Chapter II

GEOGRAPHICAL INFORMATION ABOUT THE STUDY AREA

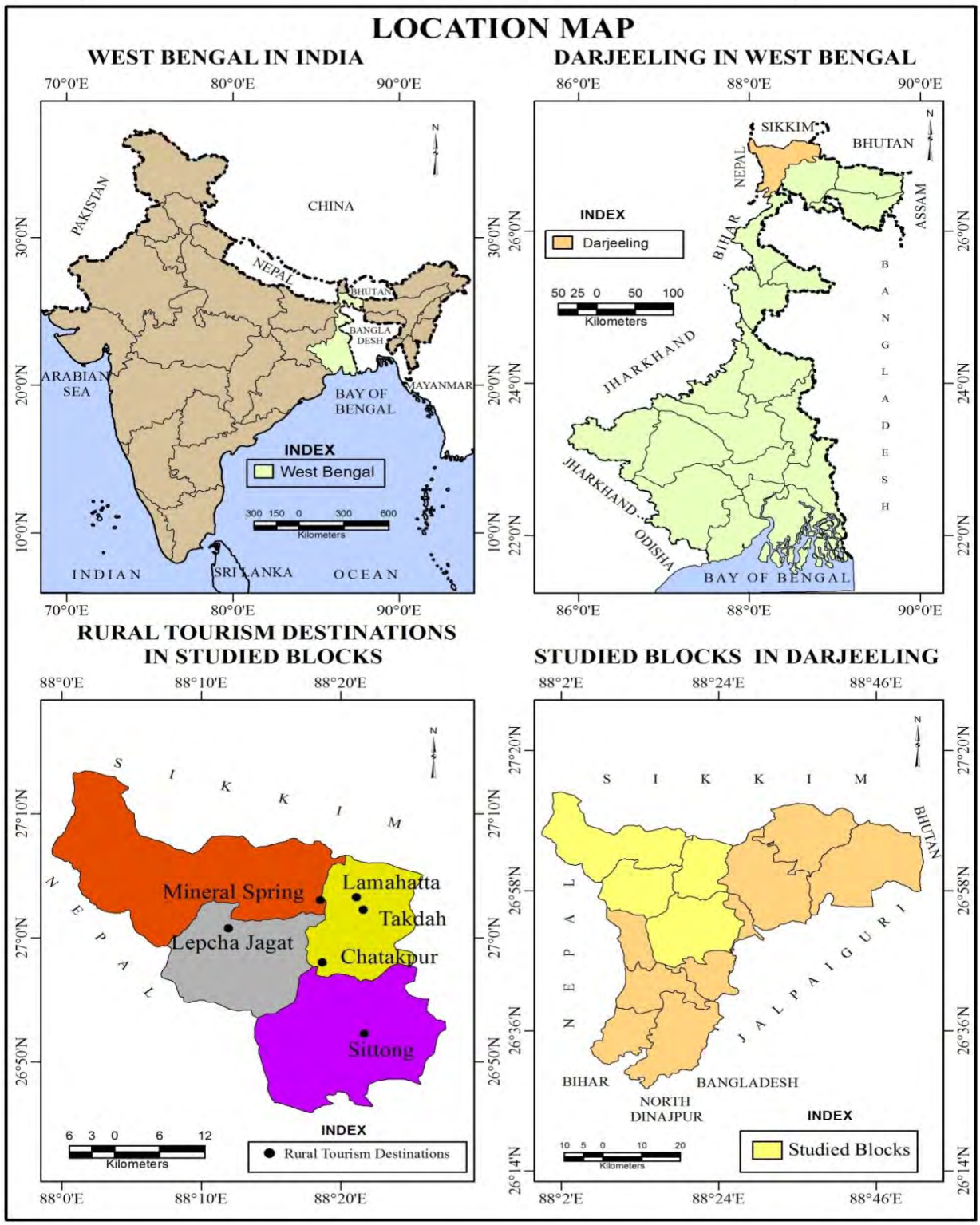
This chapter presents the profile of Darjeeling Himalaya. It emphasizes the physical determinants like location, physiography, climate, vegetation, drainage system, geology, soil types and demographic pattern of the study area.

2.1 Location of the Study Area

"The district of Darjeeling lies between 26° 31' and 27° 13' north latitude and between 87° 59' and 88° 53' east longitude and its total area is about 1,200 square miles. The principal town and administrative headquarters of the· district is Darjeeling town at 27° 3' north latitude and 88° 16' east longitude" (Dash, 1947, pp. 1). "The name Darjeeling is a corruption of *dorje* and *ling*; dorje, the precious stone or ecclesiastical sceptre, which is emblematic of the thunderbolt of Sakhra (Indra) and of *ling*, a place. It means therefore the place of the dorje, the mystic thunderbolt of the Lamaist religion, this being the name by which the Buddhist monastery which once stood on Observatory Hill was formerly known" (O'Malley, 1907, pp. 1).

The district is shaped like an inverted triangle, with its base in Sikkim, a small Indian state. Darjeeling district is a bordering district that stretches from the mountainous state of Sikkim in the north to the lowlands of Bengal in the south, wedged between the neighboring nations of Nepal and Bhutan. A number of mountains and rivers separate the district from the state of Sikkim. The steep Singalila mountain chain forms the district's northern boundary, while its south-eastern and southern boundaries run parallel to the districts of Jalpaiguri (West Bengal) and Purnea (Bihar). (O'Malley, 1907).

Figure 2.1 Location Map of the Study Area



Source: Tourism Department, GTA, Darjeeling

2.2 Physical Features of Darjeeling Himalaya

2.2.1 Physiography

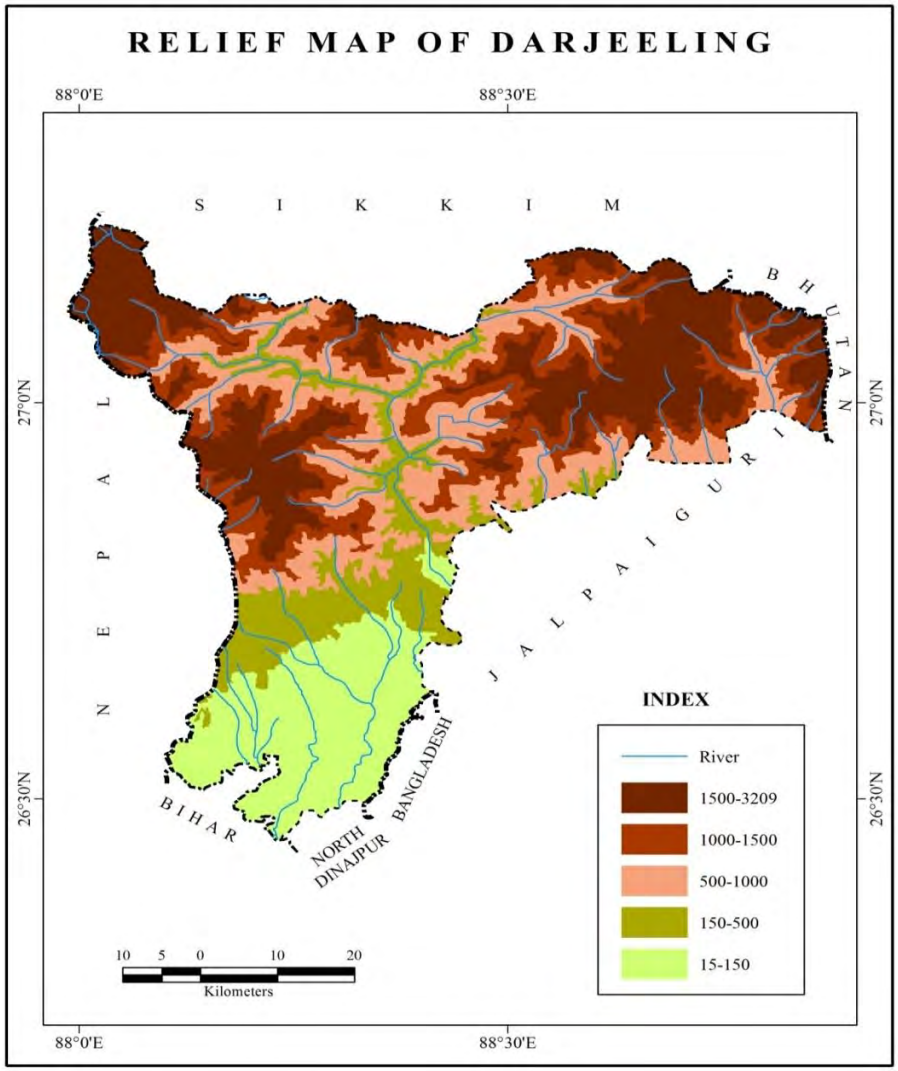
The hilly region and the Terai-Dooars region are two distinct physiographic units in the Darjeeling district. Darjeeling Sadar, Kurseong, and Mirik are all part of the hilly region. The Terai-Dooars, which include the Siliguri sub-division, is the Himalayan foothills. The hills of the Darjeeling Himalaya are made up of large ranges that stretch north to south along their whole length. Mount Kanchenjunga (8579 m) lies to the northwest, and Mount Dongkya lies to the northeast (7066 m) (Dash, 1947).

The elevation of the Darjeeling Himalaya ranges between 150 m at the foothills to as much as 3,630 m at the highest point in the district - Sandakphu - which is the highest elevated place of the entire state of West Bengal. The area is drained by rivers such as Mahananda, Teesta, Mechi and Balason. Much of the region is dedicated to tea plantations and a variety of pine forests (Dash, 1947).

The Singalila range, the largest range of the state, extends south to the plains from Kanchenjunga, forming the boundary between Nepal and Darjeeling. The mountain extends south and southeast through Tanglu and Senchal with its various side branches that form the Darjeeling hill area west of Teesta. To the east of Teesta, a high mountain begins at Dongkya and divides into two large foothills at Gipmochi (351 km), one to the southeast and the other to the southwest, between which is the Jaldhaka valley. It is the lower part of the south-western spur along the Kalimpong Hills, east of river Teesta. The Singalila ridge commands Nepal on one side and Sikkim and Darjeeling on the other and the basins of two main river systems. The rivers draining its western part flow into the Ganges, while the rivers draining its eastern part flow into the tributaries of the Brahmaputra River. The mountain has risen from 0.048 3 meters to

3,658 meters, and the peaks of Sandakphu and Phalut meet the borders of Nepal, Sikkim and Darjeeling (O'Malley, 1907).

Figure 2.2.1 Relief Map of Darjeeling



Source: Tourism Department, GTA, Darjeeling

2.2.2 Climate

The climate of the Darjeeling Himalaya varies due to variations in altitude and aspects. It varies from hot and humid in the foothill regions to cold and moist in the higher altitudes. Darjeeling experiences severe winters when temperatures fall below freezing point and reach -5 °C during the

month. Darjeeling has a pleasant summer, with monsoon winds in May-September bringing heavy rainfall and occasional snowfall in the winter months. Frequent rains cause frequent landslides in the district and cause extensive damage to power lines, settlements, life and property. Tarai-Dooars plain, on the other hand, experiences warmer summers, less rain and milder, drier winters. In May, summer temperatures reach 35 °C in Dooars. In January, winter temperatures drop to 5 °C. In general, the hills of Darjeeling come under the monsoon climate regime. According to the Koppen classification, the region is mainly subject to hot temperate or humid mesothermal "CWB" environments. 'H' type climate or Highland climate has been experienced due to its hilly terrain (Barry and Chorley 1968, Chang 1972, Trewartha and Horn 1980). The transcendent 'Cwb' climate is portrayed by gentle winters and delayed summers with abundant rain (O'Malley, 1907). "As the Darjeeling district consists of valleys, in which the elevation above the sea may be not more than 1,000 feet, and hill ranges, which rise to a height of 10,000 to 12,000 feet, climatic conditions are necessarily varied, more especially as regards temperature. In the Tarai and the lower valleys the heat is tropical; but in the town of Darjeeling the temperature is that of a temperate zone and only about two degrees above that of London" (O'Malley, 1907, pp. 17).

"During the cold-weather months very little rain falls in the Darjeeling hills. November and December are almost rainless, and the light showers which fall in January and February occur when shallow depressions are passing eastward over the plains" (O'Malley, 1907, pp. 17).

January and February are the coldest months in the Darjeeling hills. During January and February, temperatures in steep areas may drop below freezing (0 °C), resulting in snowfall. The months of March and April are spring in Darjeeling Himalaya. In May, June, and July, people can experience the summer. In June, July and August, monsoon season can be experienced (Dash, 1947).

Table 2.2.2.1 Climatic Data of Darjeeling, 2020

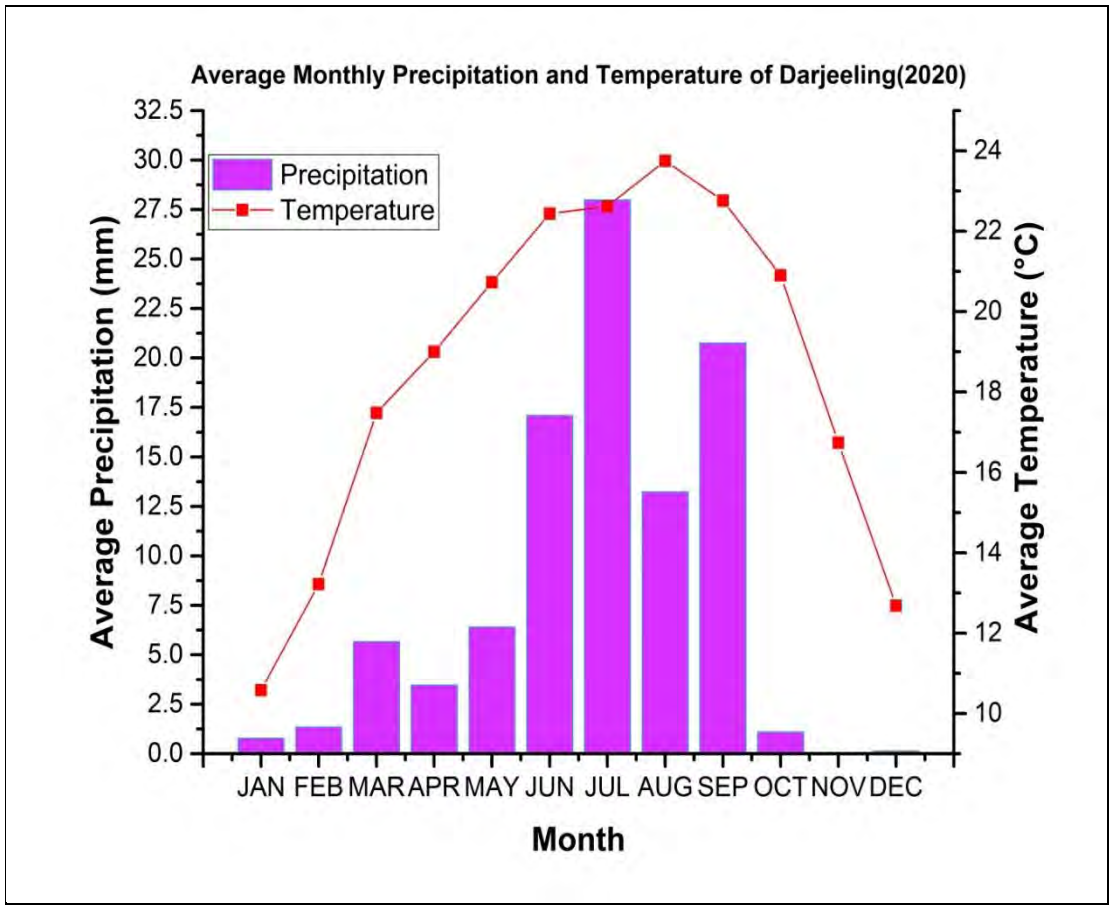
Month	Precipitation (mm)	Temperature (°C)
January	0.79	10.58
February	1.36	13.22
March	5.68	17.48
April	3.48	19.00
May	6.41	20.73
June	17.11	22.44
July	28.00	22.62
August	13.24	23.75
September	20.77	22.76
October	1.11	20.90
November	0.02	16.74
December	0.14	12.68

(Source: Indian Meteorological Department)

The above data shows the average monthly precipitation (in mm) and average monthly temperature (°C) of Darjeeling (2020). The highest precipitation of 17.11 mm is experienced in June while the lowest of 0.14 mm is experienced in December. The highest temperature of 23.75 °C is experienced in August while the lowest temperature of 10.58 °C is experienced in January. January is the coldest month in Darjeeling.

Climate of Darjeeling, 2020

Figure 2.2.2.1 Climatic Graph of Darjeeling, 2020



(Source: Indian Meteorological Department)

2.2.2.2 Rainfall

The Darjeeling Himalaya experiences high rainfall. The highest rainfall experienced is 28.00 mm in July and the lowest is experienced in November with only 0.02 mm. The average annual rainfall is 106.08 mm. (Dash, 1947).

2.2.3 Natural Vegetation

The physical nature of the Himalayas and the Indian monsoon has a profound effect on the characteristics of vegetation in the Darjeeling region. Even in relatively small areas, rainfall

variability can have a significant impact on species distribution and crop formation. The foothills of the southern slope of the Darjeeling Himalaya are at the altitude of 160 m to 1,000 m comprising tropical species like *Schima wallichii, Terminalia bellirica, Nyssa javanica and Shorea robusta*, and the community type is *Terminalia/ Shorea/ Schima*. The type of intermediate community is *Castanopsis/ Alcimandra/ Curacas.* The eastern and south-eastern belts are deciduous, with evergreen trees beneath the upper forest (1,800 m - 2,800 m above sea level). At the higher altitudes (3,000 m – 3,700 m), only first-class evergreen communities predominate. *Abyss densa*, scattered *rhododendrons* and *Betida aeroids* are on the second level and the community is classified as abyss/ rhododendron/ betula. In and around the city of Darjeeling, some of the city's varieties can be found on the heights of tropical evergreen hills. Conifers such as Podocarpus are only grown locally and include mainly Frankensens (Cryptomeria japonica), Utis, Pipli, and Rhododendron. But now, with rapid urbanization, under the control of private or government, there is almost no trace of forest cover in the municipal limits except for a few pockets. Senchal forests which are also the famous Tiger Hill - the reservoir of Senchal Sarovar are on the verge of depletion and have become a major cause for scarcity of water in summer in Darjeeling. (O'Malley, 1907).

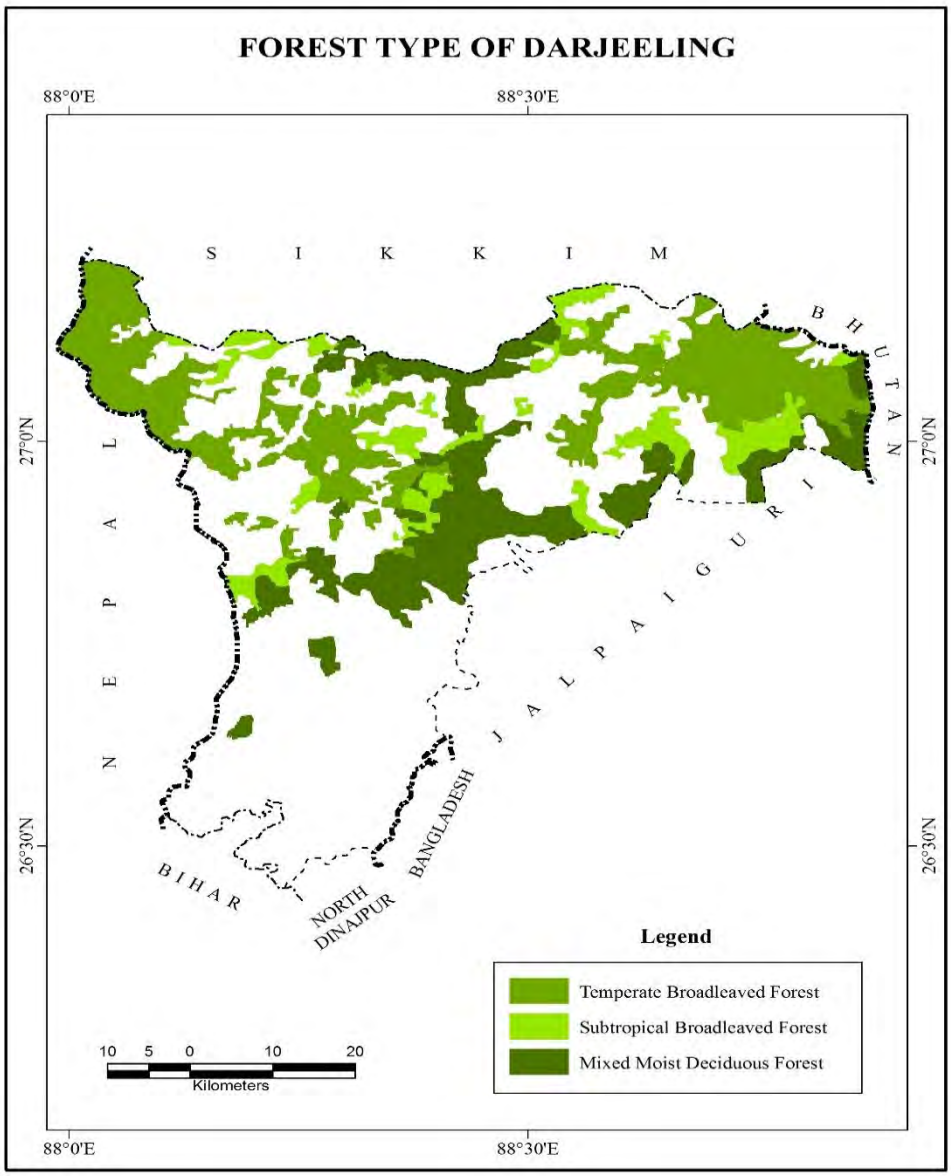
Table 2.2.3: Altitudinal Zones of Darjeeling Himalayan Forests

Sl. No.	Forest Type	Altitude
1	Tropical Moist Deciduous	300-1000 m
2	Tropical Evergreen Lower Montane	1000-2000 m
3	Tropical Evergreen Upper Montane	2000-3000 m
4	Temperate Coniferous	3000-3500m
5	Temperate Coniferous	above 3500 m

(Source: Municipal Office, Darjeeling)

The altitudinal zones of Darjeeling Himalayan forests fall between 300m to more than 3500m consisting of five zones. The Tropical Moist Deciduous forest ranges between 300 to 1000m, the Tropical Evergreen Lower Montane forest ranges between 1000m to 2000m, the Tropical Evergreen Upper Montane forest ranges between 2000 to 3000m, the Temperate Coniferous forest ranges between 3000 to 3500m, the Temperate Coniferous forest exists above 3500m altitude.

Figure 2.2.3 Natural Vegetation Map of Darjeeling



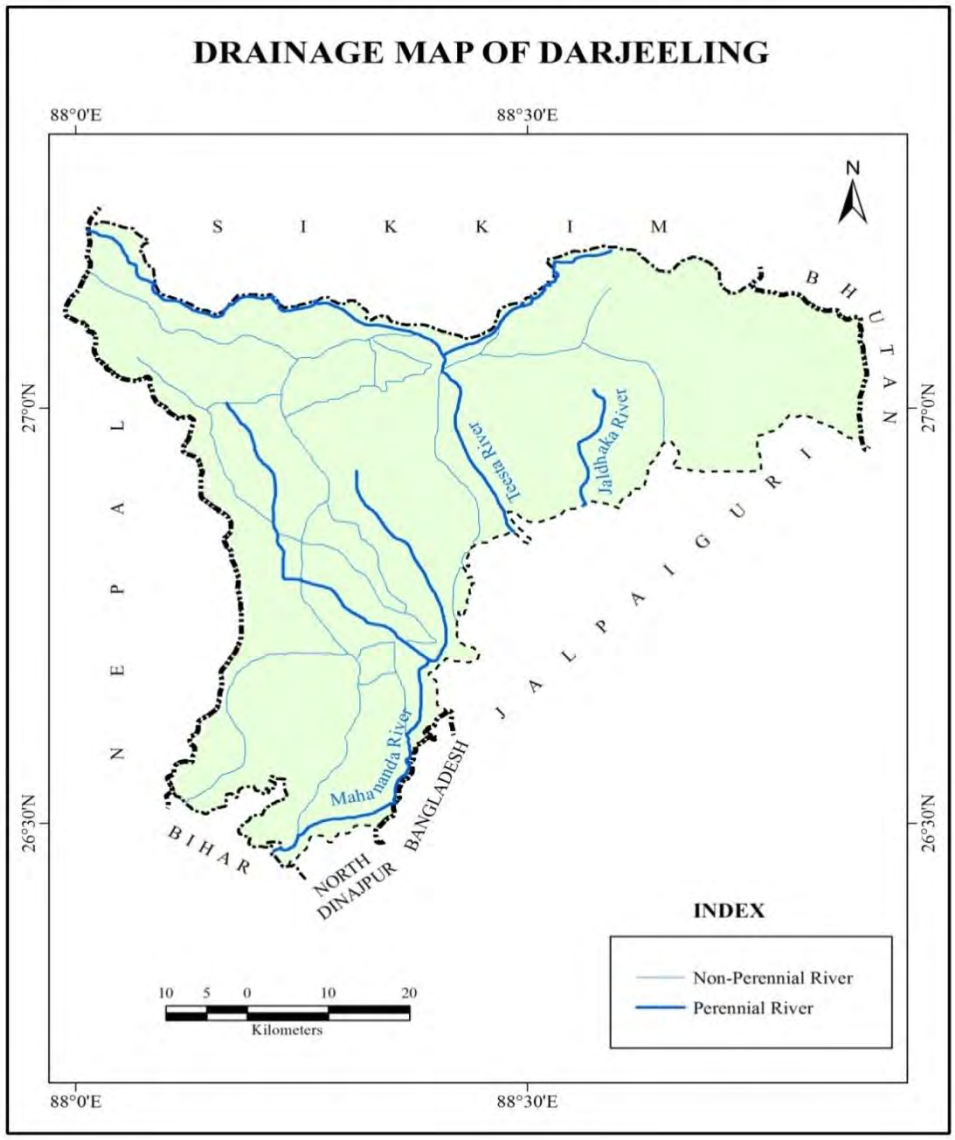
Source: Tourism Department, GTA, Darjeeling

Most of the parts of Darjeeling have been covered by Temperate Broadleaved Forest and Mixed Moist Deciduous Forest. Subtropical Broadleaved Forest is spread over the northern, north-eastern and central parts of Darjeeling.

2.2.4 Drainage System

Darjeeling Himalayan Rivers eventually flow south; from the west-eastern boundaries descend several tributaries and flows north and east or west before flowing into other major rivers. "Dominating all the other rivers in the District from the point where it is joined by the Rango down to its junction with the Great Rangit flowing in from the west. From that point it lies entirely in the Darjeeling District until it leaves it at Sivok, ultimately entering the Brahmaputra in Rangpur District. In Darjeeling District, its principal tributaries are the Rangpo and the Rili on its left bank and the Great Rangit, the Riyang and the Sivok on the right bank. The river is bridged by a suspension bridge near Melli. In the gorge, where both banks are in the District, there are three bridges, two of reinforced concrete carrying heavy road traffic and one suspension bridge carrying only animals and pedestrians" (Dash, 1947, pp. 3). Of the tributaries of Teesta, the Great Rangit is the most important. (Dey and Kushari, 1980)

Figure 2.2.4 Drainage Map of Darjeeling



Source: Tourism Department, GTA, Darjeeling

The Great Rangit River has a rocky or sandy bed. Its banks are usually covered with forests, with few individual crops. The meeting of the Rangit and the Teesta is one of the most captivating scenes along its course. The latter's colour and coolness are undoubtedly related to the number of glaciers it is attached to, while the coloration of the former depends mainly on the rains from the outer ridges of the Senchal and Singalila range, so the water is warm and clean. To the east of the

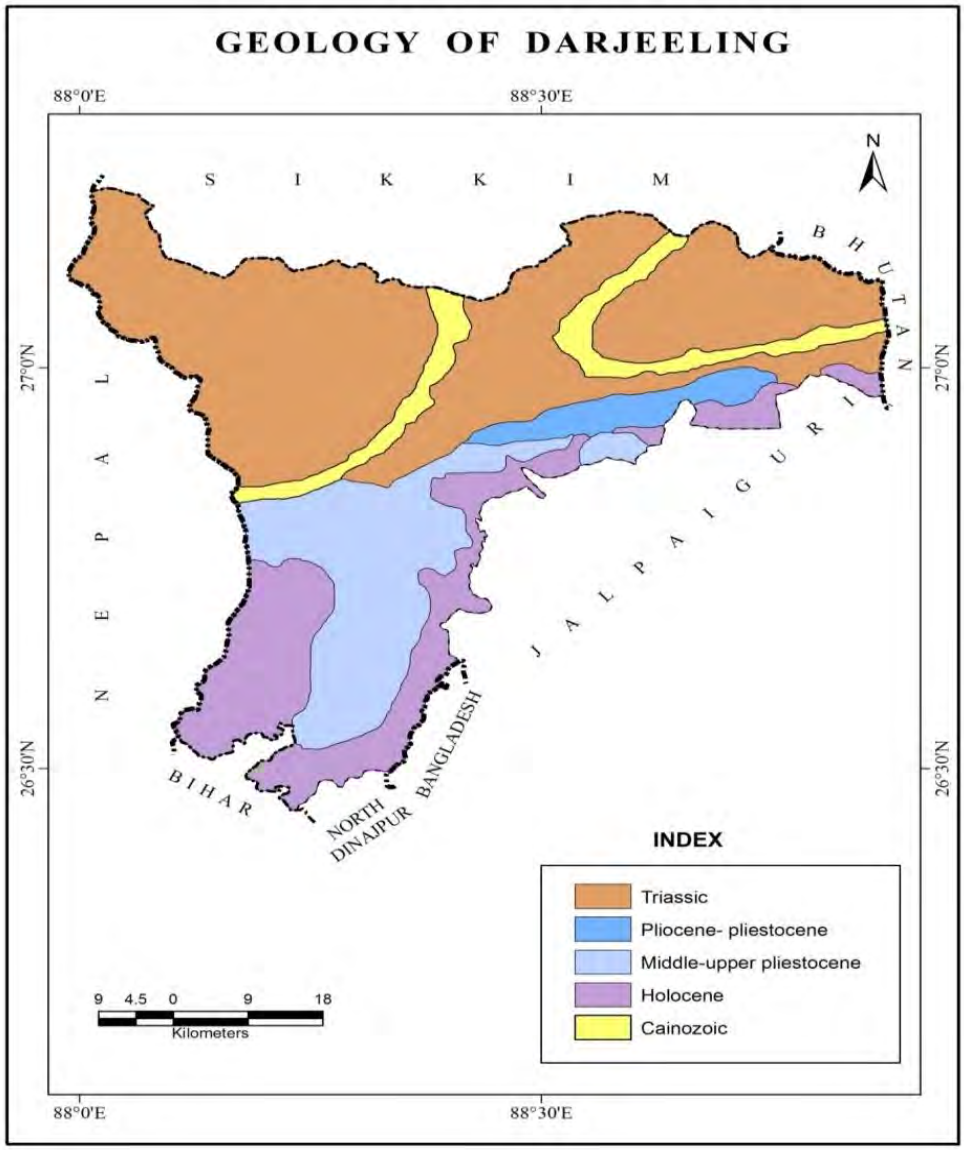
Teesta are rivers that drain to the Brahmaputra after coming out of the hills. “The Jaldhaka carries the largest volume of water of all this group of eastern foothill rivers” (Dash, 1947, pp. 6). The eroded materials from the hills are carried by the Lish, the Gish and the Chel rivers (Dey and Kushari, 1980).

2.2.5 Geology

“The geological formations of the Darjeeling District consist of unaltered sedimentary rocks, confined to the hills on the south, and different grades of metamorphic rocks over the rest of the area. The outcrops of the various rocks form a series of bands more or less parallel to the general line of the Himalaya and dip one beneath the other into the hills. A characteristic feature of the southern area is that the older formations rest on the younger, showing a complete reversal of the original order of superposition” (Dash, 1947, pp. 7).

The geographical structures found in the Darjeeling region are divided into five groups: Gneiss, the Daling series, the Buxa series, Gondwanas and the Tertiary system. This outflow forms a series of bands that conform to the general trends of the Himalayas. The most surprising aspect of the subdivision is that the tertiary layer disappears under Gondwana, because the young layer is underneath the old layer. The Gondwana under the Buxa and Darling series, and the second under the Gneiss, are completely contrasted with pots and warps in their original grading order. Gneiss foil varies from granite or quartz, feldspar, biotite to more or less pure mica schist and consists of a partially intrusive granite and partially metamorphic sedimentary source. The Daling series covers a large area north and east of the district. It contains phyllite, slate and quartzite, dolomite amphibolite schist and several dependent zones (Dash, 1947).

Figure 2.2.5 Geology of Darjeeling



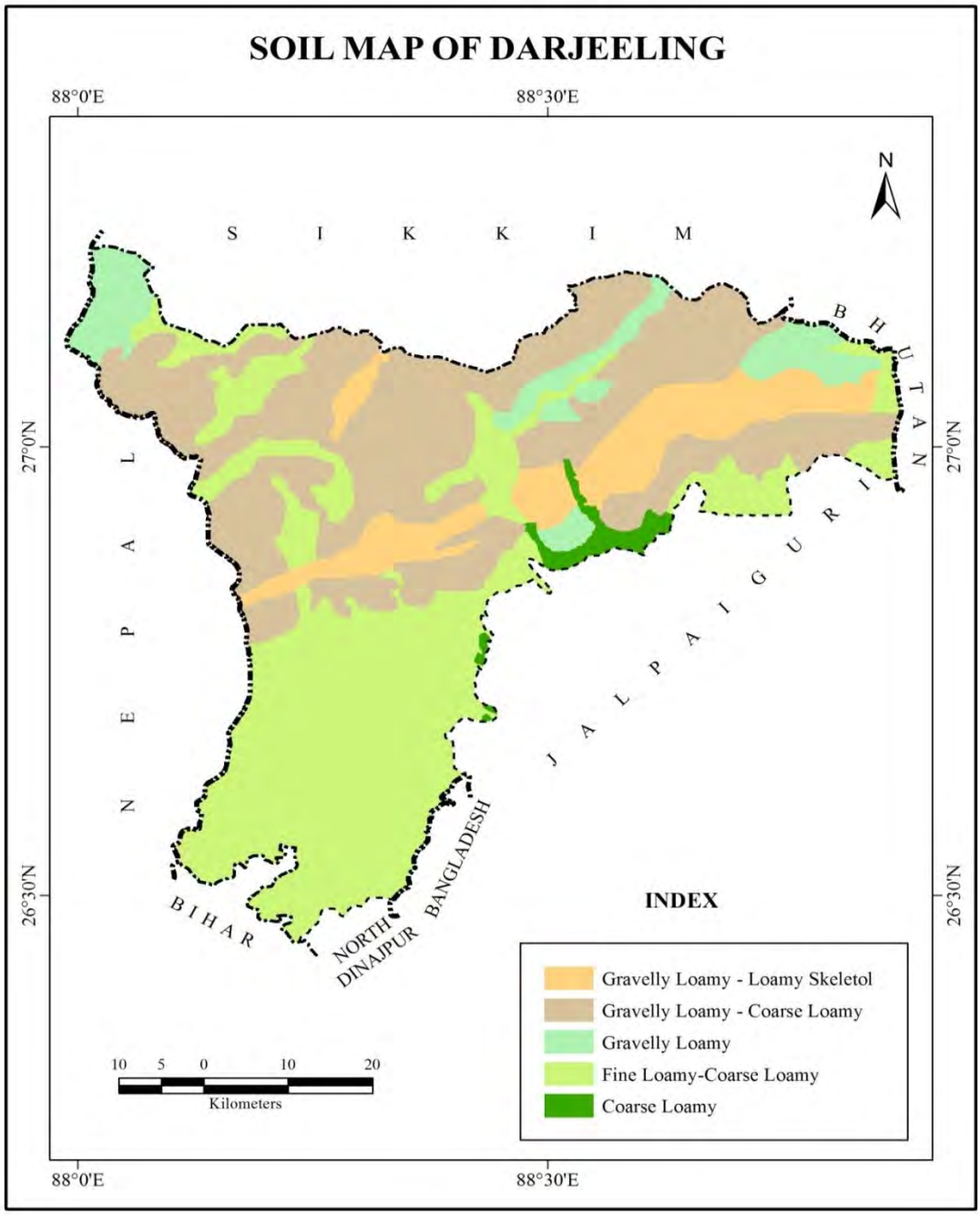
Source: Tourism Department, GTA, Darjeeling

2.2.6 Soil Types

Darjeeling hills soils are formed from two major rocks namely, Daling rocks and Darjeeling Gneiss. The soils in the area include black, acidic and deep forest soils that were high in silica but low in lime. “The soil in the Terai is composed of alluvium, a light sandy loam being the most common. There are also considerable tracts of sandy or gravelly soils, unsuitable for cultivation.

In the hills, cultivators recognize only three kinds of soil, white, red and black. Of these, the black soil is the richest, the white the poorest, the red soil occupying an intermediate position, requiring heavy manuring to give as good an outturn as the black" (Dash, 1947, pp. 102).

Figure 2.2.6 Soil Map of Darjeeling



Source: Tourism Department, GTA, Darjeeling

Darjeeling's entire territory is covered by four types of loamy soils. The gravelly to coarse loamy soils dominate in the northern section. A few areas in the north-western and north-eastern part is covered by gravelly loamy, the whole southern part is covered by fine loamy to coarse loamy, and only a few areas in the northeast is covered by coarse loamy soils.

2.3 Demographic Profile

Darjeeling has a population of 1,645,162 people, with 834,255 men and 807,907 women, according to the 2011 census. In India, it is ranked 257th (out of a total of 640). Darjeeling had a population of 1,609,172 people in 2001, with 830,644 men and 778,528 women. 727,963 people (39.42 %) live in cities, whereas 1,118,860 people (60.58 %) live in rural areas, according to the 2011 census. The region has a population density of 586 people per square kilometre, and a sex ratio of 973 females per 1000 males. The literacy rate of Darjeeling is 79.56 percent.

The Gorkhas, Lepchas and Bhutias are the three main ethnic groups in Darjeeling. In 1850, Dr. Campbell predicted a population of 10,000 people, which grew to 22,000 in 1869. Bengalis, Biharis and Marwaris migrated to the highlands for administrative and business purposes. Along with Bengalis, Adivasis such as the Santhals, Orauns and Mundas can be found in the plains, alongside Rajbansis. The Gorkhas make up a large portion of the population in the Hills. Brahmins, Chettris, Rais, Mangars, Newars, Gurungs, Tamangs, Limbus, Sherpas, Kamis, Damais, Sunwars, Sarkis, and other communities comprise the majority of Gorkhas (O'Malley, 1907).

Table 2.3.1: Block-wise Distribution of Population in Darjeeling Hills, 2011

Sl. No.	Name of the blocks	No. of Gram Panchayats	Population		
			Male	Female	Total
1	Darjeeling-Pulbazar	23	63,766	62,981	1,26,747
2	Rangli-Rangliot, Takdah	11	35,065	35,044	70,109
3	Jorebunglow-Sukhiapokhari	16	56,139	57,362	1,13,501
4	Kurseong	14	47,047	47,289	94,337
5	Mirik	06	23,082	22,706	45,788

(Source: Census of India, 2011)

Table 2.3.2: Population of Municipal Towns in Darjeeling Hills, 2011

Sl. No.	Name of the Municipality	No. of Wards	Population		
			Male	Female	Total
1	Darjeeling Municipality	32	60,113	60,300	1,20,414
3	Kurseong Municipality	20	21,642	20,704	42,346
4	Mirik Municipality	09	5,675	5,812	11,487

(Source: Census of India, 2011)

2.4 Cultural Background

Traditionally, the Gorkhas are divided into two categories: the Tagadari (the sacred thread's owner) and the Matwali (the drinker of alcohol). Most Brahmans and Khatris fall into the first type, while others fall into the second. Some Gorkhas are secular humanists who hold a strong shamanic belief. Most Gorkhas today practice Hinduism, but the Lepchas, Tamangs, Sherpas

and Bhutias practice Buddhism; some scheduled tribes, like the Kamis and Damais, practice Christianity. The majority of the festivals are observed with Hindu rites, either in accordance with Indian tradition or in defiance of it. Hinduism and Buddhism both have festivals that are historically observed (O'Malley, 1907).

2.5 Languages

The major hill language is Nepali, which is also the lingua franca of the Dooars, which is located in the northern section of the Jalpaiguri region. Few Lepcha and Limbu households speak their languages to their families in rural regions. The Indian Constitution recognized Nepali as an important language in India and in West Bengal's official language as well. Apart from the Nepali language, all Gorkhas understand and speak Hindi language as well in the hills. "Darjeeling contains a polyglot population. In the hills Nepali Hindi and in the Tarai Bengali are spoken by a great majority of the inhabitants, but there are a great number of other languages current. Nearly half the people speak languages of the Tibeto-Burman family, of which no less than 19 different dialects were shown in the census returns of 1901" (O'Malley, 1907, pp. 47). Apart from a variety of Indo-Aryan languages and dialects spoken in the district, both in the plains and hills, many Austric and Dravidian dialects are also spoken in the plains, particularly in the tea gardens. Nepali speakers make up the largest single group of Indo-Aryan speakers in the district (Dey and Kushari, 1980).

2.6 Economy

As Darjeeling is famous for tea, timber and tourism, the economy of Darjeeling Hill depends mainly on them. In addition to these, there may be small income from agriculture, sericulture, medicinal plant cultivation, hydroelectric power. The cultivation of rice and legumes is common on low slopes; cardamom, ginger and orange are treated like cash crops, albeit on a small scale. In

Kalimpong, sericulture and flower cultivation continues. Orchids are grown in Kalimpong and Takdah. The Taphill Stream minor hydroelectric plant is installed in Phaji, near Sidrabong and Kurseong, below the city of Darjeeling, with a large project in the Rambhang valley. The large-scale industry in the hills is practically nil. For a number of causes, cottage businesses such as textiles, tanning, paper manufacturing, and juice production have been involved. The hill economy largely depends on the tea industry.

2.6.1 History of the Tea industry in Darjeeling

Darjeeling tea is noted for its distinct flavour and taste. Dr. Campbell, the then-Administrator of Darjeeling, began the tea plantation in the hills in 1850. Later it expanded to the plains. Darjeeling's first tea garden was established in 1856 by the Darjeeling and Kurseong Tea Estate. Dhutardia Tea Garden was founded in 1859 by Dr. Brougham. The Kurseong and Darjeeling Tea Company created further tea estates in Takdah, Ambutia, Ging, and Phubsering between 1860 and 1864. The Lebong Tea Company enlarged its Takvar and Badamtam gardens. Several tea plantations, such as Pandam, Steinthal and Makaibari, were established during this time. "By the end of 1866, i.e., only ten years after the establishment of the industry on a commercial basis, there were no less than 39 gardens with 10,000 acres under cultivation, and an outturn of over 433,000 lbs. of tea. In 1870 there were 56 gardens with 11,000 acres under cultivation, employing 8,000 labourers and yielding nearly 1,700,000 lbs.; and in 1874 the number of gardens have increased to 113, the area under cultivation to 18,888 acres, the outturn to 3,928,000 lbs., and the labour force to 19,000 souls. In other words, between 1866 and 1874the number of gardeners under tea was almost exactly trebled, the area under cultivation increased by 82 per cent., while the outturn of tea was multiplied nearly ten times. Since that time the industry has progressed steadily until no less than 50, 600 acres, or 79 square miles are under tea cultivation" (O'Malley, 1907, pp. 74).

2.6.2 History of Tourism in Darjeeling

Darjeeling's history begins in 1835 when Captain Lloyd founded a sanatorium. In 1838, the completion of the Calcutta-Darjeeling route marked the beginning of modern communication. The Darjeeling Himalaya is called after a British-built elevation modest village that served the East India Company's administrative and military employees' needs. In terms of functionality, it's gone through a lot of adjustments mostly in the development of the colonial environment and tourism. In terms of colonial and post-colonial events, Darjeeling's tourist evolution and expansion may be divided into three eras. The eras started from 1835 to 1947 called the British era, between 1947 and 1988 called the post-independence era and the contemporary scenario that is 1988 onwards called as post-Gorkhaland Movement. In 1868, the Darjeeling Planters' Club was founded. Darjeeling's rise to prominence as a famous hill station was brilliant. The term "Queen of Hill Stations" began to be used to describe the hill station. For the promotion of tourism, the British government beautified some tourist hotspots and erected bungalows for the tourists without damaging the environment. The Darjeeling Family Hotel debuted in 1839 with 12 rooms, succeeded by Wilson's Hotel with 18 rooms, which was erected in a two-storied building. The Woodlands, Rockville, Dam, Bellevue, and hotel Mt. Everest were other ones to emerge, accompanied by the Nelson Hotel. The development of tourism amenities coincided with a growth in the proportion of tourists. At this time, the majority of visitors were British officials and affluent Indian nobles who had opulent bungalows in Darjeeling, such as the Maharajas of Burdwan, Cooch Behar, and Dighapatia. During the British occupation, some hotels were built in Kurseong, Ghoom, and Kalimpong. As a result, the extension of colonialism in the tropics was represented by the rise of tourism in Darjeeling throughout the British period (Mitchell, Nora, 1972). They do represent the region's modern tourism expansion.

2.7 Conclusion

Geographical features have an essential role in drawing tourists from all over the world and boosting the country's economy. Each geographical feature has its significance concerning tourism. The better, more beautiful, and more exciting is the geographical location, the more tourists it attracts. The important factors of tourism such as attraction, accessibility, accommodation, amenities and awareness, and other aspects contribute to effective tourism development. Therefore, attractiveness is a fundamental aspect of tourism and reflects geographical characteristics such as physical, social, cultural and environmental aspects or features. The geographical or physical features such as landscape, topography, relief, slope, drainage, waterfalls, lakes, climate and biological environment, etc. attract tourists. Ethnicity, heritage, cultural traits, history, and other social and cultural characteristics, such as society and traditions, varied traditions, different languages, innovative ideas, improved technology, and so on, serve as a force of attraction for the tourists may it be domestic or it is foreign. With its varied landscapes, natural beauty, and pleasant climate, the Darjeeling Himalaya has a lot of tourist potential. Hilly and mountainous terrain with unique culture and customs enhance scenic splendour, various vistas, and a tranquil environment. As a result, a huge number of visitors are drawn to Darjeeling Himalaya's many tourism destinations to experience the serenity and natural beauty.

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