



Chapter 1 - Land and People

India is the seventh-largest country in the world and ranks first in population. It is bounded by the Great Himalayas to the north and stretches southward between the Bay of Bengal to the east and the Arabian Sea to the west. Lying entirely in the Northern Hemisphere, the mainland extends between latitudes 8°4' N and 37°6' N, longitudes 68°7' E and 97°25' E, and measures about 3,214 km from north to south and about- 2,933 km from east to west. It has a land frontier of about 15,200 km. The total length of the coastline of the mainland, Lakshadweep Islands, and Andaman and Nicobar Islands is 7,516.6 km.

Geographical Background

India shares its borders with several countries: Afghanistan, Pakistan, China, Bhutan, Nepal, Myanmar and Bangladesh. Sri Lanka is separated by a narrow channel of sea, formed by the Palk Strait and the Gulf of Mannar. Administratively, India comprises 28 states and 8 union territories.

Physical Features: The Indian mainland consists of four major regions:

1. The Great Mountain Zone
2. The Plains of the Ganga and the Indus
3. The Desert Region
4. The Southern Peninsula

The Great Mountain Zone: The Himalayas, stretching about 2,400 km with a depth of 240–320 km, consist of three parallel ranges, interspersed with fertile valleys like Kashmir and Kullu. Some of the world's highest peaks are found here, with travel possible only through select passes such as Jelep La, Nathu La, and Shipki La.

- To the east, the range gradually transitions into lower hill ranges like the Garo, Khasi, Jaintia, and Naga Hills, and the Mizo and Rakhine Hills along the India-Myanmar and India-Bangladesh borders.

The Plains of the Ganga and the Indus: Spanning about 2,400 km in length, these plains are formed by the basins of three major rivers like Indus, Ganga and Brahmaputra

- This region is one of the largest alluvial plains and among the most densely populated areas on Earth. Between Delhi (on the Yamuna River) and the Bay of Bengal, approximately 1,600 km away, there is an elevation drop of only 200 metres.

The Desert Region: The desert region is divided into the Great Desert, extending from the Rann of Kutch to the Rajasthan-Sindh frontier, and the Little Desert, located between the Luni River, Jaisalmer, and Jodhpur, with a barren zone of rocky terrain and limestone ridges in between.

The Southern Peninsula: The Peninsular Plateau is distinct from the northern plains, bordered by mountain and hill ranges. Prominent ranges include Aravali, Satpura, Ajanta, Vindhya, and Maikala.

- The Peninsula, flanked by the Eastern and Western Ghats, has a narrow coastal strip between the Western Ghats and the Arabian Sea, and a broader coastal plain between the Eastern Ghats and the Bay of Bengal.

- The Nilgiri Hills mark the southern tip, where the Ghats converge, followed by the Cardamom Hills, a continuation of the Western Ghats.

Geological Structure

The Indian subcontinent can be divided into three main regions:

- The Extra-Peninsular region (The Himalayas),
- The Indo-Gangetic Plains, and
- The Peninsular region.

The present geological configuration of India resulted from the collision between the Indian and Eurasian plates around 40–50 million years ago, forming the Himalayas. Before this, the region was submerged under the Tethys Sea.

- South of the Himalayas lies the Indo-Gangetic Plains, a geologically young, fertile area composed of alluvium deposited by rivers from the Himalayas and Peninsular region. The Peninsular region, shaped like an inverted triangle, is a significant reservoir of economic minerals and features ancient rock formations, Gondwana Supergroup, Deccan Traps volcanic lava flows, and younger Quaternary sediments.

River Systems: The river systems of India can be broadly classified into four groups:

- Himalayan rivers,
- Deccan rivers,
- Coastal rivers, and
- Rivers of inland drainage basins.

Himalayan Rivers: Formed by the melting of snow and glaciers, the Himalayan rivers flow perennially. The major river systems include the Indus and the Ganga-Brahmaputra-Meghna systems.

- **The Indus River** rises near Mansarovar in Tibet and finally drains into the Arabian Sea near Karachi. Important tributaries in India include the Sutlej (originating in Tibet), Beas, Ravi, Chenab, and Jhelum.
- **The Ganga-Brahmaputra-Meghna system:** Bhagirathi and Alaknanda, joining at Devprayag to form the Ganga. Flowing through Uttarakhand, Uttar Pradesh, Bihar, and West Bengal, the Bhagirathi branches off below the Rajmahal Hills, while the main stream (Padma) continues east into Bangladesh.
 - Important tributaries of the Ganga include the Yamuna, Ramganga, Ghaghra, Gandak, Kosi, Mahananda, and Sone.
 - The Chambal and Betwa rivers are sub-tributaries of the Yamuna. In Bangladesh, the Padma (or Ganga) joins the Brahmaputra.
- **The Brahmaputra River** originates in Tibet (Tsangpo) and enters India as the Dihang in Arunachal Pradesh, receiving tributaries like the Dibang and Lohit near Pasighat. It flows through Assam before entering Bangladesh, where it merges with the Ganga after being fed by the Teesta.
 - Major Indian tributaries include the Subansiri, Jia Bhareli, Dhansiri, Puthimari, Pagladiya, and Manas.
- **The Barak River**, rising in Manipur, is a headstream of the Meghna and has tributaries such as Makku, Trang, and Jiri. It flows into Bangladesh and joins the Ganga-Brahmaputra system near Bhairab Bazar.

Deccan Rivers: Most rivers in the Deccan region flow eastward into the Bay of Bengal, while the Narmada and Tapi flow westward into the Arabian Sea.

- The Godavari River is the second-largest basin (10% of India's territory), followed by the Krishna and Mahanadi.
- On the west coast, there are around 600 small rivers, while only a few drain into the sea near the deltas of the east coast.

Coastal Rivers: The coastal streams, particularly on the west coast, are short in length and have limited catchment areas. Most of them are non-perennial.

Rivers of Inland Drainage Basins: Rivers in Rajasthan and desert areas, such as the Luni, Machhu, Rupen, Saraswati, Banas, and Ghaggar, do not reach the sea, instead draining into salt lakes or disappearing into the sands.

River Basin Classification: For effective planning and management, India is divided into 20 river basins or groups of river basins, comprising 12 major basins and 8 composite river basins.

| 12 Major River Basins (each exceeding 20,000 sq. km) | 8 Composite River Basins (medium and small rivers) |
|--|--|
| <ol style="list-style-type: none">1. Indus2. Ganga-Brahmaputra-Meghna3. Godavari4. Krishna5. Cauvery6. Mahanadi7. Pennar8. Brahmani-Baitarani9. Sabarmati10. Mahi11. Narmada12. Tapti | <ol style="list-style-type: none">1. Subarnarekha (including nearby rivers between Subarnarekha and Baitarani)2. East-flowing rivers between Mahanadi and Pennar3. East-flowing rivers between Pennar and Kanyakumari4. Inland drainage area of the Rajasthan desert5. West-flowing rivers of Kutch and Saurashtra, including Luni6. West-flowing rivers from Tapi to Tadri7. West-flowing rivers from Tadri to Kanyakumari8. Minor rivers draining into Myanmar and Bangladesh |

Climate and Seasons of India

India's climate is influenced by the oceans, Himalayas, and the Thar Desert. Peninsular India, surrounded by the Arabian Sea, Indian Ocean, and Bay of Bengal, experiences an equable maritime climate along the coast. The Himalayas, stretching from Kashmir to Arunachal Pradesh, shield India from cold winds and block rain-bearing southwest monsoons, while northern India's land areas experience a continental climate with extreme summer heat and cold winters. India experiences four principal seasons:

- **Winter:** January and February
- **Pre-monsoon or Summer:** March, April, and May
- **Southwest Monsoon:** June to September
- **Post-monsoon or Northeast Monsoon:** October to December

Winter: The winter season spans from December to March, characterized by clear skies, pleasant weather, light northerly winds, low humidity, and significant daytime temperature variations. December and January are the coldest months, with temperatures gradually rising towards the equator.

Pre-monsoon or Summer: The pre-monsoon (summer) season, from April to June, is characterized by intense heat and convective weather phenomena such as thunderstorms, dust storms, and hailstorms.

- The northeast, northwest, and central India experience mean temperatures between 19°C and 43°C. In the peninsular region, hot conditions persist, with dust storms (known as andhis) frequent in northwest India, and violent thunderstorms, called Kal Baisakhis, occur in eastern and northeastern states like Bihar, Odisha, West Bengal, and Assam.

Southwest Monsoon: The southwest monsoon, spanning from June to September, typically begins over Kerala around June 1st and advances across the country by the end of July, with the Bay of Bengal islands receiving it a week earlier.

- The monsoon lasts from fewer than 75 days in western Rajasthan to over 120 days in the southwestern peninsular regions.
- During this period, humid southwesterly winds blow across India, with winds in July originating from the southwest in contrast to the northeasterly winds of January.

Prevalence of Cyclones: India is highly vulnerable to cyclones over the North Indian Ocean, which form over warm ocean waters and intensify into massive systems with strong winds, cloud cover, and heavy rains.

- Both the east and west coasts are at risk from cyclones originating in the Bay of Bengal and Arabian Sea, with peak activity in the post-monsoon and pre-monsoon seasons.
- Cyclones typically occur during the monsoon's onset (June) and withdrawal (September).

Flora

India's rich and diverse vegetation, resulting from variations in climate, altitudes, and geography, is classified into 11 phytogeographical zones, each with distinct floristic components.

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|----------------------|-----------------------------|--|
| North-West Himalayas | Eastern Himalayas | Northern Western Ghats and Northern West Coast |
| Indo-Gangetic Plains | Andaman and Nicobar Islands | Southern Western Ghats, Southern West Coast, and Lakshadweep |
| Central India | Deccan | Eastern Ghats and Coromandel Coast |
| Assam | Arid Zone | |

Regional Details

- **North-West Himalayas:** The North-West Himalayas, stretching from Jammu & Kashmir and Ladakh to Kumaon in Uttarakhand via Himachal Pradesh, feature a diverse range of forests including tropical Sal forests, temperate Pines, Deodar, Blue Pine, Silver Fir, and Quercus species.
- **Indo-Gangetic Plains:** The Indo-Gangetic Plains, covering Punjab, Haryana, Uttar Pradesh, Bihar, parts of Jharkhand, and West Bengal, are characterized by fertile alluvial soils supporting crops like wheat, sugarcane, and paddy. Vegetation includes Sal forests, mixed forests, swamp forests, wetlands, and mangroves with species like Shorea robusta, Lagerstroemia parviflora, and Rhizophora.
- **Eastern Himalayas:** Spanning from Sikkim to Arunachal Pradesh, including Darjeeling and the Duars, this region has lower tree lines and fewer glaciers than the western Himalayas. Dominant species include oaks, laurels, maples, rhododendrons, alders, and birches.
- **Assam Region:** Encompassing the Brahmaputra and Surma Valleys, this area features evergreen forests, bamboo thickets, tall grasses, and an abundance of epiphytes, including orchids.
- **Central India:** Covering Madhya Pradesh, Chhattisgarh, Jharkhand, and surrounding regions, it predominantly consists of tropical deciduous and thorn forests. Common species include Acacia, Albizia, Anogeissus, Gardenia, Grewia, and Sterculia.
- **Arid Zone:** Comprising the dry areas of western Rajasthan, Kutch in Gujarat, and parts of southwest Punjab and Haryana, this region supports desert vegetation dominated by thorny plants.
- **Northern Western Ghats and Northern West Coast:** It spans from Goa to the Tapti Basin, featuring lateritic plateaus and estuarine vegetation, including mangroves and halophytes.
- **Southern Western Ghats, Southern West Coast, and Lakshadweep:** Characterized by coastal swamps and a variety of forest types, including montane tropical, subtropical, temperate, and shola forests.
- **Deccan Plateau:** A triangular plateau between the Western and Eastern Ghats, this rain-shadow

region is dominated by deciduous forests.

- **Eastern Ghats and Coromandel Coast:** Stretching from the Mahanadi delta in Odisha to Kanyakumari in Tamil Nadu, this region features deciduous, semi-evergreen, and evergreen forests, intermixed with dry savannas, scrub, and estuarine vegetation.
- **Andaman and Nicobar Islands:** The Andaman and Nicobar Islands, rich in evergreen, mangrove, beach, and alluvial forests, share floristic affinities with Myanmar and Malesian flora, hosting many endemic and botanically significant species.

Botanical Survey of India (BSI)

The Botanical Survey of India (BSI), headquartered in Kolkata, studies India's flora through 17 regional centers. However, due to deforestation and other factors, over 1,500 plant species in India are currently considered threatened and are protected under Schedule 38 of the Biological Diversity Act, 2002.

Faunal Resources

Zoological Survey of India (ZSI)

The ZSI, under the Ministry of Environment, Forest and Climate Change, catalogs India's faunal diversity, from protozoa to mammals, with its headquarters in Kolkata and 16 regional centers. It has documented species under the Wildlife (Protection) Act, 1972.

- India is the first country to compile a complete checklist of its faunal species. It spans two major realms — the Palearctic and Indo-Malayan — and three biomes: tropical humid forests, tropical dry deciduous forests, and warm deserts/semi-deserts. The country's 10 biogeographic zones have.
- India has established 1,022 protected areas, covering 5.43% of its geographical area, and boasts a coastline of 7,516.6 km with an Exclusive Economic Zone (EEZ) of 2.37 million sq. km, supporting rich marine biodiversity.
 - With 7,076 species listed on the IUCN Red List, India also has 85 Ramsar wetlands and 18 biosphere reserves under UNESCO's Man and Biosphere Programme.
- Additionally, India shares four global biodiversity hotspots—Himalayas, Indo-Burma, Sundaland, and Western Ghats-Sri Lanka—featuring high endemism.

Demographic Background

Census: The 2011 Census was the 15th since the first Census was conducted in 1872. (Census 2021 and related activities were postponed due to the COVID-19 pandemic.)

Population: As per the Census of India 2011, the population of India stood at 121.09 crore (1.21 billion), comprising 62.33 crore males and 58.76 crore females. Of this, 83.38 crore (68.9%) resided in rural areas, while 37.71 crore (31.1%) lived in urban areas.

- The population was estimated to have reached 1,363.0 million in 2021 and is projected to reach 1,522.3 million by 2036. India accounts for 2.4% of the world's surface area but holds about 17.7% of the global population.

Population Density: Population density is defined as the number of persons per square kilometre. In 2011, India's population density was 382 persons per sq. km, with a decadal growth rate of 17.7%.

- **Among the larger states:**
 - **Bihar:** 1,106 persons per sq. km
 - **West Bengal:** 1,028 persons per sq. km
 - **Kerala:** 860 persons per sq. km
- **Among smaller states and union territories:**
 - **Delhi (NCT):** 11,320 persons per sq. km
 - **Chandigarh:** 9,258 persons per sq. km

Sex Ratio: The sex ratio, defined as the number of females per 1,000 males, has historically been

unfavourable to females in India.

- In 1901, it was 972 females per 1,000 males.
- It declined to 945 in 1941.
- It improved from 933 in 2001 to 943 in 2011.
- However, the child sex ratio (girls aged 0–6 years per 1,000 boys aged 0–6 years) declined from 927 in 2001 to 919 in 2011. The overall sex ratio is projected to improve to 957 females per 1,000 males by 2036.

Literacy: According to the Census of India 2011, a person aged seven and above who can read and write with understanding in any language is considered literate. Persons who can only read but not write are not classified as literate.

- In 2011, India's literacy rate stood at 73.0% (**Male:** 80.9%; **Female:** 64.6%).
- Kerala retained its top position with 94.0% literacy (male: 96.1%, female: 92.1%), followed by Lakshadweep at 91.8%. Bihar ranked lowest with 61.8% literacy.
- As per the Periodic Labour Force Survey (PLFS), 2020–21, Ministry of Statistics & Programme Implementation (MoSPI), the estimated literacy rate rose to 79.7%.

Migration: Migration is a significant demographic factor. People migrate for various socio-economic reasons. The Census records migration based on: **Place of last residence** and **Place of birth**.

- As per the 2011 Census, 455.8 million people were migrants by the last residence method, while 141.9 million were migrants between 2001 and 2011 by the place of birth method.
- The Migration in India 2020-21 report (PLFS 2020-21, MoSPI) indicates a total migration rate of 28.9%, with a rural migration rate of 26.5%. Employment-related migration accounts for 10.8%, driven by factors such as job opportunities, workplace proximity, business, transfers, job loss, or lack of local opportunities.

Fertility and Mortality Rates:

- India's Total Fertility Rate (TFR) decreased from 2.5 in 2010 to 2.0 in 2020, achieving replacement-level fertility (2.1).
- The Crude Birth Rate (CBR) in 2020 was 19.5 per 1,000 people, while the Crude Death Rate (CDR) was 6.0 per 1,000 people.
- The Infant Mortality Rate (IMR) reduced from 47 in 2010 to 28 in 2020.