

## **Chapter Two**

### **Geographical Background of the Study Area**





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#### 2.1 Introduction:

Different extremities of topography, soil, rainfall, vegetation and ancestral chronology are some of the determining factors for different tribal habitats in India. As the natural landscape is not the same everywhere and as the tribes have made specific adjustments to their habitats, the course of their cultural evolution has moved along diverse paths (Dash, 1993: 32).

Tribal culture and tribal agriculture, both are intrinsically interwoven with the physical geography, particularly the physical base of the habitat. Therefore, the knowledge of physical geography and its impact upon tribal agriculture is a prerequisite. Other than physical geography, demographic, cultural and economic aspects of a particular region are also important. Characterization of the tribes or indigenous people by the World level organizations vindicate the same in the following manner.

The most widely accepted characterizations of indigenous peoples are derived from the International Labour Organization (ILO) Conventions 107 and 169 (ILO, 1957; 1989), and from the United Nations Economic and Social Council's (ECOSOC's) Sub-Commission on Prevention of Discrimination and Protection of Minorities which point towards the following:

- Indigenous people usually maintain a strong attachment to particular geographical locations and ancestral territorial origins.
- They typically seek to remain culturally, geographically and institutionally distinct from the dominant society, resisting assimilation into the greater national society.
- In this way, they tend to preserve their own socio-cultural, economic and political ways of life.
- They specifically and overtly self-identify as 'indigenous' or 'tribal' (FAO Report, 2009: 3).
- Based on the above, it follows that particular locations for tribal communities are indispensable for their livelihood. To focus on this particular location of tribal people of eastern Gujarat the following classifications have studied:

1) ICAR: ICAR has delineated eight agro-climatic zones in Gujarat. Each zone has a definite climate and soil. Gujarat belongs to arid western plain (AICRP, 2023)

2) Planning Commission: Considering climate and socio-economic aspects, there are fifteen agro-climatic regions. Gujarat plains and hills are one of the regions (Sinha, 2023)

3) On a popular note, Gujarat is regionalized into Mainland Gujarat and Peninsular Gujarat with the following sub-regions:

- North Gujarat
- Central Gujarat
- South Gujarat
- Saurashtra and Kachchh

4) According to Dikshit, the entire area of Gujarat could be divided into five physiographic units based on the height above sea level: The coastal lowlands of Gujarat and the Rann with a few inlands

- The plains of Gujarat
- The plateau of Saurashtra
- The peripheral piedmonts
- The hills, ridges and relict mountains (Dikshit, 1970: 12).

5) Mitra and Sengupta delineated sub-micro regions at district level during the 1981 census. Following this project, there was a continuation of demarcating sub-micro regions based on physio-geographical characteristics and published during the 1991 census. According to this regional division of India, Gujarat as a meso-region is a part of the Coastal Plains and Islands. Within the Gujarat region, there are four micro-regions, namely Gujarat Plains, Eastern Hilly Region, Kathiawar Peninsula, and Kachchh Peninsula (Census of India, 1991: 26).

## **2.2 The Study Area:**

The current study has embraced the Gujarat regionalization plan from the 1991 census since it is thought to be more appropriate given the context. The two microregions of the Gujarat Plains and the Eastern Hilly Region roughly approximate to Gujarat's tribal belt. The twelve

districts covering these two regions have been considered in the present research. For the purpose of this research, it is intended to generate and analyze data at two levels.

1) Secondary Level: The Twelve Integrated Tribal Development Programme (ITDP) districts covering fully the Eastern Hilly Region and partly the Gujarat Plains shall be studied with the help of secondary data provided by Census of India and other official sources.

2) Primary Level: The tribal *talukas* of Vadodara/Chhota Udepur district shall be put to detailed investigation with the help of secondary as well as primary data generated through direct field investigation.

### **2.3 The Twelve ITDP Districts:**

The gradient of Gujarat in general is from north-east to south-west. With average height of 300 meters, the eastern and north-eastern parts of the State are distinguished from the western and south-western parts by their hilly topography and forested tracts, where the major rivers of Narmada, Tapi, Sabarmati and Mahi have carved out their flood plains.

**Geology:** Gujarat is characterized with peninsular formation extending from Arabian sea to eastern hilly region. The geological structure of the whole region is mostly composed of Deccan Trap formations.

**Climate:** The state of Gujarat falls under tropical monsoon climate with wide regional variations in the rainfall pattern. The southern part of the State receives more rainfall compared to its northern part.

**Vegetation:** A region's vegetation type, coverage, and density are influenced by a number of factors, the most significant of which are terrain, temperature, rainfall, and human activity. There is a strong correlation between Gujarat's rainfall patterns and vegetation, with higher proportions of forest cover seen in the state's south, south-east, and east. (Dikshit, op. cit.: 38).

**Soil:** Soils of Gujarat can be classified broadly into four categories, viz. alluvial soils, desert soils, laterite soils and local soils. The alluvial soils found in the State can again be classified into river alluvium, coastal alluvium and black soils.

### 2.3.1 The Gujarat Plains:

The Gujarat Plains cover the districts of Banas Kantha, Sabar Kantha, Vadodara, Bharuch, Surat and Valsad. The eastern margin of the plain from north to south is covered by protrusions of the Aravalli ranges, the Vindhya, the Satpuras and the Western Ghats. Gradually decreasing in width from north to south, the Gujarat Plains are the most fertile tracts of the State. The relief of the Plains varies between 25 to 75 meters above mean sea level (amsl).

**Drainage:** Meandering through the Gujarat Plains from east to west, the most important rivers of Narmada and Tapi have created several terraced beds. Due to the meanders in its course, the Narmada River has developed a few islands like, Shuklatirth in Bharuch district and Aliabet in its estuary. These two main rivers contribute significantly in maintaining the fertility of the alluvial soils of the Plains. The south Gujarat region consisting of Bharuch, Valsad, Navsari districts are well known for the production of Cotton. And the streams run parallel to each other in the south Gujarat Plain flowing directly to the Arabian sea. Most of the rivers have parted ways by the intervening spurs of the Satpura Range and the Western Ghats.

**Soil:** Starting from Banas Kantha district, the soil emerges as sandy while Sabar Kantha district has fertile alluvial soils originating from Sabarmati River. The soil of Gujarat Plain varies widely in colour and texture. According to age, the alluvium is mainly divided into Gorat<sup>1</sup> or old alluvium and Bhata<sup>2</sup> or newer alluvium. Gorat soils are worn out in fertility, usually having brown clay and limestone nodules, and can be found in river terraces. Other than these two soil types, Goradu soils are common in almost all water-shed areas of central districts and it is less fertile than the previous two soils. Bhatas occur in the flood plains and Goradu soils can be traced in river terraces. From Banas Kantha in the north to Vadodara, the entire central plain in Gujarat is covered with different types of alluvial soils. The southern part of Gujarat Plain consists mainly of Regur<sup>3</sup> or black soil in the Narmada and the Tapi River basins. Black soils in the Vadodara, Bharuch, Surat and Valsad districts of Gujarat Plain region are mostly weathered basaltic materials transported

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<sup>1</sup> Gorad soils (local name) are older alluvium found on the river terraces.

<sup>2</sup> Bhata soil is made up of fresh silt from the river.

<sup>3</sup> Regur or black soil is good for cotton cultivation, so known as black cotton soil.

from Satpura and Western Ghats. The Narmada and the Tapi River valleys are fertile plains covering a large part of the Gujarat Plains division (Ibid.: 44).

**Vegetation:** The plain region is covered with dry and moist deciduous vegetation depending on the amount of rainfall. The Dangs, Valsad, Surat and parts of Panch Mahals have moist deciduous forest.

### **2.3.2 Eastern Hilly Region:**

Highlands that border north, north-eastern and eastern parts of the State are rugged and stretch from Sabar Kantha in the north to The Dangs district in the south. Higher parts of these highlands are a continuous stretch of hilly terrain located in the northern part of Sabar Kantha district and eastern part of Narmada-Tapi divide (Ibid, 1970: 20). Eastern Highlands usually are not more than 300 meters in elevation and have three different morphologies viz., the southern part of Aravalli, the middle part with its two subdivisions - north of Narmada and south of Narmada River, and the third is south of the Tapi River.

**Geology:** Aravalli outliers in the north are formed of crystalline and metamorphic Dharwar rocks. Sabar Kantha and Banas Kantha districts have granite rocks underneath. Other parts of the highlands are composed of Erinpura granite, gneiss and Deccan trap formations. The eastern part of the central districts of Chhota Udepur is covered with Vindhyan Hill ranges. Deccan Trap, Intra-Trappean Bagh, Lameta Beds and Gneiss constitute the geological structure of this region. More than 300-meter isoline passes through the northern part of this region.

The undulating hilly terrain of Satpura Hills characterize the eastern part of Bharuch district, which has penetrated from the eastern margin of Maharashtra state. The Rajpipla Hills of Satpura Hill ranges are famous for agate quarries. (Singh, 1971: 882). Agate stones are generally associated with the volcanic and metamorphic formations of Deccan Trap, Intra Trappean Bagh and Lameta Beds. Hill ranges of the Western Ghats cover the eastern part of the Valsad district. Altitude in this part of the Western Ghats varies between 280 meters to 615 meters amsl. Geologically, the region is made of rocks belonging to the Deccan Trap formations.

**Drainage:** Of the four major rivers of Gujarat, Sabarmati and Mahi drain the districts of Panch Mahals and Sabar Kantha. The lower course of the Mahi River is characterized by gullied

sand banks and ravines. The Narmada and the Tapi Rivers along with their tributaries like Orsang, Heran, Karjan, Kaveri, and Amravati Rivers, traverse the southern districts of the State.

**Vegetation:** Mostly dry deciduous forests with mixed variety of trees can be found in Sabar Kantha district of Eastern Hilly Region. With decreasing rainfall in the northern part of Banas Kantha district, thorny or xerophytic forest exists along with bamboo.

**Soil:** Eastern Hilly Region is characterized by two main soil formations, Gorad alluvium and black cotton soil. Gorad soil covers the greater part of Banas Kantha and Sabar Kantha districts. River beds and river islands in Vadodara, Bharuch, Valsad and Surat districts are formed of Bhata soil. The black soil is predominantly occurring in the greater part of north eastern highland.

## **2.4 The Micro Region - Tribal *talukas* of Vadodara/Chhota Udepur District:**

### **2.4.1 Evolution of the Vadodara District:**

The Vadodara district extends between 21° 50' to 22° 50' north latitudes and 72° 50' to 74° 10' east longitudes. Total area of the district is 7,5462 kms, holding the tenth position among the districts of the State. It is bounded by the Panch Mahals and Dohad districts in the north, Kheda and Anand districts in the west and Bharuch and Narmada districts in the south. Eastern margin of the district is flanked by the boundaries of Madhya Pradesh and Maharashtra states. Vadodara district has an average elevation of 37.7 meters amsl, with height increasing gradually from west to east.

The area was formerly known as Chandanvati, after Raja Chandan of the Rajput Dor tribe. Following Chandanvati, the district was given the name "abode of warriors," or Viravati. Later, Vadpatraka, which means "leaf of the Vad tree," was adopted. The district of Vadodara was formerly a part of the British Bombay Province and was included into the state of Gujarat on May 1, 1960.

While the western part of the district covers a portion of Gujarat Plains, the eastern part is marked by the outcrops of the Vindhyan ranges. It has seven sub-divisions, namely Khambat Silt, Mahi Plain, Vadodara Plain, Orsang-Heran Plain, Vindhyan Hills, Narmada Gorge and lower Narmada Valley. Vadodara district was bifurcated into two separate districts, Vadodara and Chhota

Udepur on 26th January, 2013. The four hilly and forested *talukas* dominated by tribal population, namely Kavant, Chhota Udepur, Nasvadi and Jetpur Pavi along with two other *talukas* of Sankheda and Bodeli accommodating both tribal and non-tribal population have been carved out of Vadodara district as Chhota Udepur district. For the purpose of on-going research, these six *talukas* of the newly formed Chhota Udepur district have been taken into account intentionally as the required secondary data for district as a whole is not available in the 2011 census sources.

#### **2.4.2 Chhota Udepur District:**

Chhota Udepur was the capital of the Princely state of Chhota Udepur, the first-class state under Rewa Kantha Agency, founded by Rawal Udeysinji. It was founded in 1743 and later merged with the Union of India on tenth March, 1948. Chhota Udepur town located in Chhota Udepur *taluka* serves as the district headquarters of this 28th district of Gujarat with six *talukas* under its administration. It is the third tribal dominated district of the State after Narmada and The Tapi districts (District Geologist, 2016: 42).

**Location:** The total area of the district is 3,4362 kms, extending from  $21^{\circ} 51' 36''$  to  $22^{\circ} 34' 39''$  north latitudes and  $73^{\circ} 28' 46''$  to  $74^{\circ} 16' 25''$  east longitudes. The district shares its boundaries with the state of Madhya Pradesh in the east and south-east, Dahod and Panch Mahals districts in the north, Vadodara district in the south and Narmada district in the south and south-west.

**Physiography:** South of Chhota Udepur is mainly constituted by the Deccan Trap which was furrowed by the Narmada and the Tapi Rivers. North of the Narmada River is covered by Vindhyan offshoots known as Vanmala Hills, while south of the Narmada are the broken and dissected Rajpipla hills (Dikshit, op cit, 1970: 20).

The three main morphological characteristics of Chhota Udepur district and also the study area of the present research are:

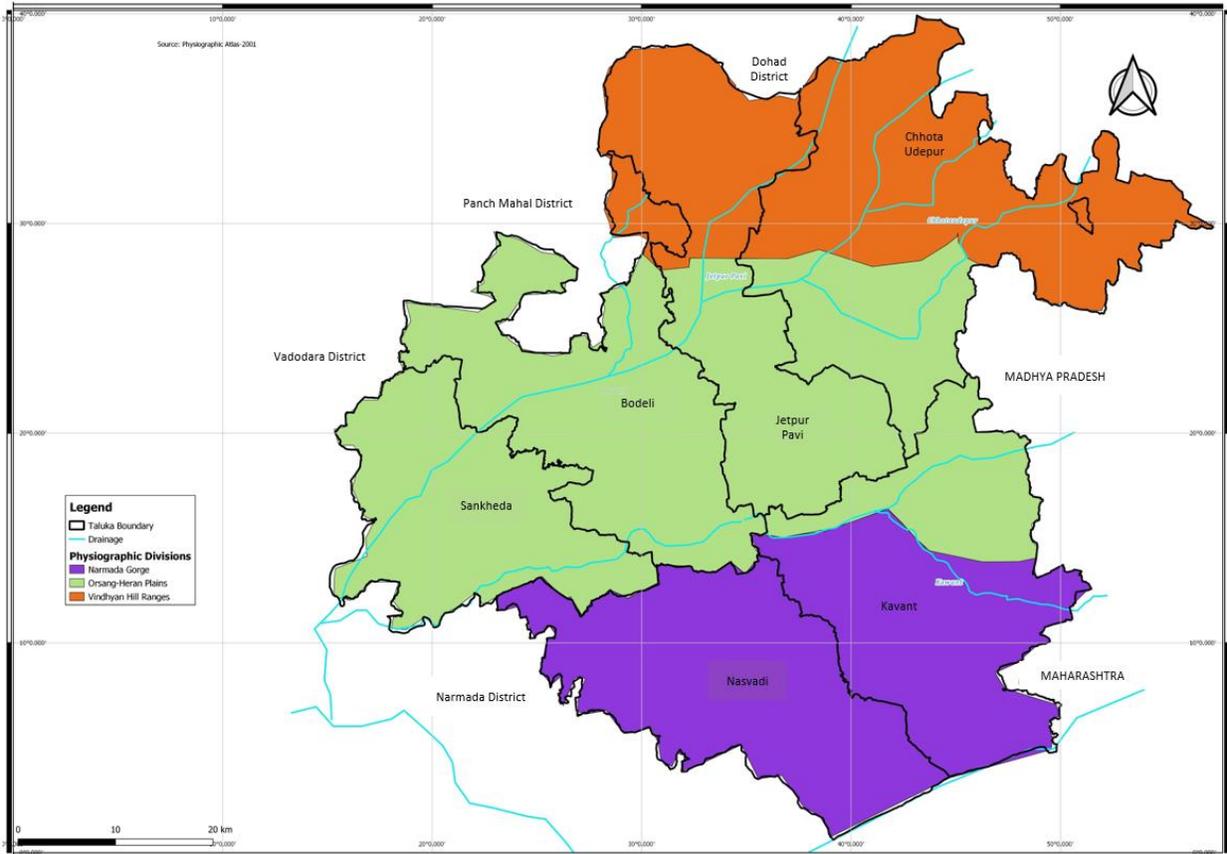
1) Vindhyan Hills: The central and eastern parts of the district, particularly Chhota Udepur and Nasvadi *talukas* are partly covered by the hills of Vindhyan Ranges. Contour line of 300 meters passes through the northern part of the region.

2) Orsang-Heran Plain: Parts of Nasvadi, Sankheda, Chhota Udepur and Jetpur Pavi *talukas* are occupied by the alluvium of the Orsang and the Heran Rivers. Relief of the region

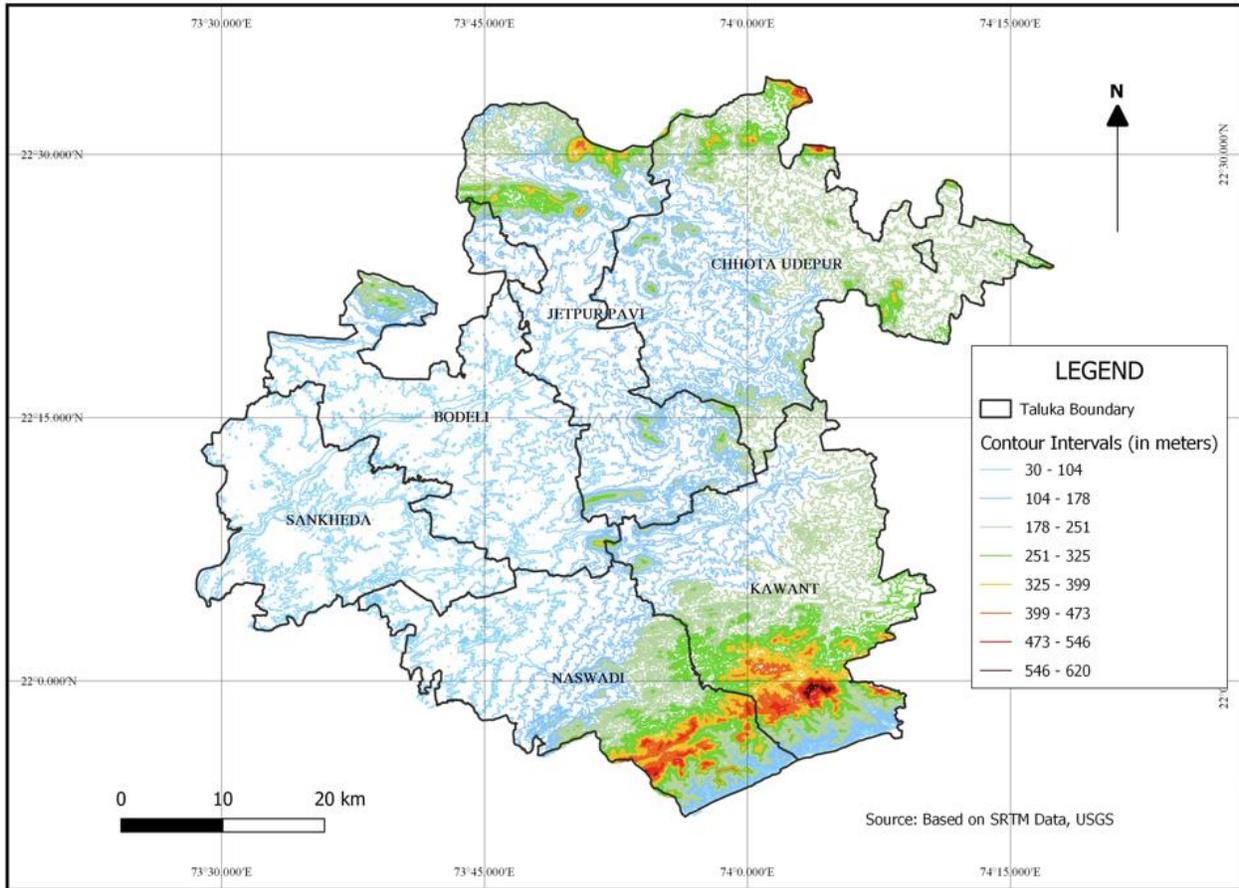
reveals 400 meters altitude in the north and 75 meters in the south. Geologically the region is a part of Deccan Trap formations, Intra- Trappean, Bagh and Lameta beds with gneissic and Aravalli rocks. General slope is from east to west (Census of India, op. cit.: 166,167).

3) Narmada Gorge: This region forms the south-eastern part of the district covering some parts of Chhota Udepur and Kavant *talukas*. Relief features range between 300 to 520 meters amsl, in elevation.

**Map - 2.1**  
**Physiographic Divisions of Chhota Udepur District**

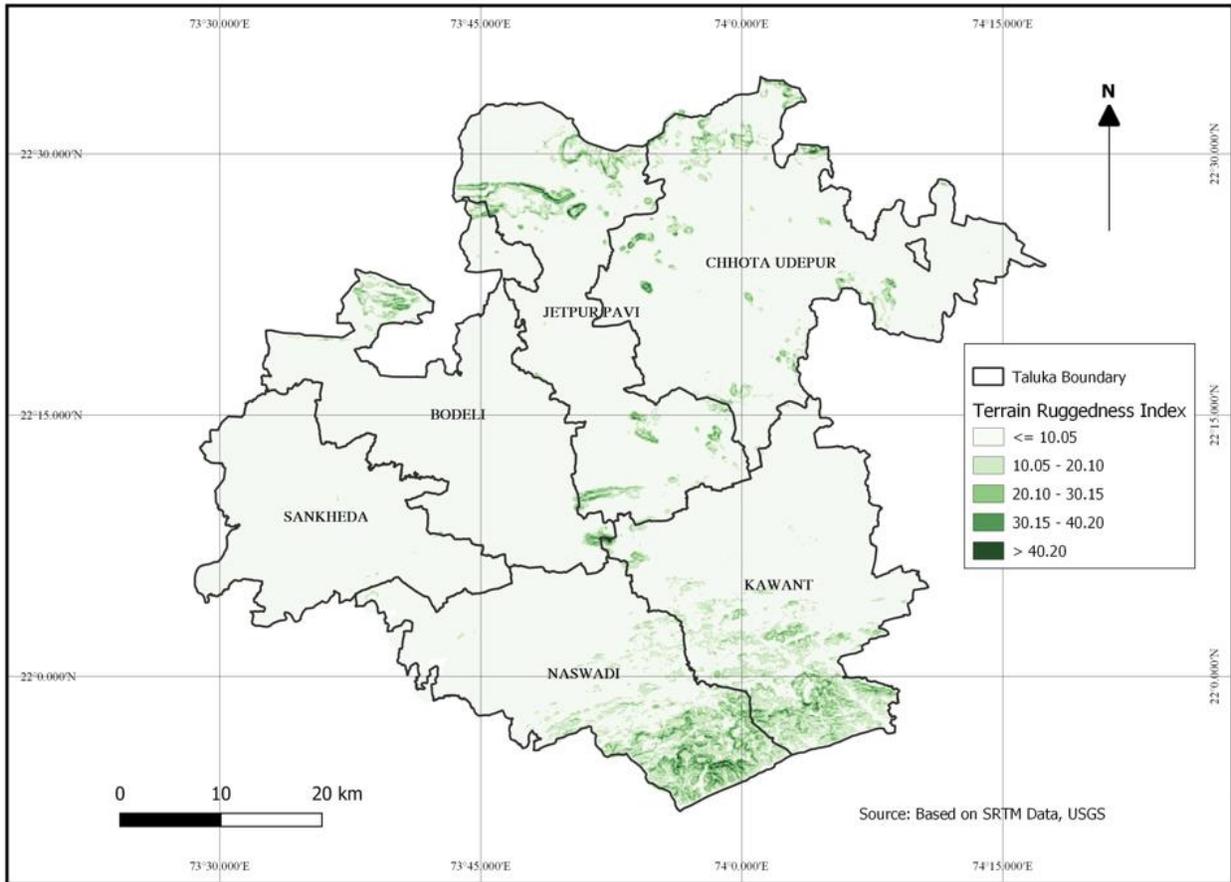


**Map - 2.2**  
**Contour Map of Chhota Udepur District**



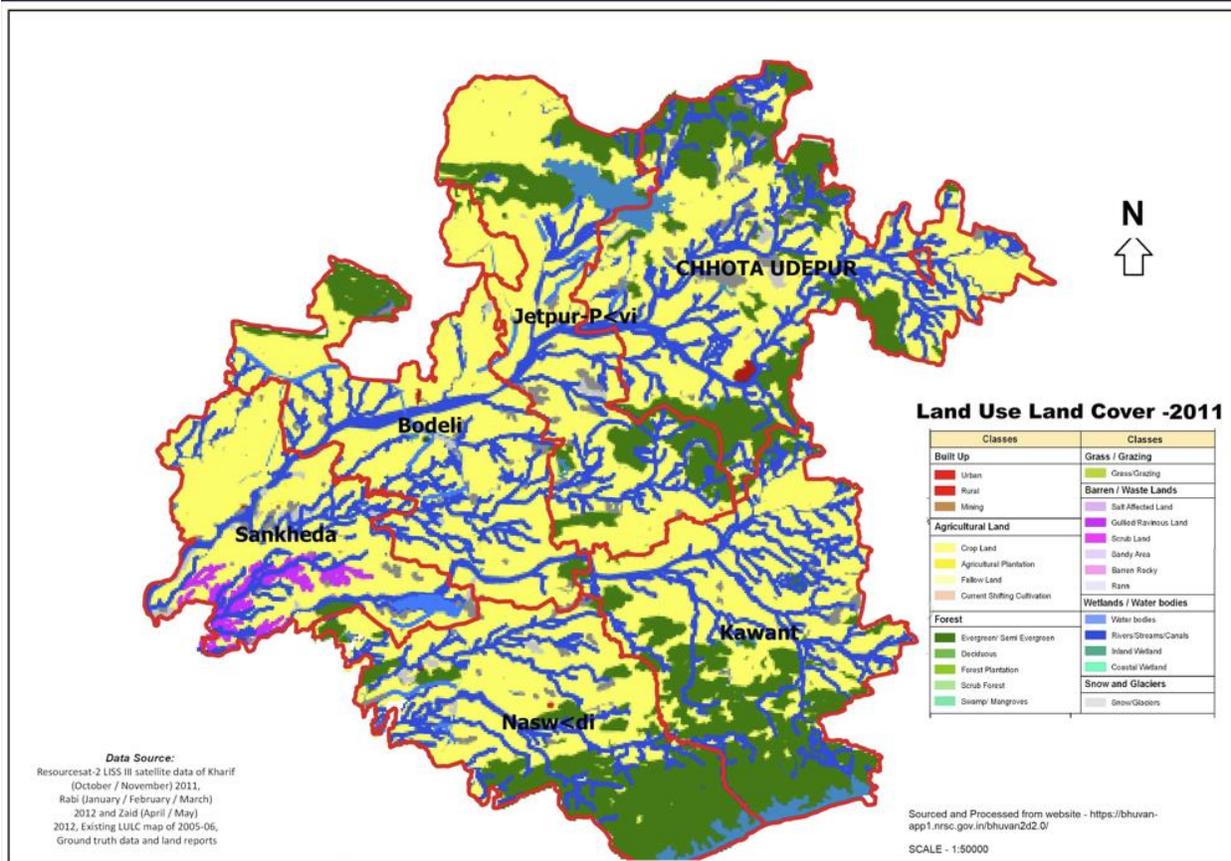
As is clear from Map – 2.2, the general elevation increases from west to east and south-east. Spacing of contour lines are closer in the south-eastern boundaries of the district and in the northern flank which are the parts of Narmada Gorge and Aravalli outliers respectively. These areas are covered with forest. From the central part to western part of the district, elevation decreases as there are widely spaced contours. The spacing of the contour lines in Sankheda and Bodeli talukas are displaying their plain topography and less elevation as these areas are river valleys. Chhota Udepur, Kavant, Jetpur Pavi, have relief ranging between 300 to 550 meters amsl.

**Map - 2.3**  
**Relief Ruggedness of Chhota Udepur District**



Except in the western and central parts of the District, Terrain Ruggedness Index (TRI) shows moderate values. A significant percentage of high values appears in the north and south-eastern part of the District. As TRI values are connected to lithology, dispersed medium to high values can be observed in the central part of Vindhyan Hill ranges. Differentiation of lithology clearly emerges in the terrain ruggedness and so from the Map – 2.4, LULC map, it can be observed that high TRI value regions are covered with forest and low TRI regions are occupied by river valleys and used for intensive cultivation.

**Map - 2.4**  
**Land Use Land Cover - Chhota Udepur District**



**Drainage:** Drainage of the Chhota Udepur district reflects clear correspondence with the terrain characteristics. Narmada is the main river flowing in the District. Orsang river with its two tributaries, Heran and Bharaj, meets the Narmada River at Chandod. The Orsang river is the most important river system draining the Chhota Udepur district. Apart from Heran and Bharaj Rivers, Waswa, Ani, Jarawa, Suketa, Meriya, Nakda, Uchh Rivers are other tributaries of Orsang river (District Geologist, op. cit.: 40). Lateral sand bar deposits can be observed in the Orsang River valley, perhaps due to less vegetation and inadequate rainfall in the summer months.



**Plate - 2.1**  
**Sandbars on Orsang River Bed**

**Climate:** Climate is one of the most important factors which influence all the governing aspects of natural resources and in turn, cropping patterns and agricultural practices. Climate is more difficult in the State as it lies in a critical position on the flanks of the Arabian Sea branch of the monsoon. Rainfall thus decreases rapidly from south to north (Spate and Learmonth, 1967: 650). Chhota Udepur has a semi-arid climatic condition with the rainfall period confined to the middle of June to the middle of October, when the district receives much of its monsoon rains.

**Table - 2.1**  
**Year-Wise Maximum and Minimum Temperature: Chhota Udepur District**

Month	Jan		Feb		Mar		Apr		May		Jun	
Year	Temperature (in Celsius)											
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
2016	35	9.4	37.2	12.8	42	19.5	43	23.4	44.6	26.6	44.1	26.6
2017	35.1	6.5	38	11.3	42.7	13	43.4	20	42.6	25	41	22.2
2018	34.2	10	37	14	40.7	18.4	41.4	21.4	43.7	26.5	41.1	24.6
2019	33.8	7.6	37.5	9.4	41.6	13.6	44.4	22.4	42.4	26.2	42	24.8
2020	31	9.8	36.1	13.2	38.4	14.8	43.2	21.2	43.3	26.6	40	24.6
Month	Jul		Aug		Sep		Oct		Nov		Dec	
2016	35.6	24.7	34.6	23.5	36.5	24	35.1	17.2	34.4	12.6	33.2	11
2017	35.8	24	34.4	24.4	36	24.6	38	17.4	35.4	13.4	33.2	10.4
2018	37.6	23.4	34.7	24	36.8	23	37.8	17	36.4	15.1	31.7	7.2
2019	38.5	24	34.6	24.4	34.6	24	35.5	20.6	34.4	17.4	32	11.4
2020	37.4	25.6	35.4	23.8	36.6	24.4	36.7	19	35.2	13.4	34.8	10

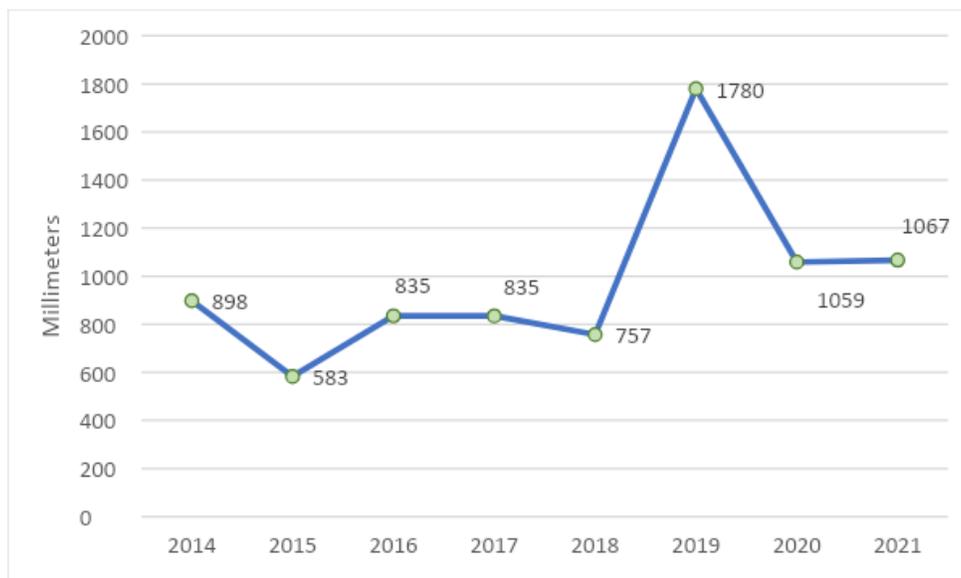
Source: Govt. of Gujarat, 2022a: 25

**Table - 2.2**  
**Annual Average Rainfall in Chhota Udepur**

Year	2014	2015	2016	2017	2018	2019	2020	2021
Rainfall (in millimeters)	898	583	835	835	757	1780	1059	1067

Source: Govt. of Gujarat, 2022b: S-35

**Figure - 2.1**  
**Annual Average Rainfall - Chhota Udepur District**



The District has experienced nearly 1,200 mms of rainfall variation from 2014 to 2021. Highest rainfall occurred in 2019 (1780 mms), while lowest rainfall was recorded during the year 2015 (583 mms).

**Natural Vegetation:** Forest area is mainly confined to the eastern border of the District covering Chhota Udepur, Nasvadi and Jetpur Pavi *talukas* and is of dry mixed deciduous type. The northern margin of Chhota Udepur district shelters the Ratanmahal Wildlife and Jambugoda Wildlife sanctuaries. Timber and firewood are the major forest products. Most of the tribal communities in these *talukas* depend on nearby forests for collection of firewood. Other minor forest products include *timru* leaves, gum, *rosha* grass, *mahuda* flowers and fruits, custard apple, lac and *ashotri* leaves. Seasonal farming in tribal villages is supplemented by forest product collection for livelihood. Major problem faced by the farmers is destruction by wild boars which live in the wildlife sanctuaries.

**Soil:** The Chhota Udepur district is mostly covered by black soil. However, certain parts of Chhota Udepur, Jetpur Pavi and Nasvadi *talukas* have mixed soils. Land in these areas is relatively more rugged due to the small hills, rivers and ravines. *Besar* soil is a mixture of black soil and sandy loam, and can be traced in Jetpur Pavi and a few villages of Sankheda *taluka*.

The soil quality of Kavant *taluka* is infertile as it is sandy loam. The depth of the soil is shallow to medium ranging between 25 to 90 cm. The soil fertility lacks nitrogen, phosphorus and potash which indirectly enhances input cost of farming. Organic carbon is also deficient in the soil due to unavailability of organic resources and lack of awareness among tribal farmers. Hilly soils are composed of rock fragments and *muram*. These soils can be found in the eastern part of the District.

## **2.5 Conclusion:**

In India, the agricultural sector holds significant importance, and Gujarat is no exception. The agricultural sector makes a noteworthy contribution to the State's economy. Nonetheless, the shares of the various State regions varied due to regional disparities. The eastern hilly and forested region, which is primarily home to the tribes, makes a very small contribution to agriculture. The region's natural circumstances allow for the growth of just one crop throughout the wet season. The physical environment of the area, including its geology, topography, drainage, soil, climate, and native vegetation, affects cropping patterns and productivity. These factors can be considered separately or in combination to influence the results of agriculture.

The underlying geological structure of hard Deccan Trap rocks in the study area of Chhota Udepur district, have shallow soil cover. The region is excellent for the production of coarse variety food crops and cotton as a cash crop due to its largely undulating topography, which is a result of its location on the western edge of the Peninsular Plateau. Lower amounts of rains, most of which is received during the four months of South-West Monsoon season, permits cultivation of a single crop annually. Lack of rainfall, canal irrigation, and underground water poses water shortages in major parts of the region. The natural vegetation in the tribal area of Chhota Udepur district guarantees the availability of fuel wood and other non-timber forest products for domestic use, such as *ashotri* leaves, gum, *rosha* grass, custard apple, lac, and *mahuda* flowers and fruits.

An attempt has been made in the following chapter to throw light on the socio-economic background of the population of the eastern tribal region of the State in terms of a few selected parameters.

