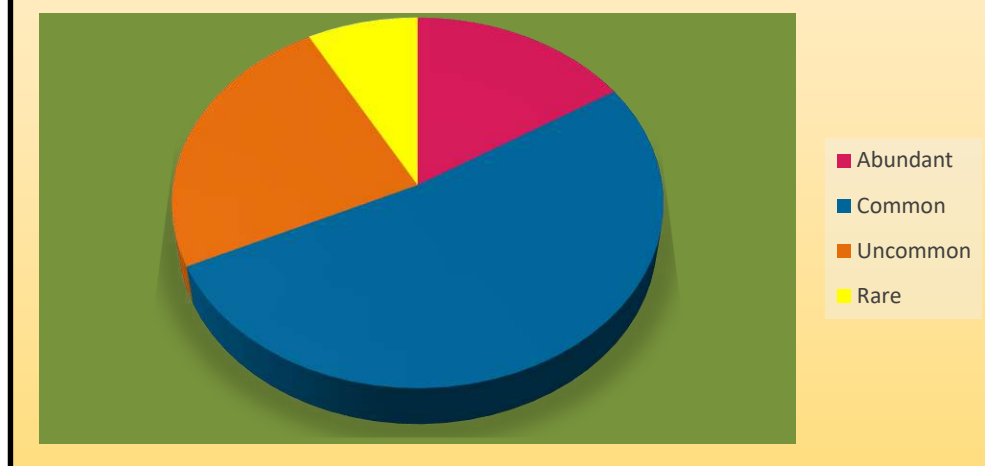


Figure 8: Diversity of freshwater aquatic arthropods in the pond of Bhairab Ganguly College

2.3. Number of plant species in Bhairab Ganguly College Campus:

Bhairab Ganguly College premises having about 10 acres of land have unique plant diversities. These include flowering plants, leafy trees, medicinal herbs and innumerable wild bushes. There are valuable trees like Mahogany, Ashok, Arjun, Jarul, Siris, Akashmoni Neem, Karabi, Bokul, Radhachura, Deodar, Basant bahar and decorative plants like Royal Palm, Christmas tree, Bottle brush etc. There are 45 types of trees and the highest number of the types of trees (37) are found within the species range of up to 10 i.e. within the lowest class range and only 1 type of tree has species number above 40 i.e. within the highest class range. There are 3 types of trees within the range of 10 to 20 trees, 2 types are within 20 to 30 species range and another 2 tree types are within 30 to 40 range. There are about 82% of the trees which have lower number of plant species (upto 10) i.e. 18% of the trees belong to the remaining species ranges. Besides, the campus is very green with a standard football ground surrounded by trees of different sizes and the roadside is also beautified by the plantations of a variety of decorative and indigenous species of trees.

<u>Local name of the plants</u>		<u>Scientific name of the plants</u>	<u>Family of the plants</u>	<u>No of plant species</u>	<u>Location</u>
1	Mini Togor	<u><i>Tabernaemontana divericata</i></u>	Apocyanaceae	60	Side of the Auditorium, side of the butterfly garden
2	Mohagini	<u><i>Swietenia sp</i></u>	Meliaceae	7+5=12	East side of the playground in first row: Row A and southern part of the playground
3	Asokha	<u><i>Saraca asoca</i></u>	Papilionaceae	3+1=4	East side of the playground in first row: Row A
4	Arjuna	<u><i>Terminalia arjuna</i></u>	Combretaceae	27+3=30	Northern par of swimming pool, two side of the road around the playground, and also
5	Rakto Kanchan	<u><i>Bauhinia veriegata</i></u>	Fabaceae	2+4=6	East side of the playground in first row: RowA. And near the student union
6	Jarul	<u><i>Lagestroemia speciosa</i></u>	Lathyraceae	19+17 =36	Three side of the road around play ground
7	Kanthal	<u><i>Atrocarpus heterophyllus</i></u>	Moraceae	1+1=2	East side of the playground in first row: Row A and Near the staff quater
8	Amloki	<u><i>Phyllanthus emblica</i></u>	Phyllanthaceae	3	East side of the playground in first row: Row A
9	Segun	<u><i>Tectona grandis</i></u>	Verbinaceae	1	East side of the playground in first row: Row A
10	Simul	<u><i>Bombox. sp</i></u>	Malvaceae	4	side of the road around the playground (north and east side)
11	Kadam	<u><i>Neolamarckia cadamba</i></u>	Rubiaceae	6+1=7	At the corner of the play ground North side and in west South, and side of the playground.
12	Siris	<u><i>Albizia julibrissin, A. lebbeck</i></u>	Fabaceae	4+1=5	Opposite side of the auditorium gate and

					southern part of the playground Opposite to pond building side
13	Akashmoni	<u>Acacia auriculiformis</u>	Caesalpinaceae	3+1 +1=5	Opposite side of the auditorium gate and southern and south- west part of the playground, near the entry gate
14	Jam	<u>Syzygium cumini</u>	Myrtaceae	1	North west corner of the playground
15	Karabi	<u>Nerium oleander</u>	Apocyanaceae	1+14 =15	Side of the auditorium and near the pond side in between royal plam tree
16	Neem	<u>Azadirachta indica</u>	Meliaceae	1+1+1=3	North side and west side of the playground and Near the staff quater
17	Krishnachura	<u>Delonix regia</u>	Fabaceae	2+3=5	Opposite side of the auditorium gate and southern and south- west part of the playground And near the entrance of college .
18	Bokul	<u>Mimusops elengi</u>	Sapotaceae	2+12+1+3=18	East side of the playground in first row: Row A And south west corner of the play ground And West side of the playground near the principal ffice building
19	Not identify		Papilionaceae	20	side of the road around the playground (north and east side)
20	Not identify		Papilionaceae	7	East side of the playground in first row: Row A
21	Radhachura	<u>Peltophorum pterocarpum</u>	Fabaceae	5	West side of the playground or

					side pf the chemistry department
22	Banana tree	<u>Musa sp</u>	Musaceae	A clump of tree.	side pf the chemistry department, also present in north and west side of the swimming pool.
23	Payara/Guava	<u>Psidium guajava</u>	Myrtaceae	3+3=6	Corner of the south side of playground, near staff quater
24	Kul / Indian jujube	<u>Ziziphus mauritiana</u>	Rhamnaceae	1	South side of the play ground
25	Khajur /Date plam	<u>Phoenix dactylifera</u>	Aracaceae	1	End portion of the western side of the swimming pool
26	Castor oil plant/ Reeri	<u>Ricinus communis</u>	euphorbiaceae	Bushy clump of the tree	End portion of the western side of the swimming pool.
27	Eucalyptus	<u>Eucalyptus</u>	Myrtaceae	1	Opposite side of the auditorium gate
28	Mango	<u>Mangifera indica</u>	Anacardiaceae	5+1=6	Near the staff quater
29	Jamrul	<u>Syzygium samarangense</u>	Myrtaceae	6	Near the staff quarter fruit garden
30	Bandar lathi/Golden shower tree	<u>Cassia fistula</u>	Caesalpinaceae	7	Near the staff quarter fruit garden
31	Dumur	<u>Ficus cunica</u>	Moraceae	1	Near the staff quater
32	Bata briksha	<u>Ficus bengalensis</u>	Moraceae	1	Near the staff quater
33	Aswatha	<u>Ficus religiosa</u>	Moraceae	1	Near the staff quater
35	Debdaru	<u>Polyalthia longifolia</u>	Annonaceae	1+2+2=5	Near the staff quarter, near the entry gate
36	Batabi labu	<u>Citrus grandis</u>	Rutaceae	1	Near the staff quater
37	Sajina	<u>Moringa oleifera</u>	Morinagceae	1	Near the staff quater
38	Narikal/ Coconut	<u>Cocos nucifera</u>	Arecaceae	1	Near the staff quater
39.	Chalta	<u>Dillenia indica</u>	Dilleniaceae	1	Western side of the playground
40	Chatim	<u>Alstonia scholaris</u>	Apocynaceae	1+1=2	Western side of the playground Near the entry of

					the building opposite to sohid bedi
41	Supari	<i>Areca catechu</i>	<u>Arecaceae</u>	1	Near the entry gate of the college
41	Christmas tree	<i>Araucaria columnaris</i>	Araucariaceae	1	Near the sohid badi
42	Basanta bahar	Handroanthus sp	<u>Bignoniaceae</u>	1	Just opposite to the sohid bad
43	Royal palm	<i>Roystonea regia</i>	<u>Arecaceae</u>	16+4=20	Side of the pond and side of the 112 room
44	Bottle brush plants	Callistemon sp	Myrtaceae	1	Near the flower garden
45	Pata bahar	Codiaeum variegatum	euphorbiaceae	1	Near the student union
46	Cycus	Cycus sp	cycaceae	1	Near chatim tree
47	Rangan	Ixora sp	rubiceae		
48	Pepe	<i>Carica papaya</i>	Caricaceae	1	At southeast corner of the playground

TOTAL PLANTS	No of species	NO. OF PLANTS	PERCENTAGE
45	<10	37	82
	10 TO 20	3	7
	20 TO 30	2	5
	30 TO 40	2	4
	>40	1	2

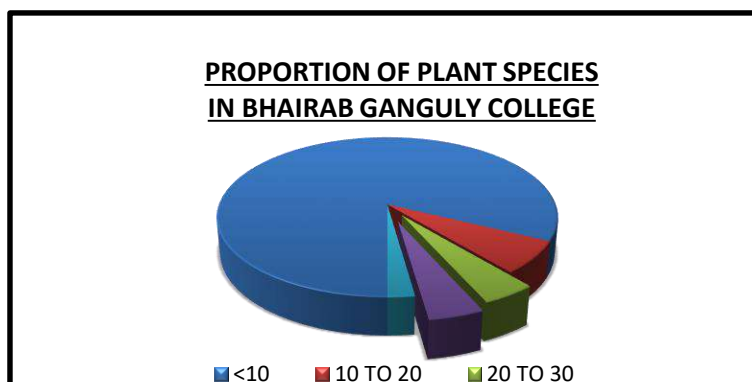


Figure 9: PROPORTION OF PLANT SPECIES IN BHAIRAB GANGULY COLLEGE

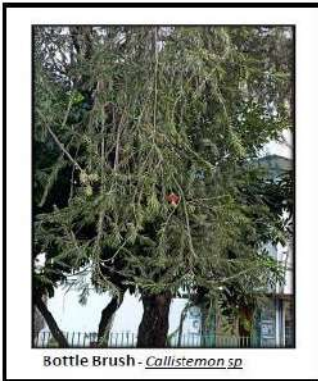
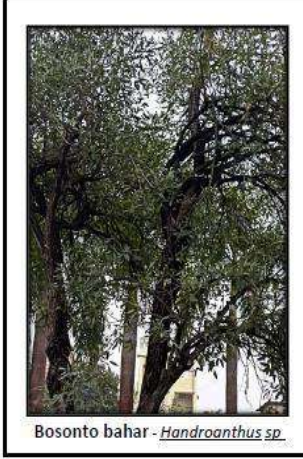


Plate 1: Plant Species in Bhairab Ganguly College

2.4. Butterfly Diversity in Bhairab Ganguly College Campus:

Bhairab Ganguly College campus possesses large scale butterfly diversity. The greenery of the college attracts a large number of species of butterflies. The survey identified 25 species of butterflies. Out of 25 species identified, 5 are abundant accounting for about 20% of the total, 11 are common accounting for about 44% of total, 6 belong to the uncommon category accounting for about 24% of total and 3 are rare accounting for about 12% of total.

SL. NO	SCIENTIFIC NAME	COMMON NAME
1.	<i>Tirumala limniace</i>	Blue Tiger
2.	<i>Mycalesis gotama</i>	Chinese Bushbrown
3.	<i>Neptis hylas</i>	Common Sailor
4.	<i>Moduza procris</i>	Commander
5.	<i>Euthalia aconthea</i>	Common Baron
6.	<i>Mycalesis perseus</i>	Common Bushbrown
7.	<i>Ariadne merione</i>	Common Castor
8.	<i>Euploea core</i>	Common Crow
9.	<i>Melanitis leda</i>	Common Evening Brown
10.	<i>Ypthima baldus</i>	Common Five-ring
11.	<i>Ypthima huebneri</i>	Common Four-ring
12.	<i>Eurema hecabe</i>	Common Grass Yellow
13.	<i>Delias eucharis</i>	Common Jezebel
14.	<i>Elymnias hypermnestra</i>	Common Palmfly
15.	<i>Castalius rosimon</i>	Common Pierrot
16.	<i>Mahathala ameria</i>	Falcate Oakblue
17.	<i>Junonia atlites</i>	Grey Pansy
18.	<i>Papilo demoleus</i>	Lime Butterfly
19.	<i>Danaus chrysippus</i>	Plain Tiger
20.	<i>Danaus genutia</i>	Striped Tiger
21.	<i>Leptosia nina</i>	Psyche
22.	<i>Neopithecops zalmora</i>	Common Quaker

23.	<i>Graphium agamemnon</i>	Tailed Jay
24.	<i>Acraea terpsicore</i>	Tawny Coster
25.	<i>Loxura atymnus</i>	Yamfly

TOTAL	Abundant	Percentage	Common	Percentage	Uncommon	Percentage	Rare	Percentage
25	5	20	11	44	6	24	3	12

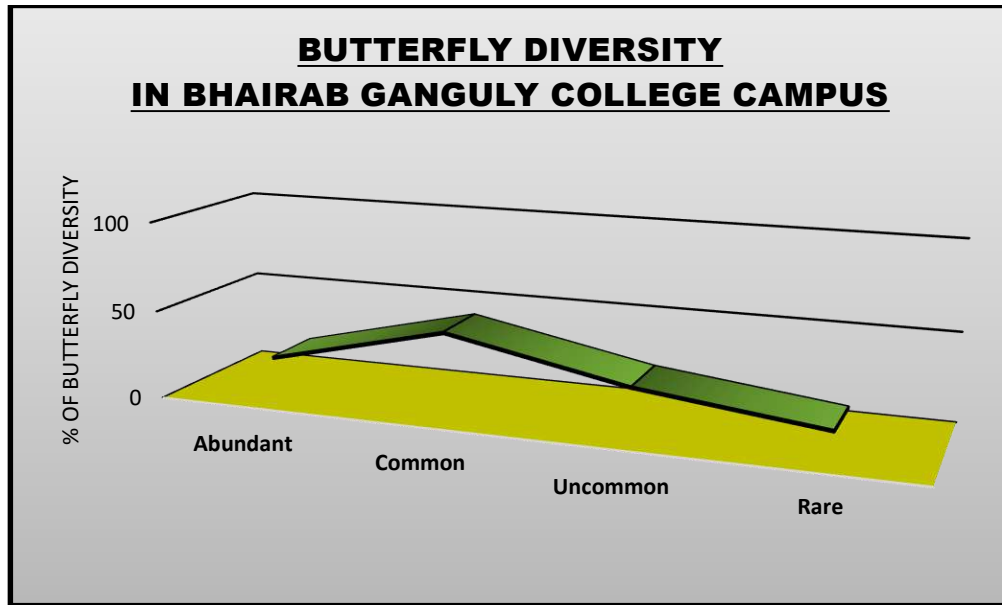


Figure 10: Butterfly Diversity in Bhairab Ganguly College



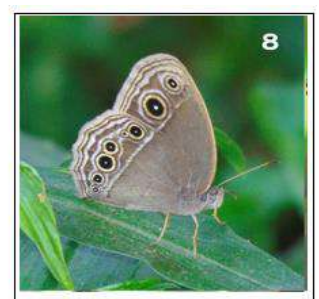
Common Evening Brown - *Melanitis leda*



Plain Tiger - *Danaus chrysippus*



Common Palmfly - *Elymnias hypermnestra*



Common Bushbrown - *Mycalesis perseus*



Common Salieor - *Neptis hylas*



Cabbage White - *Pieris brassicae*



Common Crow - *Euploea core*



Quaker - *Neopithecops zabnora*



Tawny Coster - *Acraea violae*



Lime - *Papilio democus*



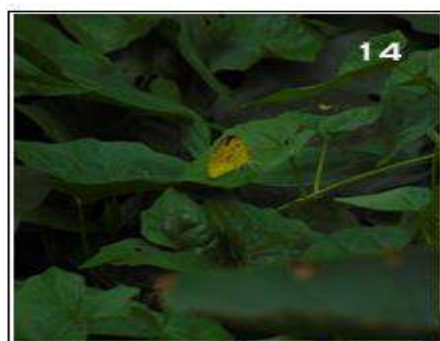
Common Baron - *Euthalia aconthea*



Commander - *Moduza procris*



Common Jezebel - *Delias eucharis*



Common Grass Yellow - *Eurema hecabe*



Grey Pansy - *Junonia atlites*



Common Five-ring - *Ypthima baldus*



Tailed Jay - *Graphium agamemnon*



Common Four-ring - *Ypthima huebneri*

Plate 2: Butterfly Diversity in Bhairab Ganguly College

2.5. Avian Diversity of Bhairab Ganguly College Campus:

Bhairab Ganguly College campus possesses large scale avian diversity. The greenery of the college attracts a large number of species of birds. The survey identified 32 species of birds. Out of 32 species identified, 11 are abundant accounting for about 34% of the total, 12 are common accounting for about 38% of total, 6 belong to the uncommon category accounting for about 19% of total and 3 are rare accounting for about 9% of total.

Sl. No	Scientific Name	Common Name
1.	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen
2.	<i>Ardeola grayii</i>	Indian Pond Heron
3.	<i>Centropus sinensis</i>	Crow Pheasant
4.	<i>Chrysocolaptes guttacristatus</i>	Greater Flameback
5.	<i>Columba livia</i>	Rock Dove
6.	<i>Copsychus saularis</i>	Oriental Magpie Robin
7.	<i>Corvus macrorhynchos</i>	Large-billed Crow
8.	<i>Eudynamys scolopaceus</i>	Asian Koel
9.	<i>Dendrocitta vagabunda</i>	Rufous Treepie
10.	<i>Dicrurus macrocercus</i>	Black Drongo
11.	<i>Hierococcyx varius</i>	Common Hawk-cuckoo
12.	<i>Lonchura punctulata</i>	Scaly Breasted Munia
13.	<i>Psilopogon haemacephalus</i>	Coppersmith Barbet
14.	<i>Psilopogon asiaticus</i>	Blue Throated Barbet
15.	<i>Merops orientalis</i>	Green Bee-eater
16.	<i>Milvus migrans</i>	Black Kite

17.	<i>Pycnonotus cafer</i>	Red- vented Bulbul
18.	<i>Motacilla alba</i>	White Wagtail
19.	<i>Nycticorax nycticorax</i>	Black-crowned Night Heron
20.	<i>Oriolus xanthornus</i>	Black Hooded Oriole
21.	<i>Orthotomus sutorius</i>	Common Tailor Bird
22.	<i>Passer domesticus</i>	House Sparrow
23.	<i>Phalacrocorax fuscicollis</i>	Indian Shag
24.	<i>Gracupica contra</i>	Indian Pied Myna
25.	<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul
26.	<i>Spilopelia chinensis</i>	Spotted Dove
27.	<i>Treron phoenicoptera</i>	Yellow Footed Green Pigeon
28.	<i>Argya striatus</i>	Jungle Babbler
29.	<i>Upupa epops</i>	Eurasian Hoopoe
30.	<i>Halcyon smyrnensis</i>	White-throated Kingfisher
31.	<i>Corvus splendens</i>	Common Crow
32.	<i>Acridotheres tristis</i>	Common Myna

TOTAL	Abundant	PERCENTAGE	Common	PERCENTAGE	Uncommon	PERCENTAGE	Rare	PERCENTAGE
32	11	34	12	38	6	19	3	9

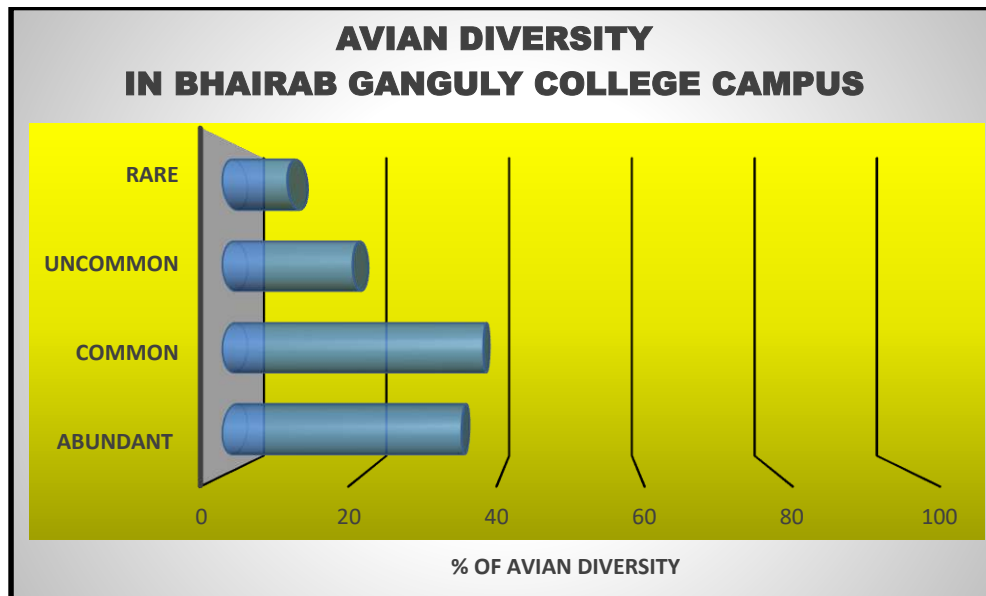


Figure 11: Avian Diversity in Bhairab Ganguly College

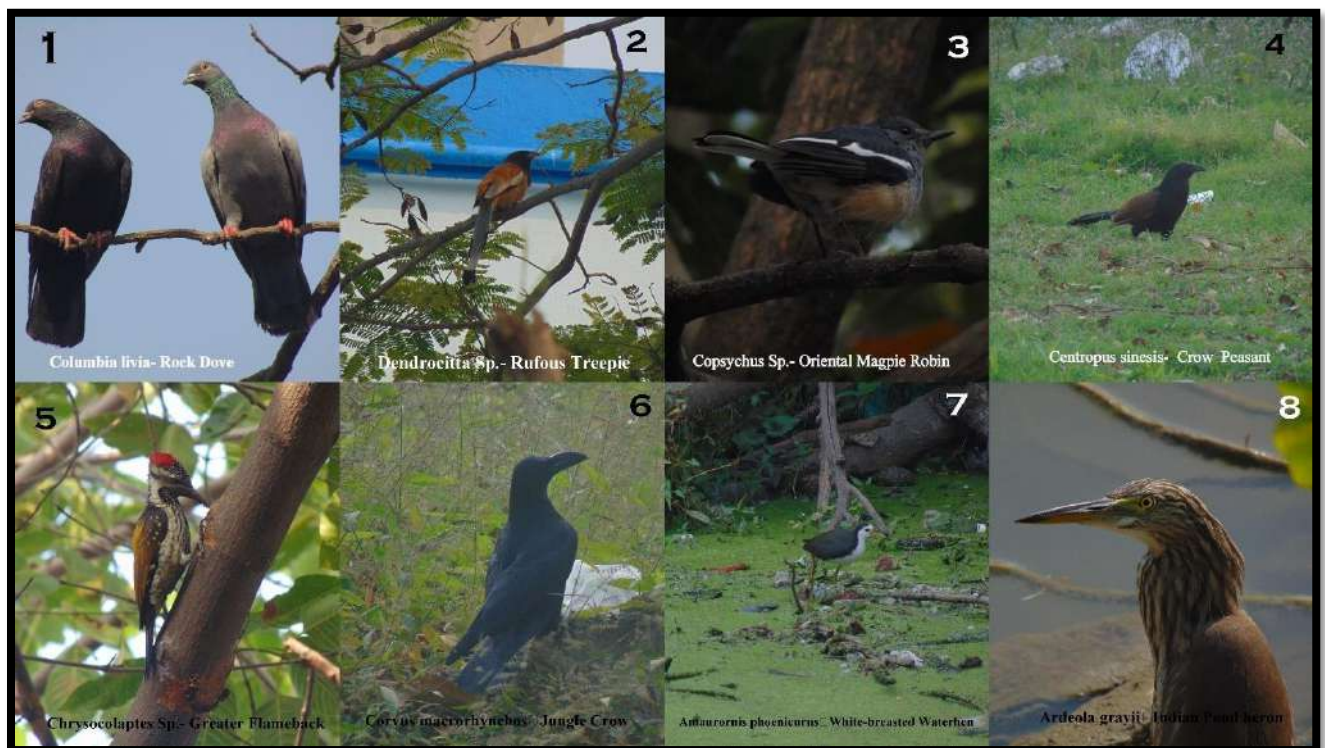


Plate 3: Avian Diversity in Bhairab Ganguly College



Plate 4: Avian Diversity in Bhairab Ganguly College



Plate 5: Avian Diversity in Bhairab Ganguly College

RECOMMENDATION:

- Green education for learning the necessity of green management for environmental quality and improvement.
- To encourage to increase the green cover as a tool for environmental purification.
- To promote awareness about the necessity of afforestation.
- To increase and maintain biodiversity.
- To improve aesthetic beauty of the college campus.
- For more and more students' participation in green management and conservation practices, awareness campaign, interactive classes and courses may be made a routine practice involving both the teaching and non-teaching members of the College. Neighbourhood participation may also be encouraged, occasionally.

CONCLUSION:

Environment is comprised of physical, biological and cultural elements and greenery is an important component. Lack of understanding of the interrelationships may be detrimental for vegetation health. Anthropocentric approach taking care of all the non-living and living elements is necessary through nurturing, maintenance for the improvement of biodiversity quality in an institution. Bhairab Ganguly College as a premier educational institution of the state has taken this important task of green auditing to attain the objective of protecting biodiversity of the institution. Biodiversity data have been prepared and photographs have been collected to fulfil this objective.
