

THE PHYSIOGRAPHY OF INDIA: AN OVERVIEW

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Abstract. Physiography is a field of geography that studies the physical patterns and processes of the Earth, such as geomorphology, hydrology, soil, rocks, biogeography, and the effects of tectonic forces on landscapes. This paper aimed to discuss the physiographic characteristics of India due to its diverse geographical features by using a systematic search and collection of publications and secondary data. The characteristics of India's physiography were discussed descriptively and visually. This study highlights the fundamental physiographic divisions, sub-divisions, and socioeconomic functions of each type of terrain in India, including the northern mountain range, northern plains, peninsular plateau, coastal plains, and islands (the eastern and western coastal plains, Andaman and Nicobar islands). This overview concluded that the physiography of India is complex, heterogeneous and could be categorized into four divisions with distinct characteristics. In detail, the Himalayan Range is a mountainous region in the northern part of the country which produced by the fold mountain processes. Meanwhile, the Indo-Gangetic Plain was well recognised for its extensive agricultural activities contributed by the Ganges River. India's diverse landforms had a profound impact on the country's cultural and economical development. On the other hand, this study also demonstrated that the plateau region in the country's southern and central regions was geographically diversified. The different landscapes of India influenced the socioeconomic characteristics of the Indian society and consequently supported national development of India.

Keywords: *physiography, geography, India, landforms, national development*

Introduction

Physiography is a branch of geography that analyses the physical patterns and processes of the Earth (Gregory et al., 2002). This area includes geomorphology, hydrology, soil, rocks, biogeography, and tectonic effects on landscapes (Bhat, 2009). All manmade activity took place in these landscapes. Mapping is an important part of the physiographic research since it provides a large scale of landforms on the planet (Best, 1986). India was chosen for studying the physiography of an area because of its diverse landforms (Medlicott et al., 2011). The northern mountain area, northern vast plains, peninsular plateau, coastal plains, and islands are the four divisions used by modern geographers to subdivide India (Qasim, 1998). These divisions serve various functions and provide inhabitants with a range of resources such as water, farmland, woods, and so on. The government and inhabitants may create incomes by utilising these resources, ensuring the long-term viability of India's national development (Best, 1986).

The study of India's physiography is critical for providing descriptive and quantitative explanations for landscape development. Mountains, plains, valleys, plateaus, coastal regions, and other landscapes are among them. In India, different landforms may serve different roles in the creation of different cultures. People who reside near the Ganges River, for example, prefer to engage in agricultural pursuits over those who dwell in the Himalayas. Furthermore, this research might lead to more research on how physiography relates to Indian cultural practises. This is fundamental, because the natural environment has traditionally served as a source of inspiration for

the development of culture for centuries (Sarma, 2005). Aside from that, this research looks at how individuals in one region develop connections with people in other locations through cultural and economic activities. As a result, this study details how India's natural physiography affects human activity in the region (Sinha et al., 2005). It should ideally be able to be utilised as a reference for future study.

The goal of this research is to figure out how India's physiography came to be. As a result, the following goals have been set: (1) to determine India's key physiographic divisions; (2) to investigate the physiography of India's sub-divisions; and (3) to comprehend the functions that each division plays in India's socioeconomic.

Materials and Methods

A literature survey was used to conduct this research, which includes a search of publications such as reports, journals, articles, and books. These secondary data were searched using the keywords "physiography" and "India," as well as physiographic divisions such as "Northern mountain area," "Northern plains," "Peninsular plateau," and "Coastal plains and islands." The records were further filtered to exclude geographic information that was not relevant to the principal issues of this study. The literature review was organised by the key divisions and subdivisions of India's physiography. Maps derived from Google Image and Google Map were used to describe the characteristics of these key divisions. Official websites such as the India Commission Website were also used to obtain and evaluate information about the relationship between physiography and socio-economics in India.

Study area

Refers to the *Figure 1*, India is an Asian country which located at the Equatorial line at 0° latitude. In details, the location of this country is between 8°4' N to 37°6' N latitude and 68°7' E to 97°25' E longitude (Google Map). This country situated at the south part of Asia, bordering the Arabian Sea at the west and the Bay of Bengal at the east. The capital city of India is New Delhi, which is the centre of the government. The total surface area of India is about 32, 87,782 km², occupied approximately 2.42% of the total area of the world. This is slightly more than one-third of the size of United States. The length from north to south is 3214 km and from east to west is 2933 km. It has a land frontier of 15200 km and has a coastline of 6083 km (Indian Quick Facts Official Portal, 2013).

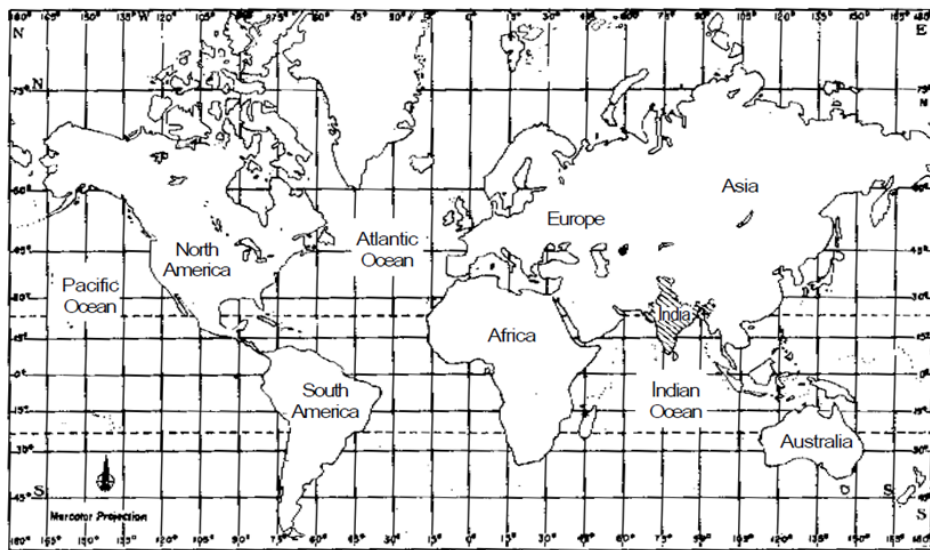


Figure 1. World map: The map of India.
Source: Geoscience News and Information (2021).

The total surface area of India is about 32, 87,782 km², occupied approximately 2.42% of the total area of the world. This is slightly more than one-third of the size of United States. The length from north to south is 3214 km and from east to west is 2933 km. It has a land frontier of 15200 km and has a coastline of 6083 km (Indian Quick Facts Official Portal, 2013). Geographically, the north part of India is snow-capped Himalayan Mountainous regions, while the south part is tropical forests (Medlicott et al., 2011). This means the north part of India is a temperate zone while southern part is tropical area. Therefore, people from north and south are experienced a very different lifestyles (Pletcher, 2010).

Results and Discussion

Physiography of India

India is a land of diversities. Great mountains, rivers, wide plateaus and plains, lengthy coastlines etc. constitute the topography of this country (Figure 2). Physiographic ally, India can be classified into four divisions, which are the northern mountain region, Great Plains of the north, the peninsular plateau, coastal plains and islands (Medlicott et al., 2011). Every type of physiography plays a significant function in India, notably in terms of social and economic development. Residents cultivate crops on the fertile lands of the northern plains, which are rich in minerals and nutrients, while mountain locations benefit tourism industry (Pletcher, 2010). While the Ganges River plays main role as Holy River and attracts many tourists from local and international, which generate economic benefits to the country (Pletcher, 2010). At the same time, these unique landscapes have also affected to the human lifestyles.

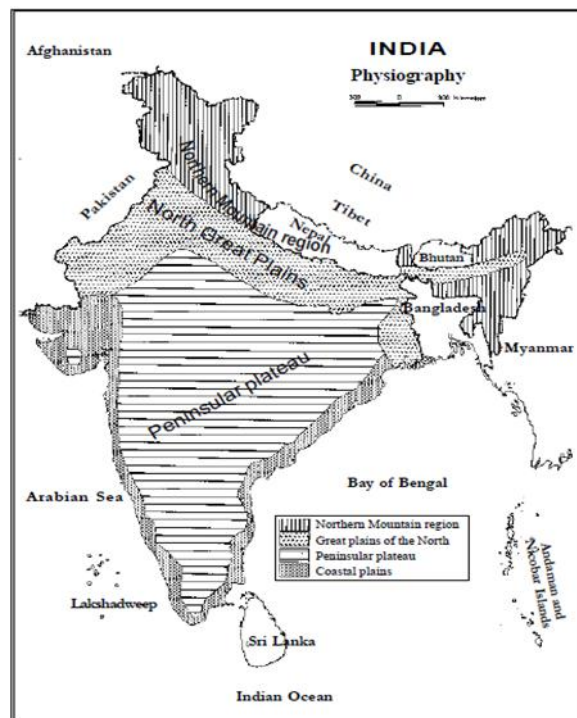


Figure 2. Map of main physiography of India.
Source: Rautela (2006).

The northern mountain region

Himalayan Range age around 70 million years is the youngest and highest mountain in the world. Himalaya in Sanskrit means, “Abode of snow”, which is mountain covered with snow. Himalaya have an arc-shaped from west to east for about 2415 km long (1500 miles), lying along the northern boundary of India with Tibet. Himalaya landform happened due to the collision of Indo-Australian plate with Eurasian plate, form as “Fold Mountains”. According to scientist, Indo-Australian plate still moving at 67 mm per year, that mean Himalaya are still rising and at a rate of more than 1 cm every year. Therefore, the area geologically is unstable and seismically active. It is width ranging from 240 to 330 km, along the boundaries and covering some of Asian countries. The Himalaya span an area of 750 000 square kilometers, which pass through the nations of India, Pakistan, Afghanistan, China, Myanmar, Nepal and Bhutan. The Himalayan Mountains form the northern mountain region of India. They are the highest mountain ranges in the world. They have the highest peaks, deep valleys, glaciers, etc. These mountain ranges start from Pamir Knot in the west and extend up to Purvanchal in the east; form a barrier separates northern India from the plateau of Tibet. The Ladakh, Zaskar and the Himalayan range of mountains and the eastern highlands, forms this region. The average height is 6000m above. The highest peak in India, Mount Godwin Austin (8611m) is in the Karakoram Range (Bhat, 2009).

Northern most part of the Himalaya Range is the world’s highest regions with an average altitude of 6,000m, including of the world’s highest peak, Mount Everest (8,848m), followed by Mount Makalu (8,481m), Mansalu (8,156m), Annapurna (8,078m), Kanchenjungs (8,598m), and Nanga Parbat (8,126m) (US Library of Congress, 2013). The Himalayas, a part of the Northern mountain region, which trend in NW-SE direction for a length of about 2400km is an arc shaped mountain range (*Figure*

3). This mountain region with an area of about 5 lakh km² is the highest region in the world (Qasim, 1998). The area has an average elevation of 500 m to 3000 m above sea level. This geographic divide is comprised of three parallel mountain ranges, many deep valleys, and huge plateaus (Medlicott et al., 2011). The remains of numerous marine species discovered at various points on the mountain ranges support the theory that the region was once covered by sea. As mountain ranges approach the eastern parts of the Northern mountainous regions, their height steadily declines (Bhat, 2009).

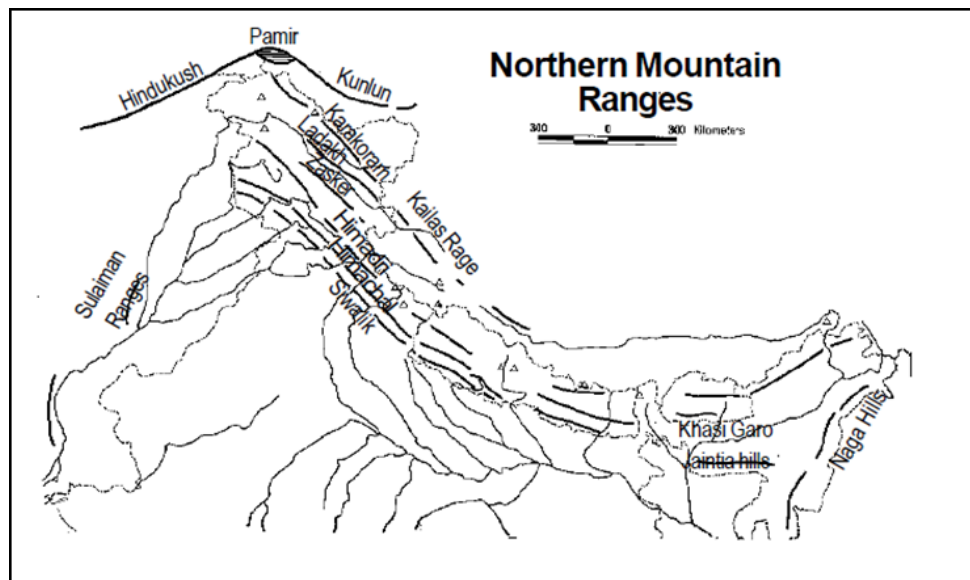


Figure 3. Map of northern mountain ranges in India.
Source: FlexiPrep Official Portal (2021).

According to *Figure 4*, the Himalaya Range is divided into three sections: the Lesser Himalaya, the Great Himalaya, and the Tethys Himalayas. The Lesser Himalayas, also known as the Lower Himalaya Range, are located north of the Sub-Himalayan Range and south of the Great Himalayas. The mountains range in elevation from 1800 to 4600 metres. Millions of years of folding, faulting and over thrusting has led to the formation of these mountains (US Library of Congress, 2013).

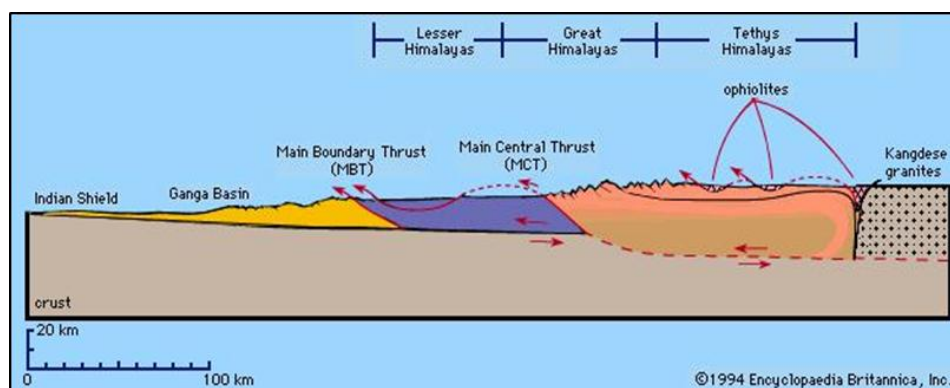


Figure 4. A cross section of the Himalayan Range.
Source: Bishop (2021).

Great Himalayas is mountain ranges separate the plains of the Indian subcontinent from the Tibetan Plateau. This region includes over a hundred mountains exceeding 7,200m in elevation. This is the highest zone, high peaks covered with snow, average height 6000 meters. Some peaks are reached above 8000 meters (Bhat, 2009). Mount Everest height 8848 meters, which lies between Tibet and the kingdom of The Himalayas, has profoundly shaped the India culture (US Library of Congress, 2013). Tethys Himalayas stretch over 2,400km between Namche Barwa syntaxes in Tibet and the Nanga Parbat syntaxes in Pakistan, are the result of an ongoing collision between two continental tectonic plates (Medlicott et al., 2011). This immense mountain range was formed by tectonic forces and sculpted by weathering and erosion. Simplified north-south cross section of the Himalayas, revealing a foreland basin (Ganga Basin), an over thrusting of crystalline terrains onto the Indian Plate, and a steeper thrust fault (a ramp) beneath the Great Himalayas.

Himalaya Range plays a main role in socio-economy of India. This mountain range forms the natural wall along the northern borders. This is a natural shield to protect the country against invasions from the northern regions. Moreover, it also protects India from cold winds coming from the north (Indian Quick Facts Official Portal, 2013). Therefore, Indian residents no need to suffer from cold temperature and the agricultural activities have been carried out in the suitable temperature and climate. The rivers that flow from the Himalayas bring fertile soil to the plains. The rivers Indus, Ganga, and Brahmaputra provide this vast plain with year-round water. At the same time, the large amount of river water can be used to generate hydroelectricity. Dams are proposed to be built in three major Himalayan river basins in India because of their electricity potential and relatively high yearly water output (Richardson and Thorne, 2001).

East Himalaya provides a wide potential in tourism that has yet largely remained unexploited. The perennially snow-capped mountains, lush green tropical and temperate forests, gurgling streams and the rich of flora and fauna (Roy and Sinha, 2007), is situated in North East India, just south of Sikkim, Darjeeling provides the perfect ambiance of a hill resort with its mild climate and laid back charm (Medlicott et al., 2011). Its lush hills and valleys are rich in colour, and large areas of rolling green tea gardens dot the landscape. Mt. Kangchenjunga, the third tallest mountain on Earth (Sarma and Phukan, 2004), looms over the northern horizon, providing the country a magnificent aura that intoxicates one's senses (The Indian Analyst Official Portal, 2007).

The northern plains

The Northern Plains lies to the south of Himalayan Region. It is also called the Gangetic Plain. It is a vast plain and level land between the Himalayas in the North and Deccan Plateau in the South. From Punjab in the West to Assam in the East, this plain is about 2400 km. long and its width varies from 150 km. in the East to about 300 km. in the West. It includes the States of Punjab, Haryana, Uttar Pradesh, Bihar, West Bengal, some parts of Assam and the Union Territory of Delhi (Indian Quick Facts Official Portal, 2013). The soil of this plain is built of the sediments brought down by the rivers from Himalayas (Richardson and Thorne, 2001). Such plain is called an alluvial plain and is very fertile. This plain is one of the largest and most fertile plains of the World. It is the most thickly populated plain. This is also the major crop growing area in India. This plain is drained by Sutlej, Ganga, Brahmaputra and their tributaries (*Figure 5*). The slope of this plain in the West is South-west and in the East is Southeast (Indian Quick

Facts Official Portal, 2013). Generally, there are three main rivers, the Sutlej, Ganga, Brahmaputra and their tributaries flow through this plain. Therefore, this plain can be divided into three parts namely The Sutlej Basin, The Ganga Basin, and The Brahmaputra Basin (Indian Quick Facts Official Portal, 2013). An area through which a river and its tributaries flow is called its basin. The characteristics and functions of each basin are as following (Jain et al, 2007):

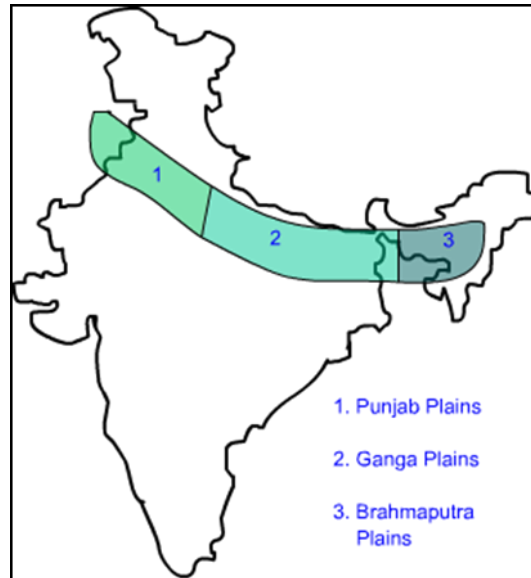


Figure 5. Map of northern plains in India.

Source: Adhikari (2021).

- (a) The Sutlej Basin: lies in the Western part of the Northern plain. River Sutlej and its tributary Beas flows in this part. Beas joins Sutlej at Harike before the Sutlej enters Pakistan. Two important states of this basin are Punjab and Haryana. The Union Territory of Chandigarh also falls in this basin. This part does not get sufficient rain therefore wells, tube-wells and canals are also used for irrigation. Wheat is the main crop of Sutlej Basin. Other crops like rice, sugarcane, cotton, gram and oil seeds are also produced in large quantity. Sutlej Basin is a granary of the country which supplies wheat and rice to other parts of the country. The climate of this part is very hot in summer and very cold in winter. The people of this basin are very healthy and hardworking. They make good soldiers for our army. Amritsar, Jalandhar, Ludhiana, Patiala, Chandigarh, Ambala, Kurukshetra, Karnal, and Sonapat (Medlicott et al., 2011).
- (b) The Ganga Basin is situated to the east of the Sutlej Basin. It encompasses the majority of the rich Northern Plain. As a result, this plain is also known as the Gangetic Plain. The Ganga Basin includes the states of Uttar Pradesh, Bihar, West Bengal, and the Union Territory of Delhi. The rivers Ganga, Yamuna and their tributaries flow through this part. The Ganga rises in the Himalayas in the glacier known as Gangotri. The Yamuna rises in a nearby glacier called Yamunotri. Bhagirathi, Mandakini, Alaknanda and some other streams join Ganga before it reaches Haridwar (Richardson and Thorne, 2001). It grows to be a large river, and the Ganga enters the plains at Haridwar. Haridwar is regarded as the most sacred location. This basin's significant towns and industrial centres include Faridabad.

- (c) The Brahmaputra Basin is the fertile Northern plain's easternmost region. The Brahmaputra River rises in Tibet's Mansarovar Lake, where it is known as Tsang-Po. It turns south and enters India through the Himalayas' eastern end. Turning west, it enters the plain of Assam through a lengthy valley, and then the Brahmaputra turns south and enters Bangladesh. It then merges with Padma and flows into the Sunderbans delta. It is a narrow plain in Assam. This basin is surrounded on three sides by hills and mountains. Its southern border is bounded by the Khasi, Garo, Jaintia, and Naga Hills (Medlicott et al., 2011).

These plains are made up of alluvial soil deposited by rivers. As a result, the soil is extremely soft and productive. Wheat, rice, sugarcane, legumes, oil seeds, and jute are among the major crops farmed here. This plain is known as India's "food bowl." Furthermore, irrigation wells, tube-wells, and canals can be dug. Because of efficient irrigation, this area has become India's top producer of food grains (Bhat, 2009). This plain receives an adequate amount of rainfall. There are numerous rivers, streams, and lakes in the area. There is also a lot of vegetation. These elements influence the climate and make it livable. The Northern Plains have a very cold winter climate and a very hot summer climate (Indian Quick Facts Official Portal, 2013). This plain is significant to India's economic development. Because the land is level, transportation and communication are simple. This plain is well-served by a network of railways and highways. Some key sectors, such as iron and steel, jute, cement, sugar, and textile, are evenly distributed throughout the region.

The Ganges is a sacred river to Hindus along every fragment of its length. All along its course, Hindus bathe in its waters, paying homage to their ancestors and to their gods by cupping the water in their hands, lifting it and letting it fall back into the river; they offer flowers and rose petals and float shallow clay dishes filled with oil. Its water is regarded as holy, but this holy water is getting polluted. Waste of many cities and industries located along its banks is making the water polluted. The water is no fit for drinking. The government has made up a plan known as the Ganga Action Plan to clean the water from this pollution. Some regulations have been enacted to prevent the disposal of wastes into rivers in order to protect this river (Prasad, 2006).

The peninsular plateau

The Peninsular Plateau is a vast area stretching over much of India. It consists of undulating land, which is higher than the coastal plains to the east and west or the flat Northern Plain of the Ganga and the Satluj. This plateau extends from north to south for a distance of about 1600 km and from east to west for about 1400 km (Medlicott et al., 2011). This zone has a diverse topography of mountains, plateaus and valleys. The plateau of this physiographic division has an average altitude of above 400 mean sea levels. Anamudi (2695m) is the highest peak (Bhat, 2009). Most of the rivers in this zone flow towards the east. There are large deposits of different minerals occur in this zone. The Narmada River, which is, divides the peninsular plateau in two unequal parts, which are northern and southern parts. However, the Peninsular Plateau generally can be divided into three parts. The northern part is called the Central Highlands, the southern part is the Deccan Plateau and the southeastern part named as Chhotanagpur Plateau (*Figure 6*).

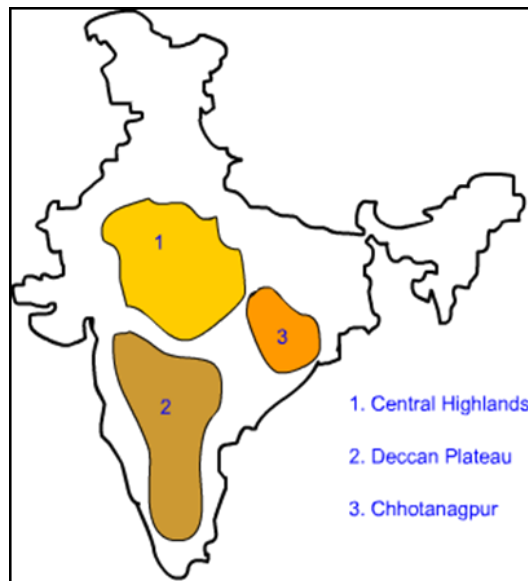


Figure 6. Map of peninsular plateau in India.

Source: Victoria and Albert Museum Official Portal (2021).

Central Highlands comprises of Bundelkhand Bhandar, Baghel and Malwa Plateau. These highlands are situated to the north of Narmada rift valley, which formed from hard metamorphic and igneous rocks (Qasim, 1998). The southern tributaries of the Ganga River and Yamuna River drain the plateau. Bundelkhand Plateau is a part of central highlands and is composed of granite and gneisses. Malwa Plateau is an example of dissected lava plateau, which is covered with black soil (Indian Quick Facts Official Portal, 2013). Deccan Plateau the largest plateau lying to the south of the Narmada River. It includes the Western Ghats north of 16° north latitude (Indian Quick Facts Official Portal, 2013), plateau of Maharashtra (except the east of Nagpur) and the adjoining parts of Madhya Pradesh, Karnataka and Andhra Pradesh (Jain et al, 2007). Chhotanagpur Plateau's highest peak is Parasnath (1,366m) situated in the north eastern part of Indian Plateau includes the region of Bihar, adjoining Madhya Pradesh and West Bengal. It consists of Ranchi Plateau in the south, the Hazaribagh Plateau in the north, and the Rajmahal Hills in the northeast. It is described as the "Ruhr of India" (Indian Quick Facts Official Portal, 2013). It contains pat lands and is very rich in mineral resources.

According to the Figure 7, The Peninsular Plateau is surrounded on all sides by low-lying plains. Much of the plateau is bordered by sloping scarps or Ghats. On the western side, the scarp of the plateau is very steep. To the east, river valleys divide the Ghats into small hilly areas. To the north, there is a scarp at some places and at other places, the land just slopes gently down to the Northern Plains (Medlicott et al., 2011). This region is the origin of some rivers, which flow from the west to east. The Godavari River and its confluents, including the Indrāvati River (Jain et al., 2007), irrigate the majority of the northern part of the terrain, ascending in the Western Ghats and running to the east in the direction of Bay of Bengal (Richardson and Throne, 2001). Therefore, the Peninsular Plateau of India plays a main role in irrigation of water resources to the agricultural activities (Indian Quick Facts Official Portal, 2013). In economic terms, the Indo-Gangetic Plain is the most important region of India. The plain is a great alluvial crescent stretching from the Indus River system in Pakistan to the Punjab Plain and the

Haryana Plain to the delta of the Ganga in Bangladesh. This region is very crucial in India's economy and cultural lifestyles.

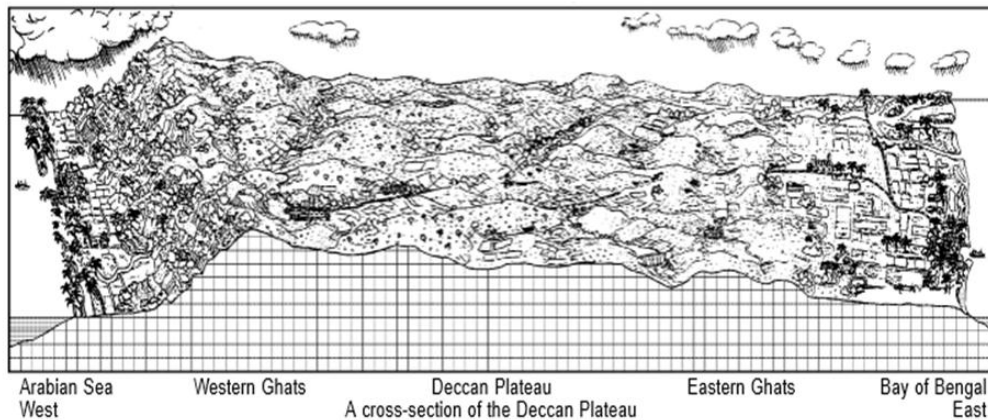


Figure 7. A cross section of the Deccan Plateau.
Source: Jay and Widdowson (2008).

The plateau's population density is very high due to the fertile soil for farming. The plains support one of the most populous areas on Earth, being home to nearly 1 billion peoples on 700,000 km². Its major cities includes Karachi, Hyderabad, Multan, Islamabad, Rawalpindi, Faisalabad, Lahore, Amritsar, Bathinda, Jammu, Jalandhar, Pathankot, Ludhiana, Chandigarh, Delhi, Jaipur, Kampur, Lucknow, Allahabad, Varanasi, Patna, Kolkata, Guwahati and Dhaka (Pletcher, 2010). Topographically the plain is homogeneous, with only floodplain bluffs and other related features of river erosion and changes in river channels forming important natural features. The economic role of India Great Plain are farming which primarily consists of rice, wheat, maize, sugarcane, and cotton (Indian Quick Facts Official Portal, 2013). The main source of rainfall is the southwest monsoon, which is normally sufficient for general agricultural.

The Great Plains, also known as The Indus-Ganga plains, are large floodplains of the Indus and the Ganga-Brahmaputra river systems. They run parallel to the Himalaya Mountains, which is from Jammu and Kashmir in the west to Assam in the east and draining most of northern and eastern India (Richardson and Thorne, 2001). These plains extend in the east west direction between the Himalayan in the north and Great Plain Peninsular Plateau in the south. The plains encompass an area of 700,000 km² and vary in width through their length by several hundred kilometers. The major rivers of this system are the Ganga and the Indus along with their tributaries, which are Beas, Yamuna, Gomti, Ravi, Chambal, Sutlej and Chenab (Bhat, 2009). The rivers flow out from the Himalaya provides much water for major irrigation works. Since the land is almost flat, it is very easy to construct irrigation canals and have inland navigation. It has excellent roads and railways, which are helpful for the establishment of many industries. 40% of the total population of India lives here and it is called "The heart of India". Thus, this area is very important to the India's economy.

The coastal plains and islands

Coastal plains of India are the waved platforms and the raised beaches above the watermark (Figure 8). These are mainly the emerged floors from the seas that are adjacent to the land. The Peninsular India plateau is bordered by the narrow coastal

plains (Bhat, 2009). The Deccan plateau in India is surrounded by the coastal plains in the west and the east. These are numerous estuaries in the Indian Coastal Plains. Among these, the major ones are Narmada River and Tapi River in the state of Gujarat. The plain is blessed with natural harbors such as Marmagao and Mumbai (Sarma and Phukan, 2004).

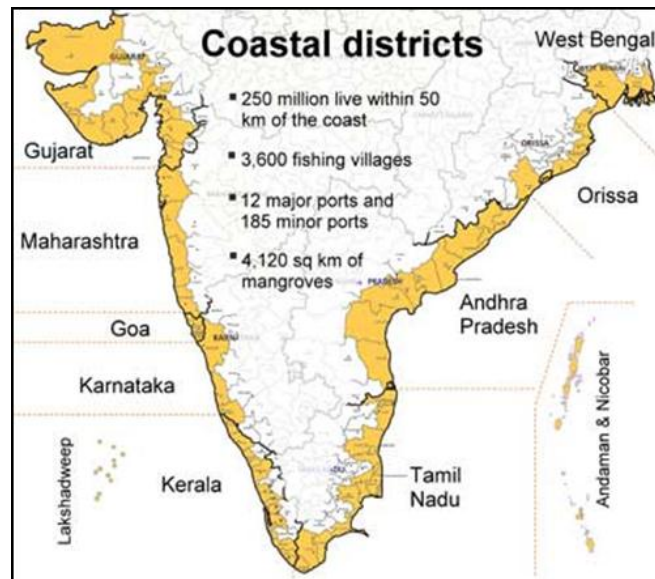


Figure 8. Map of coastal plains and islands of India.
Source: Kapoor et al. (2012).

In the south, the coastal plains are combined with the salt-water lakes also known as lagoons. Spits and sand bars can be found at their mouths. The coast plains alongside the Bay of Bengal are very extensive and differ from the plains in the western strip. India's coastline is about 7500 km and comprises of ecologically sensitive and diverse areas that call for preservation (Sinha et al., 2005). Coastal areas are home to wildlife habitats, mangrove, coral reef, estuarine and creek ecosystems and have designated national parks, sanctuaries and reserve forests. Coastal and deep-sea waters are important breeding and spawning grounds for fish and other aquatic organisms. The coastal area of India can be divided into the eastern coastal plains and western coastal plains. Both of these coastal areas have significance in economy aspects (Nammalwar et al., 2013).

The eastern coastal plains

The East Coastal Plains (8° - 22° $13' 30''$ N and 77° $30' 30''$ - $87^{\circ}20'$ E) cover about 1,02,882 sq. km of area along the coasts of Orissa, Andhra Pradesh and Tamil Nadu (India Quick Facts, 2013). It lies between the Eastern Ghats and the Bay of Bengal and is more extensive and wide than its western counterpart (Sinha et al., 2005). This plain, situated between the Bay of Bengal and the Eastern Ghats, is a 120-kilometer-wide swath of land. The plains stretch from the southern state of Tamil Nadu to the northern state of West Bengal in India. These plains experience a temperature of over 30°C , characterized by high humidity level. Abundant rainfall is received by the region that amount between 1000mm to 3000mm annually, subject to southwest and northeast monsoon rains (Sarma, 2005). These plains are characterized by numerous rivers, large

deltas, fertile and irrigated lands, lagoons, spits and offshore bars. At places, the plains are bordered with dunes. Mangrove forests also grow in this region. In the state of Tamil Nadu, the eastern coastal plain is much wider, stretching to about 100 to 120 km of width (Sinha et al., 2005).

The three main divisions into which the eastern coastal plains can be divided: (i) Utkal Plains: extends for about 400km from deltaic plains of the Gango to the Mahanadi delta. The coastal stretch of the state of Orissa and consists of the Mahanadi delta. The famous feature of the region is the Chilka Lake lying on the south of the Mahanadi Delta (The Indian Analyst Official Portal, 2007); (ii) Tamil Nadu Plains: extend about 675km, from the north of Chennai to Kanyakumari in the south. It has the deltaic plains of Kaveri and is popularly called the Granary of South India (Sarma and Phukan, 2004). The prominent feature of the region is the Kaveri delta, the fertile soil and irrigational facilities of which makes it a granary in South India; and (iii) Adhra Plains: extend from the Utkal Plains on the north to the Pulicat Lake in the south. The delta formation by the River Kaveri and River Godavari happens to be important features of the region.

The western coastal plains

West Coastal Plain (8° 15'-20° 22'N and 73° 40'-77° 30'E) between the Sahyadris and the Arabian Sea covers a total area of 64,264 sq. km (N-S length 1,400 km, E-W width 10-80 km). It has an elevation from sea level to 150 m, at places reaching more than 300 m (Indian Quick Facts Official Portal, 2013). It is characterized by sandy beaches, mud flats, and lagoons, alluvial tracts along rivers, estuary, laterite plat-forms and residual hills. These plains are situated on a thin strip of land and nestled with the Arabian Sea and the Western Ghats. Having a length about 1,400 km and a breadth of 10-80 km, the western coastal plains cover an area of about 64,284 km² (Sarma, 2005). Extending from Gujarat, in the northern side to the south in the state of Kerala, the western coastal plains are characterized by many rivers and backwaters and rivers that drain into this area. The rivers that flow through this region resulted in the formation of most estuaries in the western coastal plains.

The storm activity experienced by these plains is less in comparison to the eastern coastal plains. Most of the storm in March, happens in the states of Karnataka, Maharashtra, and Goa (Indian Quick Facts Official Portal, 2013). The western coastal plains are small and can be divided into 3 parts, namely; (i) Konkan region that is the northern part of the coast; (ii) Kanara region, forms a separate transitional zone in between the Malabar coast; and (iii) Malabar Coast that is the southern part of the coast. These areas had been polluted due to rapid development of coastal areas. Most pollution in India coastal areas are arises from land-based sources - industrial & domestic wastes and agricultural run-off (Indian Quick Facts Official Portal, 2013). Shipping and associated shipbuilding, breaking and port activities are becoming increasingly significant. The crops of recently started coastally located industries use seawater as a resource and the coastal domain as a sink of altered seawater. These pose newer, more direct threats to sensitive eco areas (Qasim, 1998). Therefore, this area play an important role in coastal development and beneficial to the economic improvement.

Andaman and Nicobar islands

The Indian Ocean is divided into two major groupings of islands. They are located far from the Indian mainland's coast. The Andaman and Nicobar Islands are in the Bay

of Bengal, while Lakshadweep is in the Arabian Sea (US Library of Congress, 2013). The Andaman and Nicobar Group of islands is situated between 6 °N to 14 °N latitudes and between 90 °E to 94 °E longitudes. It consists of about 572 big, small and tiny islands, out of which only 38 are inhabited. This group is about 1255 km from Kolkata and about 1190 km from Chennai (Indian Quick Facts Official Portal, 2013). The total area is about 8249 sq km. The Ten Degree Channel separates the Andaman group from the Nicobar group, about 121 km wide. The north-south extent is about 590 km and the maximum width is about 58 km (Indian Quick Facts Official Portal, 2013). The extreme southernmost point is the Indira Point (Sinha, et al., 2005).

The Andaman is a closely-knit group of islands in which only 25 islands are inhabited. In the Nicobar group, only 13 islands are inhabited (Indian Quick Facts Official Portal, 2013). Most of the islands are made up of sandstone, limestone and shale. Most of them are of volcanic origin, and some are fringed with coral reefs. The islands are mountainous, with maximum elevation at Saddle Peak (about 750 m). The climate is hot and humid and the area is covered with thick forests and coconut groves. The Lakshadweep group of islands, located in the Arabian Sea, consists of only 27 islands, 11 of which are inhabited (US Library of Congress, 2013). In 1973, the Laccadives, Minicoy, and Aminidivi group of islands were renamed Lakshadweep (meaning "one lakh islands"). This island group is widely scattered over an area of about 110 km² (Indian Quick Facts Official Portal, 2013). Lakshadweep lies around 200 to 500 kilometres southwest of Kerala's coast. These are coral-based islands (US Library of Congress, 2013). Minicoy Island is the largest and most developed of the islands in the group. Shallow lagoons have formed as a result of the reef deposits, particularly on the western side. The majority of these are low-lying islands. There are no relief characteristics such as hills, streams, or valleys on these islands. As a result, these islands play an important role in both tourism and biodiversity in India (Jerard et al., 2017).

Conclusion

India's physiography is complex and can be split into four separate divisions with distinct characteristics. The Himalayan Range is a mountainous region in the country's north produced by the fold mountains process. While the Indo-Gangetic Plain is well-known for its large-scale agricultural activity. Whereas the plateau region is found in the country's southern and central regions. Last but not least, coastal and island regions have enormous deltas that cover a considerable percentage of the land. The diversity of landforms in India has profoundly affected the country's culture and economy. This demonstrates that these places are tourism hotspots, attracting a large number of tourists who come to appreciate India's historical and cultural activities. Furthermore, the high Himalaya regions serve as a sanctuary for a diverse range of biodiversity, including medicinal plants and wildlife. As a result, diverse landforms in India have influenced India's socioeconomic aspects, encouraging the nation's development.

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Conflict of interest

The author confirms that there is no conflict of interest with any parties involved with this study.

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