



**Physical and cultural landscapes of Lataguri
with special reference
to
Murti & Neora river,
West Bengal**

**B.A./B.Sc Hons Semester V, 2022-2023
Maheshtala college
University of Calcutta**



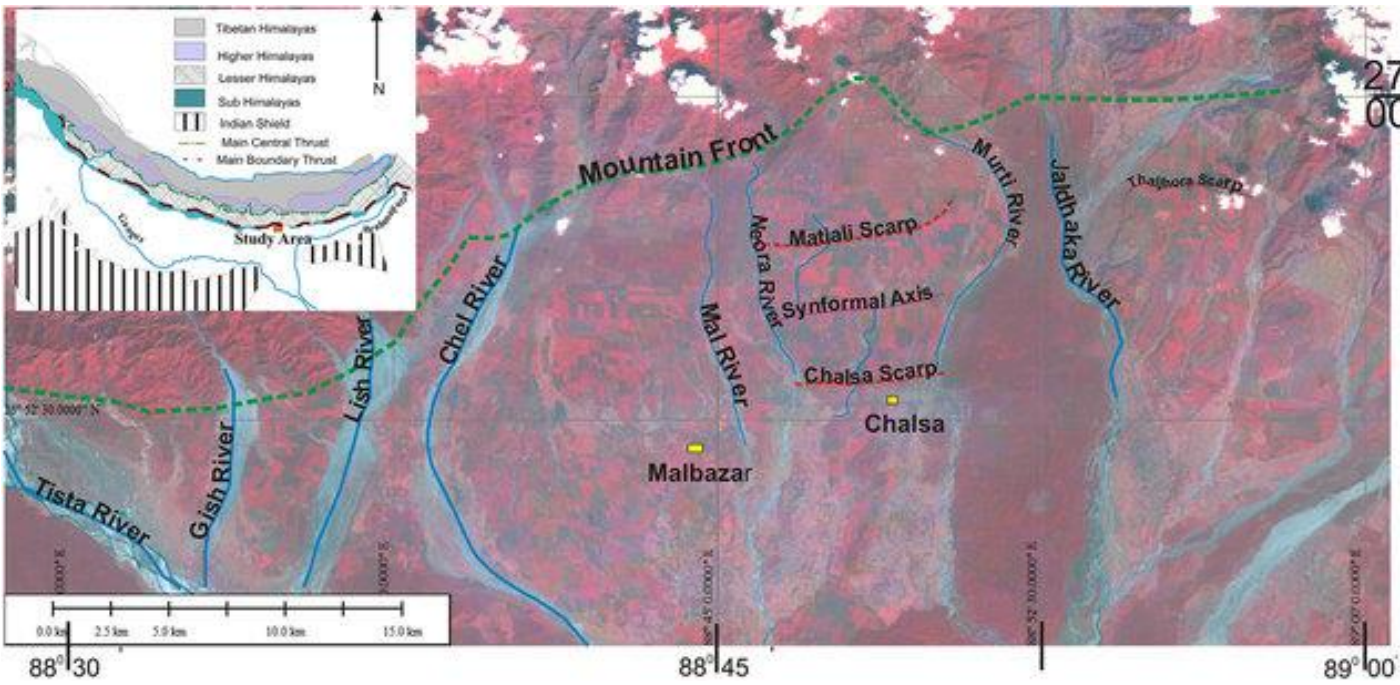
**Our Group at Murti River Bed,
Dept. of Geography, Maheshtala college**



Socio - Economic Survey by Students

Tourist Places of the study area

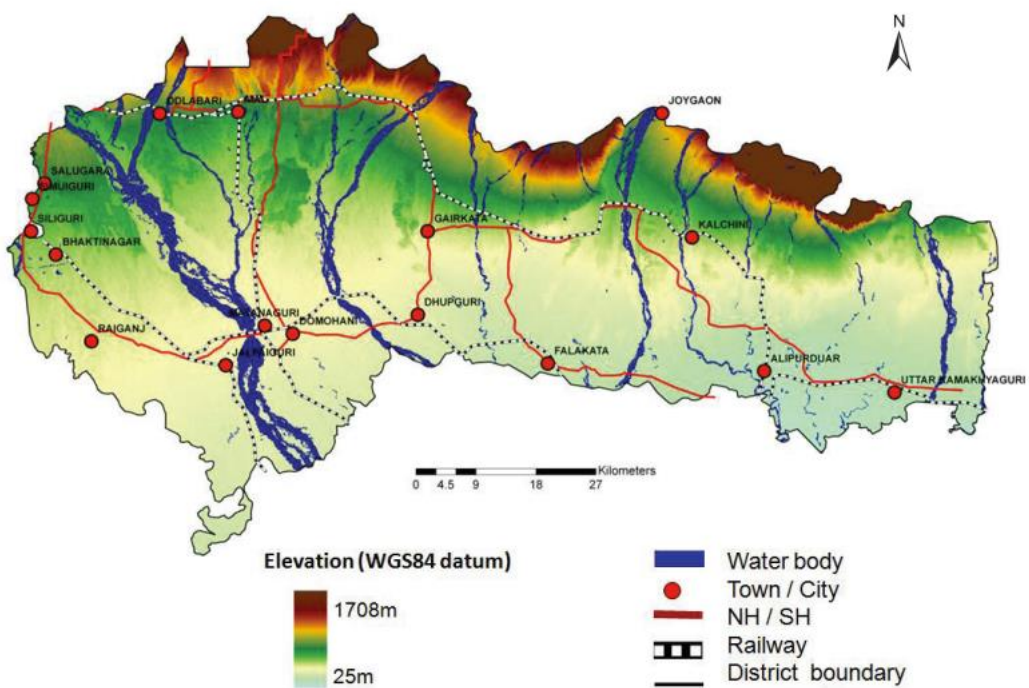




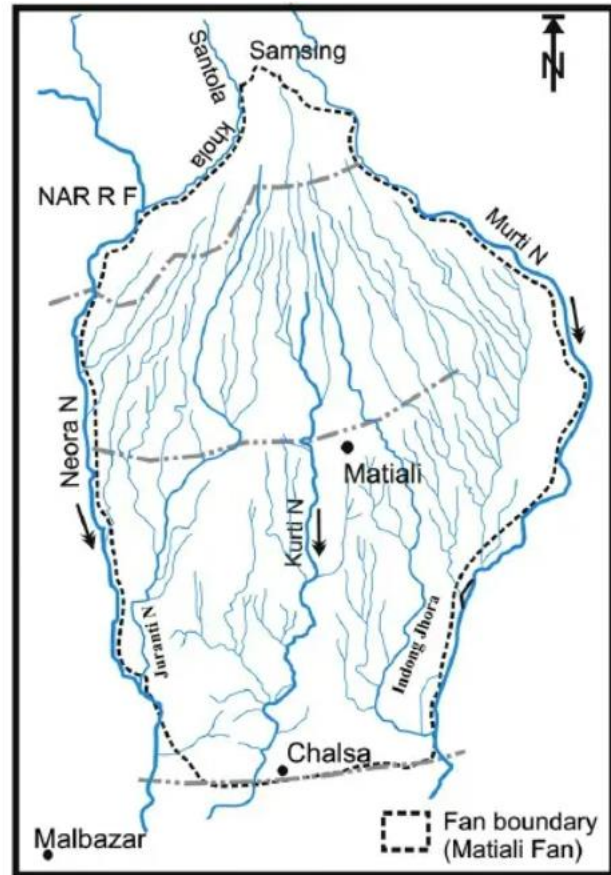
Study area showing major rivers and scarps (inset: major tectonic divisions of Himalaya after Gansser, 1964)



Both T 1 and T 2 are cut-and-fill terraces, Neora river, looking from south



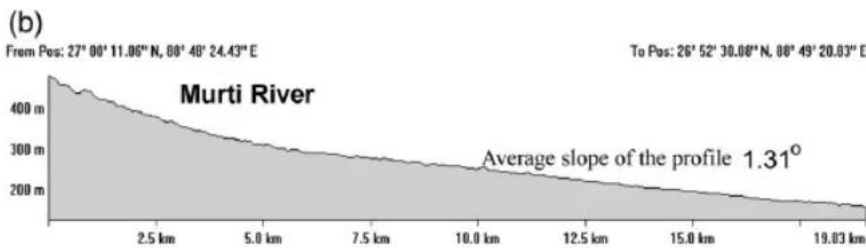
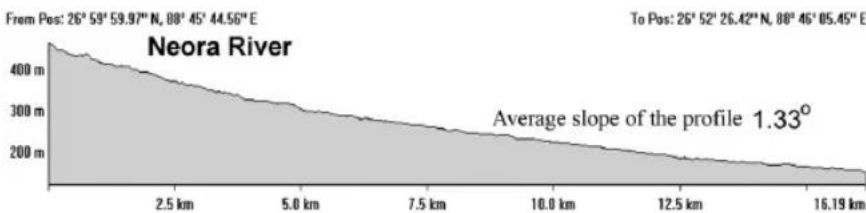
Digital Elevation Model



Drainage map of the Matiali fan, Kar, et.al



Sediment Analysis of Murti River



Profile of main rivers in the study area



Murti River



GORUMARA

The National Park



NEORA VALLEY





Photographs of Land use



Geo Tag Photos of Field Survey, Sursuti Village



Upper Tendu Forest M, West Bengal, India
WVQ5+99H, Chapramari Rly Stn - Kumani Rd, Upper Tendu Forest M, West Bengal 735223, India
Lat 26.93868°
Long 88.858255°
18/08/22 10:34 AM

GPS Map Camera



GPS Map Camera



Lataguri, West Bengal, India
Appu Valley Tea Estate & Greenery Eco Resort Rd, Lataguri, West Bengal 735230, India
Lat 26.731128°
Long 88.761302°
17/08/22 07:56 AM



GPS Map



Upper Tendu Forest M, West Bengal, India
WVQ5+99H, Chapramari Rly Stn - Kumani Rd, Upper Tendu Forest M, West Bengal 735223, India
Lat 26.93868°
Long 88.858255°
18/08/22 10:34 AM



GPS Map Camera



Upper Tendu Forest M, West Bengal, India
WVQ5+99H, Chapramari Rly Stn - Kumani Rd, Upper Tendu Forest M, West Bengal 735223, India
Lat 26.93868°
Long 88.858255°
18/08/22 10:51 AM

Field Survey done by the students at Lataguri & college Lab



To,
The Principal,
Maheshtala College,
Kolkata-700141

Date- 01.08.2022

Subject: Permission for Academic Tour of 3rd and 5th Semester (Hons) student in Duars and its surroundings.

Respected Madam,

With due respect, I, Dr. Deepa Bhattacharjee, want to inform you that we are going to arrange a compulsory field work for 3rd and 5th Semester (Hons) students at **Duars and its surrounding areas, West Bengal** from 15.08.2022 to 19.08.2022. The student would be guided for the field work by Dr. Deepa Bhattacharjee, Prof. Tania Guha and Lb. Attendant Supratip Dey.

You are kindly requested to provide permission for the field work. The list of the students is attached with the letter.

Thanking You,

Yours sincerely

Deepa Bhattacharjee
(Dr. Deepa Bhattacharjee)

Asst. Professor,

Dept. Of geography, Maheshtala College



Permitted,

R Das
13/8/2022

LIST OF STUDENTS FIELD WORK:2022

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2	Sonali Khatoun	F	19	15-12-2002	8240238446
3	Shreya Arash	F	19	18-06-2003	6289446933
4	Susmita Paul	F	19	03-03-2003	8240354227
5	Ayantika Kunti	F	18	01-08-2004	7439594315
6	Shaheena Mollick	F	19	01-04-2003	8420402281
7	Gargi Das	F	19	27-06-2003	9874513496
8	Sheya Mondal	F	18	27-04-2004	7439703813
9	Disha Das	F	19	07-11-2003	9330039706
10	Borsha Khatun	F	20	31-12-2002	6294745731
11	Wazifa Rahaman	F	19	29-07-2003	9732310672
12	Jeba Raisa	F	19	22-09-2003	8274999600
13	Anamika Das	F	19	11-05-2003	9330285454
14	Poulami Manna	F	19	15-03-2003	7439708096
15	Sathi Naskar	F	18	18-02-2004	8777367831
16	Neha Sardar	F	19	26-03-2003	9830186246
17	Anindita Pal	F	18	27-05-2004	9674382952
18	Sayani Sultana	F	19	14-06-2003	6289525426
19	Manira Khatun	F	20	14-09-2002	6289447734
20	Pinki Khatun	F	20	30-09-2002	9875457772
21	Arpita Saha	F	19	07-10-2003	8240197705
22	Rakiba Khatun	F	19	19-02-2003	7439935994
23	Pritam Malik	M	19	17-07-2003	7439956904
24	Nayan Mondal	M	21	28-04-2001	7439557581
25	MD. Irfan Islam Molla	M	18	09-05-2004	8017450417
26	Bikram Das	M	19	27-12-2003	9143093908
27	Bishal Das	M	19	27-12-2003	9143093908
28	Arish Mondal	M	19	28-11-2003	6290889981
29	Avra Panja	M	18	21-04-2004	7439178552
30	Pritam Bera	M	19	18-12-2003	7595831268
31	Sk. Arif Hossain	M	19	27-06-2003	8017941654
32	Ranjan Mondal	M	20	28-02-2002	7602711772
33	Daniya Khan	F	19	27-05-2003	9331770450
34	Priya Das	F	19	27-08-2002	9836620738
35	Sidhartha Sardar	M	21	16-08-2001	8910769431
36	Puja Sardar	F	20	20-02-2002	7980879544
37	Ekra Zahid	F	21	07-04-2001	7044364272
38	Tanay Saha	M	21	13-08-2001	7980324485
39	Imrul Kayes	M	20	18-01-2002	9883136373
40	Mriganka Karan	M	20	27-02-2002	9748236342
41	Sneha Ghuri	F	21	07-11-2000	8240456328
42	Injamamul Hoque Molla	M	21	31-11-2001	807284564

TEACHER'S NAME

1	Dr. Rumpa Das	F	48	
2	Dr. Deepa Bhattacharjee	F	39	
3	Tania Guha	F	39	
4	Supratip Dey	M	34	

R Das
13/8/2022



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This is to certify that*Mriganka Kanan*....., student of the Department of Geography of this college, has prepared his /her Field Report on **Physical and Cultural landscape on LATAGURI with special reference to Murti and Neora River Basin** on the basis of the visit to the locality on 15.08.2022 – 19.08.2022 in accordance with the syllabus of C.U for the students of Geography (H) for CBCS, Semester-V Examination.

However, the quality of the report depends upon the individual student.

Roll No. *203562-21-0001*.....

Registration No. *562-1111-0123-20*.....

Signatures

Dr. Deepa 3.1.23.

Dr. Deepa Bhattacharyya

Department of Geography

Maheshtala College

Tania Guha 3.1.23.

Tania Guha

Department of Geography

Maheshtala College

ACKNOWLEDGEMENT

First and foremost, praises and thanks to the God, the Almighty, for His showers of blessings throughout my Project work to complete the Project successfully.

I would like to acknowledge my indebtedness and render my warmest thanks to my supervisor, Prof. Tania Guha and Dr. Deepa Bhattacharyya, who made this work possible. Their friendly guidance and expert advice have been invaluable throughout all stages of the work. I would also wish to express my gratitude to for giving me the opportunity to do research and providing invaluable guidance throughout this research. Their dynamism, vision, sincerity and motivation have deeply inspired me. They have taught me the methodology to carry out the research and to present the research works as clearly as possible. It was a great privilege and honor to work and study under their guidance.

I am extending my thanks to Dr. Rumpa Das, Principal, Maheshtala College for her support during my research work. I also thank Mr. Supratip Dey, staff of our Department for his kindness and deep support. Many people, especially my classmates have made valuable comment suggestions on my paper which gave me an inspiration to improve the quality of the assignment. I would also like to expand my gratitude to all those who have directly and indirectly guided me in preparing this Project work.

I am extremely grateful to my parents for their love, prayers, caring and sacrifices for educating and preparing me for my future. Finally, my thanks go to all the local people and official staffs of Lataguri Administration who have supported me to complete the research work directly or indirectly.

August, 2022

Department of Geography,
Maheshtala College,
University of Calcutta.

Mriganka Karan

Name of the Student

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CHAPTER I:
INTRODUCTION

INTRODUCTION:-

A wide area of plain and hills in North-eastern India, lying in the foot of Himalayan Mountains is waiting to woo you when you make a visit in the Dooars. The name of Dooars came from the word 'duan' meaning door in the local languages. It is named so because this area serves a purpose of a gateway between India and Bhutan with 18 passages connecting these two countries. The valley covers an area of 8800 sq km. spread within the whole area of Jalpaiguri and Alipurdwar district and some area of Kochbihar in West-Bengal and Dhubri, Goalpara, Kokrajhar, Bongaigaon, Barpeta district in Assam. This whole plain area is continuously fertile by the major rivers like Brahmaputra and Manas. But we should mention the names of other rivers too which have a great contribution to the valley, Teesta along with Torsa, Sankosh, Jaldhaka, Raidhak etc.

Gorumara National Park is a National Park in northern West Bengal, India. Located in the Terai region of the Himalayan foothills, it is a medium-sized park with grasslands and forests. It is primarily known for its population of Indian Rhinoceros. The Park has been declared as the best among the protected areas in India by the Ministry of Environment and Forests for the year 2009. Gorumara was a reserve forest since 1895. The Park was declared a wildlife Gorumara National Park Sanctuary in 1949, on account of its breeding population of Indian Rhinoceros. It was declared an Indian National Park on January 31, 1994. Originally as small as 7 km², Gorumara has grown by incorporating neighboring lands to about 80 km².

The Park is located in the Malbazar subdivision of Jalpaiguri district, in the state of West Bengal in India.

AREA LOCATION:-

Jalpaiguri district is a district of the Indian state of West Bengal. It is situated between $26^{\circ}16'$ and $27^{\circ}0'$ North Latitudes and $88^{\circ}4'$ and $89^{\circ}53'$ East longitudes. The district was established in 1869 in British India. The headquarters of North Bengal which is the headquarters of the district are in the Indian city of Jalpaiguri. Jalpaiguri District earlier had three sub-division - Jalpaiguri Sadar subdivision, Mal subdivision and Alipurduar subdivision. Alipurduar district was created in June 2014 and Jalpaiguri district was left with two subdivision - Jalpaiguri Sadar and Mal. The district is divided into seven assembly constituencies: Dhupguri, Maynaguri, Raiganj, Jalpaiguri, Matiali, Mal and Nagrakata.

Total area of the district is 3044 sq km. National Protected areas include the Gorumara National Park and the Chapramari Wildlife Sanctuary.

A Location map of Study area is furnished as Figure No: 1.1

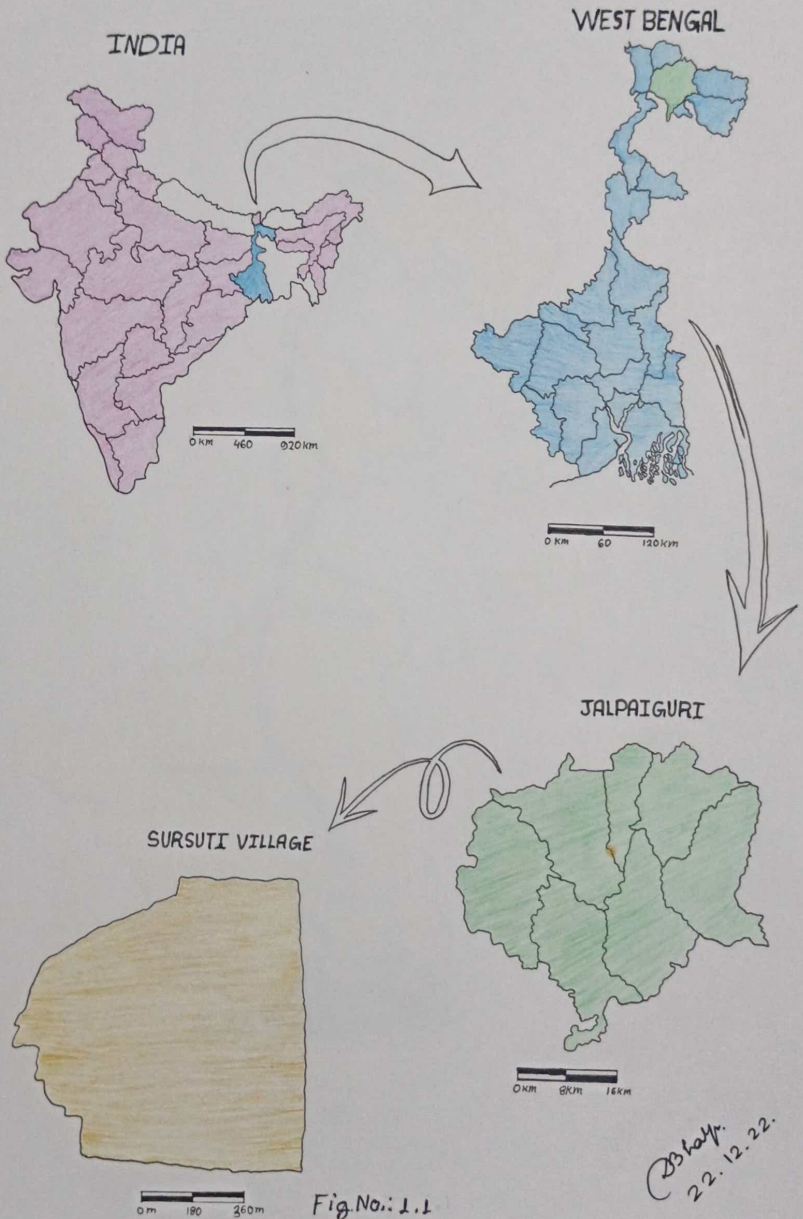
A table for details of block of Jalpaiguri is furnished in table No: 1.1

Table NO. 1.1 : Details of Block of Jalpaiguri District

Sub-Division	Assembly	Police Station	C.D. Block M/M.C.	Panchayat			Inhabited Villages	House holds
				Samity	Gram	Gram Sansad		
Jalpaiguri Sadar Sub-Div.	Rajgunj	Rajgunj Bhaktinagan (P)	Rajgunj	1	12	220	26	82038
	Jalpaiguri	Jalpaiguri	Jalpaiguri	1	14	227	28	73981
			Jalpaiguri (M)					26205
	Maynaguri	Maynaguri	Maynaguri	1	16	234	79	76492
	Dhupguni	Dhupguni (P) Banarhat (P)	Dhupguni	1	16	296	98	91329
			Dhupguni (P)	Dhupguni (M)				
Bhaktinagan (P)			Siliguri (M.C)					49895
Mal Sub-Div.	Mal	Mal	Mal	1	12	196	100	64310
		Nagrakata (P)	Mal (M)					5933
	Metiali	Metiali	Metiali	1	5	81	27	25251
	Nagrakata	Nagrakata (P) Banarhat (P)	Nagrakata	1	5	91	33	27274

SOURCE: District census handbook 2011

LOCATION MAP



B. Saha
22.12.22.

SOURCE: Administrative Atlas of West Bengal, Sensus of India

ROUTE MAP OF JALPAIGURI



Fig. No.: 1.2

Debayy
22.12.22

REVIEW OF LITERATURES:-

For a long time, the tribal people have been the focus of study for social scientists. A bulk of description is available about the different socio-economic aspects of tribal people. Indian tribal people have been studied by the scholars of different disciplines from different points of view. The scholars from sociology, history and anthropology studied more about the tribal people rather than the geographers. However, a review based on earlier literature is presented here.

The present Mal subdivision is a part of western Dooars of Bhutan and Britishers. The historical information is required to understand the socio-economic development through the passage of time. But there are very limited writings about the history of Dooars. However, significant contributions are made in this context by William Wilson Hunter (1875), Alexander Mackenzie (1884), D.H.E. Sunder (1895), J.F. Gruing (1911), and Shubhojit Ray (2002).

Hunter's (1875) 'Statistical Account of Bengal,' consisting of ten volumes, is a pioneer work about the history of British ruled Bengal. The tenth volume is described about the Dooars of Jalpaiguri, Darjeeling and princely Koch Behar State. Physical, socio-economic and anthropological aspects are analysed in a descriptive way in Hunter's work. Agriculture of the people inhabiting in the Dooars region are minutely described in this book.

Mackenzie's (1884) book 'History of the Relations of the Government with the Hill Tribes of the North-East Frontier of Bengal' is a pioneer writing on tribals of Assam and Bhutan borders. In the second chapter of the book there are descriptions of Bhutanese aggression to the tribes living in India-Bhutan borders.

The oppression of Bhutan Raj upon the tribal People and aggression towards Dooars has vividly been described in this book. The Koch Raj was unable to protect his area from Bhutanese and the East India Company invades to tackle Bhutanese aggressions by Anglo-Bhutan war which comes to an end with the treaty of Sinchula in 1865.

OBJECTIVE:-

- 1) To study the physical and cultural landscape's analysis of the Neona Munti adjacent areas.
- 2) To Identify Landuse analysis.
- 3) To analysis the Socio-Economic Characteristics.

DATA BASE:-

A brief identities of data which is used in this work are:

1) Satellite Images:

- Landsat 8 (Date of acquisition: 28-02-2017)
Source - <https://earthexplorer.usgs.gov>
- Landsat 2 (Date of acquisition: 03-02-1977)
Source - <https://earthexplorer.usgs.gov>
- Google Earth Images (Source: Google Earth)

2) Field Data:

- Sediment Samples
- Field Photographs
- Water Samples
- Soil Samples
- Socio-Economic Survey Data

3) TEMPERATURE & RAIN FALL DATA:

- Source: Indian Meteorological Department 2018.

METHODOLOGY:-

The methodologies that have been followed throughout the whole work are:

□ Pre-field Methodology: Some papers, thesis and monograph on the relevant issue are taken and frame the planning of the field work. And the landsat images, also other data are downloaded from its official website.

□ Field Methodology: Field photographs are taken at Neona & Munti river, doing profiles of Munti and Neona river, data collect by household survey, Market Survey, Hotel Survey. Sediment Sample are

collected also Soil and water samples are collected from the river bank and river. And GPS Points are marked on that Particular Places of collection.

▫ Post-Field Methodology: Raw data are processed with paper and pen by using calculator. The profiles of the study area are generated by Geomatic tools. Overall area can be identified by Google Earth images and generated Land use Land cover map by mouza map. Different analysis like demographic status, market features are distribute by in hand with Paper, Pen and calculator. Geomorphological mapping, drainage system, topographical mapping of Selected area have done in different GIS Software.

▫ Lab based: The sieving of sediments sample Soil and water are tested and measurement of each sample have been completed in the pedology lab.

CHAPTER II:
PHYSICAL SET UP

□ GEOLOGY:

Inconformity with the general geological setting in the Himalayan tract of North Bengal, the foothill belt comprises the Siwalikes in the south, separated from the impersistent Gondwanas rock attain maximum thickness here, and is best developed in the whole North Bengal. It follows the Gondwanas in the north, forming the southern flank of the Dalings, which becomes the prominent rock unit in Bhutan. Among the Quaternary Geological formations of Eastern India, this study area has involved polyaxalic landscape and peculiar drainage system, being reconstructed from time to time.

The Stratigraphic Succession is furnished in Table No. 2.1

Table No. 2.1: Geological Succession of Jalpaiguri

GROUP NAME	Lithology Type
Older Alluvium	Loose sandy soil with boulders and pebbles of older rocks.
Siwalik Group	Coarse grained micaceous, sub greywacke with plaets of clay and lenses of lignite.
Main Boundary Fault	
Gondwana Group	Lamprophyres and quartz yeins, Tectonically mixed boundary quartzite sandstone. Original bedding from usually obliterated
Thrust contact	
Epidiorites	Mostly Occurring as sills
Buxa Series	Dolomite and orthoquartzite with variagated phyllites
Thrust contact	
Daling Series	Thick pure quartzite beds interblended with thick grey phyllite and schist

HYDROLOGY:

Hydrological condition at a particular point is guided by topography, geology, and rainfall of the region. Hydrological characteristics also have changed from last decade in this region. Rock types of the upper part of this region are older Alluvium which includes silt/sand/Gravel/lithomargic clay and lower part of this region are of younger Alluvium type which includes clay/silt/sand/calcareous concretion, upper part and lower part of the district is of Quaternary age. Granular/fracture zone are encountered within 15-400 m b.g.l in the Northern Part and 15-400 m b.g.l in the Southern Part. Thickness of aquifer zone varies between 50-700m in North whereas in south it varies between 50-700m. Prospect of ground water yields varies between 200-1500 cum/day.

A hydrological map of Jalpaiguri district is furnished as Figure No.:

GEOLOGICAL MAP OF JALPAIGURI

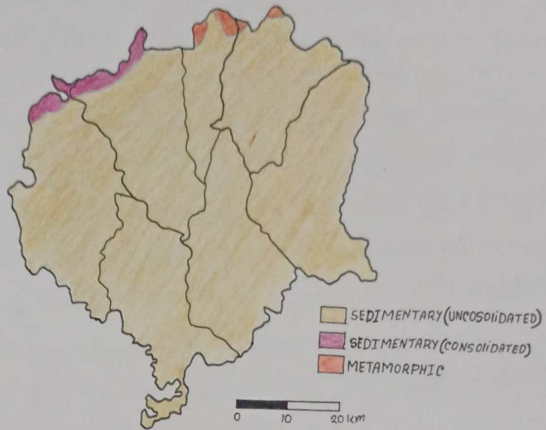


Fig No. 2.1

HYDROGEOLOGICAL MAP OF JALPAIGURI

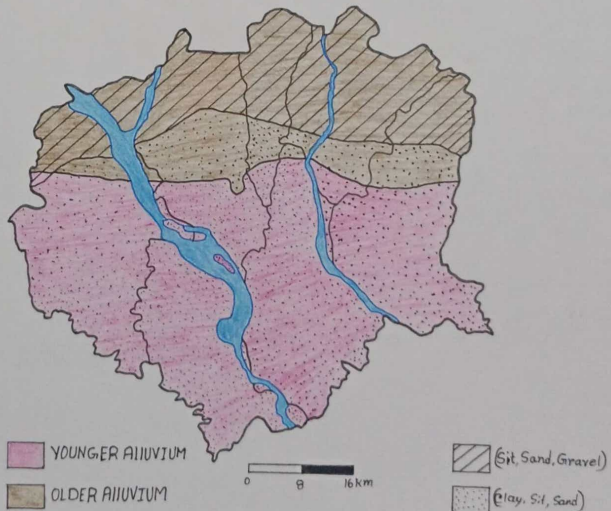


Fig No. 2.2

Abhay
22.12.23

Climate:

Climate Condition of Jalpaiguri is apart of monsoon climate zone of South-Eastern Asia. July (sometimes August) is the hottest month of this region with average maximum temperature of about 29°C whereas January is coldest with 14°C. Highest ever recorded maximum and minimum temperature are 41.3°C and 2.1°C in Jalpaiguri City. The average annual humidity in the district is of 82%. The annual average rainfall is 3360mm. January is the driest month with average rainfall 9mm and July is wettest with 818 mm. Number of rainy days are 2 to 5 during November to February and 26 to 30 days during June to September. Thunderstorms are common weather phenomenon during May. Rainfall details of rainfall data of five years is furnished in table no.: 2.2.

Table No.: 2.2 Monthly Rainfalls in Jalpaiguri (1998-2012)

YEAR	JAN	FEB	MAR	APR	MAY	JUNE	JUL	AUG	SEP	OCT	NOV	DEC
1998	0	8	112	153	206	1042	1169	1296	538	160	15	0
1999	2	0	8	167	394	590	1060	948	250	313	4	0
2000	3	17	15	152	400	1021	810	694	414	141	58	0
2001	2	0	42	112	385	529	473	626	523	473	35	5
2002	26	0	94	244	167	471	1319	145	343	117	2	5
2003	8	61	103	202	260	630	1234	432	550	314	24	24
2004	15	8	35	208	416	647	1307	436	668	171	9	4
2005	17	5	132	207	230	438	782	648	254	353	7	0
2006	0	7	17	98	404	625	760	242	637	201	15	11
2007	0	63	45	201	222	511	946	717	701	2	0	0
2008	15	06	64	173	251	678	967	937	291	99	0	0
2009	0	0	27	163	254	670	715	738	250	336	0	2
2010	0	2	74	159	396	900	1044	688	539	70	10	0
2011	3	8	78	184	321	652	889	562	509	39	2	0
2012	5	6	5	150	310	1096	1043	429	575	168	0	0
MEAN	6	13	57	172	308	693	963	639	469	197	12	3

SOURCE: IMD, Govt of India.

Table NO.: 2.3: Maximum, Minimum and Mean Temperature

	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Maximum	22	26	30	32	34	31	32	34	33	32	29	24
Minimum	11	13	17	21	23	24	25	25	23	20	15	12
Mean	16.5	19.5	23.5	27.5	28.5	29.5	28.0	29.5	28.0	26.0	22.0	18.0

SOURCE: IMD, Govt. of India

CLIMATIC CHARACTERISTICS

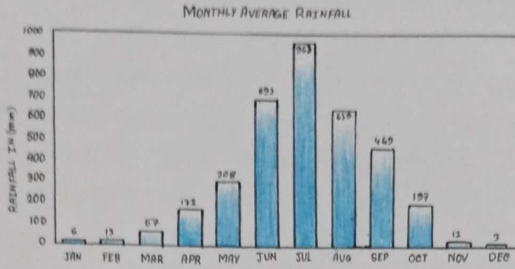


Fig No. 2.3

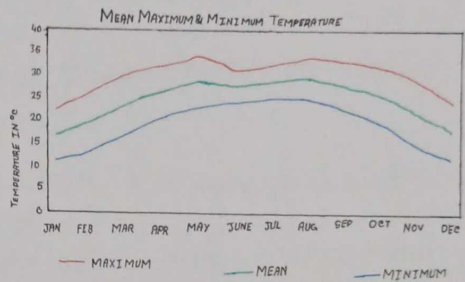


Fig No. 2.4

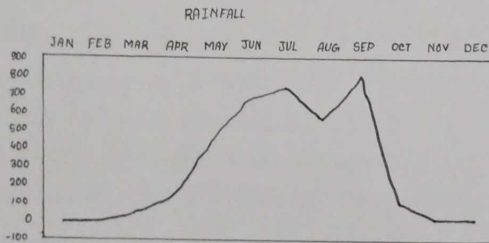


Fig No. 2.5

MONTH WISE TEMPERATURE DISTRIBUTION OF THE STUDY AREA, 2018



Fig No. 2.6

Abhay
22.12.22.

GENERAL LANDFORMS:-

The whole region is full of tea gardens and scatter forests. The entire topography is crisscrossed with streams, rivers and hills. The district topography wears a mixed look consisting both of hilly areas and undulating plains coupled with vast flat plains. Three district Physiographic units can be identified in the district @ The northern hilly terrain which is a part of the sub-Himalayan Ranges, @ the Central tract, locally called Bhabar and @ The gently sloping alluvial plain in the south locally called Terai. A few hills occur in the Terai or Dooars region at the foot of the Himalays. Some remnants of the Siwaliks can be seen in the region.

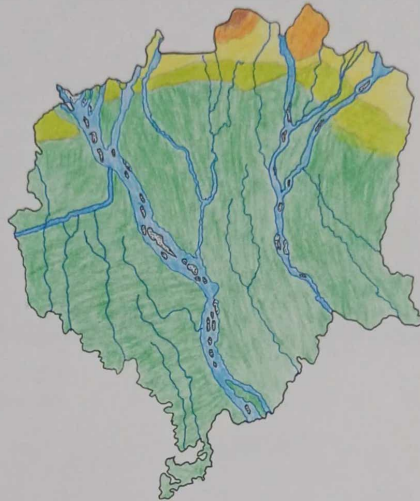
The "Terai" is a belt of marshy grassland, savannas, and forests at the base of the Himalaya range stretching southwards to about 38km, Above the Terai belt lies the Bhabar, a forested belt of rock, gravel, and soil eroded from the Himalayas. Terai-Duar Savanna and Wetlands are a mosaic of tall grasslands, savannas and evergreen and deciduous forests. The Terai and Dooars region politically constitute the plains of Darjeeling District, whole of Jalpaiguri and Alipurduar district and upper region of Cooch Behar District in West Bengal. The slope of the land is gentle, from north to south. The general height of the land is 80 to 100m. The entire region is made up of sand, gravel and pebbles laid down by the Himalayan rivers like the Teesta, Torsa, Raidak, Jaldhaka, Sankosh and several other small rivulets. The Teesta has divided the area into two parts the western parts is known as the Terai whereas the eastern part is known as the Dooars or Duars. The Dooars region can be further subdivided into the Siliguri or Western Dooars, The middle or Jalpaiguri Dooars and the eastern or Alipur Dooars.

(Source; District census handbook 2011)

DRAINAGE:-

Majority of the rivers and rivulets are flowing in Jalpaiguri district originates in the northern hills and the rivers flow from the north towards the south and south-easterly direction among which Tista, Jaldhaka, Karotoya, Diana, Murti and Neora are noteworthy. Jalpaiguri district is the interfluvial of rivers and rivulets. Because of foothills rivers that flow from the hilly courses abruptly reach the plain. The rivers after reaching the plains are braided and therefore the rivers are incapable of transporting their bed load. Hence, the river beds are raised resulting into floods during heavy monsoon rains in few parts of the plains. However, changing of the river courses and shifting of river are the common features in this region. Flooding, bank erosion is the problems which sometimes cause damage to agriculture, forest, tea garden and settlement.

TOPOGRAPHICAL MAP OF JALPAIGURI DISTRICT



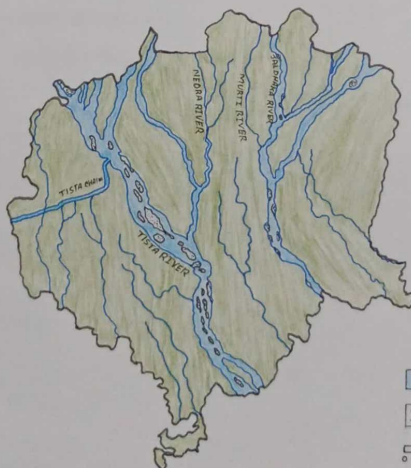
ELEVATION IN METER

- 451 - 550
- 351 - 450
- 251 - 350
- 151 - 250
- 50 - 150

Fig No: 2.7

0 10 20 km

DRAINAGE MAP OF JALPAIGURI DISTRICT



RIVERS

SAND BAR

0 10 20 km

Fig No.: 2.8

Chowdhury
3.1.23.

CROSS SECTION OF MURTI RIVER CHANNEL ALONG THE LINE G TO G' NEAR DHUPJHORA VILLAGE, JALPAIGURI DISTRICT

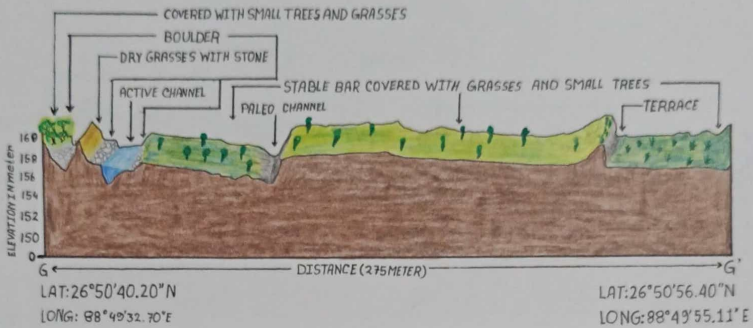


Fig No: 2.9

TERRACE STUDY OF LANDUSE DEVELOPEMENT NEAR DHUPJHORA GRAM, JAL PAIGURI DISTRICT

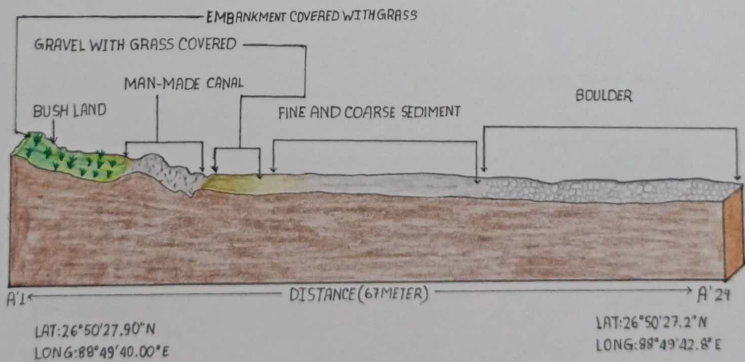
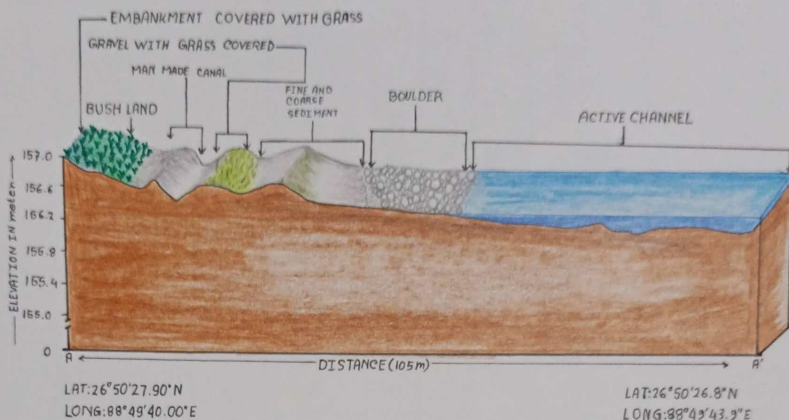


Fig No: 2.10

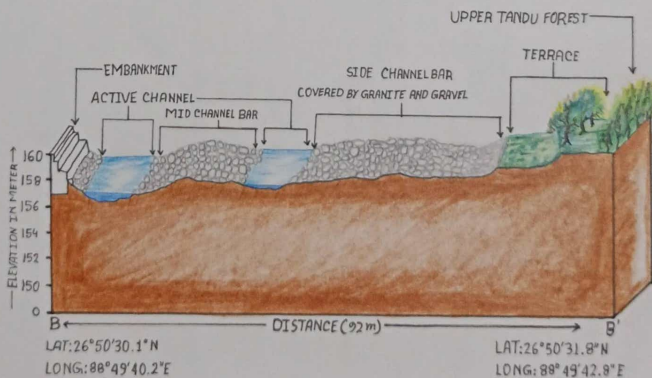
Drawn
3.1.23.

CROSS SECTION OF MURTI RIVER CHANNEL ALONG THE LINE A TO A' NEAR DHUPJHORA VILLAGE, JALPAIGURI DISTRICT



FigNo: 2.11

CROSS SECTION OF MURTI RIVER CHANNEL ALONG THE LINE B TO B' NEAR DHUPJHORA VILLAGE, JALPAIGURI DISTRICT



FigNo: 2.12

Shahin
23.12.22.

TABLE NO. 2.4: CLOSED TRAVERSE SURVEY BY PRISMATIC COMPASS

LOCATION

PLACE:

INSTRUMENT NO:- PL

TIME:- 4:30 PM

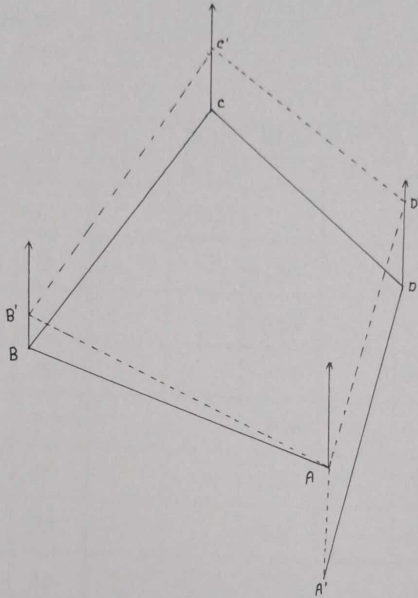
DATE:- 16/08/2022



LINE	LENGTH		OBSERVED DEPARTING		$\Sigma = FB - BB$	ERROR $\Sigma d = 180^\circ$	$\theta = \frac{E}{2}$	CORRECTED DEPARTING		CHECKED	REMARKS
	GROUND M ^S	IN PAPER $1cm = 4m$	F. B	B. B				F. B	B. B		
AB	25	6.25	290°	110° 30'	179° 30'	-0° 30'	± 0° 15'	290° 15'	110° 15'	180° 0'	
BC	23	5.75	21° 30'	233° 30'	212° 0'	32° 0'	± 16°	37° 30'	217° 30'	180° 0'	
CD	20	5	152°	289°	137°	-43°	± 21° 30'	130° 30'	310° 30'	180° 0'	
DA	23.10	5.77	192°	15°	177°	-3°	± 1° 30'	193° 30'	13° 30'	180° 0'	

PLOTTING OF A CLOSED TRAVERSE (ABCD A') PARALLEL MERIDIAN METHOD (CLOCK WISE)



INSTRUMENT NO: P₁

DATE: _____
TIME: _____



-  MAGNETIC NORTH
-  OBSERVED TRAVERSE

SCALE
1cm = 4 unit

-  CORRECTED TRAVERSE
-  CLOSING ERROR

DISTRIBUTION OF CLOSING ERROR AFTER BOWDITCH'S METHOD

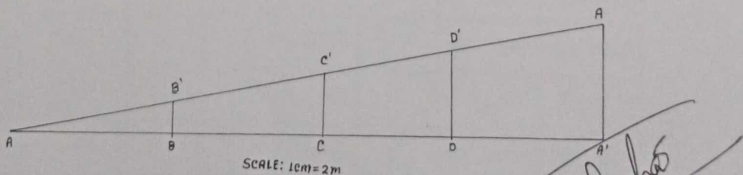


Fig No: 2.13

Tanya Jha
2/11/23

Table No 2.5: Longitudinal Profile

INST. NO:- D₁, P

TIME: 4:00 PM

DATE: 16/08/2022

PLACE: NAORA RIVER SIDE,
LATAGURI

LINE	STATION OBSERVED	DISTANCE IN MTS	REDUCING TO SCALE 1cm=5	STAFF READING IN (m)			COLLIMATION LEVEL (m)	REDUCED LEVEL (m)	REMARK
				B.S	IS	FS			
A/B	A	0	-	1.395			100.395	99	BM = 99m
	A ₁	5	1		1.670		100.395	98.725	
	A ₂	10	2		1.725		100.395	98.67	
	A ₃	15	3		1.940		100.395	98.455	
	A ₄	20	4		2.040		100.395	98.355	
	A ₅	25	5		2.220		100.395	98.175	
	A ₆	30	6		2.300		100.395	98.095	
	A ₇	35	7		2.470		100.395	97.925	
	A ₈	40	8		2.612		100.395	97.695	
	A ₉	45	9		2.700		100.395	97.475	
	A ₁₀	50	10		2.920		100.395	97.165	
	A ₁₁	55	11		3.230		100.395	97.06	
	A ₁₂	60	12		3.333		100.395	96.99	
	A ₁₃	65	13		3.405		100.395	96.795	
	A ₁₄	70	14		3.600		100.395	96.7	
	A ₁₅	75	15		3.695		100.395	96.78	
A ₁₆	80	16		3.625		100.395	96.77		
B	85	17			3.940	100.395	96.455		

LONGITUDINAL PROFILE ALONG THE LINE AB COLLIMATION METHOD

PLACE: LHM SURRI
INST. NO.: D1

DATE:
TIME:

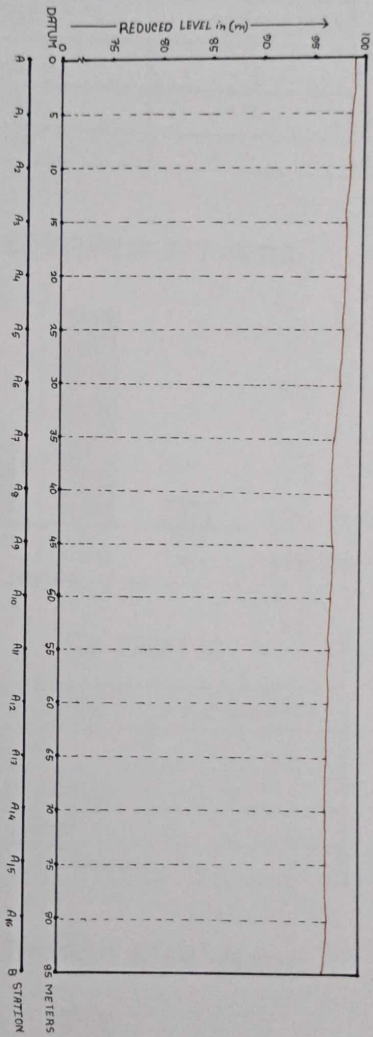


Fig No: 2.14

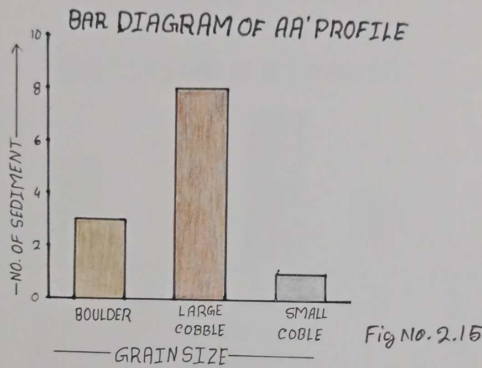
SOURCE: Field Work 2022

SEDIMENT SIZE ANALYSIS OF RIVER MURTI

Showing the various types of sediments of Murti River
Near Dhupguri

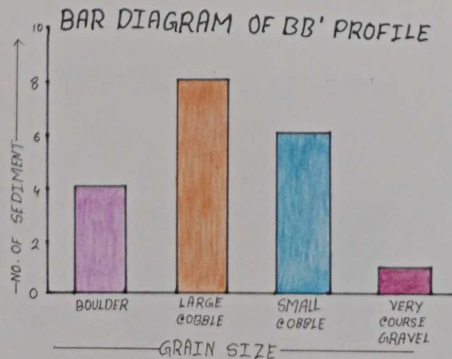
GRAIN SIZE SCALE	FREQUENCY
Boulder	3
Large	8
Small	1

← AA' Profile



BB' PROFILE

GRAIN SIZE	FREQUENCY
Boulder	4
Large Cobble	8
Small Cobble	6
Very course Gravel	1



Abhay
22.12.22.

DD' PROFILE

GRAIN SIZE	FREQUENCY
Boulder	4
Large cobble	5
Small cobble	6
Very coarse Gravel	3
Course Gravel	1

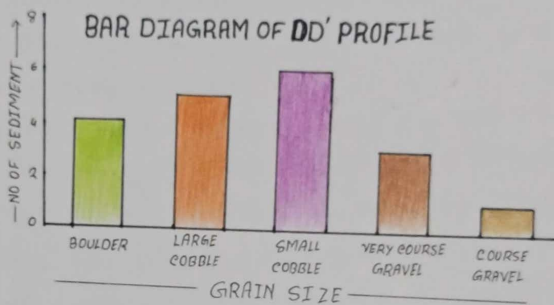
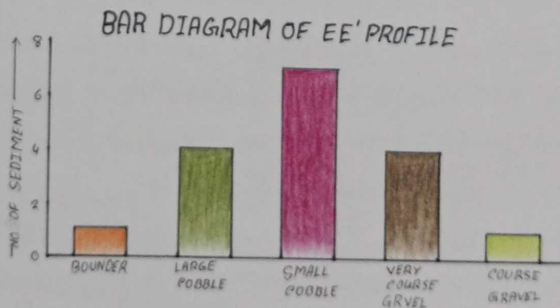


Fig-2.17

EE' PROFILE

GRAIN SIZE	FREQUENCY
Boulder	1
Large cobble	4
Small cobble	7
Very coarse Gravel	4
course Gravel	1



Abhay
22.12.22.

VEGETATION:-

The district is blessed with rich reserves of forest resources. The presence of vast hilly tracts covered with dense forests with sparkling streams flowing through them attracts tourists from all over the world. The forests, covering about 1,70,000 hectares of land which is 27.8 Percent of the total geographical areas, are home to a fascinating variety of flora and fauna. The vegetation is mostly deciduous semi-evergreen with sal as the dominant species. The timber produced in these forests is very valuable and is used for building furniture, doors, windows and other wooden equipment. Social forestry is also becoming popular now-a-days with trees like Eucalyptus, Simul, Krishna chuna etc. being widely cultivated or planted. The forested hilly ranges have also augmented growth of several major wild life Reserve.

□ Flora: The district Jalpaiguri is blessed with rich reserves of forest resource. The presence of vast hilly tracts covered with dense forests with sparkling streams flowing through them has attracted the attention of all over the world. It is the home of a fascinating variety of flora and fauna. There are 352 species of trees, 108 species of climbers, 6 species of canes, 133 species of shrubs, 144 species of bamboos and 25 varieties of rare plants.

□ Fauna: The forests of this district is the abode of a spectacular range of faunal variety with mammal 69 species, reptiles 41 species, birds 249 species, amphibians 45 species, fishes 33 species and entomic fauna 353 species. The forested hilly ranges have given birth to two major wild life Reserves viz. Gorumara Wild Life Sanctuary and Chapramari Wild Life Sanctuary.

The Gorumara Wild Life Sanctuary is the oldest sanctuary in the district. The Sanctuary is famous for its varied collection of wild life. At the initial stage this sanctuary was designated to preserve the famous Indian one-horned Rhinoceros. Later, apart from the one-horned Rhinoceros, the Sanctuary was also made the home of elephant, tiger, leopard, Sambar, hog deer, barking deer, Spotted deer, Swamp deer, Pig, Sloth, bear etc. Bird like Peacock, jungle fowl, woodcock, owl, kingfisher, hornbill, dove Pigeon, Parrot, blue bird, twitter and many other also found in huge numbers. Various kinds of Snakes and lizards inhabit the Sanctuary. Commonly found Snakes are the huge fangless python, the cobra, the king cobra, Knails, vipers, Cat Snake etc. The Chapramani Wild Life Sanctuary covers an area of 2,373 acres.

SOIL Pattern:- The soil type are mostly clayey-loam, loam, sandy loam, acidic pH ranges from 4.5 to 6.6 and deficient in micronutrients. The soil in this region varies from alluvial soil to sandy and hard black clayey. The upper region in the north of Dooars, the soil is mainly black and clayey. This soil is suitable for growing tea, which is a major cash crop of this district. In the lower plain, the soil consists of a mixture of both clay and sand. The alluvial soil is fertile enough for crops like paddy, wheat, jute, Potato, Pulses, Oilseeds, Sugarcane, etc. to be grown.

NATURAL VEGETATION MAP OF JALPAIGURI

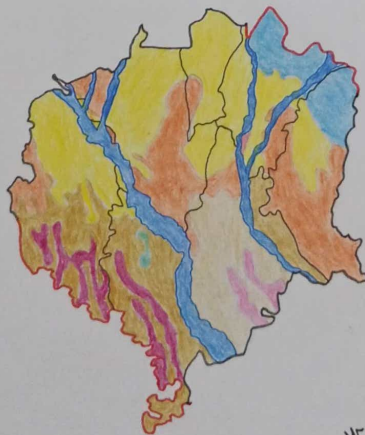


FOREST

1. CHAPRAMARI
2. GORUMARA NP
3. DINA FOREST
4. MORAGHAT FOREST
5. APPLE CHAND FOREST
6. BAIKUNTHAPUR FOREST

Fig No: 2.19

SOIL MAP OF JALPAIGURI



- RIVER
- W006
- W007
- W009
- W009
- W010
- W018
- W020
- W022

0 10 20 km

Fig No: 2.20

W006	coarse loamy, Umbre Dystrochrepts
W007	Fine loamy, Fluventic Eudrochrepts, coarse loamy
W008	coars loamy, Typic Haplaquents, coarse loamy
W009	coars loamy, Aquic ustifluvents,
W010	Fine loamy, Aquic typic Haplaquents
W018	coarse loamy, Typic Fluvaquents, coarse loamy
W020	coarse loamy Aquic ustifluvents,
W022	Fine loamy, Aeric Haplaquents, coarse loamy

Shahy.
23.12.22.

SOURCE: DRM, 2021

NEORA RIVER PH SCALE

Table No.:2.6; Upstream

Sample	1	2	3	4	5
PH	9.78	9.38	9.37	9.35	9.24

Table No.:2.7; Downstream

Sample	1	2	3	4	5
PH	7.16	7.25	7.31	7.23	7.55

MURTI RIVER PH SCALE

Table No.:2.8, UPSTREAM

Sample	1	2	3	4	5
PH	7.1	7.2	7.2	7.5	7.5

Table No.:2.9, Downstream

Sample	1	2	3	4	5
PH	7.4	7.4	7.5	7.6	7.5

PH SCALE IN DIFFERNT STREAM

NEAORA RIVER

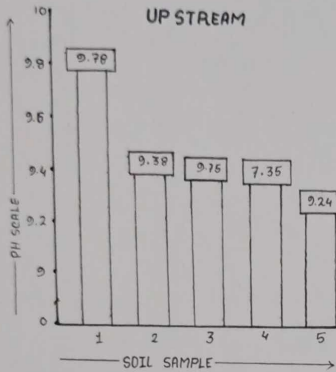


Fig NO: 2.21

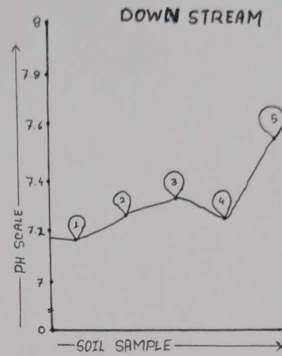


Fig NO: 2.22

MURTI RIVER

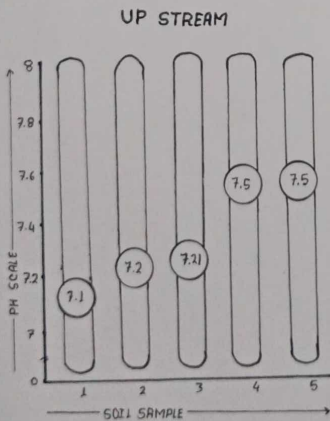


Fig NO: 2.23

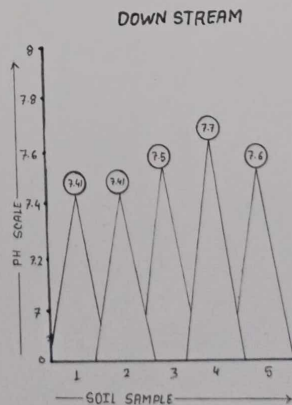


Fig NO: 2.24

Abhay
23.12.22.

CHAPTER III:
SOCIO ECONOMIC CULTURAL SET UP

DEMOGRAPHY:-

The district encompasses a geographical area of 3044 sq km and has a population of 1985600 including 1015890 males and 969710 females. Sex ratio of Jalpaiguri District is about 954/1000. Population density of the district is about 1300/sq. km. The major religions in the district are Hindu and Buddhist of the total population. The literacy rate in the district is 61.62%, 56.55% male and 43.45% females. Official languages of the district are Bengali and English. Regional languages are Bengali, Hindi, Bodo & Nepali. Main livelihood is agriculture in Jalpaiguri District. Boro, Meoh, Toto and Santhal are main tribes of this district.

The table representing demographic profile of Mal & Jalpaiguri Block, modified based on 2011 census.

Table NO.: 3.1, Demographic Status

Block	Area (sq.km)	Number of Household	Population	Male	Female	Literate	Illiterate	% of Population to district Population
Mal	520	64310	299556	151826	147730	172753	12603	15.09
Jalpaiguri	501	73981	323445	166036	157409	209956	113419	16.29

■ Population:- Dooars area was sparsely populated before the introduction of tea plantation. The Koch-Rajbanshi, Meoh or Bodo, Rabha and the Lepchas were the indigenous people in this region. After the introduction of tea plantation, the number of people has increased significantly by immigration from Nepal & Bhutan as well as from the Chhotonagpur areas. Thus the region grew into a new hub of multi-racial and multi-lingual people. In the plain areas infiltration of Bangladeshi people took shelter after independence.

As per 2011 census, Mal subdivision has a total population of 5,69711 distributing in three blocks of Mal, Matiali and Nagrakata and in a single town namely Mal. The Rural area composed of 544493 populations. Average density of population is 474/sq.km. The three blocks highest density of rural population is found in Matiali block while the least density is in Nagrakata block. Among the GPs, highest density is in Lataguri (985/sq.km).

Social Structure: Different social groups and religious groups can be termed as the base of social structure. In Mal sub-division, on an average 21.2% People belong to Scheduled cast, 40% People belong to Scheduled caste proportion is high in Mal block and lowest in Nagrakata block. There are 49.2% People in rural areas of Mal subdivision who are belonging to Scheduled cast. There are 49.2% People of Nagrakata block who belong to Schedule tribe category. Share of Scheduled tribe population is lowest in Mal block (34.5%). Average ratio of scheduled tribe is 40% in the subdivision.

Table NO.3.2 Population of study area

Male	Female	Total
142	118	260

Table NO.3.3 Reason For Migration in (%)

	Service	Business	Education	Health	Marriage	Forced	Other
Male	28%	17%	21%	14%	0	7%	13%
Female	0	0	13%	33%	32%	6%	13%

Table No:3,4, House Types

Earthen	Semi-concrete	concrete
55%	36%	10%

Table No.3.5 Average Monthly Income

	<5000	5000-10000	10000-20000	20000<
Male	16%	66%	14%	4%
Female	39%	61%	0	0

Table No.3.6, House Category

OWN	Rented
92.85%	7.14%

POPULATION STRUCTURE & CHARACTERISTICS

DISTRIBUTION OF POPULATION

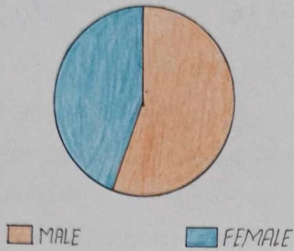


Fig No: 3.1

REASON FOR MIGRATION

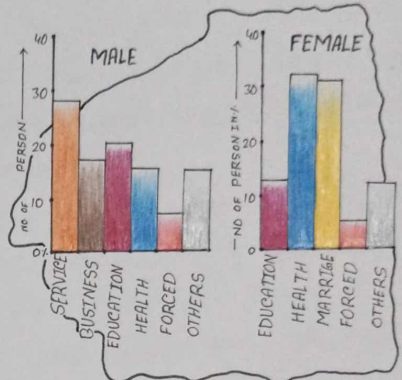


Fig No: 3.2

HOUSE TYPE

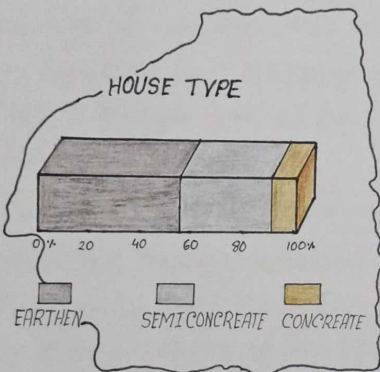


Fig No: 3.3

AVERAGE MONTHLY INCOME

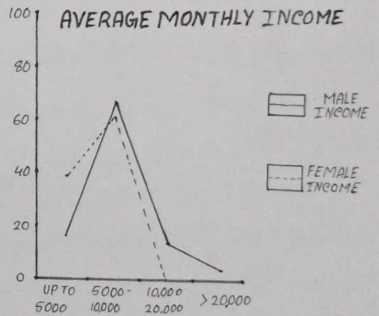


Fig No: 3.4

NUMBER OF EMPLOYED & UNEMPLOYED



Fig No: 3.5

HOUSE CATEGORY

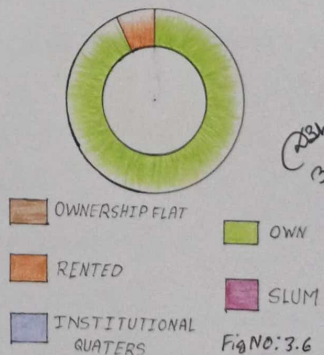


Fig No: 3.6

Abhay
3.1.23.

Health: Health is one of the important keys of infrastructure. There are 95 sub-centres throughout the subdivision of Mal. In Mal and Matiali there is no any rural hospital. There is only one rural hospital in Nagrakata block. In Mal and Matiali block there are block Primary health centres. There are seven primary health centres. So, the govt health centres are limited in the blocks of the Mal subdivision. There are 10 Non-governmental hospitals in the subdivision. A few of them are run by the Christian missionaries.

Number of health centers in a region not always speak about the health status rather there are considerations of number of hospital beds and number of doctors. There are 33 doctors and 541 beds in the hospitals of the subdivision. The coverage ratio of hospital beds to total populations in the subdivision is 1:1006.

Education: Educational institutes in the subdivision are fewer than the Sadam subdivision of Jalpaiguri district. There are 281 Primary Schools, 22 middle Schools, 17 high Schools and 16 Higher Secondary schools in the rural area. The Matiali block has 3 higher Secondary Schools. Matiali and Nagrakata block has no general degree college. The only degree college of the subdivision is Mal Parimal Mitra Smriti Mahavidyalaya situated in the Mal block. There is no professional or technical institution in the subdivision. So the educational infrastructure in these blocks are poorer than the other blocks of Jalpaiguri district.

Table No.:3.7, Health & Nutrition (Health Indices)

SL No.	A	B	C	D	E	F	G	H	I	J
Health Indices	separate Latrine	Separate Kitchen	Safe Drinking water	water facility within Premise	Treatment by Doctor	Sufficient Nutrient foods	Institutional child Delivery	Sleeping Mosquito Net	without Drinking Habit	Average
Value	31%	35%	4%	4%	3%	6%	3%	0%	3%	1%

Table No.:3.8, Education Level

	Literate	up to V	V-X	Secondary	H.S	UG
male	38%	22%	19%	15%	5%	1%
female	33%	23%	30%	6%	3%	5%

Table No.:3.9, Weather Satisfactory

YES	NO
90%	10%

EDUCATION & HEALTH STATUS OF STUDY AREA

HEALTH INDICES STRUCTURE

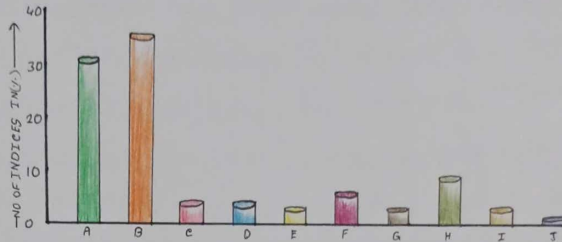


Fig NO: 3.7

EDUCATION LEVEL

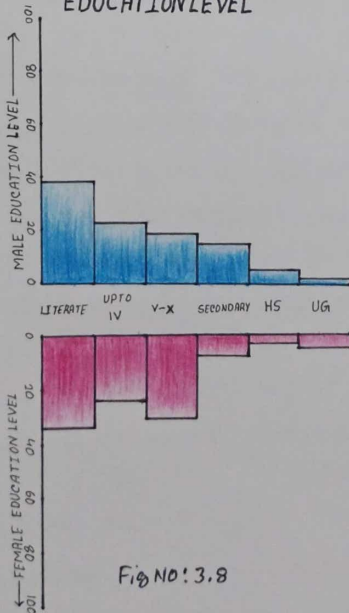


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WEATHER SATISFACTORY

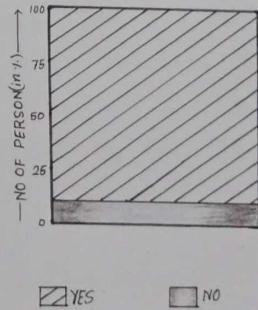


Fig NO: 3.9

Sanjay
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Culture: Though different varieties of races and their cultures got intermingled in the same land; each individual race retained their individual culture and heritage over the ages. Thus the phenomenon of "combined culture" never got a chance to bloom here. In the serenity of the forests, beyond the misty curtain of the hills or by the gushing streams here and there developed and prospered various culture like - The Bhotia Culture, The Rajbanshi Culture, The Nepali Cultural. The Bengali Cultural together. Majority of Tribal Culture are Folk Culture. Folk Dances, Folk Songs and Folk lore forms are integral part of these cultures. And then comes the variety of festivals. Apart from the major festivals like the "Durga Puja" and the "Kali Puja" there is the "Teesta Burir Puja" epitomising the life line of this region the Teesta River; an occasion observed by the local Rajbanshis. Moreover, the rich tribal cultural of Doars associated with marriages are very notable.

Occupational Structure: As per census 2011 data, 39.02% people are in the category of workers in the subdivision. Malda has the highest workers and Mal block has lowest workers ratio. Among the workers are cultivators are 9.15%, agricultural labourers are 16.18%, household industrial workers are 1.65% and other workers are 73.02% in the subdivision. Agricultural labourers are more in Mal among the three blocks. Among the workers, 28.65% are main workers and 10.37% are marginal workers.

Tea Plantations: Economy of this region is deeply much influenced by the tea garden based economic activities. Tea cultivation became possible and the tea gardens grew up in Doars on account of appropriate soil favourable climatic conditions and above all availability of land since the areas

were declared non-regulated and the Government can acquire land for its purpose.

Table No.:3.10, Type of Facilities they want

Health	Road	School	Water supply	Factory	Eleet.	House	Drainage
27%	17%	22%	16%	4.45%	5.7%	2.54%	1.14%

Table No.:3.11, ASSETS POSSED

Land	car	Two wheelen	computer	T.V.	Refridgerator	Washing Maching
39%	3%	29%	1%	23%	5%	0%

Table No.:3.12, Monthly Income (in Rs)

<2500	2501 - 5000	5001 - 7000	7001 - 10000	10000 <
0	9.52%	35.7%	38.09%	16.66%

Table No.:3.13, DISEASES Among the tea Labours

Diseases category	Diarhhea	Dysentery	Fever	Tuberculosis	Typhoid	Hepatitis	Snake Bites	Other
Male	16.67	0	42	0	3.27	0	34.24	0
Female	10	0	40	0	2.5	0	47.5	0

ASSETS & INCOME DISTRIBUTION

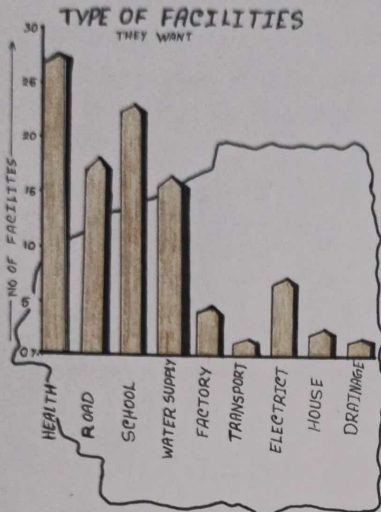


Fig No: 3.11

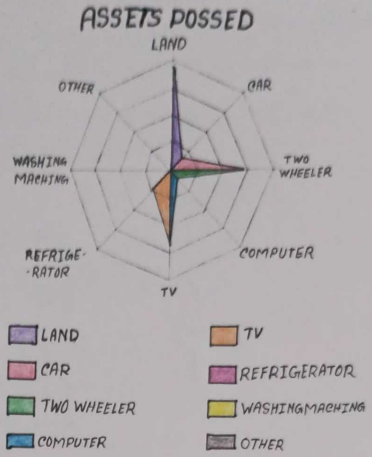


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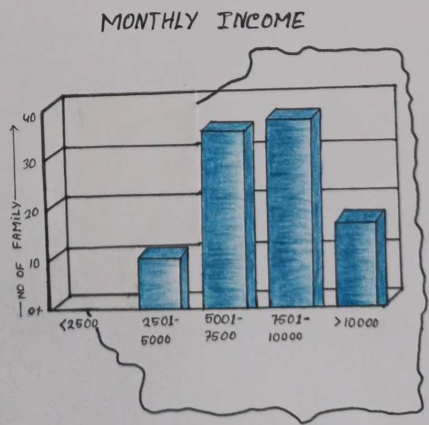
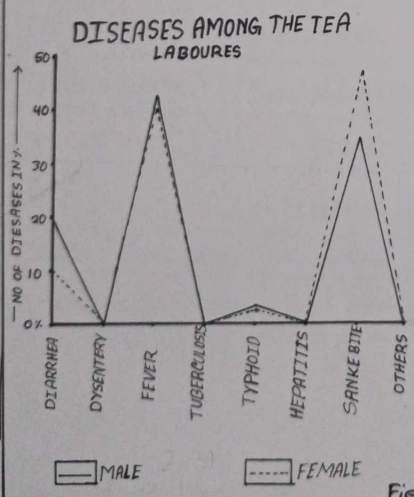


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□ Economic Background: Economy of the area largely depends on agriculture and tea garden. Tribal People are basically depended on tea garden while the others are on agriculture. The traditional agricultural Practices gain importance as the status of farming. A considerable amount of people depend on livestock farming, cattle and buffalo rearing sheep, goat and pig rearing, Poultry and allied activities etc.

Table No.: 3.15, Age of Family Members

	Upto 5	6-17	18-40	41-60	60+
Male	17%	22%	37%	15%	9%
Female	13%	24%	46%	13%	4%

Table No.: 3.14 Monthly Expenditure

Food	Clothing	Education	Transport	Medical	Rent	Other	Savings
45%	13%	27%	1%	3.22%	3.22%	0	5.37%

Table No.: 3.17, Specific Level of Education

Inadequate	Satisfactory	Sufficient
65%	33%	2%

Table No.: 3.18, Pet Animal

Cow	Hen	Dog	Pig	Goat	Cat	Duck	other
35%	33%	6%	10%	8%	4%	4%	0

LEVEL OF EDUCATION & MONTHLY EXPENDITURE

AGE OF THE FAMILY MEMBERS

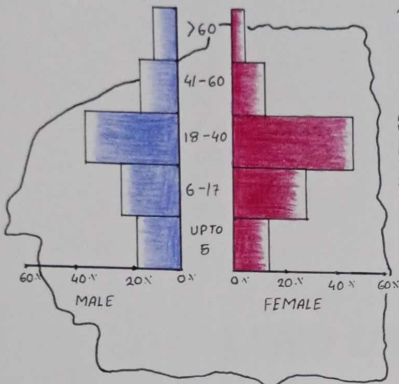


Fig No - 3.15

MONTHLY EXPENDITURE

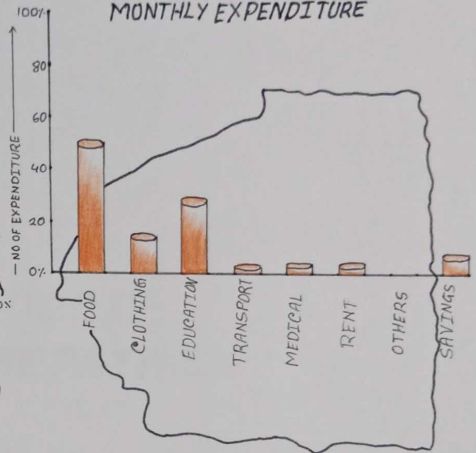


Fig No - 3.16

SPECIFIC LEVEL OF EDUCATION



Fig No - 3.17

PET ANIMAL

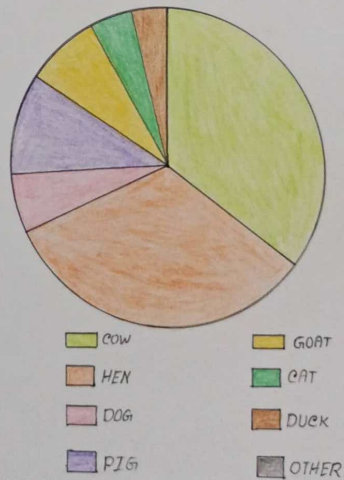


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CHAPTER IV:
LAND USE PATTERN

LAND USE PATTERN:-

The land share of district Jalpaiguri is modest in comparison to other districts in the state. Large Proportion of land is covered by agricultural land. Table gives land utilization Statie of Jalpaiguri district. Figure is Pie diagram representing borad land use pattern of the district and Figure is Land use Land cover map of the Study area

Table 4.1, Land Utilisation Statistic

Class Name	Area(in %)
Brush Land	10.54%
Tea Garden	14.96%
Forest	25.85%
Bamboo Tree	2.04%
Settlement	5.10%
Agriculture Land	41.46%

LAND USE & LAND COVER MAP OF SURSUTI VILLAGE



0 0.1 0.2 km

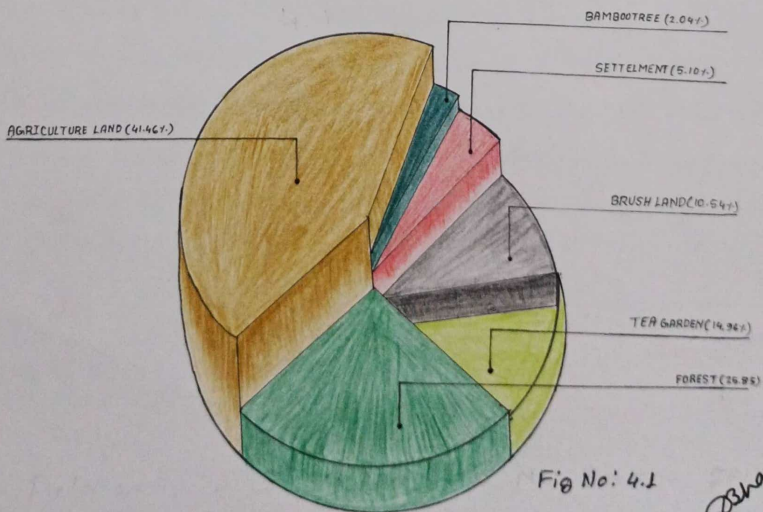


Fig No: 4.1

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Transport & Communication:-

Throughout the Sub-Division in rural areas of Mal, Matiiali and Nagrakata, there are different govt. agencies to maintain the roads. These are P.W.D Zilla Parishad, Panchayat Samity, Gram Panchayat and central sponsored Pradhan Mantri Gram Sadak Yojana. The state PWD maintained 116.03 km road in the subdivision, of which there are only 8 km road in Matiiali block. Zilla Parishad has a total surface and un-surface road of 287.63 km and 170.42 km respectively. Gram Panchayat Yojana scheme has covered 144.28 km surfaced road in the Sub-Division Road. Beside, National Highway No. 31 has crossed Mal, Matiiali and Nagrakata connecting places like Jalpaiguri, Maynaguri, Siliguri, Dhupguri, Coochbehar and Alipunduar etc.

Due to high concentration of forests and tea gardens in some GP areas of Mal, Matiiali and Nagrakata block, road connectivity is relatively poor than other parts of subdivision. A large railway tract of North-East Frontier railway connecting New Jalpaiguri - Guahati is within the dense forest area. Important railway stations are New Mal Chalsa, Nagrakata, Bagrakot etc. A new railway route has presently been activated between Chongrabandha and New Jalpaiguri connecting the places of Maynaguri, Lataguri, Moulani, Chalsa, and New Mal.

TRANSPORTATION MAP OF JALPAIGURI

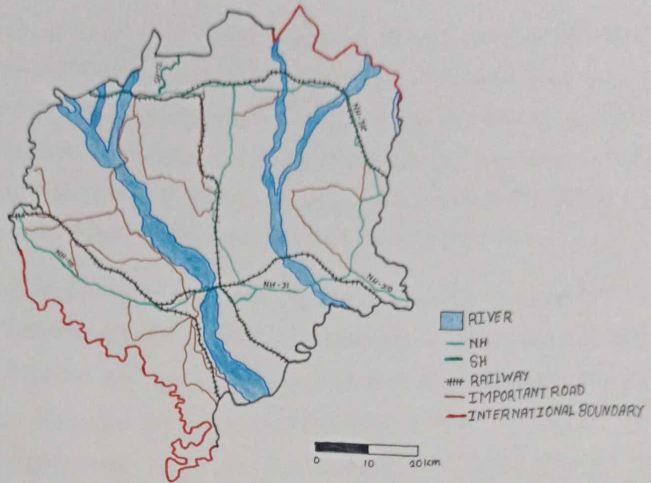


Fig No: 4.2

GPS PROFILE ALONG THE NATIONAL HIGHWAY 31

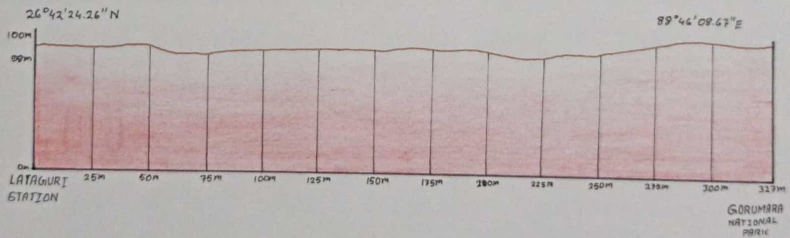


Fig No: 4.3

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TRANSPORT SURVEY:-

Mainly we surveyed the transport and communication System on Lalaguri road of Malbajar Sub-Division.

Throughout the subdivision in rural areas of Mal there are different govt. agencies to maintain the roads. We have prepared a road density map on the basis of topographical sheet. The road density map of Lalaguri and its surrounding reveals moderate road density 283.75m is limited towards the north and north eastern part.

A traffic flow is Prepared on the basis of transport Survey made by us. we surveyed the intensity of different types of vehicles at the new Jalpaiguri crossing of Jalpaiguri district as one of the important centres in respect of connectivity. we selected two different time span, one is from 10:00 AM to 11:00 AM and another is from 4:30 PM to 5:30 PM, Busy time and slack time of a day respectively. The flow diagram indicates that flow of Two wheeler (Motor-cycles) are maximum in number. The next important mode of transport is Van, Private car, Auto, toto, Matadors, Bus are other significant vehicles flowing at a considerable number along the roads.

TRANSPORT SURVEY

Table No: 4.2

NUMBER OF VEHICLES	PEAK		ACCORDING TO SCALE 1CM = 50		TIME	PEAK		ACCORDING TO SCALE 1CM = 50		TIME
	UP	DOWN	UP	DOWN		UP	DOWN	UP	DOWN	
TWO WHEELER	65	20	1.3	1.8	10:00AM to 11:00AM	35	40	0.7	0.8	4:30PM to 5:30PM
THREE WHEELER	65	40	1.3	0.8	10:00AM to 11:00AM	28	15	0.56	0.3	4:30PM to 5:30PM
FOUR WHEELER	60	55	1.2	1.1	10:00AM to 11:00AM	95	22	0.5	0.44	4:30PM to 5:30PM
BUS	22	30	0.44	0.6	10:00AM to 11:00AM	10	15	0.3	0.24	4:30PM to 5:30PM

Traffic Flow Along The Lataguri Road

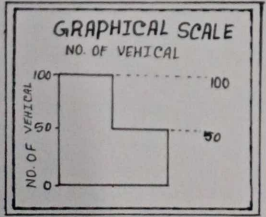
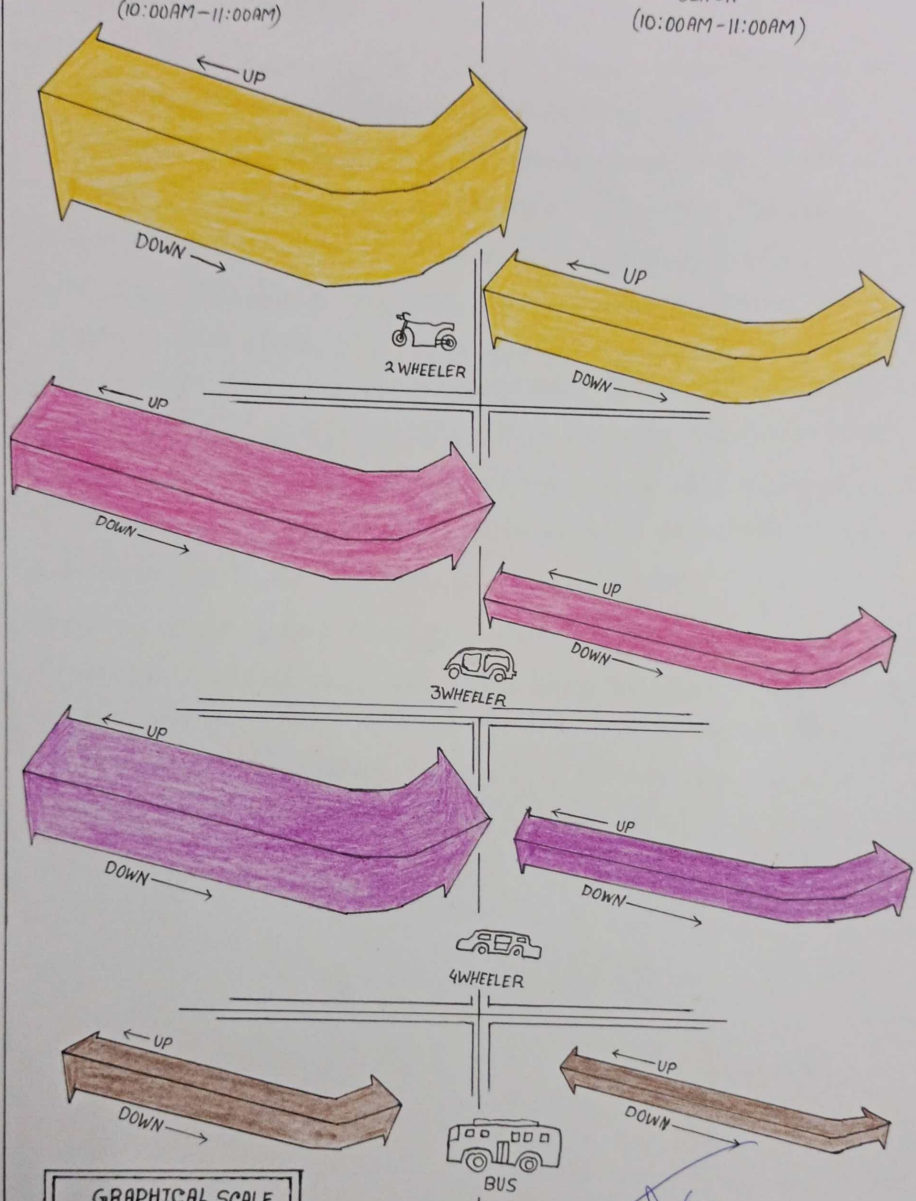


Not to Scale

TRAFFIC FLOW ALONG THE LATAGURI ROAD

PEAK
(10:00AM - 11:00AM)

SLACK
(10:00AM - 11:00AM)



Tanishka
8/10/22.

Fig No: 4.4

Market Features:-

Morphology of the main market has been shown in the market morphology map, we surveyed in Lataguri at Malbozan Sub-Division. It is the main market of Malbozan. The market is located along the road of Lataguri. The shops are mainly comprise of handicrafts item like coffee shop, food store, chicken shop, Saloon, Agency, Pan store, shoe shop, colour store, fruit shop etc. There was a temple and a hotel also. local people become able to get all the required things of their daily lives from this market. We have drawn a simple bar graph to show the frequency of different type of shops and it shows that stationary & vegetable shop are main food store, saloon, shoe shop, Medical store, Tea, Grocery shop, cloth store are the next dominating category of shops. coffee shop, chicken shop, temple, colour store, xerox and corn shop are the next important types of shop. On the basis of market survey data collected by us, we analysis various aspects of the market.

MARKET MORPHOLOGY

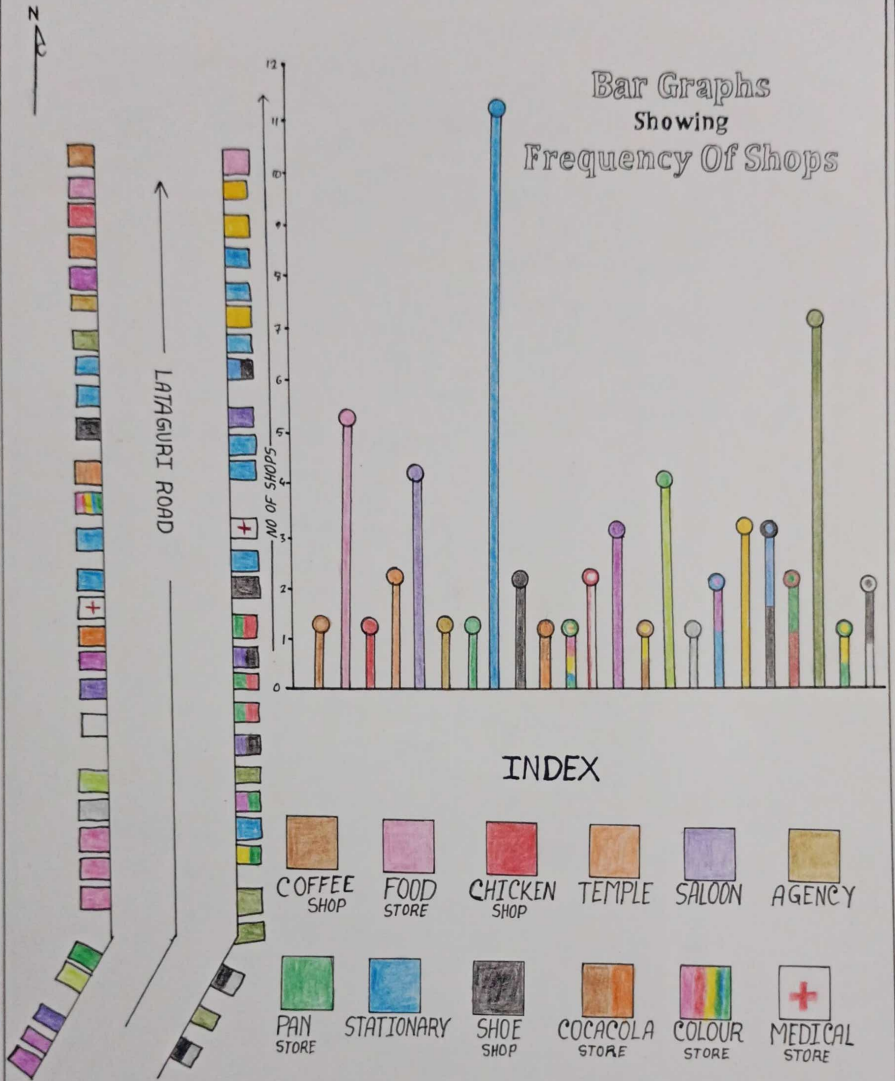
LATAGURI ROAD
TOTAL ROAD LENGTH 283.75 m

Table No: 4.3
















Sl NO	Name of the Shop	Distance (m)	Distance Between SHOP (m)
1	Coffee Shop	4m	2m
2	Jaganath Food Shop	6	3.5
3	Lataguri Shivbani Mandir	2.5	5
4	Kedan Abir Sallon	4.75	1.50
5	Ma Monosa Lotari Agency	3.25	0.5
6	Royal Pan Ghar	3.75	5.25
7	Taiguru latari Counter	9	8
8	Nagaland state lotaries	1	1
9	Sen shoe	2	0.75
10	Cococola Shop	2.75	1.75
11	B.P. Coloun	1	4
12	Bonik Store	5	3
13	Kedcurnath Centre	2	1.25
14	Chandra Mohan Medical	3.25	0.75
15	Soni Mohakal Mandir	4	4.75
16	Remb Ladies Parlour	8.7	6.25
17	Nondala Hotel	2.5	7
18	Bazar	0.5	7.25
19	Tea Stall	2.25	1.5
20	XEROX	2	2
21	Mio Amore Cake	2	0.5
22	Water Shop	8	4

23	Sweet Shop	8m	4.7m
24	Tea shop	7	2
25	Electronics Shop	2	3
26	Salon	1	3.5
27	Salon	3.5	0.27
28	Sweet Shop	2.25	0.75
29	Grocery Shop	2	1.7
30	Grocer Stone	4.2	2.3
31	Handwash Shop	3	2.75
32	Hand wash shop	2.7	2.5
33	Grocery shop	1	2
34	Banick Shop	2.5	0.35
35	Clothes Shop	2.7	4
36	Dada vai Hotel	3.5	2.5
37	Sunya kiran Steel	5.5	0.5
38	Sheeja Valty	3.5	0.5
39	Soumik Medical	1	1
40	Danik Steel & Furniture House	4.5	0.25
41	Shoe Shop	4	0.75
42	Fruit Shop	3.7	6.25
43	Clothes shop	3	0.5
44	Fruit Shop	11	0.27

Market Morphology



INDEX

- | | | | | | |
|---|--|--|--|--|---|
|  COFFEE SHOP |  FOOD STORE |  CHICKEN SHOP |  TEMPLE |  SALOON |  AGENCY |
|  PAN STORE |  STATIONARY |  SHOE SHOP |  COCACOLA STORE |  COLOUR STORE |  MEDICAL STORE |
|  HOTEL |  BAZAR |  TEA SHOP |  XEROX STORE |  ELECTRIC STORE |  GROCERY SHOP |
|  CLOTH STORE |  FRUIT SHOP |  VEGETABLE SHOP |  CORN SHOP |  BUILDERS STORE | |

SCALE, 1cm = 15 mts

Tanay Kumar
8/12/22.

Fig No: 4.5

SOURCE: MARKET SURVEY

Table No. 4.6, TYPES OF BUYERS

Local	In state	Out state
18%	16%	5%

Table No. 4.7, ROOF OF SHOP

THATCHED	CONCRETE
78%	22%

Table No. 4.8, NO OF WORKER

1	2	2+	NILL
56%	34%	10%	0

Table No. 4.9, IS The Shop Permanent

YES	NO
60%	40%

Table No. 4.10, Availability of Electricity Shop

YES	NO
70%	30%

Table No. 4.11 Religious Structure

Hindu	Muslim
81%	19%

Table No. 4.12, Income In Peak Season & Off Season

< 20,000	20,000 - 25,000	25,000 - 30,000	SEASON
67%	18%	10%	Peak
86%	10%	5%	OFF

Table No.4.13, AGE SEX STRUCTURE

AGE				SEX	
<25	25 to 40	40 to 60	60<	MALM	FEMALE
16%	35%	27%	21%	78%	22%

Table No.4.14, Category of Population

GENERAL	SC	ST	OBC	Total
54%	24%	8%	13%	100%

Table No.4.15, Marital Status

Marnied	Unmarnied
71%	29%

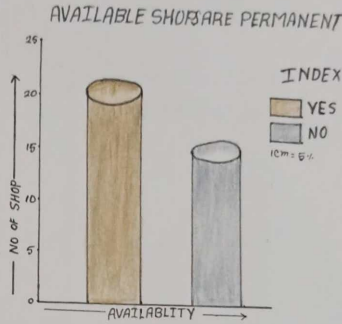
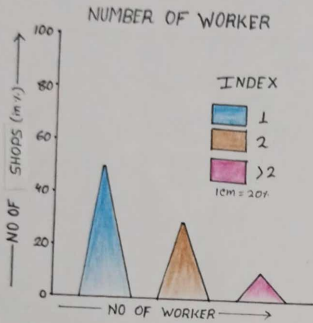
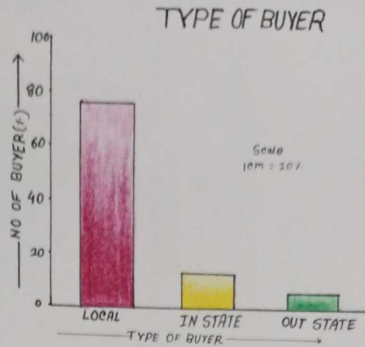
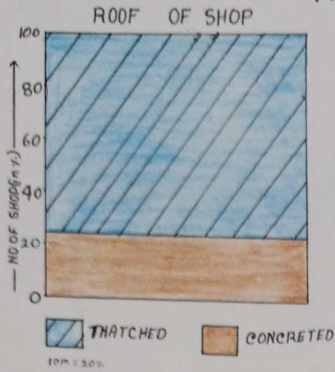
Table No.4.16 Education Qualification

Illiterate	UPTO VIII	VIII to X	X to XII	XII <
30%	16%	22%	13%	19%

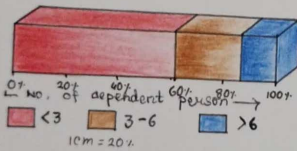
Table No.4.17, Religious Structure

Hindu	Muslim
81%	19%

MARKET FEATURES



NUMBER OF DEPENDENT PERSON



AVAILABILITY OF ELECTRICITY IN SHOP



INCOME IN PEAK AND OFF SEASON

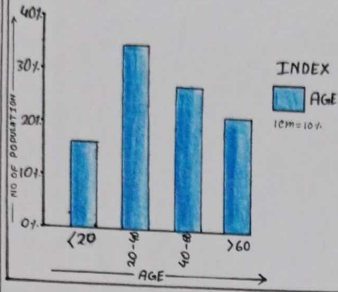


Fig No - 4.6

SOURCE: MARKET SURVEY

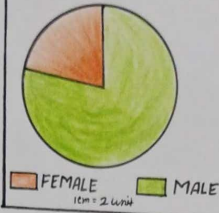
Tanishka
22/1/23

AGE STRUCTURE

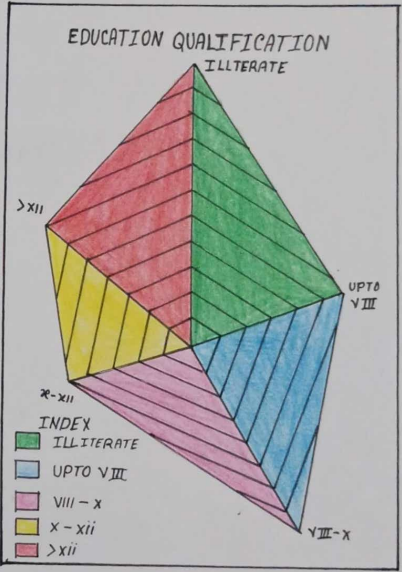
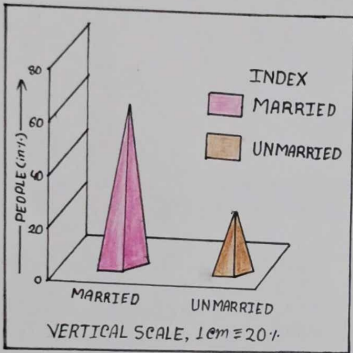
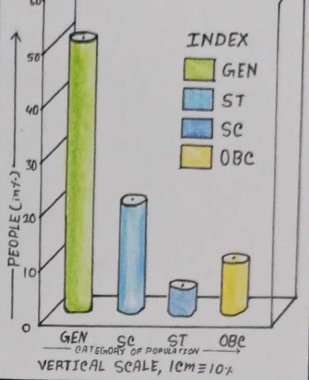


MARKET FEATURES

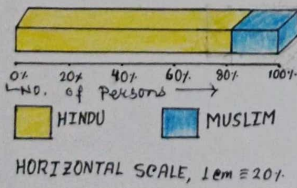
SEX STRUCTURE



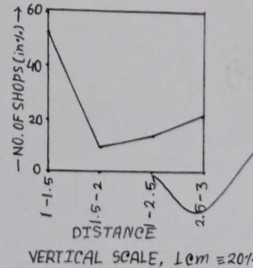
CATEGORY OF POPULATION



RELIGIOUS STRUCTURE



NUMBER OF DEPENDENT PERSON



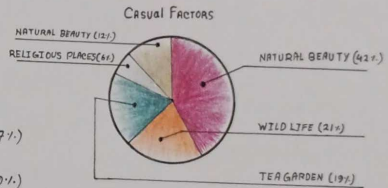
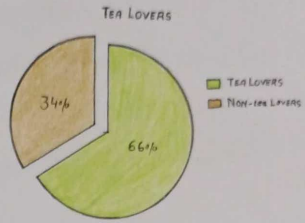
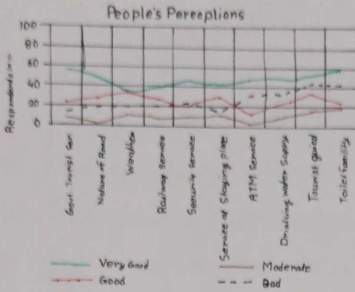
SOURCE: MARKET SURVEY

Fig-4.7

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CHAPTER V:
TOURISM & HAZARDS

DISTRIBUTION OF TOURISM



CAUSES FOR SHOWING INTEREST TO VISIT IN TEA GARDEN IN FUTURE

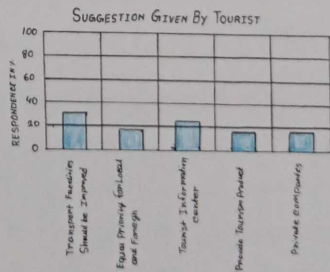
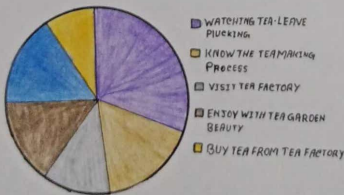


Fig No-5.1

Shayy.
3.1.23.

HAZARDS :-

• Environmental Problems:- The study area Mal subdivision faces different environmental constraints consisting with rough topography, dense forests, and wildlife. Once, the area was breeding ground of mosquitoes. Malaria, black water fever and Kalaazar were very common among the tribal people. Presently two important problems faced by the tribal and non-tribal people in Mal subdivision are Man-animal conflicts and physical constraints of the region.

• Man-Animal Conflicts:- Man-animal conflicts are very common in the Dooars. Earlier entire Dooars area was covered by forest and all forest were connected, population were very poor in number. Wild animals were very common to wander through the thick jungles. But after thinning of jungles, the wild animals' habitat has been degraded rapidly. In recent years man-animal conflict has gone up steeply owing to increase in human population. Land use transformations, development activities, special habitat degradation and fragmentation, growth of eco-tourism and also increasing wild life population as a result of conservation strategies, human population and its growing demands for land and biological resource affected this landscape to greater extent.

In Mal subdivision of Jalpaiguri district, there are wild life sanctuaries and national parks that include Chapnamani wild life sanctuary and Gorumara National Park. Elephant is the main wildlife in the Dooars which harms the people's life and property. Habitat fragmentation or obstruction to migration path bring about

about human-elephant conflicts resulting in damage to agricultural crops, Property, household and injury and mortality to both humans and elephants. On an average, they annually destroy crops over an area of 0.8 to 1 million hectares which in turn affect the livelihood of at least 5,00,000 cultivators. The Doon region perhaps experiences one of the highest level of human elephant conflicts in Asia.

• Floods:- Special mention must be made the occurring of floods in the Jalpaiguri district. This district are flood-prone and three main reasons for floods in this district are excessive rainfall of small duration on small catchments, continuous rainfall for several days on bigger catchments and the district being situated in the Himalayan foothills and being crisscrossed by the Himalayan rivers. It is observed that the melted snow of the high mountains also causes overflowing the perennial rivers which adds to the worry of common people. History reveals that the district hasn't escaped from the floods in any single decade. All the riverbeds in the district risen to the height of 1 to 2.5 meters in between 1985 and 1999.

Source: District census handbook 2011

Table No 5.1, Nature of Hazards

Earth Quake	Cyclone	Soil Erosion	Flood	Water Pollution	Road Accident
34%	12%	17%	16%	15%	3%

Table No 5.2, Types of Regular Hazards

Rain	Elephant	Insect
30%	40%	30%

Table No 5.3, Hazard Awareness Facility

Radio	T.V	Local Announcement	Other
31%	40%	23%	4%

Table No 5.4, Health Treatment

Govt. Hospital	Private Hospital
85%	14%

Table No 5.5, Health Facility

YES	NO
52%	47%

Table No 5.6, Health Facility Feedback

Inadequate	Satisfactory	Sufficient
71%	21%	7%

HAZARDS PROFILE

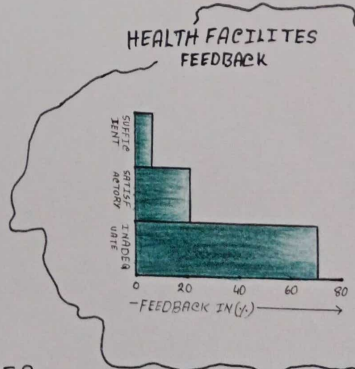
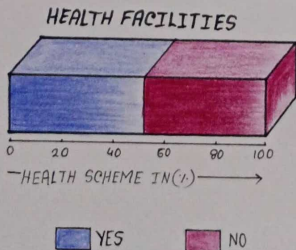
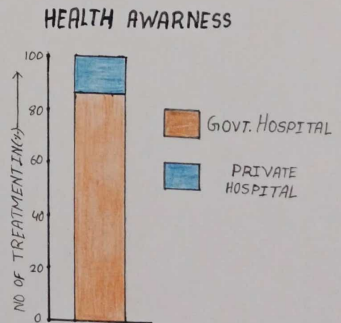
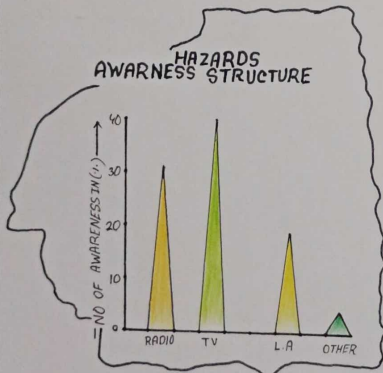
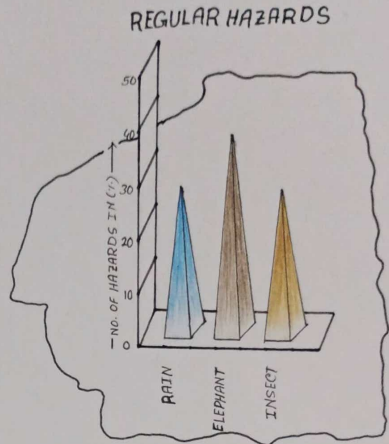
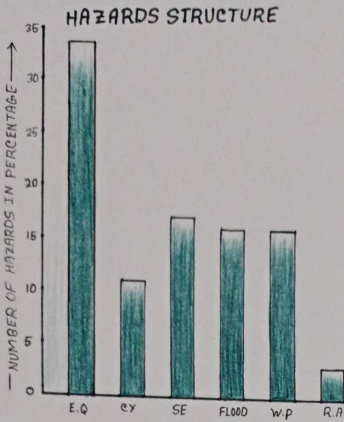


Fig No-5.2

Signature
3.1.23

CHAPTER VI:
CONCLUSION

CONCLUSION:- The Mal Subdivision Shows variation in all three aspects of physical, socio-Economic and Infrastructural facilities. Physical characteristics are quite diverse in respect of topography, drainage, geology, Natural vegetation etc. The Social behaviours are diverse in respect of ethnicity language, Cultural and religion. The infrastructural facilities health, education, electricity, transport-communication and source of drinking water are limited in the area. In conclusion it can be said be the diversity of three aspects deserve more studies to understand the region properly as well as for the development of the living standard of the people of the region.

REFERENCES

- Anders NS, Seijmonsbergen Ae, Bouten W. 2011. Segment-
-tation optimization and stratified objectbase analysis for
Semi-automated geomorphological mapping. *Remote sensing
of Environment* 115:2976-2985
- Blaschke T. 2010. Object base image analysis for remote
Sensing, *ISPRS Journal of Photogrammetry and Remote
Sensing* 65(1):2-16
- Colwell RN. 1983. *Manual of Remote Sensing*. American
Society of Photogrammetry: Washington.
- Cooke RU, Doornikamp JC, 1990. *Geomorphology in
environmental management, A New Introduction*. Cleaverdon
Press: Oxford
- Dykes AP. 2008. Geomorphological maps of Irish Peat
landslides created using hand-held GPS. *Journal of Maps*
2008: 258-276
- Evans IS. 1990. Cartographic techniques in geomorphology
In *Geomorphological techniques*. Gaudie A (eds.) Unwin Hyman:
London, 07-108.
- Hillier JK, Smith M. 2008. Residual relief separation:
digital elevation model enhancement for geomorphological
mapping. *Earth Surface Processes and Landforms* 33(14):
2266-2276.