



☎ 9153549620

✉ [dumkalcollege@gmail.com](mailto:dumkalcollege@gmail.com)

# DUMKAL COLLEGE

P.O-Basantapur,P.S-Dumkal,Dist.-Murshidabad,WestBengal, PIN-742406

(Govt.Aided, Affiliated to the: University of Kalyani Included under section 2(f) & 12 (B) of UGC Act.)

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## 2<sup>nd</sup> CYCLE NAAC ACCREDITATION PROCESS-2024

### **CRITERIA: 1 – Curricular Aspects**

### **Key Indicator: 1.3: Curriculum Enrichment**

**Metric: 1.3.2 -Supporting Document ❖ Number of students undertaking project work/field work / internships during latest Completed academic year ❖ Relevant Part of the Curriculum of different Subjects related to Project Work/Field Work/Dissertations etc**

## REPORT OF FIELD WORK 2022-2023

Title of the Report: **SOCIAL AND ECONOMIC ASPECTS OF MANGALBARI CENSUS TOWN OF JALPAIGURI DISTRICT, WB**

Prepared by: Semester V (Hons) Students of Department of Geography

No of Students: 51

Location of Fieldwork: Mangalbari Town

Dates of Fieldwork: 28 Oct-01 November. 2022

Supervisor/Guide: 1. Dr. Swati Mollah, Associate Prof. of Geography  
2. Sri Arindom Biswas, Assistant Prof. of Geography  
3. Dr. Prasenjit Kumar Mondal, Assistant Prof. of Geography

### Attendance of Students

<b>ATTENDANCE SHEET</b>				
S_NAME	ROLL_NO	REG_NO	REG_YR	SIGNATURE
GANDIB SARKAR	56730	058224	2022	Gandib Sarkar
HAFIJ ASAD	56733	058225	2022	Hafij Asad
MAHFUJ HASSAN	56741	058226	2022	Mahfuj Hassan
MANUAR HOSSAIN	56742	058227	2022	Manuar Hossain
MAYNAK SARKAR	56743	058228	2022	Maynak Sarkar
MD ABU BAKKAR SIDDIQUE	56744	058229	2022	Md. Abu Bakkar Siddique
MURSALIN	56760	058230	2022	Mursalina
MUSTAKIN SK	56761	058231	2022	Mustakin SK
NABIN GHOSH	56763	058232	2022	Nabin Ghosh
NAJMUS SAKIB SARKAR	56765	058233	2022	Najmus Sakib Sarkar
RAHUL MANDAL	56772	058234	2022	Rahul Mandal
RIMON SK	56776	058235	2022	Rimon SK
ROMIO MONDAL	56777	058236	2022	Romio Mondal
SABIR AHMED	56780	058237	2022	Sabir Ahmed
SAKIL AHMED	56787	058238	2022	Sakil Ahmed
SAKIL AHMED	56788	058239	2022	Sakil Ahmed
SAMSUL MOLLA	56791	058240	2022	Samsul Molla
SAYAN DAS	56793	058241	2022	Sayan Das
SHUBHADIP SAHA	56794	058242	2022	Shubhadip Saha
SOURAV MIA	56799	058243	2022	Sourav Mia
SUJOY HALDER	56802	058244	2022	Sujoy Halder
TANOY KUMAR SAHA	56806	058245	2022	Tanoy Kumar Saha
SWEETY GHOSH	56701	058214	2022	Sweety Ghosh

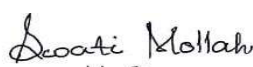
SURNAME	ROLL NO.	MOBILE NO.	YEAR	NAME
ANANYA PRAMANIK	56646	058187	2022	Ananya Pramanik
ARCHITA GHOSH	56648	058188	2022	Archita Ghosh
ARPITA BISWAS	56650	058189	2022	Arpita Biswas
ASHIYA KHATUN	56652	058190	2022	Ashiya Khatun
BITHI KHATUN	56656	058191	2022	Bithi Khatun
DISHA MONDAL	56657	058192	2022	Disha Mondal
DURBA DAS	56658	058193	2022	Durba Das
HASINA TUL KANIZ	56660	058194	2022	(Ab)
JINATAMAN BEGAM	56663	058195	2022	Jinataman Begam
JUMANA KHATUN	56665	058196	2022	Jumana Khatun
NAJMUN FERDOUS	56671	058197	2022	Najmun Ferdous
NEHA KHATUN	56673	058199	2022	Neha Khatun
NEWSIN NOWAR	56676	058200	2022	Newsin Nowar
RAIMA AFJAL	56678	058201	2022	Raima Afjal
RIMPA HALDER	56679	058202	2022	Rimpa Halder
RIYA KHATUN	56680	058203	2022	Riya Khatun
RIYAMONI SARKAR	56681	058204	2022	Riyamoni Sarkar
RUPA KHATUN ANSARY	56682	058205	2022	Rupa Khatun Ansary
SABNAM MUSTARI BANU	56683	058206	2022	(Ab)
SAKILA KHATUN	56688	058209	2022	Sakila Khatun
SOHANA SARMIN	56693	058210	2022	Sohana Sarmin
SUMAIYA SULTANA	56695	058211	2022	Sumaiya Sultana
SUPRIYA GHOSH	56697	058212	2022	Supriya Ghosh
SWAPNA BISWAS	56700	058213	2022	Swapna Biswas
TAMANNA KHATUN	56702	058215	2022	Tamanna Khatun
TANIA SULTANA	56703	058216	2022	Tania Sultana
UMME HABIBA	56706	058217	2022	Umme Habiba
UMME SALAHA	56707	058218	2022	Umme Salaha
ANJAN MONDAL	56714	058219	2022	Anjan Mondal
BITTU BISWAS	56721	058221	2022	Bittu Biswas
BITTU BISWAS	56722	058222	2022	Bittu Biswas
EMDADUL SK	56724	058223	2022	Emdadul SK



Signature of Principal

  
Principal  
Dumkal College  
Basantapur, Murshidabad

Signature of Teachers

  
Seoti Mollah  
HoD  
Department of Geography  
Dumkal College  
Basantapur, Murshidabad

## REPORT OF PROJECT WORK 2022-2023

**Title of the Report: PROBLEM OF FLOOD HAZARD IN JAMALPUR VILLAGE OF JALANGI BLOCK OF MURSHIDABAD DISTRICT, WB**

**Prepared by:** Semester VI (Hons) Students of Department of Geography

**No of Students:** 51

**Location of Fieldwork:** Bamnabad Village

**Period of Project:** September 2023

**Supervisor/Guide:** Dr. Swati Mollah, Associate Prof. of Geography

### Signature of Students Completing the Project Work

Sl. No.	Name	Roll No.	Year	Signature	
1	ANANYA PRAMANIK	56646	058187	2022	Ananya Pramanik
2	ARCHITA GHOSH	56648	058188	2022	Archita Ghosh
3	ARPITA BISWAS	56650	058189	2022	Arpita Biswas
4	ASHIYA KHATUN	56652	058190	2022	Ashiya Khatun
5	BITHI KHATUN	56656	058191	2022	Bithi Khatun
6	DISHA MONDAL	56657	058192	2022	Disha Mondal
7	DURBA DAS	56658	058193	2022	Durba Das
8	HASINA TUL KANIZ	56660	058194	2022	(Ab)
9	JINATAMAN BEGAM	56663	058195	2022	Jinataman Begam
10	JUMANA KHATUN	56665	058196	2022	Jumana Khatun
11	NAJMUN FERDOUS	56671	058197	2022	Najmun Ferdous
12	NEHA KHATUN	56673	058199	2022	Neha Khatun
13	NOWSIN NOWAR	56676	058200	2022	Nowsin Nowar
14	RAIMA AFJAL	56678	058201	2022	Raima Afjal
15	RIMPA HALDER	56679	058202	2022	Rimpa Halder
16	RIYA KHATUN	56680	058203	2022	Riya Khatun
17	RIYAMONI SARKAR	56681	058204	2022	Riyamoni Sarkar
18	RUPA KHATUN ANSARY	56682	058205	2022	Rupa Khatun Ansary
19	SABNAM MUSTARI BANU	56683	058206	2022	(Ab)
20	SAKILA KHATUN	56688	058209	2022	Sakila Khatun
21	SOHANA SARMIN	56693	058210	2022	Sohana Sarmin
22	SUMAIYA SULTANA	56695	058211	2022	Sumaiya Sultana
23	SUPRIYA GHOSH	56697	058212	2022	Supriya Ghosh
24	SWAPNA BISWAS	56700	058213	2022	Swapna Biswas
25	TAMANNA KHATUN	56702	058215	2022	Tamanna Khatun
26	TANIA SULTANA	56703	058216	2022	Tania Sultana
27	UMME HABIBA	56706	058217	2022	Umme Habiba
28	UMME SALAHA	56707	058218	2022	Umme Salaha
29	ANJAN MONDAL	56714	058219	2022	Anjan Mondal
30	BITTU BISWAS	56721	058221	2022	Bittu Biswas
31	BITTU BISWAS	56722	058222	2022	Bittu Biswas
32	EMDADUL SK	56724	058223	2022	Emdadul SK

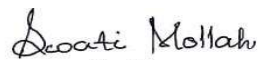
REG_NO	REG_YR	NAME	Signature
052154	2021	TAJMIRA MONDAL	Tajmira Mondal
052155	2021	WASIFA FERDOWSI	Wasifa Ferdowski
052156	2021	ABDUL GAFFAR MONDAL	Abdul Gaffar Mondal.
052157	2021	ABDULHALIM	Absent
052158	2021	AINUL SHAH	Aimul Shah
052159	2021	ALL MAMUN MANDAL	All Munmun Mand
052160	2021	ANOWAR HOSSAIN	Anowar Hossain
052162	2021	BISWAJIT MANDAL	Biswajit Mondal
081689	2021	DIBYENDU PRAMANIK	Dibyendu Pramanik
052164	2021	KANCHAN KUMAR PAL	Kanchan km. Pal.
052165	2021	KESHAB MONDAL	Keshab Mondal.
052166	2021	MD AKHIBUL ISLAM	Md. Akhibul Islam
052167	2021	MD NUHUNABI KHAN	Md. Nuhunabi Khan
052168	2021	NABAB SEKH	Nabab Sekh.
081691	2021	NAJIR HOSSAIN	Najir Hossain
052169	2021	NASIMUDDIN MOLLA	Nasimuddin Molla
052171	2021	NILAY MISTRI	Nilay Mistri
052172	2021	RAHUL MONDAL	Rahul Mondal
052173	2021	RASHIKUL MONDAL	Rashikul Mondal
052175	2021	RIJWAN SK	Rijwan SK
052176	2021	SABBIR AHAMMED	Sabbir Ahammed
052179	2021	SAJID ALI	Sajid Ali
052180	2021	SAMIUL ISLAM	Samiul Islam
052181	2021	SAYAN MANDAL	Sayan Mandal
052182	2021	SOUBHIK SARKAR	Soubhik Sarkar
052183	2021	SOUMAK SAHA	Soumak Saha

Signature of Principal



Principal  
Dumkal College  
Basantapur, Murshidabad

Signature of Teachers



HOD  
Department of Geography  
Dumkal College  
Basantapur, Murshidabad



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P.O-Basantapur, P.S-Dumkal, Dist.-Murshidabad, WestBengal, PIN-742406

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Act.) 📞 9153549620 ✉ [dumkalcollege@gmail.com](mailto:dumkalcollege@gmail.com)

## DEPARTMENT OF CHEMISTRY

### Project Work Students List (2022-2023)

Sl. No	Programme Name	Programme CODE	Name	Session
1	Green approach for the synthesis of drugs	CHEMHTDSE-4	SATYAM DEBNATH	2022-23
2	Advancing catalytic converter technology for sustainable mobility	CHEMHTDSE-4	SAJJAD HOSSAIN	2022-23
3	Preparation, structure, bonding and reactions of ferrocene	CHEMHTDSE-4	MARUF AHAMED	2022-23
4	Advancing catalytic converter technology for sustainable mobility	CHEMHTDSE-4	ASIK SEKH	2022-23
5	Preparation, structure, bonding and reactions of ferrocene	CHEMHTDSE-4	NASIM ANJUM	2022-23

Principal  
Dumkal College  
Basantapur, Murshidabad



# DEPARTMENT OF COMPUTER SCIENCE DUMKAL COLLEGE

**B.Sc. Computer Science Hons. 6<sup>th</sup> Sem. Project information**  
Course Code :UG-CMSH-DSE-PRO-604, Course Title :Project Work/Dissertation  
Session-2022-23

S i. N o	Name of the Student	Project Title	Project Guided by	Signature of Students	Remark
1	ABDUL HAI SIDDIKI ANSARY	Weather Web App	SADEKUL ISLAM	Abdul Hai Siddiki Ansary	
2	AYAN MUKHERJEE	TIC-TAC-TOE Game	SADEKUL ISLAM	Ayan Mukherjee	
3	AZIZ AL AMAN	Weather Web App	SADEKUL ISLAM	Aziz Al Aman	
4	BULBUL AHAMED	CALCULATOR	SADEKUL ISLAM	Bulbul Ahamed	
5	DEBASIS HAZRA	TIC-TAC-TOE Game	SADEKUL ISLAM	Debasis Hazra	
6	SAKIL MOLLA	COOKIFY	SADEKUL ISLAM	Sakil Molla	
7	SAYAN BARAL	CALCULATOR	SADEKUL ISLAM	Sayan Baral	
8	SHANTANU GHOSH	CALCULATOR	SADEKUL ISLAM	Shantanu Ghosh	
9	SUBRATA PRAMANIK	CALCULATOR	SADEKUL ISLAM	Subrata Pramanik	
10	TAMASOW ROY CHOWDHURY	CALCULATOR	SADEKUL ISLAM	T. Roy. Chowdhury	

*Sadekul Islam*  
Head of the Department  
Dept. of Computer Science  
Dumkal College, Murshidabad



**DUMKAL COLLEGE**  
**ENVIRONMENTAL STUDIES**  
**TOPIC : STUDY OF RIVER ECOLOGY**

Year	Name
2022-2023	ADORA KHATUN
2022-2023	AFSANA FARHA
2022-2023	AJIJA KHATUN
2022-2023	IMTISAN KHANAM MOMI
2022-2023	IRIN YEASMIN
2022-2023	JESMIN KHATUN
2022-2023	MEHEJAMIN SULTANA
2022-2023	NAJMA SULTANA PARVIN
2022-2023	NITASA GHOSH
2022-2023	RIYA KHATUN
2022-2023	SALMA KHATUN
2022-2023	SARMIM AKTAR ANSARY
2022-2023	TANIA SULTANA
2022-2023	ABU RAIHAN SEKH
2022-2023	ANIRUDDHA PAL
2022-2023	DILWAR HOSSAIN
2022-2023	HASIRUL ISLAM
2022-2023	MEHEBUB BADSHA
2022-2023	PARVEJ TOUFIK
2022-2023	RIAJ MONDAL AKASH
2022-2023	SAHID HASAN
2022-2023	SAMIM AKTAR KHAN
2022-2023	SARWAR ALAMIN SARKAR
2022-2023	SAWAN AKTAR MOLLAH
2022-2023	SOHON AKTAR
2022-2023	SUBHANKAR MONDAL
2022-2023	TOUSIF AHAMED SHAH
2022-2023	ASMAUL HOSNA
2022-2023	BIDISHA CHAKRABORTY
2022-2023	PROMA MONDAL
2022-2023	SAFIYA SULTANA
2022-2023	SAGNIK CHAKRABORTY
2022-2023	TUHIN AHAMED
2022-2023	HABIBUR RAHAMAN
2022-2023	ABIDA SULTANA
2022-2023	ANKITA PRAMANIK
2022-2023	AYESA KHATUN
2022-2023	AYESHA SIDDIKA
2022-2023	BABITA KHATUN
2022-2023	BARSHA KHATUN
2022-2023	DILBARA KHATUN

2022-2023	ELIJA KHATUN
2022-2023	HAFIJA KHATUN
2022-2023	HASINA KHATUN
2022-2023	HENA KHATUN
2022-2023	IFFAT SABNAM
2022-2023	IPSITA JAHAN MEGHNA
2022-2023	ISMATARA KHATUN
2022-2023	JANNATAN FERDOSA
2022-2023	JERIN AKTAR
2022-2023	KARUNA SARKAR
2022-2023	KOYEL MONDAL
2022-2023	MAFUJA KHATUN
2022-2023	MINAKSHI ROY
2022-2023	MISTU SINHA
2022-2023	MONALISA PARVEEN
2022-2023	NAZNIN SULTANA
2022-2023	NURTAJ KHATUN
2022-2023	PIU HALDER
2022-2023	PIYALI GHOSH
2022-2023	PUJA SAHA
2022-2023	PURNIMA KHATUN
2022-2023	SADIA KHATUN
2022-2023	SAMIMA KHATUN
2022-2023	SAMIMA NASRIN
2022-2023	SANTAHAR PARVIN
2022-2023	SOHELI SARMIN
2022-2023	SOHELI SULTANA
2022-2023	SOHELI SULTANA
2022-2023	SONIA KHATUN
2022-2023	SRABANI KHATUN
2022-2023	SUMAYA SULTANA
2022-2023	OYAHIDA RAHAMAN
2022-2023	TANHAJ SIRIN
2022-2023	TANIA KHATUN
2022-2023	TANIA SIDDIKA
2022-2023	TIASHA KAR
2022-2023	UMMA SALMA SABNAM
2022-2023	UMME HABIBA
2022-2023	ABDUL AZIZ
2022-2023	ABDUL HAMID
2022-2023	ABDUS SALIM MANDAL
2022-2023	ADITYA MONDAL
2022-2023	AKTARUL ISLAM BISWAS
2022-2023	ALI ASGAR SK
2022-2023	ANIMESH ROY
2022-2023	ANISUR RAHMAN
2022-2023	BAPAN MONDAL

2022-2023	BIBHAS SARKAR
2022-2023	REJIA SULTANA
2022-2023	DAUD IBRAHIM HOSSAIN
2022-2023	DEBJIT MONDAL
2022-2023	GOPINATH SARKAR
2022-2023	HABIBUL ISLAM
2022-2023	IKBAL HOSSAIN
2022-2023	JASIM MONDAL
2022-2023	KABIRUL ISLAM
2022-2023	M M TOUFIQUE
2022-2023	MASADUL BISWAS
2022-2023	MASUD REJA
2022-2023	MASUM ALI REJA
2022-2023	MD ALAMIN ISLAM
2022-2023	MD MESBAUL RUIN BISWAS
2022-2023	MD NURABUL MONDAL
2022-2023	MD SARMAN ALI KHAN
2022-2023	MD SAYEED HASAN BISWAS
2022-2023	MOFACHHER HOSSAIN
2022-2023	MONIRUL SHAIKH
2022-2023	MOTIUR RAHAMAN
2022-2023	MUNTASIR MAMAN ANSARI
2022-2023	MURSALIM SK
2022-2023	MUSTAKIM SK
2022-2023	NAIMUR RAHAMAN
2022-2023	NAJIR SEKH
2022-2023	NAJME ALAM BADSHA
2022-2023	NAZRUL MONDAL
2022-2023	NISHAN HALDER
2022-2023	NUR ALAM SK
2022-2023	NURABUL SK
2022-2023	OMOR FARUK
2022-2023	OSMAN JINNURRAIN
2022-2023	RAHUL ISLAM SHAH
2022-2023	RAIHAN KAYESH KHAN
2022-2023	RIAZ SK
2022-2023	RIMON SK
2022-2023	RINKU SHAIKH
2022-2023	ROCKY SARKAR
2022-2023	RONIT HALDER
2022-2023	SABIR MALITHA
2022-2023	SAHABUL MONDAL
2022-2023	SAID ALOM
2022-2023	SAIDUL ISLAM
2022-2023	SAJIB SHAIKH
2022-2023	SANKU MONDAL
2022-2023	SAYANDEEP SAHA

2022-2023	SELIM REJA
2022-2023	SIRAJUL ISLAM
2022-2023	SITAN SAHA
2022-2023	SOUMMYADIP ROY
2022-2023	SUBHAM MONDAL
2022-2023	SUBHANKAR SHIL
2022-2023	SUDIP DAS
2022-2023	SUJAY HALDER
2022-2023	TANJIL MONDAL
2022-2023	TOUSIF AHAMED
2022-2023	MURSELIM MONDAL
2022-2023	HASINA KHATUN
2022-2023	JENIFA KHATUN
2022-2023	NAJMIN SULATAN SHAH
2022-2023	NASIMA NASRIN
2022-2023	NAZMA AKTAR
2022-2023	NISAT AFRIN
2022-2023	NURE TAMANNA YASMIN
2022-2023	PARBHINA KHATUN
2022-2023	SABANA YEASMIN
2022-2023	SAHARA BISWAS
2022-2023	SAMANA SARMIN
2022-2023	TAMANNA NAJRIN SULTANA
2022-2023	ABDUS SAMAD
2022-2023	ABU SAID ANOWAR MONDAL
2022-2023	FARHAD BISWAS
2022-2023	HABIBUR RAHAMAN SK
2022-2023	HASANUJJAMAN MIA
2022-2023	JAHEDEL MONDAL
2022-2023	JULIAS JAMAN
2022-2023	MD ALMAMON
2022-2023	MEHEBUB MURSHID
2022-2023	MIJAN SAIKH
2022-2023	PUSPENDU MONDAL
2022-2023	RAFIKUL ISLAM
2022-2023	RAFIKUL MONDAL
2022-2023	RANIT SAHA
2022-2023	RASHIDUL MONDAL
2022-2023	SAGAR ISLAM
2022-2023	SAKIBUJJAMAN SK
2022-2023	SAMIM AKTAR
2022-2023	SANDIP BISWAS
2022-2023	SHAHRIAR AHMED
2022-2023	SHAKIL ANJUM
2022-2023	SHAMS JAHAN
2022-2023	SUJAUDDIN BISWAS
2022-2023	TARIQUE AZIZ MONDAL

2022-2023	TOUFIK AHAMED
2022-2023	NAJIMA KHATUN
2022-2023	AAL MUTAMMIM MUHAIMIN
2022-2023	ABBAS HOSSAIN MANDAL
2022-2023	ABDUL ALIM MONDAL
2022-2023	ARMAN MONDAL
2022-2023	ASIK IKBAL
2022-2023	HABIB AHSAN MONDAL
2022-2023	KAIF IMTIAZ
2022-2023	MD ASIK ALOM DAFADAR
2022-2023	MD FARUK ISLAM
2022-2023	MD JASIMUDDIN
2022-2023	MILON MANDAL
2022-2023	MUSTAKIN SK
2022-2023	NAJBUL ISLAM
2022-2023	NAYAN MONDAL
2022-2023	NURJAMAN HASAN
2022-2023	RABBUL SK
2022-2023	RAJIBUL MONDAL
2022-2023	RAJIBUL SK
2022-2023	RAKESH MIR
2022-2023	ROBIUL MONDAL
2022-2023	SAGAR ISLAM
2022-2023	SAJABUL MONDAL
2022-2023	SAJAN HALDER
2022-2023	SAKIL AHMED SHAH
2022-2023	SAMIUL SHAH
2022-2023	SOLEHIN SK
2022-2023	SOUMOJIT ACHARYA
2022-2023	Sriman Sarkar
2022-2023	SUMAN SARKAR
2022-2023	HABIBA KHATUN
2022-2023	SADIA TASNIM
2022-2023	SONAM YASMIN
2022-2023	TUSARIN ISLAM
2022-2023	ARIF MANDAL
2022-2023	ASHIM REJA
2022-2023	JANNATUL AJAM SK
2022-2023	MD TOWFIK HASAN
2022-2023	MD. MAHAMUD HASAN
2022-2023	MUFTI MAHAMMAD SAYED
2022-2023	PRANTAR BISWAS
2022-2023	RAFIKUL ISLAM
2022-2023	RAIHAN SK
2022-2023	RIMON MONDAL
2022-2023	SAHIDUZZAMAN SAIED
2022-2023	SK SUIT NAVID NAWAJ

2022-2023	TANBIR AHAMED
2022-2023	TUHIN MEHMUD
2022-2023	WASIM AKRAM
2022-2023	AFSANA MIMI
2022-2023	AJMIRA KHATUN
2022-2023	AJMIRA KHATUN
2022-2023	ANJUMANUARA KHATUN
2022-2023	AOULIYA KHATUN
2022-2023	ASHA KHATUN
2022-2023	ASIA KHATUN
2022-2023	ASMA KHATUN
2022-2023	ASMAUL HOSNA
2022-2023	ASORA KHATUN
2022-2023	AYESA SIDDIKA
2022-2023	AYESHA KHATUN
2022-2023	AYESHA KHATUN
2022-2023	AYESHA SIDDIKA
2022-2023	AYRINA KHATUN
2022-2023	AZENARA KHATUN
2022-2023	AZIZA SULTANA
2022-2023	BABY NAJMIN
2022-2023	BABY SAHANA
2022-2023	BASIRA KHATUN
2022-2023	BEBINA KHATUN
2022-2023	DALIYA SULTANA
2022-2023	ESMINA KHATUN
2022-2023	FARHANA KHATUN
2022-2023	FERDOSHA AKTAR BANU
2022-2023	HABIBA KHATUN
2022-2023	HABIBA KHATUN
2022-2023	HAFIJA KHATUN
2022-2023	HAFIJA KHATUN
2022-2023	HALIMA KHATUN
2022-2023	HAPIJA KHATUN
2022-2023	HASINA BANU
2022-2023	HASINA KHATUN
2022-2023	HASINA KHATUN
2022-2023	HASINA KHATUN
2022-2023	HASNAHARA NARGIS
2022-2023	HASNEHENA KHATUN
2022-2023	ISMOTARA KHATUN
2022-2023	JANNATON FERDOUS
2022-2023	JESMATARA KHATUN
2022-2023	JESMINA KHATUN
2022-2023	JESMINA KHATUN
2022-2023	JESMINA KHATUN
2022-2023	JESMINA KHATUN

2022-2023	JOYTSNA KHATUN
2022-2023	JUI SARMIN MONDAL
2022-2023	JULEKHA KHATUN
2022-2023	JULEKHA KHATUN
2022-2023	KHADIJA KHATUN
2022-2023	KHADIJA KHATUN
2022-2023	KHALEDA KHATUN
2022-2023	KHALEDA KHATUN
2022-2023	LABINA KHATUN
2022-2023	LABONI KHATUN
2022-2023	MAHENUR AFROJ
2022-2023	MAHIMA KHATUN
2022-2023	MARIUM KHATUN
2022-2023	MARJINA KHATUN
2022-2023	MARJINA KHATUN
2022-2023	MEGHNA KHATUN
2022-2023	MERINA KHATUN
2022-2023	MIM SORA
2022-2023	MINAKSHI KHATUN
2022-2023	MINAKSHI KHATUN
2022-2023	MOHIMA KHATUN
2022-2023	MOLLIKA KHATUN
2022-2023	MOMINA KHATUN
2022-2023	MONIKA KHATUN
2022-2023	MOSLIMA KHATUN
2022-2023	MOTIARA BEGAM
2022-2023	MOU DEBNATH
2022-2023	MST AZMIRA KHATUN
2022-2023	MST NAJIMA KHATUN
2022-2023	MUNSURA KHATUN
2022-2023	NAFISA JAHANA
2022-2023	NAJMINA KHATUN
2022-2023	NASHIMA KHATUN
2022-2023	NASIMA KHATUN
2022-2023	NASINA KHATUN
2022-2023	NASIRA KHATUN
2022-2023	NASRIN AKTER BANU
2022-2023	NICE KHATUN
2022-2023	NISHA KHATUN
2022-2023	NURJAHAN KHATUN
2022-2023	NURJAHAN KHATUN
2022-2023	NURSIMA KHATUN
2022-2023	PINJURA KHATUN
2022-2023	PINKI KHATUN
2022-2023	PINKI KHATUN
2022-2023	PRIYA AKTAR BANU
2022-2023	PRIYA KHATUN

2022-2023	RACHITRA HALDER
2022-2023	RAHIMA BEGAM
2022-2023	REHANA PERVIN
2022-2023	RESHMA KHATUN
2022-2023	RESMATARA
2022-2023	RIAJUL SK
2022-2023	RIMPA KARMAKAR
2022-2023	RINA KHATUN
2022-2023	RIYA KHATUN
2022-2023	RIYA KHATUN
2022-2023	ROKIA KHATUN
2022-2023	RUBEJAN PERVIN
2022-2023	RUBINA BISWAS
2022-2023	RUHINA KHATUN
2022-2023	RUMA KHATUN
2022-2023	SABINA KHATUN
2022-2023	SABINA KHATUN
2022-2023	SABNAM MUSTARI
2022-2023	SABRINA SULTANA
2022-2023	SAHANAJ KHATUN
2022-2023	SAHANAJ KHATUN
2022-2023	SAHEDINNECHHA KHATUN
2022-2023	SAHIN DIL AFROJA
2022-2023	SAHINA AKTAR BANU
2022-2023	SAHINA BANU
2022-2023	SAHINA KHATUN
2022-2023	SAJINA BANU KHATUN
2022-2023	SAMIMA KHATUN
2022-2023	SAMIMA KHATUN
2022-2023	SAMPA KHATUN
2022-2023	SAMSUNNAHAR KHATUN
2022-2023	SANIMA PARVIN
2022-2023	SANTANA KHATUN
2022-2023	SAPIA PARVIN
2022-2023	SARMINA KHATUN
2022-2023	SATHI KHATUN
2022-2023	SEFALI KHATUN
2022-2023	SEFALI PRAMANIK
2022-2023	SHABNAM MOSTARI
2022-2023	SHAWNI ROY
2022-2023	SHEFALI KHATUN
2022-2023	SHILPI KHATUN
2022-2023	SHIULI ANSARY
2022-2023	SIMA KHATUN
2022-2023	SIRIN SULTANA
2022-2023	SIRINA KHATUN
2022-2023	SOMA GHOSH



2022-2023	SOMA KHATUN
2022-2023	SONALI KHATUN
2022-2023	SONIARA KHATUN
2022-2023	SONIYA KHATUN
2022-2023	SUJINA KHATUN
2022-2023	SUKTARA KHATUN
2022-2023	SULEKHA KHATUN
2022-2023	SUMAIYA KHATUN
2022-2023	SUMAIYA KHATUN
2022-2023	SUMAIYA KHATUN
2022-2023	SUNITA KHATUN
2022-2023	SURAYEA BEGAM
2022-2023	SURMA KHATUN
2022-2023	SUSMITA KHATUN
2022-2023	SWARNAMAYEE CHOWDHURY
2022-2023	TAJMINA KHATUN
2022-2023	TAMANNA YEASMIN
2022-2023	TANIA ANSARY
2022-2023	TANIA KHATUN
2022-2023	TANIA KHATUN
2022-2023	TANUJA KHATUN
2022-2023	TOKBIRA KHATUN
2022-2023	TUHINA KHATUN
2022-2023	TUNTUNI KHATUN
2022-2023	UMME HABIBA KHATUN
2022-2023	URMILA KHATUN
2022-2023	YEARUNNESA KHATUN
2022-2023	YEASMINA KHATUN
2022-2023	A K U M KAMARUJJAMAN
2022-2023	ABDUL ALIM MONDAL
2022-2023	ABDUL HASIM ALI
2022-2023	ABDUL LATIF
2022-2023	ABDULHAKIM MAL
2022-2023	ABDUR RAHAMAN MONDAL
2022-2023	ABDUR SABUR BISWAS
2022-2023	ABDUS SAMAD MONDAL
2022-2023	ABU AMAN BISWAS
2022-2023	ABU HENA MONDAL
2022-2023	ABU HURAIRA SK
2022-2023	ABU JAFOR
2022-2023	ABU SAHID MONDAL
2022-2023	ABU SATTAR SK
2022-2023	ABU SAYED MONDAL
2022-2023	ABU SUFIAN MANDAL
2022-2023	ABU SUFIAN MONDAL
2022-2023	ABU TAEB MONDAL
2022-2023	ABU TALEB SK

2022-2023	AHASAN
2022-2023	AINUL HOSSAIN
2022-2023	AJHARUL ISLAM
2022-2023	AKASH SK
2022-2023	ALAMGIR SK
2022-2023	ALAMIN MOLLA
2022-2023	ALAMIN MONDAL
2022-2023	ALAMIN SK
2022-2023	ALAMIN SK
2022-2023	ALAMIN SK
2022-2023	ALIM SEKH
2022-2023	ALINUR SK
2022-2023	ALMAMON ANSARY
2022-2023	AMINUL ISLAM
2022-2023	AMINUL ISLAM
2022-2023	AMIRUL SK
2022-2023	AMJAD HOSSAIN
2022-2023	ANARUL SK
2022-2023	ANEKUL MOLLA
2022-2023	ANESUR MONDAL
2022-2023	ANKAN SARKAR
2022-2023	ANOWAR HOSSAIN
2022-2023	ANOWAR SADAT
2022-2023	ANOWAR SADAT
2022-2023	ANSHU DAS
2022-2023	ANTU PAL
2022-2023	ANUAR HOSSAIN
2022-2023	ARIF MONDAL
2022-2023	ARIF MONDAL
2022-2023	ARUP MONDAL
2022-2023	ASANUL ALAM
2022-2023	ASFAKUL ISLAM
2022-2023	ASHIK IKBAL
2022-2023	ASHIK IMRAN
2022-2023	ASIF IKBAL BISWAS
2022-2023	ASIF MAHAMMAD
2022-2023	ASIF SK
2022-2023	ASIK ANSARY
2022-2023	ASIK IKBAL
2022-2023	ASIK IKBAL
2022-2023	ASIK SK
2022-2023	ASIM REJA
2022-2023	ASMAN ALI MONDAL
2022-2023	AYUB ALI SARDAR
2022-2023	BAHARAM MALITHA
2022-2023	BAPAN BISWAS
2022-2023	BAPON MOLLA

2022-2023	BAPPA PRAMANIK
2022-2023	BIKRAM DAS
2022-2023	BIPUL HOSSAIN
2022-2023	DELUAR HOSSAIN
2022-2023	EBRAHIM BADSHA
2022-2023	EKBAL HOSSAIN MONDAL
2022-2023	EKBOR HOSEN
2022-2023	ELIAS ALI
2022-2023	EMAN SK
2022-2023	FARDIN AHAMMED
2022-2023	FARDIN AHAMMED ANSARY
2022-2023	FARIDUL ISLAM
2022-2023	FARUK AHAMMED MONDAL
2022-2023	FIROJ ANSARY
2022-2023	FIROJ MONDAL
2022-2023	GOLAM AMBIA
2022-2023	GOLAM KIBRIA
2022-2023	GOLAM KIBRIA BISWAS
2022-2023	GOLAM MASUM
2022-2023	GOLAM SAROWAR SEKH
2022-2023	HABIB MOHAMMAD SEKH
2022-2023	HADINUR SK
2022-2023	HAMIM HOSSAIN
2022-2023	HAMIM MONDAL
2022-2023	HASAN IKBAL
2022-2023	HASANUR JAMAN
2022-2023	HASANUZZAMAN
2022-2023	HELAL MONDAL
2022-2023	HUMAYAN MONDAL
2022-2023	HUMAYUN MONDAL
2022-2023	HUSAIN
2022-2023	IBNE MAHIRUJJAMAN SAIKH
2022-2023	IBNE SAYED
2022-2023	IMON MONDAL
2022-2023	IMRAN MOLLA
2022-2023	IMRUL KAYES
2022-2023	INJAMAMUL HOQUE
2022-2023	INJAMUL HOQUE
2022-2023	INJAMUL MONDAL
2022-2023	ISMAIL ANSARI
2022-2023	ISMAIL SK
2022-2023	ISRAFIL MANDAL
2022-2023	JAHEDEL SK
2022-2023	JAHID HASAN
2022-2023	JAHID HASAN BISWAS
2022-2023	JALARUDDIN MANDAL
2022-2023	JAMAL HOSSAIN

2022-2023	JAMAN MANDAL
2022-2023	JASIM MONDAL
2022-2023	JIT PAL
2022-2023	JOSIMUDDIN MONDAL
2022-2023	JOSIMUDDIN SK
2022-2023	JOYNAL ABEDIN
2022-2023	JUBAI AL MAMON MONDAL
2022-2023	JUEL HOSSAIN
2022-2023	JUEL RANA MONDAL
2022-2023	JUEL SAIKH
2022-2023	JUEL SK
2022-2023	JULIAS HOQUE
2022-2023	JULIUS ANSARY
2022-2023	JURAES SK
2022-2023	KAFI MOLLA
2022-2023	KAIF SK
2022-2023	KAIJAR ALI SEKH
2022-2023	KAWSAR ALI
2022-2023	KHALID HASAN ANSARY
2022-2023	KHOKAN PRAMANIK
2022-2023	KINGSUK KAR
2022-2023	KIRAN KHAN
2022-2023	KOUSHIK DAS
2022-2023	LOKESH PRAMANIK
2022-2023	MAFIKUL ISLAM
2022-2023	MAHAIMIN HAQUE
2022-2023	MAHAMMAD ALI
2022-2023	MAHIN MONDAL
2022-2023	MAHMUDUL HASAN
2022-2023	MAHMUDUL KABIR
2022-2023	MAINUL HASAN
2022-2023	MAINUL ISLAM
2022-2023	MAJEDUL ISLAM
2022-2023	MANIRUL ANSARI
2022-2023	MANJARUL ISLAM
2022-2023	MANOWAR HOSSAIN MONDAL
2022-2023	MARJAHAN SK
2022-2023	MASADUR MONDAL
2022-2023	MASIDUL HASAN
2022-2023	MASRIKUL ANSARY
2022-2023	MASUD ANSARI
2022-2023	MASUD ANSARY
2022-2023	MASUD KHAN
2022-2023	MASUM SK
2022-2023	MD ABDULLA BISWAS
2022-2023	MD ABU SUFIAN
2022-2023	MD ALAHIM MONDAL

2022-2023	MD ANOWAR SK
2022-2023	MD ANSARUL MONDAL
2022-2023	MD ARIFUL MONDAL
2022-2023	MD ASIF SARKAR
2022-2023	MD ASIK MONDAL
2022-2023	MD EASIN SK
2022-2023	MD EBRAHIM MOLLA
2022-2023	MD HOSSAIN ALI
2022-2023	MD ILIUS ALI
2022-2023	ANOWAR HOSSAIN
2022-2023	MD MEHEBUB MALITHA
2022-2023	MD MUKLESUR RAHAMAN
2022-2023	MD NIJAMUDDIN MONDAL
2022-2023	MD RAFIKUL ANSARY
2022-2023	MD RAHIM MONDAL
2022-2023	MD RAHUL MONDAL
2022-2023	MD RAJIBUL ISLAM
2022-2023	MD RIAJUL MONDAL
2022-2023	MD SAGAR HOSSAIN
2022-2023	MD SAHARIYAR SK
2022-2023	MD SAID HALSANA
2022-2023	MD SAKIL SARDAR
2022-2023	MD SAMIM SK
2022-2023	MD SOHEL RANA MANDAL
2022-2023	MEHEBUB HASAN
2022-2023	MEHEBUB HASAN
2022-2023	MEHEBUB MURSHID
2022-2023	MEHEMOOD AKHTER
2022-2023	MEHEMUD HASAN BISWAS
2022-2023	MEJANUR ISLAM
2022-2023	MIJANUL BISWAS
2022-2023	MIJANUR ANSARY
2022-2023	MIJANUR HOSSAIN
2022-2023	MIJANUR ISLAM
2022-2023	MIJARUL MONDAL
2022-2023	MIJARUL MONDAL
2022-2023	MINARUL ISLAM
2022-2023	MINNAY ISLAM
2022-2023	MIR SAHINUR ALI
2022-2023	MIRAJUL HAQUE
2022-2023	MIRAJUL SK
2022-2023	MITHUN SK
2022-2023	MOBARAK MONDAL
2022-2023	MOHAIMIN REJA BISWAS
2022-2023	MONIRUL ISLAM SARDAR
2022-2023	MONIRUL SHAIKH
2022-2023	MOSARAF SK

2022-2023	MOSAROF MONDAL
2022-2023	MOSAROF SEKH
2022-2023	MOSAROF SK
2022-2023	MOSHIBUR RAHAMAN
2022-2023	MOSIBUR MONDAL
2022-2023	MOSTAFIJUR MIA
2022-2023	MOTIULLA MONDAL
2022-2023	MRINMOY PRAMANIK
2022-2023	MUKLESHUR RAHAMAN
2022-2023	MUKLESUR RAHAMAN
2022-2023	MUNNA AZIZ
2022-2023	MURSALIM MONDAL
2022-2023	MURSALIM SARKAR
2022-2023	MURSELIM MONDAL
2022-2023	MURSELIM MONDAL
2022-2023	MURSELIM SK
2022-2023	MUSABBIR ISLAM
2022-2023	MUSARAF MOLLA
2022-2023	MUSAROF SK
2022-2023	NADIM HASAN ANSARI
2022-2023	NAIM MONDAL
2022-2023	NAIMUR RAHAMAN
2022-2023	NAJBUL HOSSAIN
2022-2023	NAJIBUL SK
2022-2023	NASIBUL ANSARI
2022-2023	NASIBUL SK
2022-2023	NASIF FARHAD DAFADAR
2022-2023	NASIRUL MANDAL
2022-2023	NAYAN MONDAL
2022-2023	NAYAN MONDAL
2022-2023	NIJAMUL SK
2022-2023	NOYAJ SHARIF
2022-2023	NUR ALAM BISWAS
2022-2023	NUR ALAM SK
2022-2023	NUR ALAM SK
2022-2023	OASIM AKRAM
2022-2023	OYALIUR RAHAMAN MIRAJ
2022-2023	PALLAB KUMAR SAHA
2022-2023	PERVEZ MUSARAF HOSSAIN
2022-2023	PIYARUL MONDAL
2022-2023	PRITAM DAS
2022-2023	RABIU ISLAM
2022-2023	RAFIKUL ISLAM
2022-2023	RAFIKUL MONDAL
2022-2023	RAFIKUL MONDAL
2022-2023	RAHIM ISLAM
2022-2023	RAHUL MONDAL

2022-2023	RAHUL MONDAL
2022-2023	RAHUL MONDAL
2022-2023	RAHUL RANA MONDAL
2022-2023	RAIHAN ALI SK
2022-2023	RAIHAN MONDAL
2022-2023	RAIHAN MONDAL
2022-2023	RAIHAN RAJ BISWAS
2022-2023	RAIHAN SAIKH
2022-2023	RAJA HOSSAIN
2022-2023	RAJA MONDAL
2022-2023	RAJESH SHA
2022-2023	RAJESUR JAMAN MANDAL
2022-2023	RAJIB MOLLA
2022-2023	RAJIB PAL
2022-2023	RAJIBUL ISLAM
2022-2023	RAJIBUL ISLAM
2022-2023	RAJIBUL SK
2022-2023	RAJU MONDAL
2022-2023	RAJU RANA
2022-2023	RAKESH SHEIKH
2022-2023	RAKIB HOSSEN
2022-2023	RAKIBUL MAHALDAR
2022-2023	RAKIBUL SHEIKH
2022-2023	RAKIBUL SK
2022-2023	RAMIZ REZA AHAMMED
2022-2023	RANJU SK
2022-2023	RASEL BISWAS
2022-2023	RASEL PARVEJ
2022-2023	RASEL RANA
2022-2023	RASHIDUL SK
2022-2023	RASHIKUL ANSARI
2022-2023	RASIDUL ISLAM
2022-2023	RASIDUL SK
2022-2023	REJANUR MALITHA
2022-2023	RIAJUL ISLAM
2022-2023	RIJUAN SARIF
2022-2023	RIPAN BHOWMICK
2022-2023	RIPON SARDAR
2022-2023	RIYAJ SAIKH
2022-2023	ROHET ALI MONDAL
2022-2023	ROKY MONDAL
2022-2023	RONI MANDAL
2022-2023	RONI MONDAL
2022-2023	RUBEL KHAN
2022-2023	RUBEL SHAIKH
2022-2023	RUBEL SK
2022-2023	RUHUL AMIN

2022-2023	RUHUL SK
2022-2023	SABA SHETAB BISWAS
2022-2023	SABBIR AHAMED
2022-2023	SABBIR AHAMED
2022-2023	SABBIR AHMMAD MONDAL
2022-2023	SABBIR KHAN
2022-2023	SABIKUL SK
2022-2023	SABIR AFROJ BISWAS
2022-2023	SABIR AHAMED
2022-2023	SABIR AHAMED
2022-2023	SABIR AHAMMED
2022-2023	SABIR AHAMMED MONDAL
2022-2023	SABIR AHMED
2022-2023	SABIRUL ISLAM
2022-2023	SABIRUL MONDAL
2022-2023	SAFADUL MONDAL
2022-2023	SAFAKAT UNICH BISWAS
2022-2023	SAFIRUL SK
2022-2023	SAFIUL BISWAS
2022-2023	SAGAR MONDAL
2022-2023	SAGAR MONDAL
2022-2023	SAGIR HOSSAIN
2022-2023	SAGOR MALITHA
2022-2023	SAGOR MONDAL
2022-2023	SAHABUDDIN MONDAL
2022-2023	SAHABUL ISLAM
2022-2023	SAHAJAMAN SK
2022-2023	SAHAMOD BISWAS
2022-2023	SAHID HASAN SK
2022-2023	SAHIDUL ISLAM
2022-2023	SAHIDUL ISLAM SHEIKH
2022-2023	SAHIN REJA MONDAL
2022-2023	SAHIN SHAH
2022-2023	SAHIN SK
2022-2023	SAHINUR ALAM BISWAS
2022-2023	SAHINUR JAMAN
2022-2023	SAID HOSSAIN
2022-2023	SAIFIZ AHAMMED
2022-2023	SAIFUL ISLAM
2022-2023	SAIN KADIR
2022-2023	SAINUL ANSARI
2022-2023	SAIYED HOSSAIN
2022-2023	SAJIBAR RAHAMAN
2022-2023	SAJIDUL MONDAL
2022-2023	SAJIUL MONDAL
2022-2023	SAKHIL ISLAM
2022-2023	SAKIB BISWAS



2022-2023	SAKIB HASAN BISWAS
2022-2023	SAKIBUDDIN SEKH
2022-2023	SAKIBUL ISLAM MOLLA
2022-2023	SAKIBUL SK
2022-2023	SAKIL AHAMMED
2022-2023	SAKIM BISWAS
2022-2023	SAKIM BISWAS
2022-2023	SAMIM HOSSAIN
2022-2023	SAMIM MANDAL
2022-2023	SAMIM SK
2022-2023	SAMIUL ISALM
2022-2023	SAMIUL MANDAL
2022-2023	SAMIUL MONDAL
2022-2023	SAMSUJJAMAN MONDAL
2022-2023	SAMSUL HUDA
2022-2023	SANOAR MONDAL
2022-2023	SANOWYAR MOLLA
2022-2023	SANUOR SK
2022-2023	SANUYAR HOSSAIN
2022-2023	SANUYAR SK
2022-2023	SARIOT MONDAL
2022-2023	SARTHAK SAHA
2022-2023	SARUARJAHAN MONDAL
2022-2023	SAYAN KARMAKAR
2022-2023	SAYAN PAL
2022-2023	SAYEED AKHTAR SK
2022-2023	SAYEED ANOWER
2022-2023	SELIM MONDAL
2022-2023	SHAH ALAM
2022-2023	SHRABON SARDAR
2022-2023	SHUAIB HOSSAIN
2022-2023	SHUBHA DAS
2022-2023	SIBAJUL SK
2022-2023	SIMANTA DAS
2022-2023	SIMARUL MONDAL
2022-2023	SIYAD DAFADAR
2022-2023	SOFIKUL ISLAM
2022-2023	SOHAN SHA
2022-2023	SOHEL RANA
2022-2023	SOHEL RANA
2022-2023	SOHEL RANA MONDAL
2022-2023	SOHEL RANA SK
2022-2023	SOHIDUL MONDAL
2022-2023	SONIRUL ISLAM
2022-2023	SOUMYADIP MONDAL
2022-2023	SOURAV ALI
2022-2023	SOURAV ROY

2022-2023	SOYEL SABBIR AHAMMED
2022-2023	SHARUKH HOSSAIN MONDAL
2022-2023	SUBHAJIT SARKAR
2022-2023	SUBRATA GHOSH
2022-2023	SUJAUDDIN MIA
2022-2023	SUKALPA PRAMANIK
2022-2023	SULTAN MONDAL
2022-2023	SULTAN SK
2022-2023	SUMAN DAS
2022-2023	SUMAN MALTHYA
2022-2023	SUMAN MONDAL
2022-2023	SUNARUDDIN ARINDA
2022-2023	SURAJ MONDAL
2022-2023	SUROJ AHAMMED MONDAL
2022-2023	SUROJ MIA
2022-2023	SURYA DAS
2022-2023	SUSHANTA MANDAL
2022-2023	SUVO MONDAL
2022-2023	SWAPAN SHEIKH
2022-2023	TAFIJUL SK
2022-2023	TAMANNUR BISWAS
2022-2023	TANBIR ALAM
2022-2023	TAUFIK OMAR
2022-2023	TOHID HOSSAIN
2022-2023	TOHIDUL MONDAL
2022-2023	TOHIDUL SK
2022-2023	TOWFIK AHAMMED
2022-2023	TOWSIF AHAMED
2022-2023	TUFAJJUL ISLAM
2022-2023	TUHIN MONDAL
2022-2023	TUHIN SK
2022-2023	UDAYADITYA SHIL
2022-2023	USUF REJA
2022-2023	YAKUB SK
2022-2023	YEASIN SAIKH
2022-2023	YEASIN SEKH
2022-2023	YOUNUS ALI MONDAL
2022-2023	YUSUF ALI
2022-2023	ANKITA KUNDU
2022-2023	ARJINA KHATUN
2022-2023	ARPITA GHOSH
2022-2023	HAFIJA KHATUN
2022-2023	HOSNEWARA KHATUN
2022-2023	JHUMPA KHATUN
2022-2023	MARJINA KHATUN
2022-2023	MOMINA KHATUN
2022-2023	NAJMIN BANU

2022-2023	NAJMINA KHATUN
2022-2023	NAJMUNNAHAR BISWAS
2022-2023	NASIMA AKTER
2022-2023	NILUFA YEASMIN
2022-2023	RAHIMA KHATUN
2022-2023	RINA GHOSH
2022-2023	RIYA KHATUN
2022-2023	SAHINA KHATUN
2022-2023	SAKHILA ANSARI
2022-2023	SIDRATUL MUNTAHA
2022-2023	SYEDA SUMMA SULTANA
2022-2023	TASLIMA KHATUN
2022-2023	TUHINA KHATUN
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2022-2023	ARIF MOLLA
2022-2023	ASIF MASUD
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2022-2023	HASAN MONDAL
2022-2023	JOYNAL MONDAL
2022-2023	MD MINHAJ MURSHED KHAN
2022-2023	MD TANJIR HOSSAIN
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2022-2023	NIMESH PAL
2022-2023	RAHUL HALSANA
2022-2023	RAJESH MANDAL
2022-2023	SAFAIL MONDAL
2022-2023	SAHADUL MIA
2022-2023	SAHIN SARIAR
2022-2023	SAIBATUL HAMID
2022-2023	SAMIM ISLAM
2022-2023	SOUMEN MONDAL
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2022-2023	SUFIAN MANDAL
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2022-2023	YEASIN ANSARY
2022-2023	FARUK AHMMED
2022-2023	LAAM MUNEME MIRZA GALIB
2022-2023	MAMUD SK
2022-2023	MD GOLAM MUSTAFA KHAN
2022-2023	MD SABIR SARKAR
2022-2023	MD SOFIK ALI
2022-2023	MOSAROF HOSSAIN MEHENA
2022-2023	NURTAJUL HOQUE
2022-2023	SAHABUL ISLAM
2022-2023	SURAB ALI
2022-2023	FIROJA BANU

2022-2023	MONALISA AKTHAR BANU
2022-2023	NASIMA KHATUN
2022-2023	SUMI KHATUN
2022-2023	B N JONY MONDAL
2022-2023	FERDOS ALI
2022-2023	JUNAYED AHMED
2022-2023	MD YUSUF
2022-2023	SAHJAMAN SK
2022-2023	SANIF IKBAL
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2022-2023	TASBIHUR RAHAMAN
2022-2023	ALIYA KHATUN
2022-2023	ARSHIDA KHATUN
2022-2023	HASIBA AKTAR BANU
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2022-2023	MST RUBIA KHATUN
2022-2023	NAJMUN NAHAR
2022-2023	SABANA AJMI
2022-2023	SABIRA KHATUN
2022-2023	SABNAM MOSTARIN
2022-2023	SAHANAJ BEN BABY
2022-2023	SAMIMA AKTAR BANU
2022-2023	SAMIMA KHATUN
2022-2023	SARMIN SULTANA
2022-2023	SONALI KHATUN
2022-2023	SONIA KHATUN
2022-2023	SUHANA NARGIS
2022-2023	TAMANNA YEASMIN
2022-2023	ABDUL MOMIN SK
2022-2023	ABU RAIHAN MOLLA
2022-2023	ABU RAWA SARKAR
2022-2023	ABU SURAIJ
2022-2023	AKTAR RAIHAN ALOM BISWAS
2022-2023	AMINODDIN SK
2022-2023	ASHIK MONDAL
2022-2023	ASIF IKBAL
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2022-2023	BAPON SK
2022-2023	DISHANUDDIN SK
2022-2023	ECHHOB BISWAS
2022-2023	FAHIM AKHTAR
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2022-2023	ISAN ALI SARKAR
2022-2023	IYAMIN MOLLAH
2022-2023	JISAN MALLIK
2022-2023	MAINAK MUJKURI
2022-2023	MASUD RANA ANSARI

2022-2023	MASUD RANA BISWAS
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2022-2023	MD YEANUS SK
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2022-2023	MEHEBUB HASAN
2022-2023	MINHAZ HASSAN
2022-2023	MUSTAQ AHAMED
2022-2023	NASIM MONDAL
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2022-2023	SADDAM HOSSAIN
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2022-2023	SAHABUL SK
2022-2023	SAHIDUZZAMAN
2022-2023	SAHIL KABIR
2022-2023	SAHIN ALAM
2022-2023	SAIEM RANA
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2022-2023	SAMIM AKTAR
2022-2023	SAMIM ISLAM
2022-2023	SAYED HOSSAIN
2022-2023	SHIBANKAR GHOSH
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2022-2023	UJJAL ISLAM
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2022-2023	ANINDITA PAL
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2022-2023	BILKISH KHATUN
2022-2023	DEZY KHATUN
2022-2023	HASIBA KHATUN
2022-2023	JESMINA KHATUN
2022-2023	MAHOFUJA KHATUN
2022-2023	MEHEBUBA NASRIN
2022-2023	MERINA KHATUN
2022-2023	NASRIN PARVIN
2022-2023	NILUFA IASMIN
2022-2023	PALLABI MANDAL
2022-2023	RANJANA KHATUN
2022-2023	RUPALI KHATUN

2022-2023	SAHANA PARVIN
2022-2023	SUPARNA PAL
2022-2023	SURAIYA KHATUN
2022-2023	ABUL BASAR
2022-2023	ALAMIN ANSARI
2022-2023	AMIR MONDAL
2022-2023	APURBA DAS
2022-2023	ARIFUL SK
2022-2023	ASIK SK
2022-2023	ASIKUL SK
2022-2023	BAFIUZZAMAN BISWAS
2022-2023	BAHADUR SAH
2022-2023	BIKRAM MONDAL
2022-2023	BRATIN GHOSH
2022-2023	DELWAR HOSSAIN
2022-2023	FARUK AHAMMED
2022-2023	HABIB MONDAL
2022-2023	KHALID HASAN
2022-2023	MAFIJUR RAHAMAN
2022-2023	MAHAMADUL HASSAN MONDAL
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2022-2023	NAYAN SK
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2022-2023	RAKIBUL MOLLA
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2022-2023	RASHIKUL MONDAL
2022-2023	RINKU MONDAL
2022-2023	ROFIKUL ALAM SK
2022-2023	RUBAZ HOSSAIN MONDAL
2022-2023	SAGIR HOSSAIN
2022-2023	SAHINUR ISLAM
2022-2023	SAMAYUN KABIR MONDAL
2022-2023	SAMIM AKTER MONDAL
2022-2023	SAMIUL ALAM
2022-2023	SAMSUZZAMAN MANDAL
2022-2023	SANTANU HALDER
2022-2023	SOHEL RANA
2022-2023	SOLEMAN MIA
2022-2023	SOURAV HALDER
2022-2023	TOUKIR BISWAS
2022-2023	ARJUMA KHATUN
2022-2023	KHADIJA BANU
2022-2023	NURJAHAN KHATUN

2022-2023	NURNESA KHATUN
2022-2023	SAMIMA AKTAR
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2022-2023	HASINA KHATUN
2022-2023	IRANI ANSARY
2022-2023	ISMATARA KHATUN
2022-2023	IYARUNESA KHATUN
2022-2023	MADHUMITA KANCHAN
2022-2023	MONISHA HALDER
2022-2023	NEHA HALDER
2022-2023	REHENA KHATUN
2022-2023	REXONA KHATUN
2022-2023	TAHIA ISLAM
2022-2023	TAMANNA NASRIN
2022-2023	TANIA SULTANA
2022-2023	ABU SAYEED BISWAS
2022-2023	ABU TALEF SEKH
2022-2023	ABUL KALAM AZAD
2022-2023	AMIYA DAS
2022-2023	AROS SK
2022-2023	DIBYENDU HALDER`
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2022-2023	IMTIAJ HASAN
2022-2023	INJAMUL HOQUE
2022-2023	KOUSHAL HALDER
2022-2023	KUMARESH HALDER
2022-2023	MASIKUL HASAN
2022-2023	MD RUHANULLA AZAM
2022-2023	MD SOHEL AKHTAR
2022-2023	MEHEDI HASAN
2022-2023	MOMINUL BISWAS
2022-2023	MOMINUL SK
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2022-2023	MURSHID SK
2022-2023	NAFIJ HASSAN
2022-2023	NAZMUL ISLAM
2022-2023	NILOY GHOSH
2022-2023	RAJU SK
2022-2023	RAKESH CHANDRA GHOSH
2022-2023	RAKIBUL SAIKH
2022-2023	REJUN ALI SHA
2022-2023	RIAJUL MALITHA
2022-2023	SABIRUL ISLAM
2022-2023	SAGIR SK
2022-2023	SAHIR BIN MANNAN
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2022-2023	SANKU PRAMANIK
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2022-2023	SHOEB AKTAR
2022-2023	SOURAV MONDAL
2022-2023	SOUVIK BEDIA
2022-2023	TOUSIF ANSARY
2022-2023	TOUSIF MIRZA
2022-2023	ZAHID HASAN
2022-2023	ZEM BISWAS



**TITLE: FIELD REPORT ON CASE STUDY OF ENVIRONMENTAL DISASTER IN  
BAMNABAD VILLAGE OF RANINAGAR II BLOCK OF MURSHIDABAD, WB**

**INTRODUCTION**

Raninagar II is one of the 26 blocks of Murshidabad district of West Bengal. Our study area, Bamnabad Mouza is situated in the south extreme eastern part of Raninagar II block. Bamnabad is a village where the field survey has been done on river bank erosion problem. The study area is characterized by agrarian culture. Though the village is well connected by a local metalled road to State Highway 11 it is not well developed in terms of economic features. It has a number of educational institutions surrounding it. But it is a socially backward village having no awareness regarding health and education.

**OBJECTIVES**

These are the objectives of the field study:

1. To study the environmental characteristics of the study area
2. To study the river bank erosion problem and
3. To study the perception of the victims of the study area including preparedness

**METHODOLOGY**

In the pre-field study various official websites and published books are consulted for gathering the information regarding the study area. In the second stage the socio-economic data are collected. The study is based on primary data. The data are collected from field survey. For the presentation of the primary data appropriate diagrams are prepared.

**STUDY AREA**

Bamnabad mouza is located at 24°07'11"N 88°34'11"E in Raninagar II block. It is situated in the eastern part of the Raninagar II block. The total area of the village is 124 hectares. It is located in the right bank of River Padma. The study area is a rural area. The study area belongs to Rajapur Gram Panchayat.

**Physical Characteristics of the Study Area**

**Relief and Physiography**

The study area has elevation between 22 m from the sea level. It belongs to Padma-Bhagirathi-Bhairab Tract. The area is characterized by the recent to sub-recent geological age group. The lithological feature is that it consists of recent alluvium, clay, silt, sand, gravels etc.

Physio-graphically the Murshidabad is a part of lower Ganga Plain and the Bamnabad is situated in the Bagri physical sub-division. Bamnabad village has a unique geomorphic location lying in the bank of River Padma. It is situated in the low-lying part in the alluvial tract and is affected by the river bank erosion causing inundation during the rainy season. As per geological information in this region clay-type soil deposition has a great impact for its general geological formation and its physiography.

*Deoati Khatun*  
H.O.D.  
Department of Geography  
Dumkal College  
Basantapur, Murshidabad

## **Drainage**

The main river of the study area is River Padma. It flows in the eastern side of the study area. The river Bhagirathi and Bhairab flow in the western side of the village. Both the rivers are almost in decaying state due to heavy siltation. Both are spill channels of the River Ganga. In many places course the rivers appear as marshy land having no signs of Perennial River. As a result, in many places the river beds are used for paddy cultivation. There are a number of bills (wetlands) in the block. These blocks are products of paleo channels of Eastern Bengal Delta. But all the bills are now in drying stage. Waters are found in their beds only in the rainy season.

## **Climate**

Murshidabad has a tropical wet-and-dry climate. The annual mean temperature is approximately 27 °C; monthly mean temperatures range from 17 °C to 35 °C (approximate figures). Summers are hot and humid with temperatures in the low 30's and during dry spells the maximum temperatures often exceed 40 °C during May and June. Winter tends to last for only about two and a half months, with seasonal lows dipping to 9 °C – 11 °C between December and January. On an average, May is the hottest month with daily average temperatures ranging from a low of 27 °C to a maximum of 40 °C, while January the coldest month has temperatures varying from a low of 12 °C to a maximum of 23 °C. Often during early summer, dusty squalls followed by spells of thunderstorm or hailstorms and heavy rains cum ice sleet lash the district, bringing relief from the humid heat. These thunderstorms are convective in nature, and is locally known as Kal baisakhi. Rains brought by the Bay of Bengal branch of South-West monsoon lash the city between June and September and supplies the district with most of its annual rainfall of approx 1,600 mm (62 in). The highest rainfall occurs during the monsoon in August approx 300 mm (12 in). Floods are common during Monsoon, causing loss of life, destruction of property, and loss of crops.

## **Soil**

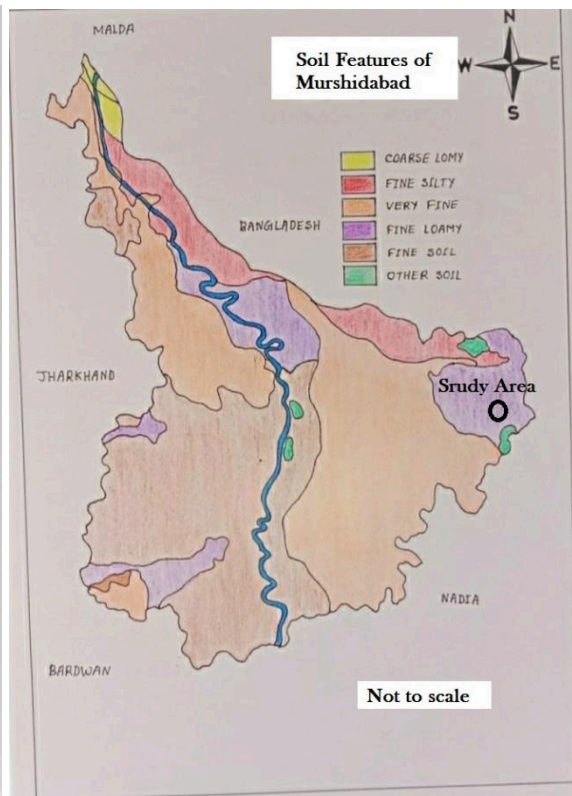
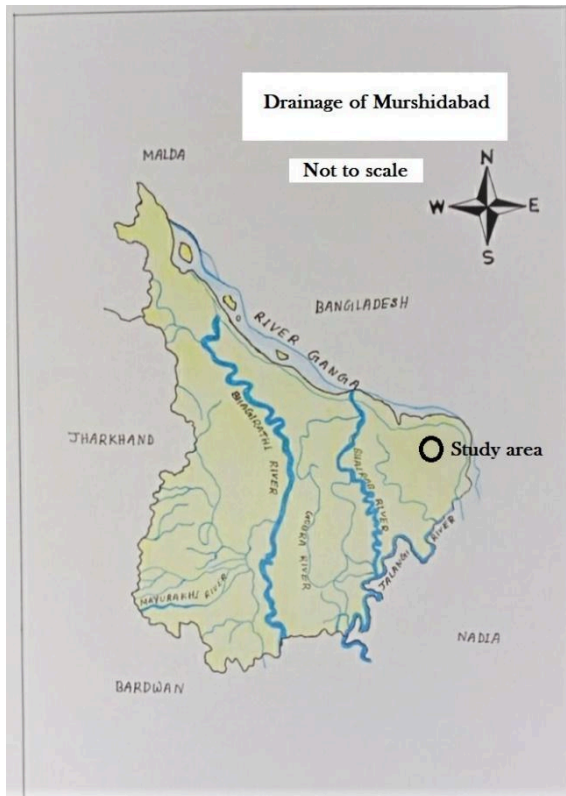
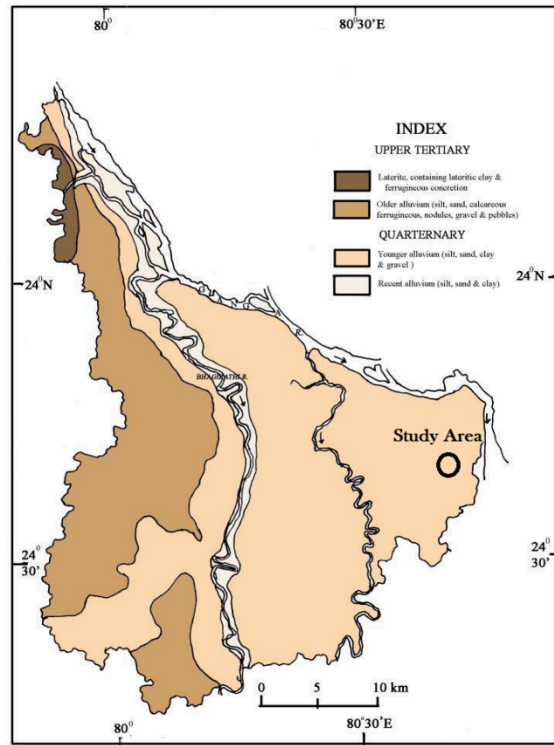
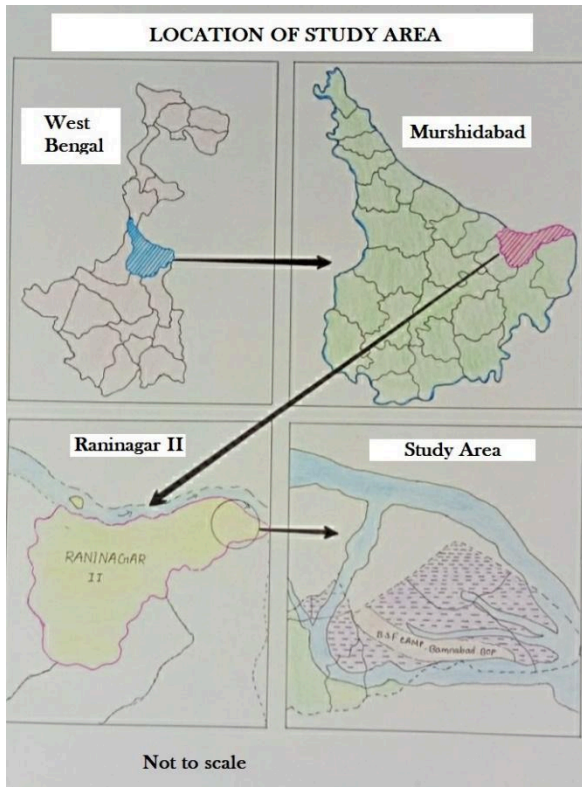
The study area is characterized by alluvial soil. The soil is formed from the recent alluvial brought by the rivers. The soil consists of very fine loams. So, the soil is very fertile for growing crops. Due to the very fertile land majority of the population depend on agriculture. The soil is exploited in its full extent. But now a day the fertility of soil has been degraded due to continuous use of fertilizers during farming. As a result, the soil becomes acidic.

## **Vegetation**

Like the other part of the Murshidabad district the study area is characterized by deciduous trees. But due the settlement the vegetation cover is very low in the study area. Only orchards and few scattered trees are found in the study area. Among the prominent trees neem, mango, simul etc. are found in the area. Many of the households have kitchen gardens beside their house.

*Devi Mollah*  
HoD  
Department of Geography  
Dumkal College  
Basantapur, Murshidabad

Location map and Physical Characteristics of the Bamnabad village and its surrounding area



**Socio-economic Characteristics of the Study area**

Deoati Kollah  
 HoD  
 Department of Geography  
 Dumkai College  
 Basantapur, Murshidabad

## **Population Composition**

The study area has total 733 households. The total population of the mouza is 4414 (2011). Among the total population the male and female population is almost same in numbers. So, the Sex Ratio in the study area is very good in terms of total number of female population per 1000 male population. The total number of populations below 6 years age is 11% of the total population. If we notice the female population under 6 years age, we find that the number is more than male population.

There is only 1% SC population live in the study area. The dominant religious category is Islam. Very few numbers of households follow Hinduism. The only language spoken in the village is Bangla.

## **Educational Level**

The total percentage of literacy in the study area is 67%. It is quiet high with respect to the other villages. The rate of illiteracy is 33%. But the level of education is very low. Majority of literate population passed only primary level of education. There is a problem related with the availability of good school and educational facilities in the study area.

## **Infrastructural Facilities**

The State Highway 11 connects the village to the nearest urban center, Raninagar. But the infrastructure is not developed in the study area. There are only 3 primary level school in the village. To go for Madhyamik and Higher Secondary school they have to go 5 to 10 km from their area. The Colleges are within 10 km from the villages. For getting public bus services the villagers have to go less than 5 kms and for railway services it is very far away, about 55 kms at Berhampore.

There are no good drinking water supply facilities in the villages. Only Arsenic Free water treatment plants were established few years back but due to non-maintenance of these plants they become defunct. There is no running water facility. The villagers use handpump for supply of drinking water.

## **Economic Status**

The total number of working populations in the village is 923. So, working population percentage is very low. The main occupation of the workers is cultivation and agricultural labour. Many of them migrate to other states for earning. There is very few govt service holder in the study area.

The total monthly income of the village is as low as Rs. 389840 and the total expenditure is Rs. 358830. This indicates the poor economic status of the study area.

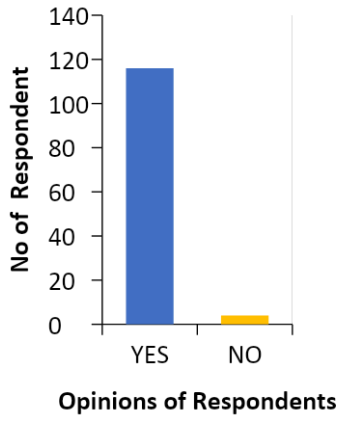
## **Land Use**

The study area is characterized by two dominant land use that is settlement and cultivable land. Only 59 hectares land is under forest. More than 80% of the cultivated land is irrigated by groundwater. This causes over exploitation of groundwater in the study area. This also results arsenic pollution in the village.

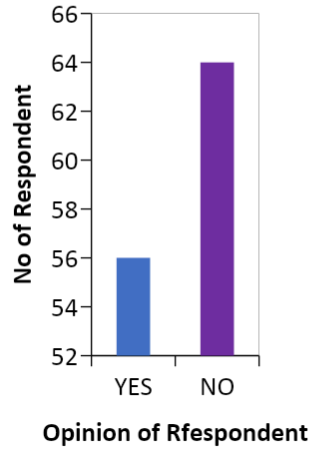
Diagrams showing the respondents perceptions, knowledge and preparedness level for river bank erosion in Bamnabad village

*Deoati Khatun*  
HOD  
Department of Geography  
Dumkai College  
Basantapur, Murshidabad

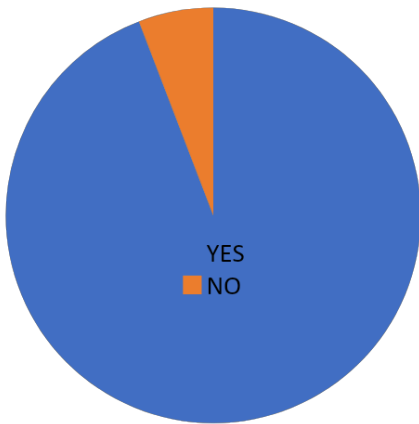
**SHOWING THE IDEA OF RIVER BANK EROSION IN RURAL AREA**



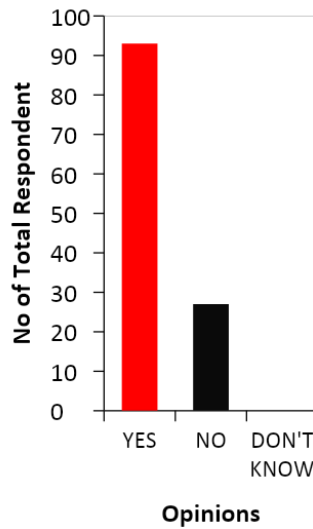
**SHOWING THE OPINION WHETHER HUMAN ACTIVITIES CAUSE RIVER BANK EROSION OR NOT IN BAMNABAD**



**SHOWING THE IDEA OF RIVER BANK EROSION IN THERE LOCALITY IN BAMNABAD**

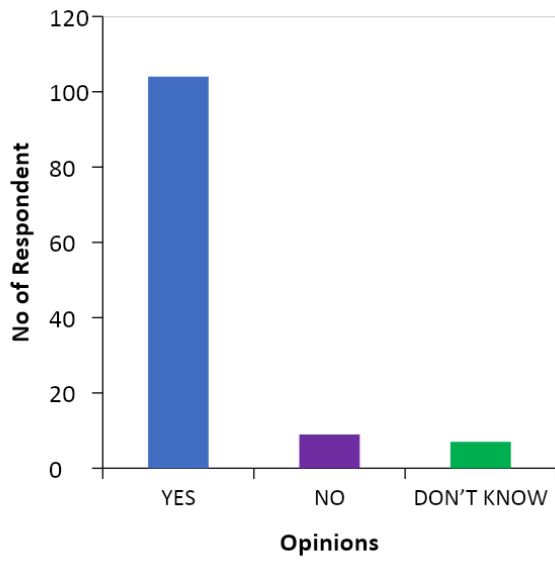


**OPINION OF RESPONDENT WHETHER RIVER BANK EROSION CAN BE CATASTROPHIC OR NOT IN BAMNABAD**

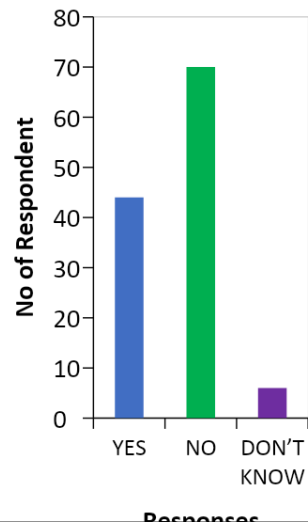


*Sevati Kollah*  
 HoD  
 Department of Geography  
 Dumkai College  
 Basantapur, Murshidabad

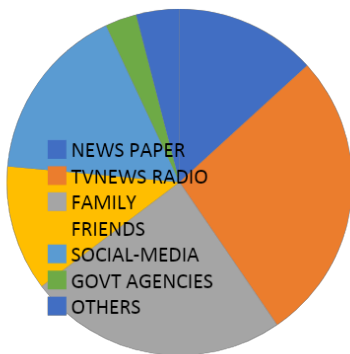
**OPINION OF RESPONDENT WHETHER RIVER BANK EROSION HARMFUL OR NOT IN BAMNABAD**



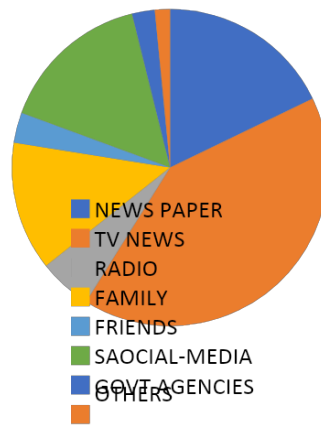
**WHETHER RESPONDENT TAKEN STEPS TO REDUCE RIVER BANK EROSION OR NOT IN BAMNABAD**



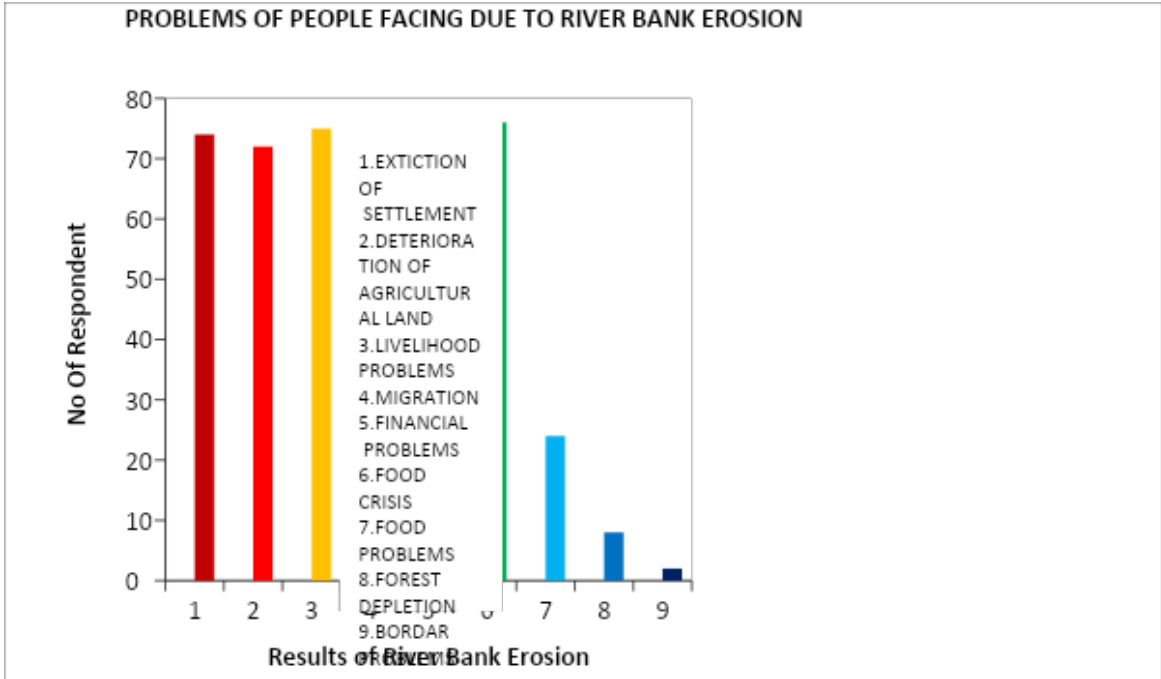
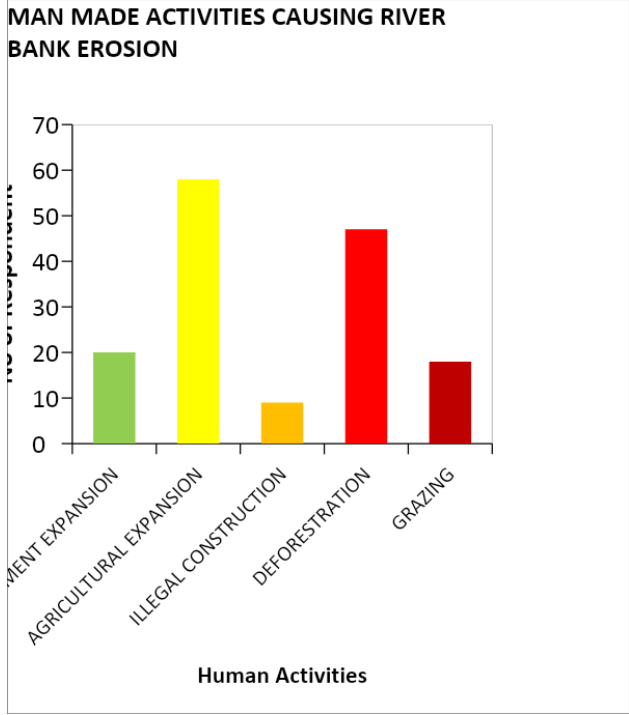
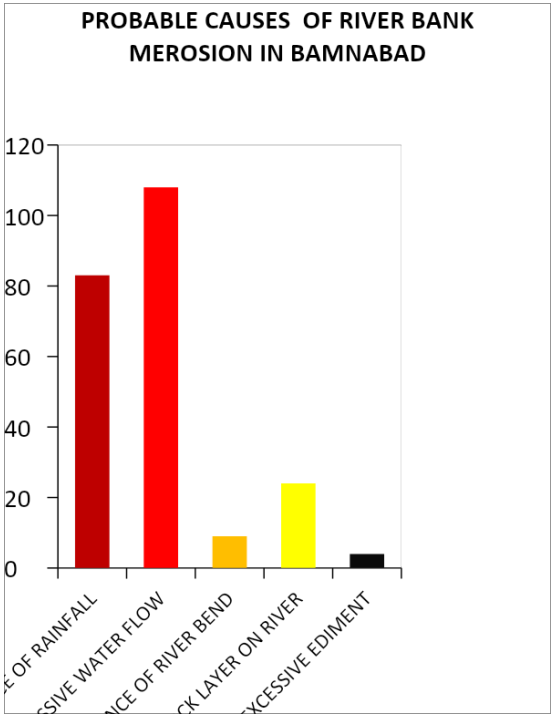
**SOURCES OF INFORMATION REGARDING RIVER BANK EROSION**



**RELIABILITY OF SOURCES FROM WHERE RESPONDENT GET INFORMATION**

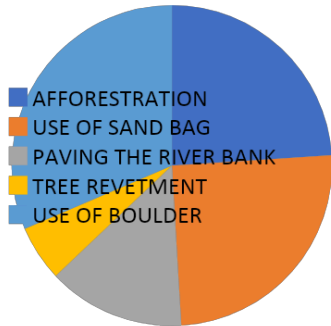


*Sooati Khatun*  
 HOD  
 Department of Geography  
 Dumkal College  
 Basantapur, Murshidabad

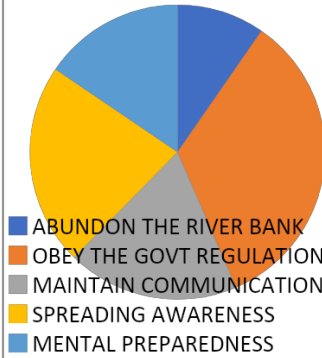


Sevati Kollah  
 HoD  
 Department of Geography  
 Dumkal College  
 Basantapur, Murshidabad

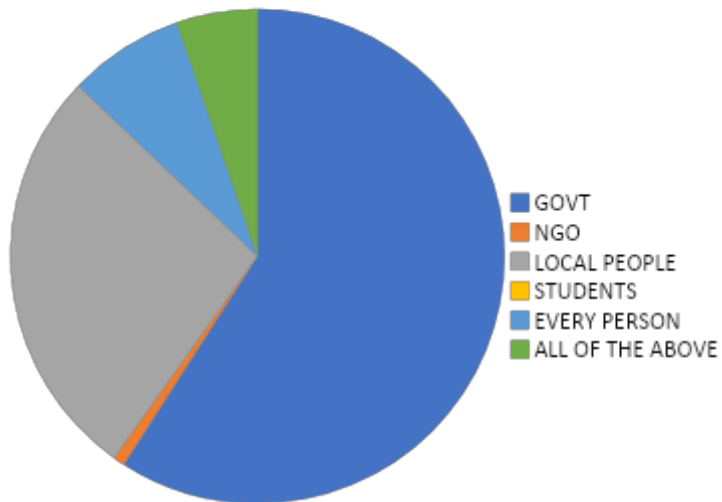
**PROBABLE WAYS TO REDUCE TO RIVER BANK EROSION**



**OPINION TO REDUCE TO RIVER BANK EROSION**

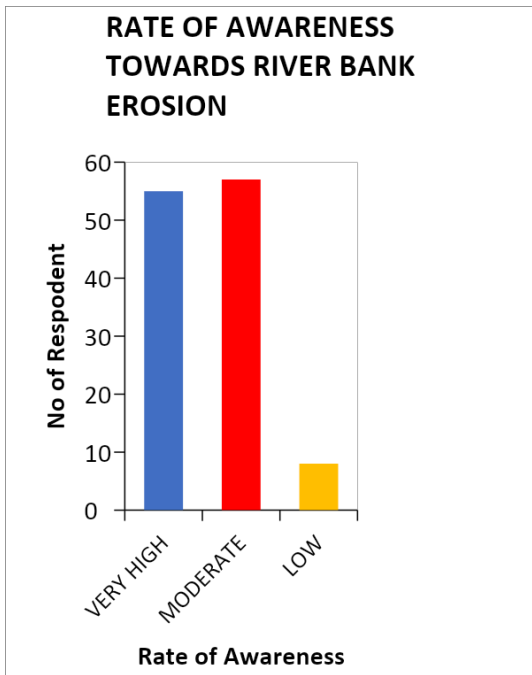
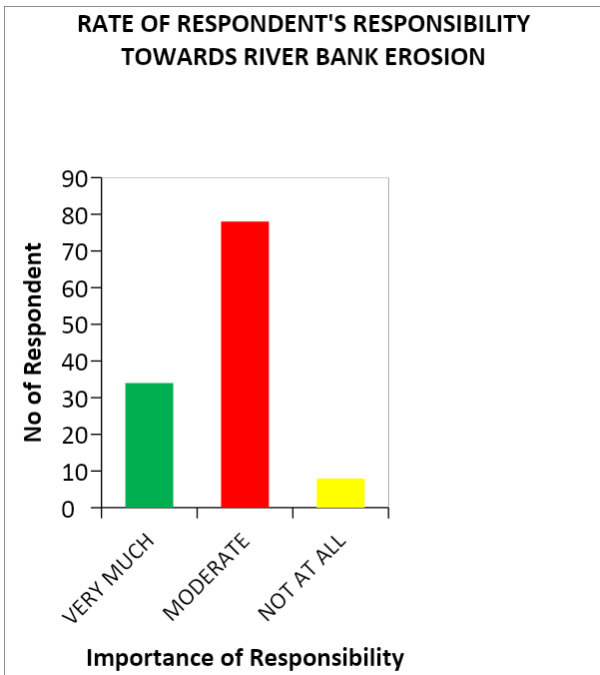
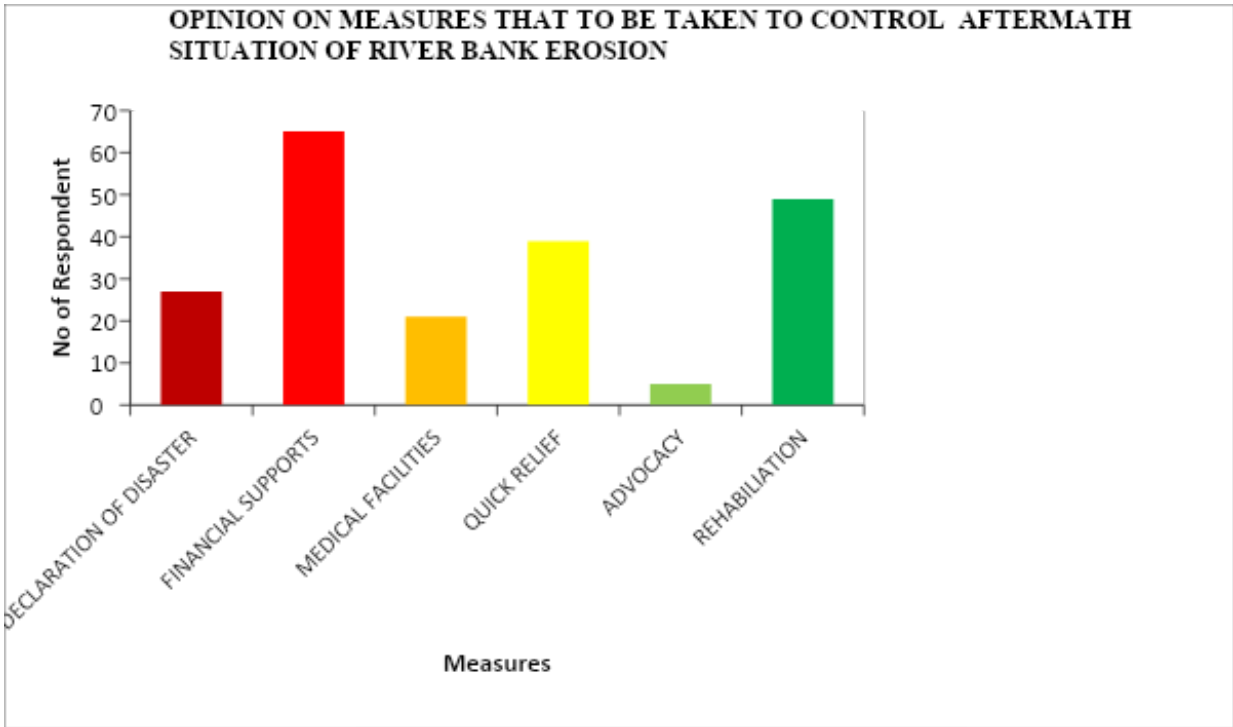


**RESPONDENT'S OPINION ON RESPONSIBILITY FOR MANAGEMENT OF RIVER BANK EROSION IN BAMNABAD**



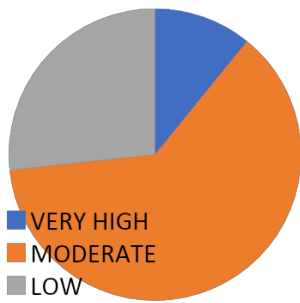
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 HoD  
 Department of Geography  
 Dumkal College  
 Basantapur, Murshidabad



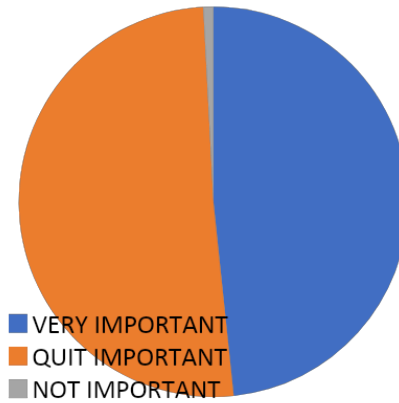


*Sevati Kollah*  
 HoD  
 Department of Geography  
 Dumkai College  
 Basantapur, Murshidabad

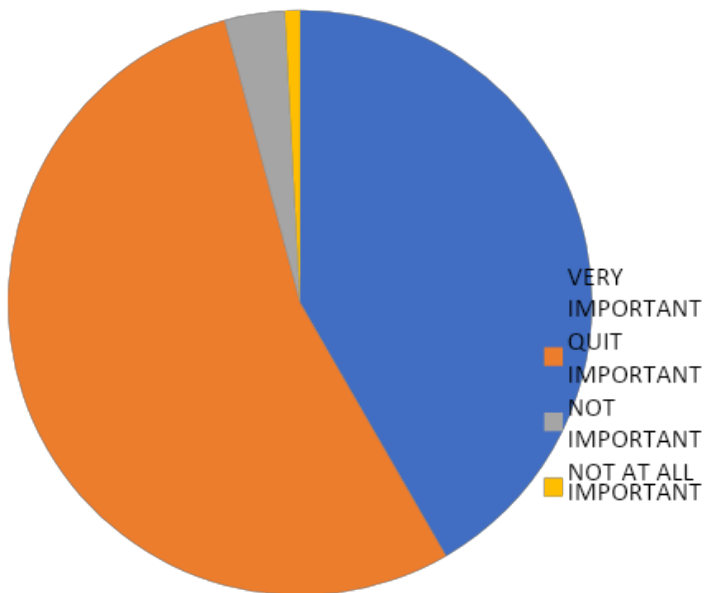
**OPINION ON ROLE OF GOVERNMENT  
IN MANAGEMENT OF RIVER BANK  
EROSION IN BAMNABAD**



**RESPONDENTS' OPINION ON HOW  
IMPORTANT THE ISSUE OF RIVER BANK  
EROSION**



**IMPORTANCE OF PREPAREDNESS FOR MANAGING RIVER BANK  
EROSION IN BAMNABAD**



*Seetai Kollah*  
 HoD  
 Department of Geography  
 Dumkal College  
 Basantapur, Murshidabad

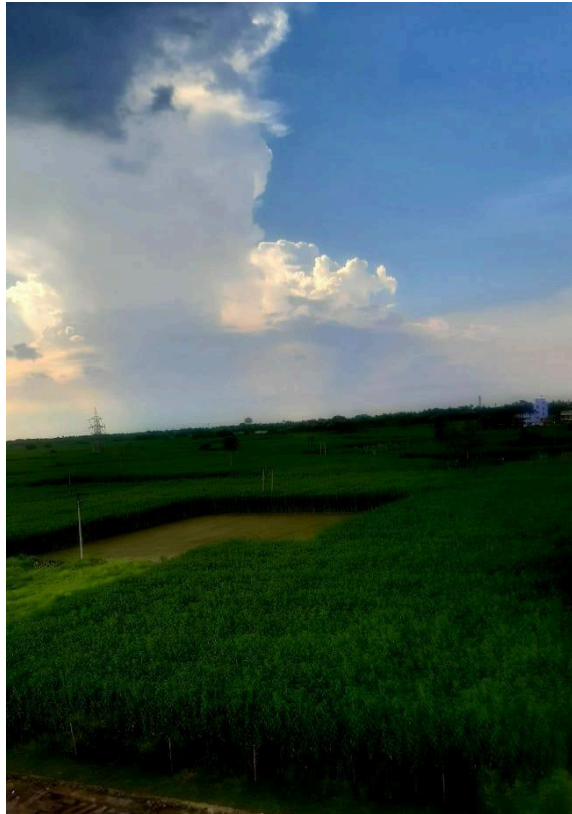
Field photos showing the physical, socio-economic features and river bank erosion problem in the study area



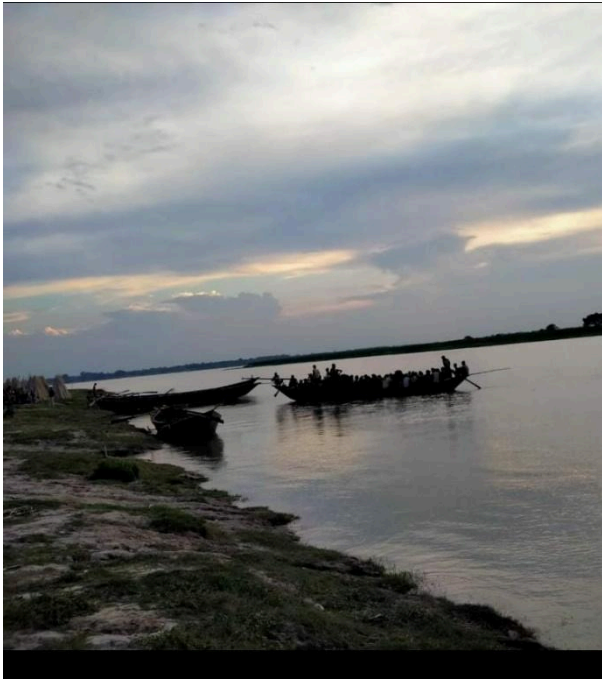
Deoati Khatun  
HoD  
Department of Geography  
Dumkai College  
Basantapur, Murshidabad



Seoati Khatun  
H.O.D.  
Department of Geography  
Dumkai College  
Basantapur, Murshidabad



Seoati Khatun  
H.O.D.  
Department of Geography  
Dumkal College  
Basantapur, Murshidabad



## CONCLUSION

The study area has a number of environmental problems. But the prominent problems are as follows-

1. River bank erosion
2. Inundation of settlement during rainy season
3. Arsenic pollution
4. Groundwater depletion

The villagers do not have much knowledge regarding disaster characteristics, preparedness, management etc. The lack of education and exposure are the main constraints here.

## **References**

Govt. of India (2011): Census Report of India, Govt. of India, New Delhi

Govt. of West Bengal (2018): District Statistical Handbook, Govt. of West Bengal, Kolkata

*Seoati Khatun*  
HOD  
Department of Geography  
Dumkal College  
Basantapur, Murshidabad

# **UNIVERSITY OF KALYANI**

**Project report**

**Submitted for the partial  
fulfillment of the B.sc degree**

**Dumkal College**

**Irin Aktar Soma**

**2022**

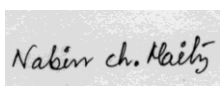
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**Title of the project: CHLOROPHYLL AND HEMOGLOBIN  
STRUCTURE AND FUNCTION**

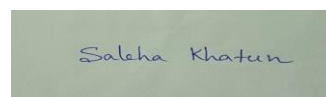
Name of the student: **Irin Aktar Soma,**

We hereby forwarded this project Report for submission in partial fulfilment of the B.Sc. examination in Chemistry, 2022. We certify that the project work presented in this dissertation was carried out under our guidance.

Date:- 06-06-2022



**Signature of the supervisor**



**Signature of the supervisor**



# *ACKNOWLEDGEMENT*

I am highly thankful to my guides Dr Nabin Chandra Maity & Mrs Saleha Khatun for their excellent guidance. They have given me valuable suggestions, both academic and non-academic, which will help me immensely in future.

I am thankful to all other teachers in the department of chemistry.

I am also thankful to all my classmates for their hearty help and for creating a friendly environment which encouraged me enormously to work hard.

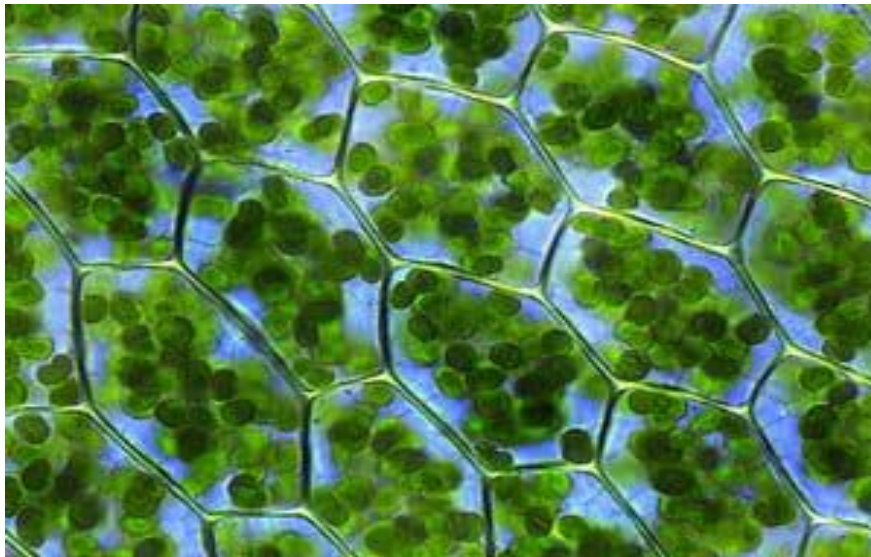
# CHLOROPHYLL AND HAEMOGLOBIN STRUCTURE AND FUNCTION

## Introduction:

Chlorophylls are unique pigments with green colour and are found in diverse plants, algae, and cyanobacteria (Inanc, 2011). The term chlorophyll is derived from the Greek chloros meaning “green” and phyllon meaning “leaf”. Isolation and naming of the chlorophyll were first carried out by Joseph Bienaimé Caventou (French pharmacist) and Pierre-Joseph Pelletier (French chemist) in 1817 (Gopiet al., 2014). Chlorophyll is made up of carbon and nitrogen atoms along with a magnesium ion in the central position. Chlorophyll is found in almost every green part of plants i.e. leaves and stem, within the chloroplast, the main organelle which contains the highest amount. Chloroplasts are found in the mesophyll layer, in the middle of plant leaves. Chloroplasts possess thylakoid membranes which contain green chlorophyll pigment. Chloroplast can be referred to as the “food factory” of the plant cell because it produces energy and glucose for the whole plant in association with CO<sub>2</sub>, water, and sunlight. The name “Chlorophyll” was first given to the chloroplast of higher plants only, but later it was extended to all photosynthetic porphyrin pigments (Vernon and Seely, 1966). It comes under the special class of compounds called tetrapyrroles because it contains four pyrrole rings joined together with a covalent bond, as are vitamin B12 and the heme molecule (Willows, 2004).



**Fig. 1.** Leaf containing green chlorophyll pigment

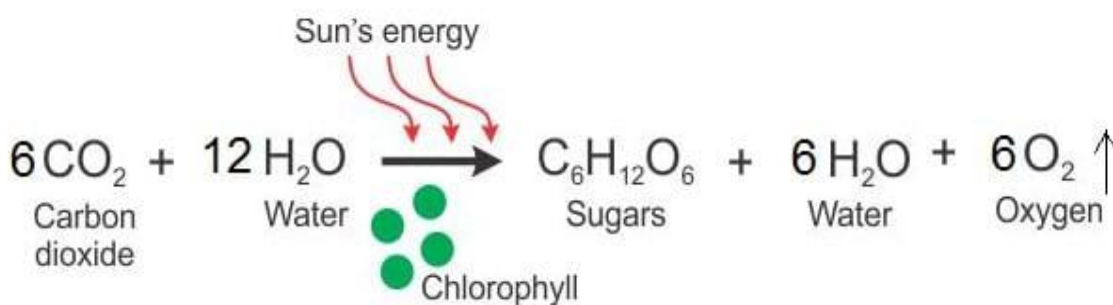


**Fig. 2.** Chlorophyll is responsible for the green colour of many plants and algae.

**Chemistry of Chlorophylls:**

The porphyrin unit has a very crucial role in nature because it participates in the fundamental skeleton of chlorophyll (Eugene and Govindjee, 1969). Many researchers have performed various experiments, and both analysed the chemical properties and elucidated the structure of chlorophyll molecules (Aronoff, 1966; eely, 1966). Research has revealed that the chlorophylls are tetrapyrroles, a cyclic form of porphyrin and chlorin (the parent molecule of all chlorophylls). This cyclic form creates an isocyclic ring with the help of -CH bridges. Chemically, chlorophyll possesses a magnesium ion in the central position which is found connected with the tetrapyrrole ring (Scheer, 1991). Moreover, chlorophylls are hydrophobic molecules because they contain phytol, an esterified isoprenoid C<sub>20</sub> alcohol. The phytol (C<sub>20</sub>H<sub>30</sub>OH) possesses a double bond in the trans configuration (Gross, 1991).

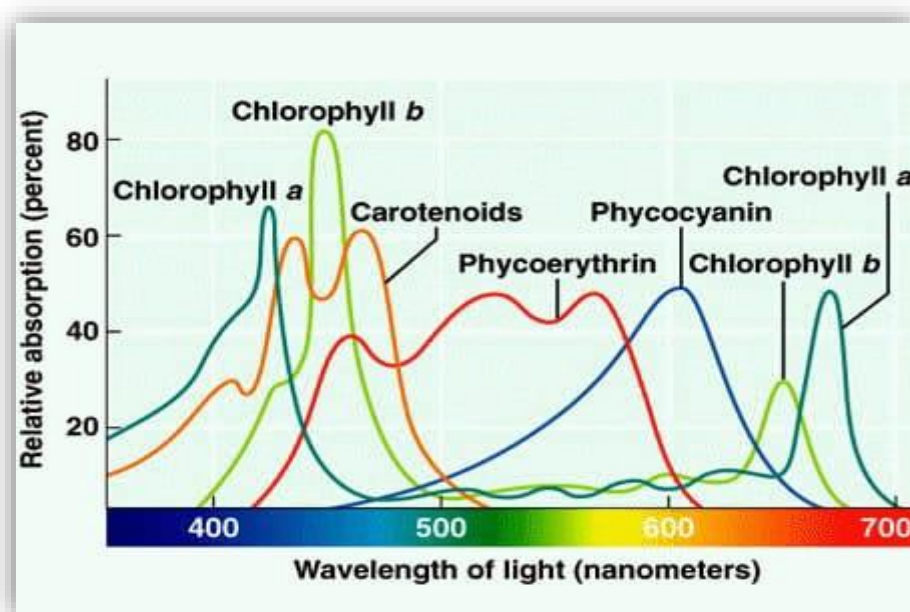
**Importance:**



**Scheme 1.** Photosynthesis in chlorophyll

The main source of life on earth is the solar energy that is captured by green plants, algae, and various photosynthetic bacteria. Although there are different photosynthetic pigments such as carotenoids and phycobilins which entrap solar radiation, chlorophyll is the most important of these molecules. It converts solar energy into chemical energy that is used to build essential carbohydrate molecules (glucose) which are used as a food source for the whole plant (Hynninen and Leppakases, 2002). The process can be described by the equation Broadly, the conversion process of solar energy into chemical energy is called photosynthesis. Chlorophyll pigment absorbs blue light and red light of solar radiation at 430 nm and 660 nm, respectively, and it reflects the green spectrum (Inanc, 2011)

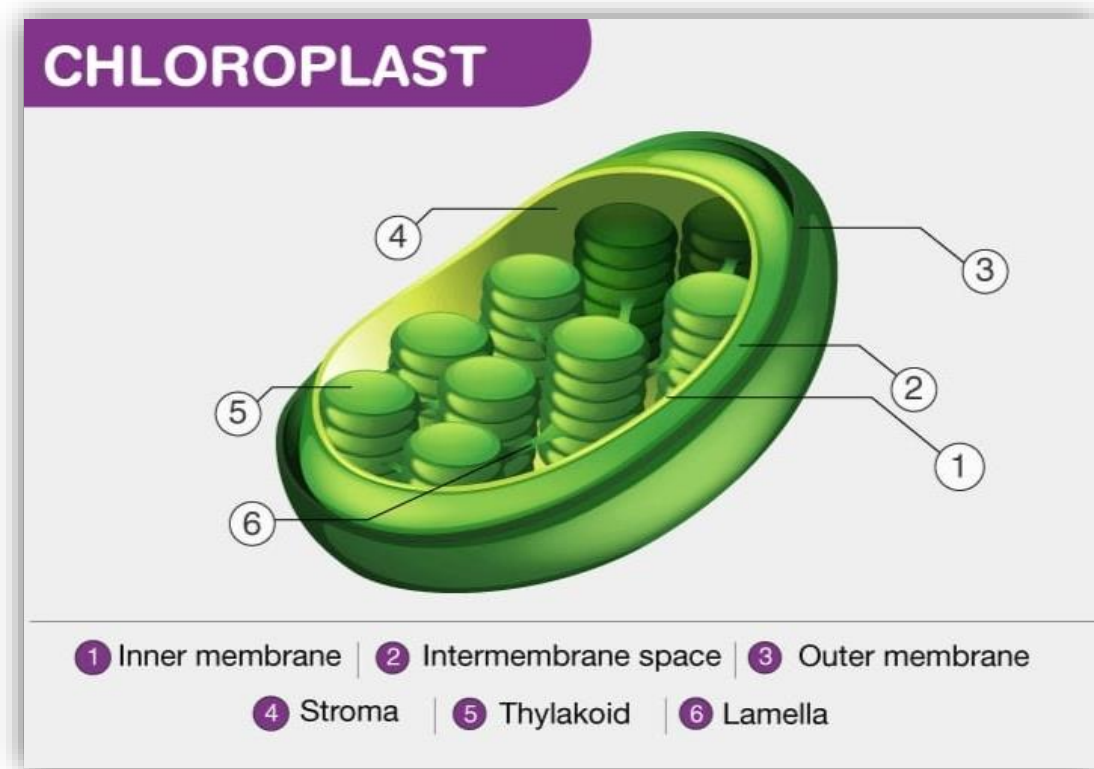
The light absorption of different photosynthetic pigments:



**Fig. 4.** Range of absorption by chlorophyll in the solar light spectrum.

### **Chloroplast:**

The chlorophyll pigment is found in plant cells' chloroplasts. These chloroplasts act as a site of the photosynthesis process in both plants and blue-green algae.



**Fig. 5.** Structure of chloroplast

Usually, the chloroplasts align along the walls of the mesophyll. This helps them to receive optimum sunlight. The chloroplast has different membranes like grana, stroma, lamellae and thylakoids. The chlorophyll pigment is enclosed in the thylakoids of the chloroplast.

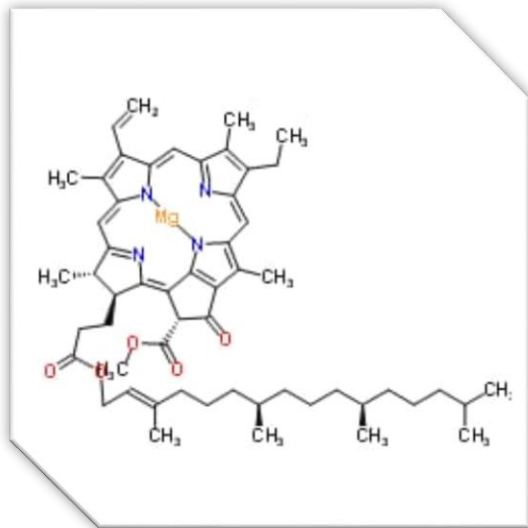
**Types and Distribution of Chlorophylls:**

The numbers of naturally occurring chlorophylls may not yet be fully known. Chlorophyll-a and chlorophyll-b are the main components of photosystems in photosynthetic organisms. The types of different chlorophyll pigments present in nature are in decreasing order of importance. Initially, chlorophyll was classified into four – chlorophyll-a, chlorophyll-b, chlorophyll-c, and chlorophyll-d (Vernon and Seely, 1966) – but later a new type of chlorophyll was discovered within stromatolite (a hard rock structure made by cyanobacteria) in western Australia, which was named chlorophyll-f. Thus eventually chlorophyll was divided into five classes, a, b, c, d, and f.

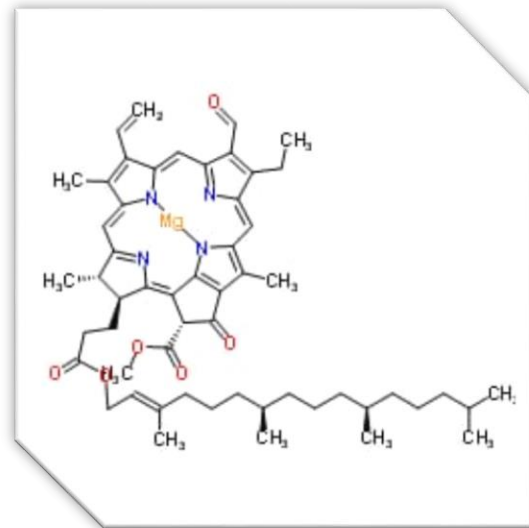
**Structures of Different Chlorophylls:**

Chemically, the basic skeleton of chlorophyll is composed of a cyclic tetrapyrrole ring, which is a large planar structure of asymmetric arrangement in which the four pyrrole rings are joined together by methine (-CH=) bridges and four nitrogen atoms are coordinated with a central metal atom. In addition, they have a phytol group that confers a hydrophobic characteristic; the metal-bound to the chlorophylls is magnesium.

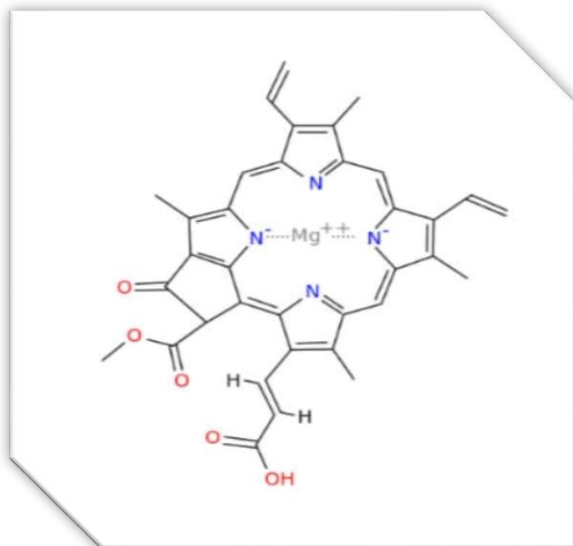
Therefore, this structure contains a chromophore of several conjugated double bonds responsible for absorbing light in the visible region, i.e. red (peak at 670-680 nm) and blue (peak at 435-455 nm). The reflection and/or transmission of the non-absorbed green light (intermediate wave-length) give the characteristic green colour to plants and chlorophyll solutions. Higher plants, ferns, mosses, green algae, and the prokaryotic organism prochloron only have two chlorophylls (a and b); the remaining chlorophylls are present in algae and bacteria. The structures of different chlorophylls are described below.



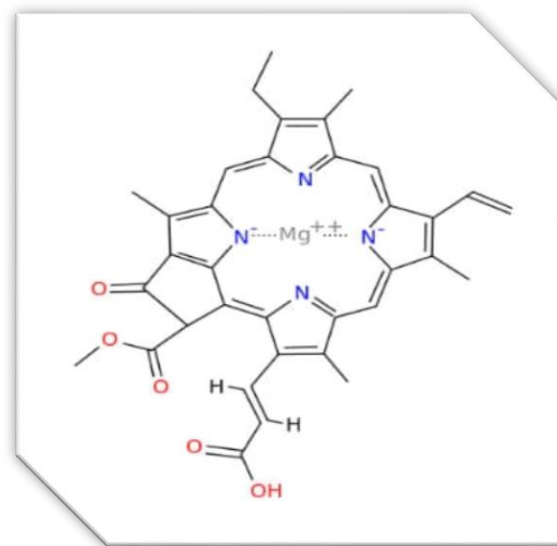
**Chlorophyll-a**



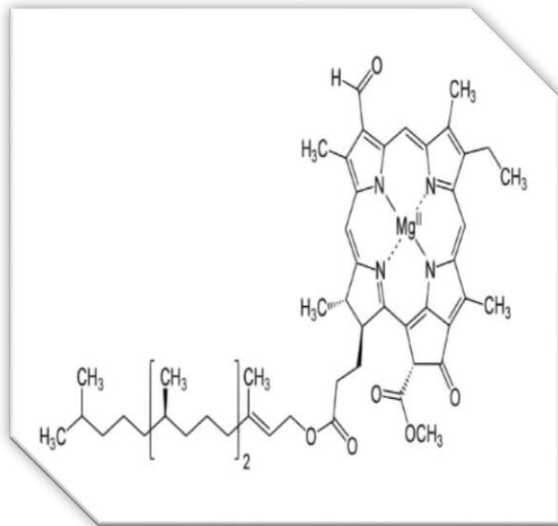
**Chlorophyll-b**



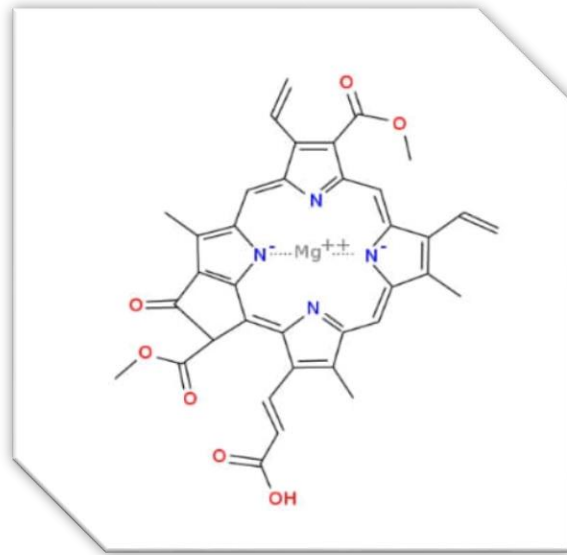
**Chlorophyll-c1**



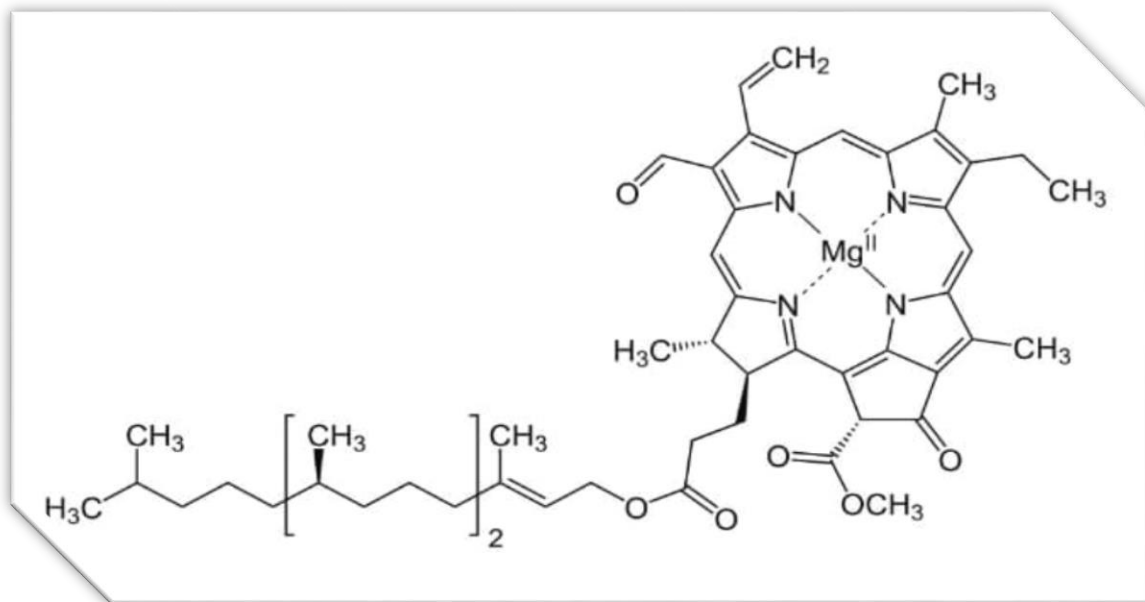
**Chlorophyll-c1**



**Chlorophyll-c3**



**Chlorophyll-d**



**Chlorophyll-f**

**Fig. 6.** Structure of various types of chlorophyll

### **Biological Function of Chlorophyll :**

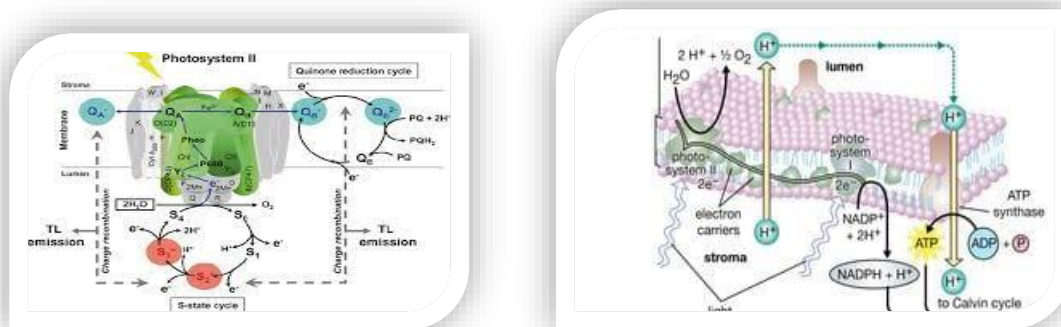
Plants use both forms of chlorophyll to collect energy from light. Chlorophyll is concentrated in the thylakoid membranes of chloroplasts. Chloroplasts are the organelles in which photosynthesis takes place. The thylakoids are small sacs of the membrane, stacked on top of each other. Embedded in these membranes are a variety of proteins that surround chlorophyll. These proteins work together to transfer the energy from light, through chlorophyll, and into the bonds of ATP – the energy transferring molecule of cells. ATP can then be used in the calvin cycle or dark cycle to create sugars.

The series of proteins that transfer energy from light and channel it into the synthesis of sugars are known as photosystems. The entire process, both light and dark cycles together, is known as photosynthesis and occurs

in plants, algae, and some bacteria. These organisms take in carbon dioxide (CO<sub>2</sub>), water (H<sub>2</sub>O) and sunlight to produce glucose. They can use this glucose in the process of cellular respiration to create ATP or they can combine the glucose into more complex molecules to be stored.

### The function of photosynthesis:

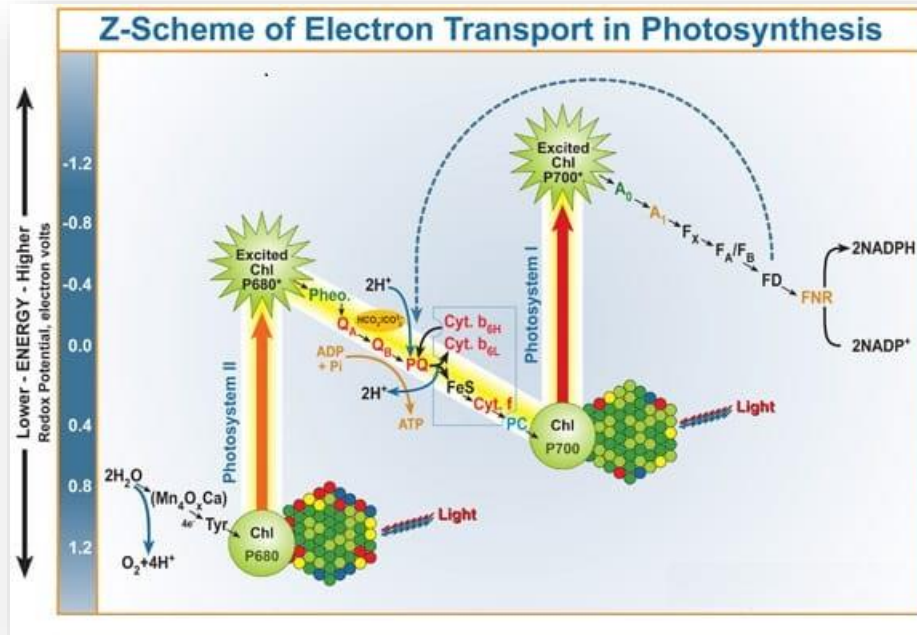
The chlorophyll acts as a chromophore in photosynthesis. The extensive Conjugation in the chlorin ring allows the electron transition  $\pi$  (HOMO)  $\rightarrow$   $\pi^*$ (LUMO) in the visible region. One absorption band arises in the region 430 - 480 nm (i.e. blue light) while the other band appears in the region 645-680 nm (i.e. red light). Chlorophyll looks green because it absorbs red and blue light. These light-harvesting pigments act as a molecular antenna to absorb the solar energy which is transferred to a centre where a chemical reaction goes on. Thus chlorophylls present in the reaction centre convert solar energy to chemical energy.



**Fig. 7.** Schematic diagram of photosynthesis

Chlorophyll catalyses the reduction of NADP<sup>+</sup> (to NADPH) and oxidation of H<sub>2</sub>O (to O<sub>2</sub>) in the presence of light. The electron flows from H<sub>2</sub> to NADP<sup>+</sup> through an electron transport chain (p-680 - p-700) which is known as Z-scheme. The whole process is divided into photosystem-I and photosystem-II.





**Fig. 8.** Electron transport during photosynthesis

Photosystem-I (abbreviated as ps-I or p-700, stands for pigment) which is excited by the wavelength of light in the region 700 nm (or lower) generates a strong reductant to bring about the reaction of NADP<sup>+</sup> to NADPH. Photosystem-II (ps-II or P-680) was the light of wavelength 680 nm or lower to produce a very strong oxidant to oxidise H<sub>2</sub>O to O<sub>2</sub>. PS-II uses chlorophyll-a, while ps-II was chlorophyll-a<sub>2</sub>. When chlorophyll (present in ps-I) is excited it can act both as a better reducing agent and also a better oxidising agent. Thus the exciting chlorophylls can initiate a series of redox reactions. The electron transport chain from pheophytin to chl-a<sub>1</sub>. The carriers are arranged in the increasing order of the reduction potential.

### **Chlorophyll in the production of oxygen:**

A by-product of photosynthesis is oxygen. Plants can use this oxygen in cellular respiration, but they also release excess oxygen into the air. This oxygen helps in supporting life on Earth. The oxygen is produced in the first part of the light cycle of photosynthesis. Plants split water molecules to produce electrons, hydrogen ions, and diatomic oxygen (O<sub>2</sub>). The electrons supply the electron transport chain that drives ATP production. The oxygen is released into the air. In this way, all the oxygen we breathe is produced.

### **Benefits of Chlorophyll:**

Because of chlorophyll, all life on Earth is possible. The first benefit of chlorophyll is sugar, produced through the process of ATP which is driven by chlorophyll. Plants, as primary producers, produce the basis

of the food chain. All other organisms in the food chain rely on the sugars plants create to sustain life. While the top predators in a food chain may never eat a single plant, they most certainly eat herbivores. These herbivores only eat plants, and grow and create muscle by digesting and utilizing plant nutrients. The accumulation of these nutrients in nature would not be possible without chlorophyll. The second benefit realized by all organisms is oxygen. While chlorophyll does not produce oxygen directly, chlorophyll and the complex of proteins it is associated with the transfer of electrons to molecules like ATP and NADPH, which can hold energy in bonds. The need for electrons to drive this process causes water molecules to be split, creating oxygen. This oxygen is released into the atmosphere. Plants, algae, and cyanobacteria, produce all of the oxygen in the atmosphere. All other animals, and most plants, need this oxygen to survive.

## **HAEMOGLOBIN STRUCTURE AND FUNCTION**

### **Introduction:**

Haemoglobin (Hb) is the most studied of the heme-containing globulin proteins and yet is not fully understood. It was one of the first proteins to be studied by X-ray crystallography and earned Max Perutz the Nobel Prize in Chemistry in 1962. The structural studies provided a plethora of data that offered glimpses of the magnificent molecular mechanisms behind Hb physiological functions. Haemoglobin is a polyfunctional molecule that is involved in several functions, such as catalytic (nitrite reductase, NO dioxygenase, monooxygenase, alkyl hydro peroxidase, esterase, lipoxygenase); nitric oxide metabolism; metabolic reprogramming; pH regulation and maintaining redox balance (Kosmachevskaya and Topunov 2018). This chapter, however, focuses on Hb primary function of oxygen transport and how mutations, endogenous or exogenous ligands or effectors affect Hb allostery.

### **Chemistry of Haemoglobin:**

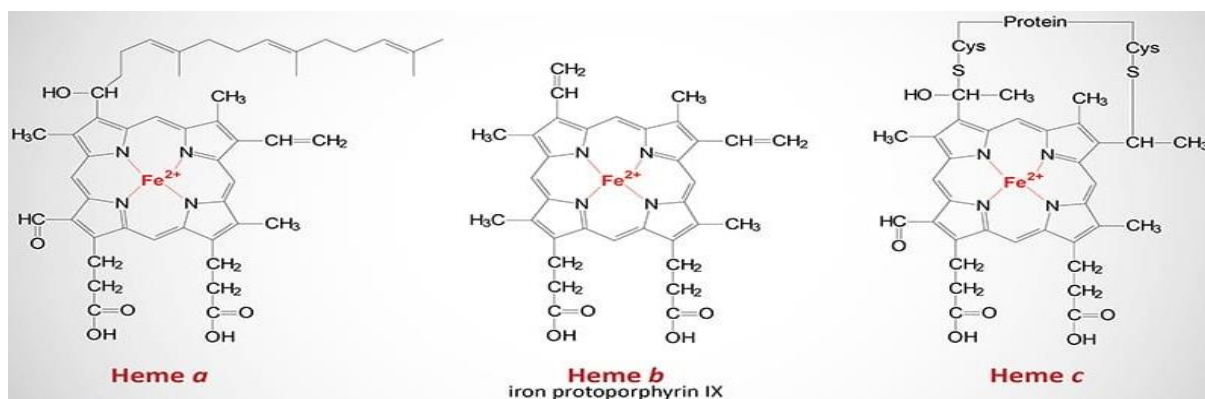
This molecule represents the most populous faction of the bloodstream proteins. About 97% of the dry weight of red cells is all haemoglobin, and the average human circulatory system holds about 750g of this stuff (compare that to, for example, albumin, of which there is only 200g). You really could just describe the circulatory system as a large branching organ filled mainly with haemoglobin. The protein itself is about 64 kDa and dissolves very well in water (for example, the contents of a red cell is an almost completely saturated solution of haemoglobin, at around 330g/L).

It is not an especially stable molecule, or rather it performs poorly when stress-tested in conditions that lay outside of the normal physiological norms. It begins to denature if heated to 50° C, and by 65° C most of it

becomes irreversibly destroyed (Rieder et al., 1970). If you drop the pH to 3.0 or below, it unfolds and the haem falls off. In case you want to play with some at home, powdered bovine haemoglobin is available (it has a good shelf life, and you reconstitute it as you want). It is used to enrich agar, create calibration solutions for measurement instruments, and create culinary abominations. Before you ask, yes acellular free haemoglobin solutions have also been considered as a resuscitation fluid, but unfortunately it is hideously toxic (more on that later).

### Structure of haemoglobin:

Haemoglobin is a tetramer composed of four subunits, two  $\alpha$  and two  $\beta$ . These subunits form two identical  $\alpha\beta$  dimers. Each subunit has a haem group. The quaternary structure of haemoglobin is essential for positive cooperativity. Each time one of the monomers binds oxygen, the molecule of haemoglobin undergoes a conformational change. This changes the equilibrium constant for the next  $O_2$  molecule to bind the next subunit (increasing the affinity for  $O_2$ ) This is described as a transition from the T (Tense) deoxygenated state to the R (Relaxed) oxygenated state, though a series of intermediate T-like and R-like states. This property is responsible for the sigmoid shape of the oxygen-haemoglobin dissociation curve.



**Fig. 9.** Structure of various forms of haem

Haem groups are iron-containing molecules of protoporphyrin-IX with physiologically essential properties: Hydrophilic cores and hydrophobic external chains, for positive cooperativity. Able to bind different gases ( $O_2$ , NO, CO,  $H_2S$  etc). Switching between  $Fe^{3+}$  and  $Fe^{2+}$  states allows it to participate in oxidation-reduction reactions.

### The function of haemoglobin:

#### Oxygen transport:

Haemoglobin increases the oxygen-carrying capacity of blood by 50-100 times. Its affinity for oxygen is described by the oxygen-haemoglobin dissociation curve, which has a sigmoid shape. Affinity for  $O_2$  is

increased under conditions of high PO<sub>2</sub>, increasing its ability to collect oxygen from the lungs. Affinity for O<sub>2</sub> is decreased under conditions of low PO<sub>2</sub>, enhancing the unloading of oxygen in the tissues.

### **Carbon dioxide transport:**

Haemoglobin binds CO<sub>2</sub> with a high affinity in its deoxygenated state (the Haldane effect), and releases it when it becomes oxygenated and loses its affinity for CO<sub>2</sub> (the reverse Haldane effect). About 10-20% of the total carriage of CO<sub>2</sub> in the blood is owing to this mechanism.

### **Buffering:**

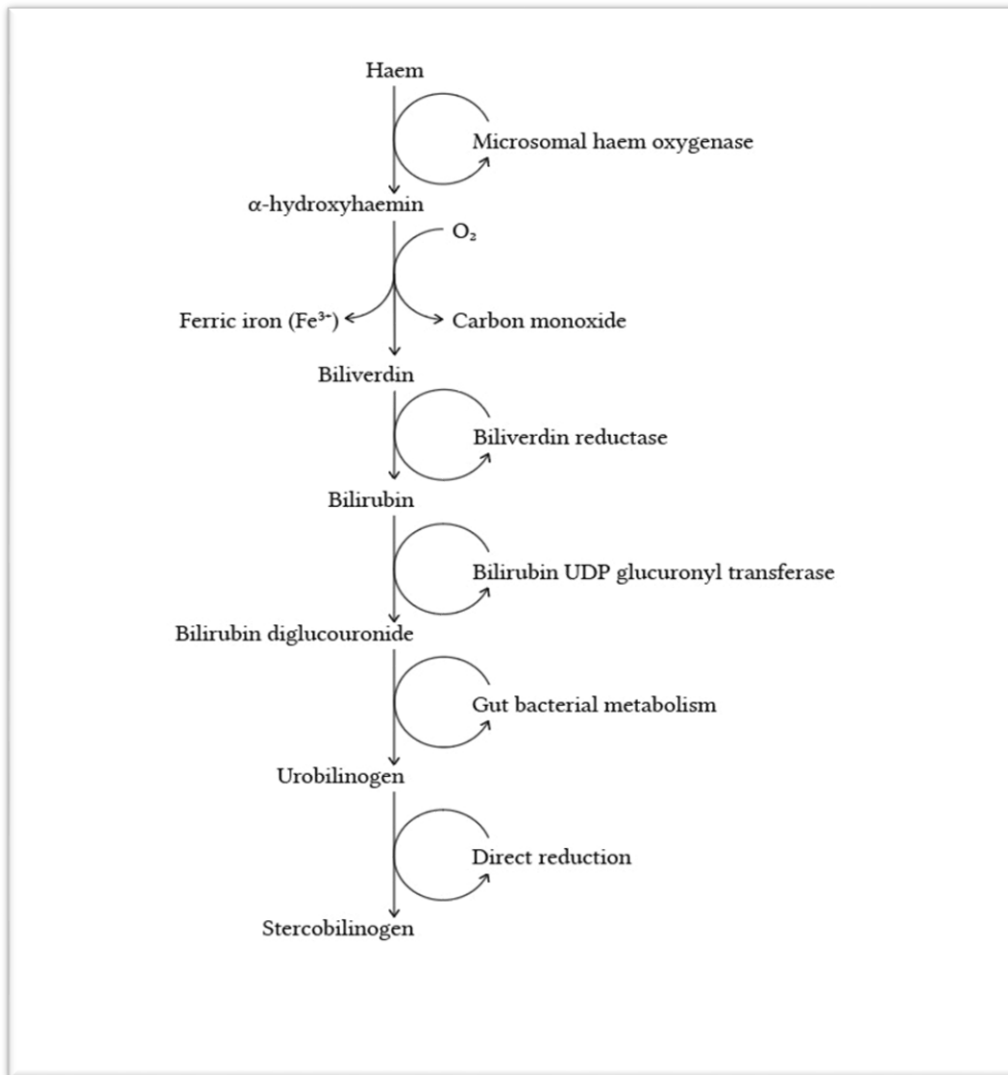
Haemoglobin has many histidine residue groups with a protonation pKa close to 6.8. This allows it to act as a buffer at physiological pH, as these histidine molecules act as proton acceptors. This buffering capacity increases in its deoxygenated state. As haemoglobin is one of the most populous proteins, it contributes a large proportion of the total buffering in the extracellular fluid, and this is incorporated into the calculation of the standard base excess. The total buffering power of haemoglobin is thought to account for up to 50-60% of the total buffering capacity of the blood, the rest being attributable to the bicarbonate and other proteins.

### **Nitric oxide scavenging:**

Nitric oxide binds to the ferrous (Fe<sup>2+</sup>) iron with great affinity, creating nitrosyl haemoglobin. This reaction is rate-limited by the fact that haemoglobin is packaged in erythrocytes, which increases the useful half-life of nitric oxide. By removing nitric oxide from the peripheral circulation, haemoglobin contributes to the regional autoregulation of blood flow. This mechanism is the most physiologically important mechanism for limiting nitric oxide bioactivity. Clinical implications and examples of this include Hypoxic pulmonary vasoconstriction and pulmonary hypertension seen with polycythaemia (Deem, 2004). Sick cell vasoconstrictive crisis (Mack and Kato, 2004)

### **Metabolic fate of haem:**

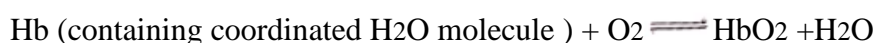
The lysosomal breakdown of haemoglobin monomers releases the haem molecule. Right there in the macrophage, it is degraded into its constituent parts, liberating iron for reuse by the organism. One possible way of presenting this pathway is by a flow diagram.



**Fig. 10.** Degradation pathway of Haem

### **Role of Haemoglobin (Hb) and Myoglobin (Mb) in Biological Systems:**

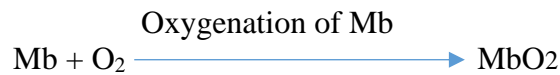
Oxygen is inhaled into the lung. In human lungs, partial pressure of O<sub>2</sub> is high, the inhaled O<sub>2</sub> binds Hb present in blood in the lungs to form oxygenated haemoglobin (HbO<sub>2</sub>), called oxyhemoglobin. We know that in Hb the sixth coordination position of Fe(II) is probably occupied by an H<sub>2</sub>O molecule which is trans to the histidine N-atom. When Hb binds with O<sub>2</sub> to form a molecule present in Hb is reversibly replaced by the O<sub>2</sub> molecule to form HbO<sub>2</sub>.



As HbO<sub>2</sub> runs to the muscular tissues through arteries, the partial pressure of O<sub>2</sub> in muscle tissues decreases and HbO<sub>2</sub> liberates O<sub>2</sub>.



The liberated free O<sub>2</sub> is taken up by myoglobin (Mb) to form oxygenated myoglobin (MbO<sub>2</sub>). This is called oxygenation of Mb.



As the blood runs through the arteries to the tissues, O<sub>2</sub> bound with MbO<sub>2</sub> is set free. This free O<sub>2</sub> is used in the combustion (oxidation) of food (glucose, C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>).



The oxidation of glucose to carbon dioxide is an energy-releasing process in which energy in the form of ATP is produced. This energy is utilised by living organisms to perform their various metabolic activities, and for maintaining their body temperature. Water produced in the above reaction is retained in the body while CO<sub>2</sub> is exhaled out and haemoglobin goes to the lungs for reuse. The above discussion makes it evident that the function of haemoglobin in our body tissue supplies oxygen to various parts of the body. Thus haemoglobin is an oxygen carrier.

### **The Bohr effect:**

The Bohr effect is a phenomenon discovered by Danish physiologist Christian Bohr in 1904. Haemoglobin's oxygen binding affinity is inversely related both to the pH and the concentration of carbon dioxide. Since carbon dioxide reacts with water to form carbonic acid, an increase in CO<sub>2</sub> results in a decrease in blood pH, resulting in haemoglobin protein releasing their load of oxygen. Conversely, a decrease in carbon dioxide provokes an increase in pH, which results in haemoglobin picking up more oxygen. The Bohr effect increases the efficiency of the oxygen transport through the blood.

### **References:**

1. Marengo-Rowe, Alain J. "Structure-function relations of human hemoglobins." Baylor University Medical Center Proceedings. Vol. 19. No. 3. Taylor & Francis, 2006.
2. Thomas, Caroline, and Andrew B. Lumb. "Physiology of haemoglobin." Continuing Education in Anaesthesia, Critical Care & Pain 12.5 (2012): 251-256.
3. Jensen, Frank B., Angela Fago, and Roy E. Weber. "Haemoglobin structure and function." Fish physiology 17 (1998): 1-40.
4. Giardina, Bruno, et al. "The multiple functions of haemoglobin." Critical reviews in biochemistry and molecular biology 30.3 (1995): 165-196.
5. Rieder, Ronald F. "Haemoglobin stability: observations on the denaturation of normal and abnormal hemoglobins by oxidant dyes, heat, and alkali." The Journal of clinical investigation 49.12 (1970): 2369-2376.



# Weather Web App

An Integrated Web Application Utilizing Real-Time Weather API Data to Deliver Comprehensive Forecasts, Climate Trends

by

Aziz Al Aman & Abdul Hai Siddiki Ansary



# Introduction

**Weather Web App:** Learn how to build a weather web app using JS, CSS, HTML, and the OpenWeatherMap API. This presentation will cover everything from setting up your environment to making API calls and displaying the weather data on your web page.



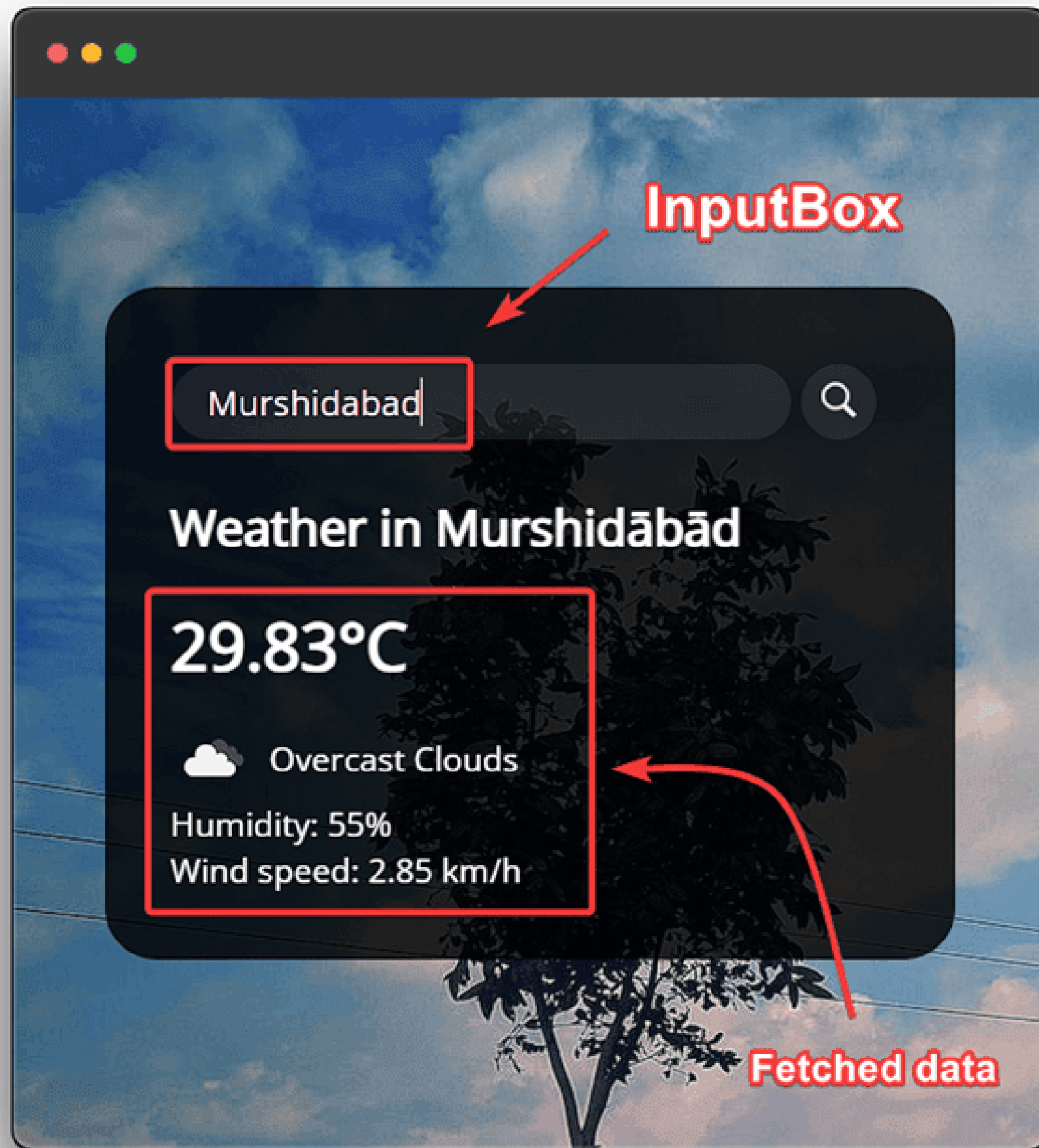
# App Overview

**Visualizing Data:** Once you've retrieved the weather data, you need to display it on your web page. This slide will cover how to use CSS and JavaScript to create a visually appealing weather display.



# Adding User Interactivity

**User Experience:** A good weather web app should allow users to interact with the data. This slide will cover how to add user interactivity using JavaScript, such as allowing users to search for specific locations or toggle between different views.



# Technologies Used

**HTML, CSS, JavaScript** Our app is crafted using the fundamental trio of web development: HTML for structure, CSS for style, and JavaScript for interactivity. This combination enables a dynamic and visually engaging user experience. Responsive Design The app's layout adapts flawlessly to various devices, ensuring user-friendliness across screens..



# OpenWeatherMap API

## Making API Calls:

Real-Time Weather Data Our app sources real-time weather data from the OpenWeatherMap API, a comprehensive weather information provider.

## Features:

**Current conditions:** Display of up-to-date weather information.

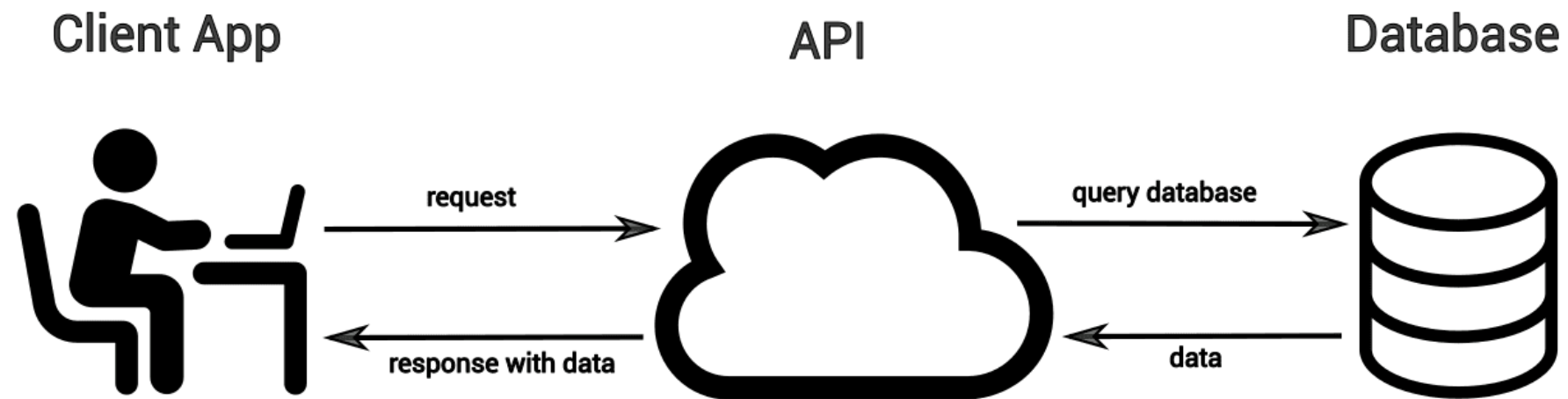
**Forecast:** Accurate predictions for the upcoming days.

**Location-based search:** Customized weather data for user-defined locations.

## API Integration:

We seamlessly integrate the API into our app's JavaScript code, fetching data and dynamically updating the interface.

With the OpenWeatherMap API, our app ensures users are informed and prepared for the elements.



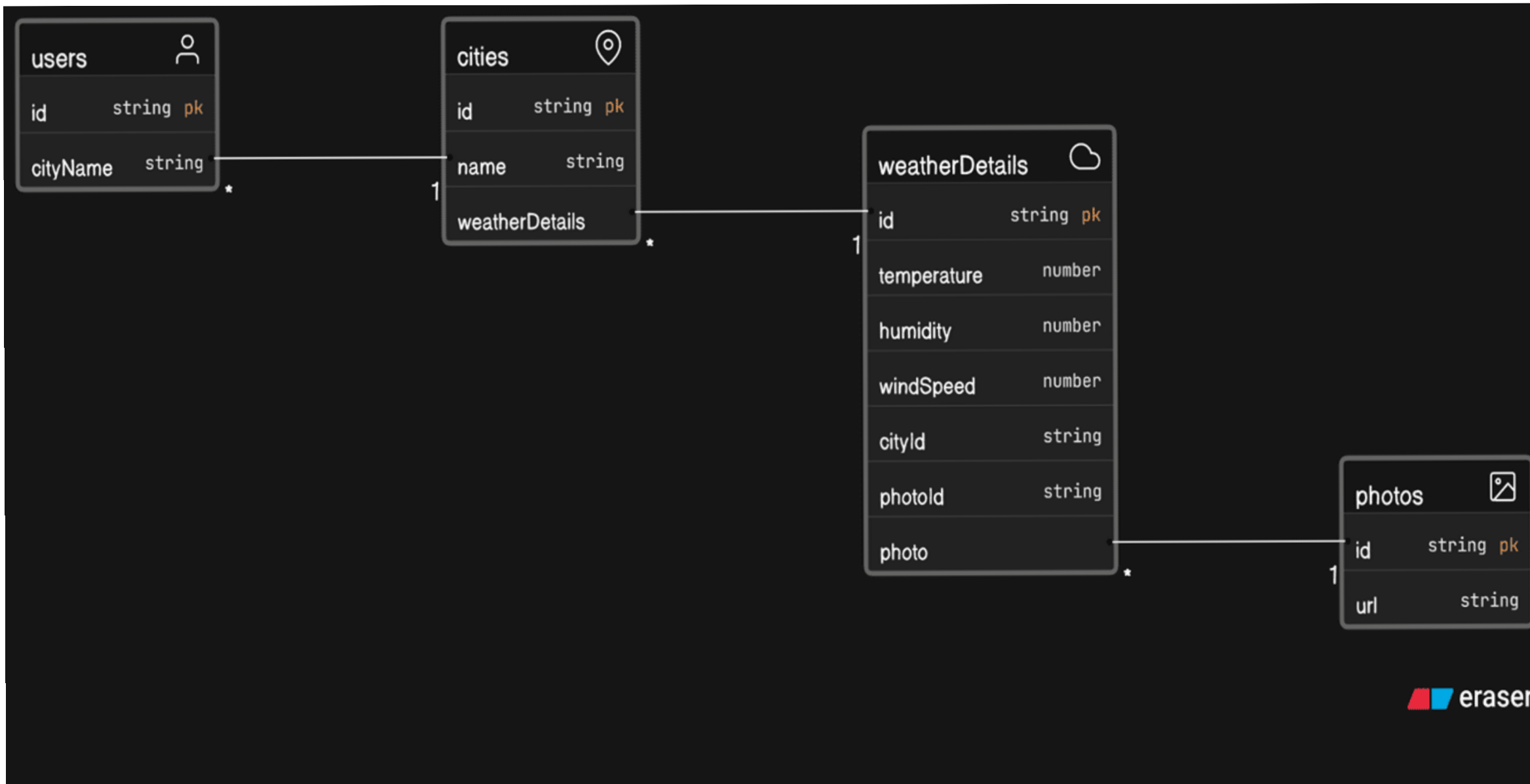
# Data Flow Diagram (DFD)



This represents the main functionalities of the weather app. It consists of two main processes: "Fetch Weather Data" and "Display Weather Data."

- **Fetch Weather Data:** This level breaks down the "Fetch Weather Data" process into two sub-processes. The first sub-process, "Send API Request," sends a request to the OpenWeatherMap API to fetch weather data. The second sub-process, "Receive API Response," receives the response containing weather information.
- **Display Weather Data:** This level elaborates on the "Display Weather Data" process. It includes two sub-processes: "Render Current Weather" and "Render Weather Forecast." These sub-processes handle the rendering of current weather information and weather forecasts, respectively.

# Entity Relationship Diagram (ERD):



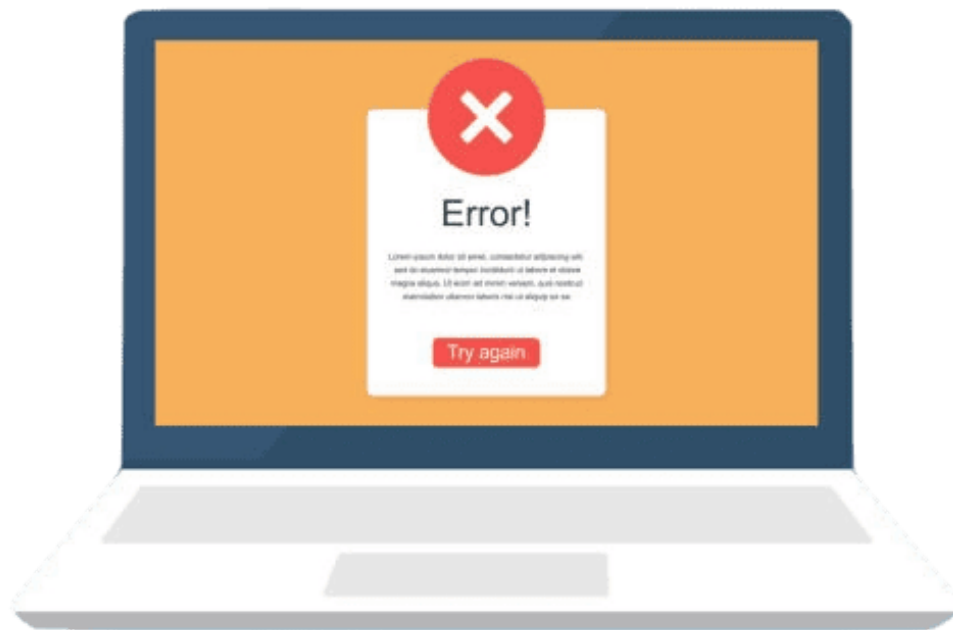
## Entities:

- **Location:** Represents a specific location for which weather data is being fetched. Each location has a unique LocationID and includes attributes like City and Country.
- **WeatherData:** Stores the weather information retrieved for a particular location. Each set of weather data has a unique WeatherDataID and is associated with a specific LocationID. The attributes include Temperature, Humidity, WindSpeed, and WeatherDescription.

- **Relationship:** The relationship between Location and WeatherData is established through the LocationID foreign key in the WeatherData table, connecting each set of weather data to its corresponding location.

# Challenges Faced

- **API Integration Complexity:** Integrating the OpenWeatherMap API seamlessly into our app posed difficulties, requiring thorough understanding of API endpoints, request formats, and handling responses.
- **Data Presentation:** Effectively visualizing complex weather data in a user-friendly manner was a challenge. We needed to strike a balance between providing comprehensive information and avoiding overwhelming the user.
- **Responsive Design:** Ensuring that our app looked and functioned well across various devices was a challenge. Adapting the layout to different screen sizes while maintaining usability was a task that required meticulous testing.
- **Error Handling:** Managing errors that could arise from API calls or unexpected user inputs was essential. Implementing robust error-handling mechanisms without disrupting the user experience was a delicate balancing act.
- **Performance Optimization:** Striving for optimal performance, especially when fetching data and rendering it dynamically, required careful consideration of code efficiency and minimizing network requests.



## Conclusion

In conclusion, our Weather App powered by the OpenWeatherMap API represents the synergy of technology and user-centric design. With HTML, CSS, and JavaScript as our tools, we've crafted an application that not only delivers real-time weather data but also offers an intuitive and engaging experience.

Through challenges faced and solutions devised, we've honed our development skills and gained valuable insights into API integration, user interface design, and responsive development. The journey has affirmed the importance of adaptability, collaboration, and continuous learning in the ever-evolving landscape of app development.

As we embrace future enhancements and possibilities, we remain committed to providing users with accurate weather information while ensuring a seamless, visually appealing, and user-friendly interaction. Thank you for joining us on this journey of innovation and exploration.



## Acknowledgement

We would like to extend our heartfelt gratitude to all those who contributed to the realization of our Weather App using the OpenWeatherMap API. This project has been a collaborative effort, and we wish to express our appreciation to:

Our teammates, whose dedication and teamwork brought diverse perspectives and creative solutions to the table.

Our teacher, MR. SADEKUL ISLAM whose guidance, insights, and expertise played a crucial role in shaping our understanding of web development and API integration.

Your support has been invaluable in helping us navigate challenges, discover new horizons, and create an app that we're proud to present. Thank you for being an integral part of this endeavor.

# Thanks!



# KALYANI UNIVERSITY



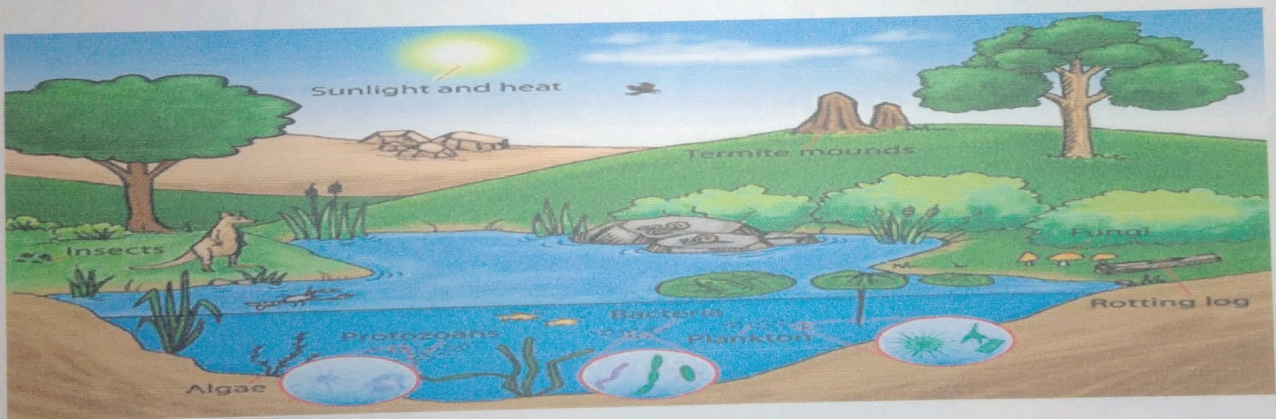
## DUMKAL COLLEGE

ESTD : 1999

BASANTAPUR \* MURSHIDABAD

### • ENVIRONMENTAL STUDIES

PROJECT TOPIC : STUDY OF RIVER ECOLOGY



B.A (HONOURS COURSE), SEMESTER : 1<sup>ST</sup>, 2022

NAME	- ANKITA KUNDU
DEPARTMENT	- BENGALI
ROLL NO	- 25
STUDENT ID	- DCB220445

Patimat Saha  
19/12/2022

# ACKNOWLEDGEMENT

I would like to express my sincere  
 appreciation to my supervisor, Dr. Anshu Kulkarni,  
 for his guidance and support during the  
 completion of my project. I am also  
 grateful to my colleagues and friends  
 for their help and cooperation. I  
 would like to thank my family  
 members for their love and support.  
 I am also grateful to the  
 faculty members of my institution  
 for their guidance and support.  
 I would like to thank the  
 staff members of my institution  
 for their help and cooperation.  
 I am also grateful to the  
 library staff for their help and  
 cooperation. I would like to  
 thank the library staff for their  
 help and cooperation.

Ankita Kunder

signature - - - - -

19/12/2022

## DECLARATION

આમને અંગે અર્જ સમાપ્ત કરવાને બાદ,  
" Study of River Ecology " project  
ને આમને અંગે કરવામાં આવ્યું છે. આમને અંગે  
અભ્યાસ કરવામાં આવ્યું છે અને અભ્યાસ  
આમને અંગે કરવામાં આવ્યું છે અને અભ્યાસ  
આમને અંગે કરવામાં આવ્યું છે અને અભ્યાસ  
આમને અંગે કરવામાં આવ્યું છે અને અભ્યાસ

Signature Ankita Kundu

## CERTIFICATE OF GUIDE

This is to certify that Ankita  
Kundu student of Dumkal  
college has successfully completed  
that project work titled "Study  
of River Ecology"

This project work is the record  
of authentic work carried out  
by him/her.

She has worked under my  
guidance.

Date:- 19/12/2022

Parimal Saha  
signature of project  
guide

# CONTENT

Page no

1. Introduction
2. Problems
3. Objectives.
4. Location of Study Area.
5. Methods of Data collection.
6. Results.
7. Discussion
8. Suggestion
9. Limitation of the study
10. Reference.

# INTRODUCTION

ଫ୍ରେସ୍‌ୱାଟର ଇକୋଲୋଜି ଏବଂ ଲିମ୍ନୋଲୋଜି  
ଦୁଇଟି ସମ୍ପର୍କିତ କ୍ଷେତ୍ର। ଲିମ୍ନୋଲୋଜି  
ଫ୍ରେସ୍‌ୱାଟର ଇକୋଲୋଜିର ଏକ ଅନ୍ତର୍ଗତ  
ଅଂଶ। ଫ୍ରେସ୍‌ୱାଟର ଇକୋଲୋଜି ଲିମ୍ନୋଲୋଜିର  
ଅନ୍ତର୍ଗତ ଅଂଶ।

ଫ୍ରେସ୍‌ୱାଟର ଇକୋଲୋଜି ଏବଂ ଲିମ୍ନୋଲୋଜି  
Fresh water habitat ଏବଂ, ଏହା ଫ୍ରେସ୍‌ୱାଟର  
ଇକୋଲୋଜିର ଏକ ଅନ୍ତର୍ଗତ ଅଂଶ।  
ଲିମ୍ନୋଲୋଜି Limnology ଏବଂ, ଲିମ୍ନୋଲୋଜି  
ଫ୍ରେସ୍‌ୱାଟର ଇକୋଲୋଜିର ଏକ ଅନ୍ତର୍ଗତ ଅଂଶ।  
ଅର୍ଥାତ୍ ।

ଫ୍ରେସ୍‌ୱାଟର ଇକୋଲୋଜି ଏବଂ ଲିମ୍ନୋଲୋଜି  
Lentic habitat ଏବଂ Lotic habitat,  
ଏହା ଫ୍ରେସ୍‌ୱାଟର ଇକୋଲୋଜିର ଏକ ଅନ୍ତର୍ଗତ ଅଂଶ।  
Lentic habitat ଏବଂ, ଏହା ଫ୍ରେସ୍‌ୱାଟର ଇକୋଲୋଜିର  
ଅନ୍ତର୍ଗତ ଅଂଶ।  
ଅର୍ଥାତ୍, ଏହା ଫ୍ରେସ୍‌ୱାଟର ଇକୋଲୋଜିର ଏକ ଅନ୍ତର୍ଗତ ଅଂଶ।

୧୨/୧୨/୨୦୨୨



അയ്യപ്പ-സമീപീകൃത സൂര്യ കമ്പോ-സൈറ്റിക്  
സമീപീകൃത Lotic habitat-യെ ഉദ്ദേശിക്കുന്ന  
സമീപീകൃത .

ഇതേ സമീപീകൃത സമീപീകൃത ഉദ്ദേശിക്കുന്ന-  
സമീപീകൃത breeding ground അയ്യപ്പ-  
സമീപീകൃത കൂടാതെ സൂര്യ കമ്പോ-സൈറ്റിക്  
സമീപീകൃത 'സമീപീകൃത' യെ ഉദ്ദേശിക്കുന്ന , സമീപീകൃത  
സമീപീകൃത സമീപീകൃത സമീപീകൃത, സമീപീകൃത സമീപീകൃത  
സമീപീകൃത സമീപീകൃത സമീപീകൃത, സമീപീകൃത സമീപീകൃത  
സമീപീകൃത സമീപീകൃത സമീപീകൃത, സമീപീകൃത സമീപീകൃത  
സമീപീകൃത Ecosystem കൂടാതെ അയ്യപ്പ-  
സമീപീകൃത സമീപീകൃത .

# Problems

ଏହି ସମସ୍ୟାଗୁଡ଼ିକର ଉଦାହରଣ ରୂପେ ନିମ୍ନଲିଖିତ ସମସ୍ୟାଗୁଡ଼ିକ  
ଦିଆଯାଇଛି। ଏହି ସମସ୍ୟାଗୁଡ଼ିକର ସମାଧାନ ପାଇଁ ଉପଯୁକ୍ତ  
ପଦ୍ଧତି ବ୍ୟବହାର କରିବାକୁ ପଡ଼ିବ। ଏହି ସମସ୍ୟାଗୁଡ଼ିକର  
ସମାଧାନ ପାଇଁ ଉପଯୁକ୍ତ ପଦ୍ଧତି ବ୍ୟବହାର କରିବାକୁ ପଡ଼ିବ।  
ଏହି ସମସ୍ୟାଗୁଡ଼ିକର ସମାଧାନ ପାଇଁ ଉପଯୁକ୍ତ ପଦ୍ଧତି  
ବ୍ୟବହାର କରିବାକୁ ପଡ଼ିବ। ଏହି ସମସ୍ୟାଗୁଡ଼ିକର  
ସମାଧାନ ପାଇଁ ଉପଯୁକ୍ତ ପଦ୍ଧତି ବ୍ୟବହାର କରିବାକୁ  
ପଡ଼ିବ। ଏହି ସମସ୍ୟାଗୁଡ଼ିକର ସମାଧାନ ପାଇଁ  
ଉପଯୁକ୍ତ ପଦ୍ଧତି ବ୍ୟବହାର କରିବାକୁ ପଡ଼ିବ।

୧୫/୧୨/୨୦୨୨

# OBJECTIVES

1. ഘടന ആവേശകരമായ ഉപയോഗ ഉപയോഗ  
എന്ന രീതിയിൽ ഉപയോഗിക്കാൻ ഉപയോഗ  
• അനുയോജ്യമാണ്.

2. സുസ്ഥിരതയും - ആവേശകരമായ ഉപയോഗ ഉപയോഗ  
രീതിയും ഉപയോഗിക്കാൻ ഉപയോഗിക്കാൻ.

3. ഘടന - അനുയോജ്യമായ ഉപയോഗ ഉപയോഗ  
• അനുയോജ്യമാണ്.

4. ഘടന - അനുയോജ്യമായ ഉപയോഗ ഉപയോഗ  
അനുയോജ്യമായ ഉപയോഗിക്കാൻ.

5. ഘടന - അനുയോജ്യമായ ഉപയോഗ ഉപയോഗ  
അനുയോജ്യമായ ഉപയോഗിക്കാൻ  
• അനുയോജ്യമാണ്.

# GEOGRAPHICAL LOCATION OF STUDY AREA

ଆରମ୍ଭ କରୁଥିବା ଅନୁସନ୍ଧାନ କ୍ଷେତ୍ର  
ଅନୁସନ୍ଧାନ କ୍ଷେତ୍ର ରାଜ୍ୟରେ। କ୍ଷେତ୍ର ଅନୁ  
ସନ୍ଧାନ କ୍ଷେତ୍ର ଅନୁସନ୍ଧାନ କ୍ଷେତ୍ର, ଏହା ଆରମ୍ଭ  
କ୍ଷେତ୍ର କ୍ଷେତ୍ର ଅନୁସନ୍ଧାନ କ୍ଷେତ୍ର ଅନୁସନ୍ଧାନ  
କ୍ଷେତ୍ର।

▶ ଏହି କ୍ଷେତ୍ର ଆରମ୍ଭ କ୍ଷେତ୍ର କ୍ଷେତ୍ର  
18 କ୍ଷେତ୍ର କ୍ଷେତ୍ର କ୍ଷେତ୍ର, 81

19/12/2022

# METHODS OF DATA COLLECTION

▶ Practical Methods of Data Collection :-

32 Methods of Data Collection  
32 Methods of Data Collection are given below.

▶ Practical Methods of Data Collection :-

32 Methods of Data Collection  
32 Methods of Data Collection are given below.

RESULTS

1. The results of the experiment show that the rate of reaction increases with an increase in the concentration of the reactants. This is because there are more particles available to collide and react.

2. The rate of reaction also increases with an increase in temperature. This is because the particles have more kinetic energy and are moving faster, so they collide more frequently and with more force.

3. The rate of reaction is also affected by the surface area of the solid reactant. A larger surface area provides more sites for the reaction to occur, leading to a faster rate.

4. The rate of reaction is not affected by the volume of the liquid reactants, as long as the concentration remains the same.

5. The rate of reaction is also not affected by the presence of a catalyst, as long as it is not consumed in the reaction.

13/12/2022

# DISCUSSION

ଏହି ଆଲୋଚନା-ସମ୍ବନ୍ଧୀୟ ସମସ୍ତଙ୍କ ଦେଖିବା  
ଆମର କେ। ଏହି ଆମ ସମସ୍ତଙ୍କ ଆଲୋଚନା  
କିଛି ସମସ୍ତଙ୍କ-ଆମର ସମସ୍ତଙ୍କ, ଏହି ସମସ୍ତଙ୍କ  
ସମସ୍ତଙ୍କ ଆଲୋଚନା ସମସ୍ତଙ୍କ ସମସ୍ତଙ୍କ,  
ଆମ ସମସ୍ତଙ୍କ କିଛି ସମସ୍ତଙ୍କ ସମସ୍ତଙ୍କ  
କିଛି ସମସ୍ତଙ୍କ ଆମର ସମସ୍ତଙ୍କ ସମସ୍ତଙ୍କ  
ଆମର ସମସ୍ତଙ୍କ ସମସ୍ତଙ୍କ। କିଛି ସମସ୍ତଙ୍କ  
ଆଲୋଚନା ସମସ୍ତଙ୍କ କିଛି ସମସ୍ତଙ୍କ  
ଆଲୋଚନା ସମସ୍ତଙ୍କ ଆମର ସମସ୍ତଙ୍କ  
ଆଲୋଚନା ସମସ୍ତଙ୍କ। ଏହି ସମସ୍ତଙ୍କ-ଆଲୋଚନା  
Biota ଆଲୋଚନା ସମସ୍ତଙ୍କ। ଏହି ସମସ୍ତଙ୍କ  
ଆଲୋଚନା ସମସ୍ତଙ୍କ-ଆମର ସମସ୍ତଙ୍କ।

8/10/12/2022

# SUGGESTION

2/6/20, આજના રોજ સરકારે જાહેર કરેલ  
વિધિવિધાન, આજના રોજ સરકારે જાહેર કરેલ  
વિધિવિધાન, આજના રોજ સરકારે જાહેર કરેલ  
વિધિવિધાન, આજના રોજ સરકારે જાહેર કરેલ  
વિધિવિધાન, આજના રોજ સરકારે જાહેર કરેલ  
વિધિવિધાન, આજના રોજ સરકારે જાહેર કરેલ



# LIMITATION OF THE STUDY

ଅଧ୍ୟୟନରେ କେବଳ ସମସ୍ତଙ୍କୁ ଅଧ୍ୟୟନ କରିବାକୁ ଦିଆଯାଇଥିଲା

ଏବଂ ଅଧ୍ୟୟନରେ କେବଳ ସମସ୍ତଙ୍କୁ ଅଧ୍ୟୟନ କରିବାକୁ ଦିଆଯାଇଥିଲା  
ଏବଂ ଅଧ୍ୟୟନରେ କେବଳ ସମସ୍ତଙ୍କୁ ଅଧ୍ୟୟନ କରିବାକୁ ଦିଆଯାଇଥିଲା  
ଏବଂ ଅଧ୍ୟୟନରେ କେବଳ ସମସ୍ତଙ୍କୁ ଅଧ୍ୟୟନ କରିବାକୁ ଦିଆଯାଇଥିଲା

19/12/2022

## REFERENCE

1. சுவாமிநாதர் சுவாமிநாதர் - சுவாமிநாதர், 132, 133
2. சுவாமிநாதர் - சுவாமிநாதர், 132, 133

21/03/2022