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Subsidence of Public Life & Environment Due to Constriction of Chaltia Bil, Berhampur, Murshidabad

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ABSTRACT

Anthropogenic factor is an important issue for environmental pollution that leads to destruction of aquatic Environment, in the context of changing climate. The study was conducted through primary investigation coupled with a stakeholder driven approach. It may cause large scale destruction of aquatic organisms, particularly fishes. Chaltia Bil is one of the important wetlands of Murshidabad district and is located under Bhakuri Gram Panchayat, adjacent to Berhampore Municipality of the District. The water quality parameters indicated the highly productive nature of the wetland. The APC of bacteria ranged from 4950 to 5800 with an average value of 5350±720 CFU/ml. The trophic state index (67.7) indicated eutrophic nature. The present fish yield realized through culture-based fisheries (CBF) practices from Chaltia Bil is 4745 kg/ha/yr which is much higher than the average yield of wetlands of India. The study describes the SWOT analysis, discusses different approaches, and recommends important measures for sustainable management of ecosystem and fisheries of the sewage fed floodplain wetland.

CHAPTER 1
GENERAL INFORMATION ABOUT STUDY
1.1. Introduction:

Wetlands are very important for maintaining urban ecosystem. Wetlands function as kidneys of landscape due to remediation of contaminants (which include nutrients, heavy metals, etc.). These fragile ecosystems are vulnerable to even small changes in their biotic and abiotic factors. In recent years, there has been concern over the continuous degradation of wetlands due to unplanned developmental activities Ramachandra. Environmental pollution due to anthropogenic factor is an important issue that leads destruction of aquatic environment of the wetlands Benjamin et al. Patil Direct release of untreated municipal sewage water to the aquatic bodies is causing large scale destruction of aquatic organisms, particularly fishes. Chaltia Bil is one of the largest water body, located under Bhakuri Gram Panchayat, adjacent to Berhampore Municipality of Murshidabad District. It is increasingly realized that the planet earth is facing grave environmental problems with fast depleting natural resources and threatening the very existence of most of the ecosystems (Akhtar, N.1995). Inland capture fisheries provided **56.32 lakh tones** (provisional) in 2012-13. Among the Inland fisheries sector (FAO), Wetland plays a crucial role through its' production system and maintaining Bio-diversity. Wetland is neither truly aquatic nor terrestrial; it is possible that wetlands can be both at the same time depending on seasonal variability. To conserve and manage wetland resources, it is important to have inventory of wetlands and their

catchments. Wetlands often called **"nurseries of life"** because they provide habitat to thousands of aquatic and semi-aquatic plants and animals, which intern provide food to many terrestrial animals, adding to the diversity of the landscape. Fresh water wetlands are called **Boars, Bils, Jheels, Ox-bow lakes and Floodplain** (Yadava, Y.S. 2004)). The wetlands of India covers a total area of 40, 40,127 hac (including man-made wetlands). Among the Indian states, West Bengal has second largest areas under wetlands mainly associated with the Ganga covering 8, 43,221 hac area

comprising about 9 percent of the total area under wetlands in India. These wetlands serve multi-purposes and are essential for meeting the livelihood and various religious and social needs of the local communities. Apart from being an important source of fisheries, they form the lifeline supporting agriculture, post-harvest operations, navigation, animal husbandry and a host of other economic activities (Ghosh, S.K. 2004). The district Murshidabad has its own heritage and great historical back ground. Murshidabad District comprises of 5 sub-division mainly Berhampore Sadar, Domkol, Lalbag, Kandi and Jangipur and present geographical area is 5316611 ha. The district is divided into two parts by the Bil. Berhampore, the selected study area is the central part of Murshidabad district. It contents so many Bils namely **Bil Bishnupur, Chaltia Bil ,Bhandardaha Bil ,Katiganga Bil.** These Wetlands or Bil in Berhampore block play a significant role by providing many goods and services in the livelihoods of the local people. The general information about these study area are given below (Table 1):-

1.2. Historical background of Chaltia Bil:

  According to the 2011 Census of India, Chaltia had a total population of 25,336, of which 12,803 (51%) were males and 12,533 (49%) were females. Population in the age range 0-6 years was 2,159. The total number of literate persons in Chaltia was 19,865 (85.71% of the population 6 years). Berhampore CD block is one of the areas of Murshidabad district where ground water is affected by high level of arsenic contamination. The WHO guideline for arsenic in drinking water is 10 mg/ litre, and the Indian Standard value is 50 mg/ litre. The maximum concentration in Berhampore CD block is 635 mg/litre.

1. 1200 CE: Establishment of the Sena Empire, which ruled over the region
2. 1757 CE: Battle of Plassey, marking British colonial rule
3. 1947 CE: India gains independence
4. 1972 CE: Establishment of the Chaltia Bil Wildlife Sanctuary

1.3. Review of Literature:

Chaltia Bil, a wetland ecosystem in Murshidabad District, West Bengal, India, has been studied extensively due to its ecological and socio-economic importance.

Ecological Studies

1. Wetland ecology and biodiversity (Kundu et al., 2015)
2. Aquatic plant species composition and distribution (Majumdar et al., 2017)
3. Fish fauna and fisheries management (Bhattacharya et al., 2019)

Socio-Economic Studies

1. Livelihood dependence on wetland resources (Sarkar et al., 2016)
2. Agricultural practices and water management (Mondal et al., 2018)
3. Impact of climate change on local communities (Chatterjee et al., 2020)

1.4. Objectives of the study:

There are some objectives, they are in below: -

I. To analysis the degree and direction of confluence sifting in recent years.
II. To find out the people probable causes of confluence dynamics.
III. To know the impact of confluence shifting beside people.

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1.5. **Limitation of the study:** -

This study has some limitation, that is: -

I.   Lack of enough time for my study.

II. It is not possible to reach the total population of this study area.

III. It is not possible to visit around the area on the danger's place.

CHAPTER -2

LOCATION OF STUDY AREA

Chaltia Bil is located in Bhakuri Gram Panchayat adjacent to Berhampore Municipality of Murshidabad District of West Bengal. (Latitude: 24 24°4'45"N; Longitude: 88°14'33"E to 88 total water area of 0.59 sq. Km./ 0.23 sq. Miles). Chaltia related problem- The location of Chaltia bil bow within the Berhampore town. It is the old course of Bhagirathi River. At present its link with Bhagirathi in per rainy season blocked due to the unauthorized settlements. In most of the cases local political interest for vote is related. Due to the stagnation of flow per rainy season 80% of the Bil now covered by water-hyacinth. More over disposal of domestic waste

around the Bil both solid and liquid made the situation grave the water pH 7.9 in a temperature of 26.67C.
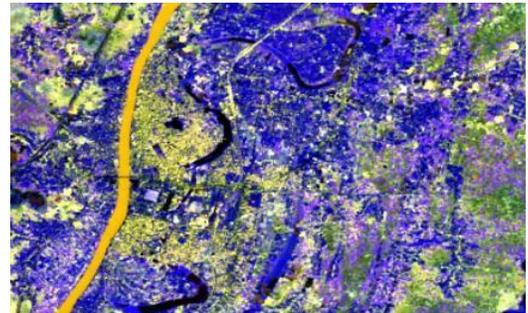

Fig.1. Scale 1;80,000 R1 G3 B4
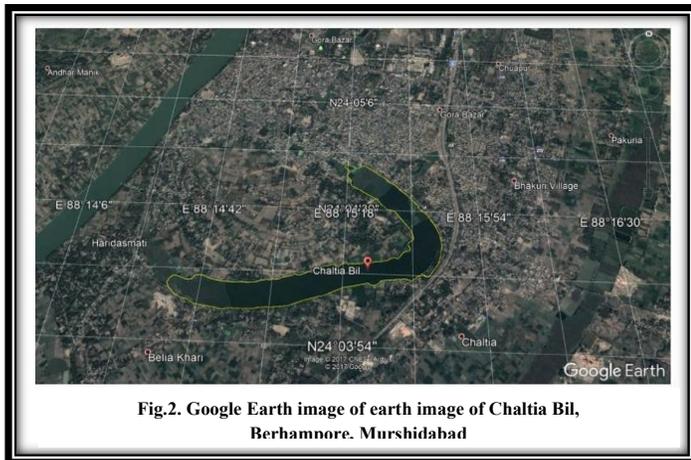
2.1. LOCATION MAP OF THE STUDY AREA

Fig.2. Google Earth image of earth image of Chaltia Bil, Berhampore, Murshidabad
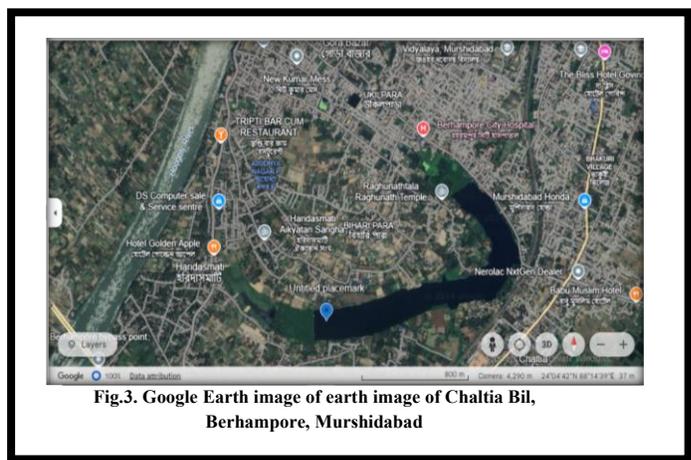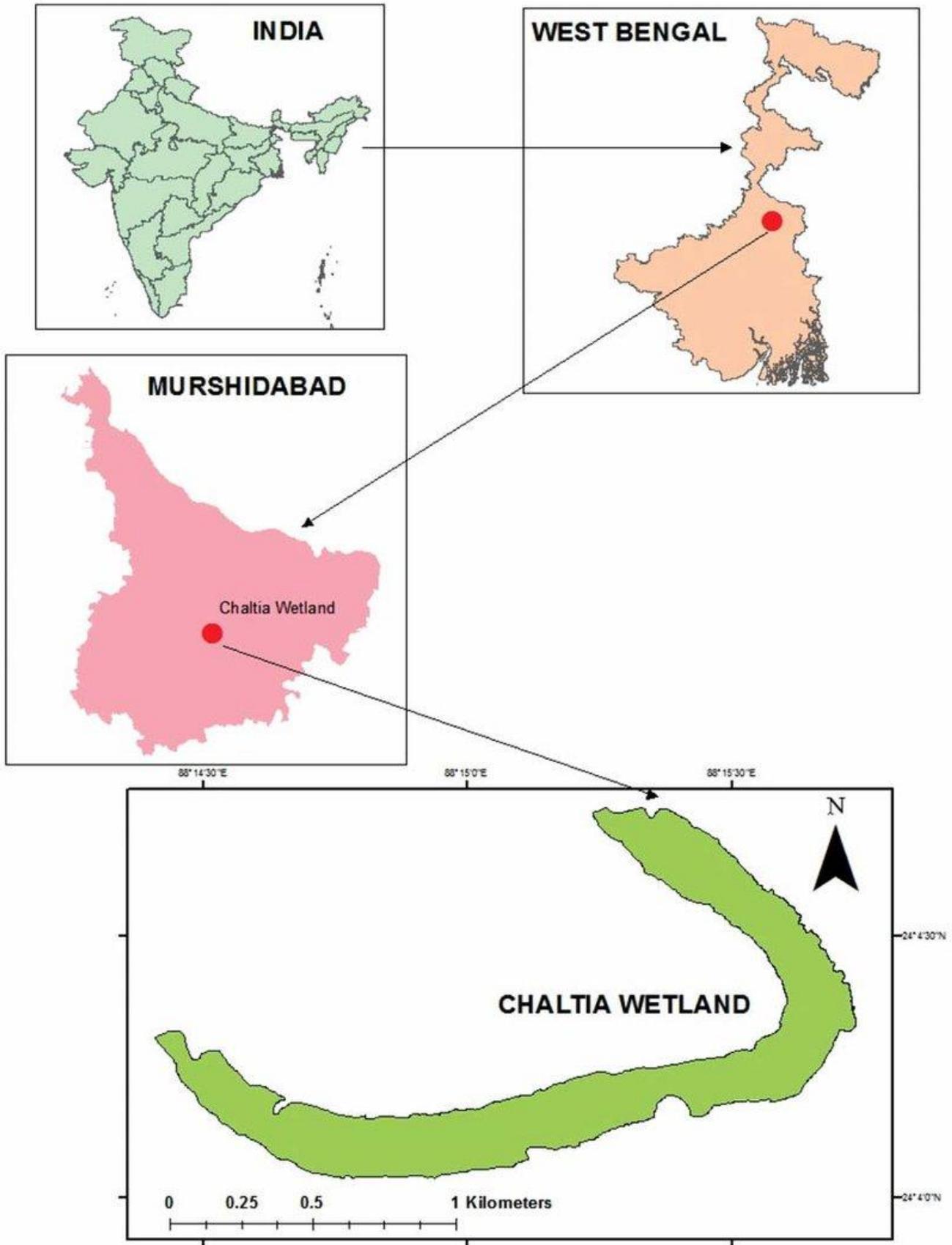

Fig.3. Google Earth image of earth image of Chaltia Bil, Berhampore, Murshidabad

CHAPTER -3

DATABASE AND METHODOLOGY

3.1. Source of Data: - To study area in detail data collection must be required. Data helps to represent the basic characteristics related to the study area in a more accurate form. Here data is collected from two source, they area:

3.1.1. Primary Data:-

The data are collected under the control and supervisor of an investigation. The field study was based on a primary survey. I have selected the topic that is truly filled based. The villager of my study area they gave me all required information which is related my work. The help been collected by questionnaire, direct observation and personnel interview etc.

3.1.2. Secondary Data:- The secondary data is the already existing data, collected by the investigator. Different types of secondary data have been collected from government, as census of India 2010 - 2024, a base map of Bil village different year of satellites image. I also studied of my dissertation topic from different websites, various journal, article, etc.

3.2. Physical Scenario of the Study Area:

Geographical Coordinates: 24.1333° N, 88.2667° E

Elevation: 10-15 meters above mean sea level

Topography: Flat to gently sloping

Wildlife:

1. Fish species (Hilsa, Pomfret, etc.)

2. Birds (migratory and resident)

3. Other aquatic and terrestrial species

Infrastructure:

1. Canals and waterways

2. Agricultural markets and storage facilities

Demographics:

1. Population density: 500-600 persons/km²

2. Main occupations: Agriculture, fishing, and small-scale industries

3.3. Method and Technique:-

Several techniques, methods and software has been used for my work. I choose some bil confluence villages of Haridasmati and Chaltia gram for my research work. The primary data was collected through questionnaire. This survey was done on the villagers who affected by confluence of Chaltia Bil, wetland fisheries were collected from twenty-one active and selected fishermen of the wetland using a structured interview schedule. MS Excel 2007 was used for analysis of statistical data and preparing various type of diagram such as a ber, pie, line etc. MS word 2007 is also used for typing and design the whole work. Google map Google Earth Pro is used for identification of location. Collected some photo of the study area by GPS map camera and collected some important waypoint by GPS logger. Used by measurement tap for soil structure you USGS Earth explorer is used for the collected of satellite images in different time periods. Arc GIS 10.5 also used for preparing the location map shifting map re location map, cross section digital elevation model (DEM).Here, Shifting of confluence map prepared by MNDWI method ARC GIS 10.8. The formula for MNDWI is:

$$MNDWI = (Green - SWIR) / (Green + SWIR)$$

Moreover, various formulas have been used to determine the length of the meandering the course of the Bil, that are:

BI =Total channel length (including all active secondary channel) / Main channel length

SI=Actual distance between two point / Straight line distance between some tow points

3.4. Sample Design :

Study Objective: Assess environmental and socio-economic impacts of human activities on Chaltia Bil wetland.

Sampling Framework:

1. Stratified Random Sampling
2. Multistage Sampling

    Sampling Units:

1. Primary sampling units: Villages surrounding Chaltia Bil
2. Secondary sampling units: Households within selected villages
3. Tertiary sampling units: Individuals within selected households

Sample Size:

1. Villages: 10-15
2. Households: 100-150
3. Individuals: 200-300

Sampling Criteria:

1. Geographic location (proximity to wetland)
2. Land use patterns (agriculture, aquaculture, etc.)
3. Socio-economic characteristics (income, education, etc.)

3.5. Geology:

Geological Formation:

1. Quaternary Alluvium (Recent to Pleistocene age) 2. Riverine and deltaic deposits 3. Sand, silt, and clay layers

Geological Structure:

1. Part of the Ganges-Brahmaputra delta 2. Influenced by Bhagirathi-Hooghly river system 3. Low-lying, flat terrain

Lithology:

1. Sand (coarse to fine-grained) 2. Silt 3. Clay 4. Sandy loam

Soil Characteristics:

1. High water 2. Saline to brackish water 3. Alkaline to neutral soil pH

Hydrogeology:

1. Shallow water (5-10 meters) 2. High water conductivity 3. Salinity intrusion during dry seasons

Geological Hazards:

1. Floods 2. Soil erosion 3. Land subsidence 4. Earthquakes (low to moderate intensity)

Economic Geology:

1. Sand and gravel deposits 2. Clay deposits (brick-making) 3. Fish and shrimp resources

3.6. Climate:

Seasonal Variations:

1. Summer (March-May): Hot and humid (28-35°C) 2. Monsoon (June-September): Heavy rainfall (1500-2000 mm) 3. Winter (December-February): Cool and dry (10-20°C)

Temperature Range:

1. Summer: 28-35°C 2. Winter: 10-20°C 3. Annual average: 24°C

Rainfall:

1. Annual average: 1500-2000 mm 2. Majority rainfall during monsoon season

Humidity:

1. Relative humidity: 60-80% 2. High humidity during monsoon season

Sunshine Hours:
1. Annual average: 6-7 hours/day 2. Reduced sunshine during monsoon season

Climate Change Impacts:
1. Rising temperatures 2. Changing rainfall patterns 3. Increased frequency of extreme weather events

3.7. Soil:

Soil Type:
1. Alluvial soil 2. Sandy loam to clay loam texture 3. Neutral to alkaline pH (7.0-8.5)

Physical Properties:
1. High water-holding capacity 2. Moderate to high permeability 3. Low to moderate bulk density

Chemical Properties:
1. Fertile soil with high organic matter 2. Adequate nutrient availability (N, P, K) 3. Moderate to high salinity

Soil Depth:
1. Shallow to moderate depth (0.5-1.5 meters)

Soil Erosion:
1. Moderate to high risk due to flooding and human activities

Soil Degradation:
1. Salinization 2. Nutrient depletion 3. Loss of organic matter

Soil Conservation Measures:
1. Sustainable agriculture practices 2. Crop rotation and intercropping 3. Organic amendments and mulching 4. Conservation tillage

CHAPTER -4
RESULT AND DISCUSSION

4.1. Causes:

Mainly **two** types of reasons are responsible for constriction of the bil. They can be broadly categorized as:-

A. Natural Activity: Natural activity may include precipitation in the particular bil area and deposition of sediment due to scarcity of water.

B. Anthropological Activity: Anthropological activity means the activity of human society around the bil. It may include deposition of soil for making ground of agriculture, making ground for building construction for dwellers, occupation of slam dwellers by construction of raw buildings, throwing garbage's to the bil etc.

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LINE GRAPH

SHOWING

PERCEPTION OF CAUSE OF BIL CONSTRICTION
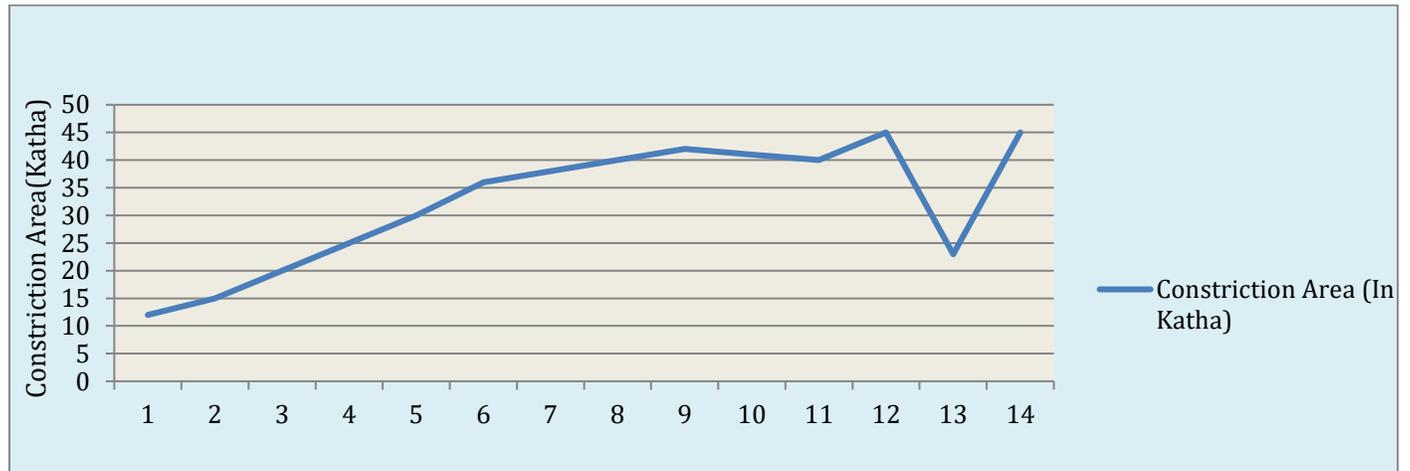

Fig. 5 Perception of Casuse of Bil Constriction   Source Field Survey 2026

4.2. Geological Setting

Geological Formation:

1. Alluvial deposits (Quaternary period) 2. Riverine and deltaic sediments 3. Sand, silt, and clay layers

Geological Structure:

1. Part of the Ganges-Brahmaputra delta

2. Influenced by Bhagirathi-Hooghly river system

3. Low-lying, flat terrain

Hydrogeology:

1. Shallow water 2. High water conductivity 3. Salinity intrusion during dry seasons

Geological Hazards:

1. Land subsidence 2. Soil erosion

4.3 Occupation of Land in the Wetland:

Current Land Use:

1. Agriculture (primarily rice, jute, and vege) 2. Aquaculture (fisheries) 3. Human settlements 4. Water bodies (canals, rivers, and wetlands)

Land Cover Changes:

1. Wetland shrinkage (due to urbanization and agriculture) 2. Loss of natural vegetation 3. Increased impervious surfaces

Threats:
1. Habitat loss for wildlife 2. Decreased water quality 3. Increased flood risk 4. Soil degradation

Conservation Efforts:

1. Wetland restoration initiatives 2. Sustainable agriculture practices 3. Eco-tourism development 4. Community-led conservation programs

Research topics:

1. Land use/land cover change analysis 2. Impact of human activities on wetland ecology 3. Community-based conservation strategies

4.4 Waste Material Deposition in Aquatic Region of the Bil:

Types of Waste:
1. Domestic waste (food waste, plastics, etc.)
2. Agricultural waste (fertilizers, pesticides, etc.)
3. Industrial waste (chemical effluents, etc.)
4. Aquaculture waste (fish feed, waste fish, etc.)

Sources of Waste:

1. Local communities 2. Agricultural runoff 3. Industrial effluents 4. Aquaculture practices

4.5 Soil characteristic (Chaltia Bil):

According to DISTRICT SURVEY REPORT OF MURSHIDABAD DISTRICT (2020), this gram this region is situated in the North Eastern corner of the district and exhibit the characteristic features of the Sub-Vindhyan region of Rarh. The soil of Rarh, is mostly clay and lateritic clay type, comparatively heavy, gray or reddis in colour. The land is high and slightly undulating having gentle slope from West to East. The soil of area is generally low in carbon content and acidic natural in reaction. The main crops are paddy, sugarcane, potato but oil seed and vege are cultivated successfully in all the three seasons. Mulberry grows well and hence sericulture has developed here.

According to Panda and Bandopadhyay (2011) that the Murshidabad district belongs into the zone of alluvial soil. The characteristics of the soil also have an important bearding on the extent of erosion. The bank of Chaltia Bil has been formed by alternate layers of slit (Fine), clay and sand. Incoming high velocity of water colliding with the sand particles and chemical composition of alluvial soil. The soils present along the banks have pore faces, which get filled up with water of Bil during the monsoon months. When this water gets inside these pore spaces, the soil particles (chemical composition) are liquefied [liquefactions]. But when the water is return back to the Bil in the winter months, the soil particles are loose and the reaches are fall, causing bil constriction.

Fig.6. Soil Profile of Chaltia Bil (East)

Fig.7. Soil Profile of Haridas Mati (West)
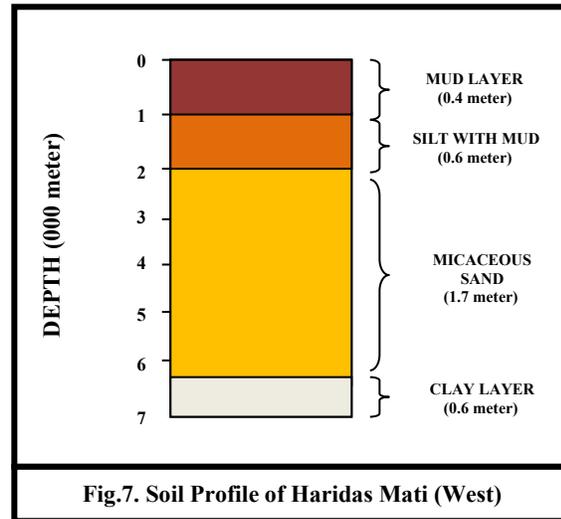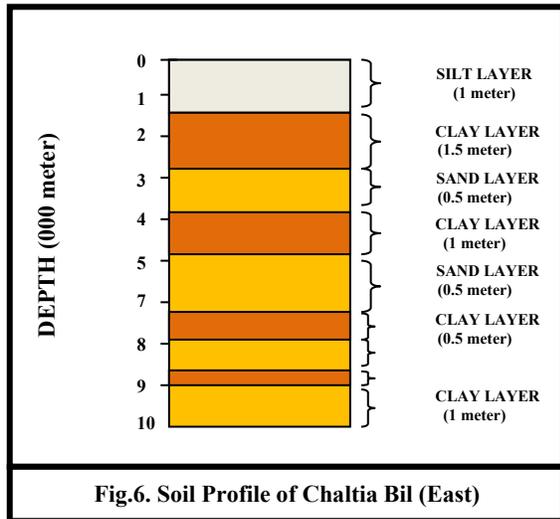
Analysis of digital elevation model (DEM) with contouring:-

The study area is a low elevated area. We can see that the highest elevation is over 23 mt and the lowest elevation is less than 9. But, elevation is not same overall area. That means some places in the Bil is shown the lowest elevation of study area is represented by purple colour and the highest elevation is represented by deep brown colour. The area with a height of above 17 mt that is the right side of Bil Haridasmati.

4.6 cross section analysis:

The cross sectional profile is drawn from DEM, which is shown by a separated map and images. The cross sectional line is drawn from right side of Chaltia Bil to left side of Chaltia Bil which is represent in the map. From the cross section AB, we can see that the graph is very low on the Bil and is high on the Haridasmati Gram.At first it is upward but later it's is fractuated.
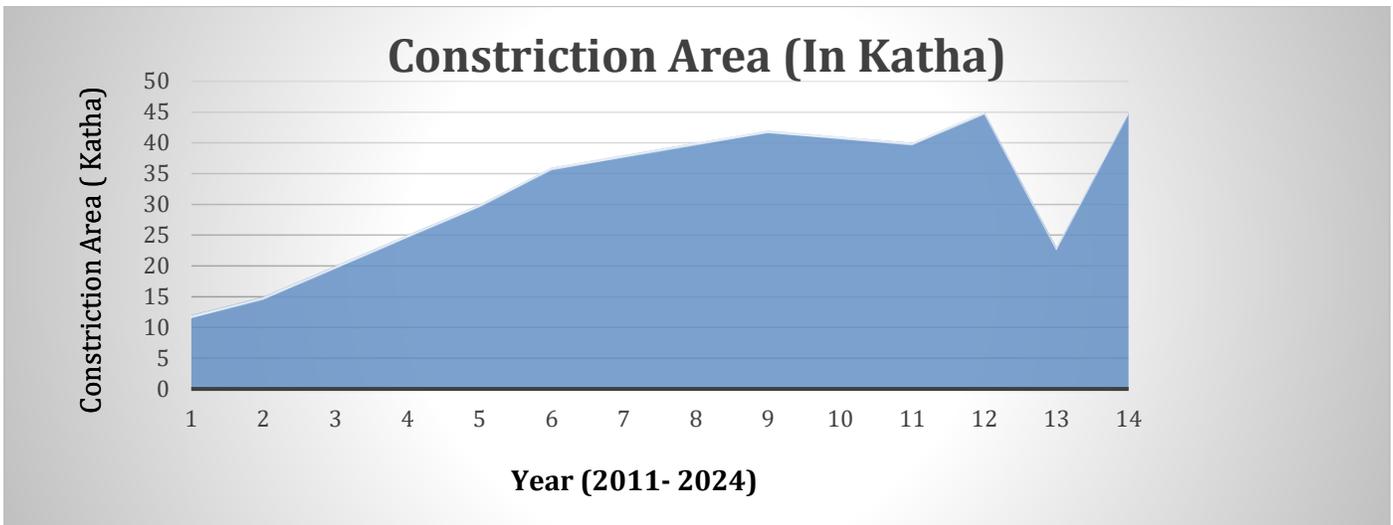
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Constriction Area (In Katha)

Fig.8: Constriction Area   Source: Google Earth Pro & Prepared by QGIS 3.40

4.7 Trained of Bil Constriction:

We can see the western part of Haridasmati gram. In that time Bil Constriction figure(8) show that the Bils Right and left side its time mid channel bar and formation bar in the in the Bil 2010 to 2024. Chaltia Bil change one course again and again. Haridasmati and Chaltia separated into two residential lands. 2019 Chaltia and Haridasmati. The Bil contricted from west (Haridasmati) to East (Chaltia gram) in the year of 2024. From Haridasmati the lift bank of Bil constricted.

4.8 Sinuosity Index:

Sinuosity index is a ratio between the actual distance of the two points and the straight-line distance between the same two points of a particular place number value.

BAR DIAGRAM
SHOWING
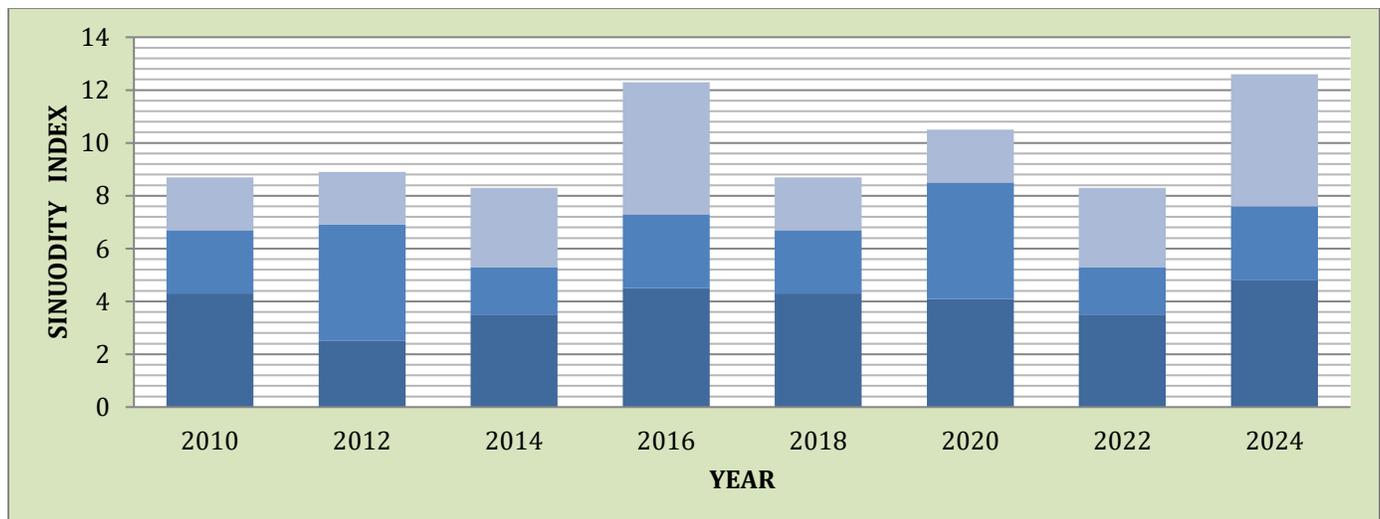**SINUOSITY OF CHALTIA BIL**

Fig. 9 : Sinuosity of Chaltia Bil   Source; Survey 2026

In this figure (9) show that, 2016 and 2024 year bil constriction highly observed in 2020. Bil Constriction has related with the Bil. Before the confluence of Chaltia Bil, Haridasmati and Chaltia gram are the land mass in the area. As the Bil Constricted to the west the area is visible land and Constriction increases day by day.

CHAPTER 5
IMPACT OF BIL CONSTRICTION
5.1. Damages of social service centre:
Due to conference of Chaltia Bil different type of social organisation touch as a school help centre government rural centre symmetry religious space government rural health centre other and etc. where describe by confluence in the study area damages social centre are showing by diagram figure (10)
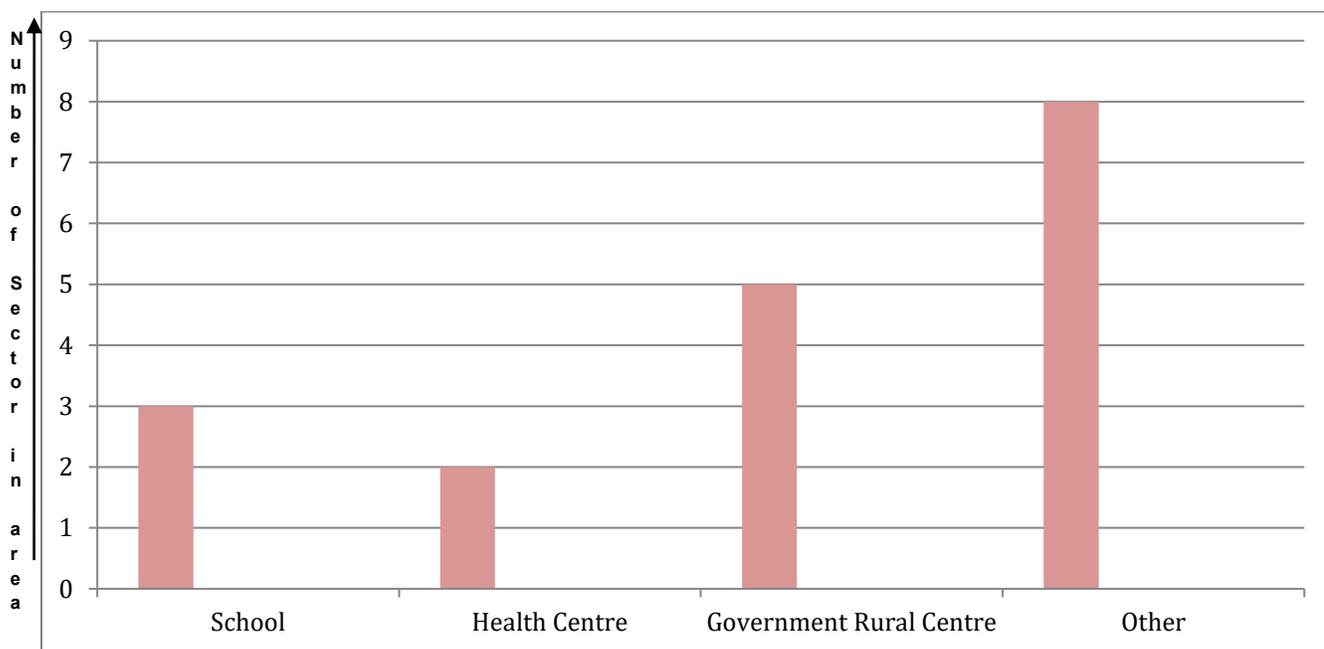
Fig.10: Destroyed Land due to Occupied   Source: Field Survey 2026

According to responded, the Number of is School 3, Health Centre 2, Government Rural Centre 5 and other is 8.

5.2. Damage of agriculture land:
The damage to agricultural land. Some common issues include:

1. Soil erosion 2. Water logging 3. Salinization 4. Pollution from chemicals and pesticides 5. Land degradation due to *Climate change*

1. Sustainable farming practices 2. Crop rotation and intercropping 3. Organic farming 4. Soil conservation techniques 5. Efficient irrigation systems

In the present scenario that total amount of agriculture land is increasing day by day but due to constriction of Chaltia Bil in this area. The biggest bil destroyed in 2002 and 2024 of the study area amounts by destroyed land is show below figure 14.

Fig.11**:** Amount of Destroy Land, Agricultural Land   Source: Field Survey 2026

5.3. Destroyed settlement:

The confluence of the two Bil the submargrans of many settlements. Mou gram many people are shifted to another place in the year of 2002. The impact on settlements due to environmental degradation or natural disasters.
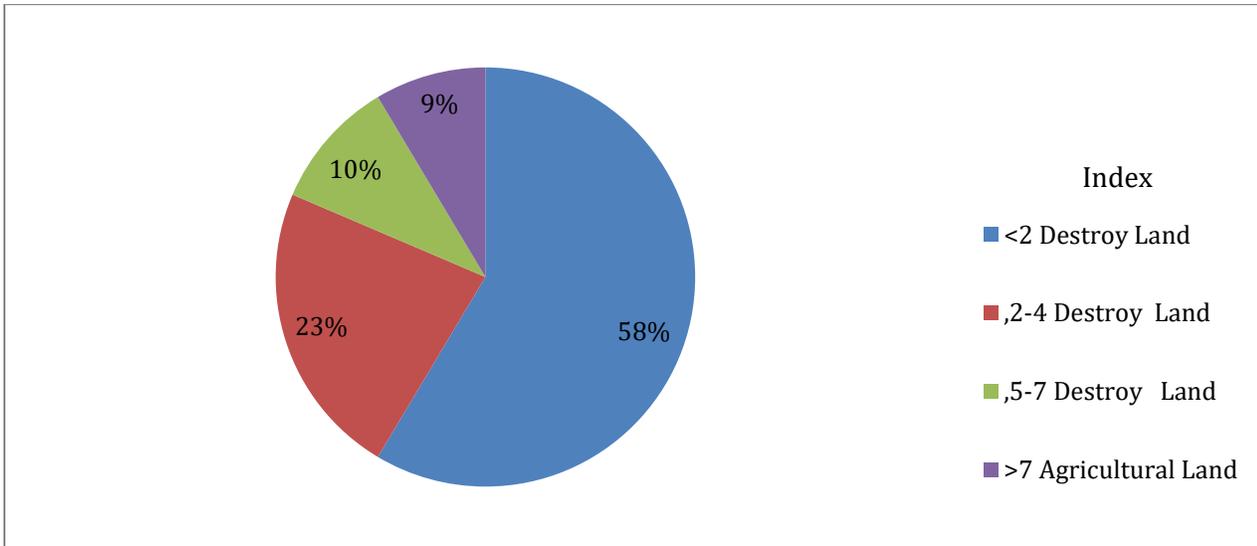
Some common issues include:

1. Loss of homes and infrastructure 2. Displacement of communities 3. Increased vulnerability to future disasters 4. Economic hardship 5. Cultural heritage loss

5.4 MIGRATION

As a bil migration of Haridasmati and Chaltia. The Bil channel migration communication the Haridasmati and Chaltia Gram. But before the Bils conference a large number of people migrate from the area where people lived in 2010 and from the centre of the village. People who lived in the Bil bankside the shifted to another place. In recent years most people migrated to other places for the breakdown of Haridasmati and Chaltia gram before constriction the study area.

5.5 RELOCATION

That involves moving people or businesses to a new location, often due to environmental or economic factors.

Types of relocation:

1. Voluntary: Personal choice 2. Involuntary: Forced due to environmental or economic factors 3. Government-led: Planned relocation for development or environmental protection

Challenges:

1. Social disruption 2. Economic instability 3. Cultural heritage loss 4. Environmental adaptation

Successful relocation strategies:

1. Community engagement 2. Economic support 3. Infrastructure development 4. Social services provision

CHAPTER 6
RECOMMENDATION
6.1 Proper Fund Allotment

The finding of this study area:

1. Bil eroded the western bank and captured land area.
2. Due to constriction people of Haridasmati and Chaltia gram village are forced to Occupied land.
3. New mid channel bar eveled in Chaltia Bil.

6.2 Government Initiatives:

1. Wetland conservation policies
2. Sustainable livelihood schemes
3. Environmental education programs

6.3 problem of the study area

There are some problems:

1. There is no permanent job
2. Communication system is not developed.
3. In case of excessive rainfall, the bank of Bil bank.
4. During the monsoon Bil water enter the populated area.

6.4. Good Number of NGOs should come forward to safe this Wetland (Well Recognized Biodiversity)

NGOs play a vital role in supporting relocation efforts and promoting sustainability. Their involvement can:
1. Provide essential services (health, education, shelter)
2. Advocate for community rights
3. Facilitate community engagement
4. Offer economic empowerment programs
5. Support environmental conservation

To encourage NGO participation:
1. Government partnerships
2. Funding opportunities
3. Capacity building
4. Network collaboration
5. Community outreach

6.5. Consciousness among the People

Consciousness among people regarding Chaltia Bil wetland conservation:

Level of Awareness:
1. Local communities: Moderate to high awareness
2. Regional population: Low to moderate awareness
3. National/international audience: Low awareness

Key Concerns:
1. Loss of livelihoods (fishing, agriculture)
2. Decreased water quality
3. Flood risk
4. Biodiversity loss

Motivators for Conservation:

1. Economic benefits (ecotourism, sustainable fishing)
2. Cultural significance (traditional practices, heritage)
3. Environmental concerns (climate change, pollution)
4. Community engagement and education

Challenges:

1. Limited knowledge on sustainable practices
2. Lack of resources and infrastructure
3. Urbanization, Agriculture
4. Policy implementation gaps

Education and Outreach:

1. Community workshops and training
2. School programs and curricula
3. Local media campaigns
4. Collaborations with NGOs and government agencies

Behavioral Change:

1. Adopting sustainable agriculture practices
2. Responsible waste management
3. Conservation-oriented fishing practices

4. Community-led conservation initiatives

Research topics:

1. Assessing awareness and attitudes toward wetland conservation
2. Evaluating effectiveness of education and outreach programs
3. Identifying motivators for behavioral change

6.6. Recommendation of the Study Area

Chaltia Bil, a wetland area in Murshidabad, West Bengal. Here are some study area recommendations:

Environmental Studies:

1. Water quality analysis
2. Biodiversity assessment (flora and fauna)
3. Wetland ecosystem services evaluation

Socio-Economic Research:

1. Livelihood dependence on wetland resources
2. Impact of wetland degradation on local communities
3. Sustainable livelihood initiatives

Geospatial Analysis:

1. Land use/land cover change detection
2. Wetland boundary demarcation
3. Hydrological modeling

Climate Change Research:

1. Vulnerability assessment
2. Adaptation strategies for local communities
3. Carbon sequestration potential

CHAPTER 7

CONCLUSION

So far, the overall discussion it was proved that image overlay shifting of Bil Chaltia to Haridasmati gram. The average lateral shifting rate of Bil chaltia to Haridasmati had been decreased day by day last two decades from 2010 to 2024, the average rate of shifting has decreased to 2018. If the chaltia bil maintains its average shifting rate at high that then it will capture Bil within 2018 to 2019 years. The study of mid channel bar evolution stability and line shifting also clearly reflected that the shifting of thawed line towards right side of chaltia bil. Mid channel bar separates flow direction and ultimately to flow direction Converse that at the right side where continuous failure happens. It accelerates concavity as well as Bil is shifting towards Bil.

PHOTOGRAPHS OF STUDY AREA

Plate No.1: Constriction Point of Chaltia Bil
Plate No.2: Haridas Mati area

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Plate No.5: Constricted Point of Chaltia Bil
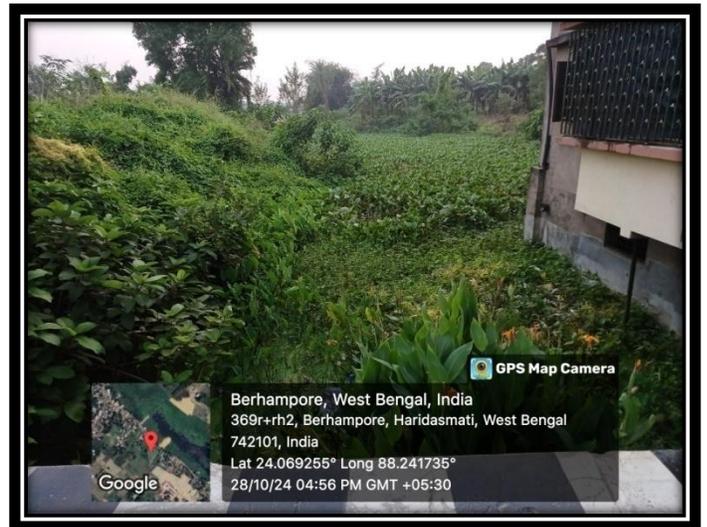
Plate No.6: House in Chaltia Bil

Plate No 3: Constriction Bil
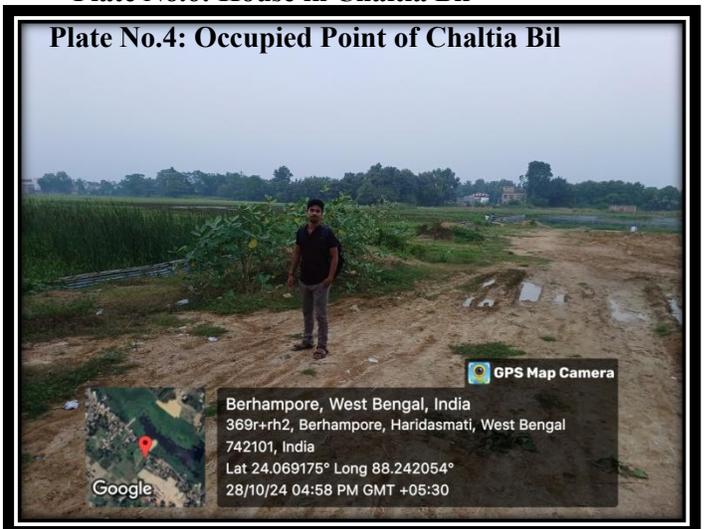
Plate No.4: Occupied Point of Chaltia Bil
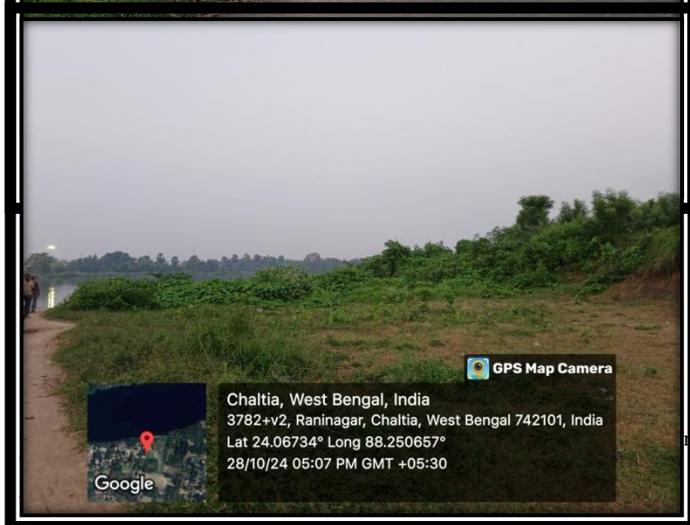
Plate No.7: Occupied road in Chaltia Bil

Plat

Plate No.10: Chaltia Bil (Haridas Mati)

Plate No.11: Cutting tree beside Chaltia Bil

Plate No.12: Land Increases Area

Plate No.13: House in Chaltia Bil

Plate No.14: During Survey Time

Plate No.15: Occupied Land in Chaltia Bil

Plate No.16: Government Board

Plate No.17: Constricted Point

Plate No.18: Waste Material

Plate No.19: Haridas Mati Prathomik Bidyalay

Plate No.20: During Survey Time

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APPENDIX

Table No. 1: General Information about study Area

Name of the district	Murshidabad	Literate population	85.71%
Elevation/Altitude	58 meter	Male Literate	44.22%
Block Name	Berhampore	Female Literate	40.59%
Area(in hectare)	253.12		
Name of theSubdivision	Bhakuri-I	Police Station	Berhampore
Total Population	25336	Nearest Railway	Berhampore Court
Male Population	12803	Name of the Bil	Chaltia Bil
Female Population	12533	Hazards/Problem	Occupied Bil,

Source: Census of India, 2011

Table No.2: Location of Study Area

SL. NO.	Name of Bils	Lat. &Long.	AL. In mt.	PH	PHOTO
1	Chaltia	24.076 &88.259	13.39	7.9	Chaltia, West Bengal, India

Source: Field Survey 2026

Table No.3: Year wise bil constriction rate and its shifting direction

Observed points	Shifting Year	Shifting rate(meter)		Bil
		West	East	
A	2010-12	-	62	Right
	2012-14	4.95	-	
	2014-16	46.7		
	2016-18	-		
	2018-20		48.5	
	2020-22			
	2022-24			
	2010-12	-	92.8	Left
	2012-14	0.45	-	
	2014-16	41.7	-	
	2016-18	-	61.7	
	2018-20	37.9	-	
	2020-22	-	0.6	
	2022-24	27	-	
B	2010-12	-	130	Right
	2012-14	1.12	-	

2014-16	**120**	**-**	
2016-18	**-**	**120**	
2018-20	**108**	**-**	
2020-22	**12.7**	**-**	
2022-24	**-**	**23**	
2010-12	**-**	**1.81**	
2012-14	**-**	**-**	
2014-16	**7.64**	**-**	
2016-18	**-**	**12**	Left
2018-20	**3.39**	**-**	
2020-22	**6.68**	**-**	
2022-24	**3.13**	**-**	

Source: Google

Table: 4. Monthly Constriction according to responded

Month	Monthly Constriction(CM)
June	14
July	18
August	25
September	18
October	6

Source: Field Survey, 2026

Table:5. Perception of cause of bil Constriction according to responded

Strong current of bil	22 Cusec
Deforestation	06 Tree
Houses near Chaltia Bil	14 House
Soil extraction	08 mg/L
Sedimentation	04 nm
Sand content is high in soil	02 um

Source: Field Survey, 2026

Table:6. Settlements damages according to responded

Amount Settlement (in katha)	No. of family
<2	19
2-4	14
5-7	08
8-10	10
>10	09

Source: Field Survey, 2026

Table: 7. Sinuosity Index

Year	Actual Distance (CM)	Straight line (CM)	Sinuosity Index(CM)
2010	7.83	5.48	1.42
2012	7.89	5.42	1.45
2014	7.81	5.42	1.49
2016	7.87	5.40	1.45
2018	8.05	5.43	1.48
2020	7.92	5.47	1.45
2022	7.86	5.43	1.44
2024	7.98	5.37	1.48

Source: Google Earth

Table:8. Public Centre Damage according to responded

Name	Number
School	03
Health Center	02
Government Rural Center	05
Others	08

Source: Field Survey, 2026

Table:9. Public Centre Destroy according to responded

Cemetery	20
Muslim Peaceful Place	02
Government Rural Health Center	05
Others	08

Source: Field Survey,2026

Table:10. Agricultural Damages according to responded

Amount Land (in bigha)	No. of Family
<2	17
2-4	12
5-7	09
8-10	08
>10	07

Source: Field Survey,2026

Table:11. Migration Family in different year according to responded

Year	No. of family
2000-2004	09
2005-2009	07
2010-2019	05
2020-2024	12

Source: Field Survey,2026

Table:12. Constriction point

Year	Confluence point (Meter)
2019	36.7
2022	23.8
2024	20.5

Source: Field Survey,2026

Table:13. Perception of cause of Bil Constriction and Cross Section Analysis

Year	Constriction point (Katha)
2011	10.00
2012	12.00
2013	15.00
2014	15.50
2015	16.00
2016	20.00
2017	20.01
2018	25.01
2019	30.01
2020	36.10
2021	36.10
2022	36.50
2023	26.10
2024	40.00

Source: Field Survey,2026