



# Dooras: The Land of 'Four Ts' of India

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

The Dooras is in the foothills of the Himalayas and initiated the tea gardens (TG) plantation during the 1880s. As a low-cost, non-alcoholic, stimulating beverage, tea is popular in household daily consumption with a vast market potential for its therapeutic and ethnobotany properties. The Mangalbari village in Matiali block in Jalpaiguri district within Dooras areas of North Bengal is popular for its tea, timber, tourism, and tribals. They have a unique socio-economic outline and livelihood pattern. Emphasis is given to women workers which constitute a very high share. The methodology combines primary and secondary data from the field, past literature, government reports, and old topological sheets from the Survey of India. The entire data set is compiled, presented through tables and graphs, and picturised through GIS/RS data for map generation, of the Dooras area, like land use and land cover (LULC) maps, including Jalpaiguri, Matiali, and Mangalpur. Causes are deliberated, and ameliorating measures are discussed. The key findings are that Matiali Fan is geologically active. Climate change-induced tea garden closures have impacts i.e. poverty, increased Human-animal conflict, increased illicit felling of wood

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offence reports, and drowning of backward class socioeconomic status. The suggestive management plans include constant government assistance, Education about WASH, women empowerment strategies (SDG-5), public-private partnerships, and NGO interventions that can address existing problems.

**Keywords:** Biodiversity; climate change; Dooras; human-animal conflict; sustainability; women empowerment.

## 1. INTRODUCTION

The demographic delusion about population growth and socioeconomic status (SES) perturbations has complex set-ups for urban agglomeration and people's sustainable futures in the Anthropocene from its inception in 1950 (Mishra, 2017; Amos, 2024). It is ubiquitous that societal behaviour and human response have altered nature's spectrum, including physical and environmental interactions. The exchange processes between societal values, human health, and geo-bio-environment such as air, water, soil, flora, fauna, avifauna, etc. have been overridden by human intervention in nature (O'Sullivan et al., 2023; Barakat et al., 2023; Lu et al., 2023 & Cirella et al., 2024).

The hilly terrains in the Himalayan foothills, the Mangalbari Census Village in Matiali Community Development blocks in Jalpaiguri in Dooras (Duars to Himalayas) is a sizeable sprawling

village within doabs of the Rivers Mahananda and the Tista. In 1854, Jalpaiguri including Alipore Duar, became a district in 1869. The population of Jalpaiguri (JPG) in 1872, 1881, 1891, and 1901 had regularly surged from 4.1786, 5.806, 6.807, and 7.874 lakhs with an increasing trend.

Brewed in China in 2737 BC by Chinese emperor Shen Nung, the tea trade was monopolised for trade by the East India Company. The tea plantation started and became popular in Dooras areas in West Bengal (WB) and Assam in 1838. <https://ir.nbu.ac.in/server/api/core/bitstreams/7.T> ea plantations spread around the world but emerged in North Bengal in 1864. The soil and climate of the Himalayas' foothills were conducive to tea plantations. The therapeutic and herbal use of tea, tempted the tea traders to start tea plantations in the recesses of the Rivers Neora, Tista, and Mahanand, the tributaries from the Ganges -Brahmaputra Doab.

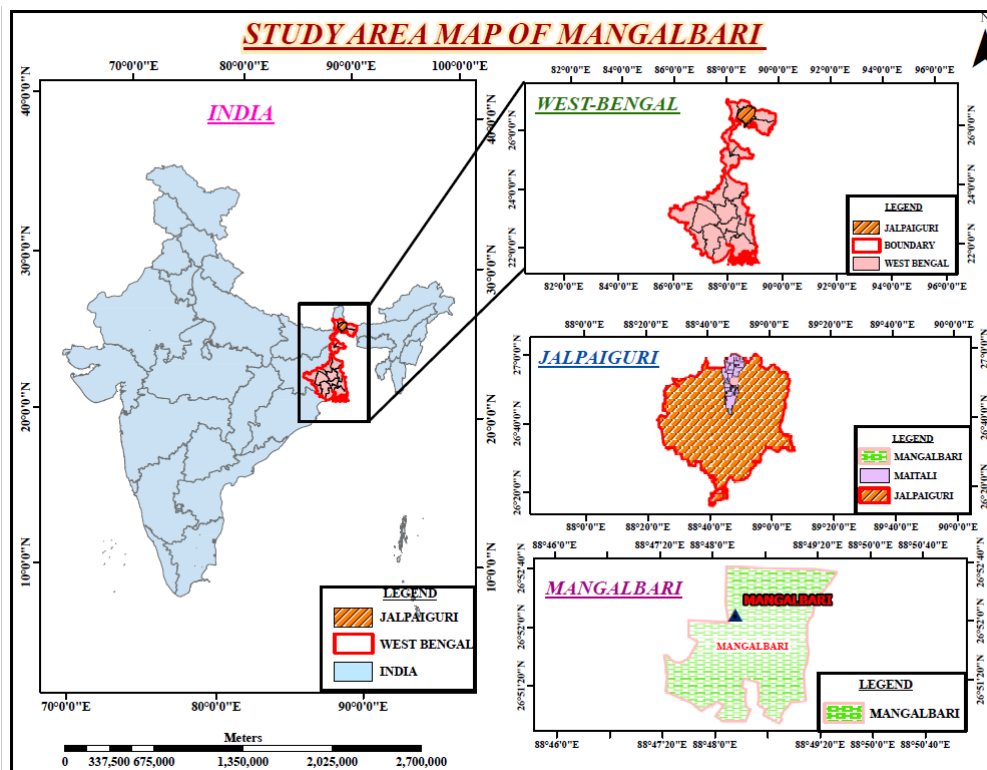


Fig. 1. The index map of the Dooras area including Jalpaiguri of West Bengal, India

The present investigation concerns urban growth correlating population indicators as a substitution for sustainable terrestrial management. The local expansion is adapted to human nature, which influences the interdependence of man and the environment. The field study investigated the physical, cultural, and inter-relationship relationship between the socioeconomic status of the Matiali Community Development (CD) block and Mangalbari, a census Town (Smith et al., 2016). The Odessey of the tea plantation and its impact on the socioeconomic development of Dooras, Jalpaiguri (JPG), Matiali block, and Mangalpur village investigated by Peng et al., (2020); Panagiotopoulos et al., (2023).

Key Notes:

1. Dooras in West Bengal is the hub for tea, timber, tribal and tourism.
2. The Matiali Fan and Matiali-Chalsa-Baradighi faults are active.
3. The Tea gardens emerged in Dooras and Jalpaiguri from 1912 to 1936
4. Women labourers constitute the major workforce in the Tea Estates of Dooras and are in jeopardy due to their closure.
5. Poverty, food insecurity, Trafficking, Human-wildlife conflict, and inadequate WASH amenities are the problems Dooras People assistance and NGOs and stakeholder participation can address.

### 1.1 Objective

After independence, the Plantation Labour Act, (1951) intervened that the tea estate owners must deliver adequate health services, drinking water, electricity and environment, food, and energy to their workers. The workers are still in poverty, illiteracy, and socially discriminated. However, the landscape has developed for tea, timber, tourism, and tribals. The primary objectives of the present study of Tea-Timber-Tourism are:

1. Gaining knowledge of Dooras and JPG Geology, Geography, history, education, infrastructure, and Tea Garden (TG) workers.
2. To correlate between the physical environment and the Societal environment
3. Searching the demographic and socioeconomic faces of the forests and tea estates.
4. Framing the area's Environmental and health Impact assessment (EHIA).

## 2. LITERATURE SURVEY

Mountain dynamics, especially in the hilly terrain of Darjeeling, Jalpaiguri, have been given importance to its mountainous forests and complex nature topography, weather, and distribution (Kumar et al., 2021; Wang et al., 2022). There are diversified changes in the foothills of the Himalayas in India in its Land use and land cover nowadays, influencing the ecosystem services (Mondal et al, 2018), The geologically young Himalayan Mountain ranges have evolved 200 Mya due to the detachment of pro-India from SE Africa by geological faults and started shifting and drifting northward until intercepted by the Eurasian plate, and the process is still active (Molnar 1986; Xu 1998; Validya 2002). The habitats in the key biodiversity areas in India, Sikkim, and West Bengal are Woolly Flying Squirrel (Teesta-Rangit Valley), > 20 identified, and Manas Buxa Corridor, which houses Buxa Tiger Reserve (BTR). The other key biodiversity areas are Champamari, Gorumara, Jaldapada, Mahanand, Neoravalley, Senchel, and Singaila (Rai et al., WWF 2005; Das et al., 2024).

WB has 11879 km<sup>2</sup>(13.38% of the total area) of forests, 7054 km<sup>2</sup> of which are Reserved, 3772 km<sup>2</sup> protected, and 1053 km<sup>2</sup> are unclassed (WB Forest Dept.). It has fifteen Wildlife Sanctuaries (WLS), six National Parks (NPs), two Tiger Reserves (TR), and one Biosphere Reserve (BRs) for sustainable Biodiversity (SDG Goal 15, i.e., Life on Land).

The tea sector in India provides livelihood to ≈1.2 million stakeholders, up to 50% of whom are women (Caro, 2020). The tea export from India was 282MT in 2021, whereas the importing countries are the European Union, the United States, and Japan, which imported 108MT (Bermúdez et al., 2024).

The four "Ts", (Timber, Tea, tribes and tourism), have intensified in Dooras areas. The surged population density has deteriorated the past forest cover has reduced, land use and land cover, and anthropogenic interventions have reduced habitat space for wild animals and vegetation. Various studies show that the domain of the four T's is rarely discussed in one basket i.e. the geo-bio-hydrology of the Dooras areas during the Anthropocene.

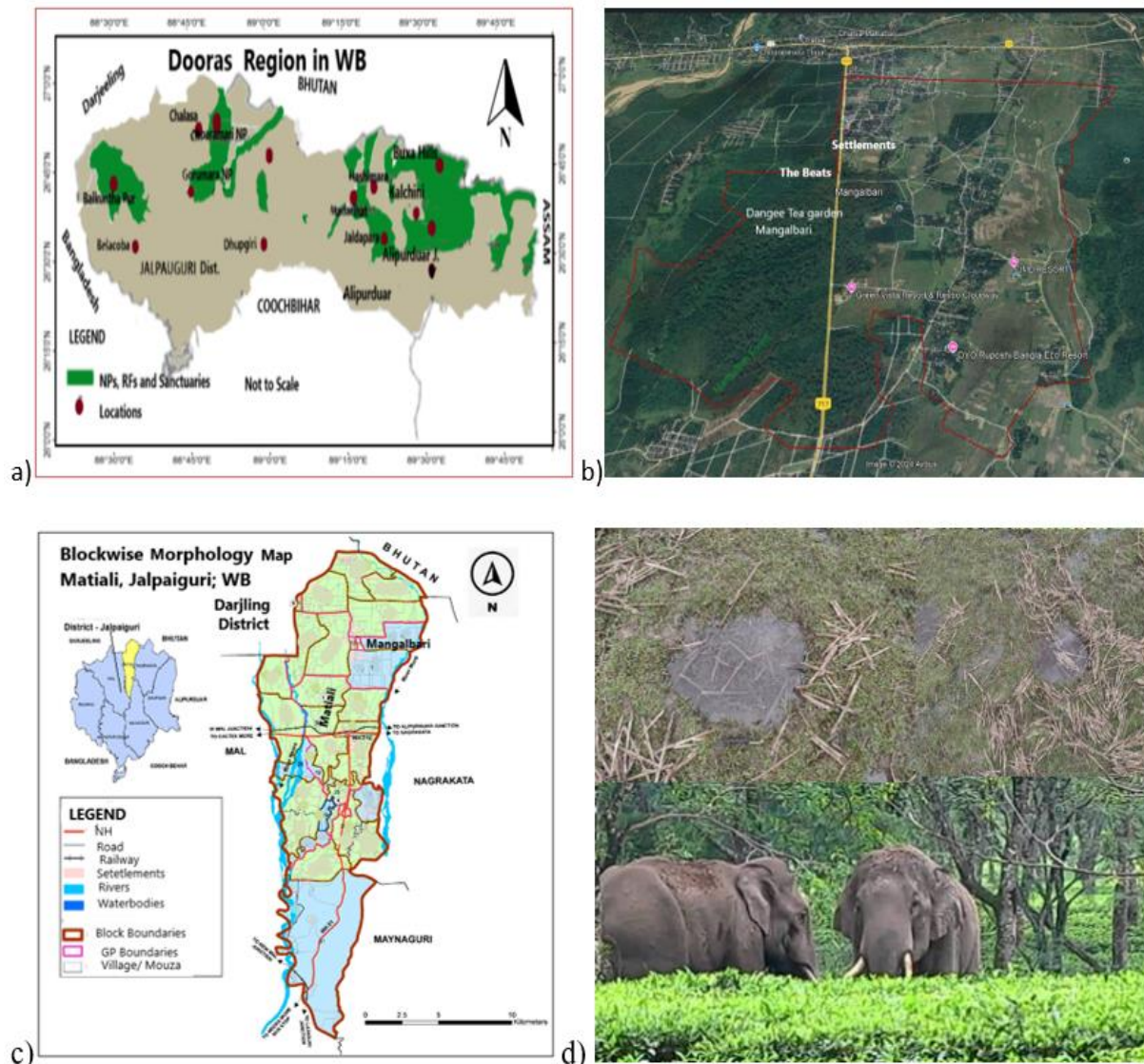
## 3. METHODOLOGY

Various studies have been conducted in the past correlating demography, geology, geography,

geomorphology, livelihood, etc., in the Dooras region. Multiple methods adopted data gathering and analysis by various methodologies and classified them as social science. Natural science approaches are comprised of field annotations, GIS/ RS (remote sensing), and a combination (hybridisation).

Initially, a collection of maps of location, topography, soil, climate, economy, etc. The

base maps (Mouza Maps) and topographic maps of Topographical Sheets of SOI (Survey of India) were collected and the Satellite imageries were downloaded. The additional information was collected from line department district reports, the census handbook and the QGIS 3.40.0 version was used for making maps. The sample survey method gathered information based on 5% of the village population.



**Fig. 2. (a) The Dooras region (b) Matiali CD Block (c) Matiali and Mangalbari in Jalpaiguri district of West Bengal (d) Human Elephant conflict a common Problem**  
(Source modified: <https://jalpaiguri.gov.in/map-of-matiali/modified>)

The data was gathered from various Google sites, department reports of West Bengal and the Govt of India, such as the Census of India, Ministry of Housing and Urban Development (MHUD), State Forest Department, Department of Urban Development and Municipal Affairs of West Bengal, etc. Other information was collected from various literature, National Atlas & Thematic Mapping Organisation (NATMO), Jalpaiguri Government, Field Survey, Bureau of Applied Economics and Statistics, Jalpaiguri, and the District Census Handbook, Jalpaiguri, etc.

### 3.1 Study Area at a Glance

The Dooras (Duars), Matiali community development (CD) block and Mangalbari Census town, is an administrative division in the Malbazar subdivision (lat. of 26.927N and long. of 88.813E) of WB, India, and is the study area. The Tista, Neora, Kruti and Jal Dhaka are major rivers in Jalpaiguri district. It has intense coverage of wild animals, tourism prospects, Tea plantations, and the land of SCs and STs (Fig. 2 (a) & (b)).

### 3.2 The Dooras Valley

The Dooras segment in the North-Bengal valley covers parts of Assam, Kalim Pong plains, Jalpaiguri, Alipurduar and the up-hills of Cooch

Bihar districts of WB. Dooras Valley has 154 Tea gardens (1390 Km<sup>2</sup>) out of 449 (10390 km<sup>2</sup>) in North Bengal, engaging about 3.5 lakh workers in 2022, Report Tea Board of India, (2022), Dooars-Terai tea gardens – Wikipedia. The Jalpaiguri district has abundant tea gardens (TGs), timber deports and tourism spots engaging 70-80 % of aboriginal people (Scheduled Tribes and Castes).

### 3.3 The Parks, Zoos, Reserves and Sanctuaries Dooras

Dooras in WB, has the popular Buxa National Park (N.P.), Alipurduar and Tiger Reserve (BTR); Jalpaiguri, and the hills of Cooch Behar. The Dooras region is famous for Gorumara NP, Jaladapara NP, Jhalang Valley, Bindu Village, Neora Valley Park, and Jayanti (The queen of Dooras). The list of NPs, zoos, wildlife sanctuaries, and reserved forests is in Table 1.

Major wildlife causing negative impact are Bison (>4000 numbers), and the Indian elephants (Pachyderms or Jumbos) > 488 numbers cause major HAC vulnerabilities 2014-15. In 2023-24 the number of deaths was 103 with 650 pachyderms whereas by 24<sup>th</sup> Nov. 2024-25 it was reduced to 53 with 800 pachyderms as per UNI Report Nov 24<sup>th</sup> 2024.

**Table 1. The tourism spots, National Parks(NPs), Sanctuaries and forests in Dooras. W.B.**

| #  | The protected reserves          | Housed at        | Area (Km <sup>2</sup> ) | Flagship species and remarks   |
|----|---------------------------------|------------------|-------------------------|--|
| 1  | Jaldapara WLS                   | Alipurduar (JPG) | 216.34                  | Leopard, Asiatic elephant, hog/ spotted deer, sandbar & bison            |
| 2  | Chilapata                       | Cooch Bihar      | Deep forests            | Tourists, Rhino, Bison and many birds, Dense forests                     |
| 3  | Gorumara NP                     | Jalpaiguri       | 79.45                   | One Horned Rhino. Murti & Raidak River; Sal Jungle                       |
| 4  | Jhalong & Bindu Tour            | Dooras (N)       |                         | Bank of Jaldhaka River   |
| 5  | Chapramari W.L.S                | Jalpaiguri       | 9.60                    | Bishon (Gour)  |
| 6  | Buxa WLS                        | Jalpaiguri       | 314.52                  | Tigers   |
| 7  | Buxa NP                         | Jalpaiguri       | 117.10                  | Tiger, Leopard, panther, elephant, Gaur, Pangolin, and Python. Hornbills |
| 8  | Pakhi Bitan (Bird Sanctuary)    | Jalpaiguri       | 14.09                   | Various birds, a novice WLS  |
| 9  | Chapmari WLS                    | Jalpaiguri       | 9.60                    | Gaur   |
| 10 | Mayur Jharana Elephant Reserve  | Jalpaiguri       | 414.00                  | Asian Elephants  |
| 11 | Eastern Dooras Elephant Reserve | Eastern Dooras   | 977.51                  | Elephant Corridor  |

Abbreviations: WLS: Wild Life sanctuaries; JPG: Jalpaiguri; ARC: Animal Risque centre;  
Source: <https://www.westbengalforest.gov.in/upload/wildlife/introduction.pdf>

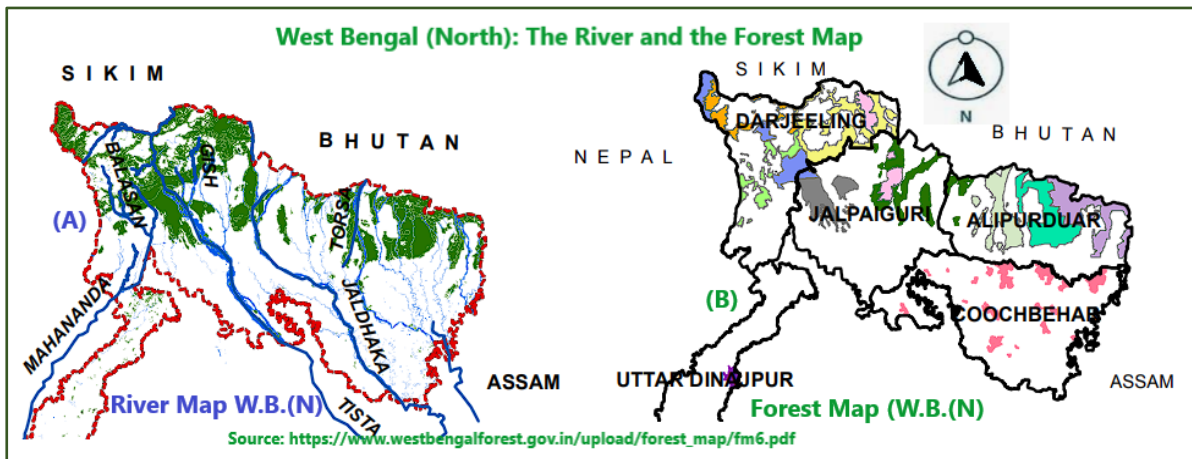


Fig. 3. The River/ the forest map of North Bengal, Dooras  
(Source: W.B. Forest map modified)

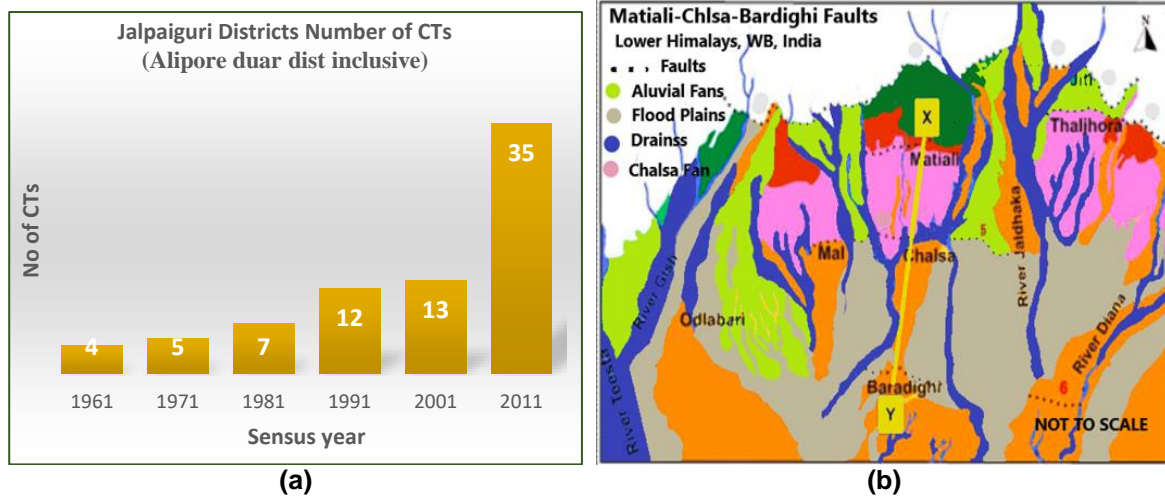


Fig. 4. The number of CTs in Jalpaiguri district before the 2011 (b) Faults/Fans lower Himalayas, West Bengal Census in India

### 3.4 Jalpaiguri District (North Bengal)

Jalpaiguri district in WB is housed in the Himalaya’s foothills between lat. 26° 16' and 27° 0' North lat. and 88° 4' to 89° 53' East long., and the forest cover is 45.97%. The Jalpaiguri District was formed on 1<sup>st</sup> Jan 1869, merging the Jalpaiguri subdivision (Rangpur dist.) and Western Duar dist. by Britishers. In 1931, the district had a population of 739160, which surged to 914538 in 1951 (Anju, 2019). The population of the dist. 3.873 million (Projected for 2024 as 4.44 million) with an average (av.) present literacy rate of 75.3%.

The Jalpaiguri district is housed in the doab of the Teesta River and the Neora Riverfans. The Jalpaiguri and Siliguri (twin cities) are the hubs for

tea, timber, tribal culture, and tourism. About two-thirds of the people are below the poverty line. The Jalpaiguri landscape is moist and undulated deciduous forests covering about 1790 Km<sup>2</sup> (50% of the total area) <https://jalpaiguri.gov.in/history/>. The Jalpaiguri and the Alipore Duar were divided into two districts in 2014 (Ali et al., (2019).

### 4. THE GEOGRAPHY OF MATIALI

The Matiali fan is formed in the lower Himalayas due to tectonics and fluvial landform deformations during 34KYBP (Kiloyears before the present) and was a part of the Matiali-Chlsa-Baradighi fan’s recess (Fig. 2.b). The fan comprises coarse-grained materials adjacent to alluvium, and flood plains in the Tista mega-fan.

The fan has many young thrust faults, such as the Gorubothan, Matiali and Chalsa faults. The sediment studies reveal continuous deposition as piling is finer to coarse at the top of recent formation. The fan is of Pleistocene origin and was intensified during the Indian summer monsoon of Marine Isotope Stage 3 (MIS-3). Later the valley was incised during the Lower glacial maximum (LGM) and weak ISM between 24 and 18 ka. During the Holocene epoch (since 12000 YBP), the period of MIS-1 and MIS-2, a new Chalsa fold, was generated during ~ 11 and ~ 6 KYBP (Greenlandian and part of Northgrippian period) (Mishra et al., 2021).

The dimensions of the saucer-type Matiali fan are 14 (length) X 10 km (Width), and the radius is 14 km, radius with across-fan upper reaches gradient slanting 1.04°. The average longitudinal terrestrial slope of the fan is 2.08° to 4.05°, and the minimum fan toe slope is 0.41°. The Sinuosity Index of flow in drainage channels are 1.53, (Kar et al., 2014). The deposition of the fan, recess, and terraces, and the formation of drainage channels (DCs), are the results of the Indian Summer Monsoon (ISM). Matiali Fan houses the River System Neora (outskirt of Matiali), having the tributaries Mal (in the west) and the Murti in the eastern parts of the Matiali Block, ultimately join the Tista River (Chakraborty et al., 2019; Biswas et al., 2021).

#### 4.1 Climate Study Area

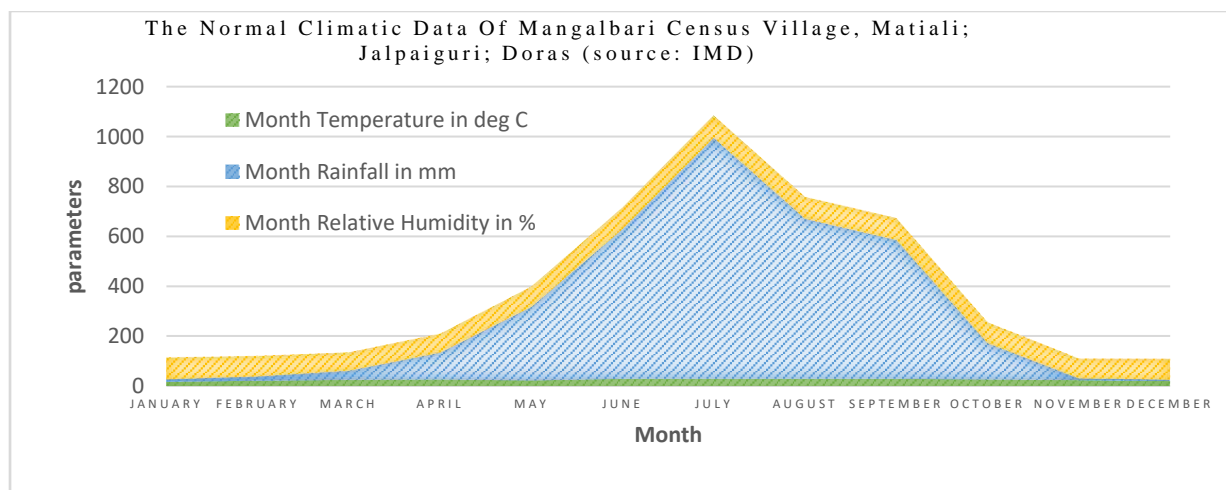
The all-time recorded maximum Temperature in August was 40.9°C (1986), and the lowest

temperature observed in January was 2.2°C (1912). The rainfall is unpredictable as it ranges from 965.7 mm in July, and almost deficient in December (IMD). In Jalpaiguri, the av. Relative Humidity (RH) is 89% in July and 73%, the lowest in March. (89%) but a cooler climate conducive to Tea cultivation.

In Mangalbari village, situated in Jalpaiguri in Dooras, the annual average maximum and minimum temperatures are 29.05°C and 17.25°C, respectively. Similarly, the normal maximum and minimum rainfall during February and July are 512.08mm and 4.15mm, respectively. The maximum average (av.) RH is 80% in August (RMC, Kolkata 2019-20).

#### 4.2 Impact of Climate Change

The changes in sun-earth geometry have surged local temperature, ITCZ/ISM positioning, rainfall patterns, anthropogenic activities, landslides, soil erosion and flash floods, Kalbaisakhi, low-intensity earthquakes, and natural calamities. The changes in LULC and anthropogenic interventions to nature have lowered the groundwater table, surged the landslide and soil erosion, the characteristics of tea growth, and dried up drainage channels, and wells. The COVID-19 pandemic and irregular rainfall had an apocalyptic impact on livelihood, resulting in colossal morbidity, unreported mortalities, migration, increased moisture stress pests, diseases, and impact on seedlings (Mondal et al., 2024).



**Fig. 5. Jalpaiguri's average monthly Temperature, rainfall, and Relative Humidity.**  
Source data: District Environment Plan for Jalpaiguri, 2024

**Table 2. The socio-demographic profile of the Matiali block (Govt. WB)**

| Block   | Popul <sup>n</sup> density | Total HH | Popul <sup>n</sup> . | SC    | STs   | General | Sex Ratio |
|---------|----------------------------|----------|----------------------|-------|-------|---------|-----------|
| Matiali | 701                        | 25251    | 117540               | 17622 | 51789 | 48129   | 956       |

### 4.3 Bio-diversity in Dooras

The Dooras Valley has many WLS. The well-known are at distances, the National Park of Gorumara (75 km), Chapramari forests (68 km), the BTR (200 km), and the Jaldapara Sanctuary (124 km) from Siliguri. Indian Tigers, elephants, and rhinos (single-horned) are the common wild animals. The Dooras area is the centre of major human-animal conflict (HAC) in WB. According to the Forest Department of West Bengal, North Bengal accommodates rich biodiversity of species comprising Mammals (73), Reptiles (76), Amphibians (5), Fishes (33), Trees (450), Shrubs (250), Birds (284), Herbs (400), Climbers (111), Orchids (150), Grasses (100) Bamboos (10) and Medicinal Plants (112). Many endangered species like the Asian Elephant, OneHorned Rhino, Serow, Red Panda, and Pigmy Hog are among the IUCN categories in the Dooras wilderness

<https://www.westbengalforest.gov.in/2022-23>, and Table 2.

### 4.4 The Matiali Block

The Matiali CD block gas geographical area is 204 km<sup>2</sup>. After bifurcation, the district has a population of 2381596. The inhabitants' mother tongues are Bengali, Bijori, and Munda. The Matiali CD Block has 2276 tea garden workers; 94 were landholders, and 102 were farm workers. The SCs and STs population is 1001572 and 349592 which is 42.05% and 14.68% of total demography respectively (Census, 2011) (Table 2).

The GPs, Rangamatee and Bagrakot, are the two GPs in the Matiali block with a tribal concentration of >50%. They are TG-concentrated areas with rich tribal culture.

### 4.5 Human-animal Conflict (HAC)

Asian elephants, Bisons (Indian Gaur), rhinos, leopards, and snakes are wild animals that conflict with people from Dooras. The Population density change between the 1981 and 2011 censuses was 352 to 576 people/Km<sup>2</sup> in North Bengal. The forest cover changed between 1977 and 2021, from 1974 km<sup>2</sup> to 1331 Km<sup>2</sup> in Matiali CD Block. Land use change, i.e. drastic loss of

the vegetative cover between 1977 and 2021 was from 1697 to 683.5 Km<sup>2</sup>(about 59%)in Matiali Block. The forests and tea gardens occupy the lion's share of land in Dooras, which accommodates plenty of wildlife. Human-elephant conflict (HEC) is the major issue in Dooras areas with 4705.94 Km<sup>2</sup> of forests under protected areas (PA) (Majumder et al., 2022; Mandal L., 2024).

Dooras houses 529 elephants and 20 tigers (BTR), 255 Rhinos (Jaldapara WLS) and 51 in Gaur NP. There were 36 wildlife offences reported in the year 2020-21 in Dooras. The main causes of HACs are population growth, Forest area encroachment, intrusion to core areas, reduction in area human settlement and Forest fire, fragmentation of Habitats, poaching and preying, anthropogenic activities etc. *Habitat loss and climate change are the major causes of the rising HAC, (Mishra et al., 2022).*

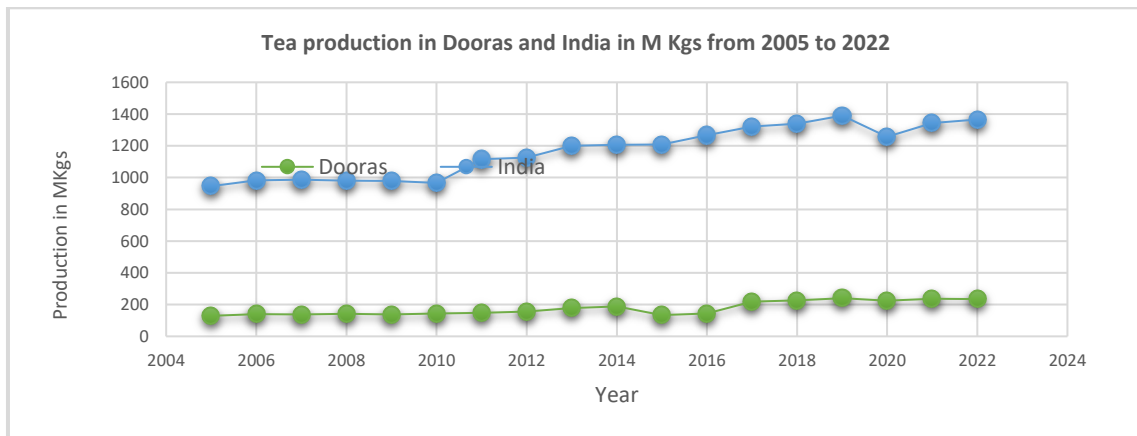
### 4.6 Eco-tourism

Tourists visit various sanctuaries, NPs, WLS, etc., and more than 100s of thousands visit regularly. The tourist attractions in Dooras are Tiger Reserve, Jaldapara NP, Gorumara NP, and Neora Valley NP tourism circuits. The eco-tourism shall augment the financial status and societal values. Illegal trades for different parts of wild animals such as tigers and leopards (Skin, bones, and nails), Rhinos (horns and nails), elephants (Ivory and bones), snakeskin and venom etc. Human-animal conflicts have become alarming, and immediate eco-restoration is needed through the afforestation of fodder, grasses, and bamboo in elephant migration corridors and fallow lands. Collaborative management through participatory forest management, restricting illegal poaching, avoiding human-wild animal conflict, strengthening fencing, etc., can develop tourism (Mishra SP, 2023).

### 4.7 Tea Garden (TG) Wage anomalies in Dooras

Chai (Tea) is a foreign drink that has no time. About two-thirds of Indians consume it today. India is the second largest tea producer, next after China (47% of global tea production) (FAO, 2022a).



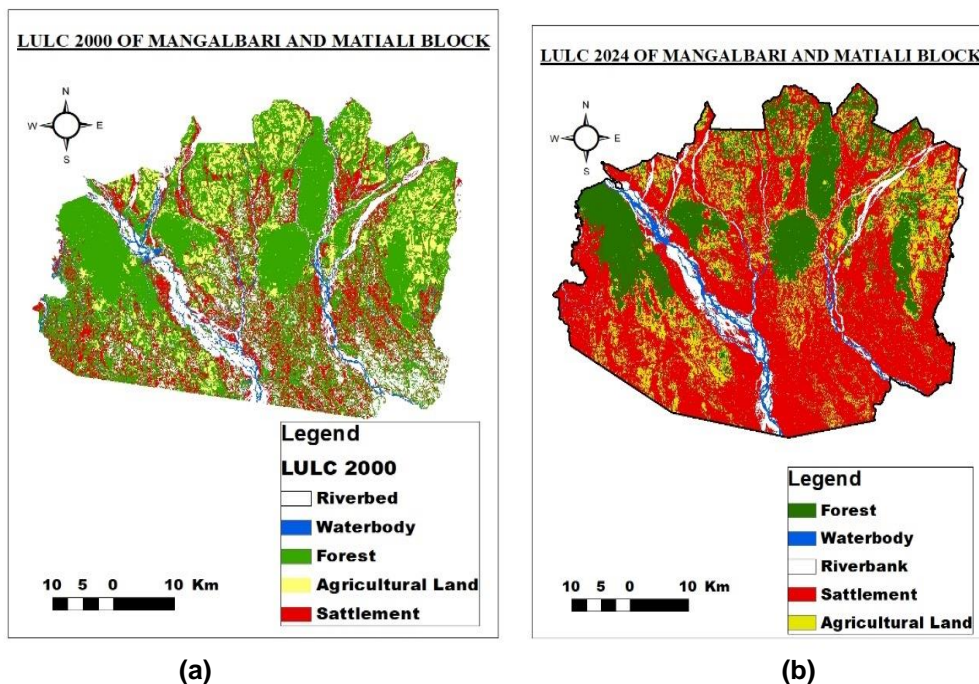


**Fig. 6. Tea production in Dooras, WB and India, from 2005-22**  
(Source: Tea Board, India)

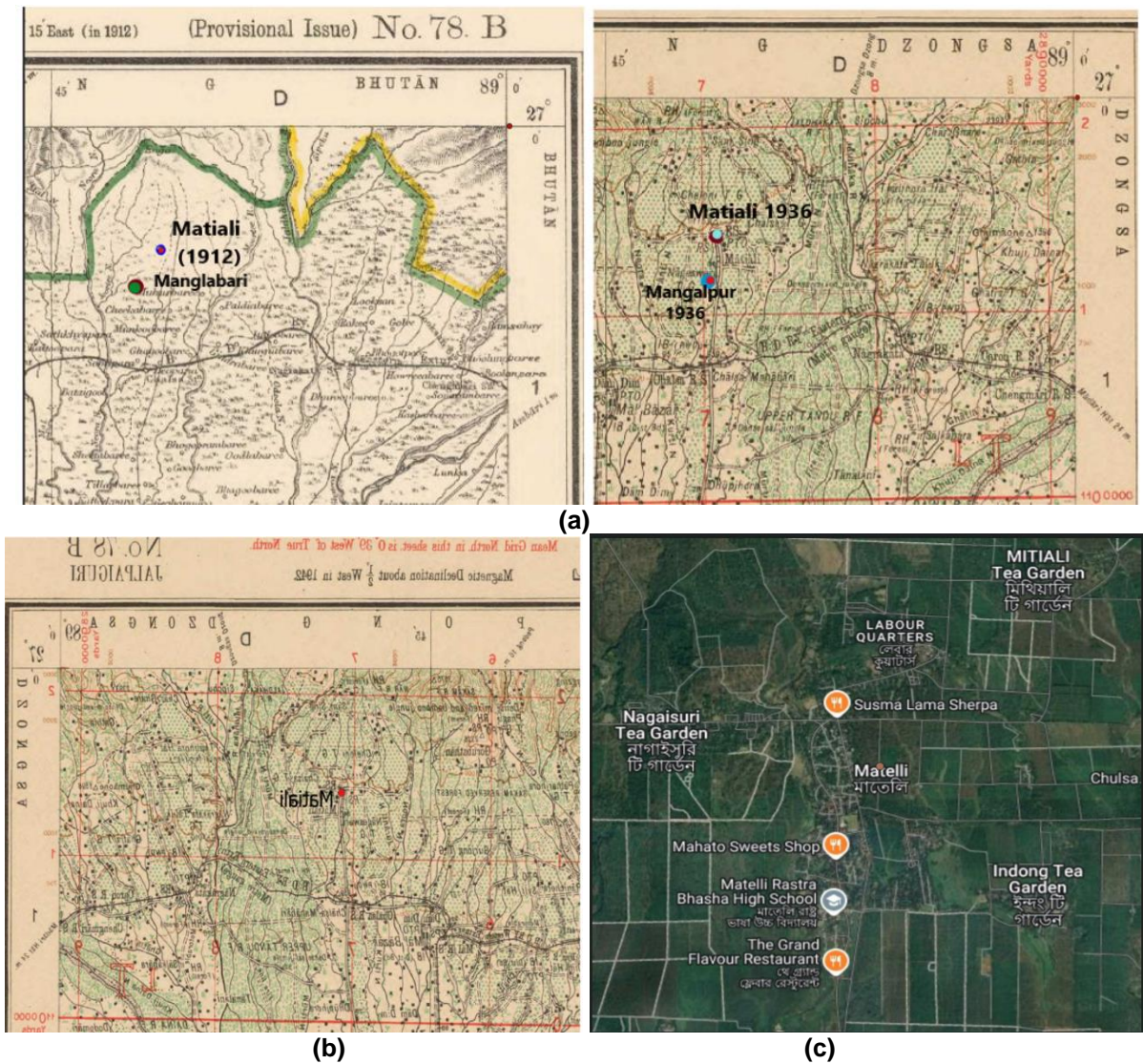
**Table 3. The tea garden worker's wages/day in the tea estate in various estates of India**

| #  | Areas                     | State        | wage (Rs) | Effective period | Remark  |
|----|---------------------------|--------------|-----------|------------------|---------|
| 1  | Brahmaputra valley        | Assam        | 232.00    | August 1st 2022  | Less    |
|    | Barak valley              | Assam        | 210.00    | August 1st 2023  | Less    |
| 2  | Dooras, Terai, Darjeeling | West Bengal  | 232.00    | Jan 1st. 2022    | Less    |
| 3  | Tripura                   | Tripura      | 176.00    | Jan 1st. 2022    | Least   |
| 4  | Annamalai; Nilgiris's,    | Tamil Nadu   | 412.65    | Sept 1st 2021    | High    |
| 5  | Idukki; Wayanad           | Kerala       | 435.03    | Jan 1st 2023     | highest |
| 6  | Western ghats Hills       | Karnataka    | 376.78    | Dec 23rd 2017    | High    |
| 7  | Himalayas                 | Sikkim       | 500.00    | April 1st 2022   | high    |
| 8  | Western Himalayas         | Uttarakhand  | 347.00    | Aug 1st 2022     | High    |
| 9  | Eastern Himalayas         | Himachal Pr. | 350.00    | April 1st 2022   | High    |
| 10 | Terai area                | Bihar        | 175.00    | Jan 1st 2020     | Lowest  |

Source: Annual Report Tea Board India, 2022-23



**Fig. 7(a). The LULC map Matiali, Jalpaiguri in 2000 (b). The same map in 2024**



**Fig. 8. Matiali Block non-existent in the 1912 SOI map, a village in 1936; (b.) The Matiali Block with Tea Gardens in 1944 (c) Matiali CD Block in 2023**  
(Source Zonedo, Sol; Google)

Jalpaiguri, tea estates have 62% Scheduled Tribe (62%) (Adivasi subgroup) estimated in its 89 registered tea gardens (Bhattacharjee, et al, 2024).

The tea estate workers of Bihar, Tripura, and WB receive lower wages than those of other states. Their economic standard of living is inferior to that of other state tea workers. The crisis for the labourers is now stressed under closure, Wage anomalies, bonus/gratuity/PF non-defrayal, etc. Table 3.

#### 4.8 The Present Landscape Jalpaiguri

The settlement has increased in the last 24 years transforming forests and agricultural lands. The Matiali CD Block has a gross command area

(GCA) of 38.53 Km<sup>2</sup>, predominately sandy soil at 59.50% of the total, and the rest are sandy loam-deposited terraces. The four gardens at Lataguri in the Matiali block are Murlidhar Tea Industries at Lataguri (Three numbers) named Urja Royal, Urja, and Urja Gold. The fourth one is Padanjali at Kabirajpara (<https://darjeelingteatrade.com/tea-gardens-terai-dooars/>).

However, the present fluctuations in the Indian summer Monsoon, global warming, glacier melts, and climate changes (CC) in the Himalayas have challenged the sustainability of these liquid gold plantations (Lutgendorf et al., 2014) Fig. 7(a) and (b). The soil cover of Dooras is reddish brown and conducive for tea plantations. The tea

estates of Dooras are the main livelihood of the people and other agricultural products are paddy, jute, Endi, and potatoes, which add to the socioeconomics of the Dooras. (Fig. 7 d).

#### 4.9 The History of Matiali from 1912

The Sol (Zendo maps) were collected and studied, and it was observed that there was no tea plantation in the Matiali block in 1912. The Sol map of the Matiali block for 1936 shows tea vegetation. In 1944, the Mangalbari had many tea estates. This proves that Matiali Block saw Tea plantations between 1912 and 1936.

#### 4.10 Mangalbari Census Town

Mangalbari CT (Census town) is housed in the Matiali block of the Jalpaiguri(JPG) district in WB ( Lat 26.8685°N and Long. 88.8045°E), with a 6.5095Km2 area accommodating the present projected population of ≈8300 in 2024.

The Mangalbari includes the Dangee tea garden, a Reserve Forest, agricultural land and scattered forest patches. In Mangalbari, the soil ranges from coarse loamy to fine loamy. The loamy soil has lower water-holding capacity. The pH value of the soil is 5.0- 6.5 (acidic).

#### 4.11 The History of Tea Industry (WB)

The West Bengal state has a history of tea plantations for 200 years from 1835 when Mr

Gordon and Mr Camphell experimentally planted China tea seedlings along Darjeeling tea tracks and Alubari of WB, but it was futile. Finally, Mr. Crommelin achieved success at lower altitudes. Towards 1874, many tea estates developed in Dooras areas but were luxury non-alcoholic drinks (Datta, 2017). The emergence of tea estates in Doors started at Gazal Duba in 1874 and spread to 235 units in 1901. Presently 324 Tea gardens exist in Dooras by 2023 <https://natorolled.com/blogs/tea/understanding-dooars-tea-and-its-market-demand#>

#### 4.12 Comparative study Matiali and Mangalbari

The land use pattern of the Mangalbari census town comprises agriculture, tea plantations, gardens, horticulture, settlements, forests, built-up areas, and fallow land. There are 1235 aboriginals, of which 602 are males and females are 633, Table 4 (Census, 2011).

Primarily they work in tea estates for their livelihood. These growing villages need industrial, and infrastructural development with more education, health care services, drinking water, communication, and electricity. The youths are fascinated by mobile phones, laptops, desktops, and tourism. There is a demand for more bank assistance and Government-aided programs.

**Table 4. A relative demographic study of the Matiali CD Block Vs. Mangalbari Village**

| Parameters                 | Unit                   | Matiali CD Block | Mangalbari CT | Data Source |
|----------------------------|------------------------|------------------|---------------|-------------|
| Population                 | Number                 | 117540           | 5934          | Census 2011 |
| Households                 | Numbers                | 25251            | 1390          | Census 2011 |
| Popul <sup>n</sup> density | person/km <sup>2</sup> | 657.4            | 830           | Census 2011 |
| Area                       | Km <sup>2</sup>        | 231              | 6.5095        | Census 2011 |
| Males                      | persons                | 60109(49%)       | 2972          |             |
| Females                    | Persons                | 57431(51%)       | 2962          |             |
| Sex Ratio                  | /1000males             | 955              | 997           |             |
| Rural (87%)                | Persons                | 102418           | 99%           |             |
| Urban (13%)                | Persons                | 15122            | 01%           |             |
| Literacy                   | Persons> 6yrs          | 69264            | 3710 (70.4%)  | Wikipedia   |
| Illiterates                | Persons                | 34149            | 2224          |             |
| Children                   | 0-6years               | 14127            | 661 (11%)     |             |
| Adults                     | 7+ years               | 103413           | 5273          |             |
| SC                         | Persons                | 17622 (15%)      | 1748          |             |
| ST                         | Persons                | 51789 (41%)      | 1235          |             |
| Not Indigenous             | Persons                | 48129 (44%)      |               |             |

Source: <https://www.censusindia2011.com/west-bengal/jalpaiguri/matiali/mangalbari-ct-population>

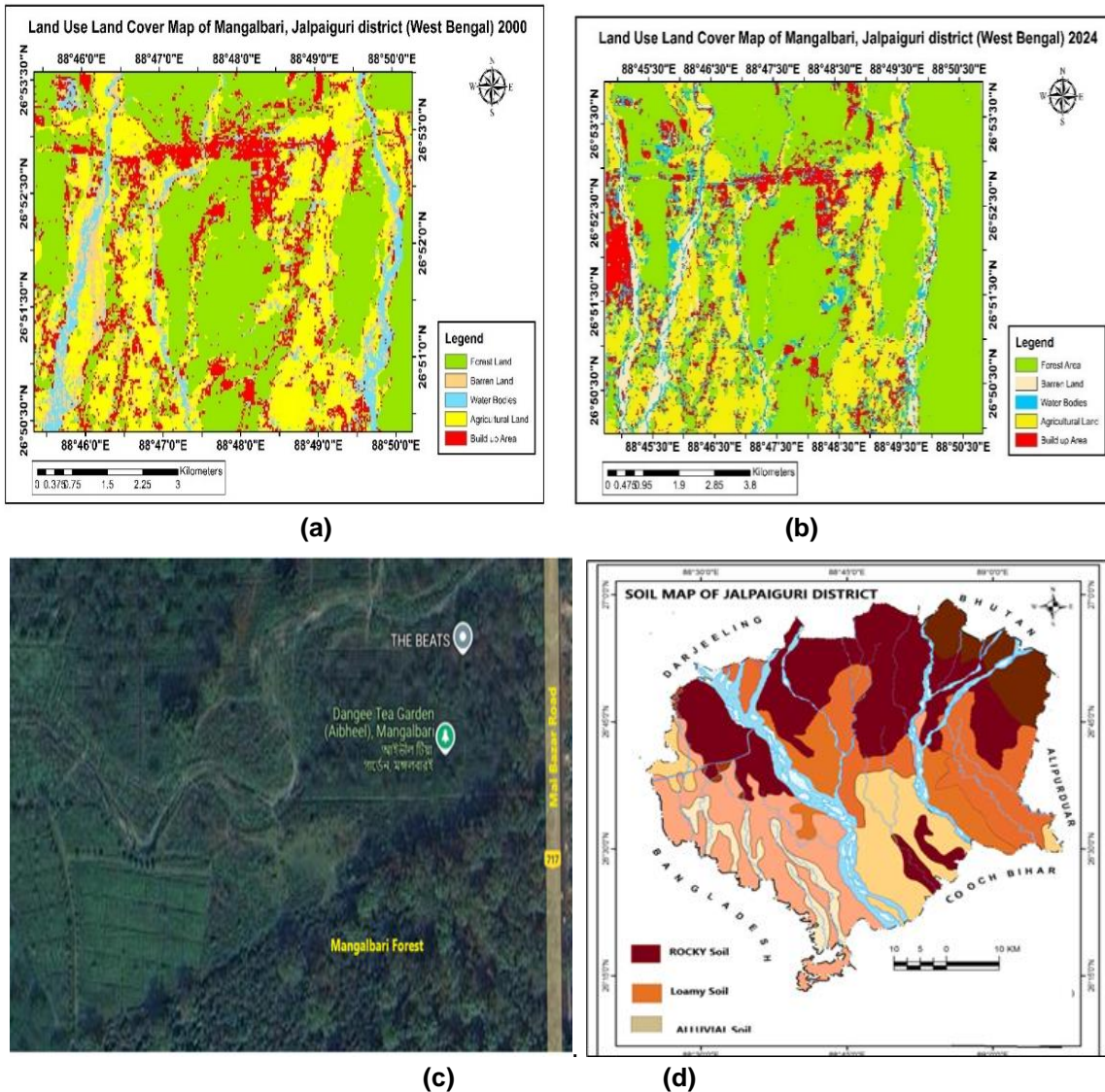


Fig. 9 (a, d). The LULC map of the village Mangalbari between 2000 and 2024 (c) The Google map of Mangalpur village with Dangree Tea Garden (d) soil map of JPG dist.

#### 4.13 Health Care Units

People in slums/hattings are the socially outcast groups. They have limited accessibility to healthcare amenities rather than dependence on ethnobotany/ Ayurveda. The mobile medical care (MMC) units have reported injuries, scabies and snake bites, gastrointestinal disorders, and high vertigo cases in the Matiali CD block of Jalpaiguri district (Mohapatra et al., 2024). Anaemia prevalence has reached its peak (87.9%) among the tea-garden workers belonging to the labour class group (Mishra et al, 2024).

#### 4.14 Women Workers Tea Estate, Dooras

The women workers in tea estates have Low Wages (Struggle for livelihood), Poor Workplaces

(affecting their Health and Well-being), restricted access to WASH facilities (health risk), social security (dominant society, backward class and tribal lifestyle), Less education and lack of skill development, and Govt's solo ownership (encouraging public-private partnerships in running of tea industry).

#### 4.15 Major Problems of Women in Dooras

The Tea Gardens in 2022 revealed that about 76% of Tea Estate workers are females; ≈81.2% are from a social basis backward class, >55.9% are illiterate, and about two third (67.2%) are economically backward (Dutta 2014; Yasmin et al., 2022). The tea industry is labour-intensive and more than 50% of workers are women. The

various problems of these women workers are food insecurity, poor connectivity, inadequate transportation, unhealthy drinking water, insufficient illumination, Wash problems, inadequate storm/sewerage system, waterlogging/inundations, wanting WASH facilities, illiteracy, lacking creche, poor healthcare amenities etc. The permanent TG workers have no land for housing, and live in huts, bastes, and old abandoned company quarters. The socioeconomic problems in Doors TG women workers are low incomes, social security, unemployment, and dependency on others, The societal risks are illiteracy, poor health care, WASH amenities, addiction, lacking awareness lack of awareness, of training, government assistance, SC/ST preferences etc. This leads to the mismanagement of society adding women's exploitation, child abuse, trafficking etc.

#### **4.16 Women empowerment in Dooras**

The Tea industry in Dooras is drowning caused of short-term leases, low labour productivity, high production costs, surged domestic consumption, fall in tea prices, quality deterioration etc. Most tea garden workers are women and prominent members of plugging, drying and processing. The closure of TGs has made them vulnerable to human trafficking and girl-child violence. The focussed areas are “women and child” abuse or trafficking for alternate occupation, domestic help, forced marriage or sexual exploitation. Cases are there like “rape” and “sexual violence”, “dowry cases” and “wife battering”. Siliguri is a regular corridor concerning human trafficking to cosmopolis like Kolkata, Delhi etc. for the Dooras region. (Chhetri et al, 2015; Bhattacharya CS., 2024.

#### **4.17 Snakebite and Women Tea Workers**

The emerging HAC in tea gardens are the venomous snake bite deaths, and women are the worst victims, followed by the least reported bee stings. On summer days, especially in the daytime, snakebite incidents are reported more by Cobras, Russel's, Vipers and Craits. Women tea workers are the most vulnerable in waist-high tea bushes during plugging, transporting, and clearing in harvest areas and are underreported. To address the snake bites and the related deaths and disabilities, people from the healthcare sector complain about the availability of antivenom, public awareness, religion/region-specific empathies, and monovalent antivenom to treat the victim.

## **5. SOCIOECONOMIC STRATEGIES**

The flat terrain of Matiali is suitable for cultivating various vegetables. However, it is not ideal for cultivating other crops. The crop of rice flour is grown throughout the year. There is less connectivity and few places are inaccessible. The Mangalbari tea workers' basti of Matiali block are socioeconomically backwards compared to other tea workers in the Dooras.

### **5.1 Tribals in JPG**

The tribal-dominated areas of Matiali have Champadanga, Moulani, Lataguri, Bidhannagar, and Angrabhasa-II GP Matiali Batabari-I, and Matiali Batabari-II. People in these areas have lower income rates, low sex ratios, less literacy, and a higher expectancy rate than non-scheduled people (Mostly Santal). The major community is ST which constitutes which constitute (62%) of the Adivasi subgroup found in its 89 registered tea gardens (Sarkar et al., 2017) (Table 4).

### **5.2 The Tea Trade in Dooras**

India has 6.20 lakh hectares (ha) of 1567 numbers tea gardens, whereas West Bengal shares 1.39 lakh hain 449 numbers of tea gardens in 2022 (The Tea Board of India). The quality and flavour of Dooras tea in the name of Darjeeling tea are unique. The tea trade is declining due to reduced tea prices in the global market fetching closure to the Tea industry. They suffer from food security and degraded socioeconomic status resulting in migration, and marginalisation. As a result, women and girl children confront human trafficking. The tea gardens face environmental hazards like Storm impact, soil erosion, river shifting, and surface and groundwater quality issues Bhattacharjee 2024.

West Bengal Adviser appealed the Supreme Court (S.C.), a report on Hunger in Tea Plantations in North Bengal during 2004. Another survey report recorded 450 fatalities, about 20,000 roofless families, 38 tea gardens (TGs) and 80000 workers without electricity, and the larger numbers in TGs live without Wash facilities violating the mandate of the law, in 2010. The land reform acts in 2019 and 2023 have been protested by the aboriginals and tribals <https://www.india-seminar.com/2023/765/765-10%20JOY%20PRAFFUL%20LAKRA.htm>.

### 5.3 Demographic Analysis Mangalbari Village

Jalpaiguri, tea estates have 62% Scheduled Tribe (Adivasi subgroup) estimated in its 89 registered tea gardens (Bhattacharjee et al, 2024). A random survey results show children aged 0-6 years in Mangalbari village is 661 between 0 and 6. This shows that out of 94 respondents, Schedule caste and Schedule Tribe constitute more than 86% of the caste category in Mangalbari. The aboriginals of Dooras are Munda, Santals, Limbu, Mech, Mahali, Malpaharia, Tamang, Lohar, Oraon, Kharia, etc. The areas in Matiali CD block with the majority of Aboriginals are Mech, Rabha, Garos, and others. The migrants are settled at Lataguri, Bidhan Nagar, Matiali Batbari I, Matiali Hat, Matiali

Batbari II, and Indong Matiali, etc. The Mundas community has an average income, education, and life expectancy, followed by Santal and Mech. The Mahali, Lohar, Kharia, and Oraon communities work in tea gardens (Sarkar et al., 2017).

#### 5.3.1 Age structure

The survey results of 94 houses having 239 males and 218 females show a rise in adolescence, youth, and adult population for both females and males in Mangalbari. The village is going to flourish in future, and the older group (> 60 years) are rarely available due to the morbidity and lacking health care. The frequency of middle family size (4-8 members) is the maximum response to the ignorance of family planning Fig. 12(a).

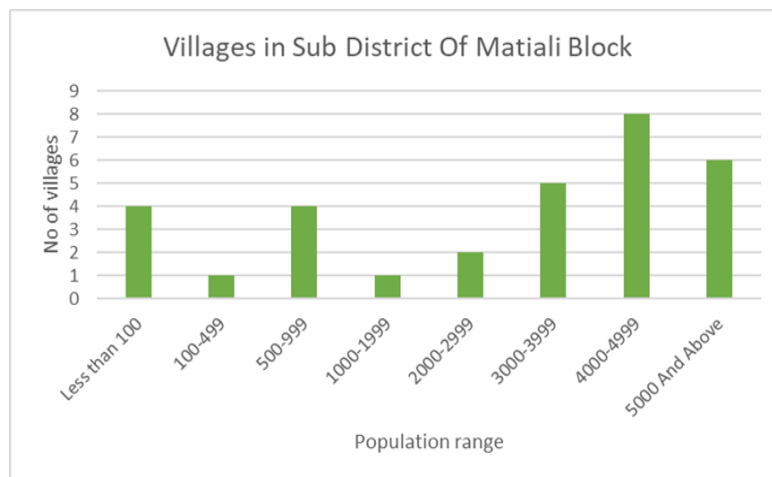


Fig. 10. Number of population range Villages in Matiali CD Block (Census 2011)

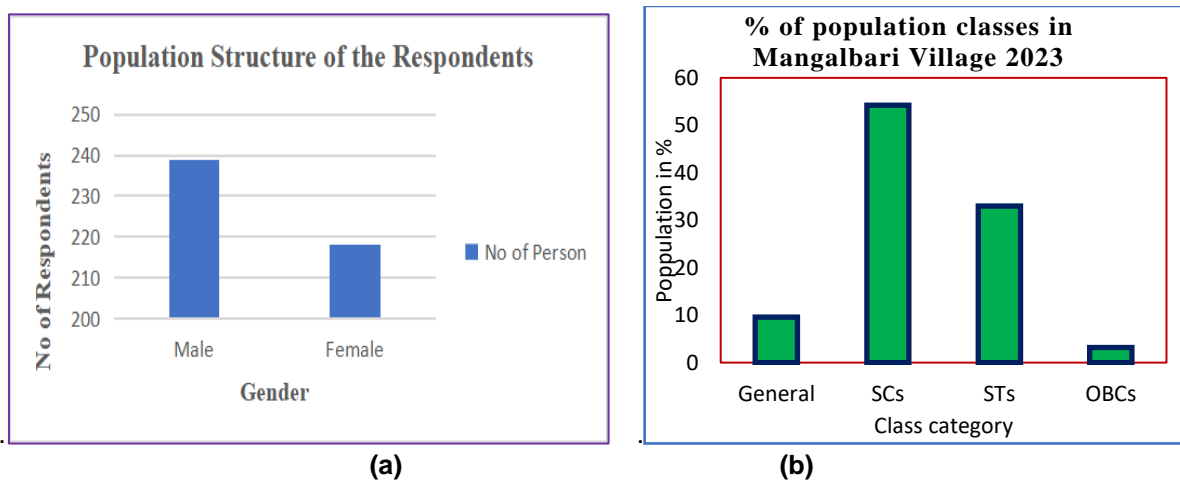


Fig. 11. (a) Sex-wise persons (b) Cast-wise population in % in Mangalbari village

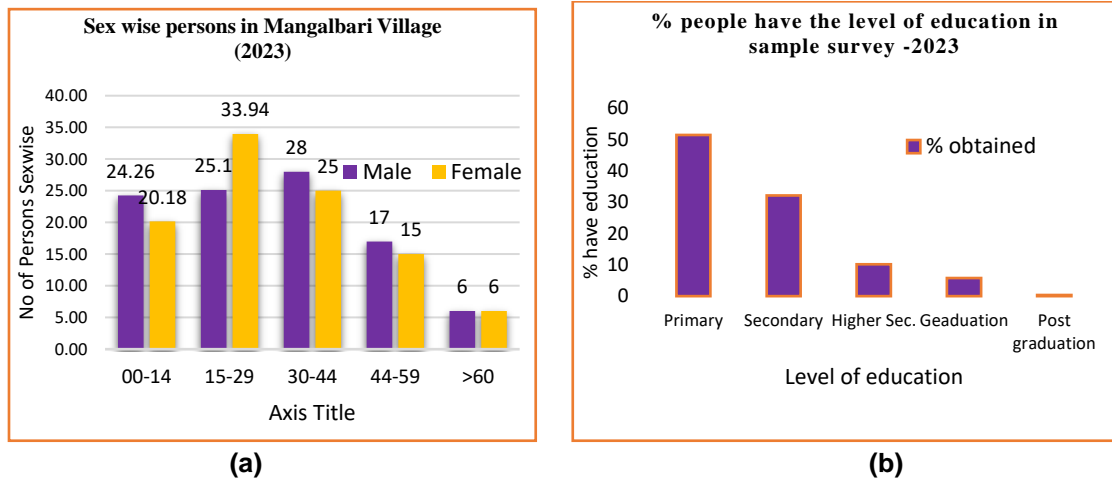


Fig. 12(a). Respondents sex wise males/ females (b) Level-wise education of population(%)

### 5.3.2 The literacy rate

The Mangalbari had a literacy rate of 70.36% in 2011, whereas the average literacy rate of WB is 76.26%. The literacy rate of the male and female are 70% and 59% respectively. The % of people in various slabs is in Fig 12(b). Interaction reveals parents admit their wards for midday meals and their safety when they are at work. But when become adolescents, abscond from school mid-day and later leave their education. They undertake petty jobs later.

### 5.3.3 Tea Estate

The Tea trade is the major economy of Dooras. The Green leaves of tea are the raw material and supplied to the factories. The production from processing plants promotes stakeholders and the state economy.

### 5.3.4 Tourism

Dooras transformed into a famous and popular tour destination like many NPs, Safari, and sanctuaries that have escalated the Dooras

people's economy. The hotels, motels and tin/ bamboo cottages are famous for lodging, and food with tribal cultural activities.

### 5.3.5 Timber

Sal, Teak, Mahogany, Sisso, Piasal, etc are the costlier trees and are the main timbers plentifully available in tropical moist deciduous forests in Dooras. These timbers are valuable. As per the State Forest Department (SFD), those trees shall be chopped which are mature and only after wood balance study. So many timber industries have flourished in western Dooras like sawmills, plywood industries, and other allied businesses that contribute to the economy of West Bengal. The rise in Tourism has deteriorated the forests. The tribals who protect forests in the past now befalling these trees for livelihood, Table 5.

The SFD is constantly working to enhance the greenery and tree cover through Social Forestry, Agroforestry, on-farm Forestry, Community Forestry and wasteland forestry, TGs, embankments, roadside, etc.

Table 5. The POR/COR/UDOR cases filed in Dooras areas during F.Y. 2020-21

| Division     | Illicit Felling in 2020-21 |           |            |             |
|--------------|----------------------------|-----------|------------|-------------|
|              | POR cases                  | COR cases | UDOR Cases | Total cases |
| Siliguri SF  | 3                          | 49        | 0          | 52          |
| Baikunthapur | 29                         | 141       | 181        | 351         |
| Jalpaiguri   | 23                         | 232       | 858        | 1113        |
| BTR west     | 31                         | 0         | 834        | 865         |
| Cooch Behar  | 2                          | 52        | 43         | 97          |
| Jaldapara WL | 8                          | 0         | 305        | 313         |
| Gorumara WL  | 0                          | 0         | 313        | 313         |
| Total        | 96                         | 474       | 2534       | 3104        |

POR: Prosecution Offense reports; COR: Compoundable Offence Report; UDOR: Un-Detected Offence Report  
Source: Forest Department Annual Report of West Bengal Year 2020-2021

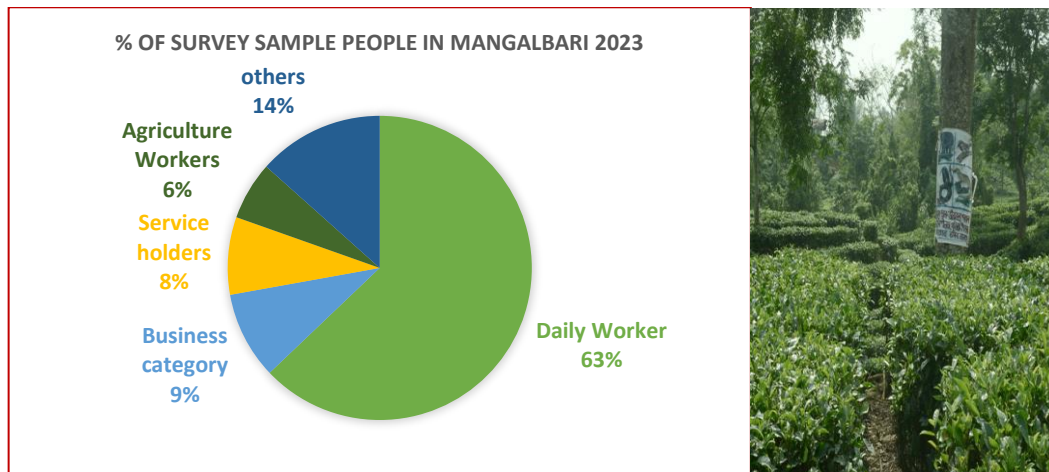


Fig. 13. The working class in Mangalbari Area, Matiali block but be aware of Snakes

### 5.3.6 Tribes

Jalpaiguri accommodates appreciable tribals of 3.45 Lakhs of categories Munda, Mahali, Gora, Santal, Oroan, Lodha, Lohara, and Lepcha, are the scheduled tribes which is 5.88% of the state's population 2011 census data. These native people cut wood from the forests as their birthright. Sometimes they are depredated by wild animals. The population of SCs and STs are comparably much higher than general cast people in Dooras. As a result, illicit felling. Deforestation of costly woods is common.

### 5.4 Agriculture in Dooras to Mangalpur

Major crops cultivated in Dooras are Rice, Wheat, Tea, fruits Vegetables, Maize, etc. Tea plants are the main cash crop. The tea industry is focused trade of people. Many private Tea Estates have flourished companies like Goodricke, Lipton etc. Apart from this, Rice, Jute, Black Pepper, Betel Nut etc. hold the people's economy. The Tea gardens are amidst small shading trees that brew vees and pests. It is controlled by wrapping the lower part of the tree trunk using yellow-coloured paper with special types of adhesives. Rubber plantations and Betel nut orchards amidst the trees are common and create an eco-friendly environment. Traditional techniques like stubble mulching, strip cropping, conservation tillage etc. are in practice that prevent fertilizing and soil erosion. The yield of cereals and tea is 54.733 MT and 53.72MT respectively are leading crops in Mangalbari as per the Dist. website of JPG-2020.

#### 5.4.1 Working class

In the Mangalbari CT, 2276 people were in the working class. About 72.5% have more than 200

days/annum employment, while 27.5% of marginal workers < 200 days/year. The survey class included 94 families, cultivators (owner or co-owner), and agricultural labourers (102). Analysis of survey samples reveals that, out of the 457 population, 32% are from the working class and 68% are non-working class. Based on their occupation, most of the population are either daily labourers (61%) or businesses (9%), 8% belong to the service sector, 6% are agricultural labourers and others constitute 13%. More than 82% have no agricultural land and the rest only have land for agriculture. This can be identified from (Fig. 13).

## 6. RESULTS AND DISCUSSION

The daily wage workers in the tea garden or in the agriculture field are either less paid or descaled by the owner as per the market rate declared by the Labour Department of Govt. WB. or Indian Tea Board, which compels them to live in slum settlements.

*The local families are deprived of the WASH (Water and Sanitary and health) facilities:* They are deprived of the provision of clean water, sanitation, hygiene, waste management, and services of health care facilities. The *increased production cost* and the differential cost of production and sale margin have reduced causing loss or minimal profit to the owner disheartening for trade expansion fetching closure.

Climate change (CC) and low productivity due to Global warming have invited glacier melting, and flooding the perennial drainage channels from the Himalayas has negative impacts on the yield,



which has been reducing since the 1980s in Doras.

The occupational exposure in the tea sector, the workers suffering from respiratory diseases, and allergies need routine checks and systematic surveillance of the air quality. The workplaces should improve for workers their physical and mental health. Status. The tea workers are to be provided adequate training and supplied with protective equipment to mitigate risks of health problems.

Short-term leases for TGs are continued from the British period. Long-term leases only can improve tea gardens and the workers. For example, the CTC and Orthodox green tea manufacturers shall cease their manufacturing by December 2024 and these closures shall stop the functioning of many tea gardens in Doras. Ref No.12(17)/LC/2008/ Part III/502 dated 15<sup>th</sup> July 2024 of tea board India.

Works involved in Tea production in the fields are Plucking, Manuring, Weeding, Irrigation, Disease control, Pruning, Pest control, etc whereas inside the factory the jobs are Withering, Rolling, Fermenting, Drying, Weighing Sorting/Cutting, Packing and others. Almost all the field works are executed by the women who are the indispensable workers in Doras.

The TG worker's fatalities are reported due to snake bites, attacks from wild animals, and other contagious diseases. In closed tea estates

workers are under starvation and malnutrition. So, they need attention to healthcare. Further, records reveal that from 2000 to 2015, 1400 people died in 17 closed tea estates in West Bengal (Roy NC et al, 2018).

Overall, 80% of women working in tea estates are from ST and SC. These socio-economically and politically backward tea workers still have harsh livelihoods. They have increased migration, marginalization, human trafficking (women and children) sexual exploitation and are ignorant about the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act or PoSH Act, 2013.

### 6.1 Soil Conservation Works

After all the anthropogenic transformations, the Soil conservation division in Jalpaiguri has brought land reforms to arrest soil erosions. In hilly regions in Jalpaiguri, soil erosion and slippages are controlled by structures like Gully plugging, hand-packed walls and plantations in landslide areas. In *Boulder Reachs of River*, soil erosion plays a vital role, and the soil conservation structures in the land-slide/slip-prone areas constructed are boulder sausage, the hand-packed walls through community participatory management. Gully plugging, check dams, catchwater drains, CR/RR masonry retaining walls etc. To protect against slides or slips adequate necessary plantations like bamboo, pandanus, and grasses are needs plantation along the slopes.

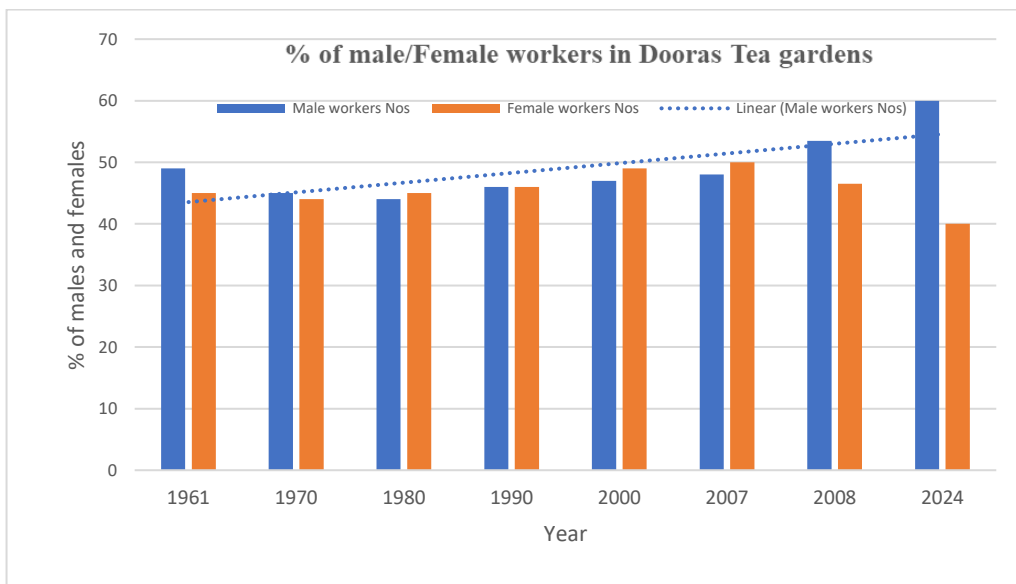


Fig. 14. The % of male and female workers in the Tea gardens in Doras West Bengal

### 6.1.1 Low wages and human rights

In comparison to other states the tea workers in Dooras are less paid to meet their demands for livelihood to uplift the socioeconomic standards and their malnourished uneducated children and strictly follow Human rights.

### 6.1.2 Tea garden closure

There is a large-scale closure of the tea gardens in the Dooras region. The closures have a severe impact on the tea garden worker's livelihood.

### 6.1.3 Migration

Marginalisation: In the areas of tea-closed estates, the workers without income were forced to migrate to other places, shift to other professions, and report human trafficking especially women and children which is alarming to society.

### 6.1.4 Gender inequalities, Human trafficking

The tea gardens, where joyous livelihood and employment everywhere in the Tea Bastes, the closed and defunct tea estates are in darkness due to their illiteracy, dishonesty influence their societal dogma to breed domestic violence, women atrocities that conceive human trafficking, adolescence and forest illegal felling and wildlife offences etc.

### 6.1.5 Access to clean water and energy

It is one of the key issues. Workers don't have proper solid waste management facilities and toilets. As the quality of life is poor in Indian tea gardens, workers have been choosing alternative livelihoods.

### 6.1.6 Fighting disasters

The trajectory of many BoB storms after slamming the east coast and Kalbaisakhi passes through the Dooras region giving strong gusty winds and heavy rainfall causing landslides, soil erosion, and embankment breaches causing distress to tea plantations.

## 6.2 Shifting Gardens to Other Countries

The TG proprietors are shifting their activities to foreign countries like Kenya, Sri Lanka etc. It is due to foreign trade policies, global politics, and price wars. Those have a severe impact on the tea trade and its workers' livelihoods in India.

The results are migration, marginalisation and human trafficking (Especially female and children)

### 6.2.1 IWM projects

The perineal flow of the rivers Kurti, the Noira, the Tista and the Mahanada fluctuates for seasonal floods and that causes erosional hillslopes. River training works like low-level spurs, Groynes, and slope ripraps become necessary to protect the embankments and the flood inundation through Integrated Watershed Management Projects (IWMP).

## 6.3 Sustainable Agriculture

Some initiatives in the Noira-Tista will ensure that the tea gardens of north Bengal remain sustainable. The fan has moderate gradient hills conducive for tea plantations. Sustainable farming practices that help conserve soil include interim crops before and after Paddy cultivation (fodders and legumes), modern ploughing methodologies, crop rotation, tillage with water conservation, proper paste management, soil enrichment by organic and compost manures and above all, organic farming (Mishra et al., 2020). The augmentation of yields through sustainable farming can be achieved by effectual water management, land use intensification, agroforestry, Pollinator fortification, etc.

### 6.3.1 Sustainable tea farming

The protagonists of tea gardens in Dooras are the conducive environment, worker safety and well-being, high yield, consumer prerequisite, and efficient trading. Bio-fertilizers, pesticides, and sustainable water management should be encouraged as orthodox methods of the plantation. Tea gardens can shift to sustainable organic farming to cut the demand for chemical fertilizers and pesticides. Water-saving strategies like rainwater harvesting and drip irrigation can be adopted. Soil conservation and afforestation techniques will restore damaged land and preserve natural resources. Cutting-edge farming methods and equipment will improve tea quality and tea gardens' productivity. More research and development works are warranted to protect Tea plants from diseases/ pests.

## 6.4 Suggestion

**Government intervention:** The canal and its water need to be adequately maintained so that

both the Mangalbari and its nearby villages are irrigated to yield better than past. The government should intervene by better affordable methods of processing and marketing products without brokers. The villagers should get subsidized with raw materials and specific schemes to protect them from the erratic ISM.

#### 6.4.1 The Safe and Riskless WASH Facilities

The Safe and Riskless WASH Facilities education, skill development, and connectivity should be assured either by the Government, or TG estate owners. Women need to be empowered. MANREGA, Mahila Shakti mission should try to increase their working days and their skill development. Women should be provided actions against, poor healthcare facilities, maternal mortality, epidemics and pandemics problems, drinking water crisis, early marriage, child labour, alcoholism, snakebites, unskilled, illiteracy, etc.

#### 6.4.2 Soil health management practices

Soil health management practices should be enhanced by multiple cropping, the use of organic fertilizers, and composts to improve soil fertility, weed suppression, nutrient content, and biological activity (Mishra et al 2017).

#### 6.4.3 Tribals and the Aboriginals

Tribals and the Aboriginals admitted the importance of women in their society but lost importance in the long run. Micro-finance can empower them by upswing their socioeconomic stability (Sahoo et al, 2022).

### 7. PROSPECTUS

Nowadays, Dooars is a very famous and popular tea garden and tourism destination. The tourists visit regularly, but October to January is the peak season. The Indigenous people, cut wood illegally falling and poaching from the forests. The government schemes, tea factory returns, timber works, and hotel business have accelerated the economy of this place and have prospects. The aboriginal Indo-mongoloids (Mech, Toto, Garo, Rabha etc) became reluctant to work in Tea gardens, so Indian communities such as Oraons, Santal, Mahali, Munda, Malpaharia, Kharia, Lohars etc. migrated to work in the labour-oriented tea gardens since start of tea plantation. The differential social culture

faces the challenges of being exuberated by economic sustainability problems and the socio-cultural identity crisis.

Dooras and the Matiali area are suffering from land degradation, soil erosion, floods, and gradual nutrient loss for the tea plantation areas. Policy involvement, livelihood upgrading, and strategic planning adaptation can provide a permanent solution to soil degradation through climate change adoption.

### 8. CONCLUSION

The economy, livelihood and societal values of Dooars rest mainly stans on four Ts – Tea, Timber, Tourism and Tribes. Dooras is popular today in India due to Tea-tourism, quality timber, tourism activities and exhibition of tribal culture. The tea is the cash-making agroindustry in Dooras. Poverty, Ignorance, aboriginal culture food habits, and surging population have made lives vulnerable to societal, financial, unsafe and risky lifestyles of the people in Dooras.

The Bengal Government schemes/ policies, like the Chai Sundari Yojana/ Tea Tourism and Allied Business Policy, 2019 are against the Dooras tribal's livelihood. The West Bengal Land Reforms (Amendment) Bill, 2023, is again antagonistic to tribal land ownership and they vehemently protest the recent act.

Animals and humans live interdependently and conjointly on the same land. They fulfil all their needs by sharing in a shrunken habitat that has accelerated HAC. The ameliorating strategies warranted are fixing corridors, wildlife overpasses, and the use of solar technology.

Mangalbari is a small tea-based village in Dooras, where the primary problems are poverty, closure, human-animal conflict (especially the HEC), Women and child trafficking. They have less organized women's groups, education, WASH facilities, etc.

All living beings live in their natural setting. It is unlikely that an eternal remedy is difficult to find. All settings among tea estates, tribes, timber, and tourism sectors must be planned independently but managed conjointly. Regular data collection, analysis, and dissemination, combined with proper field surveys, can assure the natural environment and its socioeconomic interrelationship and gender equality.

## DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

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## COMPETING INTERESTS

The authors have declared that no competing interests exist.

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