4.1.3- Number of classrooms and seminar halls with ICT-enabled facilities such as smart class, LMS, etc

Total number of classrooms (highlighted)

NAAC Room No: 101	Organic Chemistry Lab Room No: 124	Union Anti-chamber Room No: 148
NCC Room No: 102	Inorganic Chemistry Lab - 1 Room No: 125	Geography Staff Room Room No: 149
NSS Room No: 103	Inorganic Chemistry Lab – 2 Room No: 126	Geography Class Room Room No: 150
Physics Staff Room Room No: 104	Chemistry Balance Room Room No: 127	Old Health Home Room No: 151
Physics Computer Room Room No: 105	Chemistry store Room (Glass) Room No: 128	Old Health Home Room No: 152
Physics Seminar Room Room No: 106	Chemistry Physical Laboratory Room No: 129	Old Health Home Room No: 153
Physics Seminar Room Room No: 107	Chemistry ... Room No: 130	Physical Education Room Room No: 154
Physics Electronics Laboratory Room No: 108	Chemistry General Class Room Room No: 131	Physical Education Room Room No: 155
Physics Store Room Room No: 109	Class Room Room No: 132	Physical Education Room Room No: 156
Physics Electricity and Magnetism Room No: 110	Smart Room Room No: 133	Physiology Histology Laboratory Room No 157
Physics Dark Room Room No: 111	Class room Room No: 134	Teachers' Staff room Room No 158
Physics General Properties and Heat Matter Room No: 112	Library Reading Room Room No: 135	Non-Teaching staff Room Room No 159
Physics General Laboratory Room No: 113	Central Library Room No: 136	Bio-Chemistry Practical Lab (for Hons.) Room No 160
Physics General Laboratory Room No: 114	Library Book Shelf Room No: 137	B. Sc. Programme Lab. Room No 161
Physics Dark Room Room No: 115	Library Book Shelf Room No: 138	Lecture Room Theoretical for Hons. Room No 162
Chemistry Store Room Daily Used Chemical Room No: 116 A	Library Reading Room Room No: 139	Expentual Lab Room No 163
Chemistry Store Room for Chemical Room No: 116 B	Library Reading Room Room No: 140	Smart Room Room No 164
Chemistry Balanced Room Room No: 117	General Class Room Room No: 141	Health Checkup Room Room No 165
Chemistry Staff Room Room No: 118	Store Room (Electrical) Room No: 142	Bio Gallery Room No 166
Chemistry Daily Used Operators Room No: 119	Mathematics Staff Room Room No: 143	Class Room Room No 167
Mathematics Class Room - Theoretical Room No: 120	Mathematics Research Lab Room No: 144	Class Room Room No 168
Mathematics Computer room with smart Room Room No: 121	NCC Office Room No: 145	Class Room Room No 169
General Chemistry Laboratory Room No: 122	Boys' Common Room Room No: 146	Class Room Room No 170
Research Lab - 1	Students' Union Room	

RAMANANDA COLLEGE ESTD.-1945 (BANKURA) BISHNUPUR

Principal
Ramananda College,
Bishnupur, Bankura

P2

Room No: 123	Room No: 147	
Chemistry General Class Room Room No G - 01	R.N. Chakraborty Hall Room No - 201	Room No - 221
Class Room Room No G - 02	Girls' Common Room Room No - 202	Room No - 222
Room No G - 03	Non-Teaching Staff Room Room No - 203	Room No - 223
Commerce Staff Room Room No G - 04	Pension, Service Book and Scholarship Room Room No - 204	Philosophy Department Room No - 224
Commerce Staff Room Room No G - 05	Teachers' Common Room Room No - 205	Sanskrit Department Room No - 225
Gym Room No G - 06	Principal's Chamber Room No - 206	Political Science Department Room No - 226
Gym Room No G - 07	Office Room No - 207	History Department Room No - 227
Toilet for Boys'	Store Room Room No - 208	English Department Room No - 228
Canteen	Exam Room Room No - 209	Bengali Department Room No - 229
	Economics Department Room No - 210	Chemistry Smart Room Room No - 230
	Room No - 211	Music Department Room No - 231
	Room No - 212	CAC Room No - 232
	Room No - 213	Geography Class Room Room No - 233
	Room No - 214	Geography Smart Room Room No - 234
	Room No - 215	Ex-Student Samity Room No - 235
	Room No - 216	Botany Lab - 3 Room No - 236
	Room No - 217	Botany Lab Room No - 237
	Room No - 218	Botany Lab for Bio-Chemistry Room No - 238
	Room No - 219	Botany Lab- 2 Room No - 239
	Room No - 220	Departmental Library for Zoology Room No - 240
		Zoology Staff Room Room No - 241
		Zoology Lab - 1 Room No - 242
		Zoology Lab - 2

RAMANANDA COLLEGE ESTD.-1945 (BANKURA) BISHNUPUR

Principal
Ramananda College,
Bishnupur, Bankura

		Room No - 243
Room No - 244	Computer Science Staff Room Room No - 301	
Room No - 245	Language Lab Room No - 302	
Room No - 246	Computer Science Departmental Lab Room No - 303	
Room No - 247	Smart Room - Social Science Department Room No - 304	
Ladies Toilet Room No – 248	Smart Room – Literature and Language Department Room No - 305	
	Central Computer Centre Room No - 306	
	Carrere Counselling Room No - 307	
	Netaji Subhas Open Class Room Room No - 308	
	Netaji Subhas Open Class Room Room No - 309	
	Nutrition Office Room No - 310	
	Nutrition Lab - 1 Room No - 311	
	Nutrition Lab - 2 Room No - 312	
	Nutrition Class Room - 1 Room No - 313	
	Nutrition Class Room - 2 Room No - 314	
	Botany Class Room - 1 Room No - 315	
	Botany Lab for P.G Room No - 316	
	Botany Inoculation Room Room - 1 Room No - 317	
	Botany Lab – 2 (Hons) Room No - 318	
	Botany P.G Lab (Taxonomy) Room No - 319	
	Smart Room (Bio) Room No - 320	

RAMANANDA COLLEGE ESTD.-1945 (BANKURA) BISHNUPUR

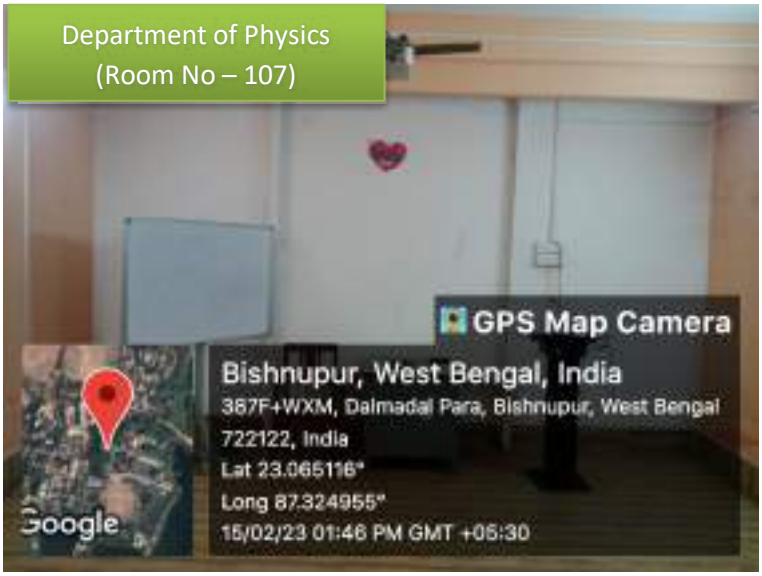
Principal
Ramananda College,
Bishnupur, Bankura

Picture of Smart Rooms

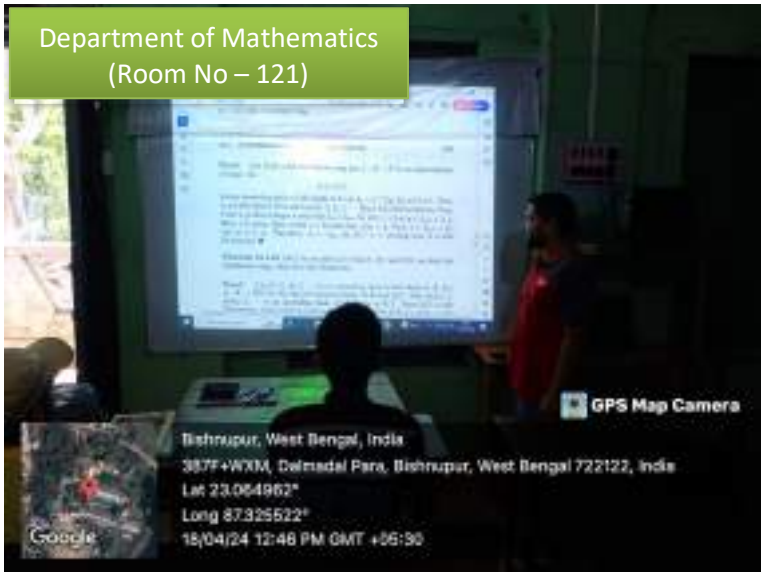
Department of Commerce
(Room No – 133)

Department of Physiology & Nutrition
(Room No – 164)

Department of Physics
(Room No – 107)



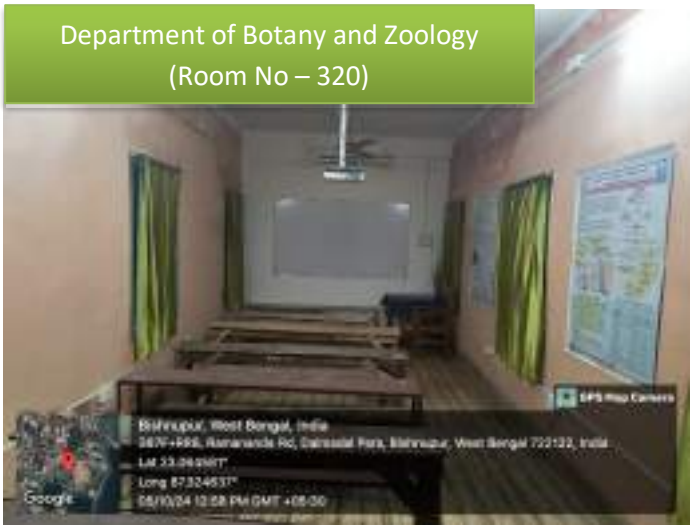
Department of Mathematics
(Room No – 121)

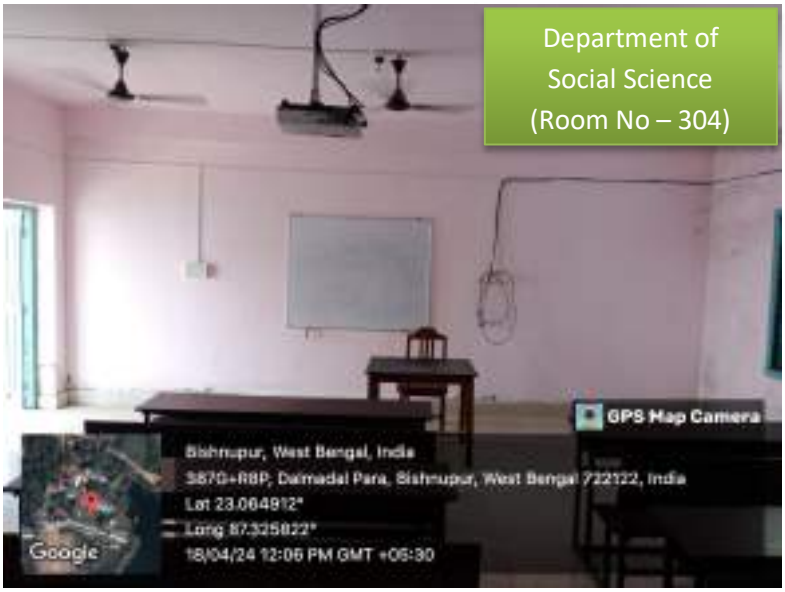



Department of Chemistry
(Room No – 230)
GPS Map Camera
Bishnupur, West Bengal, India
Google


Department of Geography
(Room No – 234)
HAPPY TEACHERS DAY
Bishnupur, West Bengal, India
Google


Department of English
(Room No – 302)
Smart Room
ROOM NO 302
GPS Map Camera
Bishnupur, West Bengal, India
Google


Department of Botany and Zoology
(Room No – 320)
Bishnupur, West Bengal, India
Google


Department of
Social Science
(Room No – 304)
GPS Map Camera
Bishnupur, West Bengal, India
Google

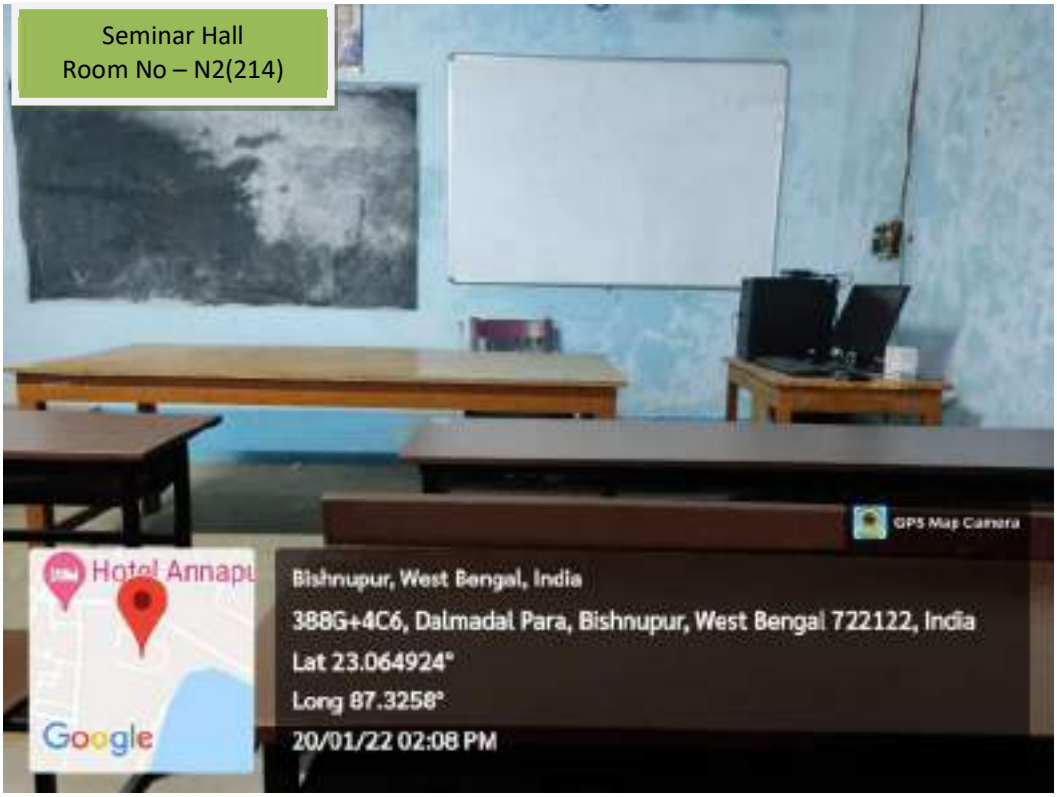

Department of Bengali
(Room No – 305)
Smart Room
GPS Map Camera
Bishnupur, West Bengal, India
Google

Pictures of Seminar Hall

Auditorium
Seminar Hall

Ramnolini Hall
(Room No –
201)

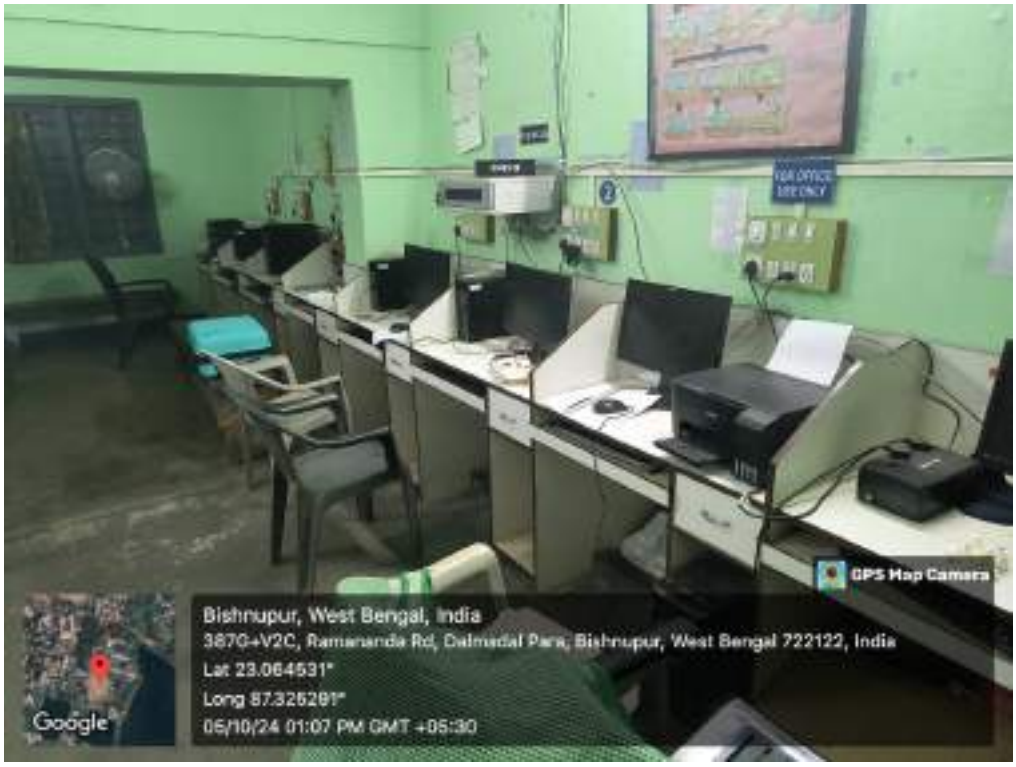
Seminar Hall
Room No – N2(214)



Computer Center

Browsing Centres

Department of Geography



Department of Mathematics

Department of Physics

Browsing Centres

Library

STUDENTS SEMINAR
by using ICT Tools

GEOGRAPHY STUDENTS' SEMINAR

Geography Student Seminar 3rd Semester 2022

Sl no	Name	Tropic
1	Ananya mukherjee	Insolation
2	Arpita pal	Ice crystal theory
3	Mistu debgharia	Inversion of temperature
4	Dwipkul bala	Organ and characteristics of tropical and temperate cyclones
5	Ramendra nath saren	Green revolution
6	Antara dutta	Inversion of temperature
7	Jasimuddin mondal	Soil classification
8	Jyotilal kisku	Jet stream
9	Poulame samanta	Darjeeling hills
10	Priyanka kisku	Airmass
11	Debaprasad rakshit	Regional problem of Darjeeling hill
12	Sayandip sindal	Regional problem of Jangalmahal
13	Sonam ghatak	Monsoon in India

DEPARTMENT OF GEOGRAPHY
ESTD. 1945
P.O.- Bishnupur
Dt.- Bankura
RAMANANDA COLLEGE

Sahash 12/06/29
Head
Department of Geography
Ramananda College
Bishnupur Bankura

GEOGRAPHY SEMINAR OF 5TH SEMESTER (2022)

SL	NAME	UID	ROLL	TOPIC
1	AMBIKA LOHAR	20173119019	185	DEVELOPMENT OF GEOGRAPHY IN THE 20TH CENTURY: QUANTITATIVE REVOLUTION AND ITS IMPACT(TOUGHT)
2	ABHINANDAN BANERJEE	20173119017	186	URBAN GEOGRAPHY GEOGRAPGY ISSUES: PROBLEMS OF HOUSING, SLUMS, CIVIC AMENITIES (WATER AND TRANSPORT) (URBAN GEOGRAPHY GEOGRAPGY)
3	CHANDRIKA BETAL	20173119011	192	MAJOR RELIEF FEATURES OF THE OCEAN FLOOR: CHARACTERISTICS AND ORIGIN ACCORDING TO PLATE TECTONICS.(HYDROLOGY)
4	RIYA DE	20173119014	193	PATTERNS AND TRENDS OF URBAN GEOGRAPHY GEOGRAPGYIZATION IN INDIA(URBAN GEOGRAPHY GEOGRAPGY)
5	PALLAVI MIDDYA	20173119003	194	WATER MASS, T–S DIAGRAM(HYDROLOGY)
6	NEHA NAG	20173119012	198	DEVELOPMENT OF MODERN SCIENTIFIC GEOGRAPHY IN THE 19TH CENTURY WITH PARTICULAR REFERENCE TO THE CONTRIBUTIONS OF HUMBOLDT AND RITTER(TOUGHT)
7	SUMAN DEY	20173119010	199	CORAL REEFS: FORMATION, CLASSIFICATION AND THREATS(HYDROLOGY)
8	MAHAMUD HASSAN MONDAL	20173119020	206	CITY STRUCTURE-CONCENTRIC ZONE THEORY, SECTOR THEORY, (URBAN GEOGRAPHY GEOGRAPGY)
9	SOUMI KESH	20173119009	207	SEA LEVEL CHANGE: TYPES AND CAUSES(HYDROLOGY)
10	SOUVIK MANNA	20173119005	212	PATTERNS OF URBAN GEOGRAPHY GEOGRAPGYIZATION IN DEVELOPED AND DEVELOPING COUNTRIES(URBAN GEOGRAPHY GEOGRAPGY)
11	SINDHIYA DAS	20173119007	213	RUN OFF: CONTROLLING FACTORS,RUN OFF CYCLE(HYDROLOGY)

12	RACHANA KARMAKAR	20173119001	1168	APPROACHES TO GEOGRAPHIC STUDIES: SYSTEMATIC VS. REGIONAL APPROACH(TOUGHT)
13	CHAITALI BARAT	20173119002	1169	MARINE RESOURCES: CLASSIFICATION AND SUSTAINABLE UTILIZATION(HYDROLOGY)
14	REEKA DUTTA	20173119006	1170	AMERICAN SCHOOL , INDIAN SCHOOL(TOUGHT)
15	DIPESH SAHA	20173119004	1171	GERMAN SCHOOL , BRITISH SCHOOL(TOUGHT)
16	ROMESH ROY	20173119021	209	SYSTEMS APPROACH IN HYDROLOGY. GLOBAL HYDROLOGICAL CYCLE: ITS PHYSICAL AND BIOLOGICAL ROLE(HYDROLOGY)
17	ISHIKA HALDAR	20173119022	195	URBAN GEOGRAPHY GEOGRAPGY FRINGE,CITY-REGION(URBAN GEOGRAPHY GEOGRAPGY)
18	RANA CHAKRABORTY	20173119018	190	CENTRAL PLACE THEORY; AUGUST LOCH'S THEORY OF MARKET CENTRES(URBAN GEOGRAPHY GEOGRAPGY)
19	SAINIK BAURI	20173119008	208	DEVELOPMENT OF GEOGRAPHY IN THE 20TH CENTURY: QUANTITATIVE REVOLUTION AND ITS IMPACT(TOUGHT)

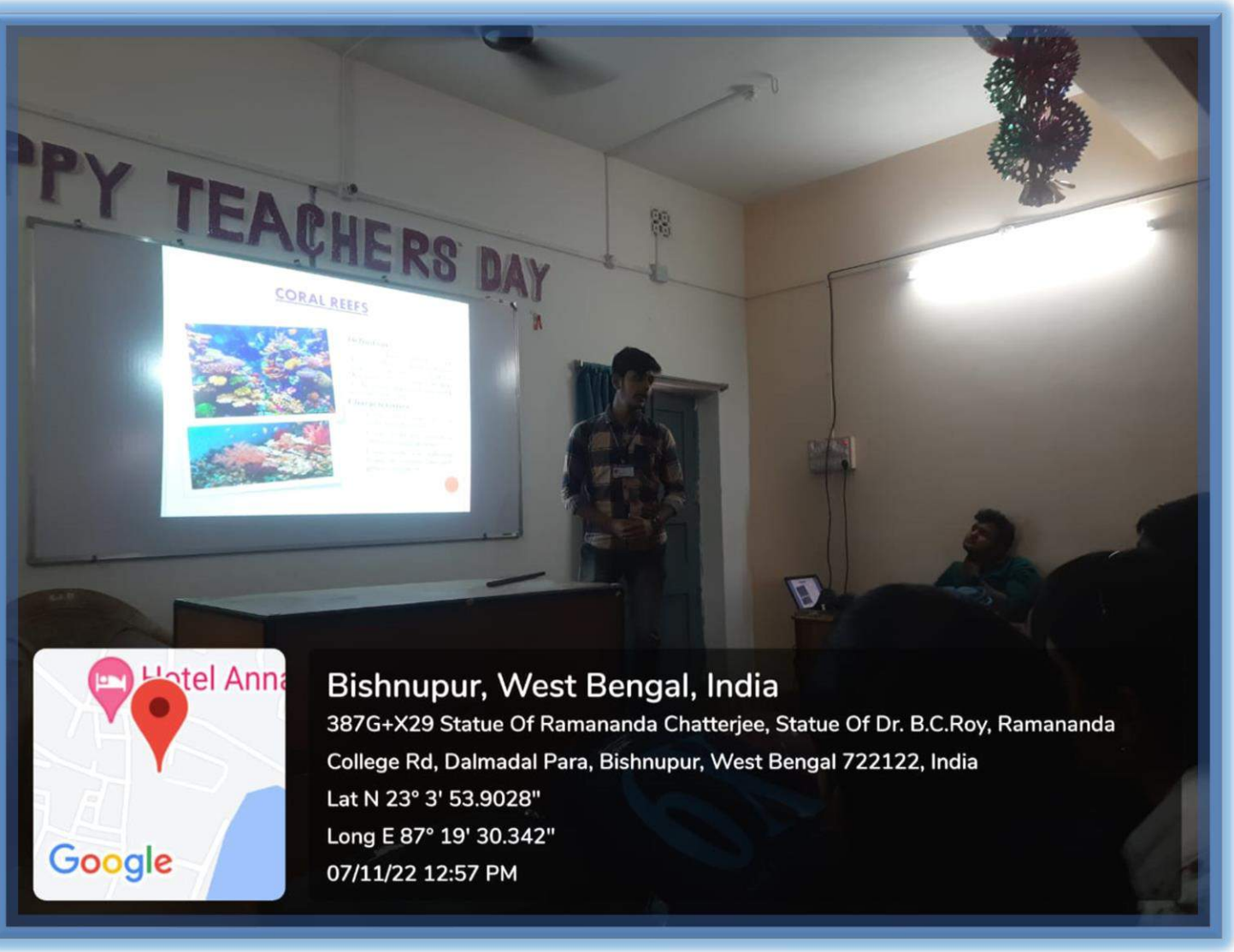
DATE-

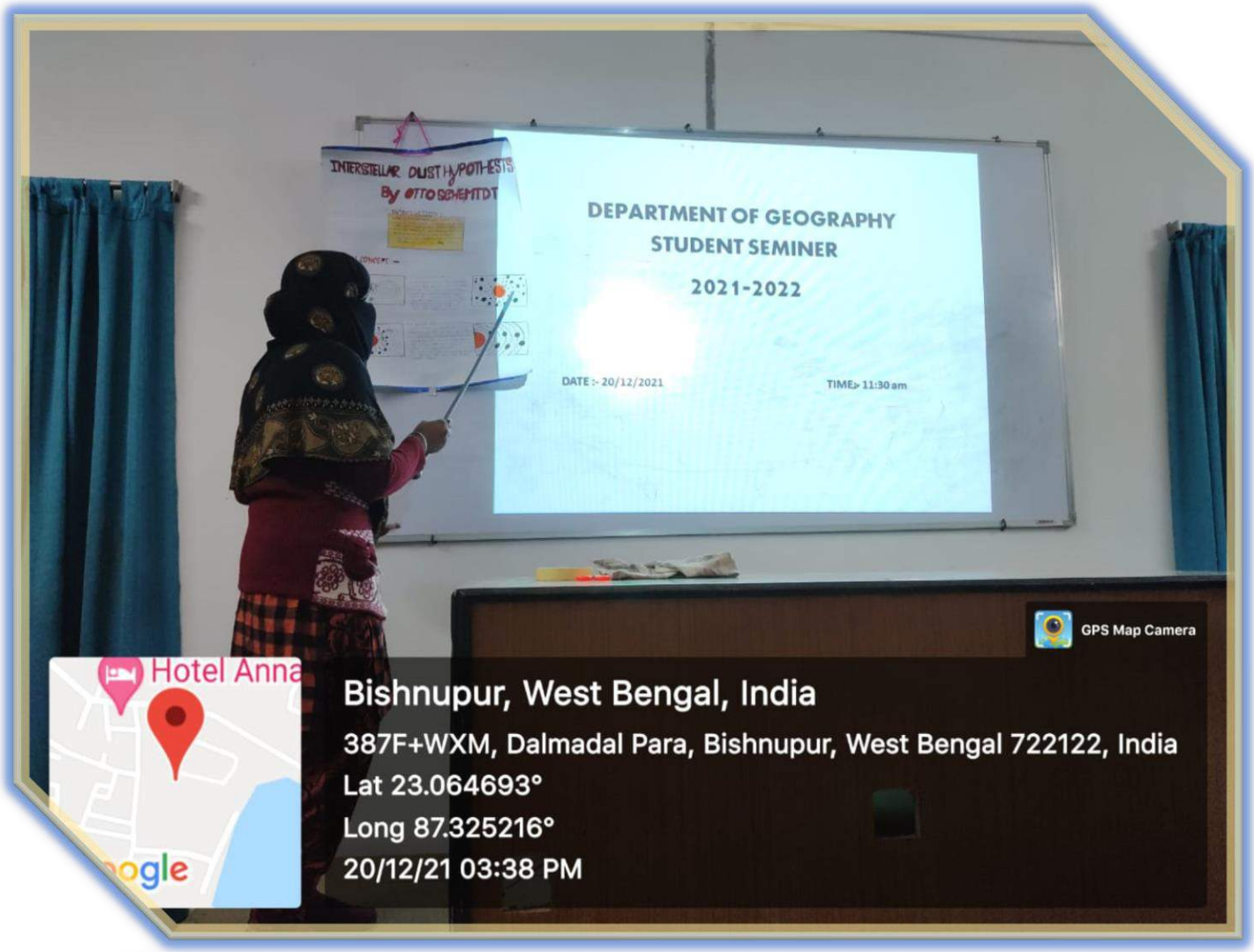
DEPARTMENT OF GEOG. ESTD. - 1945 P.O.- Bishnupur Dt.- Bankura RAMANANDA COLLEGE

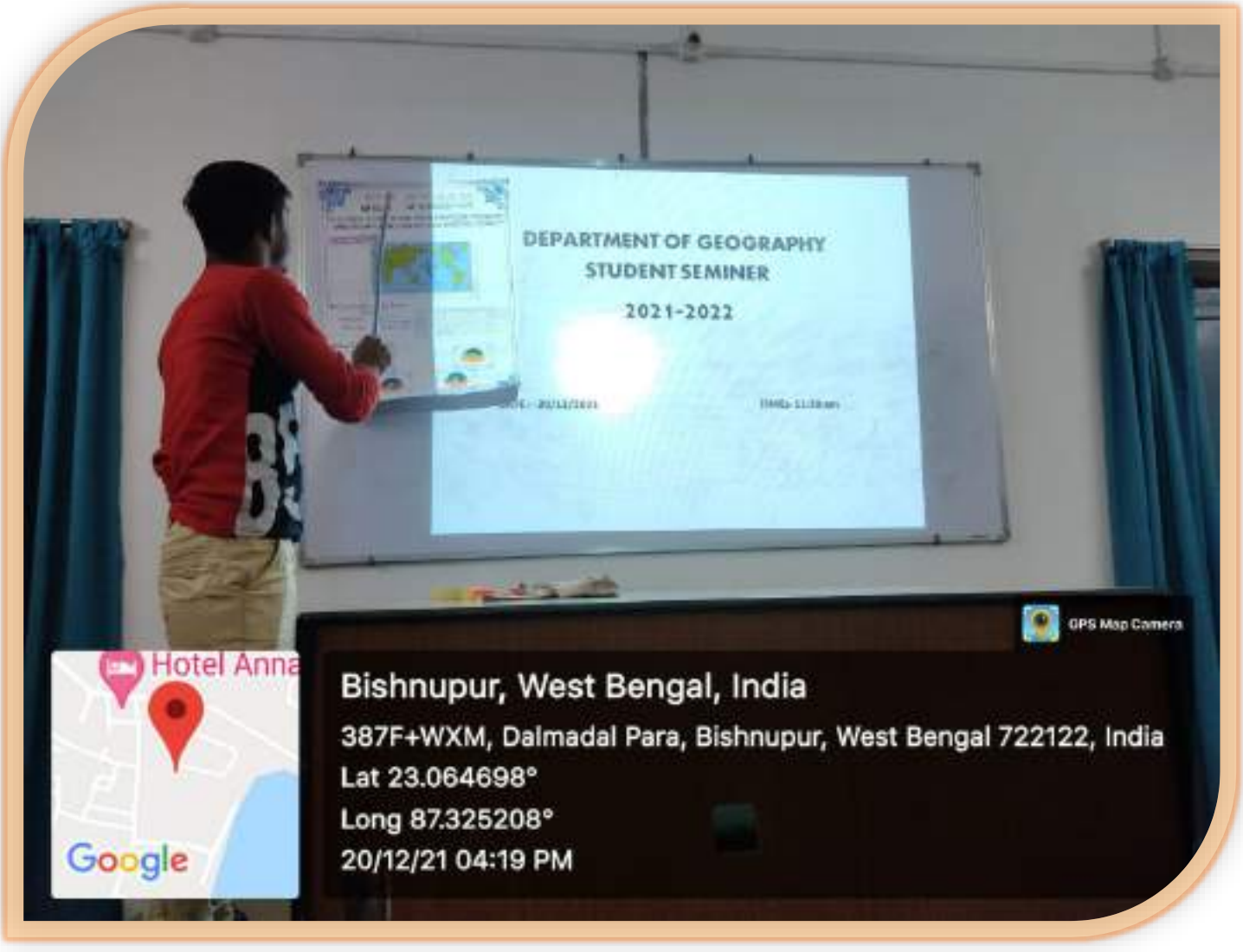
Sahash 12/06/24

Head
Department of Geography
Ramananda College
Bishnupur, Bankura

Student Seminar 2022-23
Geography Department




DEPARTMENT OF GEOGRAPHY
STUDENT SEMINER
2021-2022
DATE :- 20/12/2021
TIME:- 11:30 am
GPS Map Camera
Hotel Anna
Bishnupur, West Bengal, India
387F+WXM, Dalmadal Para, Bishnupur, West Bengal 722122, India
Lat 23.064693°
Long 87.325216°
20/12/21 03:38 PM


DEPARTMENT OF GEOGRAPHY
STUDENT SEMINER
2021-2022
GPS Map Camera
Hotel Anna
Google
Bishnupur, West Bengal, India
387F+WXM, Dalmadal Para, Bishnupur, West Bengal 722122, India
Lat 23.064698°
Long 87.325208°
20/12/21 04:19 PM


What is Coral Reef ?
Coral reefs are diverse underwater ecosystems held together by calcium carbonate structures secreted by corals
GPS Map Camera
Hotel Anna
Google
Bishnupur, West Bengal, India
Statue Of Swami Vivekananda, Ramananda College Rd, Dalmadal Para, Bishnupur, West Bengal 722122, India
Lat 23.064688°
Long 87.325258°
21/12/21 12:00 PM


Hotel Anna
Google
Bishnupur, West Bengal, India
387G+W3W Statue Of Swami Vivekananda, Ramananda College Rd, Dalmadal Para, Bishnupur, West Bengal 722122, India
Lat N 23° 3' 53.6652"
Long E 87° 19' 30.504"
07/11/22 11:48 AM

COMPUTER SCIENCE STUDENTS' SEMINAR

Student Seminar on Process life cycle
Department of Computer Science
18.01.2023

Student attendant details

STUDENTS' SEMINAR ON
PROCESS LIFE CYCLE

NAME OF THE DEPARTMENT:COMPUTER SCIENCE

SL. NO	NAME OF THE STUDENTS	PRESENTED /PARTICIPATED	TOPIC	SEM	SIGNATURE
1.	Jigyasa Rathore	Participated.	–	1st.	Jigyasa Rathore (18.01.2023)
2.	Barsha Karmakar	participated	—	1st	Barsha Karmakar (18.01.2023)
3	Risha Goswami	presented	process lifecycle	3rd	Risha Goswami (18.01.2023)
4.	Rajib Nandi	participated	–	3rd	Rajib Nandi (18.01.2023)
5.	Rohit Dey	Participated	–	1st	Rohit Dey (18.01.2023)
6.	Sobhan Patora	Participated	–	1st	Sobhan Patora (18.01.2023)
7.	Anirban Dutta	Participated		1st (Prog)	Anirban Dutta. (18.01.2023)
8.	Arijit Khan	Participated	–	5th	Arijit Khan (18.01.2023)

DEPARTMENT OF COMPUTER SCIENCE Bishnupur, Bankura

STUDENTS' SEMINAR ON
PROCESS LIFE CYCLE

NAME OF THE DEPARTMENT:COMPUTER SCIENCE

9.	Pranab Mahata	Presented	Process Lifecycle	5th	Pranab Mahata (18.01.2023)
10.	Subhajit Chakraborty	Participated	—	1st	Subhajit Chakraborty (18.01.2023)
11.	Suman Sen	Participated	—	1st	Suman Sen (18.01.2023)
12.	Jnti sarkar	Participated.	——	1st	~~Jnti~~ Sarkar (18.01.2023)
13.	Souvik De	presented	process life cycle	3rd	Souvik De (18.01.2023)
14.	Khushi Goswami	presented	process life cycle	1st	Khushi Goswami (18.01.2023)
15.	Souvik Mondal	presented	Process life cycle	1st	Souvik Mondal (18.01.2023)
16.	Tufan Chatterjee	Presented	Procen life cycle	3rd	Tufan Chatterjee (18.01.2023)

STUDENTS' SEMINAR ON
PROCESS LIFE CYCLE

NAME OF THE DEPARTMENT:COMPUTER SCIENCE

NAME OF THE PARTICIPATED TEACHERS:

1. Aparna Sankar 18/01/2023
2. Kakali Karmakar 18.01.2023
3. Alankar Chatterjee 18.01.2023

EDUCATION
STUDENTS' SEMINAR

A ONE DAY UNIVERSITY LEVEL SEMINAR

ON

HIGHER EDUCATION IN THE LIGHT OF NEP-2020

Organised by:
Department of Education

In Collaboration with IQAC, Ramananda College

Ramananda College
Bishnupur, Bankura

Venue - Ramnalini Chakraborty Hall

DATE-28.07.23
TIME-1 P.M.

Ramananda College
Department of Education
A one day university level seminar
On
"Higher Education in the light of NEP-2020"

Date: 28/7/23

S.I No	Name	Signature	Designation	Mail Id
1	Sanchita karmakar	Sanchita karmakar	Student	karmakarsanchita035 @gmail.com.
2	Rija Lohar.	Rija Lohar	Student	rijalohar55@gmail.com
3.	Anima Tudu.	Anima Tudu	Student	animatudu111@gmail.com
4.	Megha Bose	Megha Bose	Student	bosemegha63@gmail.com
5.	Disha Biswas	Disha Biswas	Student	biswasdisha428@gmail.com
6.	Indrani Haxra	Indrani Haxra	Student	Indranihaxra2005@gmail.com
7.	Nipa Mahadanda	Nipa Mahadanda	student	mahadandanipa@gmail.com
8.	Sneha Dutta	Sneha Dutta	Student	Snehadjujur@gmail.com
9.	Baisakhi Mandal	Baisakhi Mandal	Student	tarapadam80@gmail.com
10.	Mitali Ghosh	Mitali Ghosh	Student	Mitali6817@gmail.com
11.	Tuhina khatun	Tuhina khatun	student	Khatuntuhina.782@.com
12.	Shilpa khatun	Shilpa khatun	Student	msshilpakhatun@gmail.com
13.	Keya Bairagi	Keya Bairagi	student	Keyabairagi1@gmail.com
14.	Tulsi Mondal	Tulsi Mondal	Student	dipamanda1307@gmail.com
15.	Angashnee Kapuri	Angashnee Kapuri	Student	angashneekapuri2003@gmail.com
16.	Kaya Chowdhury	Kaya Chowdhury	Student	kayachowdhury1921@gmail.com
17	Bandana Hembram	Bandana Hembram	Student	bhembram204@gmail.com
18	Arati mandi	Arati mandi	Student	aratimandi190@gmail.com
19	Santilata Saren	Santilata Saren	student	SantilataSaren@gmail.com

Ramananda College
Department of Education
A one day university level seminar
On
"Higher Education in the light of NEP-2020"

Date: 28/7/23

S.I No	Name	Signature	Designation	Mail Id
1.	Kousik Tikadar		Student	KOUSIKtikadar63@gmail.com
2.	Dipak Hembram		Student	hembramdipak111@gmail.com
3.	Nilesh Basu		Student	nileshbasu.612@gmail.com
4.	Shubham Das		Student	Shubhamdas233@gmail.com
5.	Joy Sardar		Student	Sardarjoy481@gmailcom
6.	Md. Jonayet Khan		Student	mdjonayetkhan.btl@gmail.com
7.	Dipayan Satvaya		Student	dipayansatvaya369@gmail.com
8.	Sagen Murmu		Student	sagenmurmu042@gmail.com
9.	Sudip Lohar		Student	Sudiplohar03@gmail.com
10.	Subhajit Koley		Student	Subhajitkoley80@gmail.com
11.	Pradip Nayek		student	Pradipnayek@gmail.com
12.	Biplab Pal		student	Biplabpal7732@gmail.com
13	Soumyadip Lohar		Student	Soumyadiplohar@gmail.com
14.	Shippa Ghosh		Student	Ghoshbristi30@gmail.com
15.	Samapti Baitihar		Student	Baitiharsamapti623@gmail.com

ZOOLOGY
STUDENTS' SEMINAR

RAMANANDA COLLEGE

BISHNUPUR * BANKURA
Pin - 722122, West Bengal
Mob:- 6297976619
e-mail : principalramananda@gmail.com
Website : www.ramanandacollege.org

Estd.: 1945

UGC Recognized & State Government Aided Constituent College
Under the Bankura University (dt.-01.01.2017)
(Re-Accredited by NAAC 3rd Cycle at B ++ Level)

Ref. No..... Date..14.11.22.....

From : Principal
Secretary, G.B.

To
Sri Subrato Ghosh
Assistant Fishery Officer
Directorate of Fishery
Govt. Of W.B

Subject: Appreciation for your invited lecture in our college on 12/11/2022

Dear Sir,

I would like to thank you for your interesting and informative speech on ***"Ornamental Fish Keeping and Entrepreneurship opportunities in Freshwater Ornamental Fish Farming in West Bengal"*** in our college on 12/11/2022. Students and faculties were very much benefitted from your ideas on the above topic.

Thank you very much for sharing your ideas with us. All the best for your future.

Regards,

14/11/2022

Dr. Swapna Ghoral,
Ramananda College,
Bishnupur, Bankura.
West Bengal

RAMANANDA COLLEGE ESTD 1945 (BANKURA) BISHNUPUR

Principal
Ramananda College
Bishnupur, Bankura

Brief Biodata

Subrato Ghosh completed his MSc in Applied Aquaculture from Barkatullah University, Bhopal in 2003 securing first position in first class. He worked as Junior Research Fellow at Department of Fishery Pathology and Microbiology, WB University of Animal and Fishery Sciences; as Senior Research Fellow both at ICAR-Central Institute of Freshwater Aquaculture, Bhubaneswar and ICAR-Central Inland Fisheries Research Institute, Barrackpore; as Part-time Lecturer in MSc Fishery and Aquaculture course at Department of Zoology, Utkal University, Bhubaneswar. He has participated in 6 State-level, 16 National and 3 International Conferences in India and presented scientific papers on freshwater aquaculture in all of them. He has authored 11 papers published in Aquaculture Asia, published by Network of Aquaculture Centres in Asia-Pacific, Thailand and in Journal of World Aquaculture Society, USA. He joined Directorate of Fisheries, Government of West Bengal as Fishery Field Assistant in January 2013 securing first position in merit list in WBPSC exam, worked as Fishery Extension Officer at Block level from June 2017 till April 2022 and presently working as Assistant Fishery Officer under this Directorate at South 24 Parganas District Headquarters.

Empowerment of rural women through income-generating ornamental fish culture and other pisciculture practices

Subrato Ghosh
122/1V, Monohar Pukur Road, P.O. Kalighat, Kolkata – 700026

Highlight points

Participation of women in finfish farming activities, both edible and non-edible (ornamental) ones, will improve economy of rural families and enhance their nutritional status *via* partial use of pond-reared fishes for household consumption. Economic and livelihood security of rural women can be assured. Propagation of familiar and less-familiar aquarium fishes is less capital-intensive and less labour-intensive affair, can be adopted by women in semi-urban and rural areas. An idea is presented here on different facets of women-friendly pisciculture activities with emphasis on ornamental fish farming involving women groups in South 24 Pgs, West Bengal.

Introduction

Freshwater and brackishwater pisciculture, *i.e.*, farming of economically-important foodfishes in controlled systems under confined pond conditions have been playing important role in addressing nutritional and livelihood security of poor sustainably in developing countries. Farming of finfishes and shellfishes, *i.e.*, aquaculture has received much attention of Central and State Governments, farming community, scientists and others in recent years. This vocation has emerged as the key viable income-generating option for poor in rural India. Rural womenfolk, especially those from marginalized section of the community, have always played important role in livelihood generating activities and traditionally women in India contributed generously in fishery and homestead pisciculture sectors.

Women-friendly freshwater pisciculture technologies like ornamental/aquarium fish breeding and rearing in rectangular cemented cisterns in home land and backyard ponds, farming of economically-important nutritious catfishes *Clarius batrachus* and *Heteropneustes fossilis* in cemented cisterns, controlled breeding and seed production of exotic carp *Cyprinus carpio* in cloth enclosures in ponds during winter, formulated farm-made (pellet-type) feed preparation for edible and ornamental fishes, seed production of major carps in FRP portable hatchery - these can be easily implemented by rural women utilizing locally-available resources and can be adopted on small- to medium-scale for income and employment generation (individually or in form of SHGs) without jeopardizing their household activities. As for instance, according to officers of Freshwater Fisheries Research and Training Centre (FFRTC), Government of West Bengal (WB), a minimum net profit of Rs 27,850/- can be obtained in a year (Rs 2,500-4,500/- / month) from farming of familiar ornamental fishes guppy, molly, swordtail and platy. Common interest group of fisherwomen in a village can work together by shouldering the responsibilities equally and jointly.

A report of WorldFish, Malaysia states that in 2012, female fish farmer Shahnaz Dewan at Adabari village in Tangail District, Bangladesh stocked 5500nos of large-sized fish fingerlings in 24dec pond and followed proper fish pond management practices. After 105-110 days, in early September, she harvested total 1020kg of *Tilapia nilotica* and 40kg of major carps, which she sold for BDT 140,180 (1 BDT = 0.012US$). She then stocked carp fingerlings and harvested again in

early February 2013, this time obtained 350kg adult fishes and earned BDT 42,000. Her overall total production during 2012-2013 was 1410kg, yielding a gross profit of BDT 97,930. She served as a demonstration farmer, educating and influencing her neighbours. Likewise, quite a few noteworthy instances and success stories can be discussed about in context of eastern and north-eastern states of India, namely Odisha, WB, Assam and Tripura.

Spawn rearing and fry-staged fish production

In rural WB, most houses have a small backyard pond 100-800sqmt in area. It lies fallow, semi-clean and weed-infested, can be renovated and converted into a fish pond. These are ideally suited for rearing/nursing spawn-stage seed of *Labeo rohita*, *Catla catla*, *Cirrhinus mrigala* and exotic major carps by women of the family. In a study on involvement of womenfolk in aquaculture in rural Odisha, it was found that a backyard pond 200sqmt in area could produce as much as 19,000nos fry and 3,000nos fingerlings, yielding a total income of Rs 1,700/- in a period of 4 months. Resources around the home of resource-poor women can be used in such homestead fish seed rearing units, who can easily attend household works like cooking, taking care of their children and domestic animals.

Rearing of hatchery-produced spawn (3-days old) of economically-important cultivable freshwater fishes upto fry (22-25mm) stage is a preferred package of practices for resource-poor fisher-womenfolk, where 1,50,000nos fry of Indian major carps can be produced in 25dec pond in 15-18 days period and sold to grow-out fish farmers, giving an income of Rs 5,000-6,000/-. Smaller and seasonal backyard ponds 0.02-0.05 hectares in area having water depth 0.6-1.0mt are preferred for fry rearing. In this way, unutilized water resources of villages can be used productively. Rural women can adopt it as an income-generating activity; fry stages can be sold and supplied to fish growers in same village who will get healthy and quality major carp fry for stocking in larger ponds without bothering for transportation and mortality.

Rearing indigenous magur *Clarius batrachus* in cemented cisterns

The magur fish *C. batrachus* is air-breathing, nutritious, has medicinal properties, high-priced and has good demand in WB. Many unemployed youths have become interested in culture of *C. batrachus* in cement cisterns in their backyard. Its advanced fry (8-10gm) grows upto marketable size in 4 months in rectangular cement cisterns if fed fish-meal based farm-made supplementary feed. Entire water can be drained off from cisterns and fishes can be harvested easily. Presently 58 private hatcheries in WB produce induced-bred healthy seeds of indigenous magur, which can be procured for culture. Important features of this activity are: 1) Tank size: 8feet x 4feet x 3feet, two inch slope on one side and overhead shade; 2) Indigenous Magur seeds 8-10gm size stocked @ 8-10nos / sqfoot; 3) Seeds treated with 1ppm Potassium permanganate soln. for 5 minutes before stocking; 4) Mixture of fish meal, ground nut oil cake and rice bran in equal proportions fed to growing fishes 2 times a day @ 20% of bw; 5) Water replenishment done 50-60% two times a week; 6) At end of 3-4 months, 12-16kg marketable-sized Magur (50-60gm) obtained from tank; 7) Smaller-sized seeds (35-40 days old, 2.0-2.5 inch) can be stocked, price Rs 4-6/- / piece.

Ornamental/aquarium fish farming

Breeding and propagation of freshwater exotic ornamental (aquarium/coloured) fishes has proved to be an important avenue for increasing employment opportunities for rural women through small- to medium-scale farming units. It is an income-generating activity and priority sector where women can be gainfully involved, either individually or as SHGs. Basic requirements for setting up a backyard ornamental fish rearing unit are: 300-400sq feet or 25-27 sqmt land area; 5-6nos rectangular cement cisterns (2000-3000lit capacity), water depth 2 feet; overhead shade; portable water source (submersible pump, tube well or well water); few glass aquaria (150lit capacity); adult fishes or brood fishes brought from market; small feed pelletizer and raw feed ingredients; live food; medicines (Malachite green, Methylene blue, Potassium permanganate); portable aerators or air blower; bio-filter; fish sampling nets; immersion heater; fish packing polythene packets; oxygen cylinder.

This sector provides huge possibilities for empowering women economically and is a flourishing avenue of self-employment generation. State of WB has substantial involvement of women in propagation of aquarium fishes and an established avenue of women entrepreneurship. It is easy to start with live bearers; once women get acquainted with the care of brooder fishes, fry handling - slowly the unit will expand.

Features in succession in breeding and rearing of goldfish *Carassius auratus* are: 1) Adhesive eggs, thickly planted aquarium needed; 2) Spawning grids 6mm x 6mm placed in glass tank; 3) Frame/grid placed in bottom of tank, height 5cm from bottom; 4) Male and female broodstock maintained separately for a month on balanced feed; 5) Male : Female in 1:1 or 2:1 ratio released in spawning tank; 6) Within 12-20 hours, females release eggs; broodstock taken out after spawning; 7) Golden coloured fertilized eggs visible at tank bottom, may remain attached to plants; 8) After 48 hours, eggs hatch and larvae are produced; 9) From 72nd hour, goldfish larvae fed with small rotifers (zooplankton) for further development for one week; 10) Feed on zooplankton Daphnia and Moina and powdered feed (pulverized fish meal) for next 15 days; 11) Shifted to cemented rectangular tanks (5x3) or (6x3) sq.feet; 12) Within 100-120 days, it reaches to marketable size; 13) Feed preparation with mustard oil cake, rice polish, soyabean meal, pulverized fish meal and shrimp head waste/trash shrimp meal (powdered) may be used for goldfish.

Features in breeding and rearing of live bearing fishes (guppy *Poecilia reticulata*, molly *Poecilia sphenops*, sword tail *Xiphophorus hellerii*)

It includes: 1) Time required to attain maturity by adults: a) For platy, swordtail, guppy: 6-8 weeks; b) molly: 12-16 weeks; 2) Eggs develop inside the body of adult mother, young ones born with or without yolk sac; 3) Spermatozoa of male retained within body of females; 4) Gestation period: 1 month, 50-70 young ones take birth in single time; 5) Males and females kept separately, introduced into breeding tank just prior to breeding; 6) Pregnant females should be handled cautiously; 7) Diffused illumination required, young ones reared on zooplankton; 8) Box-type perforated cylindrical container can be kept fitted into wall of cement tank for 2-4 gravid females, so that newborns can drop through mesh into tank water; 9) Breeding tank must have thick plantation (Hydrilla); 10) For swordtail, it takes 24-36 hours for all young ones to have birth (about 30-80nos every time); 11) After 5 weeks, it again gives birth to young ones; 12) For guppy and molly, 1 tablespoon common salt may be added into tanks where young ones remain; 13) Three-day old young ones may be stocked @ 4000-4500nos. / tank; 14) For red molly, on 6th month, those are

stocked in spawning chambers as large earthen bowls 1.5-2.0 feet diameter in ratio 5:1 (Female : Male); 15) Gravid females move along the sides in upper water column; 16) Those are carefully collected in released in *maateer maalsa* or earthen bowl 6 inch diameter, one female in each container; 17) In 24 hours, a female gives birth to 150 fully-formed young ones.

Women-led Uttar Jafarpur ornamental fish co-operative society and SHGs

According to scientists of ICAR-CIFA, Bhubaneswar, an investment of Rs 75,000/- (capital and recurring investment of Rs 50,000/- and Rs 25,000/- respectively) gives a return of Rs 50,000/- / year from a livebearer backyard small-scale ornamental fish culture unit, where village women can have active involvement. Both live bearers and egg layers can be bred and reared for commercial purpose, hormonal injection is not required. Backyard units (cement cisterns) can be established in 500-1000sq.feet area with investment ranging upto Rs 80,000/-. A single guppy, molly, angel fish and goldfish are rated within Rs 5-20/- / piece in ornamental fish wholesale markets in WB.

Such an enterprise generates income for the unemployed youth to women homemakers. Members of the prominent Uttar Jafarpur Women Ornamental Fish Cooperative Society in Falta CD Block, Dist. South 24 Pgs, WB (where author has visited) aspire to stick to this occupation for long. This Mohila Rangin Maachh Samabay Samity (recipient of award from Hon'ble Chief Minister of WB) was established in 2003 and started with 15 women, begun with breeding and propagation of mollies - white, black and red in large earthen bowls/vessels. Thereafter cement cisterns 6feet x 2feet size were purposefully constructed. Currently, this actively-functioning registered Coop Society in ornamental fishery sector, run by women, has 36 core members (Rita Gure, Sujata Gure, Sunita Guchhait and others) engaged in daily nurture of the young ones (bought @ Rs 1.00-2.00/-/piece) and adults of 20 species of high-valued ornamental fishes. Many of these women practice aquarium fish farming at home in addition to working for the Cooperative. They have cement tanks in their backyards for maintaining brooders or curing infected ornamental fishes, and have family-owned or shared or taken-on-lease ponds where such fishes are propagated in inverted mosquito net-type enclosures fixed in ponds, with about 50000nos of growing aquarium fishes in 8dec pond (2000-2500nos / enclosure). Marketable-sized fishes have assured supply to wholesalers in Howrah district; husbands of women members go to markets to sale the produce, profit obtained as expected by dint of honesty, hard work and self-taught skills and experience. Home-made dry food fed to growing fishes. On an average, ornamental fish farming brings Rs 7,000-14,000/- / month for each woman in Uttar Jafarpur Ornamental Fish Cooperative Society; it has brought marked change in quality of life in this village in South 24 Parganas and led to increase in their family income.

The hub of ornamental fish farming in South 24 Parganas district includes Falta Block that consist more than 50 women-led SHGs; other adjacent Blocks where women-led SHGs are working exclusively and successfully on backyard ornamental fish farming include Budge Budge-II (with 8 SHGs), Bishnupur-II (5 SHGs), Mograhat-I (3 SHGs) and Mograhat-II (2 SHGs). These women have advanced their skills and knowledge through training programmes conducted by WB University of Animal and Fishery Sciences, Kolkata and Department of Fisheries, Government of WB (both at FFRTC and Block-level). Swapna Majhi, member of WB Government-instituted Swarnali Women Cooperative in Nandabhanga village in Bishnupur-II Block breeds and propagates ornamental fish in 15 tanks at her house. At more than Rs 5,000/- per month, she has almost tripled her income.

Likewise, Meen Kanya Rangin Maachh Mahila Samabay Samity Ltd., Nadia; Surya Kiran Rangin Maachh Mahila Samabay Samity Ltd., Kaliaganj Block, Uttar Dinajpur; Swapna Rangin Maachh SHG, Budge Budge-II Block to name a few, have grown up in WB, all run by women.

Epilogue

Women SHGs or Primary Cooperative Societies may be organized with common interest and similarity in economic status, especially from the poorer section of society. Many technology options have been identified through participatory approach by scientific personnel of Krishi Vigyan Kendras established in different states at district level. In view of multiple options of available fish farming technologies, labour efficiency and self-employment potential for rural women, such women-friendly technologies will be expanded widely in days to come, which will be highly rewarding in economic terms. Three quarters of the SHGs in Western Odisha Rural Livelihoods Project conducting aquaculture are women groups. Under this Project, with regards to aquaculture, women participate in auctions for the lease of water bodies, obtaining loans from banks, gaining credit worthiness, gaining technical skills and expertise to help them conduct fish culture.

Women SHGs can serve as means of generating much needed resources and family income, as an avenue for increasing women's agency and well-being and for addressing wider needs of the communities in which women live. Government Extension staff study the condition of women in a village and sensitize them to join together and form groups. Need-based training programmes and problems of women are identified. If women may show interest in ornamental fish farming, training programmes should be conducted and imparted. Women participate in it and form SHGs. After pooling fund from the group and other sources, they form a cooperative and start small business. Women fishery cooperative steadily earns money, maintain bank accounts, bring upliftment in socio-economic status of the family. In South 24 Parganas district, women are very recently coming up in preparing value-added food products from small indigenous local freshwater fishes and from those left unsold in registered and non-registered fish retail markets.

In rural Bangladesh, many women are involved in inland fishery and pisciculture activities. Year after year, they continue to be essential in improving nutrition, increasing production and distribution of food and enhancing living conditions of their families. Under the Community-Based Fisheries Management Project of WorldFish Center, many self-sustaining independent women could be created in 22 districts of Bangladesh, who manage their own fish ponds, eventually take the lead in breaking rural poverty cycle. In WB, there is ample scope of empowering rural women through integrated fish farming with poultry and duckery components in addition to those discussed above. In India, under different projects funded by Central and State Government, efforts have been made to develop skill and empower rural women in fish farming technology; different packages of practices introduced through demonstrations and participatory trials in many parts of the country. With research and extension programmes, it is expected that aquaculture vocation will be made more attractive to women. During 2006-2009, author had worked with members of Maa Biswamata SHG at Kendrapara district of Odisha and disseminated technologies like fish seed production in portable FRP hatchery, raising fry and fingerlings of major carps. It led to capacity building of the SHG women members to a considerable extent and the activities have become a sustainable source of livelihood for them.

Ornamental Fish Keeping Abd Entrepreneurship Opportunities in Freshwater Ornamental Fish Farming in West Bengal
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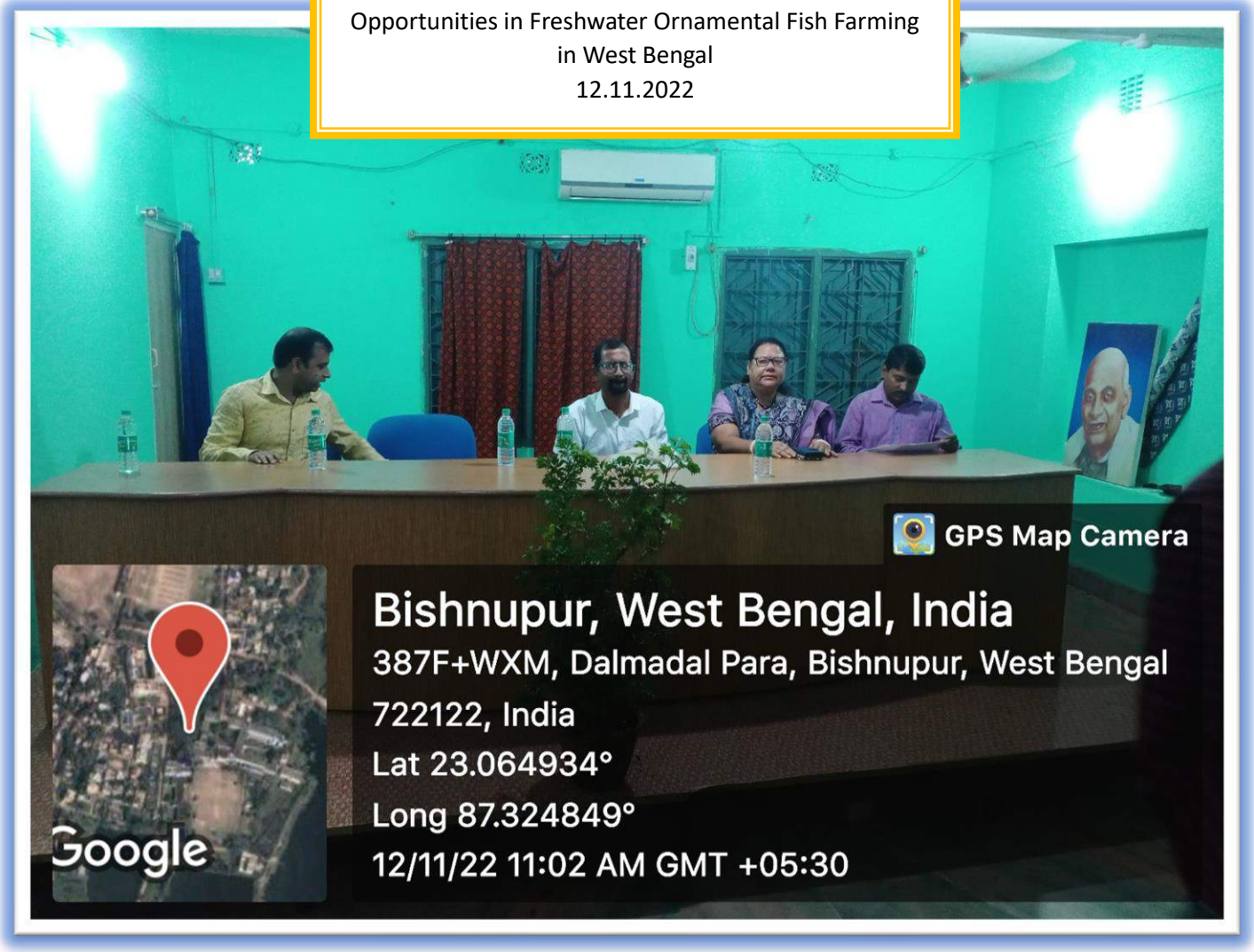

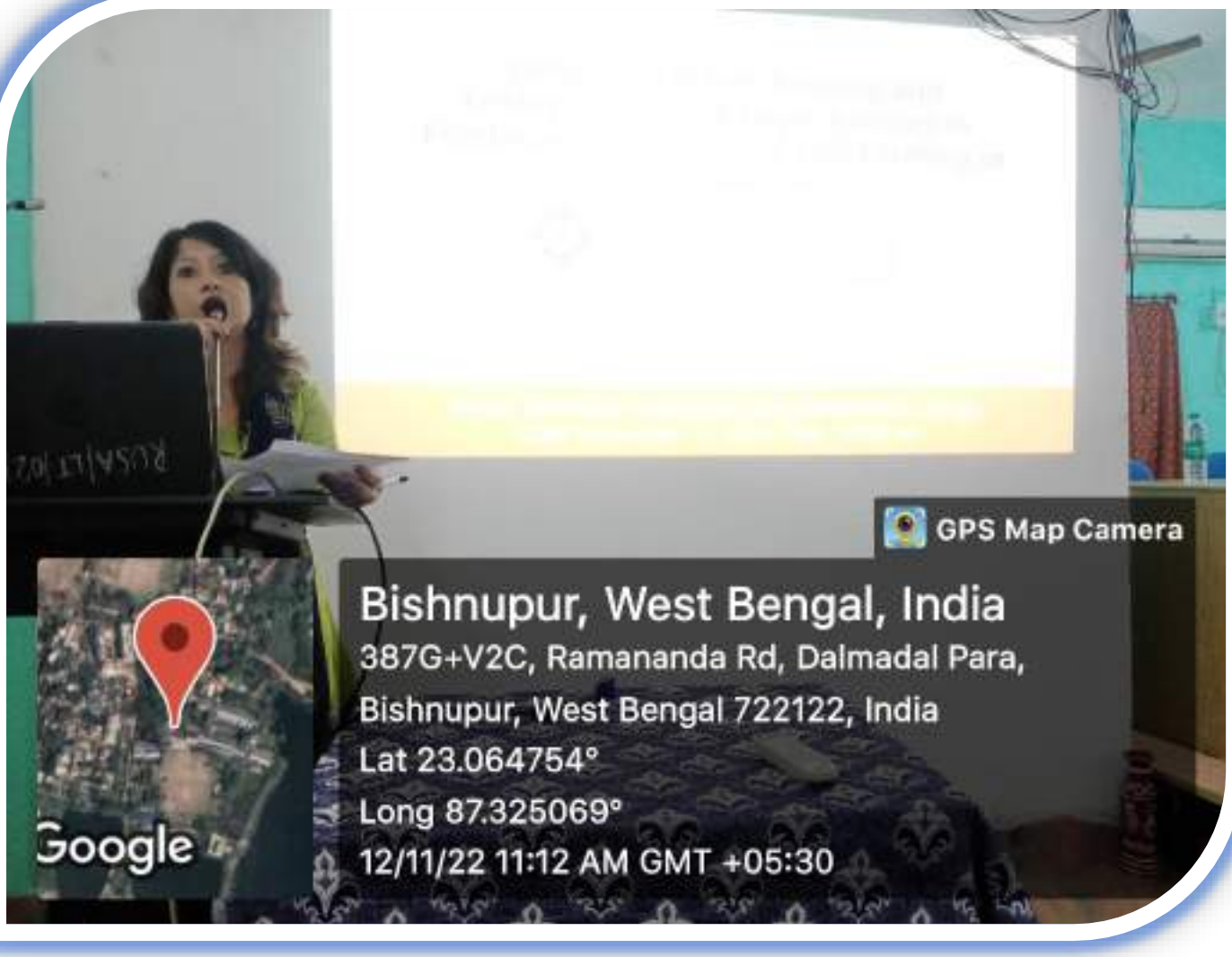
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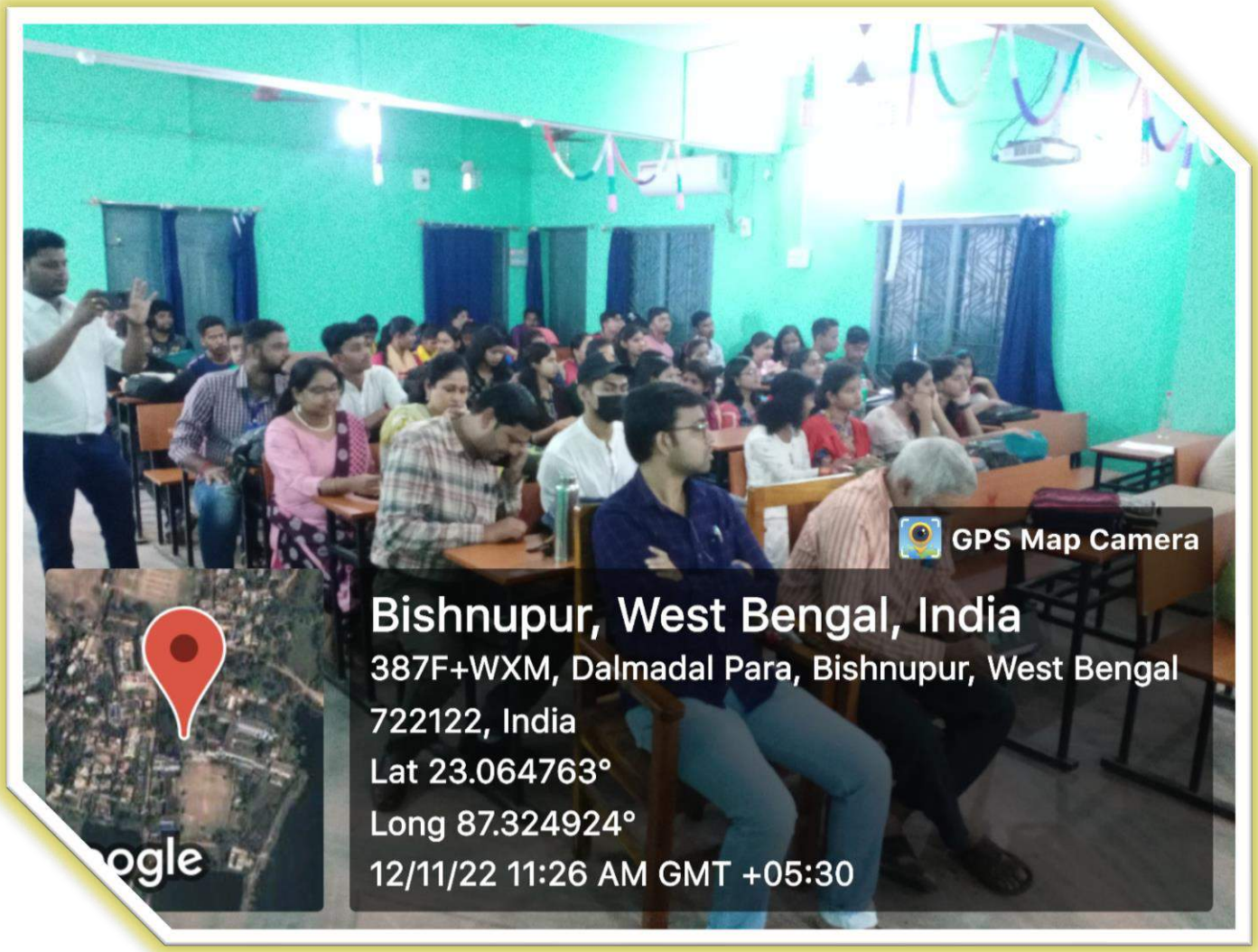
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Ornamental Fish Keeping and Entrepreneurship Opportunities in Freshwater Ornamental Fish Farming in West Bengal

ORGANISED BY – **DEPARTMENT OF ZOOLOGY, Ramananda College**
in Collaboration with Career Advancement Cell & IQAC, Ramananda College
Venue: Ramnalini Chakraborty Hall, Ramananda College

DATE: 12 / 11 / 2022 **& Time:** 10:30am

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