सत्यमेव जयते
Government of West Bengal
Office of the Principal
GOVERNMENT GENERAL DEGREE COLLEGE, KESHIARY
At.-Telipukur : P.O.- Tilaboni Mahisamura : P.S.- Keshiary
Dist- Paschim Medinipur : PIN-721135
www.ggdckeshiary.ac.in

Criterion 7: Institutional Values and Social responsibilities

7.1 Institutional Values and Social Responsibilities

7.1.3. Quality audits on environment and energy regularly undertaken by the Institution.
The institutional environment and energy initiatives are confirmed through the following
1. Green audit / Environment audit
2. Energy audit
3. Clean and green campus initiatives
4. Beyond the campus environmental promotion and sustainability activities

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Policy document on environment and energy usage Certificate from the auditing agency

Green Audit & Energy Audit Report, 2022-2023

Officer-in-Charge
Govt. Gen. Degree College
Keshiary

Policy document on environment and energy usage
Certificate from the auditing agency
FOR GOVERNMENT GENERAL DEGREE COLLEGE, KESHIARY

Introduction:

Government General Degree College, Keshiary was established in the year 2015 in the Keshiary Block under the Kharagpur Subdivision of the district of Paschim Medinipur, West Bengal with a vision to cater higher education in the rural and backword sector of the state. The college is committed towards the environmental causes and it prioritises Green Campus Initiatives, Waste Management Strategies, Water Management Efforts, Energy Management & Carbon Footprint reduction strategies which were adopted and executed for development of a sustainable campus free from pollution and wastage of natural resources.

Policy statement:

- **Environmental responsibilities:** Government General Degree College, Keshiary recognizes its responsibilities to protect and conserve the environment. The college is committed to minimize the adverse environmental impacts in its routine activities and operations.
- **Energy efficiency:** Government General Degree College, Keshiary would ensure energy efficiency in its electrical installation in all its buildings and operations and would take initiatives to adopt energy-efficient technologies and practices to minimize energy consumptions. Regular energy audit would be conducted to explore opportunities to reduce carbon footprint.
- **Renewable energy:** Government General Degree College, Keshiary would explore every opportunity to reduce power consumption from fossil-fuel sources by promoting alternative source of energy tapping like installation of solar-panel modules, etc.
- **Waste reduction:** Government General Degree College, Keshiary would take all possible initiatives to optimize waste management by minimizing land-fill wastes, suitable utilization of bio-wastes and responsible disposal of non-biodegradable wastes.
- **Water conservation:** Government General Degree College, Keshiary would take all possible initiatives to conserve water resources and promote avenues for rainwater harvesting within its campus.
- **Education and awareness:** Government General Degree College, Keshiary would take all possible initiatives to promote environmental awareness and sustainability among its stakeholders by conducting lectures, seminars, campaigns and social outreach programme of its NSS Unit 1.
- **Promotion and maintenance of greenery:** Government General Degree College, Keshiary would be committed to promote greenery within its campus and would adopt all possible measures for maintenance of its greeneries.

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Compliance:

Government General Degree College, Keshiary would comply with the extant environmental laws and regulations and standards of the nation and would strive to be vigilant on the environmental issues of global significance. The college would be enthusiastic to achieve relevant environmental certificates from competent authorities.

Roles and responsibilities:

- **College administration:** The college administration would be committed to provide necessary support for the implementation of its policies on environmental and energy.
- **Environment and Energy Committee:** A responsible and dedicated committee would be formed comprising internal and external members of the college to design plan of progress, set goals and monitor the progress of plausible initiatives.
- **Faculty and staff:** The faculty and staff of the college would be motivated to support the environmental cause. They are expected to support and join hands in programmes promoting environmental causes and energy conservation.
- **Students:** The students would be motivated to participate in the initiatives of green and sustainable environment within campus and adopt to the practices of judicious use of conventional sources of energy.

Reporting and monitoring:

The progress towards the goals and initiatives as mentioned in the policy would be evaluated on annual basis and a report would be published to identify the progress and further scopes for improvement.

Review and revision:

A report on Green Audit and Energy Audit would be published on annual basis and made available to the stakeholders of the Government General Degree College, Keshiary. The effort would ensure the commitment of the institution towards the cause of environment and energy conservation.

Conclusion:

Government General Degree College, Keshiary is committed towards the environmental cause and is ever vigilant to minimise carbon footprint. The institute values the idea of a sustainable environment and an environmentally committed society which would collectively contribute toward conservation of Mother Nature in this planet.

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GOVERNMENT GENERAL DEGREE COLLEGE, KESHIARY

ESTABLISHED: 2015

GREEN AUDIT & ENERGY AUDIT REPORT, 2022-2023

(CRITERIA 7.1.*3* of SSR OF NAAC)

ADDRESS

P.O. TILABONI MAHISAMURA **P.S.** KESHIARY
DIST. PASCHIM MEDINIPUR **PIN** 721135
WEST BENGAL, INDIA www.ggdckeshiary.ac.in

Government of West Bengal

Government General Degree College, Keshiary

(Affiliated to the Vidyasagar University)

Telipukur, P.O. Tilaboni Mahishamura, P.S. Keshiary, Dist. Paschim Medinipur, PIN: 721135

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CONTENT

1. Disclaimer

The Green Audit and Energy Audit Team has prepared this report on the basis of primary data collected from Government General Degree College, Keshiary. The report has been prepared with utmost care considering every detail as far as practicable. The Green Audit and Energy Audit Report of Government General Degree College, Keshiary for the Academic Year 2022-2023 is hereby authenticated.

SL. NO.	NAME	DESIGNATION& AFFILIATION	Signature with Seal
1.	DR. SAJAL RAY	Professor in Zoology, Department of Zoology, University of Calcutta, Kolkata, West Bengal	Sajal Ray 30/6/23 Dr. Sajal Ray Professor Zoology Department Calcutta University
2.	DR. SAGAR ACHARYA	Assistant Professor in Zoology, Department of Zoology, Vidyasagar University, Paschim Medinipur, West Bengal	Sacharya 30.06.2023 DR. SAGAR ACHARYA Assistant Professor Department of Zoology VIDYASAGAR UNIVERSITY Midnapore - 721102
3.	DR. SUJIT KUMAR BHOWAL	Associate Professor in Zoology, Department of Zoology, Maulana Azad College, Kolkata, West Bengal	30/6/2023 Dr. Sujit Kumar Bhowal WBES Associate Professor of Zoology Higher Education Dept. Govt. of West Bengal Maulana Azad College, Kol - 13
4.	DR. MADHUMITA MAITRA	Assistant Professor in Microbiology, Department of Microbiology, St. Xavier's College (Autonomous), Kolkata, West Bengal	30.06.23 Department of Microbiology St. Xavier's College Kol - 16
5.	DR. RAJENDRA PRASAD DE	Assistant Professor in Botany, Department of Botany, Government General Degree College, Mohanpur, Paschim Medinipur, West Bengal	30.06.2023 Dr. Rajendra Prasad De Assistant Professor (WBES) Dept. of Botany Mohanpur Govt. College Govt. of West Bengal
6.	ARNAB KUMAR MONDAL	Lecturer in Electrical Engineering, Sidhu Kanhu Birsa Polytechnic, Keshiary, Paschim Medinipur, West Bengal	H.O.D. Electrical Engg. S.K.B. Polytechnic, Keshiary Paschim Medinipur - 721133 Govt. of West Bengal

2. Audit participants: external experts

The Honourable External Experts for the Green Audit and Energy Audit Report of Government General Degree College, Keshiary for the Academic Year 2022-2023 are the following:

SL. NO.	NAME	DESIGNATION & AFFILIATION	EXPERTISE
1.	DR. SAJAL RAY	Professor in Zoology, Department of Zoology, University of Calcutta, Kolkata, West Bengal	Ecology and ecotoxicology
2.	DR. SAGAR ACHARYA	Assistant Professor in Zoology, Department of Zoology, Vidyasagar University, Paschim Medinipur, West Bengal	Wild life biology, avian biology, butterfly diversity
3.	DR. SUJIT KUMAR BHOWAL	Associate Professor in Zoology, Department of Zoology, Maulana Azad College, Kolkata, West Bengal	Ecology and animal diversity
4.	DR. MADHUMITA MAITRA	Assistant Professor in Microbiology, Department of Microbiology, St. Xavier's College (Autonomous), Kolkata, West Bengal	Microbiology
5.	DR. RAJENDRA PRASAD DE	Assistant Professor in Botany, Department of Botany, Government General Degree College, Mohanpur, Paschim Medinipur, West Bengal	Plant diversity and taxonomy
6.	ARNAB KUMAR MONDAL	Lecturer in Electrical Engineering, Sidhu Kanhu Birsa Polytechnic, Keshiary, Paschim Medinipur, West Bengal	Electrical engineering

3. Audit participants: on behalf of the college

The report on the Green Audit and Energy Audit of Government General Degree College, Keshiary for the Academic Year 2022-2023 was prepared based on the primary data recorded throughout the year. The recorded data was compared with the primary data of the past years. The data of the report was collected by the qualified faculty of different academic departments of the college (list of the faculty tabulated below) utilizing the expertise, resource and instruments of their own and intra-departmental cooperation.

SL. NO.	NAME	Designation & Affiliation	Qualification	EXPERTISE	Signature with seal
1.	Dr. Sudipta Chakraborty	Assistant Professor in Zoology and Officer in Charge, Government General Degree College, Keshiary	M.Sc., Ph.D.	Aquatic toxicology, parasitology, avian biology, butterfly diversity	30/6/2023 Officer-in-Charge Govt Gen Degree College Keshiary
2.	Dr. Sutapa Ray	Assistant Professor in Chemistry & IQAC Jt. Coordinator Government General Degree College, Keshiary	M.Sc., Ph.D.	Soil and water chemistry	30/6/2023 Coordinator IQAC CELL Govt. Gen. Degree College Keshiary
3.	Dr. Susanta Kumar Maity	Assistant Professor in Botany, Government general Degree College, Keshiary	M.Sc., Ph.D.	Plant taxonomy and algal biology	30/06/2023 Assistant Professor GGDC, Keshiary
4.	Dr. Nilay Kumar Maitra	Assistant Professor in Botany and IQAC Jt. Coordinator, Government General Degree College, Keshiary	M.Sc., Ph.D.	Plant taxonomy and plant physiology	30/06/2023 Coordinator IQAC CELL Govt. Gen. Degree College Keshiary
5.	Sk Md Ismail Al Amin	Assistant Professor in Botany, Government General Degree College, Keshiary	M.Sc.	Plant genetics and taxonomy	Sk. Md Ismail 30.06.2023. Assistant Professor GGDC, Keshiary
6.	Dr. Manidip Shasmal	Assistant Professor in Zoology, Government General Degree College, Keshiary	M.Sc., Ph.D.	Ecology and wild life	Manidip Shasmal 30/6/23. Assistant Professor GGDC, Keshiary
7.	Dr. Soumya Sundar Mati	Assistant Professor in Chemistry & NAAC Coordinator, Government General Degree College, Keshiary	M.Sc., Ph.D.	Soil and water chemistry	Soumya Sundar Mati 30.06.23 Assistant Professor GGDC, Keshiary
8.	Debarshi Mondal	Assistant Professor in Zoology, Government General Degree College, Keshiary	M.Sc.	Entomology and animal taxonomy	D. Mondal 30/06/2023 Assistant Professor GGDC, Keshiary

The data so collected was provided to the board of external experts ***(Green Audit and Energy Audit)***. The data was cross checked by the external experts of the *Green Audit and Energy Audit* and their observations and recommendations were duly recorded for further improvement in future.

4. Concept and context

In the present era of consumerism, promotion of environmental consciousness among the students in the arena of higher learning is an absolute necessity for the development of a responsible citizen for this great nation. Green Audit and Energy Audit are eye openers for assessing the level of justified utilization of natural resources within the premises of higher learning. The model practices and promotion of initiatives related to conservation of our natural environment motivates the stakeholders of an institution to adopt healthy life strategies that are essential for nation building.

The National Assessment and Accreditation Council (NAAC), India has stipulated that every Higher Educational Institutions should submit an annual Green, Environment and Energy Audit Report. The report is currently associated with the Criteria 7.1.3 of Self Study Report (SSR) of the NAAC. The mandate has created an opportunity to evaluate the degree of association of an institute of higher learning with good environmental practices. Government General Degree College, Keshiary takes this opportunity to assess its position in the and efforts to offer a Green Campus to its stakeholders and to reconfirm its oath for optimal utilization of natural resources without rendering any misuse or wastage. The Green Audit and Energy Audit for the Academic Year 2022-2023 would assess the yearlong involvement of the college with its clean and green initiatives and motivational deeds to impress its stakeholders and the society.

5. Aims and objective of the study

The present Green and Energy Audit was conducted to assess the abidance of the institute of higher learning with the national and international environmental norms and regulations. The study would elucidate the level of preparedness and awareness of the college in the following aspects:

- The level of promotion of awareness for an eco-friendly environmental among its stakeholders
- The level of active participation in environment protection initiatives
- The level of judicious energy management system extant in the institution
- The level of maintenance of healthy environmental parameters with respect to potable water indices and water management
- The level of awareness on plant and animal diversity existing within and around the college premises
- The level of green initiatives undertaken to amplify the robustness of the natural ecosystem in the college campus
- To identify the scopes of betterment in future green initiatives and better energy management

6. Introduction

Government General Degree College, Keshiary was established in the year 2015 in the Keshiary Block under the Kharagpur Subdivision of the district of Paschim Medinipur, West Bengal with a vision to cater higher education in the rural and backword sector of the state inhabited by a tribal population. The college is connected by SH 05 to the nearest railway station of Kharagpur 25 km away (Figure 1) and is nearly 4 km away from the nearest town of Keshiary.

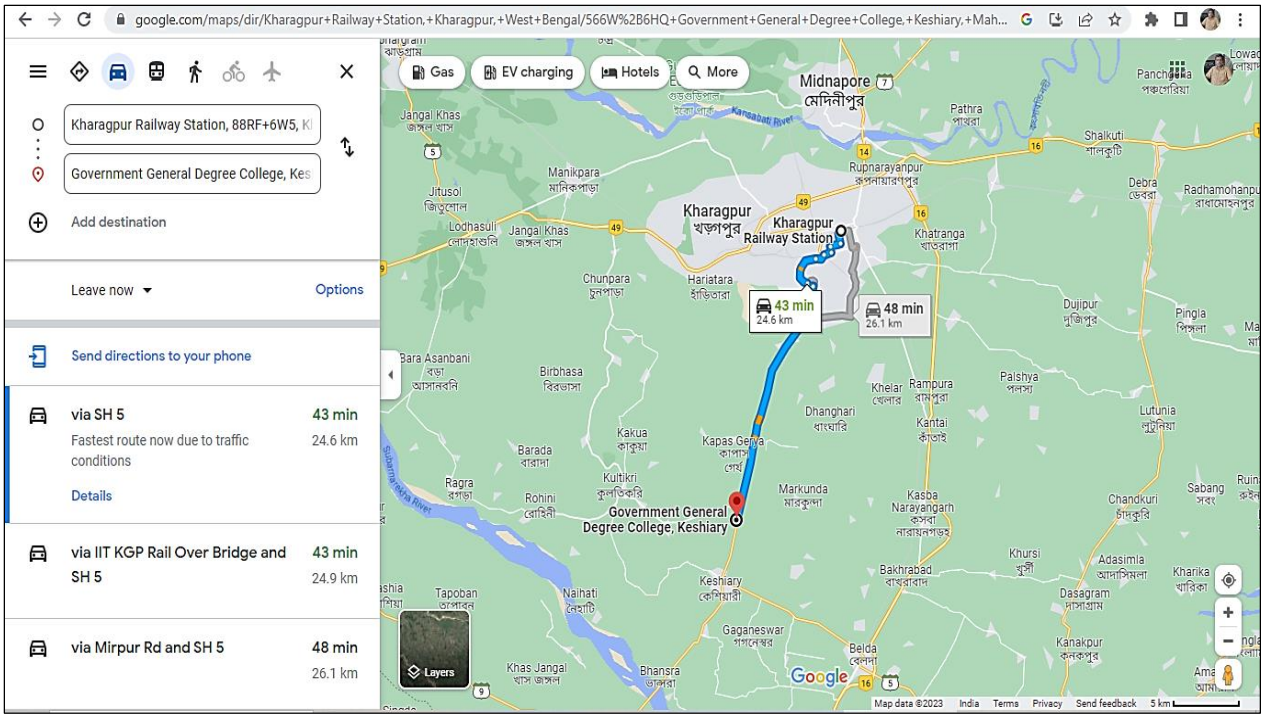

Figure 1. Location of Government General Degree College, Keshiary from nearby railway station of Kharagpur on Google map.

The coeducational college (AISHE code C-52881) is affiliate to the Vidyasagar University, Paschim Medinipur, West Bengal and has attained UGC 2f recognition in the year 2018. The college has nine academic departments of which five are from Arts and Humanities and four are from Sciences. Three departments of the Arts are language departments namely Santali, Bengali and English while the rest being History and Political Science. The Science departments comprise of Anthropology, Botany, Chemistry and Zoology. At present the college offers three-year degree courses (Honours and General) in Choice based Credit System (CBCS) system and the registered student strength being 799 in the academic year 2022-2023.

Although the college has a brief span of existence, it has already made its impact in promoting academics in the rural sector of West Bengal as reflected from its University results where more than 80 percent of the students have secured >60% marks in their final examinations. Moreover, a student from the college has secured second position in the University Examinations from the Department of Anthropology and a considerable part of the alumni have got engaged in Masters and higher learning.

7. Location and area of the college

The college campus (Longitude 87.2439330; Latitude 22.1603010) encompasses five acre of land which in its inception was mostly barren. The dry climate of the region and poor water holding capacity of the red lateritic soil rendered a harsh environment in the college campus in its initial years although it has the adjacent Langamara forest range (Figure 2). The superstructure of the existing college building occupies note more than 40 percent of the five-acre college campus (Annexure 1). Rest sixty percent of the college campus exhibits the nature and natural topography of the region which has been moulded into greenery through continuous effort of the college through time (Figure 3).

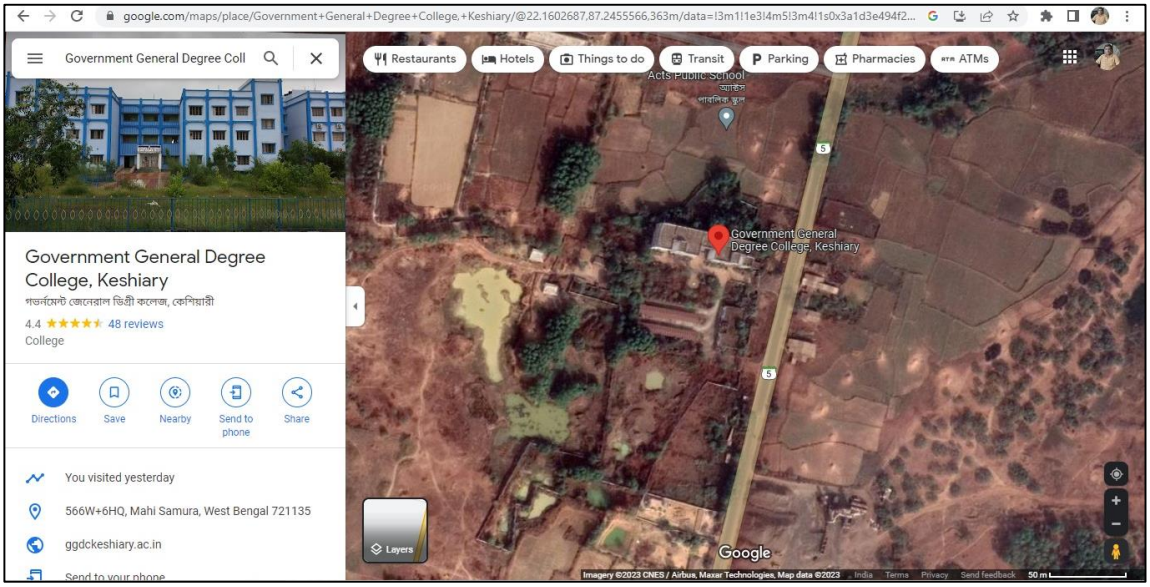

Figure 3. Location of Government General Degree College, Keshiary on Google map.

8. Executive summary

The Green Audit and Energy Audit of Government General Degree College, Keshiary for the Academic Year 2022-2023 would focus on the Green Campus Initiatives, Waste Management Strategies, Water Management Efforts, Energy Management & Carbon Footprint reduction strategies adopted and executed for development of a sustainable campus free from pollution and wastage of natural resources. The concepts, methodology and the tools of analysis are vividly discussed and the green initiatives implemented are being methodically scrutinized and criticized. The entire study is developed on a systematic questionnaire the answer of which are cross checked and analysed by competent authority.

Moreover, suggestions are asserted to improve the future endeavour of the college for the development of a more sustainable and environmentally responsible campus of higher learning.

9. Green audit analysis

The following data points were taken into consideration while preparing the green audit and energy audit reports of Government General Degree College, Keshiary for the academic Year 2022-2023:

9.1 General information

i. Has there been any Green Audit conducted earlier?

No. This is for the first time that a comprehensive dive for a green audit and Energy Audit has been undertaken by the college.

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

Types of strength	Male	Female	Other	Total
Student strength	356	443	0	799
Teaching faculty strength	15	06	0	21
Librarian	01	0	0	01
Non-teaching faculty strength	06	02	0	08

iii. What is the total number of working days of your campus in academic year 2022-2023?

The total number of working days in the academic year 2022-2023 was 197 days.

iv. What is the postal address and official web address of the college?

Telipukur, P.O. Tilaboni Mahishamura, P.S. Keshiary, District: Paschim Medinipur, PIN: 721135, West Bengal
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v. Mention whether the following facilities are available within the college campus:

a.	Garden area	Available
b.	Playground	Not available
c.	Toilets	Available
d.	Garbage / waste bin	Available
e.	Laboratory for testing environmental parameters	Available
f.	Canteen	Available
g.	Hostel Facility	Not available
h.	Guest House	Not available

vi. Mention whether the following facilities are available near your institute?

a.	Municipal dump yard	Not available near the institute
b.	Garbage heap	Not available near the institute
c.	Public convenience	Available
d.	Covered drainage	Not available
e.	Stagnant water	No stagnant water
f.	Industry	Available
g.	Bus / Railway station	Available
h.	Market / Shopping complex	Not available near the institute

9.2 Water indices

The college utilizes underground water for supplying water through its pipelines. The overhead water tanks of the college are periodically cleaned and sanitized by chlorination. Besides, the college has three units of potable water purifiers maintained by Eureka Forbes Aquaguard through annual maintenance (Annexure 2). The quality of the water delivered through the taps are tested for quality once a year from recognized laboratory and qualified Microbiologist. The water quality indices of the college as examined in the academic year 2022-2023 are as summarised below (Annexure 3):

Sl. No.	Event/parameter	Data	Control value (if any)	Remark
1.	Date of collection of water sample	12.04.2023	-	
2.	Number of water samples collected	03	-	2 tap water and 1 filtered water sample
3.	Nature of collection	Random sampling	-	Once a year
4.	pH of the water	Tap water 1: 6.2 Tap water 2: 6.3 Filtered water: 6.6	6.5 to 8.5	
5.	Most probable number (MNP) of enteric lactose fermenting bacteria	Tap water 1: 02 Tap water 2: 02 Filtered water: Less than 02	WHO standard for MNP: < 2.2 MNP/ 100 ml water	No pathogenic bacteria were present in the sampled waters.
6.	Chlorine content	Tap water 1: 0.6 mg/liter Tap water 2: 0.5 mg/liter Filtered water: 0.2 mg/liter	Chlorine content upto 04 mg/liter is considered safe for drinking	Tap water had a relatively higher trace of chlorine as a recent event of chlorination was done for sterilization. However, the tap water was fit for drinking.

Figure 4: The filtered potable water units installed at Government General Degree College, Keshiary

9.3 Greening the campus

The green initiatives of the campus are planned yearly and executed in a well-organized manner and the NSS Unit 1 of Government General Degree College, Keshiary provide the leadership in this regard.

i. Is there a garden in your institute?

Yes, nearly 11,000 sq. ft. area of the campus has been developed as gardens.

ii. Do students spend time in the garden and gardening?

Yes, they spend 1-2 hours in and around the college gardens. They are free to bring in plant saplings and plant them in cognition of the college authority. The students often donate tree saplings for the college garden during an announced tree plantation drive.

iii. Total number of plants and trees in the campus?

Sl. No.	Types of vegetation	Number
a.	Tree (fully grown)	212
b.	Tree (semi-fully grown)	218
c.	Shrub	168
d.	Medicinal herb	887
	Total:	***1485***
Additional grassland cover		***10,000 sq. ft.***

iv. How many tree plantation drives had been organized in the college campus in AY 2022-2023?

The college had organized 02 tree plantation drives in the Academic Year 2022-2023.

v. Is there any Plant Distribution Program for students and community?

Yes. The winner of any declared college competition is awarded with plant saplings as a token gesture of awareness drive for plantation programme. Sometimes, visiting guests of honour are specially invited to plant tree sapling in the college campus.

9.4 Campus biodiversity

9.4.1 Plant diversity

The campus of Government General Degree College, Keshiary has a luxuriant plant diversity representing trees, shrub and herbs. Nearly 38 species of trees were identified which were timber yielding, fruit yielding and have reported medicinal importance (Table 1; Figure 5-8). Besides 18 species of shrubs and 19 species of herbs were also identified in the campus (Table 2; Figure 4-9). The campus, with active cooperation of the Department of Botany, maintains a medicinal plant garden (Figure 10) hosting nearly 15 different medicinal herbs (Figure 9). The total number of trees as on record was 430 of which 212 were fully grown and 218 were semi fully grown. Nearly 168 shrubs were recorded in the campus while the number of herbs were 887. Besides the college has a lush grassland along with a rain-fed natural waterbody. The lush green cover of the campus has been developed by consistent endeavour of the stakeholders of the college and the greenery supports a vibrant animal life from micro to macro level.

Table 1: The list of some timber, fruit and flower yielding trees as identified within the college campus of Government General Degree College, Keshiary (FGT: Fully Grown Tree; SFGT: Semi Fully Grown Tree)

Sl. No.	Scientific Name	Common Name	Category of plant	FGT	SFGT	Total Number
1.	*Tectona grandis*	Segun (Bengali)	Timber yielding tree	6	0	6
2.	*Swietenia macrophylla*	Mahogany (Bengali)	Timber yielding tree	8	8	16
3.	*Azadirachta indica*	Neem (Bengali)	Timber & medicine yielding tree	3	18	21
4.	*Albizia lebbeck*	Sirish (Bengali)	Timber yielding tree	15	5	20
5.	*Acacia auriculiformis*	Akashmani (Bengali)	Timber yielding tree	100	20	120
6.	*Mangifera indica*	Mango/ Aam (Bengali)	Timber& fruit yielding tree	5	18	23
7.	*Bombax ceiba*	Shimul (Bengali)	Timber yielding tree	0	5	5
8.	*Butea monosperma*	Palash (Bengali)	Timber & flower yielding tree	0	5	5
9.	*Eucalyptus* sp.	Eucalyptus	Timber yielding tree	9	0	9
10.	*Cocos nucifera*	Coconut/ Narkol (Bengali)	Timber & fruit yielding tree	0	2	2
11.	*Bambusa* sp.	Bamboo/ Bans (Bengali)	Timber yielding tree	25	0	25
12.	*Melia azedarach*	Persian lilac/ Chinaberrytree	Timber & medicine yielding tree	12	3	15
13.	*Neolamarckia cadamba*	Kadam (Bengali)	Timber yielding tree	2	0	2
14.	*Areca catechu*	Betle nut/ Supari (Bengali)	Fruit yielding tree	0	21	21
15.	*Manilkara zapota*	Sobeda (Bengali)	Fruit yielding tree	0	3	3
16.	*Psidium guajava*	Guava/ Peyara (Bengali)	Fruit yielding tree	0	10	10
17.	*Syzygium cumini*	Jam (Bengali)	Fruit yielding tree	0	7	7
18.	*Aegle marmelos*	Wood apple/ Bel (Bengali)	Fruit yielding tree	5	5	10
19.	*Artocarpus heterophyllus*	Jackfruit/ Kathal (Bengali)	Fruit yielding tree	0	4	4
20.	*Anacardium occidentale*	Cashew/ Kaju (Bengali)	Fruit yielding tree	0	2	2
21.	*Ziziphus mauritiana*	Kul (Bengali)	Fruit yielding tree	7	5	12
22.	*Moringa oleifera*	Sojne (Bengali)	Fruit yielding tree	0	3	3
23.	*Embelica officanalis*	Amlaki (Bengali)	Fruit & medicine yielding tree	0	5	5
24.	*Terminaria bellirica*	Boyra (Bengali)	Fruit & medicine yielding	0	5	5
25.	*Terminalia chebula*	Haritaki (Bengali)	Fruit & medicine yielding	0	5	5
26.	*Buchanania lanzan*	Chironji, Piyal (Bengali)	Fruit yielding tree	1	0	1
27.	*Terminalia arjuna*	Arjun (Bengali)	Medicine yielding tree	0	5	5
28.	*Tamarindus indica*	Tamarind/Tetul (Bengali)	Fruit yielding tree	0	1	1
29.	*Ficus benghalensis*	Banyan/ Bot (Bengali)	Fruit yielding tree	2	0	2
30.	*Ficus religiosa*	Pipal/ Aswatha (Bengali)	Tree	1	0	1
31.	*Alstonia scholaris*	Chatim (Bengali)	Flower yielding tree	3	1	4
32.	*Delonix regia*	Gulmohar	Flower yielding tree	0	3	3
33.	*Cinnamomum tamala*	Tejpata (Bengali)	Spice tree	0	5	5
34.	*Minusops elengi*	Bokul (Bengali)	Flower yielding tree	0	3	3
35.	*Tamarix dioica*	Choto jhau (Bengali)	Tree	0	34	34
36.	*Casuarina* equisitifolia	Boro jhau (Bengali)	Tree	6	6	12
37.	*Pterospermum acerifolium*	Kanakchanpa (Bengali)	Flower yielding tree	0	1	1
38.	*Ficus carica*	Dumur (Bengali)	Fruit yielding tree	2	0	2
			Total:	**212**	**218**	**430**

Figure 5: Photographs of some trees available in the garden of the college**: A.**Banyan (*Ficus benghalensis*);**B.** Coconut (*Cocos nucifera*); **C.**Wood apple (*Aegle marmelos*); **D.** Kadam (*Neolamarckia cadamba*); **E.** Mango (*Mangifera indica)*;**F.** Segun (*Tectona grandis*); **G.**Mahogany (*Swietenia mahagoni*); **H.** Akashmoni (*Acacia auriculiformis*); **I.** Gulmohar (*Delonix regia*); **J.** Betle nut (*Areca catechu*); **K.** Bokul (*Minusops elengi)***; L.** Choto Jhau (*Tamarix dioica);***M.** BoroJhau (*Casuarina* sp.)[Photograph courtesy: Dr. Sudipta Chakraborty]

Figure 6: The landscape and some foliage of the college**: A.** natural waterbody with grassland; **B.** Lemon (*Citrus limon*); **C.** Guava (*Psidium* sp.); **D.** Crepe jasmine (*Tabernaemontana divaricate*); **E.** Kamini (*Murraya paniculata)*; **F.** Banana (*Musa sapientum*); **G.**Piyal (*Buchanania lanzan*); **H.**Bamboo (*Bambusa sp.*); **I.** Neem (*Azadirachta indica*); **J.** Jackfruit (*Artocarpus heterophyllus*); **K.** Cashew (*Anacardium occidentale)***; L.** Debdaru (*Polyalthia longifolia);* **M.** Jam (*Syzygium jambos*)[Photograph courtesy: Dr. Nilay Kumar Maitra and Dr. Sudipta Chakraborty]

Table 2: The list of shrubs and herbs as identified within the college campus of Government General Degree College, Keshiary (*excluding Sl. No. 35-39)

Sl. No.	Scientific Name	Common Name	Category	Fully grown plants
1.	*Punica granetum*	Pomegranate/Bedana (Bengali)	Fruit yielding shrub	2
2.	*Citrus limon*	Pati lebu (Bengali)	Fruit yielding shrub	3
3.	*Citrus limetta*	Musambi (Bengali)	Fruit yielding shrub	2
4.	*Carica papaya*	Papaya (Bengali)	Fruit yielding shrub	10
5.	*Cajanus cajan*	Arhar (Bengali)	Pulse yielding shrub	3
6.	*Cascabela thevetia*	Yellow Oleander	Flower yielding shrub	9
7.	*Ixora* sp.	Rangan (Bengali)	Flower yielding shrub	5
8.	*Hibiscus* sp.	Jaba (Bengali)	Flower yielding shrub	40
9.	*Calotropis gigantean*	Akanda (Bengali)	Flower yielding shrub	20
10.	*Rosa* sp.	Rose/Golap (Bengali)	Flower yielding shrub	40
11.	*Murraya paniculata*	Kamini (Bengali)	Flower yielding shrub	5
12.	*Tabernaemontan adivaricate*	Crepe Jasmine/ Togor (Bengali)	Flower yielding shrub	10
13.	*Gardenia jasminoides*	Gandharaj (Bengali)	Flower yielding shrub	2
14.	*Nyctanthes arbora*	Shiuli (Bengali)	Flower yielding shrub	4
15.	*Prunus avium*	Cherry	Fruit yielding shrub	01
16.	*Mussaenda erythrophylla*	Musanda (Bengali)	Flower yielding shrub	5
17.	*Morinda citrifolia*	Noni (Bengali)	Flower & fruit yielding shrub	1
18.	*Duranta erecta*	Pigeon berry	Shrub	6
19.	*Musa sapientum*	Banana /Kala (Bengali)	Fruit yielding herb	10
20.	*Catharanthus roseus*	Nayantara (Bengali)	Medicinal herb	500
21.	*Asparagus racemosus*	Satamuli (Bengali)	Medicinal herb	1
22.	*Osimum* sp.	Tulsi (Bengali)	Medicinal herb	50
23.	*Withania somnifera*	Ashwagandha (Bengali)	Medicinal herb	1
24.	*Cissus quadrangularis*	Harjora (Bengali)	Medicinal herb	1
25.	*Aloe barbadensis*	Aloe vera/Ghritakumari (Bengali)	Medicinal herb	70
26.	*Clitoria ternatea*	Aparajita (Bengali)	Medicinal herb	100
27.	*Andrographis paniculata*	Kalmegh (Bengali)	Medicinal herb	10
28.	*Cissus quadrangularis*	Harjora (Bengali)	Medicinal herb	3
29.	*Phyllanthus niruri*	Bhui amla (Bengali)	Medicinal herb	100
30.	*Hygrophila auriculata*	Kulekhara (Bengali)	Medicinal herb	5
31.	*Adhatoda vasica*	Bashak (Bengali)	Medicinal herb	10
32.	*Barleria lupulina*	Bishallakarani (Bengali)	Medicinal herb	1
33.	*Eclipta alba*	Keshut (Bengali)	Medicinal herb	5
34	*Jatropha* sp.	Bharanda (Bengali)	Medicinal herb	20
35.	*Curcuma longa*	Turmeric/ Haldi (Bengali)	Medicinal herb	4' x 4'
36.	*Zingiber officinale*	Ginger/ Ada (Bengali)	Medicinal herb	4' x 4'
37.	*Bacopa monnieri*	Brahmi (Bengali)	Medicinal herb	4' x 4'
38.	*Centella asiatica*	Thankuni (Bengali)	Medicinal herb	4' x 4'
39.	*Nymphaea* sp.	Shapla (Bengali)	Aquatic herb	13' x 9' tank
			Total:	1055*

Figure 7: Photographs of some shrubs available in the garden of the college: **A.** Persial lilac (*Melia azedarach*); **B.** Fig (*Asparagus racemosus*); **C.** Shiuli (*Nyctanthes arbora*); **D.** Gandharaj (*Gardenia jasminoides*);**E.** Shimul (*Bombax ceiba)*; **F.** Palash (*Butea monosperma*); **G.** Musanda (*Mussaenda erythrophylla*); **H.** Cherry (*Prunus avium*); **I.** China rose (*Hibiscus* sp.); **J.** Arahar (*Cajanus cajan*); **K.** Kul (*Ziziphus mauritiana*)[Photograph courtesy: Ashok Das,Dr. Nilay Kumar Maitra and Dr. Sudipta Chakraborty]

Figure 8: Photographs of some shrubs available in the garden of the college: **A.** Rangan (*Ixora* sp.); **B.** Fig (*Asparagus racemosus*); **C.** Kanakchanpa (*Pterospermum acerifolium*); **D.** Bharanda (*Catharanthus roseus*); **E.** Wild guava (*Morinda citrifolia)*; **F.** Akanda (*Calotropis gigantean*); **G.** Pomegranate (*Punica granetum*); **H.** Sunflower (*Helianthus sp.*); **I.** Pigeon berry (*Duranta erecta*); **J.** Papaya (*Carica papaya*); **J.** Rose (*Rosa* sp.)[Photograph courtesy: Ashok Das,Dr. Nilay Kumar Maitra and Dr. Sudipta Chakraborty]

Figure 9: Photographs of some medicinal herbs available in the garden of the college: **A.** Brahmi (*Bacopa monnieri*); **B.** Satamuli (*Asparagus racemosus*); **C.** Thankuni (*Centella asiatica*); **D.** Nayantara (*Catharanthus roseus*); **E.** Harjora (*Cissus quadrangularis)*; **F.** Tulsi (*Osimum* sp.); **G.** Ghritakumari (*Aloe barbadensis*); **H.** Bisallakarani (*Barleria lupulina*);**I.** Aparajita (*Clitoria ternatea*); **J.** Ashwagandha (*Withania somnifera*); **K.**Kalmegh (*Andrographis paniculata*); **L.** Bhui amla (*Phyllanthus niruri)* [Photograph courtesy: Ashok Das, Dr. Nilay Kumar Maitra and Dr. Sudipta Chakraborty)

Figure 10: Photographs of the medicinal plant garden established at Government General Degree College, Keshiary

9.4.2 Animal diversity

The college campus is a natural abode of a rich animal diversity which consists of several hundred species of animals from twelve taxonomic classes in the Animal Kingdom ranging from the Annelids to Mammals. The rich plant diversity of the college campus accommodates the animal life and supports a robust ecosystem (Table 3).

The diversity of the observed animal life indicates existence of a balanced ecosystem with representation of consumers from all trophic levels and an ideal environment for plant-animal interactions. Notable diversity of reptiles and mammals are indicative of a strongly supported top level predators in an agrarian ecosystem where prey-predation relationship thrives in the backdrop of luxuriant floral population.

Table 3: The list of animal life as identified within the college campus of Government General Degree College, Keshiary

Sl. No.	Identified species /scientific name	Common Name	Class	Availability
1.	Several species of earthworm	Earthworm	Annelida	Perennial
2.	Several species of beetles	Beetle	Insecta	Perennial
3.	30 species identified (list in Table)	Butterflies and Moths	Insecta	Seasonal/ Perennial
4.	Several species of dragon fly & damsel fly	Dragon fly & damsel fly	Insecta	Perennial
5.	Several species of ants and termites	Termites and ants	Insecta	Perennial
6.	Unidentified species	Scorpion	Arachnida	Perennial
7.	*Argiope* sp.	Signature spider	Arachnida	Perennial
8.	*Lamellidens marginalis*	Snails/Jhinuk (Bengali)	Bivalvia	Seasonal
9.	*Pila globose*	Snails/Shamuk(Bengali)	Gastropoda	Seasonal
10.	*Bellamya bengalensis*	Snails/ Gugli (Bengali)	Gastropoda	Seasonal
11.	*Channa punctata*	Lata (Bengali)	Actinopterygii	Seasonal
12.	*Channa striatus*	Shol (Bengali)	Actinopterygii	Seasonal
13.	*Heteropneustes fossilis*	Shingi (Bengali)	Actinopterygii	Seasonal
14.	*Clarias batrachus*	Magur(Bengali)	Actinopterygii	Seasonal
15.	*Anabas testudineus*	Koi (Bengali)	Actinopterygii	Seasonal
16.	*Puntius* sp.	Punti (Bengali)	Actinopterygii	Seasonal
17.	*Duttaphrynus melanostictus*	Toad/Kuno bang (Bengali)	Amphibia	Seasonal
18.	*Rana tigrine*	Frog/ Sona bang (Bengali)	Amphibia	Seasonal
19.	*Calotes versicolor*	Girgiti (Bengali)	Reptilia	Perennial
20.	*Chamaeleo zeylanicus*	Indian chameleon	Reptilia	Perennial
21.	*Daboia russelii*	Russell's viper	Reptilia	Perennial
22.	*Naja kaouthia*	Keute (Bengali)	Reptilia	Perennial
23.	*Lycodon aulicus*	Indian wolf snake/Ghor chiti	Reptilia	Perennial
24.	*Fowlea piscator*	Checkered keelback	Reptilia	Perennial
25.	*21 species identified (list in Table)*	Birds	Aves	Seasonal &Perennial
26.	*Funambulus palmarum*	Indian palm squirrel	Mammalia	Perennial
27.	*Paradoxurus* sp.	Palm Civet	Mammalia	Perennial
28.	*Sus* sp.	Pig	Mammalia	Perennial
29.	*Felis domesticus*	Cat	Mammalia	Perennial
30.	*Canis* sp.	Dog	Mammalia	Perennial
31.	*Vulpes bengalensis*	Fox	Mammalia	Perennial
32.	*Herpestidae* sp.	Mongoose	Mammalia	Perennial
33.	*Bandicota bengalensis*	Rat	Mammalia	Perennial
34.	*Mus musculus*	Mouse	Mammalia	Perennial

Figure 11: Photographs of some animals and their nests within the campus of the college: **A.** Black blister beetle (*Epicauta* sp.); **B.** Blister beetle (*Hycleus* sp.); **C.** Saber-toothed ground beetles (*Anthia* sp.); **D.** Grasshopper (*Poekilocerus* sp.); **E.** Dragonfly (*Daboia russelii*); **F.**Wasp nest of *Polistes* sp.;**G.** Signature spider(*Argiope* sp.); **H.** Scorpion; **I.** Whip scorpion; **J.** Termite mound**; K.**Moth (*Ambulyx* sp.); **L.** Indian owlet moth (*Spirama retora*).[Photograph courtesy: Dr. Sudipta Chakraborty)

Figure 12: Photographs of some of the animals from the campus of the college: **A.** Nest of sunbird with eggs; **B.** Nest of Common tailorbird; **C.** Bengal fox (*Vulpes bengalensis)*; **D.** Indian vine snake (*Ahaetulla oxyrhyncha)*; **E.** Frog; **F.** Indian chameleon (*Chamaeleo zeylanicus*); **G.** Oriental garden lizard (*Calotes* sp.)**; H.** Russell's viper (*Daboia russelii*); **I.** Indian wolf snake (*Lycodon aulicus)* [Photograph courtesy: Debjyoti Giri (student), Dr. Nilay Kumar Maitra and Dr. Sudipta Chakraborty; Debjyoti Giri)

9.4.3 Butterfly garden: plant-animal interactions

i. Is there any dedicated butterfly garden in the college premises?

Yes. The college has a dedicated butterfly garden (900 sq. ft. area) along with vast flower bed spreading throughout the campus. It attracts pollinators like butterflies, honey bees, ants etc. round the year.

ii. How many species of butterflies are seen in the campus on annual basis?

More than thirty species of butterflies have been recorded in the butterfly garden and within the college campus (Table 4; Figure. 13, 14).

iii. What are the major foraging plants available for the butterflies and other pollinators?

Ixora sp., *Catharanthus roseus, Chrysanthemum* sp., *Cosmos* sp., *Celosia* sp., *Petunia* sp., *Rosa* sp., *Hibiscus* sp., *Lantana camara, Clitoria ternatea, Zinnia* sp. etc. are some flowering plants that are preferred by the butterflies for foraging.

Figure 13: Some flower beds that comprises part of the butterfly garden within the college campus: **A.***Ixora* sp.; **B.** *Petunia* sp.; **C.** *Celosia* sp.; **D.** *Catharanthus roseus;* **E.** *Cosmos* sp. **F.** *Zinnia* sp.*;* **G.** *Lantana camara* [Photograph courtesy: Ashok Das, Debarshi Mondal and Dr. Sudipta Chakraborty]

Table 4. The butterfly species as observed within the campus of Government General Degree College, Keshiary in the years 2019 and 2022 (Status: VC: Very Common; C: Common; R: Rare) (adapted from Chakraborty, 2023)

Sl. No.	Scientific Name	Common Name	Family	Status	2019	2022
1.	*Appias albino* (Biosduval, 1836)	Common Albatross	Pieridae	R	N	Y
2.	*Appias libythea* (Fabricius, 1775)	Striped Albatross	Pieridae	VC	Y	Y
3.	*Cepora nerissa* (Fabricius, 1775)	Common Gull	Pieridae	VC	Y	Y
4.	*Catopsilia pomona* (Fabricius, 1775)	Common Emigrant	Pieridae	VC	Y	Y
5.	*Eurema hecabe* (Linnaeus, 1758)	Common Grass Yellow	Pieridae	VC	Y	Y
6.	*Leptosia nina* (Fabricius, 1793)	Psyche	Pieridae	VC	Y	Y
7.	*Catochrysops strabo* (Fabricius, 1793)	Forget Me Not	Lycaenidae	VC	Y	Y
8.	*Spindasis vulcanus* (Fabricius, 1775)	Common Silverline	Lycaenidae	VC	N	Y
9.	*Papilio demoleus*(Linnaeus,1758)	Lime Butterfly	Papilionidae	VC	Y	Y
10.	*Papilio polytes* (Linnaeus, 1758)	Common Mormon	Papilionidae	VC	Y	Y
11.	*Pachliopta aristolochiae* (Fabricius, 1775)	Common Rose	Papilionidae	VC	N	Y
12.	*Ariadne merione* (Cramer, 1777)	Common Castor	Nymphalidae	VC	Y	Y
13.	*Acraea violae* (Fabricius, 1775)	Tawny Coster	Nymphalidae	VC	Y	Y
14.	*Danaus genutia* (Cramer, 1779)	Striped Tiger	Nymphalidae	VC	Y	Y
15.	*Euthalia aconthea* (Cramer, 1777)	Common Barron	Nymphalidae	VC	Y	Y
16.	*Elymnias hypermnestra* (Linnaeus,1763)	Common Palmfly	Nymphalidae	VC	Y	Y
17.	*Euploea core* (Cramer, 1780)	Common Crow	Nymphalidae	VC	Y	Y
18.	*Junonia hierta* (Fabricius, 1798)	Yellow Pansy	Nymphalidae	C	N	Y
19.	*Junonia orithya* (Linnaeus, 1758)	Blue Pansy	Nymphalidae	VC	N	Y
20.	*Junonia iphita* (Cramer, 1779)	Chocolate Pansy	Nymphalidae	C	Y	Y
21.	*Junonia atlites* (Linnaeus, 1763)	Grey Pansy	Nymphalidae	VC	Y	Y
22.	*Junonia almana* (Linnaeus, 1758)	Peacock Pansy	Nymphalidae	VC	Y	Y
23.	*Junonia lemonias* (Linnaeus, 1758)	Lemon Pansy	Nymphalidae	VC	Y	Y
24.	*Melanitis leda* (Linnaeus, 1758)	Common Evening Brown	Nymphalidae	VC	Y	Y
25.	*Moduza procris* (Cramer, 1777)	Commander	Nymphalidae	VC	Y	Y
26.	*Neptis hylas* (Linnaeus, 1758)	Common Sailer	Nymphalidae	C	Y	Y
27.	*Ypthimab aldus* (Fabricius, 1775)	Common Five Ring	Nymphalidae	VC	Y	Y
28.	*Ypthima huebneri* (Kirby, 1871)	Common Four Ring	Nymphalidae	VC	Y	Y
29.	*Amblypodia anita* (Hewitson, 1862)	Purple Leaf Blue	Lycaenidae	C	Y	Y
30.	*Castalius rosimon* (Fabricius, 1775)	Common Pierrot	Lycaenidae	VC	Y	Y

Figure 14: A. Yellow Pansy (*Junonia hierta*); **B.** Blue Pansy (*Junonia orithya*); **C.** Chocolate Pansy (*Junonia iphita*); **D.** Grey Pansy (*Junonia atlites*); **E.** Common Castor (*Ariadne merione*); **F.** Common Albatross (*Appias albino*); **G.** Common gull (*Cepora nerissa*); **H.** Striped Albatross (*Appias libythea*); **I.** Peacock Pansy (*Junonia almanac*); **J.** Lemon pansy (*Junonia lemonias*); **K.** Common Emigrant (*Catopsilia pomona*); **L.** Common Grass Yellow (*Eurema hecabe*); **M.** Common Baron (*Euthalia aconthea*); **N.** Common Palmfly (*Elymnias hypermnestra*); **O.** Common Evening Brown (*Melanitis leda*); **P.** Commander (*Moduza procris*)**Q.** Tawny Coster (*Acraea violae*); **R.** Striped Tiger (*Danaus genutia*); **S.** Common Pierrot (*Castalius rosimon*); **T.** Purple Leaf Blue (*Amblypodia anita*); **U.** Common Crow (*Euploea core*); **V.** Common Mormon (*Papilio polytes*); **W.** Forget Me Not (*Catochrysops strabo*)**X.** Lime Butterfly (*Papilio demoleus*); **Y.** Common Silverline (*Spindasis vulcanus*); **Z.** Psyche (*Leptosia nina*); **A1.** Common Sailer (*Neptis hylas*); **B1.** Common Four Ring (*Ypthima huebneri*) [Photograph courtesy: Dr. Sudipta Chakraborty]

9.4.4 Avian diversity

i. Is there any record of diversity of birds observed within the college premises?

Yes. The college has recorder more than twenty-five different bird species within the campus (Table 5; Figure 15).

ii. Are the observed bird species resident or migratory?

Some of the observed bird species are resident while some are migratory and seasonal.

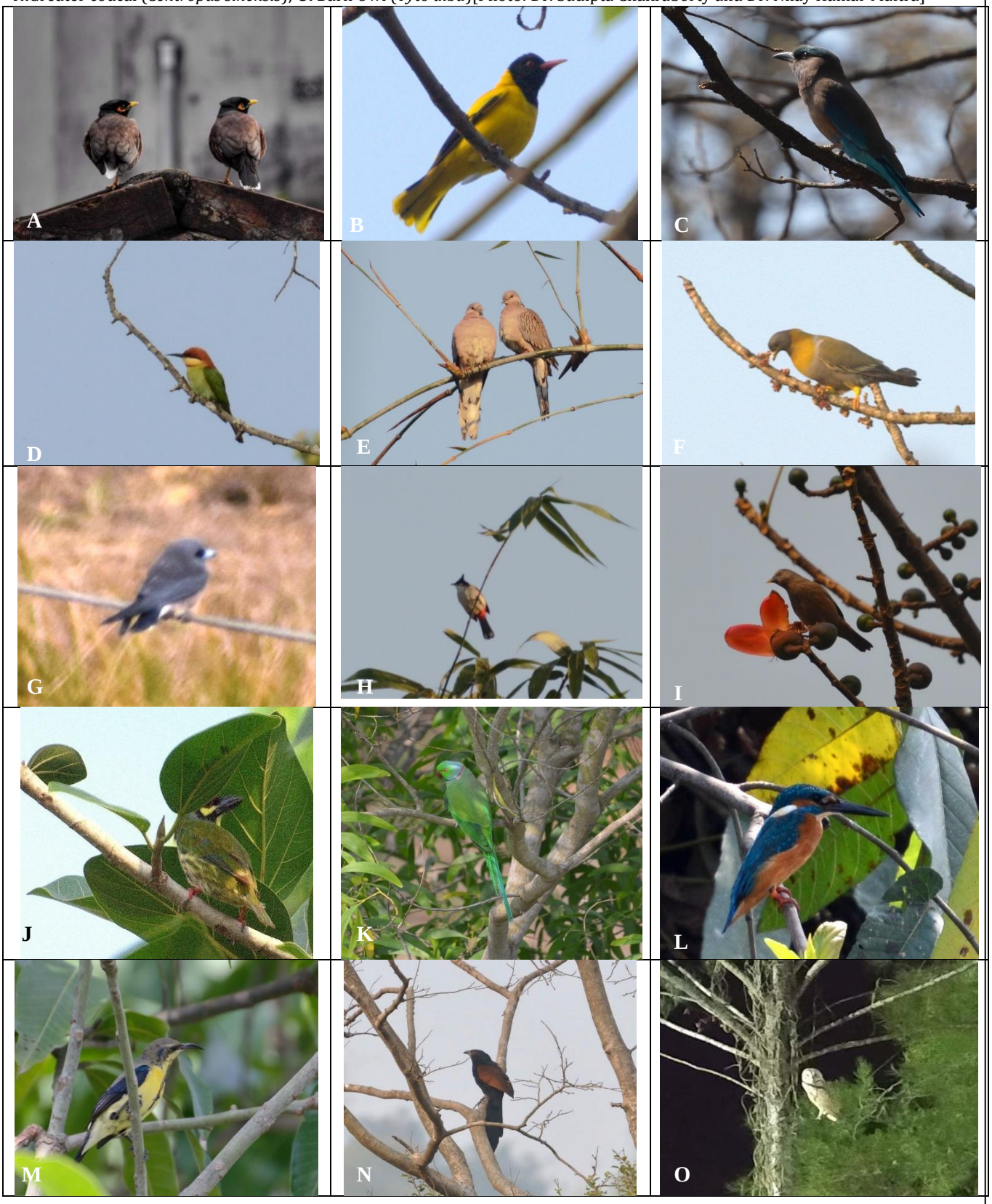
iii. What do they forage upon?

The birds usually forage upon naturally available fruits, insects and worms within the college campus.

Table 5. The avian species as observed within the campus of Government General Degree College, Keshiary

Sl. No.	Scientific Name	Common Name	Family	IUCN Status
1.	*Argya striata*	Jungle babbler/Chhatare	Leiothrichidae	Least Concern and stable population
2.	*Orthotomus sutorius*	Common Tailorbird /Tuntuni	Cisticolidae	Least Concern and stable population
3.	*Acridotheres tristis*	Common mayna	Sturnidae	Least Concern and increasing population
4.	*Tyto alba*	Barn Owl	Tytonidae	Least Concern and stable population
5.	*Psilopogon haemacephalus*	Coppersmith barbet	Megalaimidae	Least Concern and increasing population
6.	*Dicrurus macrocercus*	Black drongo	Dicruridae	Least Concern and unknown population
7.	*Dicrurus bracteatus*	Spangled tailed drongo	Dicruridae	Least Concern and stable population
8.	*Merops orientalis*	Green Bee-eater	Meropidae	Least Concern and increasing population
9.	*Treron phoenicopterus*	Yellow footed green pigeon	Columbidae	Least Concern and increasing population
10.	*Spilopelia chinensis*	Spotted Dove	Columbidae	Least Concern and increasing population
11.	*Oriolus xanthornus*	Black-hooded oriole	Oriolidae	Least Concern and stable population
12.	*Halcyon smyrnensis*	White-breasted kingfisher	Alcedinidae	Least Concern and increasing population
13.	*Dendrocitta vagabunda*	Rufous Treepie	Corvidae	Threatened
14.	*Pycnonotus cafer*	Red-vented Bulbul	Pycnonotidae	Least Concern and increasing population
15.	*Hirundo rustica*	Barn Swallow	Hirundinidae	Least Concern but decreasing population
16.	*Lanius cristatus*	Brown Shrike	Laniidae	Least Concern but decreasing population
17.	*Eudynamys scolopaceus*	Asian Koel	Cuculidae	Least Concern and stable population
18.	*Iduna caligata*	Booted Warbler	Acrocephalidae	Least Concern and increasing population
19.	*Lonchura atricapilla*	Chestnut Munia	Estrildidae	Least Concern and stable population
20.	*Cinnyris asiaticus*	Purple Sunbird	Nectariniidae	Least Concern and stable population
21.	*Upupa epops*	Eurasian Hoopoe	Upupidae	Least Concern but decreasing population
22	*Coracias benghalensis*	Indian roller	Coraciidae	Least Concern and increasing population
23.	*Centropus sinensis*	Greater coucal	Cuculidae	Least Concern and stable population
24.	*Sturnia malabarica*	Chestnut-tailed starling	Sturnidae	Least Concern and unknown population
25.	*Psittacula* sp.	Rose-ringed parakeet	Psittaculidae	-

Figure 15: Some common birds from the college campus: **A.**Common Mayna (*Acridotheres tristis*); **B.** Black-hooded oriole (*Oriolus xanthornus*); **C.** Indian roller (*Coracias benghalensis*); **D.** Green bee-eater (*Merops orientalis*); **E.** Spotted dove (*Spilopelia chinensis*); **F.** Yellow footed green pigeon (*Treron Phoenicopterus*); **G.** Ashy Wood swallow (*Artamus fuscus*); **H.** Red-vented bulbul (*Pycnonotus cafer*); **I.** chestnut-tailed starling (*Sturnia malabarica*); **J.** Coppersmith barbet (*Psilopogon haemacephalus*);**K.**Rose-ringed parakeet (*Psittacula* sp.); **L.** White-breasted kingfisher(*Halcyon smyrnensis*); **M.** Purple sunbird (*Cinnyris asiaticus*); **N.**Greater coucal (*Centropus sinensis*); **O.** Barn Owl (*Tyto alba*)[Photo: Dr. Sudipta Chakraborty and Dr. Nilay Kumar Maitra]



9.5 Waste management

i. What are the different types of wastes generated by the institute?

Solid waste, office waste, laboratory waste, canteen waste, e-waste etc. which are of two categories: (bio-degradable and non-biodegradable).

ii. What is the approximate amount of waste generated per day (in kilogram)?

Sl. No.	*Type of waste*	*Components*	*Amount*
a.	Biodegradable waste	Solid waste, papers and packaging materials, fruits and vegetable waste etc.	109.00 kg
b.	Non-biodegradable waste	Plastic packaging materials for food, instruments and materials of regular use	91.00 kg
c.	e-waste	Electronic spares and damaged materials etc.	09.00 kg
d.	Hazardous waste	Laboratory refuges etc.	37.00 lt

iii. How is the waste managed in the institute?

Sl. No.	*Type of waste*	*Waste treatment and management*
a.	Biodegradable waste	i. Aerobic composting is done to generate biofertilizer for the college garden ii. One side printed non-essential papers are re-used for internal communication iii. Internal circulars are communicated to the departments by emails and electronic media like WhatsApp etc. iv. Pay-slips, office orders are generated and distributed via human resource management system thereby reducing paper waste
b.	Non-biodegradable waste	i. The campus has been declared as a plastic-free zone. ii. All the plastic wastes of the campus are accumulated in bins and periodically discarder by Block administration
c.	e-waste	Electronic spares and damaged materials etc. are stored in a college store room and the college has the provision to write-off by Government tender for possible e-recycling
d.	Laboratory refuges	Diluted solutions are used instead of concentrated solutions in laboratories (as far as practicable)

iv. Do you use recycled paper in institute?

Yes. Some of the papers for office use are recycled quality. Moreover, one side printed non-essential papers are re-used for internal communication.

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

Yes. The message of recycling and waste reduction is periodically sensitized by:

a.	Organizing poster competition
b.	Organizing seminars and popular lecture
c.	Organizing rally and periodic campus cleaning drive involving students, teachers as well as the non-teaching staff

vi. Have you achieved zero garbage in your institute?

Not yet achieved. It can be made possible in future through organized waste planning and management system.

9.6 Water management

i. What is the source of water of regular use within the college campus and how are they being stored and replenished?

Sl. No.	Water storage type with source of the water	Water storage tank capacity	Number of tanks	Total capacity	Replenishing frequency
a.	Overhead tanks on main college building (underground water raised by submersible pump)	5000 lt	06	30000 lt	Once in every 5 days during July-February and once every 3 day during March-June
b.	Overhead tank on student section (underground water raised by submersible pump)	5000 lt	02	10000 lt	Once in every 5 days during July-February and once every 3day during March-June
c.	Overhead tank on security guard chamber (underground water raised by submersible pump)	1000 lt	01	1000 lt	Once in every 3 days during July-February and once every 2 day during March-June

ii. Is there any artificial/natural rain water harvesting system in the institute? If yes, mention the nature, capacity of water storage, method of replenishment.

Yes, the institute have both artificial as well as natural rain water harvesting systems in the campus.

Sl. No.	Water storage type with source of the water	Water storage tank capacity	Number of tanks	Total capacity	Replenishing method
a.	Rooftop rainwater storage tank	1000 lt	02	2000 lt	Filled up by roof top rain water and overflow of the overhead tanks
b.	Rainwater storage tank	10000 lt	01	10000 lt	Filled up by roof top rain water and overflow of the overhead tanks; regularly used for gardening and washing
c.	Natural waterbody (rain fed)	500000 lt	01	500000 lt	Filled up by rain during the monsoon months or any seasonal rain

iii. Mention the different uses of water in the institute per month

Sl. No.	Types of water usage in the campus	Average water usage	Average water usage
a.	Drinking water	7000 lt. per month during July-March and 10000 lt per month during April-June	7,750 lt. per month
b.	Gardening	15000 lt. per month during July-March and 25000 lt. per month during April-June	17,500 lt. per month
c.	Toilets and sanitation	100000 lt. per month	1,00,000 lt. per month
d.	Canteens	20000 lt. per month	20,000 lt. per month
e.	Laboratory	30000 lt. per month	30,000 lt. per month
f.	Others	20000 lt. per month	20,000 lt. per month
		Total:	***195250 lt. per month***

iv. Mention the different measures adopted to reduce loss of water:

a. Water conservation and awareness programme are organized with the new students
b. Closing of the taps after usage is practiced and relevant notice are being displayed at water points
c. Regular monitoring of the valves and outlet points in the water supply system is done to avoid overflow, leakage and spillage.
d. The potable water points are fitted with push taps to save water and water flow is regulated by auto-cut timer.

9.7 Energy budget: Carbon dioxide emission and sequestration

i. What are major electrical installations existing within the college campus? Mention the specification, wattage and number.

Sl. No.	Type of electrical installations	Watt	Number
a.	Tube lights	40	369
b.	Tube lights (LED)	20	40
c.	Bulb (CFL)	18	20
d.	Bulb (LED)	9	54
e.	Ceiling fan	60	234
f.	Stand fan	55	02
g.	Exhaust fan	50	21
h.	Air conditioner (Four star)	1500	18
i.	Refrigerator	220	5
j.	Photocopiers	30.80	7
k.	Printers	230	10
l.	Scanner	12	6
m.	Inverter system	1200	05
n.	Computer (desktop)	150	22
o.	Overhead LCD projector	300	07
p.	Spectrophotometer	80	02
q.	Water distillation unit	2000	02
r.	Autoclave machine	1500	01
s.	Incubator	1500	03
t.	Shaker	170	01
u.	Centrifuge	150	04
v.	Potable water purification plant	20	03
w.	Roof top flood light (LED)	150	10
x.	High mast light (LED)	200	02
y.	Submersible pump (2 Hp)	1490	02
z.	Deep freezer	165	01
zi.	Hot air oven	1100	01

ii. Mention the electrical power consumption of the college in the Academic Year 2022-2023 (in kWatt)

Electricity consumed in the period June,2022 to May, 2023: 15,712.00 kWatt

Sl. No.	Consumption period	Unit consumed (KWatt)	Total (KWatt)	Bill amount (Rs.)	Total (Rs.)
a.	June, July, August, 2022	2966.00	**15,712.00**	28653	1,48,817/-
b.	September, October, November, 2022	4558.00		42804	
c.	December, 2022, January, February 2023	2582.00		25241	
d.	March, April, May, 2023	5606.00		52119	

iii. Mention the consumption of LPG (kg) in the laboratories of the college in the Academic Year 2022-2023

LPG consumed in the FY 2022-2023: 05.00 kg

iv. Mention the consumption of Diesel (lt) by the diesel electric power generator of the college in the Academic Year 2022-2023

Diesel used in the FY 2022-2023: 10.00 lt

iv. Estimate the emission and sequestration of CO_2 in the college in the Academic Year 2022-2023

A. Carbon dioxide emission

i. Electricity used per year - CO_2 emission from Electricity

Electricity used in 2022-2023: 15,712.00kWatt

***CO_2* emission=** [(Electricity used per year in kWh/1000) x 0.84] ton
= (15712/1000 x 0.84)
= **18.70 ton**

ii. LPG used per year: CO_2 emission from LPG/PNG

LPG used in 2022-2023: 05.00kg

***CO_2* emission=** [(LPG used per year in kg)/1000 x 2.99] ton
= (5/1000 x 2.99) ton
= **0.01495 ton**

iii. Diesel used per year: CO_2 emission from power generator (Diesel)

Diesel used in 2022-2023: 10.00lt

***CO_2* emission =** [(Diesel used per year in kg)/1000 x 2.68] ton
= [10/1000 x2.68) ton
= **0.0268 ton**

iv. Transportation per year: CO_2 emission from transportation (Bus and Car)

GGDC, Keshiary doesn't own any vehicle. So emission due to transportation by Bus/Car is **zero**.

Total **CO_2**emission in AY 2022-2023 [by: electricity usage + LPG use + Diesel Use + Bus and car transportation] = (18.70 + 0.01495 + 0.0268) = **18.742 ton**

B. Energy generation from renewable source: green energy

Sl. No.	Solar panel capacity	Number of solar plants	Yield of power per day (kWatt)	Yield of power per year (kWatt)	*Negative CO_2 emission (ton)*
a.	50 Watt Power	10	0.50	182.5	**0.1533**

The ten solar powered lamp-posts were installed in the January, 2020 (Annexure 5)

C. Carbon dioxide sequestration

Sl. No.	Category of plant	Rate of *CO_2* fixation*	Number of trees	Total *CO_2* fixation (kg)	Total *CO_2* fixation (ton)
a.	Fully grown tree	22 kg/ year	212	4664	4.664
b.	Semi grown tree	11 kg/year	218	2398	2.398
c.	Shrub	0.20 kg/year	168	33.4	0.0336
d.	Herb	0.20 kg/year	887	177.4	0.1774
e.	Grassland	0.365 kg /10 sq. ft./year	10,000 sq. ft.	3650.00	3.650
		Total:	**1298**	**10867.8**	**10.923**

Net *CO_2* emission: (A-B-C) = (18.742 -0.1533–10.923) ton = 7.6657 ton

9.8 Energy conservation strategies

Following strategies have been adopted to minimise the misuse of energy in the college campus:

A. Installation of solar powered lamp posts
B. Judicious use of electrical installations and display of notice near electrical points
C. Utilization of natural light for classrooms and laboratory
D. Conducting awareness campaign and seminars on energy conservation

9.9 Greening of the campus and its impact on the stakeholders and society

The greenery established within the college campus is a continuous and it is being uninterruptedly monitored by its multiple watchdogs including its NSS Unit 1, Swachhata Team and environment conscious teachers and students. In this tryst the campus and its surroundings is regularly being cleaned of pollutants alike plastic wastes (Figure 16 a, b. c; Figure 17).

Figure 16. Initiative by the teachers and students of GGDC, Keshiary to make the college campus free of plastic pollutant affecting soil and greenery

Figure 17: Plants of different nature are being donated by the students for plantation in the college garden

The greening of the college campus has been done through relentlessly nature-promoting activities involving the students, teaching staff and non-teaching staff of the college (Figure 6, 7). The activities of plantation of plants have been formally initiated by the NSS Unit 1 of the college and also involuntarily by the students of the college (Figure 17). The college has observed World Water Day (March 22), Earth Day (April 22), World Environment Day (June 5), No Plastic Day (July 3), National Pollution Control Day (Dec 2) to create opportunity for plantation of new plants within the campus. Moreover, every formal occasion of the college is being celebrated by formal plantation of a plant sapling within the college campus. The green initiatives of the college have already attracted accolades from recognized bodies (Annexure 6).

The students of the college take voluntary initiatives to water the plants and in this regard the water harvested during the rainy seasons is utilized to a great extent (Figure 17). The students are regularly being sensitized and encouraged to support greening of the campus by conducting popular talks on environmental issues by organizing in-house seminars, workshops and invited talks the Seminar and Symposium Sub-committee of the college. Additionally, the aesthetics of the garden is further beautified by planting seasonal flowering plants. The beautiful greening of the campus has not only beautified the college but has drawn admiration of the students, local people and visitors (Figure 18).

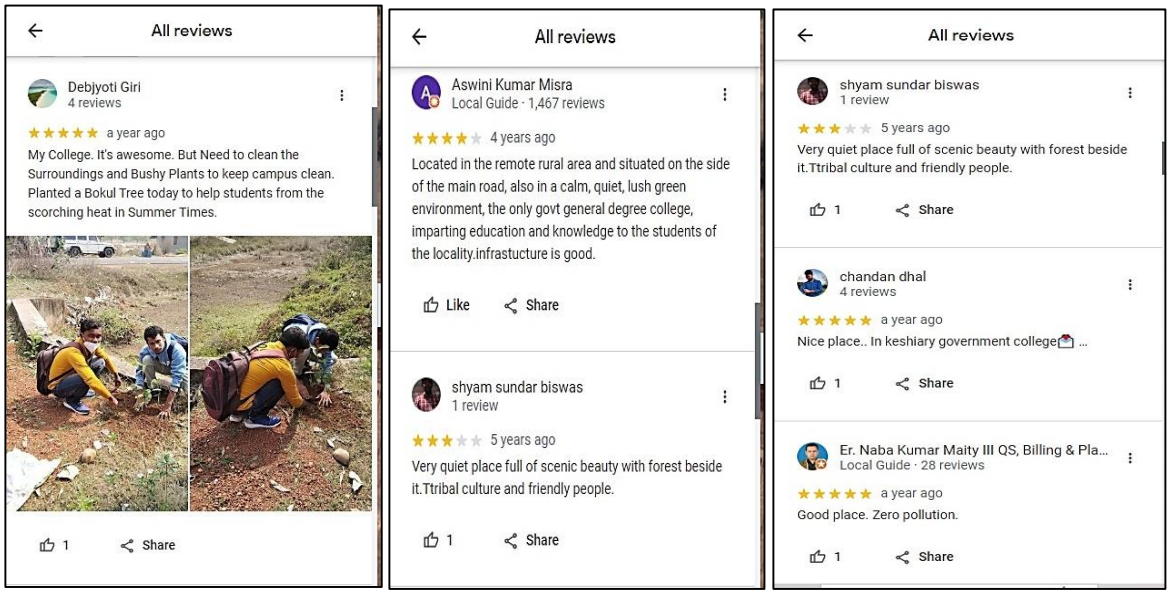


Figure 18. Selected review on the campus environment of GGDC, Keshiary as available in the in Google Map.(Source:https://www.google.com/maps/place/Government+General+Degree+College,+Keshiary/@22.160583,87.2442879,17z/data=!4m7!3m6!1s0x3a1d3e494f247725:0xfe9e0ff7d7b1fcc2!8m2!3d22.160578!4d87.2464766!9m1!1b1)

10 Recommendation by the audit experts

a. Plantation of more trees within the college campus for better fixation of carbon
b. Installation of more solar powered electrical units
c. Increasing the capacity of rain water harvest and storage system
d. Installation of ground water recharge system to replenish the underground water table with rooftop rain water
e. Installation of a greenhouse and a horticulture unit
f. Increasing the floral bed to allure more butterflies and other pollinators
g. College should increase the use of Sprinklers gardening purpose
h. College should start drip irrigation to save water in campus
i. Water Meter should be installed at every building of institute for monitoring of water consumption per capita.
j. Flow rate of taps should be checked, it should not be more than 2.5 litres/minute
k. All the lights should be LED to reduce power consumption
l. The air conditioning system must be restricted at 25^0C or above to minimize energy consumption
m. Students should be encouraged to use bicycle as personal mode of transport; use of personal vehicle should be discouraged.
n. Single use of plastic for personal use should be banned in campus
o. Installation of air pollution monitor

11 References

[1] The Environment [Protection] Act, 1986 (Amended 1991) & Rules-1986 (Amended 2010)
[2] The Petroleum Act: 1934
[3] The Petroleum Rules: 2002
[4] The Central Motor Vehicle Act: 1988 (Amended 2011) and The Central Motor Vehicle¬ Rules:1989 (Amended in 2005)
[5] Energy Conservation Act 2010.
[6] The Water [Prevention¬& Control Of Pollution] Act, 1974 (Amended 1988) & the Water (Prevention& Control of Pollution) Rules, 1975
[7] The Air [Prevention¬& Control Of Pollution] Act, 1981 (Amended 1987) The Air (Prevention & Control of Pollution) Rules, 1982
[8] The Gas Cylinders Rules, 2016 (Replaces the Gas Cylinder Rules, 1981
[9] E-waste management rules 2016
[10] Electrical Act 2003 (Amended 2001) / Rules 1956 (Amended 2006)
[11] The Hazardous Waste (Management and Handling and Trans-boundary Movement) Rules, 2008 (Amended 2016)
[12] The Noise Pollution Regulation¬& Control rules, 2000 (Amended 2010)
[13] The Batteries (Management and Handling) rules, 2001 (Amended 2010)
[14] Relevant Indian Standard Code practices
[15] Bernal, B., Murray, L.T. and Pearson, T.R.H. (2018). Pearson Global carbon dioxide removal rates from forest landscape restoration activities. *Carbon Balance and Management* ,13, 22. https://doi.org/10.1186/s13021-018-0110-8

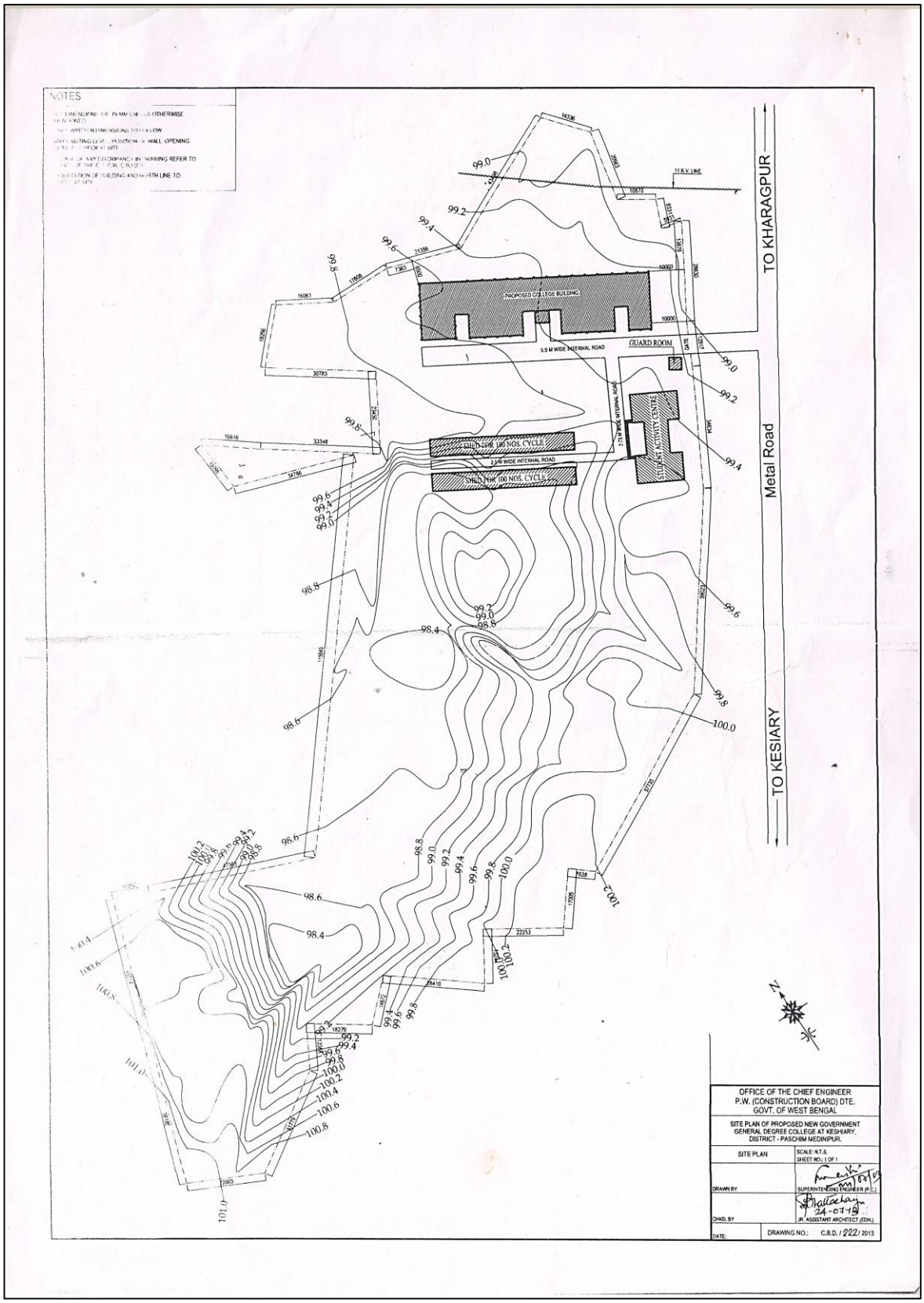
12 Photo gallery

Gallery 1. Views of greenery from different angles within the campus of GGDC, Keshiary: (A) towards the southern end beyond the cycle stand with natural waterbody; (B) towards the student section; (c). the college campus is located on a natural elephant corridor and migratory proboscideans are being encountered every year near the college.

Gallery 2: Diverse efforts by the Government General Degree College, Keshiary for the maintenance of a clean and green campus: (A) Plantation of plant sapling by Principal, Jhargram Raj College; (B, C) Installed solar lamp-posts in the premises of Government General Degree College, Keshiary on 27.01.2020; (D) Weighing of the paper wastes for disposal into compost pit; (E) Deposition of biodegradable wastes in compost pit; (F) Rooftop rainwater harvesting system for use of gardening; (G) Use of rooftop rain water and overflow water in rearing of aquaculture in the college campus.

ANNEXURE 1

Official site plan of the fire acre campus of Government General Degree College, Keshiary



ANNEXURE 2

Annual Maintenance Contract of water filtration units with Eureka Forbes

Original for Recipient

TAX INVOICE

EUREKA FORBES LIMITED
(Formerly Forbes Enviro Solutions Ltd.)
KOUSHALLYA OPP. RAJ NURSING HOME
KHARAGPUR 721301
www.eurekaforbes.com

GSTIN: 19AABCF3759R1ZU PAN: AABCF3759R CIN: L27310MH2008PLC188478
GST Principal Place of Business: 201 Second Floor, Southend Enclave R.B Connector, EKADB Kokata, West Bangal 700107
Name of State: West Bengal State Code: 19
Tax is Payable on Reverse Charge (Yes/No) : No
Invoice No : IN23WB0053139 **Ref No : 823481235 Invoice Date :** 25.07.2022
IRN No :

Mode of Transport:
Veh No:
Place of Supply: 19 - West Bengal
Ack No :
Ack.Date :

Details of Receiver(Billed to) : PAN NO. :
Customer code : 1013709008
Name: PRINCIPAL/OFFICER INCHARGEGOVERNMEN
Address: KESHIARY GOVERNMENT COLLAGE 00 PO-TILABONI KESHIARY 721135
State Code : 19
GSTIN/Uniqne ID:
PO Number and Date :

Details of Consignee(Shipped to)
Customer Code: 1013709008
Name: PRINCIPAL/OFFICER INCHARGEGOVERNMEN
Address: KESHIARY GOVERNMENT COLLAGE 00 PO-TILABONI KESHIARY 721135
State Code : 19
GSTIN/Unique ID:
PO Number and Date :

S. No.	Description Of Service	SAC code	Qty	Unit	Rate	Total(Base Price)	Discount / Abatement	Taxable Amount	CGST Rate	CGST Amount	SGST Rate	SGST Amount
1	Maint & repair services of electrical household appliances DRCLS1C36 DR. AG CLASSIC NEW -36 MTHS COMP.AMC For AMC Period From 25.07.2022 To 24.07.2025	998715	1	NOS	4788.15	4788.15	423.73	4364.42	9 %	392.79	9 %	392.79
	Total Amount					4788.15	423.73	4364.42		**392.79**		392.79

Invoice Total(In Words): FIVE THOUSAND ONE HUNDRED FIFTY AND ZERO PAISE Only.
Invoice Total 5150.00

Execution Partner: 0000090431-ASHIT DOLAI

TERMS AND CONDITION OF SALE
1. For AMC T&C please visit https://www.eurekaforbes.com/amc-terms-and-conditions.
2. Payment by "Account Payee" Cheques / Drafts only in the name of Eureka Forbes Limited.
3. Payment received beyond due date will attract interest @ 18% P.A for the period of delay.
4. Concessional rate of Tax charged or exemption from charging tax will apply only if the appropriate declaration / form(s) is /are received along with P.O , otherwise the buyer is liable to pay full tax.
5. Subject to Mumbai jurisdiction
We certify that the particulars given above are true and the amount indicated represents the price actually charged for the service and there is no flow of additional consideration directly or indirectly from the buyer for this transaction.

Signature Not Verified
Digitally Signed By:
DS EUREKA FORBES LIMITED 2
Mon 25-Jul-2022 18:56:51 IST
Kavita Gandhi
Authorised Signatory

Page 1 of 1

Original for Recipient

TAX INVOICE

EUREKA FORBES LIMITED
(Formerly Forbes Enviro Solutions Ltd.)
KOUSHALLYA OPP. RAJ NURSING HOME
KHARAGPUR 721301
www.eurekaforbes.com

GSTIN: 19AABCF3759R1ZU PAN: AABCF3759R CIN: L27310MH2008PLC188478
GST Principal Place of Business: 201 Second Floor,Southend Enclave R.B Connector,EKADB Kokata, West Bangal 700107
Name of State: West Bengal State Code: 19
Tax is Payable on Reverse Charge (Yes/No) : No
Invoice No : IN23WB0053136 **Ref No : 823481230 Invoice Date :** 25.07.2022
IRN No :

Mode of Transport:
Veh No:
Place of Supply: 19 - West Bengal
Ack No :
Ack.Date :

Details of Receiver(Billed to) : PAN NO. :
Customer code : 1013709008
Name: PRINCIPAL/OFFICER INCHARGEGOVERNMEN
Address: KESHIARY GOVERNMENT COLLAGE 00 PO-TILABONI KESHIARY 721135
State Code : 19
GSTIN/Unique ID:
PO Number and Date :

Details of Consignee(Shipped to)
Customer Code: 1013709008
Name: PRINCIPAL/OFFICER INCHARGEGOVERNMEN
Address: KESHIARY GOVERNMENT COLLAGE 00 PO-TILABONI KESHIARY 721135
State Code : 19
GSTIN/Unique ID:
PO Number and Date :

S. No.	Description Of Service	SAC code	Qty	Unit	Rate	Total(Base Price)	Discount / Abatement	Taxable Amount	CGST Rate	CGST Amount	SGST Rate	SGST Amount
1	Maint & repair services of electrical household appliances DRCLS1C36 DR. AG CLASSIC NEW -36 MTHS COMP.AMC For AMC Period From 25.07.2022 To 24.07.2025	998715	1	NOS	4788.15	4788.15	423.73	4364.42	9 %	392.79	9 %	392.79
	Total Amount					4788.15	423.73	4364.42		**392.79**		392.79

Invoice Total(In Words): FIVE THOUSAND ONE HUNDRED FIFTY AND ZERO PAISE Only. | **Invoice Total** | **5150.00**

Execution Partner: 0000090431-ASHIT DOLAI

TERMS AND CONDITION OF SALE
1. For AMC T&C please visit https://www.eurekaforbes.com/amc-terms-and-conditions.
2. Payment by "Account Payee" Cheques / Drafts only in the name of Eureka Forbes Limited.
3. Payment received beyond due date will attract interest @ 18% P.A for the period of delay.
4. Concessional rate of Tax charged or exemption from charging tax will apply only if the appropriate declaration / form(s) is /are received along with P.O , otherwise the buyer is liable to pay full tax.
5. Subject to Mumbai jurisdiction

We certify that the particulars given above are true and the amount indicated represents the price actually charged for the service and there is no flow of additional consideration directly or indirectly from the buyer for this transaction.

Signature Not Verified
Digitally Signed By:
DS EUREKA FORBES LIMITED 2
Mon 25-Jul-2022 18:54:46 IST
Kavita Gandhi
Authorised Signatory

Page 1 of 1

ANNEXURE *3*

Report on water quality analysis of the Government General Degree College, Keshiary

Madhumita Maitra
M. Sc. Ph.D
Assistant Professor
Department Of Microbiology (U.G. and P.G.)
St. Xavier's College (Autonomous)
(Under University of Calcutta)

30, Mother Teresa Sarani
Kolkata - 700016
Phone : (033)2255-1276
Mobile: 9831337928
email: madhumitamaitra@sxccal.edu

Date: **26th June 2023**

To

The Officer-in-charge
Govt. General Degree College, Keshiary
Keshiary

Subject: Water analysis report of the Govt. General Degree College, Keshiary (WB).

Dear Sir,

With regard to the letter no.98/GGDCK/2023 dated 27.03.2023, I hereby accept the invitation for conducting the water analysis report of the Govt. Gen. Degree College, Keshiary with reference to its Green audit and Energy audit related survey. The analysis of the three water samples were carried out collected from three different sources inside college premises. Various analytical tests were carried out and it was found that the filtered water is the potable water that is fit for consumption. The detailed analysis report is attached herewith for reference.

Thanking you,

26.06.23
Dr. Madhumita Maitra
Assistant Professor

Department of Microbiology
St. Xavier's College
Kol-16

Residence: **SONARTORI, 79- DUM DUM PARK, KOLKATA - 700055**

Water Quality Assessment Report
Government General Degree College, Keshiary
Paschim Medinipore [West Bengal]

Prepared By: Dr. Madhumita Maitra
Assistant Professor
Department of Microbiology
St. Xavier's College,
30 Mother Teresa Sarani,
Kolkata - 700016
9831337928

Date: **26th June 2023**

The objective of water quality monitoring is to obtain qualitative and quantitative information on the physical, chemical, and biological characteristics of water via statistical sampling methods. Though there are many methods of analysis we have focussed on the biological characterisation of the provided water samples from the above mentioned college premises.

Three water samples were provided namely – 2 Tap water samples (Student section & Main building) and 1 filtered water sample (Main building).
Test Performed –
1. pH of the water samples.
2. Most Probable Number [MPN] of enteric lactose fermenting bacteria.
3. Pathogenecity of bacterial growth.
4. Determination of Chlorine content.

Results of the Test performed -

pH of the water samples were found to be –
1. Tapwater 1 Student section [T1] – 6.2
2. Tapwater 2 Main building [T2] – 6.3
3. Filtered water Main building [FW] – 6.6

MPN Analysis –
The **MPN index per 100ml** for different water samples were found to be:
1. Tapwater 1 [T1] – 2
2. Tapwater 2 [T2] – 2
3. Filtered water [FW] – Less than 2

Bacterial growth was found in Tapwater water 1 and Tapwater water 2 but no gas production in Durham's tubes. Hence, lactose fermenting bacteria were found to be absent.

Pathogenecity of bacterial growth:
Since bacterial growth was found in MPN test in sample T1 and T2 but no gas production, it was further analysed to check pathogenecity of the bacteria. The samples were inoculated on the Blood Agar media and allowed to incubate for 48 hrs.
The bacterial growth does not produce a hemolytic zone, hence no change to the RBCs, and the medium remain opaque red. This lack of hemolysis infers that the **bacteria are not pathogenic** and harmful.

Chlorine content:
The amount of chlorine was determined in three water samples and found to be as follows –
1. Tapwater 1 [T1] – 0.6mg/l
2. Tapwater 2 [T2] – 0.5mg/l
3. Filtered water [FW]- 0.2mg/l

Analysis of the results -
Routine surveillance of drinking water supplies should be carried out by the relevant authorities to understand the risk of specific pathogens and to define proper control procedures.
1. The pH of the water samples were found to be suitable for consumption.
2. The MPN analysis showed some bacterial growth in Tapwater but no growth at all in filtered water. This showed that the filtered water is most suitable for consumption. However the bacteria found in Tapwater were found to be non-pathogenic, as they do not exhibit any hemolysis on Blood Agar medium.
3. The chlorine content were a little higher in Tapwaters due to chlorination done in water supply. However it was reduced in filtered water making the filtered water fit for consumption.
All the results therefore shows that the filtered water can be classified as the **Potable water** fit for consumption.

Suggestions:
1. A regular analysis with an interval of 6-7 months should be carried out to have a routine reporting of the year.
2. Few other biochemical tests like dissolve oxygen, biochemical oxygen demand, phosphate and nitrate should be analysed, if possible.

26.06.23
Dr. Madhumita Maitra
Assistant Professor

Department of Microbiology
St. Xavier's College
Kol-16

References:

Following range of values are used as references for the water quality analysis of Potable water –

1. pH of the potable water - recommended pH level between 6.5 to 8.5.
2. MPN analysis - WHO standard for drinking water shows water sample should have an MPN value of 2.2 MPN/100 ml of water (Addo et al., 2009).
3. Chlorine levels up to 4 milligrams per liter (mg/L or 4 parts per million (ppm)) are considered safe in drinking water.
4. Culture in Blood Agar media - The water destined for human consumption should be free from all microorganisms, although in practice, this is an unattainable goal. While heterotrophic bacteria are a part of the natural flora of most surface and ground waters, no pathogens should be present.

Dr. Madhumita Maitra
Assistant Professor

Department of Microbiology
St. Xavier's College
Kol-16

General Degree College, Keshiary

Annexure 4

Electricity bills of Government General Degree College, Keshiary for the AY 2022-2023

(Electricity bill for the period of 22.05.2022 – 30.08.2022)

West Bengal State Electricity Distribution Company Ltd.

(A Government of West Bengal Enterprise)

BILL-Internet Copy

Helpline Number (24X7) 19121

WBSEDCL

KESHIARY CUSTOMER CARE CENTER, PHONE No - , CALL CENTER PHONE No - 19121(TOLL FREE), TAN: CALW05053G

Hours of Payment of Bill: Monday to Friday : From 9.30 A.M. to 3.45 P.M. CHEQUES WILL NOT BE ACCEPTED AFTER DUE DATE

PRINCIPAL		Invoice No.	: 452010264245
KESHIARY GOVT. COLLEGE VILL-		Prev. Reading Date	: 22.05.2022
TELIPUSKARINI PO- TILABONI		Present Reading Date	: 30.08.2022
Pin -		Billing Date	: 30.08.2022
Consumer Id	: 202056784	Next Reading Date:16.11.2022-20.11.2022	
Business Partner No:	20790193	Connected Load	: 35.88 KVA
Tariff Class	: A(CM-R)	LEGC-GIS Pl No:NA-NA	
Installation No	: 18426667	Meter Reading unit	: B4T17QMR
Latitude	: 22.1688815	PAN of consumer(s)	:
Longitude	: 87.2467509		

Meter No	Time	Previous Reading	Present Reading	MF	Unit consumed	Max Demand (KVA)
ST803200	N	94101.00	97067.00	1.00	2966.00	

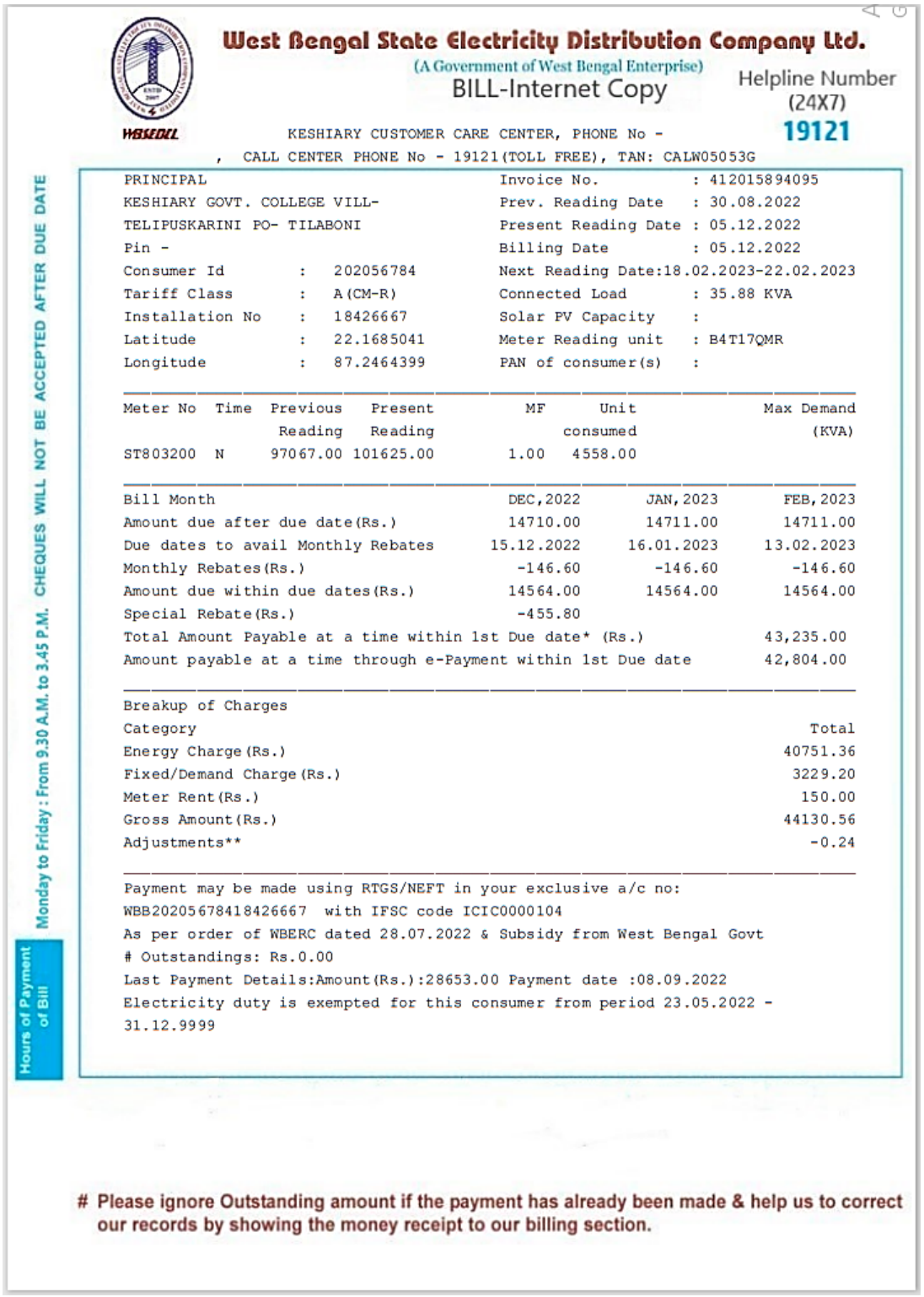
Bill Month	SEP,2022	OCT,2022	NOV,2022
Amount due after due date(Rs.)	9844.00	9844.00	9844.00
Due dates to avail Monthly Rebates	09.09.2022	11.10.2022	09.11.2022
Monthly Rebates(Rs.)	-97.93	-97.94	-97.94
Amount due within due dates(Rs.)	9746.00	9747.00	9747.00
Special Rebate(Rs.)	-296.60		
Total Amount Payable at a time within 1st Due date* (Rs.)			28,941.00
Amount payable at a time through e-Payment within 1st Due date			28,653.00

Breakup of Charges	
Category	Total
Energy Charge(Rs.)	26152.72
Fixed/Demand Charge(Rs.)	3229.20
Meter Rent(Rs.)	150.00
Gross Amount(Rs.)	29531.92
Adjustments**	-0.83

Payment may be made using RTGS/NEFT in your exclusive a/c no:
WBB20205678418426667 with IFSC code ICIC0000104
As per order of WBERC dated 28.03.2022 & Subsidy from West Bengal Govt
Outstandings: Rs.0.00
Last Payment Details:Amount(Rs.):29814.00 Payment date :01.06.2022
Electricity duty is exempted for this consumer from period 23.05.2022 - 31.12.9999

Please ignore Outstanding amount if the payment has already been made & help us to correct our records by showing the money receipt to our billing section.

(Electricity bill for the period of 30.08.2022 – 05.12.2022)



West Bengal State Electricity Distribution Company Ltd.

(A Government of West Bengal Enterprise)

BILL-Internet Copy

Helpline Number (24X7) 19121

WBSEDCL

KESHIARY CUSTOMER CARE CENTER, PHONE No - , CALL CENTER PHONE No - 19121(TOLL FREE), TAN: CALW05053G

Hours of Payment of Bill: Monday to Friday : From 9.30 A.M. to 3.45 P.M. CHEQUES WILL NOT BE ACCEPTED AFTER DUE DATE

PRINCIPAL
KESHIARY GOVT. COLLEGE VILL-
TELIPUSKARINI PO- TILABONI
Pin -

Consumer Id : 202056784
Tariff Class : A(CM-R)
Installation No : 18426667
Latitude : 22.1685041
Longitude : 87.2464399

Invoice No. : 412015894095
Prev. Reading Date : 30.08.2022
Present Reading Date : 05.12.2022
Billing Date : 05.12.2022
Next Reading Date:18.02.2023-22.02.2023
Connected Load : 35.88 KVA
Solar PV Capacity :
Meter Reading unit : B4T17QMR
PAN of consumer(s) :

Meter No	Time	Previous Reading	Present Reading	MF	Unit consumed	Max Demand (KVA)
ST803200	N	97067.00	101625.00	1.00	4558.00	

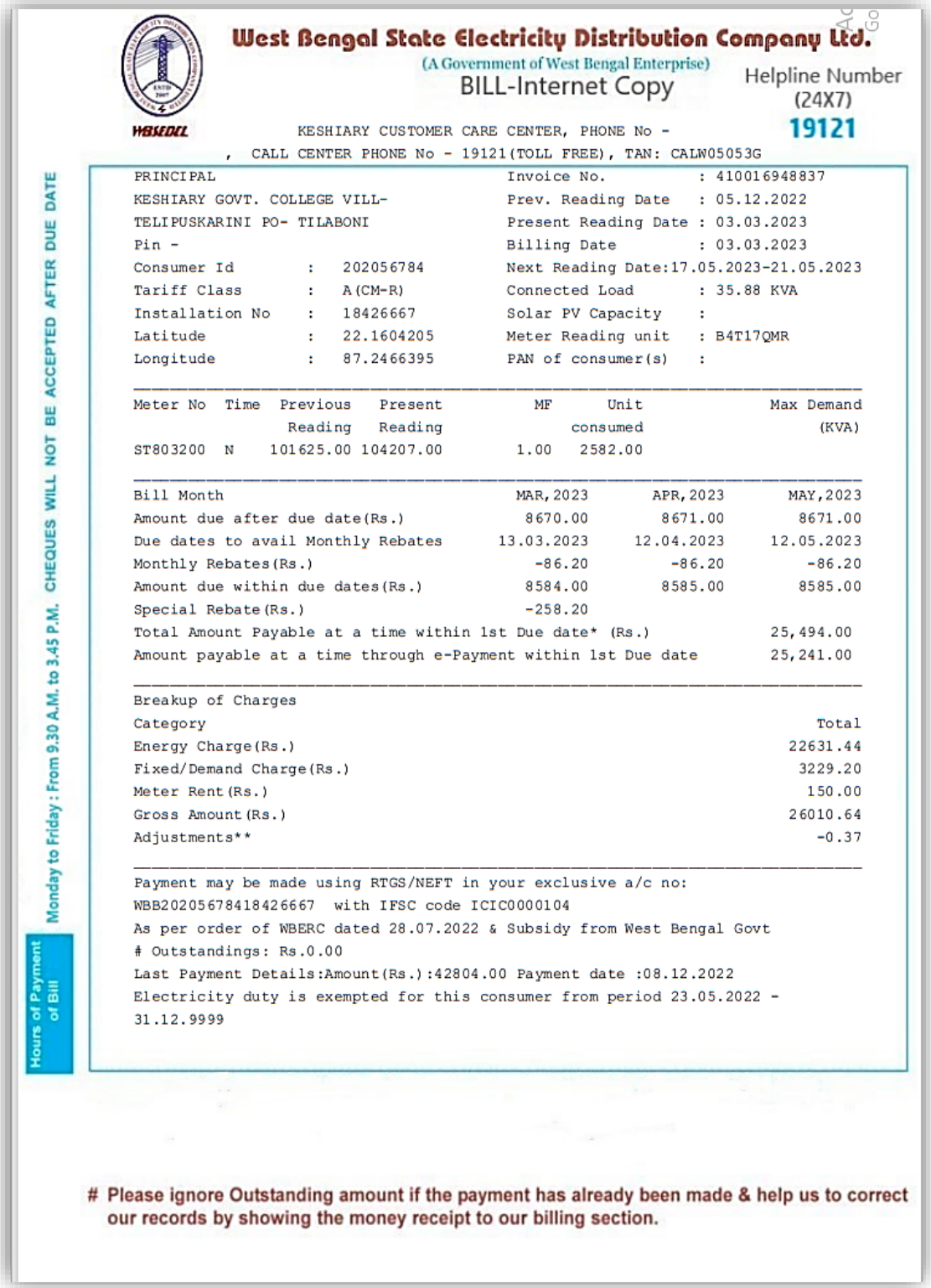
Bill Month	DEC,2022	JAN,2023	FEB,2023
Amount due after due date(Rs.)	14710.00	14711.00	14711.00
Due dates to avail Monthly Rebates	15.12.2022	16.01.2023	13.02.2023
Monthly Rebates(Rs.)	-146.60	-146.60	-146.60
Amount due within due dates(Rs.)	14564.00	14564.00	14564.00
Special Rebate(Rs.)	-455.80		
Total Amount Payable at a time within 1st Due date* (Rs.)			43,235.00
Amount payable at a time through e-Payment within 1st Due date			42,804.00

Breakup of Charges Category	Total
Energy Charge(Rs.)	40751.36
Fixed/Demand Charge(Rs.)	3229.20
Meter Rent(Rs.)	150.00
Gross Amount(Rs.)	44130.56
Adjustments**	-0.24

Payment may be made using RTGS/NEFT in your exclusive a/c no:
WBB20205678418426667 with IFSC code ICIC0000104
As per order of WBERC dated 28.07.2022 & Subsidy from West Bengal Govt
Outstandings: Rs.0.00
Last Payment Details:Amount(Rs.):28653.00 Payment date :08.09.2022
Electricity duty is exempted for this consumer from period 23.05.2022 - 31.12.9999

Please ignore Outstanding amount if the payment has already been made & help us to correct our records by showing the money receipt to our billing section.

(Electricity bill for the period of 05.12.2022 – 03.03.2023)



West Bengal State Electricity Distribution Company Ltd.

(A Government of West Bengal Enterprise)

BILL-Internet Copy

Helpline Number (24X7) 19121

WBSEDCL

KESHIARY CUSTOMER CARE CENTER, PHONE No - , CALL CENTER PHONE No - 19121(TOLL FREE), TAN: CALW05053G

Hours of Payment of Bill: Monday to Friday : From 9.30 A.M. to 3.45 P.M. CHEQUES WILL NOT BE ACCEPTED AFTER DUE DATE

PRINCIPAL
KESHIARY GOVT. COLLEGE VILL-
TELIPUSKARINI PO- TILABONI
Pin -

Consumer Id : 202056784
Tariff Class : A(CM-R)
Installation No : 18426667
Latitude : 22.1604205
Longitude : 87.2466395

Invoice No. : 410016948837
Prev. Reading Date : 05.12.2022
Present Reading Date : 03.03.2023
Billing Date : 03.03.2023
Next Reading Date:17.05.2023-21.05.2023
Connected Load : 35.88 KVA
Solar PV Capacity :
Meter Reading unit : B4T17QMR
PAN of consumer(s) :

Meter No	Time	Previous Reading	Present Reading	MF	Unit consumed	Max Demand (KVA)
ST803200	N	101625.00	104207.00	1.00	2582.00	

Bill Month	MAR,2023	APR,2023	MAY,2023
Amount due after due date(Rs.)	8670.00	8671.00	8671.00
Due dates to avail Monthly Rebates	13.03.2023	12.04.2023	12.05.2023
Monthly Rebates(Rs.)	-86.20	-86.20	-86.20
Amount due within due dates(Rs.)	8584.00	8585.00	8585.00
Special Rebate(Rs.)	-258.20		
Total Amount Payable at a time within 1st Due date* (Rs.)			25,494.00
Amount payable at a time through e-Payment within 1st Due date			25,241.00

Breakup of Charges

Category	Total
Energy Charge(Rs.)	22631.44
Fixed/Demand Charge(Rs.)	3229.20
Meter Rent(Rs.)	150.00
Gross Amount(Rs.)	26010.64
Adjustments**	-0.37

Payment may be made using RTGS/NEFT in your exclusive a/c no:
WBB20205678418426667 with IFSC code ICIC0000104
As per order of WBERC dated 28.07.2022 & Subsidy from West Bengal Govt
Outstandings: Rs.0.00
Last Payment Details:Amount(Rs.):42804.00 Payment date :08.12.2022
Electricity duty is exempted for this consumer from period 23.05.2022 - 31.12.9999

 # Please ignore Outstanding amount if the payment has already been made & help us to correct our records by showing the money receipt to our billing section.

(Electricity bill for the period of 03.03.2023 – 14.06.2023)

West Bengal State Electricity Distribution Company Ltd.

(A Government of West Bengal Enterprise)

BILL-Internet Copy

Helpline Number (24X7) 19121

WBSEDCL

KESHIARY CUSTOMER CARE CENTER, PHONE No - , CALL CENTER PHONE No - 19121(TOLL FREE), TAN: CALW05053G

Hours of Payment of Bill: Monday to Friday : From 9.30 A.M. to 3.45 P.M. CHEQUES WILL NOT BE ACCEPTED AFTER DUE DATE

PRINCIPAL		Invoice No.	: 406018654407
KESHIARY GOVT. COLLEGE VILL-		Prev. Reading Date	: 03.03.2023
TELIPUSKARINI PO- TILABONI		Present Reading Date	: 14.06.2023
Pin -		Billing Date	: 14.06.2023
Consumer Id	: 202056784	Next Reading Date:16.08.2023-20.08.2023	
Tariff Class	: A(CM-R)	Connected Load	: 35.88 KVA
Installation No	: 18426667	Solar PV Capacity	:
Latitude	: 22.1604208	Meter Reading unit	: B4T17QMR
Longitude	: 87.2466229	PAN of consumer(s)	:

Meter No	Time	Previous Reading	Present Reading	MF	Unit consumed	Max Demand (KVA)
ST803200	N	104207.00	109813.00	1.00	5606.00	

Bill Month	JUN,2023	JUL,2023	AUG,2023
Amount due after due date(Rs.)	17913.00	17914.00	17914.00
Due dates to avail Monthly Rebates	26.06.2023	24.07.2023	23.08.2023
Monthly Rebates(Rs.)	-178.63	-178.63	-178.64
Amount due within due dates(Rs.)	17735.00	17735.00	17735.00
Special Rebate(Rs.)	-560.60		
Total Amount Payable at a time within 1st Due date* (Rs.)			52,644.00
Amount payable at a time through e-Payment within 1st Due date			52,119.00

Breakup of Charges Category	Total
Energy Charge(Rs.)	50361.52
Fixed/Demand Charge(Rs.)	3229.20
Meter Rent(Rs.)	150.00
Gross Amount(Rs.)	53740.72
Adjustments**	-0.88

Payment may be made using RTGS/NEFT in your exclusive a/c no:
WBB20205678418426667 with IFSC code ICIC0000104
As per order of WBERC dated 28.07.2022 & Subsidy from West Bengal Govt
Outstandings: Rs.0.00
Last Payment Details:Amount(Rs.):25241.00 Payment date :06.03.2023
Electricity duty is exempted for this consumer from period 23.05.2022 - 31.12.9999
Interest Rs. , TDS Rs. & Net Int. Rs. on Security Deposit as on

 # Please ignore Outstanding amount if the payment has already been made & help us to correct our records by showing the money receipt to our billing section.

Annexure 5

Work order for the installation of the solar powered lamp-posts at Government General Degree College, Keshiary

Government of West Bengal
Office of the Principal
GOVERNMENT GENERAL DEGREE COLLEGE, KESHIARY
At.-Telipukur : P.o.- Tilaboni Mahisamura : P.s.- Keshiary
Dist- Paschim Medinipur : PIN-721135

Memo No...296/GGDCK/19, Date.....10/12/2019.....

From : The Principal
Government General Degree College,Keshiary

To :
To,
West Bengal Electronics Industry Development Corporation Limited
WIL Division
225F, A.J.C. BOSE ROAD, 4TH FLOOR, KOLKATA 700020

Reference: 94/GGDCK/19, dated 07.03.2019

Quotation No: WBEIDC/WIL/QTN/GGDCK/SL02/2019-20, Dated 02.12.2019

Sir,

Please supply the following articles for the Government General Degree College, Keshiary along with the bills in triplicate on or before **20.01.2020.** If the articles are not supplied within the specified period, the order may be regarded as cancelled if no intimation is received regarding the extension of the delivery time.

Further you are requested to deliver the items to the Office of the Principal/Officer-in-Charge through your messenger who will be able to demonstrate the proper functioning of the instruments supplied.

Sl. No.	Description of items	Rate (Rs.)	Quantity
1	**SOLAR MODULE – 50 WP** with: Pole (4.5 mtr.), Battery Box & Module Mounting Structure with Luminary Arm , 12 watt LED with Dusk to Dawn Controller, battery, Cable along with other accessories including installation and delivery charges.	25,800.00 + 5% GST	10

Thanking you.

Yours sincerely,

10/12/19
Convener
Purchase Committee
Government General Degree College, Keshiary
Convenor
Purchase Committee

10/12/2019
Principal/Officer-in-Charge
Government General Degree College, Keshiary
Officer-in-Charge
Govt Gen Degree College
Keshiary

Govt. General Degree College Keshiary ★ Paschim Medinipur-721135 ★

Annexure 6

Certificate of Accreditation from Mahatma Gandhi National Council of Rural Education, Dept. of Higher Education, Ministry of Education, Govt. of India

Where there is Rural Wellbeing there is Universal Prosperity

भारत 2023 INDIA

सत्यमेव जयते
Ministry of Education
Government of India

भारत सरकार / Government of India
महात्मा गांधी राष्ट्रीय ग्रामीण शिक्षा परिषद / Mahatma Gandhi National Council of Rural Education
उच्च शिक्षा विभाग/Department of Higher Education
शिक्षा मंत्रालय / Ministry of Education

Certificate of Accreditation

This is to certify that

GGDC Keshiary

District-Paschim Medinipur; State-W.B.

is graded as

Parameters	Green Cover on campus	Surface Water Harvesting	Rooftop Water Harvesting	Rooftop Solar System	Waste Management
Grades	A^+	C^+	C	B	B^+

for the academic year of 2022-23 in Phase 1 of the

National Rural Institutions Sustainability Grading (NRISG)

Nagalakshmi.

Member Secretary

Date: March 2023
Certificate NO: MGNCRE/NRISG/Paschim Midnapore-0008

General Degree College Keshiary