



**IAS 100**

A Civil Services Chronicle Initiative

# **GEOGRAPHY**

## **(PART-II)**



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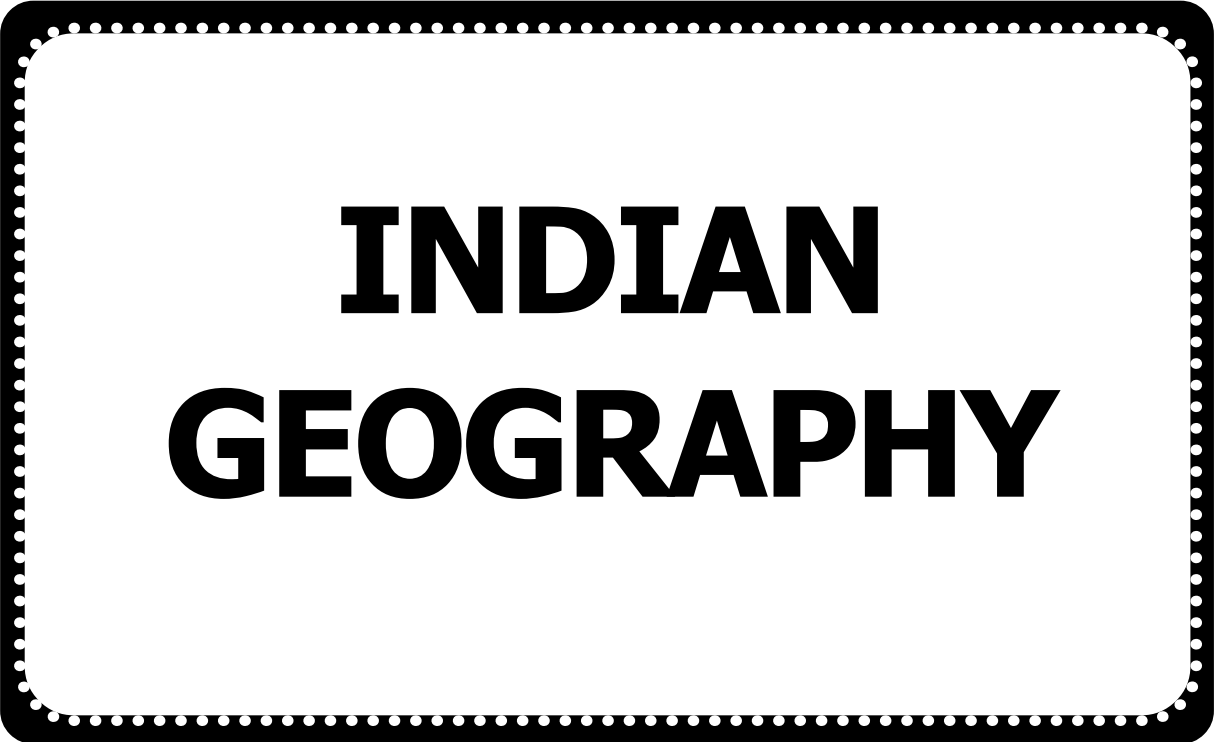
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# **INDIAN GEOGRAPHY**



India is the seventh largest and second most populous country in the world. Its area is 2.4% of the total world area but about 16% of the entire human races reside in its fold. In population, only the mainland China exceeds that of India.

India, Pakistan, Bangladesh, Nepal and Bhutan form the well-defined realm of south Asia often referred to as the Indian sub-continent.

Lying entirely in the northern hemisphere (tropical zone), the Indian mainland extends between the latitude - 8°4' N to 37°6' N and longitude - 68°7' E to 97°25' E. The southernmost point in the Indian territory, the Indira Point, is situated at 6°30' north in the Andaman and Nicobar islands. The tropic of cancer passes through the centre of India.

India covers an area of 3,287 sq. Km. and measures about 3,214 km. from north to south and about 2,933 Km east to west. The total length of the mainland coastland is nearly 6,200 km and land frontier about 15,200 km.

The boundary line between India and China is called the McMahon line. To the north-west, India, shares a boundary mainly with Pakistan and to the east with Myanmar and Bangladesh. The Indian Ocean lies in the south. In the south, on the eastern side, the Gulf of Mannar and the Palk Strait separate India from Sri Lanka. The Andaman and Nicobar Islands in the Bay of Bengal and the Lakshadweep islands in the Arabian Sea are parts of the Indian territory.

India's relief is marked by a great variety. India can be divided into five major physiographic units:

1. The Northern Mountains
2. The Great Northern Plains
3. The Peninsular Plateau.
4. The Coastal Plains
5. The Islands

### Northern Mountains

The mountain ranges and plateaus of the north Kashmir, the Himalayas and the hill ranges of Nagaland, East Assam, Manipur and Mizoram from a conspicuous mountain system bordering the country in the North.

### HIMALAYAS

**(i) The Greater Himalayas/Himadri/ Inner Himalayas:** They comprise the northern most ranges having an average height of 6000 m with breadth ranging from 120 to 190 km. Conforming the syntaxial bend to the underlying rocks, it is an asymmetrical mountain throwing very few spurs southward.

Important peaks of this system include Mt. Everest (8,848 m) at Kathmandu in Nepal, Kanchanjunga (8,598 m), Dhaulagiri (8,172 m) Nanda Devi (7,817m) Nanga Parbat (8,126m). Important passes are Bara Lacha La and Shipki La (in Himachal Pradesh), Thaga La Niti Pass and Lipulekh (Uttarakhand); Nathu La and Jelep La, (Sikkim); and Burzil pass and Zojila pass (Kashmir).

**(ii) The Lesser/ Middle Himalayas:** They have an average height of about 3,500 to 5,000 metres and average width of 60 to 80 km. It extends in the North of Siwalik range. Important ranges include the Dhauladhar, the Pir Panjal and the Musoorie range. Hills and resorts are Shimla, Musoorie, Nainital, Almora, Darjeeling etc.

**(iii) The Outer Himalayas/Shiwaliks:** They are the foothills running parallel to the Himalayas. Average height is 1,000 to 1,500 metres. It is a chain of low-lying hills formed through fluvial deposits like sand, clay and pebbles. Dehradun valley; Udhampur and Kotli valleys have developed into good human settlements.

Siwalik or Outer Himalayas is a hogback structure formed of river born deposits in the

latest phase of Himalayas uplift in Middle Miocene to lower Pleistocene age. It descends northwards to flat-floored structured valleys called "Duns". It is covered with thick tropical wet deciduous forests in the east.

## TRANS-HIMALAYAS

They comprise Karakoram and the Kailash mountain systems. Mt. K<sub>2</sub> (Godwin Austin - 8,611m) which is now in Pakistan occupied Kashmir is located in the Karakoram. Another important peak is Hidden Peak (8,068m). The Siachen glacier (72km) - largest in India is situated in Nubra valley in this region. Other glaciers are Baltoro (60 km), Biafo (60 km) and Hispar (62 km).

## PURVANCHAL OR EASTERN HILLS

After crossing the Dihang gorge in the east, the Himalayas bend towards South forming a series of hills with a north-south direction, convex side facing the west. These hills are made up of sedimentary rocks and are highly dissected. Their heights vary from 500m to 3,000m. The 'Patkai Bum' forms the boundary between India (Arunachal Pradesh) and Burma. Further South is the Naga Hills, boundary between Nagaland and which forms Burma. Saramati (3,826m) is the highest peak. Garo, Khasi, Jaintia, Mikir, Dapha, Mini and Abor are other important hills of the north-eastern region. Mawsynram with maximum rainfall in the world is located on the Khasi hills in Meghalaya.

## REGIONAL DIVISIONS OF HIMALAYA

Region wise, the Himalayas are divided into;

- The Kashmir Himalayas
- The Punjab Himalayas
- The Kumaon Himalayas
- The Central Himalayas
- The Eastern Himalayas

The **Kashmir Himalayas** cover an area of 3, 50,000 sq. km. Main subdivisions are Karakoram range in north, Ladakh plateau, the Valley of Kashmir and the Pir Panjal range. Banihal is an important pass.

The **Punjab Himalay** as have important passes like Zojila, Rohtang and Bara Lacha La. Kangra, Lahul and Spiti Valleys are known for their scenic beauty.

The **Kumaon Himalay** as have important peaks like Nanda Devi; Badrinath Kedarnath, Gangotri and Yamnotri are located here.

The **Central Himalayas** extend from river Kali to river Tista. Important peaks are Dhaulagiri, Annapurna, Mt. Everest and Kanchanjunga. This range is known as the Sikkim Himalaya in Sikkim; Darjeeling Himalaya in West Bengal, and Bhutan Himalaya in Bhutan.

### Indian Glaciers

Indian Glaciers			
<b>Jammu and Kashmir</b>			
Siachen Glacier	Nubra	Chong Kumdan	Drang Drung
<b>Himachal Pradesh</b>			
Bara Shigri	Chandra	Chandra Nahan	Bhadal
Bhaga	Mukkila	Sonapani	the ady of eylong
Gora	Perad	Parbati and Dudhon	Beas Kund
<b>Sikkim</b>			
Zemu Glacier	Rathong	Lonak	
<b>Uttarakhand</b>			
Gangotri	Kalabaland		Meola
Milam			
Namik	Panchchuli	Pindari	Ralam
Sona	Kafni	Sunderdhunga	
<b>Assam &amp; Nepal</b>			
	Chemayungdung	Khumbu	(100 km)

### Passes

Niti Pass	...	Zaskar Range
Dharma Pass	...	Zaskar Range
Thal Ghat Pass	...	Sahyadri
Bhorghat Pass	...	Sahyadri
Nanaghat Pass	...	Sahyadri
Palghat	...	Between Nilgiris & Annamalai
Pir Panjal	...	Pir Panjal Range
Banihal	...	Main gateway to the valley of Kashmir from the plains of India
Bolan	...	Between Kirthar and Sulaiman Range
Khyber	...	North of Sulaiman Range
Gomal	...	North of Kirthar
Mala	...	Zaskar Range
Nathu La	...	Sikkim Himalaya
Jelep La	...	Sikkim Himalaya

### Great Northern Plains

The great plains are an aggradational surface of great extent formed after the Himalayas. These are formed by the Indus, the Ganga and Brahmaputra rivers. The Great Plains stretch in the east-west direction between the Himalayas in the north and the peninsular plateau in the south. Width varies from 500 km in Punjab-Rajasthan to 200 km. in Bihar. It covers an area of over 7 lakh sq. km. Important characteristics include - Bhabar (unsorted sediments), Terai (Marshy tract) Bhangar (older alluvium) and Khadar (newer alluvium)

**The Great Northern plains consist of the following regions:**

**(a) The Punjab-Haryana Plains:** They are drained by the tributaries of river Indus, Ravi, Beas and Satluj. These plains are flat with an average elevation of 200 to 240 metres. These fertile plains include the Bari Doab (between Ravi and Beas rivers) and Bist Doab (between Beas and Satluj)

**(b) The Rajasthan Plains:** They cover an area of 1.75 lakh sq. km. in Rajasthan and its adjoining states. It includes the Marusthali of Thar desert and bagar tract west of the Aravallis. The region is one of the dry river beds (Saraswati) and shifting sand dunes. River Luni is an inland drainage river. Sambhar, Kuchaman, Didwana and Pachbhadra are the salt lakes of this region.

**(c) The Ganga Plains :** The Ganga plains of U.P., Bihar and West Bengal occupy an area of 3.57 lakh sq. km. Important rivers of this region are the Ganga, the Yamuna, the Gandak, the Son and the Kosi. The Bengal basin is mainly composed of the Ganga delta.

**(d) The Brahmaputra Plains:** It contains alluvial deposits of the Brahmaputra and its tributaries the Subansiri, Dibang and the Lohit. It is a flood prone area because the slope of the valley is too gentle to drain away the large volume of rainfall in monsoon season.

### Peninsular Plateau

The Peninsular plateau, which covers an area of about 16 lakh sq. km., is the largest physiographic division of the country. It has senile topographical features. The Aravallis form

its boundary in the north-west, Rajmahal Hills in the north and north-east. South of about 22°N latitude, the Sahyadris (Western Ghats) and the Eastern Ghats form the western and eastern boundaries respectively.

On the basis of variation in relief, further divisions of the Peninsular Plateau may be made as follows:

**(a) The Aravalli Range:** It is one of the oldest fold mountains of the world. The highest peak is Gurushikhar (1,722m) in Mount Abu Hills. The Delhi Ridge marks the northern end of the range.

**(b) The Central Plateau:** It consists of Plateau of Rajasthan and Madhya Pradesh. Average height is 250-300m. The Malwa Plateau in Madhya Pradesh lies in the north of Vindhya. The Plateau is largely broken. The Chambal ravine is an important feature. The area between the Yamuna and Vindhyan Plateau is called Bundelkhand Plateau. It lies in the east of Maikal ranges and south of river Son. Important rivers of the region are the Rihand and Son.

**(c) The Vindhya Range:** It is an escarpment running in east-west direction. Kaimur Hills form its eastern portion.

**(d) The Satpura Range:** It lies between Narmada and Tapi (Tapi) valleys latitudinally. The plateau is formed of lava. The highest point of Satpura range is Dhupgarh in Panchmarhi (1,350m). The eastern part of the range is Maikal Plateau.

**(e) The Eastern Plateau and the Chhotanagpur Plateau:** East of the Maikal Hills lies the Baghelkhand Plateau. South of the Baghelkhand is Chhattisgarh Basin. Further south is Bastar Plateau or Dandakaranya.

The Chotanagpur Plateau lies in the east of Baghelkhand Plateau. It has an average height of 700m. It has a radial drainage. The Damodar river originates near Tori in Palamau. Damodar valley project is located here. The Chotanagpur Plateau ends in Rajmahal Hills.

**(f) The Kathiawar and Kutch Peninsula:** They have an Archaean structure but are surfaced by tertiary rocks. It tapers into the Arabian Sea.

**(g) The Deccan Plateau:** It is located within the Satpura-Mahadeo-Maikal ranges in the north, the Eastern Ghats in the East and the Western



Ghats in the west. It is slightly titled towards south-east. The peninsula is triangular in shape-rising from 500 to 1,000m. Amarkantak (1,057m) and Dhupgarh (1,350m) are important peaks.

**(h) The Western Ghats or the Sahyadris:**

They form the western edge of the Deccan Plateau. Starting from Khandesh, south of Tapi and running southward parallel along the western coast for 1600 km, it reaches Kanyakumari and joins the Eastern Ghats at Nilgiri Hills. Kalsubai (1,646m), Mahabaleshwar (1,438m) and Harishchandra are among the highest peaks in this part of the ghats. Thalghat and Bhorghat are important passes through which roads and railways run between the Deccan Plateau and the Konkan plains. Kudremukh (1,894m), Pushpagiri (1,714m) and Brahmagiri peak lie south of Coorg.

The highest peak of the Nilgiri Hills is Dodabeta (2,637m) situated near Ootacamund. Udyogmandal (Ooty) is an important hill resort.

**(I) Palghat Gap:** It connects Tamil Nadu and Kerala and is located south of the Nilgiri, separating the Cardamom Hills from the Nilgiris. Further south of the Palghat Gap, there are the Annamalai Hills and the Palni Hills in the north east. The culmination point of these hills is the Anai Mudi Peak (2,695m) with the distinction of being the highest peak of South India.

**(J) The Eastern Ghats:** They form the eastern boundary of the Deccan Plateau. They are broken as compared to the Western Ghats. The highest point (1,680m) is in the Visakhapatnam district, Mahendragiri (1,501m).

The most important hill in the Cuddapah Range is Nallamalla Hills. The Southern part of Nallamalla is called Palkonda Range. Javadi Hills in North Arcot and Ginjee Hills in South Arcot and Pachaimalai in Tamil Nadu, form the others hills of the Eastern Ghat.

### Coastal Plains

It occurs along the shores of the Bay of Bengal and the Arabian Sea. The Plains are narrower along the west coast than the east coast. A number of deltas occur on the east coast because the gradient is less steep.

**1. The West Coastal Plains:** It spreads its structure from the Rann of Kutch to Kanyakumari

for about 1,500 km. The Gujarat plain is formed by the Sabarmati, Mahi and several other rivers. The Karnataka coast extends south of Goa for about 525 km. The Sharavati is an important river. The region has several rocky cliffs. The Kerala plain extends from south of Cannanore to Cape Comorin for about 500 km.

**2. The East Coastal Plains:** Extends from the mouth of Subarnarekha to Kanyakumari for about 1,100 km. Its average width is 120 km. The East Coast is much wider and contains many deltas. The Krishna and Godavari form large delta. Kolleru Lake is located between Krishna and Godavari. The Pulicat Lake is a lagoon (salt water lake) separated from the sea by Sriharikota Island. The Utkal plains include the Mahanadi delta. Chilka Lake, south of Mahanadi delta is an important Lagoon.

### The Islands

India has in all 247 islands of which 204 lie in the Bay of Bengal and remaining in the Arabian Sea and Gulf of Mannar between India and Sri Lanka.

The **Andaman and Nicobar** are two major groups of Islands in the Bay of Bengal. These are extensions of the Arakan Yoma of Burma.

The islands in the Arabian Sea have a coral origin and are surrounded by fringing reefs. **Lakshadweep** (32 sq. km. area) is important for coral reefs. Further south of it is Minicoy islands. It is the largest with an area of 4.5 sq. km. Rameshwaram Island which lies just off the Tamil Nadu coast, between India and Sri Lanka, is also of coral origin.

### Lakes

Lakes in India are mainly found in mountainous or coastal regions. The plains have few lakes. On the basis of their origin they can be classified as under:

- (1) **Tectonic lakes-** Wular lake (Kashmir), Kumayun Lake
- (2) **Lakes formed due to volcanic activity-** Lunar Lake (Maharashtra)
- (3) **Lagoon lakes-** Chilka (Orissa), Pulicat (Tamil Nadu), Kolleru (Andhra Pradesh).

- (4) **Glacial lakes-** Khurpa Taal, Samtaal, Punataal, Malwa Taal, Nainital, Rakas Taal, Bhimtal (all Kuma yun Himalayas)
- (5) **Lakes formed due to Aeolian process-** Sambhar, Pachbhadra, Lunakransar, Didwana (Rajasthan)
- (6) **Others-** Dal lake (Kashmir), Udai Sagar, Pichola, Rajsamand, Jaisamand, Annasagar (Rajasthan), Loktak (Manipur), Vembanad (Kerala), Husain Sagar (Andhra Pradesh)

**Wetlands:** India has 16 wetlands. They are Kolleru (A.P), Wular (J.K), Chilka (Orissa), Loktak (Manipur), Bhoj(M.P), Sambhar and Pichola (Rajasthan), Astamudi, Sasthamkitta (Kerala), Harike, Kanjali (Punjab), Ujni (Maharashtra), Renuka (U.P), Kabar (Bihar), Nabsarovar (Gujarat), Sukhna (Chandigarh).

### Drainage System

#### Important Concepts

**Tributary:** A river or stream which contributes its water to a main river. For example, the Yamuna is the tributary of the Ganga.

**Distributary:** A branch or outlet which leaves a main river and does not rejoin it, carrying its water to the sea or a lake.

**Delta:** A triangular shaped alluvial tract, formed at the mouth of a river. For instance the delta of the Ganges is the largest delta in the world.

**Doab:** The alluvial tract of land between two adjacent rivers, e.g. the plain between the Ganges and the Yamuna.

**Catchment Basin (Drainage Area):** The region which drains all the river water that falls on it into a river or stream.

**Breakwater:** A barrier built into the sea in order to break the force of the waves and thus to serve as a protection against them.

**Estuary:** The mouth of a river where tidal effects are felt and where fresh water and sea water mix.

**Drainage Patterns:** River and its tributaries drain an area, which is called a 'river basin'. Its boundary formed by the crest line of the surrounding highland is the watershed of the basin.

A river system usually develops a pattern which is related to the general structure of the basin.

A dendritic pattern develops in a region made of rocks which offer some resistance to erosion and which has a uniform structure. A trellis drainage pattern develops in a region made up of alternate belts of hard and soft rocks all of which dip in the same direction and which lie at right angles to the general slope, down which the river flows. A radial pattern develops on a dome or volcanic cone.

**Classification of Drainage System:** Over 90% of India's land surface drains into the Bay of Bengal and almost all the remaining area drains into the Arabian Sea. Only a very small area in Rajasthan has an inland drainage.

Our river system can be classified into:

- (a) The Himalayan River System
- (b) The Peninsular River System

The Himalayan rivers fall into four broad groups:

**1. Pre-Himalayan Rivers:** Arun, Indus, Satluj and Brahmaputra.

**2. Great-Himalayan Rivers:** Ganga, Kali, Ghaghra, Gandak, Tista etc.

**3. Lesser -Himalayan Rivers:** Beas, Ravi, Chenab, Jhelum etc.

**4. Siwalik Rivers:** Hindan, Sonali etc.

The peninsular rivers fall into two categories, viz., the coastal rivers and the inland rivers. The former are comparatively small streams. The west-coast rivers are of great importance. Although only 3 percent of the areal extent of the basins of India is drained by these rivers, as much as 14 percent of the country's water resources are contained by them.

1. **Rivers rising from the Western Ghats:** the Godavari, the Krishna, the Cauvery, the Pennar, the Palar, the Vaigai etc.
2. **Rivers flowing into the Arabian Sea:** The Narmada, the Tapi, the Sharavati etc.
3. **Rivers originating in the Vindhyas and Satpura but flowing north-east towards Ganga:** The Chambal, the Betwa, the Damodar, the Son, the Ken etc. The

Narmada and the Tapi flow in the fault created by them during the Himalayan uplift.

### Points to Remember

1. India is the seventh largest country of the world in area-wise, accounting for about 2.4% of the total world area, and second largest population wise.
2. Called a sub-continent for it stands out prominent in the Asian continent.
3. North-south extent is 3214 km. and west-east is 2933 km.
4. Total length of land frontier is 15200 km.
5. Total length of coastline is 7516 km.
6. Total length of mainland coastline is 6100 km.
7. States having common boundaries with India are Pakistan, Afghanistan, China, Bhutan, Nepal, Myanmar and Bangladesh.
8. Tropic of cancer passes through the sub continent almost midway.
9. The southernmost tip is Pygmalion point (Now known as Indira point) in Great Nicobar Islands.
10. The southernmost tip of the mainland is the Cape of Camorin  $8^{\circ}$  north of Equator.
11. Prominent islands in the Bay of Bengal are Andaman (200) and Nicobar (19), Barren and Narcondam.
12. Prominent islands in the Arabian Sea are Lakshadweep (Coral island), Minicoy and Aminidivi.
13. Prominent island in the Gulf of Mannar is Pamban.
14. The Gulf of Mannar and the Palk Strait separate India from Sri Lanka.
15. The western coast is known as Malabar coast (mainly in Kerala) and Coromandal coast (mainly in Tamil Nadu and Andhra Pradesh).
16.  $82^{\circ}30'$  East longitude is taken to be Standard Meridian of India. The local time determined along this meridian serves as the Indian

Standard Time for every place, in the country. It passes through near Naini (Allahabad).

17. In India, "Aravalli Range" is one of the oldest mountain ranges of the world.
18. The only active volcano of India is found in the Andamans.
19. The islands in the Arabian Sea are of coral origin.
20. The "Satpura Range" lies between "Narmada" and "Tapti" rivers.
21. The Andaman and Nicobar are believed to be the extension of the "Arakan Yoma" of Burma.
22. The river Damodar originates near "Tori" in Palamau.
23. The "Palghat Gap" connects Tamil Nadu and Kerala and is located south of the Nilgiri.
24. India is 4 times larger than Pakistan which is second largest in the Asia. 12 times larger than UK and 8 times larger than Japan.
25. The northern frontier of India is "15,200"km long and it has a coastline of 6,100 km.
26. The Gulf of Mannar and Palk Strait separate India from Srilanka.
27. Himalayas has been credited of having the world's 14<sup>th</sup> highest peaks ranging between the "Jana" (7710 m) Everest (8848 m) Kanchanjunga (8,598 m), Dhaulagiri (8,127 m), Nanga Parbat (8,126 m) and Nanda Devi (7,817 m)
28. The "Khyber Pass" is of "1000 m" and leads from Peshawar to Kabul.
29. The Gomal Pass is of "1,525 m" and is an important trade route.
30. The Bolan Pass is of "1,800 m" and lies between the Sulaiman and the "Kirthar" range.
31. The "Shipki Pass" leads from Punjab to Tibet.
32. The Western Ghat is known as "Sahyadri" in Maharashtra. In Tamil Nadu, they form the Nilgiri Hills.

33. "Kaveri" river is known as the "Ganga of the south"
34. Lake "Chilka" in Orissa, Kolleru and "Pulicat" in Andhra Pradesh are among the large lakes found in eastern coastal plain.
35. "Andaman and Nicobar" is separated by a deep sea known as "Ten Degree Channel" since it coincides with 10° N latitudes.
36. "Lagoons" are Salt water lakes which are separated from the Sea by the formation of the sand bars along the coast.
37. On April 10, 1991, India's only volcano erupted in Barren Island in the Andamans after lying dormant for 200 years.
38. Jammu town stands on the Jammu Hills of Siwalik range of South Kashmir Himalayas.
39. Pir Panjal range of Himachal section of Kashmir Himalayas is the origin of thrust faulting and isoclinal folding and is transversed by two passes - the Pir Panjal and Banihal; the later now provides the main gateway to the vale of Kashmir from the Indian Plains.
40. The vale of Kashmir is a synclinal valley, once the bed of a great lake. Kashmir valley is very fertile with capital Srinagar in the heart and several beauty spots like Gulmarg.
41. Dal Lake near Srinagar was carved out of the alluvial deposits of Jhelum.
42. Deosai Basin of Kashmir is an example of ancient cirque lake.
43. Zojila pass of Kashmir Himadri connects the only road to Leh (the capital of Ladakh) from Srinagar.
44. Aksai Chin and Soda plains of Ladakh Plateau are evidences of past glacial action and are dry & bare.
45. Kangra Valley of Punjab Himalayas lies in its potential mineral oil wealth gone.
46. Badrinath, a religious place of Hindu lies in the Himadri range of Kumaon Himalayas.
47. Jelep La pass of Sikkim Himalayas is the main route between Sikkim and the Chumbi Valley.
48. Darjeeling Range is famous for tea gardens, especially on Tiger Hills.
49. Cherrapunji Plateau of Khasi Hills is an example of Structural Platforms in India.
50. Dapha Bum is the highest peak of Mishmi Hills of Purva - NEFA.
51. Patkai Bum Range forms the watershed between India and Myanmar.
52. Saramati is the highest peak of Naga range.
53. Central part of the Manipur Hills is a large basin which appears to be the bed of old lake; a remnant of which occupies the south-east corner of the basin and is known as the "Loktak Lake".
54. Southernmost part of the north-eastern range is known as Lushai Hills.
55. It is the ascending monsoon clouds over the frontal slopes and the side valleys that have made Cherrapunji world famous for rain.
56. Nokrek is the highest peak of Garo Hills of Meghalaya plateau.
57. Kazi range, on the northern margin of the Mikir Hills of Meghalaya plateau, has been developed as a sanctuary for wild animals.
58. Most of the great Northern Plains are composed of alluvium deposits during Middle Pleistocene and recent geological time.
59. Almost whole of the Western Arid Plain was under sea from the Permo-Carboniferous to the Pleistocene time. It was uplifted during the Pleistocene time.
60. Western part of Western Arid Plain is sandy and is covered with shifting sand dunes called "DHARIAN".
61. Eastern part of Western Arid Plain, between the desert and the Aravalli is a fertile tracts called "ROHI".
62. Flat, narrow strips of low lying flood plains of Punjab Plains is known as "BETS", which have been formed by the shifting of river courses.
63. The Punjab Plain is drained by many rivers and the area between the two rivers are called DOABS such as :-

- (i) **Bist Doab** - between Beas and Satluj
  - (ii) **Bari Doab** - between Beas and Ravi
  - (iii) **Rachna Doab** - between Ravi and Chenab
  - (iv) **Chaj Doab** - between Chenab and Jhelum
64. The broad Punjab flood plains of Khadar, flanked by Bluffs are locally called as "DHAYA".
  65. In the north Bihar Plain, north of Ganga, a long line of marshes are known as "CHAURS", like Kabar Tal.
  66. In the South Bihar Plain, South of Ganga & west of Rajmahal hills, on the outward side occur vast depressions, known as "JALA" near Patna and "TALA" near Mokama.
  67. North Bengal Plains, from the foot of Eastern Himalayas in the north to the northern limit of Bengal basin, is the ideal home of tea plantation. Further south lies the older delta of the Ganga formed during the Pleistocene time and subsequently upwarped and eroded into terraces known as "BARIND PLAIN".
  68. "RAHR PLAIN" is the low land to the west of the Bhagirathi and when the rivers like Damodar are in flood, the entire countryside is submerged.
  69. Due to hard quartzite rocks the Aravalli provides unfavourable environment for men.
  70. Narmada river from a spring on Amarkantak Plateau and at Bheraghat. It forms a waterfall known as Dhuandhar or Marble fall.
  71. Palghat Gap, in the Western Ghats, is 24 km. wide and is probably a rift valley, owing its existence to subsidence of the land between two parallel fault lines. Ponnani river flows through it.
  72. Palni Hills, the continuity of Southern Sahyadri in the north-east direction, has many beauty spots like Kodaikanal.
  73. The Cardamom Hills or Elamalai, south of Palghat Gap as the continuation of South Sahyadri, is famous for cardamom plantation. Its east face is densely populated, commonly known as Kambam Valley.
  74. South of Tapi Valley in Maharashtra Plateau is the Ajanta Range and a southern spur, Ellora Hills is equally famous for its caves.
  75. Physiographically, the Mysore Plateau can be subdivided into two parts:
    - i) **Malnad** - Hilly, deep valley, densely forested ; Baba Budan hill lies here &
    - ii) **Maidan** - Rolling plains with low granitic hills.
  76. Eastern Ghats in Orissa and Andhra Pradesh is locally known as MALIYAS (highland), forming watershed between west flowing streams like Machkund, Sileru and the east flowing streams like Vamsadhara.
  77. In Tamil Nadu and Andhra Pradesh the East Coast Plain is also called PAYAN GHAT, extending from Cape Comorin to Krishna-Godavari delta.
  78. Bhargavi and Daya rivers drain into Chilka Lake.
  79. Kutch and Kathiawar peninsula, on the northern end were once islands.
  80. Vaitarna and Ulhas rivers drain the Konkan coast region.
  81. Sharavati river drains the Karnataka coast with making the famous waterfall, "Gersoppa fall".
  82. Astamudi and Vembanad lakes are situated on the Kerala coast.
  83. Arabian sea and the Bay of Bengal came into existence during the late Cretaceous or Early Tertiary time.
  84. South of Kathiawar the continental shelf is 350 km wide and 220 km. wide south of the mouth of Ganga. Elsewhere its width ranges from 50 km on the east coast to 100 km. on the West Coast.
  85. Bay of Bengal Islands are the elevated portion of submarine mountain range while the Arabian sea islands are of coral origin.
  86. Barren Island and Narcondam Island are the only volcanic islands within Indian Territory.

87. Little Andaman is separated from the Great Andaman by the "Duncan Passage".
88. South Andaman consists of parallel ridges and valleys with the highest hills "Mt. Harriet" (450 m), facing the east coast. The city Port Blair lies here.
89. Off the west coast of the North and Middle Andamans there are a number of smaller islands like Interview and Anderson, composed of limestone.
90. Nicobar Islands is a group of 19 islands but only 12 are inhabited.
91. Within the Nicobar Islands Great Nicobar is the largest and the Car-Nicobar is the northernmost island.
92. Main islands of Nicobar group are - Little Nicobar, Katchall, Camorta, Trinket, Nancowry etc.
93. Barren Island is a dormant volcano while the Narcondam Island is an extinct volcano.
94. Coral Island in the Arabian Sea is situated between 8 Degree N and 12 Degree N.
95. Amindivi Island is a group of six Islands- Amini, Kilton, Chetlat, Kadmat, Bitra and Peremulpur.
96. Laccadives Islands is a group of five islands- Androth, Kalpeni, Kavaratti, Pitti and Suheli Par.
97. Among the Arabian sea islands the Minicoy Island is the Southernmost, in the 8 Degree channel.

#### Various Ganga Rivers

Ram Ganga	...	Originates from Dudatoli Mountain (Nainital) joins Ganga below Farukhabad.
Vishnu Ganga	...	Originates from Kamet near Mana pass. Together with Dhaulī forms Alaknanda (one of the two streams which form the Ganga) at Vishnuprayag.
Ban Ganga	...	A bifurcation channel of the Ganga after Haridwar joins the main channel of the Ganga at Majlisipur.
Kali Ganga	...	Originates from Milam Glacier, known as Sarju in its later course.
Wain Ganga	...	A tributary of Godavari
Pen Ganga	...	A tributary of Godavari
Panch Ganga	...	A tributary of the Krishna River
Dudh Ganga	...	A tributary of the Krishna River
Vridha Ganga	...	Another name of Godavari
Dakshin Ganga	...	Another name of Godavari
Kishan Ganga	...	Originates from Pir Panjal Range; Joins the Jhelum

#### Hot Springs

Phunknag	...	J&K
Mani Kama	...	Himachal
Rajgir	...	Bihar
Tapowan	...	Jharkhand
Tatapani	...	Shimla (HP)
Vaireswari	...	Thana Dist., Maharashtra
Bakreswar	...	Virbhūm (W.B.)
Bhayumtan	...	Sikkim



The climate of India is broadly, of the tropical monsoon type. The word monsoon (Arabic: Mausim) stands for seasonal reversal in the wind pattern and accounts for and is associated with the rhythm of season, changes in the direction of winds, distribution pattern of rainfall and temperature with the change of seasons. However, the regional variations in climate can't be ignored. These variations are expressed in terms of winds, rainfall, temperature and humidity. Main factors deciding the local climate are location, altitude and distance from general relief.

### Mechanism of Indian weather

India has wide regional variations in terms of winds, rainfall, temperature, humidity etc. These differences in local climate are produced by the following factors:

- I. Surface distribution of pressure and winds;
- II. Upper air circulation caused by factors controlling global weather and the inflow of different air masses and jet streams; and
- III. Inflow of western disturbances and tropical depressions into India creating weather phenomena leading to rainfall.

### Seasons

On the basis of monsoonal variation, there are four seasons in India.

**(a) The Cold Weather Season:** (December to February): Mainly felt in North India - an important event of the season is the inflow of the depression from the west to the north-west. These low pressure systems, called Western disturbances, originate in West Asia and travel towards India causing some rain and snowfall in winter months in north and north-eastern India.

The temperature increases from north to south. The isotherms run parallel to the latitudes.

20° isotherm runs east-west through the middle part of India. By the mid-December in the north-west India a series of shallow cyclonic disturbances is observed. The rainfall is mostly confined to Punjab & Haryana Plains, North-east Rajasthan, Kashmir and western U.P. In northern India it is very useful for Rabi crops.

### **(b) The Hot Weather Season (March to May):**

Because of the heating of the subcontinent, the equatorial trough moves northward and lies at 25°N in July. This trough attracts surface winds from South - Westerly direction along the West Coast and from north, north - Westerly direction along the Bengal Coast. The northward shift of equatorial trough and the excessive heating of the Himalayan and the central Asian highlands are responsible for generating the monsoon, the influx of monsoon in mid - June changes the season to the rainy one.

Tornado-like dust storm of Punjab and Haryana; the "Andhis" of U.P. and the "Kalbaishakhis" of West Bengal involving strong convection movements causes some precipitation. The "Norwesters" (Kalbaishakhis of West Bengal) originate over the Chotanagpur Plateaus and blow in the north east direction which bring about 50cm of rainfall in Assam and about 10cm rainfall in West Bengal and Orissa. This rainfall is very useful for Assam Tea and spring rice crops of West Bengal.

Similar thunderstorm causes about 25cm rainfall in Karnataka which is locally called as "Cherry Blossom", beneficial to the coffee plantation and "Mango Showers" elsewhere in South India, which are of salutary effect on the mango crop. "Loo", a hot wind blows in the northern plain during May and June, with the temperature range of 45°C to 50°C.

**(c) The South - West Monsoon Season (June to September):** The 'monsoon burst' brings about the sudden onset of rain on different dates in different parts of India. The Arabian Sea current

covers West Coast, Maharashtra, Gujarat and parts of Madhya Pradesh, whereas the Bay of Bengal current strikes the Bengal coast and the Shillong plateau and moves West and north - west, parallel to the Himalayas and brings rain to Bihar, U.P., Delhi etc. The two currents merge over Punjab. The tropical depressions, which periodically occur, cause dry spells during the monsoon season. So these depressions determine the amount of rainfall. The East Coast of India remains dry during this season of June - September, since it is in the rain shadow area of the western current and is parallel to the Bengal current.

The normal date of onset of the S.W. - Monsoon is 20th May in Andaman and Nicobar Island, 1st June on Kerala coast and by 15th July it covers whole of India. The withdrawal of monsoon is much more gradual process than its onset. Normally it withdraws from north-west India by the beginning of October and from remaining part of India by the beginning of December. Out of the total moisture brought by the monsoon, only 20 percent is precipitated in India.

Arabian Sea branch causes the first monsoon-burst over the Kerala coast normally by 5th June and later on causes heavy rain along the western coast, while the large part of Deccan lies in a rain shadow of the Western Ghats and receive decreasing amount of rainfall. The Arabian Sea branch does not bring much rain to Gujarat and Rajasthan mainly due to absence of a mountain barrier, but gives moderate to heavy rainfall in the foothills of Western Himalayas, Eastern Punjab and North-eastern Rajasthan. The Arabian Sea branch is much more powerful than the Bay of Bengal branch.

The Bay of Bengal branch after crossing the deltaic region enters the Khasi Valley and is entrapped within it due to funnel shape of the region and strikes Cherrapunji in a perpendicular direction causing heaviest rainfall near "Mawsynram" (1143cm). A series of depressions are originated at the head of Bay of Bengal and travel in a north westerly direction across central and northern India causes heavy rainfall along their tracks, with the frequency of 2 to 4 depressions per month from June to September.

**(d) The North - East Monsoon (October to December):** The retreat of South-West monsoon from North India starts in September and is gradual. During this season, severe cyclonic storms develop in the Bay of Bengal which moves in a South-easterly to North-Westerly direction. They give substantial amount of rainfall to the East coast and sometimes cause havoc in Andhra Pradesh, Tamil Nadu and West Bengal. In Tamil Nadu and surrounding areas, it is known as the north east monsoon period.

Generally the withdrawal of monsoon starts from 1st September in the north-western India and is completed in mid December from South-eastern coast of Tamil Nadu. With the migration of Sun towards the south, a high pressure centre begins to build up over the landmass and there is a gradual weakening and withdrawal of monsoon. The retreating monsoon causes rain in the coastal tracts to the south of Krishna delta and the interior of the southern districts.

### Climatic Regions of India

The climatic division of India is based upon Trewartha's scheme, which is a modified form of Koppen's system and it corresponds with the vegetative, agricultural and geographical regions of India. Main climatic regions of India include:

**(i) Tropical Rain Forest (Am):** It is found on the West coastal plain, the Western Ghats and some parts of Assam. It is characterized by high temperature in winter not below 18.2°C; and in summer about 29°C. The average rainfall exceeds 200 cm.

**(ii) Tropical Savanna (Aw):** It is located in peninsular region except the semi - arid zone in the leeward side of the Sahyadris. It is characterized by long dry weather throughout winter and early summer and high temperature (above 18.2°C). Annual rainfall varies from 76 cm in the west to 150 cm. in the east.

**(iii) Tropical Semi-arid Steppe (BS):** Prevails in the rain-shadow belt running southward from Central Maharashtra to Tamil Nadu in the leeward side of the Sahyadris and Cardamom Hills. It is characterized by low rainfall which varies from 38 cm to 80 cm, high temperature between 20° - 30° C.

**(iv) Tropical and Sub-Tropical Steppe (BSh):** Occurs over Punjab extending to Kutch region.



The Thar Desert is in the west and the more humid climate of the Ganga plain and the Peninsula to its East and South respectively.

**(v) Tropical Desert (BWh):** The area includes the western parts of Barmer, Jaisalmer and Bikaner district of Rajasthan. A large portion of Kutch Peninsula along with Thar Desert is also included. It is characterized by scanty rainfall (30 cm. average) with few parts receiving 12 cm annual rainfall. Temperature is above 35° C.

**(vi) Humid Sub-tropical with Dry Winter (Cwa):** The area includes South of the Himalayas, East of the tropical and sub - tropical steppe and north of tropical Savanna. It is characterized by rainfall of 63.5 cm to 254 cm most of which is received during the South West Monsoon season.

**(vii) Mountain Climate (H):** The area lies above 6000 metre sea-level. Examples are the Himalayan and Karakoram ranges. Temperature decreases with altitude. The Trans - Himalayan region particularly Ladakh has a dry and cold climate - what may be called cold desert. Drought is permanent.

#### Variability in the rainfall

The average annual rainfall in India is 100cm. However, this rainfall is neither uniformly distributed throughout the country nor certain to occur every year. The unpredictable nature of the annual rain poses a major problem for India. But, there are certain regions of heavy rainfall in India which are almost certain to get the annual rainfall of more than 200 cm every year. These are Assam and its neighbourhood, the Western Ghats and the adjoining coastal areas and foothills of the Himalayas. In contrast, certain areas, particularly western Rajasthan, Kutch, Ladakh Plateau are perpetually drought - prone, the average annual precipitation being about 100 cm.

#### Points to remember

1. The position of mountain ranges and the direction of the rain bearing winds are the two main factors that determine the climate of India.
2. The chief characteristic of India's climate is the alternating seasons.
3. "Growing Season" is that part of the year when the growth of vegetation is made possible by the favourable combination of temperature and rainfall. The length of the growing season is determined by the number of frost free days.
4. The "North - East Trade Wind" blows from the continents to ocean.
5. In March, the highest day temperature of about "38°C occurs in Deccan Plateau.
6. In March, Rajasthan has very high temperature of "45°C".
7. In Kerala and Western coastal land, the pre-monsoon showers are known as "mango - shower"
8. "Kalbaishakhi", which is accompanied by thunderstorm, strong wind and heavy rainfall, occurs in Assam and West Bengal.
9. "Loo" refers to hot, dry wind that blows in northern plains. It is very common in Haryana, U.P, Punjab and Bihar.
10. During SW monsoon, the bulk of the rainfall is received in every part of India except Tamilnadu.
11. It is the relief of the region which determines the amount of rainfall in any region.
12. The "South - East Trade Wind" from the southern hemisphere are drawn into India as the south - west monsoon winds which after they cross the equator.



Soils in India display wide diversity because of the variations in the climate and relief. The soil-forming components which include parent material, relief, climate and natural vegetation vary spatially. The soil can be classified under various criteria, most acceptable being based on horizon development and its relationship with climatic condition.

**The factors that affect the soil formation are:**

**1. Parent Material:** The parent material, of which the soils are formed, is derived from the weathering of the rocks exposed on surface. For example the soil derived from lava and rocks is generally black in colour.

**2. Relief Features:** They influence the process of soil formation through various ways. The variation in relief features like slope, underground water etc. affect the colour, composition and properties of soil.

**3. Climate:** Climate is the most important single factor in soil formation. It affects the conditions of soil formation through the amount and seasonal distribution of temperature and rainfall. It also affects soil formation indirectly by affecting other genetic factors like parent material, relief features, natural vegetation etc.

**4. Natural Vegetation:** The decayed leaf material adds to the fertility of soil by providing to it the much needed content of humus. That is why the densely forested areas contain some of the best soils.

### Soil Types

*The Indian Council of Agricultural Research (ICAR) has divided the Soils of India into 8 major groups.*

**1. Alluvial Soils including the coastal and deltaic alluvium:** Agriculturally the most important soil. It covers 24% of the country's total area. Mainly found in Central plains extending from Punjab to Assam, Eastern and Western

Coastal plains and deltaic region. Alluvial soil is transported or inter-zonal soil. It is divided into Khadar (newer) and Bhabar (older). This soil is, however, deficient in nitrogen and humus content; unsuitable for water retentive plantation e.g. cotton. It is suitable for the cultivation of rice, wheat, sugar cane and vegetables.

**Khadar:** Finer and newer alluvium. Its texture varies from clayey to sandy loam. It is light in colour and is formed in the flood-plains of rivers and is generally acidic, deficient in lime, phosphorus and humus.

**Kankar:** They are found only few feet below the surface of Bhangar which is a bed of lime nodules known as kankar. Kankars are collected near Dadri in Haryana for making cement.

**Bhangar:** They are older alluvium or coarse gravel, high level soils above 30 m above flood level where flood water cannot reach. Its texture is more clayey and the colour is darker.

Alluvial texture varies from sand and loam to silts and heavy clays that are ill drained and sometimes injurious accumulations of salt and produces a sterile surface called "Usar".

In the sub-mountain belts on the foot hills of Siwalik alluvial forms with coarse often pebbly soils known as "Bhabhar". To its south occurs swampy lowland with silty soils known as "Terai".

**2. Black Cotton Soils:** This is also called regur soil. Main areas include Deccan Trap, Maharashtra, Gujarat, Madhya Pradesh, Karnataka, Andhra Pradesh, Tamil Nadu, U.P. and Rajasthan. Black Soils are usually deficient in nitrogen, phosphate and humus but rich in Potash, lime, aluminum, calcium and magnesium. The soil is moisture retentive and it has a high degree of fertility. It is suitable for the cultivation of cotton, cereals, oilseeds, tobacco, groundnut and citrus fruits.

Black soils develop under semi-arid condition, in area covered with basalt. Colour of

the black soils varies from deep black to light black or chestnut. The black colour is added due to the presence of "Titaniferous magnetite".

They become sticky when wet due to high percentage of clay and develop cracks in hot-sunny weather. Black soils are well known for their fertility. Since, the content of water soluble salt is high they are not suitable for heavy irrigation. Black soil regions are ideal for dry farming due to their moisture retentive quality.

**3. Red Soils:** Occupies about 70% of the total area in Tamil Nadu, Chhota Nagpur, few parts of Andhra Pradesh and Orissa.

Red soils develop generally on crystalline and metamorphic rocks rich in ferromagnesian minerals. Hence they are more sandy and less clayey. Red soils are found in areas of comparatively low rainfall and so are less leached than the laterite soils. Red soils have a concentration of iron, absence of lime, Kankar, carbonates, humus, phosphoric acid and are neutral to acid reactions.

They are not retentive to moisture so cultivated mostly during the rainy season. These are favourable for the cultivation of pulses and coarse grains.

**Crops:** Rice, Ragi, Tobacco, Vegetables, Groundnut etc. on coarse soil for higher level; Sugarcane on heavy clay at lower level.

**4. Laterite Soils:** They are formed under the conditions of high rainfall and temperature with alternate wet and dry periods. These soils are rich in oxides of iron and aluminum but poor in nitrogen, potash, phosphoric acid and lime content due to leaching; highly acidic in nature. These soils are concentrated in Vindhyan Plateau, Satpura, Mahadeo and Maikal ranges in Madhya Pradesh, Malabar Coast, Orissa coast and Meghalaya.

Laterite soils develop in the tropical regions which receive heavy seasonal rainfall. Heavy rainfall promotes leaching whereby lime and silica are leached away and soils rich in oxides of iron and aluminum are left behind. If the oxide of aluminum predominates the laterite soils, they are called "Bauxite", the chief industrial ore of aluminum.

Laterite soils are red due to the presence of oxides of iron. They are poor in lime content hence

acidic in nature. Laterite soils of high areas are very poor and least retentive to moisture. Sometimes they form the barren land topography. Laterite soils of low level areas hinder the process of laterization due to regular addition of soil washed down from the neighbouring high areas.

**Crops:** Rice, Ragi, Sugarcane, Tapioca, Chestnut etc.

**5. Forest Soils:** Humus predominates in forest soil but it is deficient in potash, phosphorous and lime. It is distributed over the Himalayan and other ranges in the north, Western Ghats, Eastern Ghats and Peninsula. Favourable for plantation crops e.g. tea, coffee spices and tropical fruits.

1. **Podzols (At high Level):** They are formed under high acidic condition and found on higher slopes of Himachal Pradesh and Jammu & Kashmir. They are covered by coniferous forests. They are highly leached due to excessive moisture and are greyish brown in colour.

2. **Brown Forest Soil (In warm temperate belt):** They are less acidic than podzol with high base status. They are rich in humus and fertile and extensively used for crop cultivation.

3. **Alpine Meadow (In alpine zone of Himalayas):** They are dark coloured, either sandy-clay or sandy-loam. They contain mostly undecomposed plants.

**6. Arid and Desert Soils:** These soils, characterized by high salt and low humus content, are found in Rajasthan, Haryana, Punjab, Rann of Kutch, and other rain-shadow regions, since these soils consist of high phosphate, fertility increases with irrigation and by adding nutrients.

Desert soils are found in an arid and semi-arid conditions in north-western part of India, west of Aravalli range. They are mostly friable and low in moisture content. They are rich in phosphate but poor in nitrogen and clay content (only 8%).

**Crops:** Very few crops especially Millets, Jowar, Bajra are grown for want of water supply.

**7. Saline and Alkali Soils:** Develop along arid region in small patches. Also called Reh, Kallar and Usar, they are infertile but can be reclaimed

by good drainage. These soils are found in Rajasthan, Punjab, Haryana, U.P. and Bihar.

Saline and alkaline soils develop at places where desert condition prevails because of high rate of evaporation and very little leaching. Saline soils contain free sodium and other salts while alkaline soils have sodium chloride. Alkaline soils are deficient in calcium and nitrogen and are highly impervious and have very low water holding capacity.

**Crops:** Rice, wheat, cotton, sugarcane, tobacco etc. supported by irrigation. For better fertility application of lime and gypsum and cultivation of salt resistant crops like berseem, rice, sugarcane can be used.

**8. Peaty and Organic Soils:** Develop under result of accumulation of large quantity of organic matter. Highly saline and deficient in phosphate and potash and occur in central Orissa, Central Bihar, West Bengal and Tamil Nadu.

Peaty and Marshy soils originate in humid regions as a result of an accumulation of large amount of organic matters. They may contain considerable soluble salt and is called as "Kari".

These areas are submerged under water during the monsoon season and as soon as rain ceases the land is put under paddy cultivation. These soils are black, heavy and highly acidic.

### Soil Erosion

The destruction of soil cover is known as soil erosion. The main reasons of soil erosion are:

- (a) Deforestation
- (b) Over-grazing
- (c) Irrational cultivation (e.g., Jhoom cultivation in North Eastern India)
- (d) Floods
- (e) Winds

**Soil Erosion in India:** The areas which have suffered soil erosion in India are generally tracts having sparse vegetation cover like the badlands of lower Chambal and the Yamuna. The

vegetation cover in these areas is sparse; hence, the running water cuts easily into the soil forming deep ravines. In many parts of the plain a high degree of slope induces similar erosion. The dry areas of Rajasthan and Haryana, on the other hand, lose their soil cover through wind erosion.

**Soil Conservation:** Soil conservation depends on the existing conditions. The most common methods, however, include afforestation, contour cultivation and scientific methods of cultivation keeping in view landform characteristics.

Rain water washes the calcium compounds and consequently it causes the lime deficiency in soils. Such soils are acidic and develop in area of heavy rainfall. Oxygen combining with iron compounds produces Iron-Oxide, red in colour and it gives the red colour to the soils.

### Points to remember

1. Chemical weathering is more important in hot tropical climate. Hence, the Indian subcontinent is prone to chemical weathering.
2. Leaching is more important in area of heavy rainfall. It is the most common feature of hilly regions.
3. High temperature of India promotes active decay of vegetation and hence humus is destroyed. So, Indian soils are generally deficient in humus and require regular application of nitrogen rich fertilizer.
4. Titanium salt adds black colour to the soils of Indian Plateau.
5. Sedentary soil / in situ soil, produced after breaking of parent rocks underneath the surface, are usually very deep up to 15mt. or more on the Deccan Plateau.
6. Sedentary soils are: Black cotton soils, Laterite Red soil, Podzolic soil of forest, Saline and Alkaline soil, Peaty soil.
7. Drifted soils / Transported soils / Azonal soils are formed in situ but transported by agents and deposited in valleys and deltas.



Natural vegetation may be defined as that part of plant communities which has been remaining undisturbed over a long period of time. Here the individual species adopt themselves to certain soil and climatic conditions and proliferate through natural process.

On the basis of appearance of the plant community with respect to form and other characteristics, the vegetation of India is commonly identified as forest, grasslands and shrubs. The climate, specially the sun shine and precipitation, determines the type of plant species that can survive in a particular region.

On the basis of climatic condition, the vegetation has been classified as: - *Tropical Evergreen forests, Monsoon forests, Temperate Forests, Grasslands, Tundra, Savanna, Prairie, Alpine* and so on.

### Basic terms:

- **Flora:** It refers to the plants of a particular region or period, listed by species and considered as a group.
- **Vegetation:** It refers to the assemblage of plant species living in association with each other in a given environment - often termed ecological frame.
- **Forests:** Forest is a large tract covered by trees and shrubs. It consists of forests, grassland and scrub.

### Forest Area

Forests constitute about 23% of India's total land surface and occupy 746 lakh hectares of land. The Chhattisgarh and MP covers 7217 hectare, Arunachal Pradesh 5110 hectares, Orissa - 2857 hec, Andhra Pradesh- 2724 hec, Maharashtra- 2724 hec and Uttaranchal - 1887 hectares.

### Major Vegetation Regions

1. **Tropical Evergreen or Rain Forests:** These forests occur in areas where the rainfall exceeds

200 cm, the average annual temperature is between 20°C to 27°C and average annual humidity exceeds 77 per cent. The trees are evergreen and dense and forests have a three storied appearance. These forests are found in Western parts of Western Ghats, eastern part of subtropical Himalayas (Terai), north east India comprising Lushai, Cachar, Khasi, Jaintia and Garo hills and most of Andaman and Nicobar Islands.

These forests may be sub divided into the following sub-types:

(i) **Tropical Wet Evergreen Forests:** They cover 4.5 m. ha area and are found along the western side of the Western Ghats, in a strip running south-west from Arunachal Pradesh, upper Assam, Meghalaya, Nagaland, Manipur, Tripura and Andaman and Nicobar Islands. Here the rainfall exceeds 300 cm. The forests are lofty, dense, evergreen and multistoried.

The main species of trees found are Poon, teak, chaplas, rosewood, ebony, Sissoo, ironwood, Gurjan, pila champa etc. The undergrowth consists of canes, bamboo, ferns, climbers etc. Due to the dense undergrowth and lack of transport these forests have not been exploited.

(ii) **Tropical Semi-evergreen Forests:** Where the rainfall is somewhat less than 200 cm, the mean annual temperature between 24°C to 27°C and humidity percentage is 80, the evergreen forests degenerate into semi-evergreen forests. These cover 1.9 m. ha area. These forests are found on the western coast, in upper Assam, lower slopes of eastern Himalayas, Orissa and in Andaman and Nicobar islands. The forests have evergreen trees mixed with deciduous types. The important species include Aini, Semul, Kadam, irul etc.

(ii) **Tropical Moist Deciduous Forests:** Such forests occur in areas of low annual rainfall of 100 cm to 150 cm. The mean annual temperature is between 26°C to 27°C, and humidity percent is 60 to 80. These forests are found in a belt running

north-south on eastern slopes of western ghat, central plateau including Chotanagpur, Upper Mahanadi Valley and hills of Madhya Pradesh, Himalayan foothills, eastern ghats in Tamil Nadu and Andaman and Nicobar islands.

These forest trees shed their leaves and are the most important forests source of commercial timber. The species of trees include Sal, teak, Arjun, jarul, laurel, Andaman paduk, ebony, mulberry, Kusum, kanju, ber, gular, palas, haldu, siris, mahua, Semul, har, sandalwood, jamun etc. Most of these forests have been cleared from level land for cultivation.

**(iv) Littoral and Swamp Forests:** These forests cover 6 lakh ha and occur in and around tidal creeks and river deltas. They are found in thickets on western coast at a few places but on the eastern coast they form a continuous belt on the fringe of deltas of Ganga, Mahanadi, Godavari, Krishna and Cauvery. They are densest in Sunderbans, where Sundri trees predominate.

**2. Dry Tropical Forests:** These forests occur in areas having annual rainfall between 75 cm to 125 cm, mean annual temperature of around 23°C to 27°C and humidity between 51 to 58 per cent. They are divided into the following sub-types.

**(i) Tropical Dry Deciduous:** These forests are found on a very large area in an irregular wide strip running north south from the foothills of Himalayas to Kanyakumari except in Rajasthan, Western Ghats and West Bengal. The important trees include teak, tendu, sal, bijasal, rosewood, palas, bel, lendi, axlewood, anjair, harra, khair etc.

**(ii) Tropical Thorn Forests:** They are restricted to areas where rainfall is very low i.e. between 50 cm to 75 cm, the mean annual temperature is between 25°C to 27°C and humidity is less than 47 per cent. They are found in Kutch, neighbouring parts of Saurashtra, a large strip in south western Punjab, western Haryana, western and northern Rajasthan, Upper Ganga plains, Deccan plateau and lower peninsular India. Here thorny trees especially acacias predominate.

**(iii) Tropical Dry Evergreen Forests:** These forests occur in areas where the mean annual rainfall is about 100 cm, mean annual temperature is about 28°C and mean annual humidity is 74 per cent. These forests are found in the east coast of the peninsula. The important species of trees include khirni, jamun, kokko, ritha, neem, palm, etc.

**3. Riparian Forests:** Where the rainfall is less than 50 cm, short trees and grass predominate. These forests are found along banks of rivers and wet lands. Deciduous vegetation like neem, Shisham, pipal, mango, jamun, khair are usually found. Kans and munj grass are found in abundance.

**4. Subtropical Broad Leaved Hill Forests:** The forests are found between 915 to 1830 m height above sea level where the mean annual rainfall is between 75 cm to 125 cm, mean annual temperature is between 18°C to 21°C and humidity percent is 80. These forests are found in high lands of Bastar, Panchmarhi, Mahabaleshwar, Nilgiris, Palni and Khasi hills and lower slopes of Himalaya in West Bengal and Assam. Such forests are called 'Shola' in South India.

**5. Montane Wet Temperate Forests:** These forest occur at a height of 1800 to 3000 m above sea level in areas where annual rainfall is between 150 to 300 cm, annual temperature is between 11°C to 14°C and humidity per cent is 83. These forests are found in hills of Tamilnadu, Kerala, Eastern Himalayas, higher hills of West Bengal, Assam and Arunachal Pradesh. The main trees found are deodar, Indian Chestnut, magnolia, birch, plum, blue pine, oak, hemlock etc.

**6. Montane Moist Temperate Forests:** They occur in temperate eastern and western Himalayas between the pine and alpine forests in Kashmir, Himachal Pradesh, Punjab, Uttar Pradesh, Darjeeling and Sikkim between 1600 to 3500 meters. The forests are predominantly coniferous forests and include trees like pine, deodar, spruce, silver fir, oak, beach, birch, polar, elm, chestnut, maple, rhododendrons etc.

**7. Alpine Forests:** They occur in the Alpine areas of the Himalayas beyond the limit of tree growth i.e. between 2900 to 3500 m and consist of dwarf shrubs of juniper, fir, honey suckle, birch, rhododendrons etc. At still higher altitudes, shrubs of low herbs are the only vegetation found.

**8. Grasslands:** These grasslands are divided into three types (i) Hilly or upland grassland. They are found in Himalayas above 100 m and in Deccan hills (ii) low land grasslands - They occur in plains of Punjab, Haryana, Uttar Pradesh, Bihar and north western parts of Assam (iii) Riverine

grasslands. They are found in riverine tracks of northern India especially in the bhabhar tracks.

#### Points to Remember

1. The total forest cover in India is "6, 37,397" sq hectare which constitutes about "19.39" percent of the total geographic area and the per capital forest in India is 0.2 hectares.
2. Area wise, at present, Arunachal Pradesh has the highest coverage of forest, earlier it was M.P.
3. Among the Union territory, Andaman and Nicobar has the largest area under forest.
4. As far as the "mangrove" forest is concerned, "West Bengal" holds the first position followed by Gujarat and Andaman Nicobar.
5. The tropical "Moist Deciduous Forest" requires annual rainfall of 200 cm mean annual temperature of 26° - 27°C.
6. The Wood - cellulose is the basis of the synthetic textiles and is popularly known as "rayon". The USA, Japan and European countries are the major rayon producers of the world.
7. In India, timber is largely derived from the forests of Madhya Pradesh, Orissa, Karnataka, U.P. Assam, Jammu and Kashmir.
8. An important medicinal plant is "Cinchona". The drug quinine is extracted from the bark and wood of this tree.
9. The coca shrub's leaves are the sources of the drug "cocaine".
10. Morphine and heroine are also produce or collected legally from forest plant or Opium poppies.
11. In India, Andhra Pradesh, Tamil Nadu, Rajasthan, Madhya Pradesh, Bihar and Assam account for about 70 percent of the bamboo production.
12. The "Riverine grasses" are found in northern parts of India which forms the "Bhabar Pastures".
13. The densest trees are found in great "Sunderbans delta" where the Sundri trees in abundance are found.
14. The Tropical dry evergreen forest requires annual rainfall of 10 cm with 28°C of average temperature and of 74% of humidity.



Owing to a wide range of climatic condition, India can boast of a rich and varied vegetation. In the remote hilly tracts of the Himalayas and Deccan mountains, a large number of endemic flora i.e. Plants that have grown there for millions of years and are not found to grow naturally elsewhere in the world, is found here.

In recent years, many of these endemic plants are facing extinction because of ecological disturbance. There are eight floristic regions of India:

- (i) The Western Himalayas
- (ii) The Eastern Himalayas
- (iii) Assam
- (iv) The Indus plain
- (v) The Ganga plain
- (vi) Deccan
- (vii) Malabar
- (viii) Andamans.

India has the forest cover of 22 per cent while the actual forest cover is only about 11 per cent of the total country area. Coniferous forest cover only 6 per cent and the broadleaf deciduous forests comprise about 94 per cent of the total forest cover.

**Forest as % of total area of the state:**

Andaman & Nicobar Islands (73%) > Arunachal Pradesh (62%) > Manipur (61%) > Mizoram (57%) > Meghalaya (55.4%) > Tripura (49.5%) > Nagaland (49%) > Sikkim (39.5%) > M.P. including Chhattisgarh (35%) > Goa (20%) > Andhra Pradesh (20%) > Himachal Pradesh (16%) > Gujarat (15%) > Karnataka (14%) > Tamil Nadu (13%) > Uttar Pradesh including Uttarakhand (12%) > Maharashtra (11.8%) > W. Bengal (8.8%) > Jammu and Kashmir (65%) > Rajasthan (4.1%).

India has a great variety of fauna, with about 500 species of mammals and 2,100 species of birds

and reptiles. Some rare and extinctive species are found in certain pockets in India important among them are the Asiatic lion, now confined to the Gir forest; the one horned rhinoceros, a vanishing species in Assam and the great Indian bustards, now rarely seen in Rajasthan.

Some plant and animal species are protected under various schemes and a number of wildlife sanctuaries have been planned for the conservation of animal species. The National wildlife action plan was adopted in 1983. It provides the framework of strategy as well as program for wild life conservation. The wildlife & reserves in India can be classified into 'National Parks' and 'Wildlife Sanctuaries'. The National parks protect the entire ecosystem, where as wildlife sanctuaries have the special purpose of preserving animals and birds. There are, at present, 68 national parks including marine parks, high altitude parks and parks in protected areas of Andaman and Nicobar and 367 wild life sanctuaries.

The Red Panda project was started in 1996 in the Padmini Naidu Himalayan Zoological Park. The Manipur Bow Antler deer project was started in 1977 in Kaibul Lamjoa in Manipur near the Loktak Lake. The Gir Lion sanctuary project was launched by the Gujarat government in the Gir wildlife sanctuary in 1972. The Himalayan musk deer project was started in the Kedarnath sanctuary in Uttarakhand. The crocodile project was started in 1975 in Orissa. Later Uttar Pradesh, Rajasthan, West Bengal, Tamil Nadu, Andhra Pradesh, Gujarat, Kerala, Madhya Pradesh, Bihar, Andaman and Nicobar Islands and Nagaland were included in this project. Project Hangul was started in 1970 in the Dachigam national park in Kashmir.

The national bird of India, the peacock, is found along with many species of birds throughout India. The only ape found in India is the Hoolock Gibbon in Assam.



### National Parks and Wild Life Sanctuaries

National Park/Sanctuary	Place	State
Kaziranga National Park	Jorhat	Assam
Manas Wildlife Sanctuary	Barpet	Assam
Namdafa Wildlife Sanctuary	Tirap	Arunachal Pradesh
Chandra Prabha Sanctuary	Varanasi	Uttar Pradesh
Corbett National Park	Nainital	Uttar Pradesh
Dudhwa National Park	Lakhimpur Kheri	Uttar Pradesh
Malan Sanctuary	Paudi Garhwal	Uttar Pradesh
Govind Sanctuary	Uttar Kashi	Uttar Pradesh
Simlipal Sanctuary	Mayurbhanj	Orissa
Kaaval Sanctuary	Adilabad	Andhra Pradesh
Nalpati bird Sanctuary	Nellore	Andhra Pradesh
Kolleru	Elikeneri Elleru	Andhra Pradesh
Mudumalai Sanctuary	Nilgiri	Tamil Nadu
Vedanthangal bird Sanctuary	Chinglepet	Tamil Nadu
Bandipur National Park	Bandipur	Karnataka
Dandeli Sanctuary	Dharwar	Karnataka
Sharavati Valley Sanctuary	Shimoga	Karnataka
Rangathitoo Bird Sanctuary	Mysore	Karnataka
Banarthatta National Park	Bangalore	Karnataka
Bhadra Sanctuary	Chikmanglur	Karnataka
Mukambil Sanctuary	Kanara	Karnataka
Nagarhole National Park	Durg	Karnataka
Someshwar Sanctuary	Kanara	Karnataka
Tungabhadra Sanctuary	Bellary	Karnataka
Benurd Sanctuary	Kozhikode	Kerala
Irambikulam Rajmallai Sanctuary	Idukki	Kerala
Parambikulam Sanctuary	Palghat	Kerala
Periyar Sanctuary	Idukki	Kerala
Kanchanjunga National Park	Gangtok	Sikkim
Dampha Sanctuary	Aizawal	Mizoram
Balaram National Park	Banaskantha	Gujarat
Gir National Park	Junagarh	Gujarat
Dachigam Sanctuary	Sri Nagar	Gujarat
Jaldapara Sanctuary	Jalpaiguri	West Bengal
Sunderban Tiger Reserve	24 Pargana	West Bengal
Palamau Sanctuary	Daltonganj (Betla)	Bihar
Bhimbandh Sanctuary	Monghyr	Bihar
Gautam Buddha Sanctuary	Gaya	Bihar
Hazaribagh Sanctuary	Hazaribagh	Bihar
Dalma Sanctuary	Singhbhum	Bihar
Panchmarhi Sanctuary	Hoshangabad	Madhya Pradesh

Madhav Nation Park	Sheopuri	Madhya Pradesh
Bori Sanctuary	Hoshangabad	Madhya Pradesh
Kanha Kisli National Park	Balaghat	Madhya Pradesh
Bandhavgarh National Park	Shahdol	Madhya Pradesh
Indravati National Park	Bastar	Madhya Pradesh
Fossil National Park	Mandla	Madhya Pradesh
Panna National Park	Panna	Madhya Pradesh
Sanjay National Park	Sidhi (Sarguja)	Madhya Pradesh
Satpura National Park	Hoshangabad	Madhya Pradesh
Ratapani Sanctuary	Raisen	Madhya Pradesh
Borivalli Sanctuary	Mumbai	Maharashtra
Tadowa Sanctuary	Chandrapura	Maharashtra
Pench Sanctuary	Nagpur	Maharashtra
Navgaon National Park	Bhandara	Maharashtra
Ranthambhore National Park	Sawai Madhopur	Rajasthan
Sariska Sanctuary	Alwar	Rajasthan
Keoladeo Ghana Bird Sanctuary	Bharatpur	Rajasthan
Sikridevi Sanctuary	Mandi	Himachal Pradesh
Rohella Sanctuary	Kullu	Himachal Pradesh
Ross Island National Park	Ross Island	Andaman and Nicobar
Marine National Park	Andaman	Andaman and Nicobar

#### Biosphere Reserves in India

Reserve	State
Nilgiris	Tamil Nadu, Kerala, Karnataka,
Nam Dapha	Arunachal Pradesh
Nandadevi	Uttarakhand
Northern Islands of Andaman	Andaman and Nicobar
Gulf of Mannar	Tamil Nadu
Kaziranga	Assam
Sunderbans	West Bengal
Thar Desert	Rajasthan
Manas	Assam
Kanha	Madhya Pradesh
Nokrek (Tura Range)	Meghalaya
Simlipal	Orissa

#### Points to Remember

1. The Wild Life Protection Act - 1972 adopted by all states except Jammu and Kashmir and India is signatory to the convention on International Trade in endangered Species

of Wild Flora and Fauna under which the commercial exploitation of the species is prohibited.

2. India possesses about 8% of the world's known living organism while it has only 2 percent of the world's land mass.
3. At present about 15,000 plant species and 75,000 animal species are facing extinction.
4. In the state of Maharashtra, Madhya Pradesh and Andhra Pradesh, the elephant has almost all disappeared.
5. The North-east India has over 600 different orchid species which are now facing extinction.
6. The idea of biosphere reserves was initiated by UNESCO in 1973-74 and the first reserve in the Nilgiri was established in 1986.
7. The "Man and Biosphere" (MAB) programme was launched by the government of India for the conservation of the biological diversity.
8. Asiatic lion, one of the rarest and most important wild animals in India is found in only two parts of the country: the famous

Gir National Park in Gujarat and the Chandraprabha wildlife sanctuary of Uttar Pradesh.

9. The one horned rhinoceros is also vanishing but now it is found in Assam's Kaziranga National Park and Manas wildlife sanctuary.
10. The Dachigam National Park of Kashmir protects the hangul or Kashmir Stag.
11. The largest areas reserved for sanctuaries are in Madhya Pradesh, Andhra Pradesh, Gujarat and Karnataka, but the proportion of sanctuary area to forest area is highest in Gujarat.
12. The word "National Park" refers to relatively large area of one or more ecosystem that has not materially altered by human exploitation and occupation. The place is especially meant for plants, animals and habitats for special scientific education.
13. The concept of "Wildlife-Sanctuary" is more or less similar to the national park but it is

chiefly meant to protect wildlife and conserve species. Its boundary is not fixed by the legislation.

14. The concept of "Biosphere Reserves" refers to the multipurpose protected area to preserve the genetic diversity of the ecosystem. Its main objectives are; to conserve integrity and diversity of plants, animals and micro-organism, to provide facilities for education, awareness and training and to promote research on ecological conservation.
15. The "Operation Tiger" was launched by WWF in 1973 to protect the tiger from further extinction.
16. Of the total 27 tiger reserves in India, Nagarjunasagar Tiger reserve of Andhra Pradesh is the largest with an area of 3,568 sq km.
17. The National wildlife Action plan was adopted in 1983.



Indian agriculture provides livelihood to about 70% of the work-force, contributes nearly 35% of net national product and accounts for sizeable share of total value of country's exports. It also supplies bulk of wage goods required by non - agricultural sector and raw material for a large section of industry.

### Cropping Season in India

India has many growing seasons due to prevalence of high temperature through a long period. Different crop seasons are:

(a) **Kharif:** Crops are sown at the beginning of the South -West monsoon and harvested at the end of the South -West monsoon.

**Important crops:** Jowar, bajra, rice, maize, cotton, Jute, groundnut, sugarcane, tobacco etc.

(b) **Rabi:** Crops need relatively cool climate during the period of growth but warm climate during the germination of their seed and maturation.

**Sowing season-** (October -December) and harvesting season (February - April).

**Important Crops:** Wheat, barley, gram, linseed, mustard, masur, peas and potatoes.

(c) **Zaid:** Crops which are being raised throughout the year due to artificial irrigation.

(i) **Zaid Kharif:** Sown in August-September and harvested in December-January. Important crops include rice, jowar, rapeseed, cotton and oilseeds.

(ii) **Zaid Rabi:** Sown in February - March and harvested in April -May. Important crops are watermelon, cucumber, leafy and other vegetables.

**Total geographical area of India:** 328.7 m. ha.

**Total New sown Area:** 140.27 m. ha. (46.12%)

**Total Net Irrigated Area:** 38.80 m. ha (27.66% of net sown area).

In Eastern India, east of 80° East meridian and in the coastal lowland (West coastal lowland south of Surat) rice is the dominant crop. Tea and jute are distinctive crops of eastern India. West of 80° East meridian and north of Surat, wheat is the dominant crop. 100 cm Isohyet is the major dividing line.

Jowar, bajra, pulse, groundnut and cotton are the chief crops in the Indian Plateau and wheat, various pulses, cotton, mustard, jowar, bajra, etc. in the alluvial plains of Uttar Pradesh, Haryana and Punjab.

### Types of Farming

1. **Shifting Cultivation:** Prevalent in the forest areas; cultivation is done over the burnt forests which are abandoned when fertility dwindles. It has different name indifferent states. **Main crops:** dry paddy, wheat, maize, sugar cane etc.

2. **Sedentary or Settled Cultivation:** Mainly confined to plateau and highland areas. **Main crops:** Sugarcane, Oilseeds, Cotton.

3. **Capitalist Farming:** Practised on large holdings called, farm estates. It is highly capital intensive type of agriculture. **Main crops:** plantation crops.

### Description of crops

#### • Rice

It covers about 25% of the total gross cropped area of the country.

**Climatic Conditions:** Rain fall more than 125 cm.; clayey loam soil is best suited; average monthly temperature should not fall below 21°C as in Orissa, West Bengal, Bihar, Assam and South India.

**Area:** Coastal India (south of Bombay on the western coast), Eastern India, Chhattisgarh Plain, Wainganga valley, alluvial plain of West Bengal, Mahanadi delta, eastern Assam valley, Cauvery delta.

In West Bengal rice is grown in 3 different agronomic seasons-

- (1) Aus, sown in Feb-March,
- (2) Aman, sown in March-April &
- (3) Boro, sown in June.

In terms of production as % of total rice production, West Bengal ranks first followed by T.N., U.P., Andhra Pradesh, Punjab & Bihar.

In terms of yield (kg/ha), Tamil Nadu ranks one followed by Punjab, Andhra Pradesh and Karnataka.

- **Wheat**

It covers about 14% of total cropped area of the country.

**Climatic Conditions:** Cool climate; 30 cm. rainfall during the growing period; clayey alluvial is the best suited soil; raised mainly in area of rainfall annually less than 100 cm.

**Crops:** (1) **Common bread wheat**-Most common in the Indo-Gangetic Plains; the major part of total wheat produced in India. (2) **Durum/Marcaroni wheat**-Susceptible to yellow rust; most common in the north-western India and the black soils of Indian Plateau. (3) **Emmer/Triticum Dicocum wheat**-Produced in Karnataka, Tamil Nadu and Maharashtra. (4) **Indian dwarf wheat**-Produced in limited areas of M.P. and U.P.

About 70% of total wheat area in India is under irrigation.

About 40% of total wheat area in India is rain-fed.

In terms of area as a percentage of total area under wheat, UP ranks one followed by MP, Punjab, Rajasthan, Bihar and Haryana.

In terms of production as % of total wheat production in India, U.P. ranks one followed by Punjab, Haryana, Bihar.

In terms of yield (kg/ha) Punjab ranks one followed by Haryana, West Bengal, Rajasthan, Uttar Pradesh.

- **Barley**

For the growth of barley the climatic conditions are the same as for wheat. However it can well thrive even in more cool climate as its potential area is much wider than the wheat.

Barley is used for the production of malt which again is used for brewing beer and other alcoholic products.

In terms of production as % of total barley production in India, Uttar Pradesh ranks first followed by Rajasthan, Haryana, Punjab.

- **Maize**

**Climatic Conditions:** Area of 4.5 months free from frost; temperature during growing period of 21°C to 27°C but should not fall below 13°C; rainfall between 50 to 100 cm.; well drained loamy soils rich in nitrogen; grown as kharif crop in all the states.

**Area:** Mainly north of a line connecting Surat with Kolkata (excluding Kutch, West Rajasthan and Ladakh), in the North East (Meghalaya, Nagaland, Manipur, Mizoram), northern districts of Andhra Pradesh and the adjoining districts of Maharashtra and M.P.

In terms of area as % of total area under maize U.P. ranks first followed by Rajasthan, M.P., Bihar and Gujarat.

In term of production as % of total production in India U.P. also ranks first followed by former Bihar, Karnataka, M.P., Rajasthan.

- **Jowar/Sorghum**

**Climatic Conditions:** Annual rainfall below 100 cm, needs 30 cm rainfall during the growing season; mean monthly temperature between 20° and 33°C, clayey deep regur and alluvium for better field.

**Area:** On Indian Plateau, west of 80°E meridian; south of Pune 80% agricultural land under it; in Andhra Pradesh, Maharashtra and Karnataka as rabi & as kharif elsewhere.

In terms of area as % of total area under it Maharashtra ranks first followed by Karnataka, M.P., Andhra Pradesh and Rajasthan. In terms of production as % of total production Maharashtra also ranks first followed by Karnataka, M.P., and Andhra.

- **Other Coarse Cereals**

Beside maize and jowar a variety of coarse cereals are grown in India. These are mostly rain fed crops like bajra, ragi, etc.

Coarse cereals altogether accounts 28-30% of the total area under food crops and about 18.5% of total annual food production.

Though they have little commercial value they are liable to be grown in even ecologically unfriendly areas and have been adopted by the poor section of the society.

In terms of area as % of total area under bajra Rajasthan ranks first followed by Maharashtra, Gujarat, U.P. and Haryana.

In terms of production as % of total production of bajra Rajasthan ranks first followed by Gujarat, U.P. Maharashtra and M.P.

#### ● Pulses

**Kharif Pulses:** Arhar/ Tur, Moong, Urad, Moth, etc; grown throughout India.

**Rabi Pulses:** Gram, Peas, Khesari, Masur, Urad, etc.; grown in north India.

Pulses occupy about 13% of total Indian cropped area while 90% area under it is rainfed.

In terms of area as % of total area under pulses M.P. ranks first followed by Rajasthan, Maharashtra, U.P. and Orissa.

In terms of production as % of total production: Haryana ranks first followed by Punjab, M.P. and U.P.

#### Oil Seeds

**A. Groundnut:** India ranks first in the world both in area and production.

**Climate:** Highly susceptible to frost so not grown in the winter season north of Tropic of Cancer. Well drained sandy soil is more suitable for it

**Area:** Raised as kharif throughout India but as Rabi in Tamil Nadu, Karnataka, Andhra Pradesh, Orissa. Kharif crop covers more than 90% area.

In terms of area Gujarat ranks first followed by Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra.

In terms of production Gujarat also ranks first followed by Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra.

#### B. Rapeseed & Mustard

**Climate:** Like wheat they thrive only in cool climate and frost damages it. It is grown as Rabi crop.

U.P. and Rajasthan are the chief producer and together they account for 60% of the country production.

In terms of area U.P. ranks first followed by Rajasthan, Haryana and M.P.

In terms of production Rajasthan ranks first followed by U.P., Haryana and M.P.

#### C. Sesamum/ Til

India shares about one-third of world production and area wise first in the world.

**Climate:** Raised throughout India on light soil as kharif in the northern India and as Rabi crop in south India.

The main producing states are Orissa, Karnataka and Gujarat.

#### D. Linseed

India accounts 10% of world production and area wise stands first in the world.

Main producing states are M.P., U.P., Maharashtra, Bihar and Rajasthan.

#### E. Castorseed

India contributes 20% of world production and area wise stands first in world.

**Climate:** Generally raised as a mix crop in tropical and sub-tropical climate. In India almost all area under this crop is rainfed.

Raised as kharif crop in North-India and as rabi in South-India.

Main producing states are Gujarat, Andhra Pradesh, Orissa, Karnataka & T.N.

#### F. Niger Seed

Area wise first in the world;

Used for making soap.

Main producing states are M.P., Orissa, Maharashtra and Bihar.

#### G. Sunflower

Area wise first in the world raised as rabi crop.

Maharashtra alone shares about 75% of the country production.

- **Cotton**

**Climate:** A sub-tropical crop; temperature- above 21°C and 200 frost free days; rainfall- 75 cm. during the growing season; regur soil in the rainfed area and heavy alluvial soil in the irrigated area are most suited.

**Area:** Mainly in area west of 80°E; W. Punjab, Haryana, SE-Rajasthan, black cotton soil of Malwa plateau, Nagpur plain, Kathiawar and Gujarat plain, N-Karnataka and neighbouring Andhra Pradesh, Maharashtra and W-T.N..

In terms of area under cotton Maharashtra also ranks first followed by Gujarat, Andhra Pradesh, Punjab.

In terms of production, Maharashtra also ranks first followed by Gujarat, Punjab, Andhra Pradesh and Rajasthan.

In terms of yield, Punjab ranks first followed by Rajasthan and Tamil Nadu.

- **Jute**

India ranks first both in area and production in the world but Bangladesh stands first in export.

**Climate :** Rainfall between 150 and 300 cm.; humidity over 80%; temperature between 24°C and 35°C during the growing period; preferred to land of annual flooding.

**Area:** Lower Brahmaputra Valley, West Bengal plain, Mahanadi delta, NE-Bihar,

In terms of area West Bengal ranks first followed by Bihar, Assam and Andhra Pradesh.

In terms of production West Bengal also ranks first followed by Bihar, Assam and Orissa.

- **Tobacco**

**Climate :** Rainfall about 60 cm during the growing period; humidity about 8%, well drained sandy loam soil rich in potash is most favourable.

**Area:** Ganga plain N. Bihar; Godavari and Krishna deltas of Andhra Pradesh; Madurai, Belgaum, Baroda, Satara and Kaira near Mumbai.

In terms of area under tobacco Andhra Pradesh ranks first followed by Gujarat, Karnataka, Uttar Pradesh and Bihar.

In terms of production Gujarat ranks first followed by Andhra Pradesh, Uttar Pradesh, Karnataka and Bihar.

- **Sugarcane**

India has the largest are in sugarcane production in the world and also leads in production.

**Climate:** Temperature about 25°C; hot dry wind is inimical; annual rainfall about 50 to 75 cm. plus limited irrigation; well drained reddish loamy soil is most suited; cool dry weather during its maturing period promotes the sucrose content.

**Area:** South India provides the best suited tropical conditions with longer crushing period. North India produces the sugar cane in sub-tropical condition. The main area lies in the Ganga plain west of Patna.

In terms of area under sugarcane production U.P. ranks first followed by Maharashtra, Tamil Nadu, Karnataka and Andhra Pradesh.

In terms of production U.P. also ranks first followed by Maharashtra, Tamil Nadu, Karnataka and Andhra Pradesh.

In terms of yield Tamil Nadu ranks first followed by Maharashtra.

- **Rubber**

In 1902, first of all the rubber plantation was introduced on the bank of Periyar river

India is the fourth largest natural rubber producer in the world only after Thailand, Indonesia and Malaysia.

**Area:** More than 90% area is concentrated in Kerala alone and the rest is spread over in Tamil Nadu, Karnataka, Andaman and Nicobar islands.

Both in respect of acreage and production Kerala stands first.

- **Tea**

India accounts about 30% of global output followed by China, Kenya, Sri Lanka. However, Srilanka and Kenya have overtaken India in terms of export.

**Climate:** Hot climate with the temperature between 21°C and 32°C; rainfall more than 150 cm; deep loam soil rich in humus and virgin forest

soil with very little calcium but enough iron are best suited.

**Area:** NE-India contributes about 80% of the total production and the rest 20% is shared by S. India.

**Assam:** Either sides of Brahmaputra river and south of Assam hills in Cachar.

**W. Bengal:** Darjeeling and Jalpaiguri. It has good flavour so fetches high price.

**S. India:** Annamalai hills; Hassan and Chikmanglur districts of Karnataka; Kottayam, Quilon and Trivandrum districts of Kerala.

**Uttarakhand:** Dehradun district.

**Himachal Pradesh:** Dharmashala in Kangra district.

In terms of area under tea Assam ranks first followed by W.Bengal, Tamil Nadu, Kerala.

In terms of production Assam also ranks first followed by W.Bengal, Tamil Nadu and Kerala.

In terms of productivity/yield Tamil Nadu ranks first followed by Kerala.

- **Coffee**

Arabica and Robusta varieties of coffee are grown in India accounting for 49% and 51% of area under cultivation respectively.

**Area:** Eastern slopes of Western Ghats in Kerala, Karnataka and Tamil Nadu. Karnataka (Chikmanglur, Shimoga and Hassan), Tamil Nadu (Nilgiri and Palani Hills).

In terms of area under coffee plantation Karnataka ranks first followed by Kerala and Tamil Nadu.

In terms of production Karnataka ranks first followed by Kerala, Tamil Nadu and Andhra Pradesh.

- **Spices**

In India about 60 types of spices are grown and since a long time in history India has been the chief exporter worldwide. In terms of spices export value wise Black Pepper ranks first followed by Chilli.

**Chilli:** Chief producers are Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, etc.

**Turmeric:** In terms of production Andhra Pradesh ranks first followed by T.N. and W. Bengal.

**Cardamom:** India is the largest producer and exporter. Both in terms of area and production, Kerala ranks first followed by Karnataka and Tamil Nadu.

**Black Pepper:** India is the second largest producer after Indonesia. Kerala is the largest producer followed by Karnataka, Tamil Nadu and Andaman & Nicobar.

**Areca nut:** Kerala ranks first in the production followed by Karnataka, Assam & T.N.

**Ginger:** The chief producers are Kerala, Meghalaya, Orissa, Arunachal Pradesh & H.P.

- **Coconut**

In terms of number of nuts India ranks second only after Indonesia and in terms of Copra India ranks third after Indonesia and Philippines.

In terms of area under coconut Kerala also ranks first followed by Tamil Nadu, Karnataka, Andhra Pradesh, Orissa and Goa.

In terms of production Kerala also ranks first followed by Tamil Nadu, Karnataka, Andhra Pradesh, W. Bengal and Orissa.

- **Fruits**

**A. Mango:** Alphonso of Maharashtra, Bangnapalli of Andhra Pradesh, Dashehari & Langra of U.P., Malda of W. Bengal are some famous varieties. U.P. is the largest producer followed by Bihar, Andhra Pradesh, West Bengal and Maharashtra.

**B. Banana:** India is the second largest producer after Brazil. The chief producers are Tamil Nadu, Maharashtra, Gujarat, M.P. and Kerala.

**C. Grape:** The famous variety "Anab-e-Shahi" productivity is highest in India. The chief producing areas are Coorg district of Karnataka; Wynad in Kerala; Nilgiri, Sholapur and Ahmednagar districts of Maharashtra.

**D. Citrus:** Maharashtra ranks first and Nagpur Mandarins is considered to be the best in the world.



**E. Apple:** North-west Himalayan region covers 95% of the total area and 85% of the total production

**F. Pineapple:** The chief producers are Kerala and North Eastern states.

**G. Cashewnut:** India ranks first both in area and production. Kerala ranks first in production by Andhra Pradesh, Orissa, Goa and Karnataka.

#### Points to Remember

1. India ranks 7th in the world in terms of total geographical area but 2nd in terms of cultivated land.
2. India has total geographical area of 328.7 million hectares out of which 142.60 m hectares is the net sown area. It is about 46.59%. Arunachal Pradesh has only 3.2 percent area under net cultivation while in Haryana and Punjab it is 82.20 percent.
3. In Punjab, more than 94% of the total cropped area is irrigated.
4. In India, out of the net cropped area of 142.82m hectares, only 55.14 million hectares (38.5%) are irrigated.

5. India stands next only to China in the production of rice contributing 21.5 percent of the world population.

6. Bengal is the largest rice producing state contributing to more than 14.6% of the rice production of India, but in term of yield per hectare Punjab and Haryana occupy the top rank.

7. Soviet Union, United States and China are the countries which produces more wheat than India. In term of production U.P. ranks first while in terms of yield Punjab ranks first in India.

8. India is the second largest producer of sugarcane after Brazil and it has the largest area under sugarcane cultivation.

9. India grows 7% of the total world production of tobacco which is next only to China, U.S.A and Brazil.

10. Kerala is considered as the “spice state of India”.

11. “Harrison” and “Virginia Gold” are the high yielding varieties of tobacco.



The process of supplying water to the crops by artificial means such as canals, wells, tube-wells from the source of water such as river, tanks, ponds or ground water is called irrigation. The monsoon rainfall in India is uncertain & highly variable. The temporal & spatial variability of rainfall accentuates the need for artificial supply of water to the crops. Hence irrigation in India becomes indispensable.

Apart from vagaries of monsoon, the cropping pattern in India also enhances the need for irrigation in the areas with sufficient rainfall. Certain crops like rice, sugarcane, jute, cotton, chinks require irrigational water. It is estimated that production of irrigation crops is 50 to 100 percent higher than that of unirrigated crops under similar geographical conditions. Introduction of HYV seeds and green revolution have further increased the need for irrigation.

### *Reasons for Water Scarcity*

- The rainfall is highly variable.
- 18% of water available is polluted and unfit for drinking.
- Almost all parts of India are affected either by flood or drought.
- Demand for water is increasing due to rapid increase in population.
- The management of available water resources is not proper.
- The storage facilities are very poor.
- Over-exploitation of ground water often results in the intrusion of saline sea water in coastal areas.
- Cultivation of hybrid varieties of paddy, wheat, cotton, sugarcane and tobacco which consume more water.
- Evaporation loss of water stored in large reservoirs and loss by seepage in long canal systems.
- Siltation of water bodies.
- Dumping of various types of pollutants into water bodies reduce its usability.

The source of irrigation depends upon the water availability, topography, relief, availability of soil and moisture, requirements of crop. Important sources of irrigation in India include:

- (i) **Wells:** Wells are the most basic sources of irrigation in India. It depends upon the availability of ground water. The Great Plains, the deltaic regions of the Mahanadi, Godavari, Krishna and Cauvery are important regions of well irrigation.
- (ii) **Tanks:** Located in the rocky region of the Peninsula. The tanks are non-perennial in nature and additional water is needed in summer. About 11% of the net irrigated area in India is under tank irrigation. The Karnataka plateau, coastal Maharashtra, Andhra Pradesh, Tamil Nadu have this kind of irrigation.
- (iii) **Canals:** India has one of the world's largest areas under canal irrigation. About 40% of the net irrigated area comes under canal irrigation. Uttar Pradesh, Punjab, Haryana, Rajasthan, Bihar, Andhra Pradesh are the main regions.

### **Multi-purpose projects aim at:**

- (a) Flood Control
- (b) Promotion and operation of irrigation schemes, water supply.
- (c) Generation and Transmission of electric power
- (d) Promotion and control of irrigation
- (e) Afforestation and other economic activity generation.

For the better utilization of the total potential the irrigation schemes have been divided into :

- (1) **Major Projects:** Cultivable command area of more than 10,000 hectare, (including canal irrigation)

- (2) **Medium Project:** Cultivable command area between 2000 and 10000 hectare.
- (3) **Minor Projects:** Cultivable command area less than 2000 hectare, include mainly well-irrigation.
- (4) **Micro Projects:** Drip irrigation and the use of sprinklers.

In Punjab 75% of the net sown area is irrigated, in Haryana & U.P. this ratio is of about 57%, in TN. About 49% in U.P. about 38%, in Maharashtra only 9% are irrigated.

### MAJOR IRRIGATION & POWER PROJECTS

1. **Bhakra-Nangal Project:** Joint venture of Punjab, Haryana & Rajasthan; on river Sutlej; Bhakra Dam is the highest straightway gravity dam in the world with a reservoir named 'Govind Sagar lake'. Nangal Dam is 13 km downstream of Bhakra dam. It has four power houses (total 1204 Mw) at Ganguwal, Kotta, Left Bank & Right Bank.
2. **Rihand-Dam Project:** Across river Rihand on MP-UP border in Mirzapur District. Rihand is the largest man-made lake in India; reservoir is known as 'Govind Ballabh Pant Sagar'.
3. **Chambal Project:** A joint venture of Rajasthan & MP; on river Chambal comprises three dams Gandhi Sagar Dam (MP), Rana Pratap Sagar (Rajasthan), Jawahar Sagar (Rajasthan).
4. **Gandak Project:** A joint venture of UP & Bihar & Nepal; on Gandak river; a barrage near Valmiki Nagar.
5. **Nagarjuna Sagar Project:** On Krishna River near Nandikonda village in Andhra.
6. **Kosi-Project:** On River Kosi; a joint venture of Bihar & Nepal, a barrage near Hanuman Nagar in Nepal.
7. **Tungabhadra Project:** A joint venture of Andhra & Karnataka; on river Tungabhadra.
8. **Beas Project:** A joint venture of Punjab, Haryana & Rajasthan; on river Beas; a dam at 'Pong'.
9. **Hirakund Project:** On Mahanadi in Orissa, its dam is longest in the world.
10. **Damodar Valley Project :** (W. Bengal & Bihar) have a series of small dams on the tributaries of river Damodar i.e. Tilaiya (R. Barakar), Konar (R. Konar), Maithan (R. Barakar), Panchet (R. Damodar) and 3 Thermal Power stations at Bokaro, Chandrapura & Durgapur.
11. **Kakrapar Project:** on river Tapi in Gujarat.
12. **Machkund Project:** on river Mach- kund Andhra & Orissa joint venture.
13. **Malprabha Project:** on river Malprabha in Karnataka.
14. **Mayurakshi Project:** on river Mayurakshi in W. Bengal.
15. **Hansdeo Bango Project:** on river Hansdeo in MP.
16. **Bhima Project:** have two dams Purna dam at river Purna & Ujjaini dam on river Krishna in Maharashtra.
17. **Jaikawadi Project :** on river Godavari in Maharashtra.
18. **Tawa irrigation Project:** on river Tawa, a tributary of Narmada in M.P.
19. **Tihri Dam Project:** on river Bhagirathi near Dev Prayag in UP.

### IMPORTANT HYDRO ELECTRIC PROJECTS

1. **Tata HEP:** on Nila-Mulas river in Maharashtra; power to Bombay.
2. **Pykara HEP:** T.N. on Pykara river in Nilgiri; 1st HEP in T.N.
3. **Mandi HEP:** 1st in Himalayan region on a tributary of Beas.
4. **Balimela HEP:** Orissa.
5. **Ukai HEP:** Maharashtra on river Tapi.
6. **Salal HEP:** J & K.
7. **Chukha HEP:** Bhutan-constructed by India & surplus energy is purchased by India for its NE-states.
8. **Koyna HEP:** Maharashtra on Koyna river at Deshmukh-wadi.
9. **Sivasamudram Scheme:** In Karnataka at Sivasamudram falls on Cauvery.

10. **Sharavati HEP:** Karnataka across Sharavati near Jog fall in Shimoga district.
11. **Mettur HEP:** T.N. Stanley Dam on river Cauvery.
12. **Papanasam Scheme:** T.N. On Tamraparni river in Tirunelveli district.
13. **Sabrigiri HEP:** Kerala; Dam across Pamba river.
14. **Sarda HEP:** U.P. across Sarda river in Nainital district.
15. **Idukki HEP:** Kerala have three storage dams on rivers Periyar, Cherutheni, Idukki.
16. **Kalinadi HEP:** Karnataka on Kalinadi river in N. Kanara district.

**India's potential of HEP:** 5th after Zaire, Former USSR, Canada and USA.

North-Eastern India has 30% of India HEP potential

Himalayan region has 30% of India HEP Potential.

Peninsular India has 40% of India HEP potential (1/2 in the east flowing rivers rising in the Western Ghats)

We have developed only 40% of the total potential till now.

### SUGGESTIONS FOR SUSTAINABLE WATER RESOURCE UTILISATION

- Greater emphasis on ground water utilisation as a part of comprehensive land use policy and afforestation programme.
- Introducing water harvesting technology for optimum utilisation of rain water and surface runoff to sustain use of ground water. Greater emphasis of small storage schemes.
- Involvement of local people by community participation.
- Restoring original cropping pattern to prevent any drought type situation due to introduction of HYVs.
- Judicious use of water involves:
  - (a) Drip irrigation
  - (b) Low energy precision application

- (c) Reusing urban wastewater
- (d) Saving water used in industries
- (e) Municipal water conservation managing both supply and demand of water.

- Development of National Water Management policy not only to improve supply but also to manage demand better.

### POINTS TO REMEMBER

- Wells provide about 45 percent irrigation to the net irrigated area in India.
- Tank Irrigation is chiefly confined to west Bengal, Bihar and Orissa and it accounts for about 10 percent of the net irrigated area.
- The "Canal Irrigation" is chiefly practised in U.P., Punjab, Haryana and Andhra Pradesh and it accounts for about 40 percent of the net irrigated area.
- The Nuclear Power Stations are located at Tarapur (Maharashtra) Kota (Rajasthan), Narora (U.P), Kalpakkam (Tamil Nadu), Kakrapar (Gujarat) and Kaiga (Karnataka).
- About 91.5 percent of the surface water flows into sea, 37% of the ground water resources is utilized and 84% of water is used for irrigation in India.
- About 38 percent of the net sown area is under irrigation in India; in Mizoram it is only 7.3 percent while in Punjab it is 90.8 percent.
- The areas adjacent to Krishna- Godavari delta and Cauvery delta such as Punjab, Haryana and Western U.P. have more than 60 percent of the areas under irrigation.
- The wells and tube wells irrigation predominates in Gujarat where 78.4 percent of the net irrigated areas fall under it.
- According to the Water Treaties no river valley projects falls within the jurisdiction of a single state.
- The "Farakka Accord" was concluded in 1996. It cemented the controversy between India and Bangladesh which arose with the building of Farakka dam on river Ganga in near Calcutta.

- The “Mahakali River Treaty” between Nepal and India was concluded in June 1997 which concluded rivers like Mahakali Sarda barrage, Tanakpur barrage and Pancheswar Projects.
- According to the Indus Water Treaty 80% of the water of Indus system is made available to Pakistan and remaining 20 percent to India.
- The Damodar Valley Project in India is based on the Tennessee Valley Authority of U.S.A. With the construction of four dams as Maithan, Konar, Tilaiya and Panchet the “river of sorrow” has turned into “rivers of plenty”.
- The “Govind Ballabh Pant Sagar Lake” on the Rihand dam is the largest artificial reservoir in Asia.
- The Narmada Valley Project or the Sardar Sarovar Project is one of the largest projects under implementation anywhere in the world.
- The “National Water Grid” envisages interlinking the various rivers to utilize their surplus water by diverting it to deficit area. The plan consists of to join Ganga to Kaveri and Brahmaputra to Ganga through canals. Through canal, Narmada will be turned towards Gujarat and Rajasthan.
- The “Watershed area” refers to the geohydrological area that drains at a common point.



India has the largest and most varied animal resources in the world and it has about 1/6th of the cattle, 1/2 of the buffalo and 1/5th of the goat population in the World. India has a good number of milch breeds. Sahiwal, Red Singhi and Deoni are some of the outstanding breeds. India has gone for the world's largest and most ambitious milk programmes called 'operation flood'. Drought breeds are poor in milk yields, but the bullocks are excellent draught animals. About 42% of the cattle in the country are draught animals.

India has 3% of the world's sheep population and ranks 6th among the sheep-breeding countries of the world. Rajasthan has the largest (24%) of India's total stock. India owns one of the largest livestock populations in the world. It accounts for 16% of the cattle population and 57% of buffalo population. India has become the largest producer of milk in the world.

### • Milch Breeds

Gir, Sindhi, Red Sindhi, Sahiwal, Tharpakar and Deoni are some of the outstanding breeds of milch cattle. The Gir is a native of Saurashtra and is now found in several parts of Gujarat and adjoining Rajasthan. The Sindhi breeds are mainly raised in Gujarat, Rajasthan and Maharashtra although it can be raised in several other part of the country due to its disease resistant quality. The Red Sindhi breeds have a distinct red colour and hails from Sind in Pakistan. The Sahiwal breed has its origin in widely found in Punjab, Haryana, Rajasthan, UP and Delhi. The Deoni breed is widely in north western and western parts of Andhra Pradesh.

### • Drought Breeds

Among the important drought breeds are included the Nagori Bauchaur, Malvi, Kherigarh, Hallikar, Khilari, Amritmahal, Kanhayam, Ponwar, Bargur and Siri. The Bagori breed is a native of Jodhpur and is found in large parts of Rajasthan, Haryana, U.P. and M.P., the Bauchaur breed is mainly found in Bihar. The Malvi is largely concentrated in the dry western parts of M.P. The Kenkatha

or Kenwariya breed hails from Banda district of U.P. and neigh- bouring areas of M.P. Kheri district of U.P. is the habitat of Kherigarh breed. The Halikar and Amritmahal breeds are indigenous to Tumkur, Hassan and Mysore districts of Karnataka but are spread all over the Peninsular India. Sholapur and Satara districts comprise the home of the Khillari breed. The Bargur and the Kangayam breeds are the natives of Coimbatore district of Tamil Nadu. The Siri grows well in the hilly of Darjeeling and Sikkim.

### • Dual Purpose Breeds

Cattle of these breeds are used both for milk and for drought purpose. The cows are fairly good yielders of milk while bullocks are good for drought. Tharparkar, Haryana, Mewati, Kankrej, Rath, Nimari, Dangi, Krishan and Ongole are important breeds of this category.

### • Exotic Breeds

Some of the high milk-yielding exotic breeds have been developed in India. Some foreign breeds have been crossed with India breeds and new breeds called cross breed have been developed. Some of the important exotic breeds are Jersey, Holstein, Friesian, Swiss-Brown, German Felekvich and Ayrshire.

### • Buffalo

About 75% of buffaloes are reared for milk. In wet region of W. Bengal, Assam, Orissa, Kerala they are also used for drafting and ploughing in the fields. In addition to the fact that India more buffaloes than any other country of the world, the Indian buffalo breeds are some of the world's best breeds. The Murrah, Bhadwari, Jaffarabadi, Surti, Mehsana, Nagpuri and Nili Ravi are among the important breeds.

#### Famous Buffalo Breeds

**Murrah:** Indigenous to Rohtak, Hissar and Gurgaon districts of Haryana Delhi and Punjab. The Murrah male buffaloes are good drought animals.

**Bhadwari:** The Bhadwari breed belongs to Agra and Etawah districts of U.P. and the neighbouring part of Madhya Pradesh and Rajasthan.

**Jaffarabadi:** The Jaffarabadi breeds hails from the Gir forest of Gujarat. The buffaloes of this breed are quite massive and yield about 2500 kg of milk per lactation.

**Surti:** The Surti breed comes from the Gujarat plain.

**Nili Ravi:** The Nili Ravi breed belongs to Ferozepur district of Punjab.

**Nagpuria:** From Vidarbha region of Maharashtra.

- **Cow & Oxen**

*Some important indigenous breeds are:*

**Gir:** From Saurashtra.

**Red Sindhi:** From Gujarat, Rajasthan and Maharashtra.

**Sahiwal:** From Delhi, Punjab, Haryana, Rajasthan and western U.P.

**Deori:** From Andhra Pradesh.

**Nagori:** Drought breed of Rajasthan.

**Bachaur:** Drought breed of Bihar.

**Kenkatha/Kenwaria:** Drought breed from Kiu Valley in Banda district of U.P.

**Amritmahal/Hallikar:** Drought breed from Karnataka.

**Siri:** Drought breed of Darjeeling and Sikkim.

**Ongole:** Drought breed of Guntur district of Andhra Pradesh.

In terms of cows and oxen population M.P. (including Chhattisgarh) ranks first followed by Uttar Pradesh (including Uttaranchal), Bihar (including Jharkhand), West Bengal. In terms of cow milk production Uttar Pradesh (including Uttaranchal) ranks first followed by West Bengal, Maharashtra and Tamil Nadu.

- **Sheep**

India stands sixth in sheep population in the world after Australia, Russia, China, Argentina and New Zealand. More than 4 per cent of the world's sheep are reared in India, most of the

sheep are raised in regions which are too dry, too stony or too mountainous to be too good for agricultural or for cattle rearing. Most of the India sheep are of poor quality yielding inferior wool in less quantity. Their yield of mutton is also very low. However, some of the good breeds are found in the northern temperate region. By virtue of their sheer number, sheep occupy an important place in our economy because they provide us with wool, mutton and skins.

The distribution of sheep may be properly studied by dividing the sheep areas into following regions:

**Temperate Himalayan Region:** It comprises Jammu and Kashmir, Himachal Pradesh and Uttarakhand. The entire region has temperate climate which is quite suitable for good quality sheep. The excellent pastures exist on the hill slopes. India's best quality sheep are reared in the Kula, Kangra, Chamba and Kashmir valley at altitudes varying from 2000 to 3000 m.

**Dry North-Western Region:** This region includes Rajasthan and neighbouring parts of Punjab, Haryana, Western Uttar Pradesh, Gujarat and Madhya Pradesh. There are more than 13 million sheep contributing to about half of the total wool production of India, however the wool is of comparatively inferior quality and the yield of wool per sheep is lower than that of the Himalayan. Marwari breed of Rajasthan is famous for its wool.

**Semi-arid Southern Region:** This region, comprising Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu and parts of Madhya Pradesh, supports half the total number of sheep found in India. In spite of the largest numbers of sheep about 50 percent of the sheep of this region are raised for mutton and produce no wool.

**Humid Eastern Region:** This region comprising Bihar, West Bengal, Assam and Orissa, has humid climate which is not favourable for sheep rearing. The sheep are mainly reared for producing mutton. In terms of sheep population Rajasthan ranks first followed by Andhra Pradesh, Tamil Nadu and Karnataka.

- **Goat**

Goat is called the poor man's cow because it can be cheaply reared on meagre grass of poor quality. It is the major supplier of mutton along

with milk, hair and skins. Goats are found in larger number as compared to sheep and are next only to cattle. About one-sixth of the world's goat is reared in India. Although goats are found in almost of parts of country their major concentration is in Bihar (17.31 million), West Bengal (14.17 million), and Uttar Pradesh (13.11 million). These states account for more than half goats of India.

There are some outstanding breeds which are found in some specific areas. The Himalaya or Angora goat which is also known as the Chamba, Gaddi, Chegu or Kashmiri breed is reared in Kashmir and Himachal Pradesh. It produces soft warm hair. The Pashmina reared in Kashmir and Kullu valley is world renowned for its pashmina fur known as Mohair.

The Jamunapuri is the breed found between the rivers Yamuna and the Chambal. It is dual purpose breed providing meat and milk. Among the other breeds are the Beetal of Punjab, of the Marwari, Mehsana, Kathiawar and Zalwadi of Rajasthan Gujarat and Madhya Pradesh and the Barari, Surti and Deccani of the Peninsular India. Several important foreign breeds such as Alpine, Nubian, Saanen, Toggenberg and Angora have been used for cross breeding with the local breeds.

- **Pigs**

There are about 100 lakh pigs providing about 5 per cent of India's meat production in the form of pork. In a poor and thickly populated country like India, pig rearing is an important activity because pig provides rich meat at low cost. Pig farming plays an important role in improving the socio-economic status of sizeable section of weaker rural communities especially in north-eastern states where every rural family rears pigs for meat.

- **Horses and Ponies**

About one fourth of the total horses and ponies are found in Uttar Pradesh, Bihar and Jammu and Kashmir. Some of the important indigenous breeds include Marwari, Kathiawari, Manipuri, Bhutani, Spiti and Chummarti.

- **Donkey and Mules**

Donkey and mules are used as beasts of Burden, especially in those areas where modern modes of transportation cannot be used. Most of the donkeys are found in Rajasthan, Uttar Pradesh, Punjab, Gujarat and Tamil Nadu. Mules

are derived from the crossbreeding of mares and donkeys. The largest concentration of mules is found in Uttar Pradesh and West Bengal.

In terms of goat population Bihar (including Jharkhand) ranks first followed by Rajasthan, West Bengal and Uttar Pradesh (including Uttaranchal).

In terms of goat milk production Uttar Pradesh (including Uttaranchal) ranks first followed by Rajasthan, Bihar (including Jharkhand) and former M.P.

In terms of Hen and Duck population Andhra Pradesh ranks first followed by West Bengal, Maharashtra, Tamil Nadu.

In terms of total milk production Uttar Pradesh (including Uttaranchal) ranks first followed by Rajasthan, Bihar (including Jharkhand) and Madhya Pradesh (including Chhattisgarh).

In terms of wool production Rajasthan ranks first followed by Jammu and Kashmir, Karnataka and Gujarat.

- **Camels**

Camel is an extremely useful animal for drought and transport purposes in the arid lands and is called the ship of the desert. About two-thirds of camels are concentrated in Rajasthan alone. The rest of the camels are found in the arid semiarid areas of Punjab, Haryana and Gujarat.

## Fisheries

India is the world's 7th largest producers of fish. Production of fish in India is small, being only about 2.4% of the total world production. 72% of the total catch is brought by non-mechanized boats. Marine fisheries account for 2/3rd and inland fisheries for 1/3rd of India's fish production. The present per capita consumption of fish in India is only 4kgs/year against a desired consumption level of 31kgs/year.

### Fish Production

#### Fresh-Water Fish Production Ranks:

1. West Bengal
2. Bihar (including Jharkhand)
3. Andhra Pradesh
4. Assam
5. Orissa



### **Marine Fish Production Rank:**

- (1) Gujarat
- (2) Kerala
- (3) Maharashtra
- (4) Tamil Nadu
- (5) Karnataka.

### **Total Fish Production Rank:**

- (1) West Bengal
- (2) Gujarat
- (3) Kerala
- (4) Maharashtra
- (5) Tamil Nadu

- **Marine Fisheries**

It includes coastal fisheries, off-shore fishers and deep sea fisheries.

- (1) **Coastal Fisheries:** The coastal zone extends upto 25m depth. Fish of this belt comprises of pelagic fishes, like sardines, Mackerel, Lesser Sardines, bottom species like Bombay-duck, silver bellies, Ships, etc.

Herrings, Sardines and Anchovies together accounts for 65% catch.

Tuna, Bonitos, Mackerels, Crustaceans, Shark, Rays, Skates, Flounders, Halibuts account the remaining 35% of total catch.

71% of total production of marine fish is along the west coast of Kerala, Maharashtra, Karnataka, Gujarat, Goa. Only about 29% of the total marine fish catch comes from the east coast of India.

- (2) **Off-shore and Deep Sea Fisheries:** It is not fully developed in India. Large concentrations of Sardines and Mackerel have been located along the Thiruvananthapuram Goa coast.

- **Inland Fisheries**

Quick growing species with non-precious feeding habit are generally selected for cultivation in ponds, lakes and reservoirs.

Some famous inland species are Cirrhinus-marigala, Cirrhinus -cirrhosa, Puntius, Cornaticus, Katla, Labeo-rohita, etc.

In brackish water estuarine fisheries the fish found are mostly marine species like Anchovies, Cat-fish, Perches, Pearl-spot, etc.

- **West Coast Fishing**

Here the fishing season is from September to February-March.

Here both the continental self and the water have more pronounced seasonal cycle and higher Phosphatic and nitrate contents, so more availability of plankton.

Major fish species are Sardines, Mackerel, Prawn, etc.

- **East Coast Fishing**

Here the fishing season is from July to October on the Andhra coast and September to April on the Coromandel Coast.

Here the circulation of water is less pronounced.

**Estuarine Fisheries:** Chilka and Pulicat Lake.

Per capita fish consumption is one of the highest in West Bengal but the state production is sufficient to meet only 20% of total demand.

- **Pearl Fisheries**

East coasts are more extensive and productive than the west coast and extended from Cape-Camorin to Kilkarai with Tuticorin as centre. Excellent quality of Oriental Pearls or Lingna pearls is found here.

On the West coasts Gulf of Kutch, to the north of Halar district of Saurashtra and near Jamnagar are the productive regions.

The principal pearl fishing areas in India are Gulf of Mannar, Gulf of Kutch and the Palk Bay.

In southern India pearl-oysters are harvested by divers but in Kutch and Saurashtra they are exposed to low-water spring tides and hence are easily collected by hand.

Central Marine Fisheries Research Institute is located at Mandapam Camp.

**Points to Remember**

1. The animal husbandry constitutes about 30 percent of country's agricultural output.

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|---|--|
| <ol style="list-style-type: none"> <li>2. India has about 16% of the cattle, 57% of the buffalo and one-fifth of the goat population of the world.</li> <li>3. In India, the largest number of cattle is found in Madhya Pradesh, followed by U.P., Maharashtra and Bihar.</li> <li>4. The livestock density is greatest in Maharashtra; it is 11 head of livestock per hectare of arable land. Haryana occupies the second position with 10 head/ha.</li> <li>5. In India, of the total milk-production, 63.8 percent is obtained from the buffalo, 33.5 percent from the cow and 2.7 percent from the goat</li> <li>6. The annual laying capacity of an Indian hen is 60 small eggs in a year as against 180 large eggs of white leghorn. India ranks fifth in the egg production in the world.</li> <li>7. "Operation Flood" is associated with the dairy development in India.</li> <li>8. The Sahiwal yields between 2725 and 3175 kg milk in a lactation period of 300 to 325 days.</li> <li>9. The "Amritmahal" and "Jiallikal" of Karnataka are the best known drought breeds.</li> <li>10. Nili-Ravi, Bhadwari and Toda breeds of buffaloes are facing extinction.</li> <li>11. The average yield of wool is only 700 grams in India as against 5.7 kg of some of the more exotic breeds.</li> </ol> | <ol style="list-style-type: none"> <li>12. The four large sheep-breeding farms in India are; Mimidipally (Andhra Pradesh), Challekeri (Karnataka), Daksum (Jammu and Kashmir) and Bhaisor (U.P.).</li> <li>13. The Central Sheep Breeding farm was established in 1969 at Hissar in Haryana.</li> <li>14. The Zebu cattle breed is mainly from India and is the ancestor of most tropical Asian and African cattle breeds.</li> <li>15. The main wool-bearing sheep breed is "Merino".</li> <li>16. Sheep for wool are best breed in dry climate.</li> <li>17. "India" has the largest number of goats in the World.</li> <li>18. India's share in the world production of fisheries is 4.5 percent.</li> <li>19. In India, the marine fisheries account for two thirds and inland fisheries for a third of India's fish production.</li> <li>20. The concentrations of fishing grounds are at high altitudes.</li> <li>21. The pelagic fish is seasonal because it is migratory in nature.</li> <li>22. The Russian delicacy caviar is made from the fish called sturgeon.</li> <li>23. The leading whaling area nowadays is in "north pacific".</li> </ol> |
|---|--|



Minerals are the naturally occurring materials which when exploited economically are called ores. Their exploitation is possible when they occur in concentrated form and near the surface. India is endowed with a rich variety of minerals. The ancient archaic landmass contains both metallic and nonmetallic minerals.

### Distribution of Minerals

Though natural endowment in terms of mineral is quite high, its spatial distribution is highly uneven. The important areas are:

- **North-Eastern Peninsular Belt:** This is an ancient shield area of peninsular block. It comprises of Chhotanagpur Plateau, Orissa Plateau and Chhattisgarh. It contains large quantity of coal, iron ore, manganese, mica, bauxite, copper, etc. It is known as mineral heart of India. It has 100% Kyanite, 93% iron ore, 84% coal, 70% chromite.
- **Central Belt:** The region consists of MP, Chhattisgarh, Andhra Pradesh and Maharashtra. It is the second largest mineral belt of India. Large deposits of manganese, bauxite, coal, iron ore, graphite and limestone are found.
- **The Southern Belt:** Mostly the Karnataka Plateau and Tamil Nadu highlands. It has iron ore, manganese, chromite but lacks in coal (except Neyveli coal), mica and copper.
- **The South-Western Belt:** It includes south Karnataka and Goa. It has iron ore, granite and clay deposits.
- **The North-Western Belt:** It extends along the Aravallis and adjacent Gujarat. It is important for non-ferrous mineral (copper, lead, zinc), uranium, mica, steatite, etc. It has mineral oil source in the Gujarat plains.

### Iron-ore

India has the vast resources of iron-ore, about 20% of total world reserves.

**Ore-Types:** The ore-types are the following:

- (1) **Haematite:** It has the iron content up to 86%; mainly concentrated in the Dharwar and Cuddapah system of the peninsular India. It is also called as "Red Ores" which contributes about 85% of total national production.
- (2) **Magnetite:** It has the iron content of 60%; mainly concentrated in the Dharwar and Cuddapah system of Indian peninsula. It is also called "Black Ores" and contributes about 8% of total production.
- (3) **Limonite:** It has 30-50% iron content and is the prominent constituent of laterite. It contributes about 7% of total production.

### Iron-Ore Reserves

1. Chikmanglur (Karnataka)	26%
2. Singhbhum (Jharkhand)	20%
3. Bastar (Chhattisgarh)	11%
4. Keonjhar (Orissa)	8%
5. Goa	5%

### IRON-ORE-AREA EXP. PORT

1. Goa	Marmagao
2. Bellary-Hospet	Mangalore
3. Kriburu-Bailadela	Visakhapatnam
4. Daitari- Nayagadh	Paradeep
5. Barbil	Haldia
6. Chikmanglur	Mangalore

### Manganese Ore

It is primarily used for making iron and steel and it acts as basic raw material for manufacturing its alloy. It is also used in manufacturing of bleaching powder, insecticides, paints, batteries and China clay. In India it occurs in the form of

sedimentary stratified metamorphic deposits of Dharwar System of Peninsular India.

**Ore Types:** Psilomelane, Braunite, Pyrolusite.

About 78% of total reserve is found in Nagpur and Bhandara districts of Maharashtra and Balaghat district of M.P. Singhbhum-Keonjhar-Bonai area holds the 11% of total reserve while the north Kanara shares 6%.

In terms of reserve M.P. (including Chhattisgarh) ranks first followed by Maharashtra, Orissa and Karnataka.

In terms of production Orissa ranks first followed by Karnataka, M.P. (including Chhattisgarh), Maharashtra and Andhra Pradesh.

Ferro-Manganese Plants: (1) Rayagada (2) Joda (both in Orissa) (3) Tumsar (4) Kamptee (both in Maharashtra) (5) Bhadravati (6) Dandeli (both in Karnataka) (7) Garividi (Andhra Pradesh).

### Chromite

It is used for producing "Disodium" used for the manufacturing stainless steel.

Orissa ranks first in the production by contributing 90% of the national production, followed by Karnataka, Maharashtra, Jharkhand and Tamil Nadu.

About 96% production of Tamil Nadu is exported to Japan and the rest to Australia.

The production of chromite was of 1324 thousand tonnes in 1999-2000.

### Nickel

Cuttack and Mayurbhanj districts of Orissa is famous nickel reserve and about 80% Orissa reserve is only concentrated in Kausa block.

India imports nickel to fulfill its domestic demand.

### Bauxite

These deposits are mainly associated with laterite soils.

Upto 1988 India was an important importer of aluminium but in 1993 India has become a

major exporter of alumina, mainly to Italy, Germany, U.K., Japan, etc.

In terms of reserves Orissa ranks first followed by Andhra Pradesh, M.P. (including Chhattisgarh), Bihar (including Jharkhand).

In terms of production Orissa also ranks first followed by Jharkhand, Maharashtra, Gujarat and M.P. (including Chhattisgarh).

### Copper

Copper ores in India are found as sulphides (Chalcopyrite, Chalcocite, Bornite), oxides (Cuprite) and carbonates (Malachite and Azurite).

They generally occur in veins in Peninsular India in highly metamorphosed rocks.

In terms of reserve Rajasthan ranks first followed by Bihar (including Jharkhand), M.P. (including Chhattisgarh), Karnataka and Andhra Pradesh.

### Gold

Generally found in quartz veins and sometimes associated with iron and copper sulphides.

Karnataka has been leading producer, since 1871 when the mining first started in Ooregum mines, Champion in Mysore. Other mines are Hutti, Topuldedi, Wondalli etc.

Ramagiri Gold field of Anantapuram district of Andhra Pradesh is another producer

The alluvial gold is found in the beds of Garra-nadi, South Koel, Sanjay, Subarnarekha river of Singhbhum district of Jharkhand.

**Bharat Gold mines Ltd.:** Founded in 1972 as a Public Sector which manages all the three operating mines of KGF area.

**Hindustan Copper Ltd:** Recover gold as a by-product along with other metals from its Khetri deposits.

### Silver

Generally in the form of Galena, Proustite mixed with copper, zinc or lead. Produced as by-product during the smelting of galena or produced from the

lead ore of Kurnool, Cuddapah and Guntur of Andhra Pradesh; Singhbhum and Ranchi of Jharkhand; Vadodara of Gujarat. Quartzites of Mysore Gold field and cupriferous pyrites of Chitradurg also yield some amount of silver.

### Diamond

The diamond is mostly available in Panna (Madhya Pradesh), Rammallakota in Andhra Pradesh and also in Krishna river basin. Presently diamonds are being excavated from only Panna mines.

### Mica

In India the two important ores of mica- Muscovite and Biotite - are found.

In terms of production Bihar (including Jharkhand) ranks first followed by Andhra Pradesh and Rajasthan.

Kodarma in Jharkhand is the world's largest mica mine.

Ruby mica and Bengal mica, which is of high quality, is found in Bihar and Jharkhand.

**Green Mica:** (lightest of all types), also called as Electrical Mica; found in Andhra Pradesh.

In Rajasthan green or pink colour high quality mica are found.

A large quantity of mica is also exported. But now India is facing stiff competition with Brazil.

### Limestone

Consumption of limestone in India: Cement Industry-67%, Iron & steel industry -16% chemical Industry - 4%

In terms of overall production of limestone M.P. (including Chhattisgarh) ranks first followed by Andhra Pradesh, Rajasthan, Gujarat and Karnataka.

Cement grade Lime-stone are mainly found in Andhra Pradesh, Karnataka, Gujarat and Rajasthan.

Flux grade limestone is mainly produced in MP (including Chhattisgarh), Meghalaya, Andhra Pradesh, Gujarat, Orissa, Jharkhand and Karnataka.

### Asbestos

In India Amphibole and Crysolite varieties of asbestos are found.

Asbestos has the fibrous structure and has great economic importance as it has the capacity to be separated quickly into fine filaments of high tensile strength and its great resistance to fire.

In terms of production Rajasthan ranks first followed by Andhra Pradesh and Karnataka.

### Fire Clay

It is used in making bricks for furnace.

These reserves are mostly available in Gondwana coal regions and basins. Bihar, Gujarat, Madhya Pradesh, Orissa, Tamil Nadu, Rajasthan, West Bengal and Andhra Pradesh are the states where fire clay is abundantly available.

### Gypsum

Gypsum is a colourless or white mineral which contains calcium sulphate. Gypsum is used in the production of cement and plaster of Paris.

Most of its deposits are found in Rajasthan, Tamil Nadu, Jammu & Kashmir, Himachal Pradesh and Uttar Pradesh. Some deposits are also found in Gujarat.

### Rare-Earths

In the south-west tip of India, on the Kerala and Tamil Nadu coast, an extremely rich minerals like Ilmenite and Monazite are found.

**Ilmenite:** From Quilon to Kanyakumari.

Ilmenite and Rutile are the by product in the by-products in the extraction of monazites.

### Salt

About 75% of total salt produced in India is manufactured from saline sea water by the process of solar evaporation.

**Sea-Salt:** Gujarat (Mithapur, Jamnagar, Dharsana, Okha, Bulsar), Maharashtra (Bhandrup, Uran, Bhayandar), Tamil Nadu (Madras and Tuticorin).

**Salt Lake:** Sambhar, Didwana, Pachbhadra, Lankasara in Rajasthan.

**Rock-Salt:** Mined at present in Mandi district Drang and Guna in Himachal Pradesh.

In terms of production Gujarat ranks followed by Tamil Nadu and Rajasthan.

### Kyanite

India has the largest reserves of Kyanite in the world. The distribution is as follows:

**Jharkhand:** A belt extending from Lapsa Buru to Kharasawan in Saraikela with the important mines at Lapsa-Buru, Ghagidih, Bachia- Bakro & Mauryaluka.

**Maharashtra:** Pahargaon & Pipalgaon in Sakohi Tehsil and Gorkha- Buranga and Asvalpain in Bhandara districts.

### Off-Shore Mineral Wealth

“Polymetallic Nodules”, rich in some metals like copper, cobalt, nickel, manganese, are located on the deep sea floor of the Indian Ocean especially on the Central Indian Ocean basin.

Indian Institute of Oceanography- Goa is the prime organisation to explore these metals. India has accorded “Pioneer Investor” status in deep sea bed exploration by the U.N. in 1982.

The International Seabed Authority registered India’s claim for deep seabed mining in August 1987 and allotted a site of 1.5 lakh sq. cm. for further exploration in the central Indian Ocean.

### Points to Remember

1. The occurrence of ore may be traced in Veins and Lodes, Beds and seams, weathering products and alluvial deposits.
2. A number of organisations such as the “Geological Survey of India”, Mineral Exploration Corporation Limited”, and Indian Bureau of Mines” are engaged in exploration and development of mineral resource.
3. The “Damodar Valley” in India has the largest concentration of mineral resources.
4. “Lignite” is chiefly found at Neyveli in Tamil Nadu.
5. Bihar has the largest coal reserve in the country; it is 37%, of the total coal reserve of India, West Bengal has 18% and Madhya Pradesh has 16 percent.
6. More than 33 percent of India’s iron ore production comes from Orissa especially from Keonjhar, Mayurbhanj and Bonai.
7. Jharkhand ranks second in iron-ore production and accounts for 27% of the total production of India.
8. India is the fifth largest producer of manganese in the world and in India; Madhya Pradesh occupies the top position with 97% of the total production of India.
9. The diamond mines in India are located Panna and Satna in Madhya Pradesh and Mirzapur district of U.P.
10. India is the largest producer of mica in the world. It accounts for about 67% of the global trade.



# INDUSTRIES IN INDIA

Levels of Industrialization best reflect the level of economic development in a country. Manufacturing is the main process by which industries convert primary goods into secondary products by means of value addition, which involves partial or complete transformation of the same. The location of industries is an important theme in geographical studies. It depends on both geographic and anthropogenic factors.

**Geographical Factors:** Raw material, Power, Labour, Transportation, Market, Site, Water Supply, Climate.

**Non-Geographical or Anthropogenic Factors:** Capital, Policies, Organization, Banking & Insurance.

**Another Set of Factors:** Agglomeration effect, Industrial inertia.

## Textile Industry

It includes cotton, jute, wool, silk & synthetic fibre textiles. Highest employment in manufacturing sector is found in textile industry (Cotton, Jute, Wool, Silk).

### A. Cotton Textiles

It is the most important industry in terms of employment and production of export goods. Although Maharashtra and Gujarat are the chief centres, other important states in this field are Tamil Nadu, West Bengal, Madhya Pradesh, Karnataka and Andhra Pradesh. Tamil Nadu has the largest number of cotton textile mills in India.

- Indian Cotton mills produce more yarn than woven clothes. More than 50% of yarn is spun from short and medium staples.
- Fine and super-fine yarns are produced in Mumbai, Ahmedabad and Delhi from imported long staple Egyptian and American varieties.
- In yarn production Maharashtra ranks first followed by Tamil Nadu and Gujarat.

- In terms of number of mills Tamil Nadu ranks first followed by Gujarat, Maharashtra, West Bengal, U.P., Karnataka and Andhra Pradesh.
- In India, 58% cloth is of medium variety, 36% of coarse variety and 6% of super fine variety.

**Maharashtra:** Mumbai (Cottonpolis of India), Sholapur, Pune, Nagpur, Jalgaon, Kolhapur, Akola, Dhulia, Wardha, Satara,

**Gujarat:** Ahmadabad (Manchester/Boston of India), Kalol, Rajkot, Navasari.

**Tamil Nadu:** Coimbatore, Chennai, Madurai, Tirunelveli, Tuticorin, Salem.

**U.P.:** Kanpur, Modinagar, Moradabad, Aligarh, Agra, Etawah, Hathras, Saharanpur, Bareilly, Varanasi.

**W. Bengal:** Kolkata, Howrah, 24-Pargana, Serampore.

**M.P.:** Gwalior, Indore, Mandsaur, Dewar.

**Karnataka:** Devanagiri, Hubli, Bellary, Gokak, Mysore, Bangalore.

### B. Jute Textile

India manufactures the largest quantity of jute goods in the world. Mainly located in West Bengal, followed by Andhra Pradesh, Bihar, U.P. and M.P.

India is the leading producer of jute products. First mill was established in 1854 at Rishra. There are at present 73 jute mills in India out of which West Bengal has 59 mills, Bihar 3 mills, Uttar Pradesh 3 mills, Andhra Pradesh 4 mills and Assam, Orissa, Tripura and Madhya Pradesh one each.

**West Bengal:** Titagarh, Jagatdal, Howrah, Ballygunj, Agarpara, Rishra, Serampore, Naihati

**Andhra Pradesh:** Chitvalshah, Nellimaralla, Eluru, Guntur, Ongole

**U.P.:** Kanpur, Shahjahanpur,

**Bihar:** Katihar, Muktapur

**M.P.:** Rajgarh.

### C. Silk Textile Industry

India ranks second after China in the field of silk production. There are four types of silk: Mulberry, Tasar, Eri and Muga. All the four Silk varieties are produced in India. Due to stiff competition from Italy and Japan the growth of Industry is very sluggish. India is also the second largest producer of Tasar after China. India has also a monopoly in Muga and Assam is the only producer. The first modern silk factory was established in 1932 at Howrah.

**Karnataka:** The state produces 52 per cent of the Silk cloths in India. It produces about 70% of nation output and only produces Mulberry. The main centres are Bangalore, Mysore, Kolar, Mandya, Tumkur, Belgaum and Coorg.

**W. Bengal:** Next important state, Bengal produces only 13 per cent. Mostly mulberry is produced. Production areas are Malda, Murshidabad, Virbhum, Bankura. Famous centres are Bishnerpur, Baswa, Raghunathpur, Chak-Islampur.

**Assam:** Third largest producer of non-mulberry silk and only Muga producing area.

Production centres-Goalpara, Kamrup, Nowgong.

**Jharkhand:** Mostly Tasar is produced. Production: Palamau, Ranchi, Hazaribagh.

**Bihar:** Bhagalpur.

**J&K:** Mostly Mulberry is produced. "Tabby"-white plain silk.

Production: Anantnag, Baramula, Doda, Jammu, Udhampur.

**Orissa:** Tasar producer. Varanasi and Mumbai are the main silk weaving center.

### D. Woolen Textile Industry

The modern woolen textile started with the establishment of 'Lai Imli' at Kanpur in 1876. It was followed by Dhariwal in 1888 & Mumbai in 1882. At present 625 big and small mills, 1,100 hosiery mills & 155 yarn spinning mills are running in India.

Punjab leads all other states in production. It alone has 42% of the mills of India. Dhariwal is the largest center in India. Others are Amritsar, Ludhiana & Kharer. Maharashtra is the Second largest producer of woolen textiles. Mumbai is the major center. Shahjahanpur, Mirzapur, Varanasi, apart from Kanpur are the major woolen textile centers. Jamnagar, Ahmedabad and Vadodara are important centres in Gujarat as per Panipat, Faridabad and Gurgaon in Haryana and Bikaner, Alwar, Bhilwara etc. in Rajasthan.

**Punjab:** Dhariwal, Amritsar, Ludhiana, Ferozepur (India largest trading centre of raw wool).

**Maharashtra:** Mumbai (India's largest centre)

**U.P.:** Kanpur, Mirzapur, Agra, Tanakpur.

**Gujarat:** Jamnagar, Baroda, Ahmedabad.

**Karnataka:** Bangalore.

**W. Bengal:** Kolkata.

**J&K:** Largest producer of handloom and power loom woolen goods including coarse tweeds, lohis, shawls, pattus.

**Rajasthan:** Pushkar and Ajmer produce handloom coarse blankets. Charu (Public sector mill)

### Sugar Industry

It ranks second amongst the major agro-based industries. India ranks first in both area and production if both Gur and Khandsari are included.

In sugarcane production U.P. ranks first followed by Maharashtra, Tamil Nadu, Karnataka and Andhra Pradesh.

In sugar production Maharashtra ranks first followed by U.P., Tamil Nadu, Karnataka and Gujarat.

In Gur production U.P. ranks first followed by Karnataka, Tamil Nadu and Andhra Pradesh.

Maharashtra contributes over one-third of country's sugar output (36 per cent) followed by Uttar Pradesh with 25%, Tamil Nadu and Karnataka are the other two important sugar producing states in the country. At Present, there are 465 installed sugar factories in the country (as against 138 during



1950-51) of these 244 are in co-operative sector. There has been record production of sugar during year 1999-2000, 182 lakh tonnes.

### Iron and Steel Industries

Iron & Steel industry is the basis of modern industrialization. It is the basic and core industry upon which many other industries survive. Per

capita consumption of iron & steel is a good measurement of Industrial development. For the first time in 1874 pig iron was produced successfully by Bengal Iron Works. The first modern iron & steel industry was established in 1830 at Porto Nova in Tamil Nadu. It proved to be an abortive attempt. The real beginning was made in 1907 at Sakchi (Jamshedpur) by opening the TISCO.

#### Iron & Steel Plants and Inputs Sources

Plants	Iron-Ore	Manganese	Limestone	Coal	Power
<b>TISCO</b> Jamshedpur (Singhbhum Distt) on Kharkai river	Gurumahisani (Mayurbhanj) Noamundi (Singhbhum)	Joda (Keonjhar) Noamundi	Sundergarh, Birmitrapur	Jharia, West Bokaro coalfield	DVC
<b>IISCO</b> Burnpur, Hirapur, Kulti	Gurumahisani, Gua, Chiria	Keonjhar	Birmitrapur	Raniganj, Jharia	DVC
<b>VISL</b> (Shimoga dist, Karnataka)	Kemangundi area (Chikmanglur dist.)	Local	Bhundi Guda	Use of electric Furnace due to lack of coal	Sharavati HEP, Mahatma Gandhi HEP.
<b>HSL</b> Rourkela (on Brahmani River)	Sundergarh, Keonjhar	Barajamada	Purnapani; Birmitrapur	Bokaro, Jharia, Talcher, Korba	Hirakud HEP
<b>HSL</b> Bhilai (Durg)	Dalli-Rajhara	Balaghat, Bhandara	Nandini	Korba and Kargali	Korba Thermal Power
<b>HSL</b> Durgapur (on Damodar river bank)	Bolani, Gua	Keonjhar	Birmitrapur, Hathibari	Jharia, Raniganj	DVC
<b>BSL</b> Bokaro (on the confluence of Bokaro & Damodar)	Kiriburu	Barajamada	Palamau Birmitrapur	Jharia, Kargali	DVC
<b>Salem</b>	Locally	-	-	Neyveli	HEP
<b>Vishakhapatnam</b>	Bailadila	Balaghat	Nandini	Damodar Valley & Imported	
<b>Vijayanagar</b> (Bellary dist, Karnataka)	Bababudan Hills			Kanhan valley Singareni (A.P.)	Tungbhadra HEP

**Locational Factors:** Since this industry used heavy, weight losing & huge quantity of raw material, the localization is primarily controlled by the availability of raw materials. Therefore, they are either located near the coalfields or iron ore mining areas or at the mean distance from

the two. For example, the industries located in Jharkhand, Chhattisgarh, West Bengal and Orissa. A new trend of localization near ports has been set up by the installation of Vijay Nagar Plant and Vishakhapatnam Plant in A.P. for export proposes.

### Aluminium Smelting

It is next only to I & S in terms of usefulness in the modern industries. About 50% of the total

Aluminum in India is consumed in the generation & distribution of electricity. The other important requirements are utensils and domestic wares (20%), transport (12%), Packaging (8%).

#### Aluminium Smelting Plants & Their Input Sources

Plants	Bauxite	Power
1. Korba (Bharat Al. Co. Ltd, BALCO) Bilaspur Distt., Chhattisgarh	Amarkantak Plateau (Shahdol Dist)	Korba Thermal Power
2. Renukoot (Hindustan Al. Co. Ltd., HINDALCO) Mirzapur dist.- W. Bengal	Plateau	Amarkantak Own
3. Belgaum (Indian Al. Co. Ltd., INDALCO) Karnataka	Chandgad (Kolhapur Dist)	Sharavati HEP.
4. Mehur (Madras Al. co. Ltd.)	Shevaroy Hills	Mettur HEP
5. Ratnagiri (Bharat Al. Co. Ltd.) Maharashtra	Kolaba, Kolhapur, Satara	Koyna HEP
6. Damanjodi and Angul (National Al. Co. Ltd, NALCO) Orissa	Pachpatmali	Captive thermal power Plant
7. Hirakud (Indian Al. Co. Ltd.) Orissa		
8. Alwaye (Indian Al. Co. Ltd.)		

Both these plants (Hirakud and Alwaye) convert alumina into Aluminium metal. Alumina is produced at Muri from bauxite available at Bagaru Hills.

**Locational factors:** Production of one tonne of Aluminum requires 18,573 KWh of electricity. Thus 40% of the production cost goes to Electricity alone. Thus, electricity & occurrence of Bauxite determine the location of an Aluminum Plant. Indian Aluminum Company was started in 1938 and Aluminum corporation of India in 1937 as a public limited company. Its plant started functioning in 1942 at Jaykaynagar in West Bengal. INDAL (Indian Aluminum Company Limited) set up its plant in Alappuzha (Kerala). During Second Plan, Hirakud in Orissa & Renukut in UP were installed by INDAL and HINDALCO; at Korba by BALCO in 1965 and also at Ratnagiri.

### Copper Smelting

Indian Copper Corp. was set up in 1924. And First Plant was set up at Ghatsila in Singhbhum Jharkhand). Hindustan Copper Limited came into being in 1967 & took over Indian Copper Corp in 1972. At present only two centers, Maubhandar (Ghatsila) & Khetri, (Jhunjhunu) are working.

HCL (Hindustan Copper Ltd.) set up in 1967 is only responsible organisation for the

exploration and production of copper metal in the country. At present it controls the following plants:

**Khetri Copper Complex:** Khetri (Rajasthan): Ore from Khetri, Kolihan, Chandmari, Dariba and Khetri-Singhana area. **Indian Copper Complex:** Ghatsila (Singhbhum district of Jharkhand): Ore from Musabani, Rakha, Dhobani-Rajdah, Tambapahar, Tumardih mines.

**Malanjkhand Copper Project**

**Rakha Copper Project:** Singhbhum

**Dariba copper Project:** Alwar (Rajasthan)

**Chandmari Copper Project:** Jhunjhunu (Rajasthan)

**Agnigundala Copper Project** (Andhra Pradesh).

**Taloja Copper Project** (Maharashtra).

### Lead & Zinc Smelting

The first lead smelting plant was set up at Tundao near Dhanbad in Jharkhand. Hindustan

Zinc limited overtook it in 1965. HZL has setup a plant at Vizag also. The main ore region lies in Rajasthan at Zawar and Rajpur-Dariba. There are four Zinc smelters in the country at Alwaye (Kerala), Debari & Chanderia (in Rajasthan) and Vizag (Andhra Pradesh).

Lead smelting is controlled by Hindustan Zinc Ltd. (HZL) in India. The plants are:

1. **Tundoo (Dhanbad in Jharkhand):** Ores are collected from Zawar and Rajpur-Dariba
2. **Visakhapatnam (Andhra Pradesh):** Ores from Agnigundala.
3. **Chanderiya (Rajasthan):** Ores are locally available.

The main zinc smelting plants in India are:

1. **Alwaye (Kerala):** Based on imported supplies. The H<sub>2</sub>SO<sub>4</sub> as a byproduct is supplied to the FACT.
2. **Debari (Rajasthan):** Depend upon imported zinc concentrates and ores from Rajpur-Dariba mines.
3. **Visakhapatnam (Andhra Pradesh):** Ores from Agnigundala area.
4. **Chanderiya (Rajasthan).**

### Engineering Industry

Heavy Engineering Corporation, Ranchi produces manufacturing equipments. The Mining and Allied Machinery Cooperation is at Durgapur. The Bharat Heavy plates and vessels Ltd is at Visakhapatnam. The Bharat pumps and compressors Ltd. is at Allahabad. Hindustan Machine Tools with headquarters at Bangalore has factories at Pinjore (Haryana), Kalamassery (Kerala), Hyderabad and Sri Nagar (Zainakut). The Bharat Heavy Electrical Limited has manufacturing plants at Bhopal, Trichy, Hyderabad, Hardwar, Panipat, Bangalore and Jagdishpur.

### Machine Tools

Machine tool industry is also a core industry upon which engineering industries flourish. The manufacturing started in 1932 with the advent of

Kirloskar Brothers Limited. HMT (Hindustan Machine Tools) is the first large scale modern machine tool factory setup in Public Sector at Bangalore in 1953, with collaboration of Switzerland. The units are located at Bangalore, Hyderabad, Srinagar, Ajmer and in the state of Punjab. The Heavy Machine tools plant at Ranchi was started in 1966. Praga Tools limited at Secunderabad is mainly meant for defense equipments. Jadhavpur Unit (Calcutta) produces precision instrument.

**Bangalore:** First modern factory with Swiss assistance (1950); HMT unit I & II

**Pinjore:** HMT unit III (1963)

**Kalamassery (Kerala):** HMT unit IV (1964)

**Hyderabad:** HMT unit V (1965)

**Ajmer:** Grinding machine tools; HMT unit-VI  
Secunderabad

**Ranchi:** Heavy Engineering Equipment.

### Rail-Locomotive

**Chittaranjan:** Steam locomotive for broad gauge and electrical locomotives.

**Tatanagar:** Metre gauge steam locomotives.

**Varanasi:** Diesel & Electrical locomotives.

**Bhilai:** Rail and sleeper cars.

**Perambur & Bangalore:** Rail coaches.

**West Bengal:** Produces about 60% of total wagons of India.

### Ship-Building & Repairing

Vishakhapatnam: First in ship building in India.

Garden Rich (Kolkata)

Mazgaon Dock (Mumbai)

Kidderpore Dock (Kolkata)

Cochin Dock

### Automobiles

The process started with General Motor Ltd. in 1928 at Mumbai, Ford Motors at Chennai in 1930, Premier Automobiles Limited at Kurla (Mumbai), Hindustan Motor Ltd. at Uttarapura

(Calcutta), Motor cycles at Faridabad & Mysore.  
Scooter - Lucknow, Catura, Akurdi (Pune)  
Maruti - Gurgaon (Haryana),  
Bombay, Chennai, Jamshedpur, Kolkata.  
Jabalpur - Military vehicles

### Air Craft

HAL- Bangalore

Kanpur- Transport aircraft building

MIG aircraft engines are made at Koraput, air frames at Nasik and aircraft electronics at Hyderabad.

### Heavy Electrical Equipment

Bhopal - Electric motors, turbines-generators and gears.

Ranipur (Hardwar)-Water turbine, generators and motors.

Hyderabad-Steam turbines and turbo-alternators

Tiruchchirappalli & Durgapur- High pressure Boiler of Thermal Power Plants.

Ramchandrapuram: Heavy Power Equipments.

Naini

Patiala.

### Cement Industry

Tamil Nadu, Madhya Pradesh, Bihar, Gujarat Karnataka, Andhra Pradesh and Rajasthan etc

The first successful plant was setup in Porbandar in 1914.

Raw materials: Limestone, coal, gypsum- are weight losing. So this industry is preferred in the raw material source region.

State wise some important plants are as follows:-

**M.P. (including Chhattisgarh):** Jamul, Satna, Katni, Bandhor, Durg, Neemach.

**Andhra Pradesh:** Vijaywada, Karimnagar, Cementnagar, Krishna, Adilabad.

**Rajasthan:** Lakheri, Sawai-Madhopur, Chittorgarh, Udaipur.

**Karnataka:** Shahabad, Wadi, Kurkunta, Bagalkot, Bhadravati.

**Tamil Nadu:** Talaiyathu, Anangulam, Talukkapatti, Dalmiapuram, Madukkari, Poliyur.

**Gujarat:** Ranavar, Sikka, Sewree, Ahmadabad, Dwarka, Porbandar.

**Jharkhand:** Sindri, Khalaria, Bhavnathpur, Japla, Dalmianagar, Chaibasa.

**Orissa:** Rajgangpur, Bargarh.

**U.P.:** Churk, Dalla.

**Punjab:** Bhupendre.

**Maharashtra:** Chandrapur.

**West Bengal:** Durgapur, Purulia, Bhatar, Asansol

**Himachal Pradesh:** Samloti, Rajban

At Present there are 133 large plants with an installed capacity of about 108 million tones. In addition there are 310 mini cement plants with an estimated capacity of 9 million tonnes. The total operative installed capacity is estimated to be around 109.56 million tonnes. Madhya Pradesh has the largest number of big plants (23 plants) followed by Andhra Pradesh (19 plants), Rajasthan (15 plants) and Gujarat (13 plants). During 1950-51, total cement production was only 2.7 million tonnes, which went upto 100.2 million tonnes in 1999-2000. Madhya Pradesh gives the maximum contribution in cement production of the country.

### Pharmaceuticals & Drugs

Antibiotics are produced at Pimpri and Rishikesh. The Indian Drugs and Pharmaceuticals Ltd. has 5 plants at Hyderabad, Rishikesh, Madras, Gurgaon and Muzaffarpur. A number of other units are concentrated in Bombay, Baroda, Delhi, Calcutta and Kanpur.

**Antibiotic plant-Rishikesh:** Penicillin, Streptomycin

**Synthetic Drug Plant-Hyderabad:** Analgesics, Anti-T.B. drugs, Vitamins.

**Surgical Instrument Plants:** Chennai

**Hindustan Antibiotics Ltd:** Pimpri (Pune)

**Hindustan Organic Chemical Ltd.:** Rasayani (Maharashtra).

**Hindustan Insecticides Ltd.:** N. Delhi: It produces DDT.

**Hindustan Insecticides Ltd Alwaye:** produces BHC.

### Paper Industry

It is a forest based industry. Most of the paper production units are in West Bengal, Andhra Pradesh, Orissa, Maharashtra, Karnataka, Madhya Pradesh and Bihar,. The National Newsprint and Paper Mills Ltd is located in Nepanagar (M.P.)

The first successful modern paper mill was established in 1870 at Ballygunj (West Bengal).

Newsprint Units: National News Print & paper Mill-Nepanagar, Hindustan Paper Corp Vellore, Mysore paper mill-Bhadravati.

Out of total output the share of printing & writing paper is of 57%, wrapping paper-22%, paper board- 16%, Newsprint-6%, other-4%

**W. Bengal:** Titagarh, Raniganj, Naihati, Chandrahati, Calcutta, Baranagar, Bansberia.

**Maharashtra:** Ballarpur, Kalyan, Khopoli, Roha, Chinchwad, Kamptee, Pravara Nagar, Sangli

**Andhra Pradesh.:** Rajahmundry, Sirpur, Bhadrachalam.

**Orissa:** Brajrajnagar, Rayagada, Chowdwar.

**Karnataka:** Dandeli, Bhadravati, Belagulla, Nanjangud, Ramangaram.

**M.P.:** Amlai, Bhopal, Indore, Sehore, Hoshangabad, Nepanagar.

**Bihar:** Dalmianagar, Rameshwarnagar, Samastipur,

**U.P.:**Saharanpur, Basantnagar, Aghawanpur, Lucknow, Ujhani.

**Haryana:** Faridabad, Yamunanagar.

**T.N.:** Tambaram, Pallipalayam, Charanmahadevi, Udumalpet.

**Gujarat:** Barejadi, Khadki, Utran, Vapi, Marai, Gondal, Udvarda, Barla,

**Kerala:** Punalur, Kozhikode

**Assam:** Nowgong, Cachar.

Production wise W. Bengal holds the first position followed by Maharashtra, Andhra Pradesh, Orissa, Karnataka.

At present there are about 515 paper mills (including mills producing newsprint) in the country with an annual installed capacity of around 49 lakh tonnes. During 1999-2000 total production of paper and paper board was 34.59 lakh tonnes.

### Fertilizers

The first public sector fertilizer factory was established at Sindri (Bihar) in 1951. The Fertilizer Corporation of India has four units at Sindri, Gorakhpur, (U.P.), Talcher (Orissa) and Ramagundam. The National Fertilizer Ltd. has units at Nangal, Bhatinda and Panipat. Tamil Nadu, Uttar Pradesh, Gujarat, Kerala and Andhra Pradesh lead in the production of fertilizers.

IFFCO in co-operative sector has set up its units at Kalol, Kandla and Phulpur.

Tata fertilizer complex has set its units of Okhamandal in Gujarat.

Units under the Ministry of Mines are of Rourkela, Neyveli and Khetri.

Units under the National Fertilizer Ltd. are at Durgapur, Barauni, Namrup and Trombay-V

Gas based plants on HBJ Pipeline: Vijaipur, Aonla, Hazira, Jagdispur, Godepan and Dabrala.

India produces 81% nitrogenous fertilizer and 19% phosphatic fertilizer, at present. Phosphatic fertilizer demands are almost fulfilled by import.

As per the nitrogenous fertilizer production is concerned, Gujarat stands first followed by U.P., Tamil Nadu, Punjab, Maharashtra, Bihar, Kerala and Haryana.

In the production of phosphatic fertilizer also, Gujarat stands first followed by Tamil Nadu, Maharashtra, Andhra Pradesh and Kerala.

### Glass Industry

**U.P.:** Firozabad (for Bangles), Bahjoi, Hathras, Naini, Shikohabad.

**Maharashtra:** Mumbai, Telegaon, Pune, Sitarampur, Raniganj, Kolkata, Asansol, Durgapur.

**Bihar:** Bhadaninagar, Kandra.

**Gujarat:** Vallabh Vidyanagar.

**Tamil Nadu:** Tiruvottiyar

**Karnataka:** Belgaum

### Ceramics

The first factory was established at Patharghatta (Jharkhand) in 1860.

**Kolkata & Bangalore:** Crockery, Insulators.

**Gwalior, Delhi Jaipur, Bangalore, Mumbai** : Earthenware, Sanitary-ware, Drain-pipes.

**Wankaner, Nazarbagh, Thangarh:** Crockery, Tiles, Sanitary-ware, stone-ware.

**Ranipet (Tamil Nadu):** Acid jar.

**Travancore (Kerala):** Crockery

**Rupnarayanpur, Jabalpur:** Stone-ware, Pipes, Chemical stoneware.

### Leather Industry

First unit was established in Kanpur in 1860 using vegetable tanning process. Being the holder of a large number of cattle, India has always been a big producer of leather goods.

West Bengal and Tamil Nadu are leading producer of cattle hides. Tamil Nadu is also a big producer of buffalo hides and sheep hides. U.P. is the leading producer of goat skins.

**Tamil Centres:** Kanpur, Chennai, Kolkata, Tonk, Mumbai. Tamil Nadu as the largest concentration of leather tanning units.

**Footwear manufacturing centres:** Kanpur, Agra, Chennai, Kolkata, Faridabad, Lucknow, Jaipur, Mumbai and Kolhapur.

State wise in the production of chrome tanned hides West Bengal is at the top followed by Tamil Nadu and U.P.

In the production of vegetable tanned hides U.P. ranks first followed by the West Bengal, Tamil Nadu and Maharashtra.

### Rubber Industry

The first synthetic rubber factory was established at Bareilly in 1955. Automobile tyre and tubes accounts 75% of consumption of natural rubber.

**Synthetic rubber Unit :** Bareilly, Baroda

**Reclaimed Rubber Unit :** Mumbai, Ahmedabad, Amritsar.

### Match Industry

Box wood: Pipita, Dhup, Didu, Bakota-form Andaman & Nicobar; Mango, Samel, Salai-from Peninsular India.

**T.N.** is the top producer (28%) with main centres at Sivakasi, Sattur, Kovilpatti.

**Kerala:** Shore 18% of production with main centres at Trichur, Parampavar,

### Points to Remember

1. The process of coal formation consists of these stage of its formation; peat—Lignite—Bituminous—Anthracite.
2. Gems and Jewellery comes under the small scale and cottage industry.
3. The first modern paper mill of the coun try was set up in "Serampur" in West Bengal.
4. Synclines trap oil in the absence of water.
5. It is the method of "hydrogenation" through which crude oil may be ob tained from the coal.
6. Kaolin or China clay is a fine clay formed by the alteration of granite by metamorphism.
7. The "cotton textile" industry in India provides the largest employment in India.
8. "Kimberlitic Pipe Rock" is the source rock for diamond.
9. Tungsten is a heavy metal with a melting point higher than any other metal.
10. "Sulinda in Orissa" is known for "chromite" deposits.

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| <p>11. "Sillimanite" deposit is common in Meghalaya.</p> <p>12. "Kyanite Deposits" are commonly found in Bihar.</p> <p>13. "Jadugoda" mine in Jharkhand is known for uranium deposits.</p> <p>14. India is world's leading producer of "sheet mica".</p> <p>15. Bauxite deposits are mostly associated with "laterites".</p> <p>16. "Panna" of Madhya Pradesh is famous for "diamond".</p> <p>17. "Beryllium" is mostly used as moderator in nuclear power generation.</p> | <p>18. "Thorium" is processed from "monazite".</p> <p>19. Ramgiri Gold-field is in the state of "Andhra Pradesh".</p> <p>20. "Neyveli" in TamilNadu is famous for "lignite deposits".</p> <p>21. "Sphalerite" is a common mineral ore of "Zinc".</p> <p>22. The collaborated steel plant in India are;<br/>Durgapur (Indo-British),<br/>Rourkela (Indo-German),<br/>Bhilai (Indo-Russia) and<br/>Bokaro (Indo-Russia).</p> |
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Energy consumption in a country is a good indicator of its development. It is said that the wheel of progress moves fast with the flow of energy.

### COAL

It is an inflammable organic substance composed mainly of hydrocarbons, found in the form of sedimentary rocks, which could be used as a fuel to supply heat or light or both.

It constitutes about 60% of total commercial energy consumed. The power sector and industries account for 94% of its total consumption.

It is called black gold for its high utility.

In India the coal bearing strata have been classified under two main categories:-

- **Gondwana Coal Field**

About 98 % of Indian coal reserves are confined to Gondwana.

There are more than 74 basins mostly in the Peninsular India. These basins are in the river valleys like Damodar, Son, Mahanadi, Brahmani, Wardha, Godavari, Indravati, Koel, Narmada, Panch, etc.

Gondwana coal is said to be about 250 million years old.

This coal is both coking as well as non-coking with low sulphur content. It is bituminous to sub-bituminous types and free of moisture. In general this coal is good steam or gas coal.

Gondwana coal of Jharia in Jharkhand is the "store house of metallurgical coal in India".

This coal bearing "domuda" rocks are also found along the foothills of Himalayas in eastern and north-eastern part and in north Bengal.

- **Tertiary Coalfields**

It is associated with marine deposits to limestones, which were formed during Lower and Middle Eocene, about 15 to 60 million years ago.

It is primarily confined to extra-peninsular India. They occur in part of Assam, Meghalaya, Nagaland, Arunachal Pradesh, Darjeeling, Pondicherry, Kerala, Tamil Nadu, Kashmir, U.P. and Rajasthan.

All tertiary coal generally have high sulphur percentage.

- **Lignite Coal Reserves**

**J&K:** Kashmir valley

**Tamil Nadu:** Neyveli, Karaikudi, Kulattur.

**Rajasthan:** Raithan, Lanyalab-basin, Hondwara, Nichaham.

### COAL CLASSIFICATION

#### I. Low Volatile Coal

Generally known as coking coal with low % of volatile matter, low moisture content and ash content upto 24%, they have good coking properties suitable for manufacturing of hard coke required for metallurgical purpose. About 98% of metallurgical coal is available from Jharkhand and West Bengal.

**(a) Primary Coking coal:** It directly produces hard coke for blast furnace and steel melting furnace. It is found only in Jharia coal field of Jharkhand.

**(b) Medium Coking coal:** Used in matching blends with Prime Coking coal. It is found in Raniganj, Jharia, East and west Bokaro, Ramgarh, Karnapura and Kanhan valley.

**(c) Semi to weak Coking Coal:** Used in matching blends with above two types. It is found in Dishergarh, Sanctoria and Hatral, Ponitai and Sonhat coal field.

#### II. High Volatile Coal

It has volatile matter above 30%, high moisture of 10%. It is free burning coal, suitable for steam-raising, commonly known as non-coking coal. They are used in industries for general heating,



in steam raising in thermal power generation, in steam locomotive, steam ships, brick-burning, in chemical industries and as domestic fuel.

The total known geological reserves of all types of coal in Gondwana and tertiary coalfields stands estimated at 208.75 billion tonnes as on January 1, 1999. The reserves of lignite have been estimated at a little over 29.36 billion tonnes out of which the major contributor is the lignite basins of Tamil Nadu.

During 1999-2000, the productions of coal and lignite are estimated to be about 296 million tonnes and 21 million tonnes respectively.

### Thermal Energy

It has a special significance in areas where geographical conditions are not favourable for hydroelectricity. In states of Assam, Jharkhand, Gujarat, Mizoram and West Bengal it accounts for over 90% of installed capacity. Some of the major thermal power plants are:

State	Location of Plant
Andhra Pradesh	Ramagundam Rayalseema
Bihar	Kahalgaon
Chhattisgarh	Korba Sipat Raigarh
Gujarat	Dhuvaran
Karnataka	Bellary
Madhya Pradesh	Vindhyachal Satpura Amarkantak Birsinghpur
Maharashtra	Parli Paras Dabhol
Nagaland	Dimapur
Orissa	Talcher Ib Valley Thermal Power Station
Rajasthan	Girai Dholpur
Tamilnadu	Neyveli
Tripura	Rokhia
Uttar Pradesh	Obra Harduaganj Rihand Singrauli Parichha Unchahar
West Bengal	Farakka Mejia Chandra- pura Sagardighi Santhal- dih Durgapur

### Mineral-Oil

#### Petroleum

Petroleum is an inflammable liquid obtained from sedimentary formations. It is primarily made of hydrocarbon which exists to the amount of 90-95% -and other organic compounds containing oxygen, sulphur, nitrogen and sulphur.

#### Petroleum Production in India

Year	Production of crude oil
2004-05	33.98 million tonnes
2005-06	32.19 million tonnes
2006-07	33.99 million tonnes
2007-08	22.69 million tonnes

State/Area	Production (metric tonnes)
Bombay High	20.1
Gujarat	6.2
Assam	4.7
Tamil Nadu	0.3

State/Area	Percentage of Production
Mumbai High	79.73
Gujarat	10.70
Assam	7.59
Tamil Nadu	1.33
Tripura	0.65

The modern petro-chemical industries, cement and fertilizer industries and locomotive all so heavily depend on this mineral liquid that possession of oil-wells alone makes a country or a region economically well off. Petroleum is always found in pre-existing shallow basins or geosynclines characterized by marine life sedimentation and subduction.

In India most of the petroleum occurrences are associated with anticlines and faults traps in the rocks formation of Tertiary times. However most of the areas in India are of Pre-Cambrian age which is regarded as highly unfavourable regions for oil-field.

Major Petro-rocks area in India can be identified as:

**(1) Upper Assam Basin:** Brahmaputra valley including the whole North East.

**(2) West Bengal Basin:** Sunderban and coastal Orissa.

**(3) Western Himalayan Basin:** Lesser and Sub-Himalayan area of Punjab, Haryana, J&K and Arunachal Pradesh.

**(4) Rajasthan-Saurashtra-Kutch Basin:** West of Aravalli

**(5) Northern Gujarat Basin & Southern Gujarat Basin.**

**(6) Ganga Valley Basin:** U.P. and Bihar.

**(7) Coastal Tamil Nadu, Andhra Pradesh & Kerala:** Mahanadi, Godavari, Cauvery & Krishna deltas.

**(8) Andaman and Nicobar Coastal region.**

**Main production area:** Assam-Arakan region, Cambay basin of Gujarat.

In Cambay region oil was discovered in Bombay High in 1974 and in R-12, B-37, B-38 and N-Bassein recently.

Region wise 59% of reserves are localized in the western part including Gujarat and West coast off shore. About 38% reserve is located in the eastern part including Assam-Arakan belt, W.Bengal, East coast and the off-shore area in Bay of Bengal. About 3% reserve is concentrated in the northern part.

### Distribution

**Assam:** Valley of Navo, Dihing and Burhi Dihing rivers in Lakhimpur and Sibsagar districts. Oil Wells: Digboi, Hugrijan, Moran, Naharkatiya, Sibsagar, Rudrasagar, Badarpur, Lakwa.

**Tripura:** Manu, Ampii-Bazar, Amarapur-Dombura.

**Arunachal Pradesh:** Manabhum, Kharsang, Charalia.

**Gujarat:** Baroda, Broach, Kheda, Mehsana and Surat districts.

**Oil Wells:** Ankleshwar, Kalol, Mehsana, Nawagam, Sanand, Kathna, Indore, Balol, Santhol.

**Bombay High:** Discovered in 1974 by ONGC, 176 km. North west of Bombay on the continental

self; the structure being referred to as the Bombay High and Bassein

**Rajasthan:** Ramgarh, Kharotar, Sumer-Ki-Tali, Ghotaru.

### Oil -Refineries

1. Digboi (AOC, 1901): India's first refinery; Crude oil from Naharkatiya & Moran.
2. Trombay (B.P. 1955): Crude from Ankleshwar and Iranian import.
3. Trombay (H.P. 1954):
4. Visakhapatnam (HP, 1957): Imported crude oil.
5. Nunmati (IOC): Crude oil from Naharkatiya & Moran.
6. Barauni (IOC, 1964): Crude oil from Hugrijan, Moran & Naharkatiya.
7. Cochin (Cochin Ref. Ltd.): First in joint sector but now nationalized.
8. Koyali (IOC, 1965): Crude oil from Ankleshwar and Northern Gujarat field.
9. Madras (Madras Ref Ltd. 1969): Set up with US collaboration.
10. Haldia: With French and Romanian collaboration; Crude oil from Iran.
11. Bongaigaon (IOC): Refinery cum petrochemical complex.
12. Mathura (IOC): Crude oil from Bombay High and abroad.
13. Karnal: Newly set up.
14. Mangalore: Newly set up.
15. Paradeep: It has been decided to set up on Oil Refinery at Paradeep, situated at the eastern coast of Orissa. The infrastructure work for this refinery has already been started. The expected cost of this refinery is about Rs. 4,000 crore. Paradeep Oil Refinery will be set up as a joint enterprise of India Oil Corporation and Petroleum Corporation of Kuwait (KNPC).

### Natural Gas

Almost all mineral oil fields are associated with natural gas too. Ankleshwar and Cambay fields are the main producers besides the new source of the Bombay-High.

## Occurrences

**Assam:** Naharkatiya, Moran.

**Arunachal Pradesh:** Nom-Chick, Mioa-Pung, Laptong-Pung.

**Tripura:** Branura range, Atharnure range.

**Himachal Pradesh:** Jwalamukhi, Kangra, Dunera.

**Punjab:** Ferozepur (Zirka village)

**West Bengal:** Maradpur area

**Gujarat:** Jagatai, Gogha.

**Rajasthan:** Barmer, Charaswala.

**Tamil Nadu:** Mangamadam, Avadi, Virugambakam.

Natural gas production in 1999-2000 was 28.45 bcm which is 3.7% higher than 27.43 bcm produced in 1999-99.

## Nuclear Energy

Nuclear Energy is obtained from uranium and thorium. Uranium is available in copper belt of Jharkhand and the rocks of Aravali range and Monazite sands of Kerala. Nuclear power contributes 2.9% of total power generation. Most of the nuclear power plants in India have been constructed near sources of water because it is required in great quantity for cooling purpose.

### Important Nuclear power plant:

Tarapur	Maharashtra
Kalpakkam	Tamil Nadu
Kota	Rajasthan
Narora	Uttar Pradesh
Kakrapar	Gujarat
Rawatbhata	Rajasthan
Kaiga	Karnataka
Kudankulam	Tamil Nadu

## NUCLEAR MINERALS

### • Thorium

**Ore:** Thorianite

Monazite deposits of commercial value are found in about 116 km. between Cape Comorin and Quilon in Kerala.

India has the largest reserve of Monazite in the world.

### • Uranium

**Ore:** Pitchblende, Uranite.

**Occurrence:** Jharkhand (Jadugoda mines of Singhbhum district), Rajasthan (Bisundi in Ajmer and Umra in Udaipur), Andhra Pradesh (Sankara mines of Nellore).

### • Zirconium & Ilmenite

Its deposit has been found in the beach sand of Kerala coast.

Minerals can be classified under three categories:

1. **Fuel Minerals:** Coal, Lignite, Petroleum and Natural gas.
2. **Metallic Minerals:** Iron, copper, gold, bauxite, Chromite etc.
3. **Non-Metallic Minerals:** Lime stone, magnesite and dolomite.

According to the Geological Survey of India, there are 50% important minerals occurring in 400 major sites in the different parts of the country.

## Renewable Energy Resources

### A. Hydro Electricity

Hydro electricity is a renewable, cheap, clean and environmentally benign source of energy. India has huge potential of over 84,000 MW but only a small percentage of the total is developed. This is due to certain geographical factors as well as because of developing stage of economy.

Most of the river regimes in India are extremely erratic because they are fed by monsoon winds which are highly seasonal and whimsical. Moreover, many rivers do not have natural waterfall and huge capital have to be invested for constructing dam. Most of the sites suitable for generating hydro electricity are located away from the consuming centre as a result of which a lot of energy is wasted.

Some of the states more dependent on hydroelectricity are:

State/Area	Percentage of dependence
Kerala	100
Himachal Pradesh	99.3

Meghalaya	96.4
Sikkim	90.0
Karnataka	79.0
Orissa	72.0

### Important Hydroelectricity Power Projects

**Andhra Pradesh:** Nagarjuna Sagar, Srisailem, Polavaram;

**Karnataka:** Jog fall on Sharavati River, Sivasamudram and Krishnaraja Sagar

**Tamil Nadu:** Mettur, Pykara, Papanasam, Periyar, Kodayar

**Punjab:** Bhakra dam on Sutlej, Pong dam on Beas

**Uttar Pradesh:** Sarda power project near Indo-Nepal border Matatila on Betwa river

**Kerala:** Idukki, Kuttiya, Sabarigiri, Sholayar, Periyar and pallivasal

**Maharashtra:** Lonavala, Koyna, Purna and Vaitarna

**Orissa:** Hirakud, Bhimkud, Balimela

**Himachal Pradesh:** Mandi Project, Pandoh Project on River Beas

**Jammu & Kashmir:** Chenab, Sind, Jhelum and Salal.

### B. Solar Energy

Photo-Voltaic technology converts sunlight directly into electricity. Being a tropical nation, India has great potential for generation of solar energy. It is predicted that Thar Desert could earn the distinction of being the biggest solar power house of world by year 2010. The first two projects of 100KW each have been installed at Kalyanpur in Aligarh and Sarai Saadi in Mau district. World's largest solar pond is at Madhopur, near Bhuj, Kuchchh in an area of 60,000 sq m providing 80000 litres of hot water to 70°C.

### C. Wind Energy

India has vast wind energy potential and wind farms have emerged as a viable option with the advancement of wind technology. The first wind farms in India were installed in 1986, in coastal areas of Tamilnadu. Asia's largest wind farm cluster of 150MW is located at Muppandal in Tamil Nadu Another wind farm of 28MW is located at Lamba in Gujarat.

### D. Geothermal Energy

In India, there are about 340 hot spring localities. A 5kw geothermal plant has been commissioned at Manikaran in Kullu district in Himachal Pradesh. A Potential of 4-5 MW geothermal power has been estimated in Puga valley of Ladakh in J & K.

### E. Tidal Energy

India is estimated to possess 8000-9000 MW of tidal Energy Potential. The Gulf of Khambhat is the best suited with 7000 MW potential. This followed by Gulf of Kuchchh (1000 MW) and Sunderban (100 MW).

### F. Wave Energy

Wave energy potential in India is estimated at about 40,000 MW. A wave energy power plant of 150 kw has been installed at Vizhingam near Thiruvananthapuram. Another 1 MW wave energy plant is being set up in the Andaman and Nicobar Islands.

### Points to Remember

1. In India, the 60 percent of the total energy is produced by coal.
2. India is the fourth largest coal producing country in the world.
3. The total estimated coal reserve in India is about 2, 14,000 million tonnes.
4. Of the total coal production in India, 2/3rds is consumed for electric power, about 10 percent for making iron and steel and 4 percent in cement industry.
5. Bihar and Jharkhand are the leading coal producers of the "bituminous type".
6. Raniganj coal field of West Bengal produces good quality bituminous coal.
7. The largest minerals oil deposits of India are found in the off-shore sea near Mumbai.
8. Some of the important mineral oil producing area are; Digboi, Naharkatiya, Rudrasagar and Nunmati.
9. There are 12 oil refineries in India which are located along the coast.

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| <p>10. India imports 70% of the mineral oil in order to meet her requirement.</p> <p>11. Petroleum is a type of mineral oil which is obtained from the "Sedimentary Rocks".</p> <p>12. The total oil reserves of India are 4,000 million tonnes and only <math>\frac{1}{4}</math> of this is exploitable.</p> <p>13. The total crude petroleum production in India is about 33 million tonnes, the 63% of which produced from the Mumbai High, 18 percent from Gujarat and 16 percent from Assam.</p> <p>14. "Digboi, Naharkatiya and Morangrijan" are important oil fields of Assam.</p> <p>15. At present, the demand of petroleum is about 102 million tonnes per year which is expected to increase 145 million tonnes by 2007.</p> <p>16. About 50 million tonnes of petroleum and petroleum products are imported at present.</p> | <p>17. In terms of natural gas, Andaman reserves alone have 47.6 million cubic metre of natural gas.</p> <p>18. India produces about 27,860 million cubic metres of gas per year and the three-fourth of the production comes from Mumbai High.</p> <p>19. The production of natural gas in 2000-01 was 29.477 billion cubic metres.</p> <p>20. The transportation, marketing and processing of natural gas is done by the "Gas Authority of India" Ltd (GAIL).</p> <p>21. At the current rate of consumption, India's known reserve of oil will last for about 30-40 years.</p> <p>22. Transport sector consumed about 50 percent of the total production of petroleum.</p> <p>23. The "Paraffin-Base oil" consists of high percentage of the lighter hydro carbon such as methane and gives products like petrol, paraffin and high grade lubricating oil.</p> <p>24. "Asphalt-Base Oil" consists of heavier hydrocarbon with viscous asphaltic base.</p> |
|---|---|



Transport and Communication facilities are necessary for the healthy growth of country. Road and rail transport are well developed in India with ample scope for the development of water transport. Ocean waterways are already well developed. Inland waterways require improvement.

**Railways**

Trains are the most important means of transport. They account for nearly three-fourth of the passenger traffic and four-fifth of the freight traffic in India. Indian railways system is the largest in Asia and the fourth largest in the world. It is the biggest departmental public undertaking in the country. It is also the world's second largest railway system under a single management. The first train in India steamed off from Bombay to Thane, a stretch of 34 km. in 1853. The network of railway has increased upto 63,465 km.

**Gauges of Indian Railway**

Gauge	Length	Route Track (km)	Running Track (km)	Total (km)
Broad Gauge	1.7 m	48,574	69,016	91,274
Metre Gauge	1m	11,834	12,429	15,236
Narrow Gauge	0.7 & 0.6 m	2,924	2,925	2,298
<b>Total</b>		<b>63,332</b>	<b>84,370</b>	<b>1, 09,808</b>

The Indian railways operate in three different gauges mainly-Broad Gauge, Metre Gauge and Narrow Gauge. The broad gauge accounts for nearly 50% followed by metre gauge 43% of the total route length. Railways are divided into 17 zones, headed by a General Manager who is responsible to the Railway Board for operation, maintenance and financial matters. Out of the 17 zones, Northern Railways having length 10,995 km is the longest route.

**Container Service:** Indian Railway has introduced a new marketing strategy of container services in 1980 with 7 container depots which in 1996 has expanded to 32 locations. The Container Corporation of India (CONCOR), a public sector undertaking, provide door to door services for domestic users, transportation in bulk for small customers and International transport in International Standards Organisation (ISO) containers.

**Indian Railway Zones**

Zones	Headquarters
1. Central	Mumbai, Victoria terminus
2. Eastern	Kolkata
3. Northern	New Delhi
4. North Eastern	Gorakhpur
5. North-East Frontier	Maligaon-Guwahati
6. Southern	Chennai
7. South Central	Secunderabad
8. South-Eastern	Kolkata
9. Western	Mumbai, Church gate
10. East Coast	Bhubaneswar
11. East Central	Hajipur
12. North Central	Allahabad
13. North Western	Jaipur
14. South Western	Bangalore
15. West Central	Jabalpur

**Road Transport**

India's road network is one of the largest in the world; the total length of the roads being more than 33 lakh km at present. Karnataka, with a total road length of about 64,000 km, leads followed by Madhya Pradesh and Uttar Pradesh. Roads are

most suitable for short and medium distance. Other advantages include flexibility, reliability, speed and door to door service. For the purpose of maintenance and construction, roads are classified into:

National Highways, State Highways, Village Roads, Border Roads, International Highways.

There are about 30 National Highways connecting state capitals and have been constructed by the Central government. The present National Highway system includes a total length of 38517 km. It constitutes only 2% of total road length and carries nearly 40% of the road traffic. Some of the most important National Highways are listed below. Some important national highways are as follows:

NH No	Route
1.	New Delhi-Ambala-Jalandhar- Amritsar
2.	Delhi-Mathura-Agra-Kanpur- Allahabad-Varanasi- Calcutta.
3.	Agra- Gwalior- Nasik- Bombay
4.	Thana and Madras via Pune and Belgaum
5.	Calcutta and Madras
6.	Calcutta - Dhule
7.	Varanasi - Kanyakumari
8.	Delhi -Bombay (Via Jaipur, Baroda & Ahmedabad)
9.	Bombay - Vijayawada
10.	Delhi - Fazilka
11.	Jaipur - Bikaner
22.	Ambala - Kalka - Shimla - Rampur - Chini (Indo-Tibet Border)
24.	Delhi - Bareilly - Lucknow

The National highways No-7 is the longest highways of India. At present India has 5 express highways. They are:

1. Western
2. Eastern
3. Between Calcutta and Dumdum
4. Between Sukinda mines and Paradeep
5. Between Durgapur and Calcutta.

The Plan of Super National Highways: After the National Highways, there is a plan under the consideration of Central Road Transport Ministry to create Super National Highways. Through these Super National Highways of about 14,000 km length, there is a plan to link big sea ports of the country with important cities. In the building of these Highways, the role of Private Sector will be important. This will be done on the basis of BOT (Build Operate Transfer) by Private Sector.

The National Highway Authority of India (NHAI) was constituted under the National Highway Authority of India Act 1988 and was made operational in February 1995. Initially it was entrusted with the task of implementing five externally aided NH improvement projects. Subsequently it has been mandated to implement the National Highways Development Project (NHDP) comprising 4/6 Lanning of 13252 km of national highways having two components:

(a) The Golden Quadrilateral connecting Delhi-Mumbai-Chennai-Kolkata-Delhi and

(b) North-South and East-West corridors (7300 km.), connecting Srinagar to Kanya Kumari and Silchar to Porbandar, respectively.

#### 14 New National Highways

Highway No.	Length(km)	State
NH-81	100	Bihar, W. Bengal
NH-82	130	Bihar
NH-83	130	Bihar
NH-84	60	Bihar
NH-85	95	Bihar
NH-86	360	U.P., M.P.
NH-87	83	U.P.
NH-88	115	Himachal Pradesh
NH-89	300	Rajasthan
NH-152	40	Assam
NH-212	250	Kerala, Karnataka
NH-213	130	Kerala
NH-214	270	Andhra Pradesh
NH-215	348	Orissa
<b>Total</b>	<b>2411</b>	

## Ports

There are 11 major ports and 148 minor working ports in India. Major ports are the direct responsibility of the Central government while minor ports including the intermediate ports fall in the concurrent list of the Indian Constitution and are managed and administered by the respective maritime state governments.

**Major Ports on the Western Coast :** Kandla (Gujarat); Mumbai (Maharashtra); Marmagao (Goa); New Mangalore (Karnataka); Cochin (Kerala); Jawaharlal Nehru Port (Nhava Sheva, Maharashtra).

**Major Ports on the Eastern Coast:** Tuticorin (Tamil Nadu); Chennai (T.N.); Vishakhapatnam (Andhra Pradesh); Paradeep (Orissa) and Calcutta -Haldia (West Bengal).

Among major ports, Mumbai is the biggest. Kandla is a tidal port. Marmagao enjoys the second position by value of the tonnage of traffic, bulk of which is export of iron ore. Visakhapatnam is the deepest, land-locked and protected port. Chennai has an artificial harbour. Calcutta is a riverine port. Haldia has a fully equipped containerized berth.

**Shipping:** Overseas shipping has an extremely important role to play in India's international trade. The country has the largest merchant shipping fleet among developing countries and ranks 17th in the world in shipping tonnage.

## Air Transport

The major international airports are Delhi (Indira Gandhi International Airport - Palam); Kolkata (Dum Dum, now Netaji Subhash Chandra Bose International Airport); Mumbai (Santa Cruz, now Chhatrapati Shivaji International Airport); Chennai (Meenambakam); Amritsar International Airport; Guwahati (Lokpriya Gopinath Bordoloi International Airport); Ahmedabad (Sardar Vallabhbhai Patel International Airport); Hyderabad (Rajiv Gandhi International Airport); Cochin International Airport; Bengaluru International Airport; Goa International Airport and Trivandrum International Airport (Thiruvananthapuram). Besides, there are 87 aerodromes and 20 civil enclaves maintained by Civil Aviation

Department. The Civil Aviation Centre in Fursatganj near Allahabad provides, among other things, ground training to the pilots.

Air India established in 1953 is having bilateral air services agreement with 90 countries as on Jan 1, 1998.

Indian Airlines started its operations from 1st August, 1953, with a fleet of 99 aircraft and was the outcome of the merger of seven former independent airlines, namely Deccan Airways, Airways-India, Bharat Airways, Himalayan Aviation, Kalinga Air Lines, Indian National Airways and Air Services of India. After being granted permission from the Government of India, on 15 July 2007, Indian Airlines and Air India merged and started to operate as a single entity. A new company called National Aviation Company Ltd was registered by the government to amalgamate the two airlines along with their low-fare subsidiaries- Air India Express (of Air India) and Alliance Air (of Indian). Post-merger the new airline will be renamed as Air Indian.

Pawan Hans Limited basically provides helicopter support services to oil sector, hill station and remote areas. It also provides air support services to several customers which includes ONGC, Punjab, M.P., Lakshadweep Administration, GAIL, BSF and also caters to private sector.

**Private Air Taxi:** The liberalization process in civil aviation took wing in April 1990 with the cargo open skies policies.

## National Waterways

The Inland Waterways Authority of India was set up on October 27, 1986. This statutory body has the responsibility of development, maintenance and regulation of national waterways.

The Government has identified 10 important waterways for consideration to declare them as National waterways. The followings have so far been declared as National Waterways and the same are being developed for navigation by Inland Waterways Authority of India.

- The Ganga between Allahabad and Haldia (1620 km) on October 27, 1986,
- The Sadia-Dhubri-stretch of river Brahmaputra (891 km) on October 26, 1988 and



- The Kollam-Kottapuram stretch of west coast canal (168 km) along with Champakara canal (14 km) and Udyogmandal canal (22 km) in Kerala
- Kakinada - Puducherry stretch of canals and the kalu velly Tank.
- Talcher - Dhamra stretch of river Brahmani.
- Lakhipur to Bhanga of river Barak

### Posts & Telegraphs

The first Indian postal stamp was issued in 1852 in Karachi. The Postal department was set up in 1854 when nearly 700 post offices were

already functioning. Today, there are about 1, 53,454 post offices. For the efficient and correct handling of the volume of mail, a numerical postal address code, known as the Postal Index Number (PIN), was introduced with digits which help to identify and locate every departmental delivery post offices excluding branch post offices.

### Telecommunication

Telecommunication services were introduced in India soon after invention of Telegraph and telephone. First telegraph line between Calcutta and Diamond Harbor was opened for traffic in 1851. By March 1884, telegraph messages could be sent from Agra to Calcutta.





# **WORLD GEOGRAPHY**



### Introduction

Asia is the largest of all the continents and includes an area of 44,444,100 sq km which is about 33 per cent of the world's total land surface and the greater part of the Eurasian landmass. The total population of Asia in 2001 was 3,720 million, which is likely to be 4,714 million in 2025 and 5,262 million in 2050. About 37 percent of the total population of Asia is urban. The Asian countries are usually grouped into five main geographical and politico-cultural sub-divisions:

- (1) **Southwest Asia**, which includes Afghanistan, Bahrain, Cyprus, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Yemen plus Turkey (on both sides of the Sea of Marmara in Asia and Europe), and Egypt, east of Suez Canal (Sinai peninsula).
- (2) **South Asia**, which includes Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka (formerly Ceylon).
- (3) **Southeast Asia**, which includes Brunei, Myanmar (formerly Burma), Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand and Vietnam.
- (4) **East Asia**, which includes China, Japan, North Korea, South Korea and Taiwan.
- (5) **Central Asia**, which includes all of Siberia and the Russian republics in Asia (Kazakhstan, Kirghizia, Tajikistan, Turkmenistan and Uzbekistan).

### Landscape

Some of the highest, lowest and coldest places on Earth are found in Asia. Mount Everest in the Himalayas is the highest, the Dead Sea in the west is the lowest and the frozen wastes of northern Siberia are among the coldest. The Northern Asia is made up of old mountains and ancient stable plateaus. The Jagged Himalayan mountains dominate the central part of the continent along with the

plateau of Tibet, which stretches north into China. In south-east Asia, there are many islands. Volcanoes and earthquakes are common and some of the islands are volcanically formed.

The Arabian peninsula and mountainous Iranian plateau are divided by the Gulf, fed by the Tigris and Euphrates rivers. Further east, the land begins to rise, the mountains spreading to north of the plateau of Tibet and South of the Himalayas. The plain of the south of the Himalayas are drained by the Indus and Ganges and to the east of the plateau of Tibet the Yellow River.

In the far north of Asia, the land is permanently frozen which is known as "Permafrost". Asia is watered by many great rivers. India's Ganges has its source high in the Himalayas. Tropical forests blanket the landscape across much of Southeast Asia especially in Burma, Thailand and islands of Borneo, Celebes, Java and Sumatra. The "Takla Makan" is one of the several deserts in Central Asia.

### Political Feature

In Asia there is the existence of various traditions, people and culture. The breakup of Soviet Union, which once stretched south from Russia to Iran produced the new Central Asian Republic of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. The countries in southwest Asia are mainly Muslim, but are divided by religious difference and conflict. India is the world's largest democracy while China is a communist power. China and North Korea have been governed by strict communist government since the late 1940s. In 1991, people in the Soviet Union rejected communism and elected the first non-communist government after almost 70 years. During the Soviet Era, the Islamic faith and culture in Central Asia were actively suppressed.

### Population

The deserts and high mountains of Asia are almost uninhabited and much of the Rus-

sian Federation is very sparsely populated. Singapore is one of the world's most densely populated places. Japan and India also have very high densities. Over 20 per cent of the World's people live in China but India is fast catching up.

### Industry

Agricultural occupation is still dominating around the continent. Heavy industry dominated eastern China and Russia, but Japan is the most industrially productive country. In recent years booming 'tiger' economies have developed in countries such as Taiwan which borders the Pacific Ocean. Norilsk is one of several Soviet Era industrial complexes built in Russia. It is the processing centre for rich minerals reserve found nearby.

Japan is a world-leading producer of electronic and high-tech goods like computer, cameras and hi-fi equipment. Taiwan, South Korea and Singapore also produce electronic goods.

### Mineral Resources

Over half of the world's oil gas reserves are in Asia, most importantly found in Gulf and in Western Siberia. Coal in Siberia has provided power for steel industries. Metallic minerals are also abundant. Tin is found in southeast Asia and Platinum and Nickel in Siberia. The discovery of oil in the Gulf has generated enormous wealth and produced rapid industrial and social change in the countries such as Saudi Arabia, U.A.E. and Kuwait which control the oil supplies.

### Climate

The continental type of climate is prevalent in most part of the Asia, apart from the coastal areas. Without the moderating effect of the Ocean temperature can soar during the day and plummet at night, while rainfall is generally low producing several large deserts. Temperature as low as  $-68^{\circ}\text{C}$  have been recorded in the frozen wastes of Siberia while the islands in Southeast Asia have tropical climates. Southern and Eastern Asia are also affected by a seasonal wind called the Monsoon. This originates in the Indian Ocean and brings heavy rainfall and high winds.

### Land-Use and Agriculture

The large expanses of Asia are uncultivated

because the soil is too poor or the climate is too cold or dry for crops to grow. The plateau of Tibet, much of Siberia and Arabian Peninsula have limited agriculture. Some of the most fertile land is found in eastern China and India, where rice is a staple. Elsewhere cash-crops are grown for profit, such as dates in southwest Asia, tea in India, China and Sri Lanka and coconuts throughout the island archipelago of Southeast Asia. China is the world's largest producer of rice, where it is grown in muddy fields called paddy fields. Uzbekistan is the world's fourth largest producer of cotton.

### South West Asia

#### Landscape

It chiefly consists of the countries like Bahrain, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates and Yemen. Much of the Southwest Asia is covered with sandy and rocky deserts. On the vast Arabian Peninsula which covers an area almost the size of India-narrow, sandy plains along the Red Sea and the south-coast rise to dry mountains. In the centre is a vast high plateau that slopes gently down to the flat shores of the Gulf. The mountainous area of Iran experience frequent earthquakes.

The 'Wadis', a type of valley and riverbeds are found in Saudi Arabian desert. Usually they are dry, but after heavy rains, they are briefly filled by fast flowing rivers. The Syrian desert extends from the Jordan Valley in the west to the fertile plains of the Tigris and Euphrates rivers in the East. It is mainly a rocky desert, as the sand has been swept away by winds and occasional heavy rainstorms. Oases are areas within a desert where water is available for plants and human use. They are usually formed when a fault, or split in the rock allows water to come to surface. The Dead Sea is the large lake on the border between Israel and Jordan. It is the lowest point on the earth's surface. Its shores lie 392 m below sea level. It is also the world's saltiest body of the water and can support no life forms. The Rub-al-khali desert, also known as 'Empty Quarter' is the largest uninterrupted stretch of sand on Earth. It covers some 650,000 sq.km. and is one of the world's driest and most-hostile deserts. The Iranian plateau in Central Iran is a vast semi-arid plateau,

which rises steeply from the coastal lowlands bordering the gulf. It is ringed by high Zagros and Elburz mountains.

### **Climate**

Most of the regions receive very little rainfall, apart from a few isolated pockets. During July, temperature soars, but in January temperature is much cooler, especially in the north.

### **Population**

The desert has kept much of the population clustered along the coastal area. Most people live in the cities, some of them are the fastest growing in the world. Oman and Yemen have mainly rural populations, and in Saudi Arabia, small groups of Bedouin tribe people roam the desert with their animals.

### **Industry**

The Oil and Natural Gas continue to be the main source of income for many of the countries here, although other industries are being developed to support their economies when these resources run out. Iran is famous for its carpet, which are woven from wool or silk.

### **Farming and Land Uses**

The best farmland is found along the Mediterranean coast, and in the fertile valley of the Tigris, Euphrates and Jordan river. Wheat is the main cereal crops, and cotton, dates, citrus and orchard fruits are grown for export. Elsewhere, modern irrigation techniques have created patches of fertile land in desert. Dates, wheat and coffee are cultivated in the oases and along the gulf coast.

## **South Asia**

### **Landscape**

The South Asia consists of Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. Its landscape ranges from the mighty peaks of the Himalayas in North, through vast plains and arid deserts to tropical forest and palm-fringed beaches in the south. A massive towering wall of snow-capped mountains stretches in an arc across the continents. The huge floodplains and deltas of the Indus, Ganges and the Brahmaputra rivers separate the mountains

from the rest of the peninsula, a great rolling plateau bordered on either side by coastal hills



called the Eastern and Western Ghats. The Himalayas are the highest mountain system in the world. The northern range of the Himalayas average 7,000 m in height. They include the highest point on Earth, Mount Everest on the Nepal and China border which soars to 8,848 m. Much of the Bangladesh lies in the enormous delta formed by Brahmaputra and Ganges rivers. During the summer monsoon, the rivers become swollen by the torrential rain and meltwaters from Himalayas and the delta flood. The Deccan Plateau makes up most of the central and southern India. Its volcanic rock has been deeply cut by rivers such as the Krishna, creating stepped valley called "traps".

### **Climate**

Climate is strongly influenced by the annual monsoon between July and September which brings hot, humid condition and extremely high levels of rainfall to much of the regions.

### **Industry**

Industry has expanded in India in recent years, and in cities a varieties of goods are pro-

duced and processed, including cars, aeroplanes, chemicals, food and drink. Services industries such as tourism and banking are also growing elsewhere. Small scale cottage industry serve the need of local people, but many product, mainly silk and cotton textiles, clothing leather and jewellery are also exported.

### Population

Most of the South Asia's people live in villages scattered across the fertile river floodplains in mountain valley or along the coast, but increasing number are migrating to the cities in search of work. Overcrowding is a serious problem in both rural and urban areas. In many cities thousands of people are forced to live in slums or on streets.

### Farming and Land Use

Over 60 per cent of the population involved in agriculture, but most farmers are small and produce only enough food to feed the family. Grains are the staple food crop- rice is grown in the wetter parts of the east and west, corn and millet on the Deccan Plateau, and wheat in north. Groundnuts are widely grown as a source of cooking oil. Cash crops include tea and jute.

#### South East Asia

South East Asia chiefly consists of the countries like Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam. On the mainland, a belt of mountain range clocked in thick forest, run north-south. The mountains are cut through by the wide valley of five great rivers. On their route to sea, these rivers have deposited sediments forming immense, fertile flood plains and deltas. To the southeast of the mainland lies huge arc of over 20,000 mountainous volcanic islands. "Borneo" is the world's third largest islands with total area of 757,000 km. Lying on the Equator and in the path of two monsoon, the island is hot and one of the wettest places on the Earth. The Mekong river flows through southern China and Myanmar and forms much of the border between Laos and Thailand. It then travels through Cambodia before ending in a vast delta on the southern coast of Vietnam, that is one of the world's most productive rice growing area. Indonesia is the world's most active volcanic region of the world. Java

alone has over 50 active volcanoes out of the country's total of more than 220. The Philippines' 7000 islands are mountainous and volcanic with narrow coastal plains. Irian Java is a province of Indonesia. Its dense rainforests are some of the last unexplored areas on the Earth and are inhabited by many rare plants and animal species. Indonesia is an archipelago of 13,677 islands, scattered over almost 5,000 km. The islands lie on the boundary between two of the Earth's tectonic plates and frequently experience earthquakes.

**Climate:** The Southeast Asia's climate is strongly affected by the Monsoon which brings warm humid air and high rainfall to mainland Southeast Asia during July and to maritime Southeast Asia during January.

### Industry

Industries based on the processing of raw materials like Metallic mineral, timber, oil and gas and agricultural produce, are important here but manufacturing has grown dramatically in recent years. Many foreign firms attracted by low labour cost, have invested in the region. Malaysia and Singapore are major producers of electronic goods like disk drives for computers.

### Farming and Land Use

The staple crop here is rice which grows in low-lying flooded fields called Paddies, or on terraces cut into the hillside. Sugarcane, coconut, bananas and pineapples are widely grown as cash crops and Malaysia produces 25% of the World's rubber. Freshwater and Marine fish are caught in large quantities. Fish is one of the main foods in the region.

### Population

The population is chiefly concentrated in the river valley, plateaus or plains. Upland areas are inhabited by small groups of hills peoples. Most people still live in rural areas, but the cities are growing fast. In Indonesia and Philippines, the population is unequally distributed. Some islands such as Java are densely settled.

#### East Asia

### Landscape

It mainly consists of China, Mongolia and

Taiwan. China's landscape divides into three areas. The vast plateau of Tibet in the south-west is the highest and largest plateau on Earth. It contains both dry deserts and pockets of pasture surrounded by high mountains. North-west China has dry highlands. The great plains of eastern China were formed from soil deposited by rivers like the Yellow river over thousands of years. Most of Mongolia is dry grassland, steppe and cold arid deserts. The arid landscape of the Gobi and Takla Makan desert are made up of bare rock surface and huge areas of shifting sand dunes. They are hot in the summer, but unlike most other deserts, are extremely cold in winter. In the farming areas of Eastern and Southern China, terraces have been carved into the hillside to make them flat enough to grow rice and other crops. "The Tien Shan Mountain" or "Heavenly Mountain" reaches a height of 7,435 m. They surround fields of permanent ice and spectacular glaciers. The Roof of the World or cold remote plateau of Tibet has 4,000 m average height. Many of China's great rivers have their sources here. The world's highest human settlement a town called Wenquan is found in the east of the plateau. It lies 5,099 m above the sea level.

### **Climate**

Two air masses control climate, one cold and dry from Siberia and one moist and dry from Pacific. Winters are long and cold away from the coast- especially on the plateau of Tibet.

### **Industry**

Chemicals, iron and steel, engineering and textile are the main industries in China's east coast cities and in industrial centres like Shenyang, Shanghai, Hong Kong and Beijing are also financial centres. In the interior large deposit of coal support the heavy industries in major cities such as Chengdu and Wuhan. Taiwan specializes in textile and shoe manufacture, along with electronic goods. Mongolia's economy is mainly agricultural.

### **Population**

Most of the China's people live in the eastern part of the country where the climate, landscape and soils are most favourable. Urban areas cover the houses of over 250 million people, but almost 75% of the population lives

in villages and farm the land. Taiwan's lowlands are very densely populated. In Mongolia, about 50 per cent of the people live in the countryside.

### **Farming and Land Use**

About the 90 per cent of China is unsuitable for farming. Either the soil and climate are poor, or the landscape is too mountainous. In the North and West, most farmers make their living by herding animals. On the fertile eastern plain, soyabean, wheat corn and cotton are grown. Further south, rice becomes the main crops and pigs are raised in large number.

The three Gorge hydro-electric scheme on the Yangtze River will be the world's largest.

## **Japan And Korea**

### **Landscape**

It chiefly consists of Japan, North Korea and South Korea. Japan is curved chain of 4,000 islands in the Pacific Ocean. It is covered by forested mountains and hills, fast flowing rivers and small lakes. Only about a quarter of the land is suitable for building and farming and new land has been created by cutting back hillsides and reclaiming land from the sea. The North and South Korea are mostly mountainous, with some coastal plains. Japan's four main islands- Hokkaido, Honshu, Shikoku and Kyushu were formed when two giant plates making up the Earth's crust collided making their edge buckle upward. T'aebeak-Sanmaek, a wooded mountain range forms the backbone of the Korean Peninsula. It runs from north to south close to the east coast. Huge sea-waves called "Tsunamis" frequently threaten the east coast of Japan. They are set off by submarine earthquakes. In Japan, earthquakes are parts of everyday life. The islands lie on a fault line and earthquake tremours occur, on average 5,000 times a year. Japan's mountain ranges are studded with volcanoes, 60 of which are still active. Mount Fuji is a 3,776 m snow capped volcano and the highest mountain in Japan. It last erupted in 1707.

### **Climate**

Korea has hot summer and dry, very cold winters especially in the North, where snow is very common. In Japan winters are less cold and in the Asian mainland summer are hot,



wet and humid.

### Industry

Japan is the world leader in hi-tech electronic goods like computers, televisions and cameras as well as cars. South Korea also has a thriving economy. It produces ships, cars, hi-tech goods, shoes and clothes for worldwide export. Both countries have to import most of their raw materials and energy. North Korea has little trade with other countries but it is rich in minerals and energy.

### Population

Approximately about 125 million people live in crowded cities on the coast of the four main islands. The Kanto plain around Tokyo is Japan's biggest area of flat land, and most of the populous part of the country. In South Korea, a quarter of the population lives in capital Seoul. Most North Koreans live on the coastal plains.

### Farming and Land Use

The method of farming allows Japan to grow much of its own food, despite a shortage of farmland. Rice is the main crops grown throughout the region. Japan has a large fishing fleet. The Japanese eat more fish than any other nation. In North Korea farming is controlled by the government.

### Central Asia

### Landscape

Central Asia consists of the countries like Afghanistan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. It is a land of hot, dry deserts and high rugged mountains. Two of the world's great deserts, the Kara Kum and Kyzyl Kum cover much of the Western portions of Central Asia. In the east, a belt of high mountain ranges- the Hindu Kush, The Tien Shan and the Pamirs- tower above the land. Few rivers cross the deserts, apart from Amu Darya which flows from the Pamir to the shrinking Aral Sea. The Aral Sea was once the fourth largest lake in the World, but it has shrunk by 40% since 1960. Diversion of its water for irrigation has made the lake shallower, so its water evaporates faster. The sandy desert of Kara Kum occupies over 70%, of Turkmenistan. Its surface consists of wind sculpted dunes and

depressions. The stress and strain in the Earth created the Fergana Valley, a deep depression encircled high mountains. The valley's fertile soil is irrigated by water from the Darya River and underground source. Pamir lies mainly in Tajikistan. Their highest point at 7,495 m is Communism Peak, so named because it was the highest peak in former Soviet Union.

### Climate

Central Asian climate is strongly influenced by the position deep within Asia, far from the moderating effects of the ocean, winters are cold and summers are hot everywhere. Rainfall is virtually non-existent all year around.

### Industry

The fossil fuel especially coal, natural gas and oil are extracted and processed throughout Central Asia. Agriculture supplies the raw material for many industries including food and textile processing and the manufacture of leather goods and clothing. The region is famous for its colourful traditional carpets, hand woven from the wool of Karakul Sheep. The "Fargana Valley" of southeast of Tashkent is the main industrial area.

### Population

Most of the people of Central Asia are rural farmers living in the river valley and in oases. There are few larger cities. A few still lead a traditional nomadic lifestyle, moving from place to place with their animals in search of new pastures. Large area of Afghanistan and western deserts and mountain regions in the east are virtually uninhabited.

### Farming and Land-Use

Farming is concentrated around the fertile river valley. A variety of cereals and fruits including peaches, melons and apricots are grown. In drier areas, animal breeding is important, with goats, sheep and cattle supplying wool, meat and hides. Big crops of cotton, which is a major export, are produced on land irrigated by the Amu Darya River.

### Russia

### Landscape

To the east of the Ural Mountains lies the

West Siberian Plain-the world's biggest area of flat ground. The plain gradually rises to the Central Siberian Plateau, and again to highlands in southeast. Great coniferous forest called Taiga, stretches across most of these lands. The far north of Siberia extends into the Arctic Circle. There, the landscape is made up of frozen plains called "Tundra". Much of the Kazakhstan is covered by huge rolling grasslands or Steppes; in the south are arid sandy deserts. The Tundra and Taiga are stubby birch trees, dwarf bushes, moss and lichen huddle close to the ground in frozen Tundra wastes of Northern Russia. They lie between the permanent ice and snow of the Arctic, and the thick Taiga forests which covers an area greater than the Amazon rainforest. The Caspian Sea covers 371,000 sq. km and is the world's largest expanse of inland water. It is fed by the Volga and Ural rivers which flow in from the plains of the north. The West Siberian Plain is covered with a network of marshes and streams. The Ob rivers which winds its way north across the plain, is frozen for up to half the year. Lake Baikal is the deepest lake in the world and the largest freshwater one; it is more than 1.6 km deep and covers 32,500 sq. km. It is fed by 336 rivers and contains around 20% of all fresh water in the world.

### **Farming and Land-Use**

The harsh climate of Siberia has restricted farming to the south where there are a few areas. Warm enough to grow cereals crops, such as wheat and oats, and to raise cattle on the small pocket of pasture. The rest of the region is used for hunting, herding Reindeer and forestry- the Taiga forests contains the world's biggest timber reserves. In Kazakhstan, big herds of cattle, goats and sheep are raised for wool and meat and wheat is cultivated in fertile north.

### **Climate**

Russia and Kazakhstan have strongly continental climate and their distance away from sea and ocean means that temperature fluctuates wildly both daily and seasonally. Temperature in eastern Siberia has been known to reach -68°C.

### **Population**

Siberia has some of the world's largest area

of uninhabited land. The biting cold climate and harsh living conditions have kept the population small. The industrial cities in the West hold the most people. Despite its huge size Kazakhstan has only 17 million people; most of whom live in urban areas.

### **Points To Remember**

- Asia is the world's largest peak continent.
- Mount Everest in the Himalayas is the highest in the world.
- The Dead Sea in the West is the lowest point in the world.
- The coldest point in Asia is the frozen waste of Northern Siberia.
- Himalayas is the example of young mountain range.
- The 'Takla Makan' is one of several deserts in the Central Asia.
- Singapore is one of the world's densely populated places.
- India is the world's largest democracy while China is a communist power.
- The booming 'Tiger Economy' has developed in countries such as Taiwan which borders the Pacific Ocean.
- Norilsk is one of several era industrial complexes built in Russia. It is a processing centre of rich minerals reserves found nearby.
- Mumbai is India's leading industrial city and has a thriving stock market.
- Half of the world's oil and gas reserves are in Asia.
- Japan is world's leading producer of electronic and high-tech goods like computers, cameras and equipment.
- Uzbekistan is world's fourth largest producer of cotton.
- China is World's largest producer of rice.
- Tropical climate across the island of Southeast Asia produces warm humid condition in which rainforest are found.
- The deepest lake in the world is the Lake

Baikal and it is also the largest fresh water one.

- The Taiga forests of Siberian region contain the world's biggest timber reserves.
- Lake Van is one of the shallow salt lakes found in Anatolia.
- The Syrian Desert is mainly rocky which extends from the Jordan valley in the west to fertile plains of the Tigris.
- The Dead Sea is situated between the border of Israel and Jordan.
- The Bedouin tribe is found in Saudi Arabia.
- The Wadis is a type of river bed and valley.
- The continent of Asia consists of 60 per cent of the world population.
- The alluvial river valley of the Ganges (in India) and the Yangtze and Huang Ho (in China) have the greatest population densities of the world.
- The type of Agriculture which is commonest in Asia is known as intensive agriculture.
- More than 90 per cent of the world's rice is grown in Asia.
- Coniferous forests are found in Soviet Union, Japan and Himalayan region.
- Monsoon forest is found in Myanmar and parts of south-east-Asia.

- Equatorial forests are found in Malaysia and Indonesia.
- Malaysia is the largest producer and exporter of rubber in the world.
- Victoria is the capital of Hong Kong.
- East Timor is an island situated between Indonesia and Australia in the Timor Sea.
- Tsunamis are a type of sea waves which frequently threaten the east coast of Japan.
- Mount Fuji is a 3,776 m snow-capped volcano and the highest mountain in Japan.
- The Gobi and Takla Makan desert are hot in summer and extremely cold in winter.
- The plateau of Tibet is known as the roof of the world.
- The arid and sandy Thar deserts lie between the border of India and Pakistan.
- Mekong River flows through Southern China and Myanmar and forms much of the border between Laos and Thailand.
- Indonesia is most active volcanic region of the world.
- Irian Jaya is a province of Indonesia. Its dense rainforest are some of the last unexplored areas on the Earth and are inhabited by many rare plant and animal species.

• • •

### Landscape

The continent of Africa ranks second next only to Asia in terms of size by occupying 20 per cent of the total land area. Its physiographic features consist of the mightiest rivers, greatest deserts and some well-known waterfalls. The entire continent appears like a huge plateau. One of the characteristic features of African landscape is the absence of elongated parallel ranges of continental dimensions such as Andes and Himalayas. Mount Atlas in the northwest and Drakensberg in the south-east are notable ranges. The towering mountain Kilimanjaro with snow - capped peaks all year around is well known. The Kalahari and Sahara desert also run alongside the mountain. Besides, Nile and Zaire rivers, there are so many rivers and waterfalls which have boosted up the hydro-electricity generation in the continent in which it occupies next position after Asia.

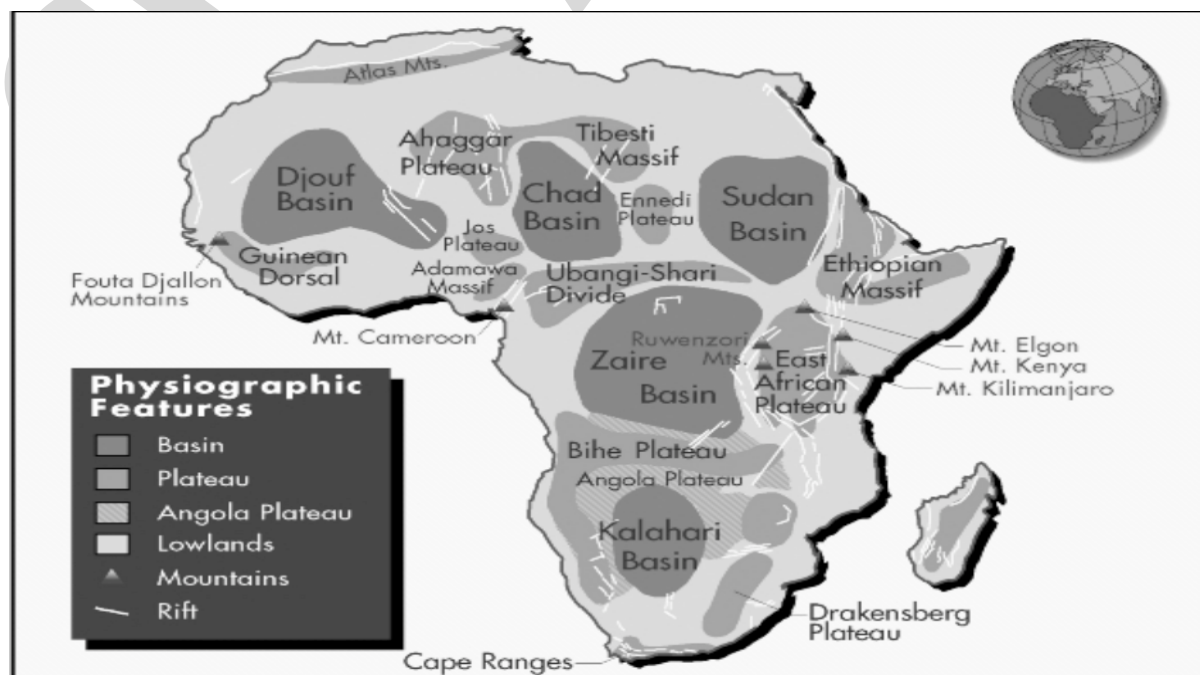
### Climate and Vegetation

It is the most tropical continent and the average temperature remains high throughout the year. Its equatorial belt has only one climate that is hot and humid with the least diurnal and annual range of temperature. The

convictional type of rainfall occurs in the late afternoon which is also called 4'o clock rains. The equatorial rain forest of Africa is also called gallery forest. Some of the well-known species such as Mahogany, Rosewood and Ebony are found in this type of forest. The entire Savanna region is prevalent in the southern and northern side where the summer season is very warm and winter is warm. It is also known as the Sudan type of climate. This region has some of the largest wild animals thus called 'The Big Game Country'.

#### • The Mediterranean Climatic Region

This type of climate is prevalent in south-western part of S.Africa and the bordering areas of Mediterranean Sea in northern Africa. The entire region experiences warm dry summers because of offshore trade winds and cool moist winters because of onshore westerlies. A prominent feature of this region is the prevalence of local winds such as Sirocco and Khamsin. The vegetation is marked by shunted trees and xerophytic adaptation. Some of the important trees are: cork, oak, figs and olives. This region is also known for the cultivation of citrus fruits and is called 'Orchards of the World'.



- **Temperate Grassland:** This region covers the areas between Drakensberg and the Kalahari and is further subdivided into a more tropical Bush - veldt and the temperate High-veldt. Parts of east Africa and Madagascar are under the influence of onshore trade winds all the year round and experiences evenly distributed rainfall which is known as the Tropical Marine Climate Region. This region is also known for the cultivation of cloves, spices and Coconuts.



- **The China Type of Climate:** It is found in the south-eastern part of South Africa. The narrowness of the continent, maritime influences and onshore trade winds bring about a uniform distribution of rains and a small annual range of temperature. The natural vegetation includes the broad leaved deciduous forests on the low lands and coniferous on the highlands. The trees like bamboo, palm, wattle, etc. are more suitable for the climate. Besides, Mangrove is found along the Gulf of Guinea and Montane vegetation on the highlands of Ethiopia, Tanzania and Kenya.

#### Social Features

Africa is well known for the diverse races and tribes. The Hausa of Nigeria are agriculturalists, the Masais of East Africa are pastoralists while the Pygmies of Congo are hunters and food gatherers. There is a plethora of tribal language spoken in sub-Saharan Africa. Here, nearly 10,000 languages of the world are being spoken, but Swahili, the lingua franca,

is understood by most. The Afro -Asiatic family of language and the Arabic language dominates in Saharan Africa.

Tribes	Regions
Masai	East Africa
Pygmies	Congo Basin
Hottentots	Kalahari
Bushman	Kalahari
Fulani	Western Africa
Tuaregs	Sahara Deserts
Bantus	Central and Southern Africa
Berbers	Algeria, Morocco and Tunisia
Hausas	Western Africa

The average population density is very low. Nile delta is the high density area accompanied by the Mediterranean regions in the north and the south. 750 million people inhabit the continent.

As far as religion is concerned, Saharan Africa is predominantly Islamic while sub-Saharan Africa is Christian and animistic. The African transition zone which marks a zone of conflict between the followers of Islam and Christianity provides a key to understanding the civil war prevalent in this zone.

After the industrial revolution, Africa has developed as an exporter of primary commodities. In the present century, Africa has made a grand departure in the field of biotechnology because it is a huge resource of biodiversity. The vast stretching area of Savanna Grassland has enough potential to grow food for the rapidly increasing population. Now the continent is rapidly developing in various spheres such as Science and Technology, quality of life, agriculture, economy, etc. Thus, it would be very apt to entitle the continent as the Continent of Hope or 'Rising star'.

#### Suez Canal

The Suez Canal is one of the world's most important waterways. Opened in 1869, the sea level artificial waterway crosses the narrow Isthmus of Suez, joining Africa and Asia and permits ocean going vessels to travel between the Arabian Sea and the Mediterranean Sea via the Gulf of Suez and the Red Sea. The canal is owned and operated by Egypt, and separates the main part of that country on the west

bank from the Sinai Peninsula on the east bank. The northern terminus of the canal is Port Said. Southward, the canal continues in a straight line through Manzala and Timshah lakes and Ismailia where the administrative headquarters of the canal is located. Further south the canal passes through the Great and Little Bear lakes (now a single lake) and then passes through the city of Suez.

### Minerals of Africa

#### Minerals      Leading Producers

- |              |              |
|--------------|--------------|
| 1. Gold      | South Africa |
| 2. Petroleum | Nigeria      |
| 3. Iron ore  | South Africa |
| 4. Diamond   | Zaire        |
| 5. Manganese | South Africa |
| 6. Phosphate | Morocco      |
| 7. Tungsten  | Zaire        |
| 8. Bauxite   | Guinea       |
| 9. Copper    | Zaire        |
| 10. Platinum | South Africa |
| 11. Chromium | South Africa |
| 12. Vanadium | South Africa |
| 13. Antimony | South Africa |

#### Mines      Minerals

- |                   |                 |
|-------------------|-----------------|
| 1. Kimberley      | Diamonds        |
| 2. Lubumbashi     | Copper          |
| 3. Wankie         | Coal            |
| 4. Witwatersrand  | Gold            |
| 5. Katanga        | Copper & Cobalt |
| 6. Kasai Province | Bort Diamond    |

#### Old Name      New Name

- |                       |                              |
|-----------------------|------------------------------|
| 1. Zaire              | Democratic Republic of Congo |
| 2. Katanga            | Shaba                        |
| 3. Elizabethville     | Lubumbashi                   |
| 4. Gold Coast         | Ghana                        |
| 5. South -West Africa | Namibia                      |
| 6. Leopoldville       | Kinshasa                     |
| 7. South Rhodesia     | Zimbabwe                     |
| 8. North Rhodesia     | Zambia                       |
| 9. Nyasaland          | Malawi                       |
| 10. Stanleyville      | Kisangani                    |

#### Agricultural Product      Leading Producer

- |           |         |
|-----------|---------|
| 1. Rubber | Liberia |
|-----------|---------|

- |             |           |
|-------------|-----------|
| 2. Tea      | Kenya     |
| 3. Coffee   | Liberia   |
| 4. Oil palm | Nigeria   |
| 5. Cocoa    | Ghana     |
| 6. Cloves   | Zanzibar  |
| 7. Sisal    | Tanzania  |
| 8. Wool     | S.Africa  |
| 9. Maize    | S.Africa  |
| 10. Cotton  | Egypt     |
| 11. Wheat   | S. Africa |

#### Points to Remember

1. Sirocco is a type of hot wind blowing from Sahara to Mediterranean.
2. Swahili is the oldest surviving African language.
3. The country Zaire has the maximum Hydro-electric Power potential in Africa.
4. The country Djibouti is facing the Strait of Bab-el-Mandeb.
5. Dar-es-Salam is the easternmost terminus of Tanjara railways which begins from Katanga mineral belt.
6. Ostrich is the flightless bird of Kalahari Desert.
7. Ethiopia is the place of origin of coffee.
8. Pretoria is the administrative capital of S. Africa.
9. Nilots are the aborigines of upper Nile.
10. River Zaire is the only river that crosses the equator twice.
11. Nubian desert lies in Egypt.
12. The countries Ethiopia and Somalia form the Horn of Africa.
13. High Veld is the temperate grassland of South Africa.
14. Africa is the most tropical of all continents.
15. Most part of Kalahari Desert lies in Botswana.
16. The Farmers of the Egypt are also called Fellahin.
17. Gibraltar, Suez and Bab-el-Mandeb are three points where Africa almost touches Eurasia.
18. Cape of Agulhas is the southernmost tip of

Africa.

19. Mt Kilimanjaro is the highest peak in Africa.
20. Teff is the highly nutritious crop of Ethiopian high lands.
21. Bab-el-Mandeb is called Gate of Tears.
22. Tanzania, Kenya and Uganda are the bordering countries of Lake Victoria.
23. Khartoum is the city at the confluence of the Blue and the White Nile.
24. Al-Aziziya of Libya is the hottest place in the world.
25. Morocco, Algeria and Tunisia are the three Maghreb Republics.
26. Tana is the source of Blue Nile while Victoria is the source of White Nile.
27. The 'Great Bitter' and Little Lake are along the Suez Canal.
28. Zaire is a large geographically disadvantaged state.
29. Lake Assal, Djibouti is the lowest point in Africa.
30. Tuaregs is the nomadic herders of Sahara.
31. The Lake Victoria in East Africa is not laying in the Great Rift Valley.
32. Lake Chad is the region of inland drainage.
33. Cape Town is the seat of legislature of S. Africa.
34. The Rain Forest is the natural region with greatest biodiversity.
35. The South African farmer of Dutch descent is called Boer.
36. Lourenco Marques was renamed as Maputo.
37. A new country Eritrea was carved out of Ethiopia during 1990s.
38. River Orange is a boundary between S. Africa and Namibia.
39. Masai is the pastoral tribe of Kenya.
40. In Africa, the best quality iron-ore (magnetite) is found in Liberia.
41. Witwatersrand is famous for Gold.
42. Kimberly is famous for diamond.
43. Victoria Falls was discovered by Livingstone.
44. The countries Ethiopia and Liberia of Africa were never colonized.
45. Victoria Falls is on river Zambezi.
46. Victoria Falls is the largest water falls in the world.
47. Akosombo dam is situated on the river Volta.
48. River Limpopo is the boundary between the South Africa and Botswana.
49. Lake Nasser is on River Nile.
50. Harmattan is hot local wind blowing from Sahara to Guinea Coast.
51. Abuja and Dodoma is the new capital of Nigeria and Tanzania.
52. South Africa is the island of Gold and Diamonds.
53. Four largest countries in decreasing order of area are Sudan - Algeria - Zaire - and Libya.
54. Nigeria is the land of oil palm.

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### Introduction

Europe is the world's second smallest continents occupying the western tip of Eurasian landmass. The old high lands lies to the north and west with the high peaks of Alps in the south. Europe's northern coastline stretches deep into the Arctic Circle. Here the Norway iceberg drift into the deep wide bottomed fjords. The north European plain has low rolling-hills and plains. Much of the area is cultivated and used for growing crops like wheat and sugar beet. Some of the world's oldest rocks are found in northwest Europe. Erosion by glaciers in the last ice age created smoothed hills such as the mountain of Wales. The Alps are Europe's major mountain chain. They were formed about 65 million years ago.

### Climate

Europe's climate is temperate with few climatic extremes. In the far north, Europe extends into the **Arctic Circle** and the climate is so cold that in the winter, the Baltic Sea freezes over. Towards the Atlantic coast in the west, the climate becomes wetter and warmer because of a warm ocean current known as the '**Gulf Stream**'. The countries such as Italy and Spain, which borders the Mediterranean Sea, have long hot summers and low rainfalls.

### Industry

The Western Europe has some of the world's wealthiest countries. In countries such as France, Germany and U.K. traditional industries like iron and steel making are now being replaced by light industries such as electronics and services like finance and insurance. In Eastern Europe, industry was subsidized by the communist government for years. Many factories are old fashioned and need investment to improve their equipment and production methods.

### Minerals

Europe has a few sizeable reserves of me-

tallic minerals; most were used by industry during the last century. Oil, gas and coal are found in large quantities-gas in Northern Sea and oil in Volga basin.

### Land Use and Agriculture

The North European plain is the heart of agriculture in Europe where fertile soil and ample rainfall mean that a variety of crops can be grown. Wheat is the main grain crops and a wide range of fruit and vegetable are also grown. Dairy and beef cattle are raised for their milk and meat throughout Europe. In the south, the Mediterranean climate allows citrus fruit and olives to grow. Forest covers much of the northern Scandinavia, while in the hills of British Isles sheep forming is common.

### Northern Europe

### Landscape

The Northern Europe consists of the countries like Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Norway and Sweden. Denmark, Sweden and Norway are together known as Scandinavia. Estonia, Latvia and Lithuania are known as "Baltic States". The Scandinavia is extremely rugged and mountainous with landscape eroded by ice.





In the South of Scandinavia, the land is flatter, with fertile soil deposited by glaciers. Much of Finland, Norway and Sweden is covered by dense forest. The Baltic States are much lower with rounded hills and many lakes and marshes. Iceland is one of world's most active volcanic areas. There are about 200 volcanoes on the islands, along with bubbling hot springs, mud-holes and geysers which spurt boiling water and steam high into the air. Norway has many Fjords, deep, wide valley drowned by seawater when the ice melted at the end of the last Ice Age. Ships from Finland, Sweden and Baltic states use the Baltic Sea as their route to the North Atlantic Ocean. In winter, much of the sea is frozen. The Finland and Sweden have many thousands of lakes. During the last Ice-Age, glacier scoured hollows which filled with water when the ice melted. The wide Courland Spit runs for 100 km. along the Baltic coast at Lithuania and the Russian enclave of Kaliningrad. It encloses a huge lagoon.

### Climate

The warm ocean currents flowing north along the coast of Norway and Iceland make the climate mild and wet. Away from the sea, the climate is generally colder and drier.

### Industry

In Scandinavia, many natural resources are used in industry; timber for paper and furniture, iron for steel and cars. Fish and natural gas are sourced from the seas. Hydro-electric power is generated by waters flowing down steep mountain slopes. The Baltic States still rely on Russia to supply their raw material and energy.

### Population

The population is distributed mainly along the warmer and flatter southern and coastal areas. The total population and its densities are low for all the countries, and Iceland has the lowest population density in the Europe, with just three people per 59 sq (square) km. Many Scandinavian have holiday homes in the islands, along the lake shores.

### Farming and Land-Use

The southern Denmark and Sweden are most productive areas, with pig farming, dairy farming and crops such as wheat, barley and potatoes. Sheep farming is important in South-

ern Norway and Iceland. In the Baltic States cereal, potatoes and sugar beet are main crops and cattle graze on dump pasture.

## The Low Countries

### Landscape

It consists of **Belgium, Luxembourg** and **Netherlands**. These are called Low Countries because most of their land is flat and low-lying. Much of the Netherlands lies below sea level. The **low countries** of Europe are most densely populated countries, but most of their people have a high living standard. The Low Countries are largely flat and low lying. The two major rivers- the Meuse and the Rhine flow across the low countries of their mouth in the North Sea. At the coast of river Rhine deposit large quantities of sediments to form delta. In the Netherlands land has been reclaimed from the sea since the Middle age by building dykes and drainage ditches. These areas of land are called '**Polders**'. They are very fertile. **The River Rhine** erodes and carries large amount of sediments along its course. When it reaches the Netherlands it divides into three rivers. As they approach the North Sea, the rivers slow down depositing the sediments to form delta. The **plain of Flanders** in western Belgium has fertile soil which was deposited by glaciers during the last Ice Age. They provide excellent land for growing crops. The **heartlands** on the Dutch-Belgium border have thin sandy soils. The only plants which grow here are heathers and gorse. The hill of Ardennes was formed over 300 million years ago. They have many deep valleys, which have been eroded by rivers like **Meuse**.

### Climate

The Low Countries share a similar climate with mild winters and warm summers. Only in the upland Ardennes region does rainfall increase and temperature decrease.

### Industry

The low-countries are an important centre for the hi-tech and electronic industries. Good transport links to the rest of the Europe allow them to sell their product in other countries. The built up area stretching from Amsterdam in the Netherlands to Antwerp in the Belgium has the greatest number of facto-

ries. Luxembourg is also an important banking centres, many international banks have its head quarter in its capital city.



### Population

More than 25 million people live in Low Countries and nine out of every ten people live in town or city. The largest urban area-known as the 'Randstad Holland' is in the Netherlands. It runs in an unbroken line from Rotterdam in the south to Amsterdam in the west. Even most rural areas in the Low Countries are densely populated.

### Farming and Land-Use

The fertile soil and flat plain of Low Countries provides excellent condition for farming. The main crops grown are barely potatoes, and flax for making linen. In the Netherlands much farmland is used for dairy-farming. The country is also famous for growing flowers.

### The British Isles

### Landscape

The British Isles consists of the countries of United Kingdom and Republic of Ireland. It lies off the Northwest coast of mainland Europe. They are made up of two large islands and 500 smaller ones. Politically, the region is divided into two countries: the United Kingdom-England, Wales, Scotland and Northern Islands and the Republic of Ireland. Geographi-

cally, the British Isles are divided between highlands to the north and west, and lowlands to the south and east.

The Ben Nevis Mountain is the highest point in the British Isles. It is 1,343 m above the sea level. The Lake District National Park has England's highest peak. Scafell Pike, at 978 m is deepest lake. Wastwater (80 m) is its largest lake. The Pennines are a chain of high hills topped by Moorland. They run for over 400 km and are known as the 'backbone of England'. The Fens is the flattest area in England. Much of the land here has been reclaimed from the sea. Rias are rivers valley that have been drowned by rising sea level. The southern coast of southwest England has many good examples. The Burren is a large area of limestone rock in the west of Ireland. Its flat surfaces are known as limestone pavements.

### Climate

'The British Isles' climate is moderated by the warm Atlantic ocean current called 'Gulf-Stream'. The west is generally wetter than the east and the south warmer than the north.

### Industry

The United Kingdom's traditional industries such are coal-mining, iron and steel-making and textiles have declined in recent years. Today, newer industries make cars, chemicals, electronic and high-tech goods. Service industries especially banking and insurance have grown in importance. The country's most valuable natural resources are its large North Sea oil and fields.

### Population

The United Kingdom is densely populated with most of the people living in urban areas. The Southeast is the most crowded part of the country. The Scottish highlands are populated today than they were 200 years ago. Ireland is still mainly rural, with many Irish people making their living from farming.

### France

### Landscape

Andorra, France and Monaco are the chief countries in these zones. The north and west of France is made up of mainly flat, grassy

plains and low hills. Wooded mountain line the country border in the south and east and much of central France is taken up by Massif Central, an enormous plateau, cut by deep rivers valley and scattered with extinct volcanoes. Three major rivers. The Loire, Seine and Garonne drain the low land basins. The Paris Basin is a saucer-shaped hollow made up of layers of hard and soft rock covered with very fertile soil. It runs across about 100,000 sq. km. of Northern France. The Western end of the European Alpine Mountain chain stretches into southeast France. The French Alps can be crossed by several passes, which give access to Italy and Switzerland.

The coast of Normandy is lined with high chalk cliff. The Mount Blanc in the French Alps is the tallest in Eastern Europe. It is 4,807 m. high. Pyrenees Mountain forms a natural barrier between France and Spain. Several of their peaks reach heights of over 3,000 meter. The Pyrenees are difficult to cross, due to their height and because they have few low passes. The vast granite plateau of Massif Central was formed over 200 million years ago. Volcanic activity here only stopped within the last 10,000 years and regions rounded hills are the worn down remains of the volcanic mountain. The Camargue is an area of marshes, pastures, sand dunes and salt flats at the mouth of the river Rhone. Rare animal and plant are found there.

### **Climate**

In winter, the coldest areas of France are mountain of the Massif Central and the Alps. Summer is the hottest on Mediterranean coast.

### **Industry**

France is one of world's top manufacturing nations, with a variety of both traditional and high tech industries. Cars, machinery and electronic products are exported worldwide, along the luxury goods such as perfumes, fashion and fine wines. Fossil fuel provides some energy, but France is currently the world's second biggest producer of Nuclear power.

### **Population**

In the past 50 years, most people have moved from the countryside into the urban areas. Paris and its suburb, the industrial cities, and the Cote d'Azur in the southeast are parts of France and now have the biggest population.

## **Farming and Land-Use**

France is able to produce a variety of crops because of its rich soil and mild climate. Wheat is grown in many parts of north, along with potatoes and other vegetables. Fields of maize and sunflower and fruit orchards are found in the south, while grapes for the famous wine industry grown across the country. Beef and dairy cattle are grazed on low-lying pasture.

## **Spain And Portugal**

### **Landscape**

Spain and Portugal occupy the Iberian Peninsula which is cut off from the rest of the Europe by the Pyrenees. Over the centuries, Iberia has been invaded and settled by many different peoples. The most of the inland in Spain is taken up by Meseta, a dry almost treeless plateau surrounded by steep mountain ranges. The only lowlands apart from narrow stripes along the Mediterranean coast are the valleys of the Ebro, Tagus, Guadiana and Guadalquivir rivers. Portugal coast is lined by wide plains. Inland, the river Tagus divides the country in two. To the north, the land is hilly and wooded; to the south it is low-lying and drier. The river Ebro carries vital irrigation water to Spain's northeastern plains before flowing into the Mediterranean Sea. The westward flowing rivers- Duero, Tagus, and Guadalquivir- flow across the Meseta on their courses to the Atlantic Ocean. The Southern end of Mesta is marked by Sierra Morena mountain range. Mulhacen is the snow capped Sierra Nevada range in southern Spain is 3,481 m high. It is Iberia's tallest mountain.

### **Climate**

The Northern Spain is wetter and cooler than the South. On the central plateau, summers are very hot and dry, and winter often-freezing. The North of Portugal is cooled by winds blowing off Atlantic Ocean. The south is warmer with dry mild winter.

### **Industry**

Madrid Barcelona and the northern parts are Spain's chief industrial centres. Here, Iron ore from Spanish mines is used to make steel, and factories produce cars, machinery and chemicals. Portugal exports textiles clothing and footwear, along with fish such as sardines and

tuna caught off the Atlantic coast. In both countries tourism is very important to the economy.

### Population

In the first half of the 20th century most Spaniards lived in villages or small towns, scattered around the countries. Today tourism and industry have drawn most of the population to the cities and coastal areas. Most Portuguese still live in rural areas along the coast or in the river valley, but the cities are growing fast.

### Farming and Land Use

Cereals especially wheat and Barley are Iberia's chief crops. In the dry south of Spain, the land is irrigated to grow citrus fruits especially orange and vegetable. In both countries olive trees and vineyard occupy large area of land. Olive oil and wine are important export. Cork oak trees from Iberia forest supply 80 per cent of the world cork.

## Germany And Alpine States

### Landscape

It consists of Austria, Germany, Liechtenstein, Slovenia and Switzerland. Germany is the biggest power in the continent. To the north, flat plains and heathlands surround the North Sea coast. Further south are Germany's central uplands which are lower and older than the jagged peaks of the Alps, which began to form about 65 million years ago. From its source in the Black forest, the River Danube flows eastward across Germany and Austria on its course to the Black Sea. The other major river, the Rhine, flows northward. The Rhine is Germany's main waterway. It is an important transport route to and from Northern ports. It twists and turns across 1,320 km of Europe from its source in southeast Switzerland to the North Sea. The Danube is Europe's second longest river flowing 2,840 km. Lake Constance covers 54 sq km and is Germany's largest lake, although its water are shared by Austria and Switzerland. The Alps were formed when African plate collided with the Eurasian plate, pushing up and crushing huge amount of rock, to form mountain. The Harz Mountains are much older than the Alps. They were formed over 300 million years ago. Most of the water of the limestone Karst region of Slovenia flows underground through huge caves and caverns.

### Climate

Winter temperature decreases eastwards and the high alpine region is coldest. Climate variations in the Alps are common due to turbulent airflows.

### Industry

Germany is a leading manufacturer of cars, chemicals, machinery and transport equipment. Switzerland and Liechtenstein with few raw materials make high value products such as watches and pharmaceuticals and provide services such as banking. The Alpine states are popular tourist locations all year round.

### Population

Western and central Germany are the most densely populated areas in the region- particularly in and around the Rhine and Ruhr valleys, where there are many industries. In the south, the steep slopes of the Alps and permanent snow cover on the higher peaks means that most large towns and cities are in scattered lowland area.

### Farming and Land Use

Germany produces three quarters of its own food. Crop farming is widespread, with cereals and root grown in flat fertile areas. Cattle and Pig rearing supply meat and dairy products. Across the Alps, the mountains limit farming, although vines are grown on the warmer south facing slopes. The rich pastures of the lower slopes are used to graze beef and dairy cattle.

## Italy

### Landscape

Italy is a type of peninsula jutting south from mainland Europe into Mediterranean Sea. In Northern and Central Italy the land is mainly mountainous. Most of the flat land is in Po Valley and along the eastern coast. Italy lies within an earthquake zone which makes the land unstable and there are also a number of active volcanoes. The basins of the river Po has the best soils in Italy. Rich alluvium is washed from the mountains by the rivers to form a wide plain. The great lakes like Garda and Como fill several south-facing valleys once occupied by glaciers. The Dolomites are high

mountains are parts of same range as the Alps. They were formed 65 million years ago. The Apennines mountain, range formed the backbone of the Italy dividing the rock west coast from the flatter sandy east coast.

Sardinia Island is made from very old rocks which were up-thrusted to form mountains. The Tyrrhenian Sea divides the Italian mainland from Sardinia is gradually filling with sediments from the rivers, which flows into it. Sicily is the largest islands in Mediterranean. It has a famous active volcano called 'Mount Etna' and often experiences earth quakes.

### **Climate**

The Alpine North has cold winters often with snow. Further south temperature are higher. Sicily has Italy's highest temperature due to warm African wind.

### **Industry**

Italian Industry is located mainly in the north. Design is extremely important to Italians and they are proud of the elegant design of their furniture, clothes and shoe. Though many firms are small, they are very efficient. Italy has few minerals resources so it needs to import new materials to make cars, engine and other high-tech products.

### **Population**

Most of the Italy's population lives in the North, mainly in and around the Po Valley, which is home to over 25 million people. Most people here have high standard of living. Southern Italy is much more rural towns are smaller and life is often much harder.

## **Central Europe**

### **Landscape**

It consists of Czech Republic, Hungary, Poland and Slovakia. The high Carpathian Mountains sweep across the northern Slovakia. The lower Sudeten Mountain lies on the border of the Czech Republic and Poland. Together these mountains form a barrier which divides the Great Hungarian plain and the Danube river basin in the South from Poland and the vast rolling lowlands of the North European plain. Pomerania is a sandy coastal area with lakes formed by glaciers. It stretches west from the

River Vistula to just beyond the German border; Poland's largest river is the river Vistula. It flows northwards passing through the capital, Warsaw on the way to the Baltic Sea. The Sudeten Mountains are famous for their hot minerals springs. These occur where water heated deep within the Earth's crust finds its way to the surface along fracture in the rock. The River Danube forms the border between Slovakia and Hungary for over 162 km. It then turns south to flow across the Great Hungarian plains. The Great Hungarian Plains covers almost half of Hungary's land area. It is a mixture of farmland and Steppe. The Tatra Mountains are a small range at northern end of the Carpathian Mountains. They include Gerlachovský which is central Europe's highest point at 2,655 m.

### **Climate**

The Carpathian Mountains are both the coldest and the wettest part of Central Europe. Temperature plunges below zero across the whole region during winter. In summer, eastern Hungary is the hottest place.

### **Industry**

Brown coal or lignite is central Europe's main fuel and one of Poland's major exports. A variety of minerals are mined in the mountains of Czech Republic and Slovakia. Hungary has a wide range of industries producing vehicles, metals and chemicals as well as textile and electrical goods. The Czech Republic is famous for its breweries and glass making.

### **Farming and Land Use**

Central Europe's main crops are cereals such as maize, wheat and rye, along with sugar beet and potatoes. In Hungary, sweet pepper grows, helped by the warm summers and mild winters. They are used to make paprika. Grapes are also grown, to make wine. Large areas of the plains of Hungary and Poland are used for rearing pigs and cattle. Trees for timber grow in the mountain of Slovakia and Czech Republic.

### **Population**

Most people in central Europe live in low lying areas, for example, along the River Vistula in Poland and in the lowlands of the Czech Republic. In mountainous Slovakia many

people still live in rural towns and villages. The industrial areas and capital cities have the highest population densities.

### South East Europe

#### Landscape

It consists of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Greece, Macedonia, Yugoslavia (Serbia and Montenegro). The Southeast Europe is largely mountainous with range running from north-west to southeast. The Dinaric Alps runs parallel to the Dalmatian coast, and the Pindus Mountain continue this line into Greece. In the Aegean Sea the drowned peaks of an old mountain chain form thousands of islands. The Vojvodina region of Yugoslavia is the southern part of the great Hungarian plains. The plain is flat and fertile soil allows grain crops like corn and wheat to be grown.

The Balkan Mountains forms a spur running east to west through Bulgaria and separate the two main rivers the Danube and the Maritsa. Dalmatian coast has many long, narrow islands near the shore. These were formed as the Atlantic Sea flooded the river valley which ran parallel to the coast. The Peloponnese is a mountainous peninsula linked to the Greek mainland only by a narrow strip of land called an isthmus. There are two groups of Greek islands-the Ionian island of the west of mainland Greece, and the more numerous islands to the east in Aegean Sea.

#### Climate

The Southern Europe's climate varies from north to south. Continental climates are found in the north; winters are cold and dry while towards the south, winters are milder and summers much hotter. Europe's wettest place is found in the mountain in Bosnia and Herzegovina.

#### Industry

The mainland Greece and the many islands in the Aegean Sea are centre of a thriving tourist trade, while tourism on the Black Sea coast continues to grow. The Dalmatian coast had a small, but growing tourist industry until the civil war in former Yugoslavia disrupted that and other industries. Heavy industries like chemicals, engineering and ship-building re-

main an important source of income in Bulgaria.

#### Population

Greece population is mostly urban; over 50 per cent live in the capital Athens and in Salonica. In Bulgaria, most people live in cities. About half of Albania's and Macedonia's people are still rural. Since the civil war, the different ethnic groups in Bosnia and Herzegovina, Yugoslavia and Croatia have lived from one another.

### Eastern Europe

#### Landscape

It consists of Belorussia, Moldavia, Romania and Ukraine. The flat and rolling grassland, marshes and rivers, flood plains covers almost all of Ukraine and Belorussia. The Carpathian Mountains cross the southwestern corner of Ukraine and continue a large arc shaped chain of high peaks at the heart of Romania. Along the southern part of this chain the Carpathians are called the Transylvanian Alps. The Pripet Marshes in Belorussia and Ukraine form the longest area of marshland in Europe. The Steppes are great wide grassland, which are found across Eastern Europe and central Asia. Over 70% of the Ukrainian landscape is Steppe. The Crimea Peninsula divides the Sea of Azov from the Black Sea. The steep mountain of Krymsk Hory runs along the southeastern coast of Crimea.

#### Climate

The climate is continental with warm dry summers and very cold dry winters. Temperatures are higher along the fringe of the Black Sea while the Carpathian Mountains are colder and wetter all year round.

#### Industry

In Ukraine, most industry is based on the country's minerals reserve. The Donbas region has Europe's largest coalfield and is an important centre for iron and steel production. Belorussia's main industries are chemicals; machine building and food processing. Romania's manufacturing industries are growing with the help of foreign investment.

#### Farming and Land Use

The Black soils found across much of Ukraine are very fertile and the country is a big producer of cereals sugar beet and sunflowers, which are grown for their oil. In Moldavia and southern Romania the warm summers are ideal for growing grapes for wine, along with sunflowers and variety of vegetables. Cattle and Pigs are farmed throughout Eastern Europe.

### Population

Most Romanians live in Bucharest, the capital or in other cities and towns. In Ukraine, two third of the population lived in the cities in the Donbas industrial area. Most of the Belorussian people are city dwellers. Moldova is the most rural country in Eastern Europe; half its people live in the countryside and make their living from farming.

### The Mediterranean

### Landscape

The Mediterranean Sea separates Europe from Africa. It stretches more than 4,000 km from east to west. The Mediterranean Sea would be an enormous lake if it were not for strait of Gibraltar, a narrow opening only 13 km wide which joins it to the Atlantic Ocean. The Mediterranean lies over the boundary of two continental plates. The Mediterranean coasts are bordered by several thousand miles of sandy beaches. The area of sea off the coast of Tunisia and also the Adriatic Sea are shallower than the rest of the Mediterranean. The rugged Atlas Mountain runs through the most of Morocco and Algeria. They form a barrier between the Mediterranean and the Sahara, which lies south to them. Greek Islands has thousands of islands, which lie, both in the Mediterranean and in the smaller Aegean Sea. Some of them are the remains of old volcanoes which has left black sand on the beaches. Suez Canal links the Mediterranean to the Gulf of Suez and the Red Sea. Before it was built ship had to sail around the whole of Africa to reach Asia.

### Tourism

The tourism industry in and around the Mediterranean is one of the most highly developed in the world. More than half of the world's income from tourism is generated here. Resorts

have grown up along the northwest coast of Africa, and in Egypt, in southern Spain, France, Italy, Greece and Turkey, tourism brings huge economic benefit.

### Industry

The Mediterranean has a large fishing industry, although most of the fishing is small-scale. Tuna and Sardines are caught throughout the region and mussels are found off the coast of Italy. Fish canning and packing takes place at most of the larger ports. Small oil and gas reserves are extracted off the coast of North Africa and near Greece, Spain and Italy.

### Points to Remember

1. Europe is the sixth largest continent with an area of 10,360,000 sq km.
2. The highest point in Europe is Mont Blanc (4807 m) in the Alps and Mt Elbrus (5633 m) in the Caucasus.
3. Belgium and Netherlands are the two small low lands countries very thickly populated.
4. Iceland, Norway, Sweden and Denmark are collectively known as Scandinavia.
5. The Seine and Rhine are the important rivers that join the English Channel and the North Sea.
6. The Volga, which is the largest river of Europe, joins a landlocked Sea named the Caspian.
7. Elbrus is the highest mountain peak in Europe, which lies in the Caucasus.
8. Lombardy in Italy and the lowlands of Andalusia in Spain and the plains of Hungary are the lowlands.
9. More than 700 million people live in Europe and its population is highly urbanized.
10. Rotterdam, in the Netherlands is a part of conurbation, a large built up area with several towns and cities.
11. Temperate type of climate is found in Europe.
12. North European plain is the Europe's agricultural heart.
13. The Alps were formed when after can plate collided with the Eurasian Plate..
14. Estonia, Latvia and Lithuania are together

called 'Baltic State.'

15. Belgium, Luxembourg and Netherlands are called 'Low countries.'
16. The plain of Flanders in Western Germany has fertile soil.
17. The Burren is a large area of limestone rock in the west of Ireland. Its flat surfaces are known as limestones pavements.
18. The coast of Normandy is lined with high chalk cliffs.
19. The Duero, Tagus and Guadalquivir rivers flow across the Meseta on their courses to Atlantic Ocean.
20. Germany is a leading manufacturer of cars, machinery and transport equipment.
21. Sicily is the largest islands in Mediterranean. It has a famous active volcano called Mount Etna.
22. The Po Valley is a broad flat plain in North of Italy.
23. Sicily has Italy's highest temperature, due to warm African winds.
24. The Poland's largest river is Vistula. It flows northwards, passing through the capital Warsaw on its way to the Baltic Sea.
25. The Tatra Mountains are small range at the northern end of the Carpathian Mountains.
26. The Balkan Mountains forms a spur running east to west through Bulgaria and separate

the two main rivers, the Danube and the Maritsa.

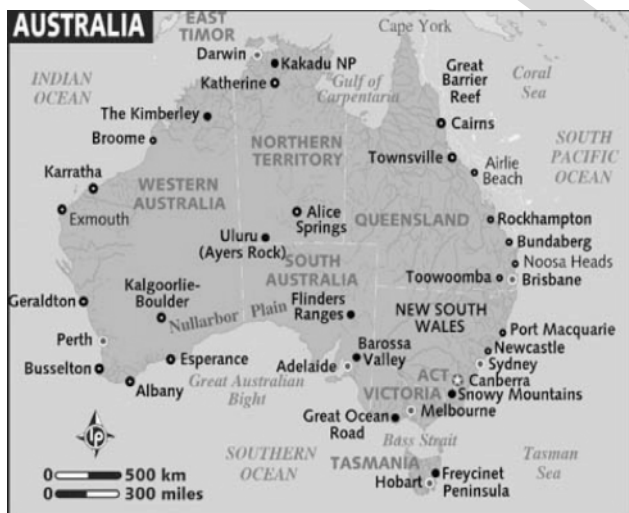
27. Carpathian Mountain Range is the largest mountain range in Eastern Europe. They are rich source of timber and minerals.
28. Suez Canal links the Mediterranean to the Gulf of Suez and the Red Sea. Before it was built, ship had to sail around the whole of Africa to reach Asia.
29. The Atlas Mountains runs through most of Morocco and Algeria. They form barrier between the Mediterranean coast and the Sahara, which lies south of them.
30. The Carpathian Mountains are both the coldest and the wettest parts of central Europe.
31. Tyrrhenian Sea divides the Italian mainland from Sardinia is gradually filling with sediments from the rivers, which flow into it.
32. Poland's largest river is the Vistula. It flows northwards passing through the Capital Warsaw.
33. Central Europe's main crops are cereals such as maize, wheat and rye, along with sugar beet and potatoes.
34. The worst nuclear incident in history happened at Chernobyl's nuclear power station in Northern Ukraine.

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# AUSTRALIA

It was British captain James Cook who first made voyage to the country in the 1770s. In 1778 captain Arthur Phillip unlocked Australia to the world. The present day boundary of Australia was delimited only in 1861. It was only after protected negotiations that the Commonwealth of Australia comprising New South Wales, Victoria, Queensland, South Australia, Western Australia and Tasmania came into being in 1901. The federation of Australia chiefly comprises these 6 states and two federal territories, the northern territory and the Australian capital territory of Canberra.



The term Oceania is used to denote the widely scattered islands of the central south Pacific; Australia and New Zealand are also frequently included in Oceania. The total population of Oceania was 31 million in 2001. Virtually, all the islands of the Oceania are either volcanic peaks or tiny coralline atolls built on submerged volcanic bases. Some of the islands such as New Guinea are sizeable land areas having snowcapped peaks as high as 5,000 m. The continent of Australia, however, shows no evidence of recent volcanism. Except for New Zealand and part of Australia, the whole of Oceania lies well within the tropics and enjoys continuous warm temperatures. The annual rainfall in Oceania may reach 400 cm in some locations. Two-thirds of Australia, a number of equatorial atolls and the leeward sides of mountainous islands tend to be arid.

**Oceania consists of:**

- (1) Australia and New Zealand,
- (2) Melanesia,
- (3) Micronesia, and
- (4) Polynesia.

Both Australia and New Zealand have minorities of indigenous inhabitants. The native Australian people are known as 'aboriginals', their population is about 260,000, living mainly in the tropical north and in the arid and semi-arid areas of the country. In New Zealand, the dominant indigenous group is Maori - a Polynesian people. They are concentrated in the Northern Island. Maoris at present constitute about 10 per cent of the total population of the country and their population is growing at a faster rate.

## Landscape

In comparison to other continents, Australia has diverse physical features. From the mountain ranges like the Great Dividing Range of Kimberly plateau to Nullarbor Plains and Great Australian Deserts. The two most important rivers of Australia are "Murray" and "Darling". The Great dividing Range in the east is not a fold mountain but only an edge of plateau which slopes gently from the east to the west. It is not continuous and exists as the Blue Mountain in New South Wales and as the Australian Alps in Victoria. It extends from Cape York in the north along the coast of Tasmania in the south. Mt. Kosciusko is the highest peak in Australia. Lying between the western plateau and eastern high land are the central lowlands, made up of Carpentaria lowland in the north. Lake Eyre basin lies in the middle - Darling basin in the south. Some of the important physical features are: Lake Eyre and Great Artesian Basin. The Western plateau or "Australian Outbreak" includes both steppe and desert climate types. The important deserts include "Gibson", "Simpson", "Great Victoria" and the "Great Sandy desert". The "Great Barrier Reef", the longest coral reef in the world, is

situated on the north - eastern coast of Australia.

### Climate and Vegetation

It is the Tropic of Capricorn which cuts the continent into the northern and southern parts. The climatic condition of the entire continent is defined by the Eastern Highlands and monsoonal circulation. The northern and the northeastern Australia have tropical monsoon and Tropical marine climate, a modified form of the tropical monsoon. The region is known for deciduous forest, onshore trade winds and uniformly distributed rainfall. The "Natal type of climate" is found in the south- eastern parts. Here the rainfall is uneven and annual temperature is very low. The "Southerly Buster" is



a violent cold wind blowing along the coast of New South Wales. In this zone, the vegetation is luxuriant with temperate "Eucalyptus" dominating the Australian Alps of Victoria and the Blue mountains of New South Wales.

The Mediterranean type of climate is found in the southern coast of Australia which is characterized by warm dry summer and cool moist winters. The Eucalyptus trees are more common while "Jarrah" and "Karri" are commercially most important.

The "British type" of climate is found in the inlands of Tasmania and New Zealand. Temperate Eucalyptus is found in Tasmania, while

coniferous can be seen on the higher slope of southern Alps in New Zealand.

Most of the parts of Australia is characterized by the arid and semi - arid vegetation. The Great Australian desert is next only to the Sahara. The natural vegetation here is xerophytic, adapted to low moisture high salinity and low humus content. In the northwest especially on the Kimberly plateau, the famed "Bottle trees" can be found. The trees are of bottle- shaped and store water in their bulbous trunk.

There are two type of grassland in Australia - the "tropical" and the "temperate". The tropical Savanna Grasslands are found in the North and are marked by hot rainy and cool dry season with extreme diurnal range of temperature. Their natural Vegetation consists of the tall and coarse grasses with deciduous trees. The species like "Mallee" and "Mulga" are found in the scrub of this forest. The temperate grassland of the south are called "Downs". It is characterized by continentality, extreme of temperature and high annual precipitation. The entire region of Australia is famous for sheep rearing and the world's largest number of sheeps are found here.

### Economy

The wool, meat and wheat have been the country's top three income earners. The cattle are reared in the wetter regions that allow better growth of grasses. It is mainly an agricultural nation, but only 5 per cent of the land is under cultivation and agriculture is mainly carried on the south western and southeastern parts and eastern coastal areas. Wheat, the most important crop of Australia, is grown mainly in New South Wales and Western Australia. The commercial grain farming is big business in Australia. Australia is also endowed with the diverse mineral resource. The "Gold rush" started with the discovery of Gold in Victoria and New South Wales in 1851. At present, minerals exports contribute significantly to the country's economy. Japan is the largest importer. Its fairly diversified manufacturing sector is concentrated in Victoria and New South Wales. Australia is basically dependent on the exports of primary products which signify its category into a developing rather in a developed economy.

### About New Zealand

The small island "New Zealand" lies across the Tasman Sea. It is the "Maoris" who first inhabited here. Abel Tasman landed on the island in 1640 from when the process of colonization started. New Zealand mainly consists of two main islands - the North and the South and a number of smaller ones. The south island is relatively longer than the North islands, but they together constitute bigger in size than the Great Britain. "Mt. Cook" is the highest peak in New Zealand which lies in the Southern Alps. The "Taranaki plain" is the slope of the central highlands in North islands and an important pasture land. The "Canterbury Plains" of the south island are also important for cattle. The Europeans account for 85 per cent of the total population while the "Maoris" constitute only 10 percent. New Zealand is also one of the foremost milk producing countries. The cold and humid climate is very conducive for the growth of nutritious grasses. The Canterbury plain of New Zealand is well known for sheep rearing and is the main farming regions of "New Zealand."

### Continental Facts

- **"Sydney"**: It is the oldest and largest city of Australia. Its harbour, "Port Jackson", is the biggest port of Australia and the main export centre of wheat and wool. It was the venue of the millennium's last Olympics. The "Sydney Opera House" and "Sydney Harbours" are well known across the world.
- **"Boomtong"**: It is a carved throwing club of tough wood used by the Australians aborigine. It is widely used for hunting.
- **"Canberra"**: It is the capital of Australia and located on the "Molonglo River". Canberra was built as a compromise capital in order to stop squabbling between Melbourne and Sydney.
- **Great Barrier Reef**: It is the world's longest coral reef which extends like a long - ridge off the north - east coast of Queensland. It consists of thousands of separate reef. The reef is generally formed from the calcareous remains of micro - organism which is known as "coral polyps", at present the reef is facing threat from environmental degradation especially from tourists.

- **The Northern Territory**: It is the only federal territory that has legalised voluntary "euthanasia". It was done in "1995".
- **"BSC-MA-PhD"**: This acronym refers to the mnemonics for clockwise arrangement of the Australian coastal cities which starts from Brisbane, Sydney, Canberra, Melbourne, Adelaide, Perth and Darwin.
- **"Don Bradman"**: He was the legendary cricketer and regarded as an idol and a national treasure by the Australians. He symbolizes Australian nationalism like no one else.
- **"Koala"**: The Guinness Book records it as the most discriminating "mammalian eater". It feeds exclusively on eucalyptus leaves.
- **"Road Trains"**: It is a type of transportation unique to Australian road in which several cargos - container like boxes are connected end to end and hauled by a common engine. They are used to transport cattle and horses.
- **"Artesian Basin"**: It is a type of structural basin of sedimentary rocks which produces a constant supply of water that rises to the ground surface by means of an artesian well from a subterranean aquifer which holds water under a pressure-head and is sandwiched between two layers of impermeable strata. Australia and New Zealand have some of the largest Artesian basins of the world.
- **"Niue"**: It is a self-governing overseas territory of New Zealand which was sighted by Captain James Cook in 1774 who called it the Savage Island. It is the world's largest uplifted coral island and the New Zealand has responsibility of looking after external affairs and defence of this island.
- **"Ayers Rock"**: It is a conspicuous Inselberg which reaches out to a height of 348 m as a huge red rock in the middle of a desert.
- **"Australian-Trans-Continental Railways"**: It is an important link which connects "Sydney with Perth". Important stations on this route are mining towns like Broken Hills, Peterborough, Port Augusta, Karlgoolie, Coolgardie etc.

### Points to Remember

1. The Australian cities in decreasing order of population are Sydney, Melbourne and Brisbane.
2. Australian states in decreasing order of population are; New South Wales - Victoria - Queensland - Western Australia.
3. Australia is one of the most important members of "common wealth".
4. Australia is world's largest producer of "bauxite".
5. Western Australia is the largest state while New South Wales is the most populous.
6. New Zealand coast was explored by Cook in 1769.
7. The major roads in Australia are called "Commonwealth Highway".
8. The "Trans- Continental Stuart Highway" connects Birdum (Northern Territory) to Oodnadatta (South - Australia) via Alice Spring and Tennant Creek.
9. "Rotorua and Maoti" towns have hot geysers; "Pohutu Geyser " is the most famous one.
10. Australia is the "smallest" of all continents.
11. Australia stands for Australia and New Zealand.
12. The largest state of Australia is the "Western Australia".
13. The largest city of Australia is Sidney.
14. "Emu" is the flightless bird of Australia.
15. The New Zealander who was first to scale Mt. Everest was "Edmund Hillary".
16. "Niue" is the highest uplifted coral island of the world.
17. "Canterbury plains" is the chief farming region of the New Zealand.
18. "Mt Cook" is the highest peak of New Zealand.
19. "Taranaki plain" of New Zealand is famous for the dairy industry.
20. "Lake Eyre" is the region of inland drainage in Australia.
21. "The Great Artesian Wells" is the natural fountain in Australia.
22. "Mt. Kosciusko" is the highest mountain peak in Australia.
23. "Auckland" is the most populous urban centre in New Zealand.
24. "Abel Tasman" was the first European to discover New Zealand.
25. "Bass strait" is the strait between Australia and Tasmania.
26. The "Great Barrier Reef" lies on the coast of "Queensland".
27. The "Cook Strait" is the strait between the North and South island of New Zealand.
28. The pride of Australia Don Bradman hails from the city of "Brisbane".
29. "Marambidgee" is the longest tributary of "Murray - Darling".
30. "Kalgoorlie" is famous for "Gold - Mining".
31. "Platypus" is an animal bird with 4 legs that lays eggs.
32. "Kangaroo" is the national animal of Australia.
33. "Wellington" is the southernmost capital city of the world.
34. "Qantas Airways" is the international airline of Australia.
35. "Maoris" is the aborigines of New Zealand of Polynesian descent.
36. "Gippsland" is famous for petroleum.
37. "Sheep - rearing farm" in Australia is called stations.
38. "Hobart" is the capital of Tasmania.
39. "Victoria" is the most industrialized state of Australia.
40. "Mt. Tom Price" is famous for Iron.
41. Lead, Zinc and Silver are mined at Mt. Isa and Broken Hills.
42. "Downs" is the temperate grassland of Australia.
43. "Torres Strait" lies between Australia and New Guinea.
44. "Trans - Australian Railways" runs between Perth and Sydney.
45. "Freemantle" is the out port of Perth.
46. "Bindibu" are the aborigines of Australia.
47. Canberra is located on the banks of river "Molonglo".
48. New South Wales is the most populated of the Australian states.



### Introduction

The continent of Anglo-America comprises the world's two largest countries- the United States of America (USA) and Canada. In spite of a wide range of socio-economic inequality, diversity of national background and language, the indigenous American culture is flourishing. Its culture encourages the entrepreneurship, development of skill and pursuit of excellence. This is the reason why USA and Canada have emerged as the two most developed countries of the world. The natural resources have facilitated the development of world's largest manufacturing complexes and as a result of it large scale urbanisation. The entire agricultural



activities in the continent are mechanized, export oriented and commercial.

### Landscape

The entire physiography of Anglo-America varies from Swampy plains to high mountains. Some of the well-known plains are "the Canadian Shield" the "Arctic Coastal Plain," the "Gulf Atlantic Plain", the "Piedmont Plain" and the "Interior Plains". The interior plains lie mostly within the drainage basins of the rivers Mississippi, Mackenzie, Saskatchewan and St Lawrence. A large part of Canadian Shield is

covered with swamps and numbers of lakes of glacial origin such as "Great Bear Winnipeg" and the "Great Lakes". The "Appalachians", "Western Cordillera" and "Interior Highland" are some of the important highlands. The Arkansas river divides the interior highlands into two major segments- the "Boston" and the "Ozark" mountains in the north and "Ouachita Mountain" in the south. The mountain range comprises the "Rocky Mountain" and "Sierra Nevada". The "Great Basin" is the largest plateau basin. "St. Lawrence" and "Mackenzie" river which flow northward are the important rivers. The Mississippi flows southward.

### Climate and Vegetation

The "non-tropical" type of climate is the most prevalent one in Anglo-America except Florida, where "tropical climatic" type is found. The "Tundra Type of Climate" is found in areas from the Alaska to Labrador and Greenland. The mean annual temperature is very low in the region. Within the Arctic Circle, there are weeks of continuous darkness or light. The "cool temperate continental" or "Siberian" or "Taiga" type of climate is found south of the Tundra region. Here, the mean annual range of temperature is very high and the precipitation is very low. The "Cool Temperate Eastern Margin" or "Laurentia type" of climate is found in south of Taiga. Here, deciduous trees species oak, beech, maple and birch are important. The "Cool Temperate Western Margin" or "British type" of climatic condition is mainly found in the north-west where westerlies influences may be traced. Due to oceanic influence, the mean annual temperature is not very large. The important species include elm, beech, poplar, alders and aspen. "The Warm Temperate Eastern Margin or China type" of climate is found in the south-east. The annual rainfall is heavy and well distributed throughout the year. The occurrence of "tornadoes" and "twister" is very common in this region. The "Warm Temperate Western Margin or Mediterranean type" of climate is found in California. The summer is dry and warm and the winter is moist. The "Desert

type" of climate is found in the region of Mohave, Sonoran and California deserts. Bordering the desert, in the interior of the continents lies the temperate Grassland. It is almost completely treeless. In North America, these are called "Prairies". An interesting feature of the Prairies is the hot local wind "Chinook" or "Snow Eater". It blows down the eastern slopes of Rockies. The Prairies is covered with Grass and no trees. Species like "Low Willow", alders and poplars are found here.

### USA

The USA is also known as the "Melting-pot of the world" because according to the latest census report nearly 85 per cent of the US population identified themselves with one of more than 140 different national backgrounds. Some of the important nationalities here are; British Irish, French, Italian, Scandinavian, African and more recently Chinese, Indian and Korean. The immigrants have brought with them different religions. The important ones are Islam, Buddhism, Confucianism and Hinduism. Nevertheless, Anglo-America remains Christian dominated.

The North-East region of U.S.A. consists of 6 New England states; Maine, New Hampshire, Vermont, Massachusetts, Connecticut and

Rhode Island and five middle Atlantic states; New York, Jersey, Pennsylvania, Delaware, Maryland and the districts of Columbia. These areas are intensely developed and most densely populated. These are also the most urbanized region. The extraordinary urbanisation is the by-product of industrialization in this region. The old textile town "Lowell and Lawrence" are the new avenues of employment.

The southern side includes the 14 states and accounts for 25 per cent of the total area and little over 30% of the population. This region has intermediate population density and lower level of urbanisation. The economy of the south is dominated by production of cash crops for the world market. The cotton growing region has now shifted to Atlantic coastal region of Georgia and South Carolina. Which is also called "Sea-Island". By 1860, "the Black-Belt" extending from Alabama of Mississippi had come to the principal centres of the U.S.A. The Midwest includes 12 states and accounts for 20 per cent of the total land area and approximately 25 per cent of the population. This region is the leading producer of agricultural products and manufactured goods. In value term, the Midwest accounts for the 40 percent of the total agricultural production. The industrial development decreases from east to west.



Agricultural Product	Leading Producer
Rice	Arizona
Wheat	Saskatchewan
Cotton	Texas
Grapes	California

Orange	Florida
Corn	Illinois
Sugar	Florida
Groundnut	Georgia
Tobacco	Kentucky

Apple	Nova Scotia
Corn	Ontario
Barley	Alberta
Oats	Alberta

The Western region comprises 11 states and accounts for 33 per cent of the land area and 20 percent of the population. In spite of water shortage, the region accounts for 20 per cent of the agricultural production. In southern California, the favorable climate and irrigation from the mountain streams supports the production of citrus fruits. Today the central valley is highly productive. "Oregon and Washington" are the leading producer of timber especially softwood varieties like "Douglas fir". The "Silicon Valley" of San Francisco region is well known for computers and biotechnology. The "Boeing Company of aircraft manufacturing" is located in Seattle. The copper in "Arizona" and oil and coal in "Utah" is well known. The western Pacific is now emerging as the world's most economically dynamic region.

### Canada

At present, Canada is one of the most industrialized and technologically advanced and urbanized state of the world. The prominent characteristic of Canada is the greater reliance on the export of raw and semi-finished material while it imports the manufactured goods. The overbearing influence on U.S.A. on Canada has been a sure point to many Canadians who think of themselves as "American Colony".

### Social Aspect

A large part of Canadian population is concentrated around its border with the U.S. In fact 70 to 80 percent of the population lives within 160 km of the border. Canada's population cluster may be grouped into four main regions:

- Atlantic region in the northeast
- Culturally divided core region of maximum population and development along the St. Lawrence River in Ontario and Quebec
- the Prairies region of interior plains and
- Vancouver region in the south-west.

City	Rivers
New York	Hudson
Chicago	Chicago
Philadelphia	Lower Delaware
Cleveland	Cuyahoga
Baltimore	Patapsco

Minneapolis	Mississippi
Cincinnati	Ohio

The easternmost of the Atlantic region is most populated regions. It consists of the province of Newfoundland, New Brunswick, Nova Scotia and Prince Edward Islands. The Prince Edward Island is a lowland occupied by farm and small agglomerated settlement. The Labrador located on the mainland, is a part of the province of Newfoundland. In this region, the fishing industry is the most important. The Atlantic province provides a hard environment for agriculture. At present, agriculture is mainly concentrated in very small patches of good land dedicated to specialized farming. These include the "Prince Edward Island" and "Annapolis-Cornwallis Valley" of Nova Scotia where potatoes and apple are grown. Prince Edward Island has the highest proportion of tilled land of any Canadian province.

The core region of Canada consists of the provinces of "Quebec" and "Ontario". In Ontario, the American Midwest is repeated on a somewhat smaller scale with corn and live-stock production, dairy farming and other special crops like fruits and vegetables while in Quebec, one find the "long lot" pattern of land-holding with dairy farming being the predominant form of agriculture. This region produces a wide variety of industrial products and accounts for more than  $\frac{3}{4}$ th of the Canada's output. The "Ontario" is well-known for iron and steel-industry. Other important industries include automobiles and auto-spare parts.

In Quebec 82 per cent of the people speak French and only 11 per cent speak English while it is quite the reverse in Ontario. The government in Quebec is French dominated.

The Prairies province or Pacific Region includes Manitoba, Saskatchewan and Alberta. This region is full of the tall Prairie grasses. Agriculture is the basis of this region's economy. Together these provinces produce around half of the farm produce of Canada and sell about a fifth of world's wheat exports. Of the three Prairie Provinces, Saskatchewan, with nearly 20 per cent of the total employment in farming, is agriculturally the most important. In recent times, minerals, especially oil and natural gas have become the foundation of advances in the region's economy. Coal, potash, nickel, copper, zinc and uranium are important minerals are mined in this region.

## Vancouver Region

This province lies within the high coast range and Rockies. This pacific province of British Columbia displays an environmental difference from the rest of the Canada. It is also a distinctive area, climatically, with British type of climate. The province is also sparsely populated with concentration of population around the Vancouver. It consists of more than 10 percent of the land area but it has over half of the province population. The economy of this region is chiefly based on the primary products especially timber and minerals including coal, oil and natural gas. This province is also well developed in hydro electricity. The fishing industry is also very well developed. In the recent times, this region has also experienced rapid urban growth.

## Industrial Centres

Centre	Specialization
New York	Garments
Baltimore	Iron and Steel
Buffalo	Iron and Steel
Pittsburg	Iron and Steel
Delaware	Chemical Industry
Wilmington	Chemical Industry
Boston	Photographic equipments
Rochester	Photographic equipments
Massachusetts	Electronic Industry
New York	Electrical equipment
Pittsburgh	Electrical equipment
Hartford	Aircraft Engines
New York	Printing and publishing
Washington D.C.	Printing and publishing
Detroit	Automobile industry
New Orleans	Oil refining, Petrochemical
Baron Rouges	Oil refining, Petrochemical
Chicago	Machinery and steel, Locomotive, Food processing, Wood products
Toledo	Glass Industry
Cleveland	Iron and Steel
Akron	Automobile tyres

The Canadian North comprises most of the territory. The population is dispersed in a small pockets along the southern fringe of the North

called "Near North" - the southern edge of the sub-arctic climate zone. Mining settlements form many of such pockets of population. Sudbury and Ontario are the most important one. Metal and paper industries are commonly found here. The agriculture potential of this region is severely limited because of harsh climatic condition. The agricultural activities are mainly concentrated around the Sanguinary River, the clay Belt of Ontario and Quebec, the Peace River plain of Alberta and British Columbia.

## Yukon and North-West Territory

This region is also known as "**Territorial Canada**" which is in federal control and comprises over a third of Canada's areas. The population consists of Native Indians, Eskimos and the people of mixed white origin. The white people are primarily engaged in the service sector while Red Indians and Eskimos still carry on their traditional hunting and gathering activities. The Native Indians and the Eskimos, on the other hand are generally unemployed and dependent on state support. In the recent time, the political assertiveness of the Indians and Eskimos, who have demanded a greater control over their affairs, has further delayed the process of development.

### Characteristic Facts

- **Douglas fir:** It is a type of tree species used in timber industry. It is found in the western USA especially in Washington and Oregon. The "Yellow" and "loblolly pines" are important tree species. The state of British Columbia is most important centre for the timber industry in Canada. Canada is the largest producer of newsprint while USA of paper and pulp.
- **Grand Canyon:** The Grand Canyon of Colorado is the largest of its kind and is famous for its stark natural beauty. It is a deep-cut gorge with wall like side in the soft rocks of Colorado plateau. In the year 1869, J.W. Powell led a pioneering expedition down the Colorado River through the Grand Canyon. He remarked, "the canyons of this region would be a Book of Revelation in the rock-leaved Bible of Geology."
- **NAFTA:** It refers to the North American Free-Trade Area which is a type of



grand economic alliance of U.S.A., Canada and Mexico. It has progressively eliminated the barriers of trade-goods and services which has also enabled the formation of world's largest trade block.

- **San Andreas Fault System:** It is the largest fault system of North America. It is inclined towards the north westerly direction through much of western California. The fault is transformed boundary. Due to the westward movement of the "pacific plate" earthquake are frequently experienced in this region. Owing to the great length and complexity of San Andreas Fault, it is more appropriately referred to as "fault system".
- **Blizzard:** It is an intensely cold and strong wind accompanied by falling snow found in the northern North America. It is called "Buran" in Eurasia.
- **The Rustbelt/the Old Metropolitan and Sunbelt:** These belts refer to the division of U.S.A into two major categories. The old metropolitan belt consists of those towns which had attained prominence by early 20th century which is growing very slowly and in some parts is even declining, especially in the Middle Atlantic belt and eastern Midwest. Such area of declining is known as "Rustbelt". The Rustbelt is characterized by outmoded buildings and equipment, depressed sales, high unemployment and unattractive surrounding. The "Sunbelt" on the other hand is a very elastic term and includes most of the south and parts of the west. It is best symbolized as "Silicon Valley" and "Sunny California". It is characterized by faster growth of the population and job.
- **Corn-Belt:** It is known for its Rectangular shape. This was prescribed in "1785" by the Federal law. It has established a system of uniformity in the entire U.S.A.
- **Highway Technology:** It refers to the Highway 128 in eastern Massachusetts because a large number of industrial units, manufacturing industries and electronics industry are situated along the roadways.
- **Long-Lot:** It refers to a type of landholding in "Quebec". It is a long narrow strip of agricultural land which lies at right angles to ribbons of comparatively dense

settlement along roads where the houses and farm buildings have formed elongated village.

- **Toponyms:** It refers to the type of Catholic settlement in the New World or Quebec in USA. The Toponyms of Quebec settled initially by the Catholics and the New York state was settled by the Protestants.
- **Yeoman Farmers:** It chiefly refers to the migrated farmers who settled in Piedmont and Appalachians and established semi-subsistence agriculture. The main reason of migration is the spread of plantation industry in the south.
- **Cajun French:** It refers to the largest non-Hispanic minority language group of southern Louisiana. The French Settlement existed during the early 1700, but the arrival of refugee group "Acadians" who planted the French culture.

#### Points to Remember

1. United States is the largest consumer and importer of mineral oil in the World. It has only 3 percent of the World oil reserve.
2. "Prince Edward Island" is Canada's smallest and most densely populated province.
3. "Newfoundland", the oldest British colony was the last province to join Canada in 1949.
4. The northernmost mine of the world is highly mechanized. "Polaris" a zinc and lead mine is just 130 km south of the North Magnetic pole.
5. The states of USA in descending order of area - Alaska > Texas > California > Montana.
6. "Rhode Island" is the smallest state of USA.
7. "George Washington" was the first president of USA.
8. "Hollywood" is in the state of California. It was established by Harvey Wilcox in 1887.
9. The river "Rio Grande" forms the boundary between U.S.A and Mexico.
10. "Distt of Columbia" is the smallest administrative unit of the U.S.A
11. "California" is the most populated states of U.S.A
12. "Mt McKinley" is the highest peak in North America.

13. "Mt Whitney" is the highest peak in conterminus USA.
14. The Great Lakes arranged from West to East - Superior, Michigan, Huron, Erie and Ontario.
15. "Michigan" Lake is entirely lying in U.S.A
16. The 49°N latitude separates USA and Canada.
17. "Seattle" is the head office of software giant, Microsoft.
18. The Canadian Pacific Railways runs between St. John's in New Brunswick and Vancouver.
19. The Canadian National Railways connects Halifax to Prince Rupert in British Columbia.
20. The "Davis Strait" separates N.America from Greenland.
21. The "Sudbury Mines of Canada" is famous for Lead, Zinc and Silver.
22. "Hamilton" is called the Birmingham of Canada.
23. "Windsor" is called the Detroit of Canada.
24. The highest tidal range is experienced in the "Bay of Fundy".
25. Canada is the largest producer of paper and pulp.
26. "Prince Edward Island" is the smallest province of Canada.
27. "Toronto" is the largest city of Canada.
28. "Ontario" is the most populated province of Canada.
29. Maritime province of Canada includes "New Foundland", "New Brunswick", "Nova Scotia" and "Prince Edward Island".
30. The largest province of Canada is "Quebec"
31. "Toronto" is the capital of the province of Ontario, Alberta, and Nova Scotia.
32. "Nunavut" is the most recent federal territory of Canada.
33. There are 10 provinces and 3 federal territories in Canada.
34. The Mediterranean type of Climate is found in California.
35. "St Louis" is the confluence of Mississippi and Missouri.
36. "St. Lawrence" is the busiest inland waterways of N.America.
37. The Damodar valley Corporation of India is on the line of "Tennessee Valley Corporation".
38. "Alaska and Hawaii" are the 49th and 50th state of U.S.A, respectively.
39. "The Yellowstone National Park, Wyoming" is the old faithful Geyser.
40. Canada generates largest amount of hydro-electricity as percentage of total power produced.
41. 'Chicago' is located on the shore of Lake Michigan
42. "Niagra Falls" lies between Lake Erie and Ontario.
43. "Soo Canal" joins Lake Superior and Huron.
44. "Welland Canal" joins Lake Erie and Ontario.
45. "Big Apple" is the nickname of the city of New York.
46. "New York" is the largest urban agglomeration of the U.S.A.
47. "Cape Kennedy, Florida" is known as the rocket launching centre of the USA.
48. "J.F. Kennedy Airport, New York" is the busiest airport of the U.S.A.
49. USA has owned the "Davis Cup" maximum number of times.
50. "Baseball" is the national sport of the U.S.A.
51. "The Star Spangled Banner" is the national anthem of U.S.A.
52. "Death Valley" is the driest and hottest place in U.S.A.

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# SOUTH AMERICA

The continent of South America was originally discovered by Columbus. This fourth largest continent of the world has diversity of physical landforms, people, culture and flora



and fauna. Therefore, it is also referred to as the "new world". In comparison to other continents, it has experienced the forces of change and its economy has ascended rapidly in the market driven economy of the modern times.

## Landscapes

The western part of continent is surrounded by the "world's longest and highest" mountain range "Andes". The Andes is a type of young fold mountain which is more or less similar to the Himalayas and run 7,000 km on the west coast. "Mt. Ojas del Salado" in the Andes is the highest active volcano in the world and "Mt Aconcagua" is the highest peak. The two important highland outside the Andes; "Guiana Massif" and "Brazilian Highland" are famous for coffee plantation.

Some of the well-known rivers of the South America are Amazon, Orinoco, Parana and Paraguay. The river Parana forms the boundary between the Paraguay and Brazil. "Itaipu", the largest dam of South America, is located on it and generates 40% of the Brazil's electric-

ity. The Guiana falls, with most voluminous discharge in the world is also on the Parana River.

## Climate and Vegetation

The climate of South America is generally hot because it lies within the tropical zone. The equatorial type of climate is found in the entire Amazon basin. The entire region is covered with the tropical rainforests which is locally known as "Selvas". The "balsa", the lightest wood in the world, is found here. The Selvas lies between the tropical grasslands called "Llanos" in the north and "Campos" in the south. In this region, "Tropical Savanna Type" of climate is found. The southern part of the Campos is marked by a "warm temperate eastern



margin type of climate" or China type. There is small annual range of temperature and rainfall. This region also experiences violent local storms. In Argentina and Uruguay, a cold wind called "Pampero" blows. It is accompanied by the thunder and lightnings.

The northern part of Chile and the southern plateau experience a typical "hot desert type of climate". The Atacama Desert", the driest in

the world, is a trade wind desert. "Patagonia" a mid-latitude desert is another well-known desert of South-America. It is a desert because of "rain-shadow effect of the Andes".

The "Mediterranean type" of climate which is characterized by warm dry summer and cool moist winter is found in central Chile. The natural vegetation here consists of the evergreen trees having thick, shiny leaves which are able to withstand the drought like conditions. The trees of Oak, walnut and chestnut are abundantly found.



The British type or cool temperate western Margin type of climate is found in the southern Chile. The natural vegetation is characterized by temperate mixed deciduous forest. The Brazilian Highland and the south of Gran Chaco are covered with the temperate grasslands called "Pampas" in Argentina. These grasslands are particularly treeless. In the Pampas, the natural grass has been replaced by a more nutritious leguminous variety called "Alfalfa".

### Social Life

The people of South America belong to three main racial group Amerindians, Black and Europeans. The people of mixed origin such as "Mestizos", "Mulattos" and "Zambos" are also found. Mestizos form the largest group. The persons of Indian origin have settled in Surinam, Guyana and Trinidad & Tobago. The most characteristic feature of the South American demography is the prevalence of high degree of urbanisation despite low level of technology and development. The rural to urban migration is very high because of both the pull and push factor. The entire economic activities

are centered around the agriculture and trade in primary products. In the north-east Brazil, plantation agriculture is practised. "Coffee" is the chief crop of Brazil which is grown in the south-eastern highlands and Andean templada. The Mediterranean region of the Chile is suitable for the "Citrus fruits". The shifting agriculture is practised in the Selvas.

### Industry

Iron & Steel  
Chemical and  
Pharmaceutical  
Automobiles  
Cement  
Meat Packing  
Food Processing

### Leading Countries

Brazil  
Brazil  
Brazil  
Brazil  
Brazil  
Argentina  
Argentina

### Mining

#### Mineral

Oil  
Tar  
Iron Ore  
Copper  
Tin  
Nitrates  
Phosphates  
Bauxite  
Silver

#### Leading Producer

Venezuela  
Trinidad  
Brazil  
Chile  
Bolivia  
Chile  
Peru  
Surinam & Guyana  
Mexico

### Agricultural Products

#### Product

Coffee  
Cotton  
Soyabean  
Wheat  
Fisheries

#### Leading Producer

Brazil  
Brazil  
Brazil  
Argentina  
Peru

### Points to Remember

1. The coffee soil of Brazil is called "Terra Roxa".
2. "Paraguay", "Uruguay" and "Bolivia" are the three buffer-states between Argentina and Brazil.
3. "Venezuela" is the south-American country which is member of the OPEC.
4. "Santos" is the outport of Sao Paulo.
5. "Cinchona" is the tree that yields quinine.
6. Brazil shares the boundary with all South

- American countries except "Chile" and "Ecuador".
7. South American countries in descending order of size; Brazil-Argentina-Peru-Colombia.
  8. "Sucre" is the legal capital of Bolivia.
  9. "La Paz" is the administrative capital of Bolivia.
  10. Punta Arenas and Chile are the southernmost inhabited cities of the world.
  11. French, Italian, Portuguese and Spanish are the Latin languages.
  12. "Portuguese" is the official language of Brazil.
  13. "Chuquibambilla" is the copper capital of the world.
  14. "Brazil" is the country with the largest reserve of hardwood.
  15. World's largest exploitable reserve of copper is found in the "Chile".
  16. "Minas Gerais" is the most mineral rich state of Brazil.
  17. "Drake Passage" is a strait between South America and Antarctica.
  18. Iquique in Atacama is the driest place on the Earth.
  19. "Colombia and Chile" are the South American countries with coast along both Pacific and Atlantic Ocean.
  20. "Titicaca" is the highest navigable lake in the world.
  21. "Brazil" is the only country through which both equator and one of the tropics pass.
  22. "Balsa" is the lightest wood that is found only in South-America.
  23. "Sao Paulo" is the largest city of South America.
  24. Argentinean ranches are called "Estancias".
  25. "Gauchos" are the people of mixed European and American Indians ancestry who work on cattle farms.
  26. "Mt. Aconcagua" is the highest peak of South America.
  27. "Madeira" is the largest tributary of Amazon.
  28. Some of the South American countries bordering Caribbean Sea are: "Colombia, Venezuela, Guyana, Surinam, French Guiana and Brazil".
  29. Caliche or Sodium Nitrate is found in "Atacama Desert".
  30. "Kourou" the French satellite launching station is in "French Guiana".
  31. Lake Maracaibo, famous for crude oil is in Venezuela.
  32. "Alfa-Alfa" is the nutritious leguminous grass of Pampas.
  33. "Angel falls" the highest in the world is on "Orinoco river of Venezuela".
  34. "Pampero" is the violent cold wind in Argentina and Uruguay.
  35. "Pampas" is the temperate grassland of Argentina.
  36. "Tubarao of South Brazil" is South America's largest steel making facility.
  37. "Coffee Plantations of Brazil" are called "Fazendas".
  38. "Bolivia" and "Paraguay" are the landlocked countries of South America.
  39. Bolivia is named after "Simon Bolivar".
  40. Trans - Andean airways connects "Buenos Aires" and "Valparaiso".
  41. "Entre Rios" is also called Mesopotamia.
  42. "Polygon of drought" is a term used to describe the Brazilian North-East.
  43. "Gran Chaco" is an inland plain of South America in Bolivia, Paraguay and Argentina. It has warm temperate forest and grasslands.



### Landscape

The "Middle America" comprises countries from Mexico to Panama and all the islands of Caribbean Sea. The mainland of the Middle America which is the site of development of the Meso-American culture is also a zone of conflict. It chiefly consists of two regions "Mexico" and "Central America" which includes within it seven countries Guatemala, Belize, El Salvador, Honduras, Nicaragua, Costa Rica and Panama. The size and population of Mexico exceed the combined population and area of all others Middle American countries put together.

### Social Features

About 60 per cent of all the Mexicans are "**Mestizos**" 25 per cent are Americans while only 9 per cent are Amerindians. In Mexico, two way exchange of cultural change has occurred. Here, Mexican Amerindians have been Europeanized while the modern Mexico is strongly indianised. Some of the distinctive Mexican modes of dress, cuisine and architectural style also reflect Amerindian contribution. The largest number of Mexicans are Roman Catholics.

### Climate and Vegetation

Over a half of Mexico lies to the North of Tropic of Cancer and is dominated by desert and steppe climatic type. The south of the Tropic of Cancer is inhabited by huge population. Mexico's climate is marked by dryness particularly in the mountain-flanked north. It is among the top five producers of agricultural products such as sugarcane, citrus fruits, coffee and corn. The central Mexico region is too high for Tierra Templada crops. The prevailing Tierra Fria environment allows only such crops which are resistant to frost damage. In the northern, Mexico the "steppe" or "desert" type of climate is found. "Lumbering" is important economic activity here. The Gulf Tropics region of Mexico is the main producer of plantation crops including Cocoa, Sugarcane and rubber.

### Minerals

The physiographic diversity of Mexico has also provided to Mexico, vast mineral wealth. Antimony, petroleum and sulphur are the chief minerals of Mexico. Mexico still exports a major share of world's silver apart from copper, zinc and lead. The yearly rate of growth of Mexican population is nearly 2.3% and it is expected that its population will double by 2025.

### Important Central American States

#### Guatemala

It became republic in "1839" and it is the most populated of the Central American countries. Most of the population belongs to the Indian and Mestizo origin. There has been a rebellion against the military backed rule. Cotton and coffee remain the major sources of income. A fairly diversified agriculture, exploitable timber resources, vast deposit of nickel, etc. Are the hope of future growth.

#### Belize

It became independent in 1981. English is a lingua franca here. More than half of the population is "Creoles" or English speaking black who are found mostly in the coastal region. Sugar is a principal export item. In 1859, a treaty was signed between Britain and Guatemala delineating the territorial boundary of Belize.

#### Honduras

There 90% of the population is Mestizo. It is the poorest Central American country and the economy is entirely based on agriculture, livestock, forestry and mining. Although Honduras has a democratically elected government, the military continues to wield a strong influence. There is a development of light industry and tourism.

## El Salvador

It is the "smallest" and most populated country in central America. The economy is based on the agriculture and the principal crop is coffee. It is also the principal source of medicinal gum. Here 90 per cent of the population is "Mestizos" and 5 per cent are Amerindians. The civil war has disastrous consequences for the society and economy of the country.

## Nicaragua

It is the largest and sparsely populated of the central American nation. It became independent in 1838. The civil war of the country was ended in 1990 in which more than 30,000 people were killed. Unemployment in Nicaragua is 50 per cent. The population growth rate is 3.1 per cent.

## Costa Rica

Costa Rica has no standing army and it is the oldest democracy in middle and South America enjoying uninterrupted political freedom since 1889 and it is also the most economically developed nation in this region. It has literacy rate of 95%. It is described as "Switzerland of Central America".

## Panama

The well known 'Panama Canal' built by the U.S.A is situated here. About 60 per cent of the population is Mestizo. Most of the rural population is Concentrated along the canal. Banana, rice, sugarcane and coffee are the prominent agricultural product. It is also the largest free trade area.

### The Islands of Caribbean

#### Physical Set-Up

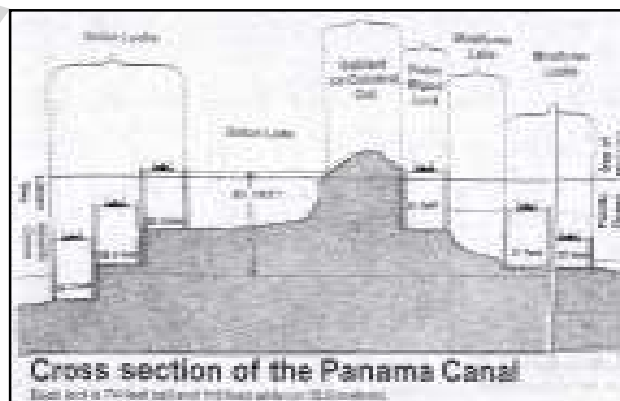
The entire region is characterized by the diverse physical conditions. The largest West Indian island; "Cuba" comprises the lowland which have low to moderate relief features. On the other hand the island of Hispaniola, Jamaica and Puerto Rico are mountainous and hilly. The Trinidad is the detached continental island which has a low mountain range in the north and hilly in the south. "Bahamas" island is of flat limestone and rimmed by coral reef. The "Virgin" island is of volcanic origin.

## Climate and Vegetation

Due to maritime influences the hot weather is uncommon and warm weather prevail throughout the year. The annual temperature is very small and the precipitation varies from island to island. These islands are the path of trade wind and the windward side of the mountain receives high rainfall than the leeward side. The natural vegetation varies from the luxuriant forest in areas of adequate moisture to sparse and scanty woodland in the drier areas.

## Social Aspect

In the entire islands the majority of people belong to "black" or "mulattos." The white people from the Europe are in the best positions from the political and economic point of view. Mulattos rank next and the Black rank lowest. The cultural heritage of different island varies greatly and there are endless combination of cultural heritage is found. The political arrangement is also diverse. Some of the independent parliamentary states which include Jamaica, Barbados and Bahamas, Grenada, St. Kitts and Nevis, St. Lucia, St Vincent, Grenadines, Antigua, Barbuda are former British colonies and continue their allegiance to British crown. Some of the Independent Republics are Cuba, Haiti, Dominican Republic, Dominica and Trinidad & Tobago.



## Economy

The subsistence type of agriculture is found here. All types of crops are grown - here. The sugarcane is the most important export crop. Some of the important plantations include banana, coffee, tobacco and coconut. Bauxite is produced in the island of Jamaica. Trinidad and Tobago produce oil. The manufacturing industry is growing in Puerto Rico and Cuba. A major portion of the income of some of the



important islands comes from tourism. "Bahamas Island" is a well known tourism centre. "The Greater Antilles" comprises of four largest Caribbean islands. It includes Cuba, Jamaica Hispaniola (containing the nations of Haiti and the Dominican Republic) and Puerto Rico.

### Barbados

It is the easternmost island of West Indies. It is the most densely populated and all the available land is under irrigation. Sugarcane is cultivated on 90 per cent of the cultivable land. It became independent from the Britishers in 1962. In the entire Caribbean country, Barbados is most educated and had a tolerant population. Agriculture accounts for the 6 per cent of the GDP while the service sector for nearly "80%". The main exports of Barbados are electrical component, petroleum products and chemicals.

#### Points to Remember

1. "Belize" is the only Central American republic that does not have a Pacific coastline.
2. "El Salvador" is the only Central American country not having an Atlantic coastline.
3. "Belize" is the country which is also called "British Honduras".
4. "Sugarcane" is the largest export of most of the Caribbean islands.
5. "Barbados" is the most densely populated country of the central America.
6. The arranged order of Central American countries from North to south: - Belize - Guatemala - Honduras - El Salvador - Nicaragua - Costa Rica - Panama.
7. The "Panama city" is the only capital city of central American country having a coastal location.
8. "Panama" was one of the provinces of Colombia.
9. The "Nicaragua" is well - known as the Mosquito Coast.
10. "Belize city" is the old capital of Belize.
11. "Chemicals" is the largest export of Puerto Rico.
12. "Balboa" and "Colon" are the cities on the Pacific and Atlantic ends respectively.
13. The capital of Costa Rica, Honduras and El Salvador are San Jose, Tegucigalpa and San Salvador.
14. The Republic of Haiti and Dominican Republic share the island of Hispaniola.
15. "El Salvador" is the most populated Central American republic. It is also the smallest Central American nation.
16. "Mexico city" is the largest urban agglomeration in the world.
17. "Mexico" is the only Middle American country where Olympics were held in 1968.
18. "Chihuahua" in Mexico is one of the largest silver mines in the world.
19. "Barbados" was the island of Lesser Antilles which was once under British rule.
20. "Mexico" is the largest country of the Central America.
21. "Cuba" is well known for producing sugarcane, cigar and rum.

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# ANTARCTICA OR 'TERRA AUSTRALIS'

## Landscape

The continent of Antarctica was chiefly discovered in the 20th century. It is the 5th largest of the seven continents. It is larger than Europe and Australia and coldest and windiest of all. It is also called "Ice continent". Antarctica has the largest reserve of freshwater. Nearly 11 per cent of the Antarctica's ice sheets consist of ice - shelves which are massive floating slabs of permanent ice fringing the content. The large rivers of the ice are called "glaciers". These glaciers flow either into the ice shelves or directly out of the edge of the continent, where they break up from the iceberg.

The entire continent is dominated by Trans-Antarctic Mountains that separate the eastern from the western part. These mountains hold back the ice plateau of East Antarctica like a massive dam and are deeply penetrated at places by glaciers that flow into the ice shelves.

## Climate and Weather

The climate of Antarctica is not uniform. The high plateau region of East Antarctica yields the lowest year round temperature while the West Antarctica has a milder climate. The interior experiences almost continuous daylight during summer and darkness during winter. In the northward direction, there are fewer days of continuous daylight and darkness. The average annual rainfall is 5 cm making the continent one of the driest deserts. Antarctica experiences several unique optical phenomena including the "Aurora Australis", "Mirage", "Perihelion" and "Parselene".

## Vegetation and Animal Life

The constant low temperature and high moisture have limited the plant life almost entirely to Protistas- simple and unicellular organism. Here, only two varieties of flowering western coast support the seaweeds and phytoplankton. Only microscopic and primitive insects survive here. The southern part has relatively wider variety of animal life including

Whale, Seals, Penguins and Albatross.



## Mineral Resource

A wide spectrum of mineral resources is found in Antarctica. It consists of coal, copper, lead, iron, molybdenum and others. The deposit of oil and natural gas is found in the continental shelf region. According to the Madrid Agreement of 1991, the use of these mineral resources was banned for 50 years. It has been done to save the ecology and environment of the Antarctica.

## National Claims of Antarctica

It was Roald Amundsen who first reached South Pole in 1911. Antarctica has been partitioned into two pie-shaped sectors centered on the South Pole. The "Peninsular Area" of Antarctica has been in controversy where British, Argentinean and Chilean claims overlapped. "Marie Byrd Land" is only sector of such claims. "Antarctica is at least four times as large as India and the southern ocean and nearly as large as Atlantic".

## Antarctica Treaty System (ATS)

The International Geophysical year 1957-58 was the year from where several nations

started to cooperate on scientific research in Antarctica. After that several projects were undertaken on diverse geophysical topics and this led to the establishment of Scientific Committee on Antarctica Research (SCAR). It also led to the development of "Antarctic Treaty" in 1959. In 1983, India was admitted as the consultative member.

This treaty is chiefly aimed at enhancing the cooperation in Antarctica. According to this treaty, Antarctica should be used only for the peaceful purposes and prohibits military activities such as waste disposal and weapons Testing. The treaty envisages continued cooperation, mutual inspection of stations and exchange of scientific personnel with the objective of maintaining the ecological balance. The ATS has also formulated several resolutions which consist of:

- (1) Conservation of Antarctic marine living resources.
- (2) Protocol on environment protection.
- (3) Agreed measures for conservation of Antarctic's flora and fauna.
- (4) Convention on Conservation of Antarctic Seals.

#### Antarctica Fact File

1. **Discovery of Antarctica:** It was James Cook who first crossed the Antarctica circle but unable to discover anything. Firstly, Sir James Clark Ross discovered the "Ross Sea", the "Victoria Island" and the "Magnetic Pole". In a race contest to South Pole, Robert F Scott, and Roald Amundsen, participated. On 14th December 1911, Norwegian, Amundsen was able to beat Scott to victory.
2. **Southernmost Post Office:** It is situated in Antarctica and operated by a lady.
3. **Aurora Australis:** It is the fantastic display of light in characteristic colour, bands and rings of various hues. It is caused by stream

of charged particles from the sun, entering into the earth's upper atmosphere. A more or less similar phenomena in the northern hemisphere is called "Aurora Borealis".

4. **Fastest Antarctica Crossing:** It is "Trans - Antarctica" completed by Ranulph Fiennes, Oliver Shepard and Charles Burton in 1980 - 82. It is also the leg of Trans - Globe Expedition in 67 days from 28th October 1980 to 11th January 1981.
5. **Ozone Hole:** It is the ozone - layer over the continent of Antarctica which was discovered in mid 1970s. Its corresponding annual hole was identified over the Arctic Ocean in 1986. This hole is most prominent during the coldest seasons.
6. **Land of Ice:** The entire Antarctica is covered with the ice sheet which is as thick as 1800 metres. If all the ice of it melts, the sea would rise by 60 metres.
7. **Cold - Pole:** It refers to the point with lowest-mean annual temperature in each hemisphere. In the northern hemisphere, this is at "Verkhoyansk" in north - east Siberia, Russia. In the south hemisphere, the lowest recorded temperature has been at the "Soviet Research Station" of Vostok on the Antarctic ice plateau. "Vostok" and "Verkhoyansk" are together known as the "Cold Poles of the Earth".
8. **Southern Ocean:** It includes southern portion of India. Atlantic and Pacific ocean and is considered as a separate ocean due to its uniform lower temperature and salt concentration,
9. **Ross - ice - shelf:** It is the largest ice- shelf in the world which is as large as France.
10. **Mt. Erebus:** It is a type of active volcano which, along with many other volcanoes, dots the coastal and island regions.
11. **Vinson Massif:** It is the highest Peak in Antarctica.



**Lake Victoria:** It is the largest Lake in Africa and is the source of "White Nile". The "Lake Tana" in Ethiopia is the source of "Blue Nile". Both the White and the Blue Nile meet at the capital city of Sudan, "Khartoum" from where the combined stream is known as "Nile" river. It is the longest river of the world. The "Aswan dam" was built on it which forms the largest man-made lake, "Lake Nasser".

**River Zambezi:** It is the largest river of South Africa and natural political boundary between Zambia and Zimbabwe. The famous "Victoria fall" is situated on it. The "Kariba Dam" of Africa is also situated on it.

**River Zaire:** It is only river in the world to cross the equator twice. "Boyoma or Stanley Falls" is situated on it.

**Guinea-Bissau:** It is the most rural country in the world. In total GDP, agriculture contributes about 60% and it is also one of the poorest countries of the world.

**Perforated State:** It is type of state whose geographical boundary completely surrounds that of another state. For example, S. Africa encloses Lesotho and Swaziland.

**Gibraltar:** It is a gateway between Atlantic Ocean and Mediterranean Sea. The stretch between the steep "Rock of Gibraltar" and "Cape Ceuta" is called "Pillars of Hercules".

**The Great Rift Valley:** It is in Africa and runs from the south of lake Malawi to the northward side of Red sea and then through Gulf of Aquaba leads to Dead sea. The extensive volcanic activity believed to accompany continental rifting is exemplified by the large volcanic mountains such as Kilimanjaro and Mount Kenya.

**Kalahari Desert:** It is situated between the "Orange" and "Zambezi" river. The entire area has the annual rainfall of less than 50 cm. "Bushmen" is the aboriginal people of this desert. They use to collect water in the Ostrich eggshells in dried buck stomachs. They also use to suck dew drops in the drier years.

**Barbary State:** The north-west African countries of Morocco, Algeria and Tunisia are called as Barbary States because of the region's oldest inhabitants the Berbers. These three countries together constitute the "Maghreb". The region "Djezira-el-Maghreb" or "Isle of West" is in recognition of Atlas Mountain rising like vast inlands on the west coast of Mediterranean Sea.

**Balkans:** The entire region of Balkan Peninsula is bounded by Adriatic Aegean and Black sea. It includes Greece, Bulgaria, Albania, Romania and former Yugoslavia. Today the region has fragmented and it is referred as "Balkanization" meaning disintegration.

**Discovery of Antarctic:** It was James Cook who first cross the boundary of Antarctic Circle. But they were not able to see the landscape. Later on, Sir James Clark Ross discovered the Ross Sea, the Victoria Island and South Magnetic Pole. Robert F. Scott and Ronald Amundsen were the chief contestants. Amundsen of Norway was able to beat Scott to victory on 14th December 1911.

**Cold Pole:** It refers to the point with the lowest mean annual temperature in each hemisphere. In the North hemisphere this is at "Verkhoyansk" in North-East Siberia, Russia. In the south hemisphere the lowest recorded temperature has been at Soviet research station of Vostok on the Antarctic ice plateau. Therefore, "Vostok" and "Verkhoyansk" together called the cold pole of the earth.

**Bentley Subglacial Trench:** It is the deepest point in Antarctica. It is "2538" metres.

**Vinson Massif:** It is the highest peak in Antarctica.

**Queen Maud Range:** It is the longest mountain in Antarctica.

**Ross-ice-Shelf:** It is the largest "ice-shelf" in the world which is as large as France.

**Magnetic Poles:** It may be classified into "Magnetic North Pole" and the "Magnetic South Pole", the former is located on the Prince of

Wales Island is North Canada while the later is situated in South Victoria land, Antarctica.

**Aurora Australis:** The display of southern light is characterized by colour bands and rings of various hues. It is caused by the streams of charged particles from the sun, entering into the earth's upper atmosphere. A similar phenomenon in the northern hemisphere is "Aurora Borealis".

**Hamites:** It refers to the people of northern and eastern Africa, ancient Egypt and Ethiopians.

**Semites:** It refers to the various ancient and modern people originating in south-west Asia. It consists of "Hebrews" and Arabs. It is also used as the synonymous of the Jews.

**Kurds:** It chiefly refers to pastoral and war like people of Kurdistan of south-east Turkey and Iran. They are the classic example of stateless nation. A large number of Kurds are divided among the nation of Iraq, Iran, Turkey, Syria and Jordan.

**Tuaregs:** It refers to the Berber and Hamite speaking members of nomadic tribe of Sahara. They wear blue-dyed cloth. The dye rubs off their face and body are resembles with the blue colours. Therefore, they are called "Tuaregs" or the colour of blue.

**Aborigines:** The term chiefly refers to the original inhabitants of any area such as Maoris of New Zealand and Bushmen of Kalahari.

**Basques:** It chiefly refers to the pre-European people whose population is about 2 million and who inhabit the Pyrenees Mountain in Northern Spain and south-west France. They remained independent until the 19th century.

**Kwajalein or Marshall Islands:** It is the largest atoll in the world where USA conducts its missile tests.

**Most rainy days of the World:** Mt. Waialeale Hawaii has upto 350 rainy days per year.

**Pearl Harbour:** It is the US Naval base in Honolulu, the Hawaiian capital. It is the place where Japanese launched a bombing attack during World War-II which was retaliated by U.S.A. by dropping atom bomb on Hiroshima and Nagasaki.

**Hawaii:** It is the pacific realm of Polynesia

which consists of 130 islands. It became the 5015 state of the U.S.A. Most of the Hawaiian Islands are of volcanic origin and the vulcanization is related to the hot spot-activity. "Mauna Loa" and "Mauna Kea" could be considered as two of the tallest mountain peak of the world. All major internal sea-route converge at Hawaii. That's why it is called "cross-road of the Pacific".

**Earth Day:** The "April-22" is celebrated as the earth day to recognize beauty and riches of the earth. It also brought awareness about the over population, energy waste and other significant issues. It was first observed on April-22, 1970.

**San Andreas Fault:** It is a fracture in Earth's crust that runs for more than 1000 kms of its length. It cuts through the U.S mainland and marks the meeting points of two plates e.g. Pacific and American plates. The Pacific plate, which is moving northwestward with respect to North American plate, causes earthquakes along the fault.

**Environmental Lapse Rate:** It refers to the normal rate of temperature decrease with the height. Normally the temperature decrease at the rate of 10°C for every 165 metres of height above sea level. The higher layers of the atmosphere contain smaller quantities of water vapour and carbon dioxide and hence their capacity to absorb heat energy is much less than that of lower layers. This is the reason why Darjeeling, Nainital and Shimla is cooler than Delhi.

**Artificial Rain:** The artificial rain is produced by introducing tiny particles of solid carbon dioxide or crystal of silver iodide into the clouds at cloud temperature above 0°C by the process called "cloud seeding". The seeding agent can be spread into a cloud from an air plane or sent up in rockets. The water-vapour in the cloud condenses around the seeding agent.

**Hottest Place:** It is the Death Valley of California in USA where temperature of over 49°C was recorded in July and August 1917.

**Coldest Place:** The Polyus Nedostypnosti of Antarctica has an extrapolated annual mean temperature of -58°C. The coldest measured annual temperature is -57°C. It was recorded at plateau station of Antarctic. The coldest permanently inhabited place in the world is vil-

lage of "Oymyakon" in Siberia of Russia.

**Tornado:** It refers to the strongest known atmospheric disturbances with the wind velocity exceeding 300 km/hr. It frequently occurs in "Mississippi Valley" in the U.S. It is called "Twister". The U.K. has the highest frequency of Tornadoes by area. The highest speed of Tornado is 450 km/hr at Texas.

**Tides:** The periodic phenomenon of alternate rise and fall in Sea levels is known as "tide". On the full moon and new moon, tides are the highest and called "Spring Tides" while "Neap Tides" is the tides of 1st and 3rd quarter. Generally the tide occurs twice a day; but the "Southampton Coast" of England experiences tides four times a day. It occurs at regular intervals of 12 hours and 25 minutes. The highest tides recorded in India at Okha, Gujarat. The "Bay of Fundy" has the highest tidal range. Lakes have no tides because moon's gravitation pull is impossible in small body of water such as lake.

**Artesian Well:** It is a type of well in which rock layers are down folded into a basin shape so that permeable strata may be sandwiched between impermeable layers. The permeable rocks only come to the surface at the edge of the basin. The permeable layer below it prevents the water from passing downwards while the impermeable layer on top prevents any possibility of water escaping upward. Such a structural basin is called "aquifer". The water is trapped in the aquifer under great pressure and when a well is bored, the pressure of water all around the basin is sufficient to force the water up to the bore hole so that it gushes into the surface like a fountain. This type of well is more valuable to man because it can be used in Desert region.

**Rubber Trees:** It is chiefly found in the "Amazon rainforest". Its scientific name is "Hevea Brasiliensis". Latex is collected by slashing tree trunks. This is a destructive system, for trees are over trapped and destroyed for profit. With the establishment of rubber plantation in south-east Asia, Amazon River lost its pre-eminent position.

**Desert of Atacama:** It is an arid type of desert in northern Chile that extends 960 km south from Peru border. It has no vegetation and considered as the "Driest Desert of the World". The 400 years of drought was recorded

in 1971 in the Calama town. The only stream "Rio Loa" reaches the Pacific Ocean. It was ceded to Chile by Peru and Bolivia in 1983-84. Atacama Desert is rich in nitrates, iodine and borax.

**Sao Paulo:** It is the third largest urban agglomeration in the world after Tokyo and Mexico City. It is the largest urban agglomeration in the southern hemisphere. It accounts for 22% of Brazil's population and 40% of the country's GDP. It is also the leading industrial region of America.

**Galapagos Islands:** It is situated on the north-west of South American mainland and is a part of Equator. The island is a home of many unique species of reptiles, birds and fishes.

**Forwarded Capital:** When a state relocates its capital to sensitive areas, perhaps near a zone of dispute with an unfriendly neighbour, in part to confirm its determination to sustain its position in that contested zone. Brasilia is located on what has been an internal frontier which has yet to be conquered by still developing Brazil. Another example of forward capital is Islamabad.

**Ejidos:** They are the agricultural communities of Mexico. The privately owned hacienda land was transferred to them after land reform were instituted by the 1917 constitution. Like cooperative in India, these present an achievement of the deal of land to the landless, but are relatively less productive.

**Panama Canal:** It connects the Atlantic with the Pacific Ocean. It came into operation in 1913. The U.S.A. had unilateral control of the canal operation and was directly involved in the administration of Panama Canal. But in the year 2000, USA transferred the canal administration to the sovereign state of Panama. The canal measures "64.8" km from Colon on the Atlantic till Panama city on the Pacific and has three locks; Pedro Miguel Lock, Mira Flores Rock and Gatun Lock.

**Douglas Fir:** It is a type of leading tree species used in the timber industry. It is the most important trees of western USA especially in Washington and Oregon. The Giant Sequoia is mainly grown in California. The important tree species here are yellow and loblolly pines. The state of British Colombia is the most im-

portant centre of timber industry in Canada. This is the reason why Canada is the largest producer of Newsprint while USA of Pulp and Paper.

**Highway of Technology:** It is also known as "Highway 128 in eastern Massachusetts" because of the concentration of industrial units manufacturing advanced electronics along the roadways.

**Prince Edward Island:** It is the smallest island of Canada and the most densely populated province.

**Newfoundland:** It was the oldest British colony and the last province to join Canada in 1949.

#### Antarctica Treaty - 1959

The International Geophysical year (1957-58) envisaged the project on diverse geophysical topics and this led to the establishment of "Scientific Committee on Antarctica Research". It also led to the development of Antarctica Treaty in 1959. India became its member in 1983. The treaty envisaged that Antarctica should be used only for the peaceful purposes and prohibits military activities. It provides continued cooperation, exchange of scientific personnel and mutual inspection of stations.

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### Geographical Areas

### Related Countries

Eurasia	Cyprus, Russia, Turkey
The low countries	Belgium, Luxemburg, Holland
Scandinavia	Norway, Sweden, Denmark
Central Europe	Germany, Poland, Austria, Czechoslovakia
The Balkans	Hungary, Romania, Yugoslavia, Bulgaria, Greece
The Caribbean	Nicaragua, Panama, Cuba, Jamaica
South East Asia	Thailand, Vietnam, Laos, Cambodia, Malaysia
The Baltic	Finland, Iceland
The Levant	Syria, Lebanon, Israel
Iberian Peninsula	Spain, Portugal
Far East	Korea, Philippines, Indonesia, China, Japan
Middle East	Turkey, Iraq, Iran, Afghanistan, Saudi Arabia

### Ten Most Populous Countries

No.	Country	Population
1.	China (Asia)	1,354,040,000
2.	India (Asia)	1,210,193,422.
3.	U.S.A. (North America)	315,183,801
4.	Indonesia (Asia)	237,424,363
5.	Brazil (South America)	193,946,886.
6.	Pakistan (Asia)	146,404,914
7.	Nigeria (Africa)	170,123,740
8.	Bangladesh (Asia)	161,083,804
9.	Russia (Eurasia)	142,517,670
10.	Japan(Asia)	127,368,088

### Ten Least Populous Countries

No.	Country	Population
1	Dominica	67,000
2	Marshall Islands	63,000
3	Saint Kitts & Nevis	38,960
4	Liechtenstein	35,904
5	Monaco	33,000
6	San Marino	32,386
7	Palau	20,000
8	Tuvalu	10,000
9	Nauru	10,000
10	Vatican City	800

### Rivers of the World

Name of the River	Source	Outflow	Length (in km)
<b>Africa</b>			
1. Nile	Lake Victoria	Mediterranean Sea	6690
2. Zaire (Congo)	Confluence of Lualaba and Luapula Rivers	Atlantic Ocean	4371
3. Niger	Guinea	Gulf of Guinea	4184
4. Zambezi	Central African plateau	Mozambique	2736
5. Orange	Lesotho	Atlantic Ocean	2092
<b>Australia</b>			
1. Murray	Australian Alps	Indian Ocean	2589
2. Darling	Central Part of Eastern Highlands (Australia)	Murray River	2789
<b>Asia</b>			
1. Yangtze Kiang	Tibetan Plateau (China)	China Sea	5,797
2. Ob	Altai Mt (C.I.S)	Gulf of Ob	5,567
3. Hwang Ho	Eastern part of Kunlun Mt.	Gulf of Po-Hai	4,667
4. Yenisey	Tannuala Mts. (C.I.S.)	Arctic Ocean	4,506
5. Irtysh	Altai Mt. (C.I.S)	Ob River	4,438
6. Amur	Confluence of Shilka & Argun Rivers	Tatar Strait	4,352
7. Lena	Baikal Mt. (C.I.S)	Arctic Ocean	4,268
8. Mekong	Tibetan Highlands	South China Sea	4,023
9. Brahmaputra	Himalayas	Ganga River	2,897
10. Indus	Himalayas	Arabian Sea	2,897
11. Ganga	Himalayas	Bay of Bengal	2,506
12. Amu Darya	Pamir (C.I.S)	Aral Sea	2,416
13. Salween	Tibetan Highland	Gulf of Martaban	2,414
14. Irrawaddy	Northern Myanmar	Bay of Bengal	2,092
15. Si Kiang	Eastern Yunnan (China)	China Sea	1,989
16. Sungari	North Korea Boundary (China)	Amur River	1,955
17. Tigris	Taurus Mt.	Shatt-al-Arab	1,899
<b>Europe</b>			
1. Volga	Valdai Plateau (C.I.S)	Caspian Sea	3,687
2. Danube	Black Forest (Germany)	Black Sea	2,842
3. Ural	Ural Mts.	Caspian Sea	2,533
4. Dnieper	Valdai Hills	Black Sea	2,284
5. Don	Tula (C.I.S)	Sea of Azov	1,968
6. Rhine	Alps	North Sea	1320
<b>South America</b>			
1. Amazon	Andes Mts.	Atlantic Ocean	6,296



2. Parana	Confluence of Paranaiba & Rio-de-Plata Grande Rivers	Atlantic Ocean	4,498
3. Madeira	Confluence of Beni & Mamore	Amazon River	3,238
4. Purus	Peruvian Andes	Amazon River	3,207
5. San Francisco	S.W. Minas Gerais Brazil	Atlantic Ocean	3,198
6. Tocantins	Gerais -Brazil	Para River	2,699
7. Paraguay	Mato Grasso-Brazil	Parana River	2,549
8. Japura	Andes Colombia	Amazon River	2,414
9. Picomayo	Andes Mts.	Paraguay River	1,999

#### First in the World

Deepest Lake	Lake Baikal (Siberia)
Highest Lake	Titicaca (Bolivia)
Highest Plateau	Tibetan Plateau
Highest Dam	Roguski Dam (Russia)
Longest River (in length)	River Nile
Largest River (in volume)	River Amazon
Biggest Irrigation project	Volga-Baltic Canal
Largest Lake	Caspian Sea (Saline)

#### Important Islands

Bahamas	Atlantic Ocean
Belize	Caribbean sea
Bermuda	Atlantic Ocean
Costa Rica	Pacific Ocean
Cuba	Atlantic Ocean
Diego Garcia	Indian Ocean
Ecuador	Pacific Ocean
El Salvador	Pacific Ocean
Tullelund Islands	Atlantic Ocean
Grenada	Atlantic Ocean
Honduras	Caribbean Sea
Madagascar	Indian Sea
Guatemala	Pacific Ocean
Nicaragua	Caribbean Sea
Seychelles	Indian Ocean

#### Smallest and Largest

Largest Freshwater Lake	Lake Superior (U.S.A)
Biggest Canal	Baltic White Sea (Russia)

Biggest Delta	Ganga-Brahmaputra Delta
Largest Planet	Jupiter
Smallest Planet	Mercury
Nearest Planet (from sun)	Mercury
Distant Planet (from sun)	Neptune
Brightest Planet	Venus
Brightest Star	Cyrus
Largest Ocean	Pacific Ocean
Biggest Volcano	Mounaloe (Hawaii)
Maximum Volcanoes	Indonesia
Highest Waterfall	Angel Fall (Venezuela)
Coldest Place	Verkhoyansk (Siberia)
Driest Place	Death Valley (America)
Longest Day	21 June
Shortest Day	22 December
Deepest Sea	Dead Sea
Highest Rainfall	Mawsynram (Meghalaya)
Highest Road	Leh (Ladakh)
Longest Road Tunnel	Gothard (Switzerland)
Mountain Tunnel	Oshimi Zu (Japan)
Largest Railway Platform	Kharagpur
Biggest Railway Junction	Grand Central Terminal (New York)
Longest Railway	Trans Siberian railway
Biggest Diamond	Cullinan
Hottest Place	Araome (Mali)
Largest Population	China
Largest Population (City)	Shanghai
Largest Country (Area)	Russia
Highest Town	Ben Chuan (China)
Highest Capital	Lhasa (Tibet)
Largest Airport	Jeddah (Saudi Arabia)
Largest Reef	Great Barrier Reef
Largest Gulf	Gulf of Mexico
Largest Estuary	Ob (Russia)
Highest Tide	Bay of Fundy (U.S.A)

#### Important Deserts

Name	Area (sq. km)	Country
Sahara	9,065,000	Algeria, Chad, Libya, Mali, Mauritania, Niger, Sudan, Tunisia, Egypt, Morocco
Australian	1,550,000	Australia
Rub-el-Khali	1, 30,000	Saudi Arabia, Yemen, Syria

Gobi	1,040,000	Mongolia, China
Kalahari	520,000	Botswana, Namibia
Takla Makan	320,000	Sikiang, China
Sonoran	310,000	Arizona (U.S.A.),
Mexico Namib	310,000	Namibia
Karakum	270,000	Turkey, Russia
Thar	260,000	India, Pakistan
Somali	260,000	Somalia
Atacama	180,000	North Chile, Peru
Kazilkum	180,000	Uzbekistan
Dasht-e-Lut	52,000	Eastern Iran
Mojave	35,000	Southern California (U.S.A)

### Boundary Lines

**Durand Line:** Between India and Afghanistan demarcated by Sir Mortimer Durand in 1896.

**McMohan Line:** Between India and China, demarcated by Sir Henry McMahon; not recognized by China.

**Maginot Line:** Boundary between France and Germany.

**Oder Neisse Line:** Boundary between Poland and Germany.

**Radcliff Line:** Demarcated by Sir Radcliff in 1947, between India and Pakistan.

**17th Parallel:** Defined the boundary between North Vietnam and South Vietnam before the two were united.

**20th Parallel:** The line which Pakistan claims should be the demarcation line between India and Pakistan; not acceptable to India.

**38th Parallel:** The boundary line between North Korea and South Korea.

**49th Parallel:** Boundary line between U.S.A. and Canada.

### Ten Territorially Largest Countries

No.	Country	Area (sq. km)
1.	Russia (Eurasia)	1, 70, 75,000
2.	Canada (N. America)	99, 76,139
3.	China (Asia)	95, 61,000
4.	U.S.A. (N. America)	93, 72,614
5.	Brazil (S. America)	85, 11,965
6.	Australia	76, 82,300
7.	India (Asia)	32, 87,263
8.	Argentina (S. America)	27, 76,654
9.	Kazakhstan (Eurasia)	27, 17,300
10.	Sudan (Africa)	25, 05,813

### Ten Territorially Smallest Countries

No.	Country	Area (sq. km)
1.	Vatican City (Europe)	0.44
2.	Monaco (Europe)	1.99
3.	Nauru (S. Pacific)	21.10
4.	Tuvalu (S. Pacific)	26.00
5.	San Marino (Europe)	61.00
6.	Liechtenstein	160.00
7.	Marshall Islands (C. Pacific)	181.00
8.	St. Kitts & Nevis (E. Caribbean)	269.00
9.	Maldives (Indian Ocean)	270.00
10.	Grenada (W. Indies)	300.00

### Countries & Towns with New Names

Old Name	New Name
Abyssinia	Ethiopia
Kampuchea	Cambodia
Constantinople	Istanbul
Formosa	Taiwan
Northern Rhodesia	Zambia
Southern Rhodesia	Zimbabwe
Dutch Guyana	Surinam
South West Africa	Namibia
Siam	Thailand
Basutoland	Lesotho
Leopoldville	Kinshasa
Salisbury	Harare
Christina	Oslo
Swarnadweep	Java

Batavia	Jakarta
Bechuanaland	Botswana
Dutch East Indies	Indonesia
Gold Coast	Ghana
Malagasy	Madagascar
Nyasaland	Malawi
Persia	Iran
Stalingrad	Volgograd
Nippon	Japan
Cape Canaveral	Cape Kennedy
Angora	Ankara
Malaya	Malaysia
Domohi	Benin
Ceylon	Sri Lanka
Upper Volta	Burkina Faso
West Irian	New Guinea
Sandwich Islands	Hawaii Islands

### Human Habitats

Aoi	...	Eskimo dwelling, especially dome shaped wither dwelling built of blocks of snow.
Igloo	...	Eskimo dwelling, especially made of seal skin, for summer dwelling.
Tupik	...	Made by Eskimos in Tundra Regions.
Izba	...	Wooden House in North Russia
Tipi	...	In the Northern part of Rocky Mountains, house by Red Indians
Yurt	...	Kirgiz in middle Asia

### Geographical Epithets

City of Skyscrapers	New York
City of Seven Hills	Rome
City of Dreaming Spires	Oxford
City of Golden Gate	San Francisco
Cockpit of Europe	Belgium
China's Sorrow	Hwang Ho
Emerald city	Rome
Forbidden City	Lhasa (Tibet)
Gate of Tears	Strait of Bab-el-Mandeb
Gateway of India	Bombay
Gift of the Nile	Egypt
Granite City	Aberdeen

Herring Pond	Atlantic Ocean
Hermit Kingdom	Korea
Holy Land	Palestine
Island Continent	Australia
Island of Cloves	Zanzibar
Isle of Pearls	Bahrain (Persian Gulf)
Key to the Mediterranean	Gibraltar
Land of Golden Fleece	Australia
Land of Midnight Sun	Norway
Land of the Morning Calm	Korea
Land of Thousand Lakes	Finland
Land of White Elephant	Thailand
Land of Lakes	Scotland

Loneliest Island	Tristan Da Cunha	Roof of the World	The Pamirs,
Pearl of the Antilles	Cuba		Central Asia
Pillars of Hercules	St. of Gibraltar	Rose Pink City	Jaipur
Pearl of the Pacific	Guayaquil Port of	Sugar Bowl of the world	Cuba
	Ecuador	Venice of the North	Stockholm
Playground of Europe	Switzerland	Windy city	Chicago
Quaker city	Philadelphia	Yellow River	Hwang-Ho
Queen of the Adriatic	Venice		

...



- (b) 1      2      5      4  
 (c) 5      4      1      2  
 (d) 5      4      1      2

8. Which of the following statements regarding El-Nino are correct?

- A. El-Nino is a complex weather system that appears once every three to seven years.  
 B. The system involves oceanic and atmospheric phenomena with the appearance of cold currents off the coast of Peru.  
 C. The word El-Nino means 'Child Christ' because this current appears around Christmas in December and decreases the intensity of the ongoing winter season.  
 D. El-Nino in India is used for forecasting long range monsoon rainfall.

**Codes:**

- (a) A, B and D  
 (b) A, C and D  
 (c) B, C and D  
 (d) A and D

9. Read the following characteristics of a part of atmosphere and recognize the region:

1. It extends up to a height of 80 km.  
 2. In this layer, temperature decreases with the increase in altitude.  
 3. Temperature reaches up to minus 100°C at the height of 80 km.

**Codes:**

- (a) Troposphere  
 (b) Stratosphere  
 (c) Mesosphere  
 (d) Ionosphere

10. South Sudan shares boundary with which of the following country.

- (a) Eritrea                      (b) Chad  
 (c) Tanzania                    (d) Kenya

11. Which one of the following refers to the process of a city expanding and accommodating the neighbouring villages and communities?

- (a) Urbanization  
 (b) Over-urbanization  
 (c) Sub-urbanisation  
 (d) Semi-urbanisation

12. Consider the following statements

1. The upper crust of the earth called SiAl has an average density of 3.0  
 2. The lower part called SiMa has an average density of 4.0

Which is/are incorrect?

- (a) 1 only                      (b) 2 only  
 (c) Both 1 and 2            (d) Neither 1 nor 2

13. Read the following statements:

1. There is so much difference in the length of degrees of longitudes outside the tropics that they are not used for calculating distances as in the case of latitudes.  
 2. Places east of Greenwich see the sun earlier and gain time w.r.t. Prime Meridian, whereas places west of Greenwich see the sun later and lose time.  
 3. International Date Line is an imaginary straight line on the earth where the date changes by exactly one day when it is crossed.  
 4. A traveller crossing the date line from east to west loses a day.

Which of the above statements are true?

- (a) 1, 2 and 3.                (b) 1, 2 and 4.  
 (c) 2, 3 and 4.                (d) 1, 2, 3 and 4.

14. Identify the crop by reading the following statements:

- I. It is a tropical crop, grows well at a temperature between 27°C and 32°C but temp. below 16°C is harmful for the crop.  
 II. It requires a moderate rainfall between 30-65 cm.  
 III. It is rich in carbohydrates, proteins, minerals and vitamins hence provide cheap food to a large section of poor population.  
 IV. It is mainly grown in Maharashtra, Karnataka and Madhya Pradesh.

**Codes:**

- (a) Bajra  
 (b) Jowar  
 (c) Maize  
 (d) Ragi

15. The Himalayas form a highly rugged and continuous stretch of high mountains and exhibits landforms which develop when strata are intensely folded. Which of the followings are found in the Himalayas?

- (i) Anticlinal ridges
- (ii) Synclinal valleys
- (iii) Recumbent folds
- (iv) Nappes

**Codes:**

- (a) i, ii, iii only
  - (b) ii, iii, iv only
  - (c) i, iii, iv only
  - (d) All the above
16. Which one of the following pairs is not correctly matched.
- (a) South East Central Railway : Bilaspur
  - (b) South - Eastern Railway: Kolkata
  - (c) South Central Railway : Secundrabad
  - (d) Southern Railway : Bengaluru
17. Glacier is a slowly moving mass or river of ice formed by the accumulation and compaction of snow on mountains or near the poles. Match the following glaciers with the correct States where they are located.

**List I**

- A. Nubra Glacier
- B. Bhaga Glacier
- C. Rathong Glacier
- D. Sona Glacier

**List II**

- I. Sikkim
- II. Himachal Pradesh
- III. J&K
- IV. Uttarakhand

**Codes:**

- (a) A-III; B-II; C-I; D-IV
  - (b) A-III; B-II; C-IV; D-I
  - (c) A-II; B-III; C-I; D-IV
  - (d) A-IV; B-III; C-II; D-I
18. Consider the following statements:
- I. The human development index (HDI) ranks the countries based on their performance in the key areas of child health, sanitation, food, adult education and access to resources.
  - II. These rankings are based on a score between 0 and 1 that a country earns from its record in the key areas of human development.

Select the correct answer code from below:

- (a) Only I is correct
- (b) Only II is correct
- (c) Both I and II are correct
- (d) Neither I nor II is correct

19. In which of the following States/ Union Territories, no community has been declared as a Scheduled Tribe?

- (a) Goa, Gujarat and Uttar Pradesh
- (b) Rajasthan, Tripura and West Bengal
- (c) Kerala, Tamil Nadu and Maharashtra
- (d) Haryana, Punjab and Pondicherry

20. Among the given factors, which have the modifying effect on the direction of ocean currents?

- (1) Prevailing wind
- (2) Rotation of earth
- (3) Configuration of coast line
- (4) Bottom relief of the ocean.

**Codes:**

- (a) (1) & (3)
  - (b) (1), (2) & (3)
  - (c) (1), (3) & (4)
  - (d) All the above.
21. Which of the following statements regarding watershed management is/are correct?
- A. Watershed management basically refers to efficient management and conservation of surface and groundwater resources.
  - B. Watershed management aims at bringing about balance between natural resources on the one hand and society on the other.
  - C. Haryali is a watershed development project sponsored by the Central Govt. which aims at enabling the urban population to conserve water.

**Codes:**

- (a) A and B only
  - (b) A and C only
  - (c) B and C only
  - (d) All of them
22. Which of the following states is a major rubber producing state of India?
- (a) Kerala-Karnataka-Tripura -Tamil Nadu
  - (b) Kerala- Karnataka-Tamil Nadu - Tripura



- (c) Kerala-Tamil Nadu -Karnataka-Tripura
- (d) Kerala-Tamil Nadu-Tripura-Karnataka

23. Choose the right statements:-

1. India has the largest deposits of mica while U.S.A. is the top producer in the world.
2. India is the sixth largest consumer & importer of the oil in the world.
3. Russia has the largest reserves of natural gas & fresh water in the world.

- (a) All
- (b) 1 & 2 only
- (c) 1 & 3 only
- (d) 2 & 3 only

24. Which among these islands in a bone of contention between U.K. & Argentina?

- (a) Spratly Island
- (b) Shetland Island

- (c) Falkland Island
- (d) Turks & Caicos Island

25. Consider the following statements:-

1. Equatorial Rainforest has highest biodiversity
2. Corals reefs are considered rainforest of the ocean & Sea
3. Amphibians are considered as a good sensor for Air Pollution in the region.
4. Mangroves are part of Equatorial rainforest.

Which of the statements given above are correct?

- (a) All
- (b) 1, 2 & 3 only
- (c) 2, 3 & 4 only
- (d) 1 & 4 only

## **GEOGRAPHY SAMPLE QUESTIONS (ANSWERS)**

1 (a)

2 (d)

3 (c)

4 (b)

5 (a)

6 (d)

7 (a)

8 (d)

9 (c)

10 (d)

11 (c)

12 (c)

13 (d)

14 (b)

15 (d)

16 (d)

17 (a)

18 (b)

19 (d)

20 (d)

21 (a)

22 (d)

23 (d)

24 (c)

25 (b)





1. High ash content
2. Low sulphur content
3. Low ash fusion temperature

Select the correct answer using the codes given below.

- (a) 1 and 2 only
- (b) 2 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

9. Which of the following statements regarding laterite soils of India are correct?

1. They are generally red in colour.
2. They are rich in nitrogen and potash.
3. They are well-developed in Rajasthan and UP.
4. Tapioca and cashew nuts grow well on these soils.

Select the correct answer using the codes given below.

- (a) 1, 2 and 3
- (b) 2, 3 and 4
- (c) 1 and 4
- (d) 2 and 3 only

10. Consider the following statements:

1. Natural gas occurs in the Gondwana beds.
2. Mica occurs in abundance in Kodarma.
3. Dharwars are famous for petroleum.

Which of the statements given above is/are correct?

- (a) 1 and 2
- (b) 2 only
- (c) 2 and 3
- (d) None

11. Consider the following crops

1. Cotton
2. Groundnut
3. Rice
4. Wheat

Which of these are Kharif crops?

- (a) 1 and 4
- (b) 2 and 3 only
- (c) 1, 2 and 3
- (d) 2, 3 and 4

12. "Climate is extreme, rainfall is scanty and the people used to be nomadic herders."

The above statement best describes which of the following regions?

- (a) African Savannah
- (b) Central Asian Steppe
- (c) North American Prairie
- (d) Siberian Tundra

13. Among the following States, which one has the most suitable climatic conditions for the cultivation of a large variety of orchids with minimum cost of production, and can develop an export oriented industry in this field?

- (a) Andhra Pradesh
- (b) Arunachal Pradesh
- (c) Madhya Pradesh
- (d) Uttar Pradesh

14. The formation of ozone hole in the Antarctic region has been a cause of concern. What could be the reason for the formation of this hole?

- (a) Presence of prominent tropo-spheric turbulence; and inflow of chlorofluorocarbons
- (b) Presence of prominent polar front and stratospheric clouds; and inflow of chlorofluorocarbons
- (c) Absence of polar front and stratospheric clouds; and inflow of methane and chlorofluorocarbons
- (d) Increased temperature at polar region due to global warming

15. Two important rivers - one with its source in Jharkhand (and known by a different name in Odisha), and another, with its source in Odisha - merge at a place only a short distance from the coast of Bay of Bengal before flowing into the sea. This is an important site of wildlife and biodiversity and a protected area. Which one of the following could be this?

- (a) Bhitarkanika
- (b) Chandipur-on-sea

- (c) Gopalpur-on-sea  
(d) Simlipal
16. India is regarded as a country with "Demographic Dividend". This is due to  
(a) Its high population in the age group below 15 years  
(b) Its high population in the age group of 15-64 years  
(c) Its high population in the age group above 65 years  
(d) Its high total population
17. La Nina is suspected to have caused recent floods in Australia. How is La Nina different from El Nino?  
1. La Nina is characterised by unusually cold ocean temperature in equatorial Indian Ocean whereas El Nino is characterised by unusually warm ocean temperature in the equatorial Pacific Ocean.  
2. El Nino has adverse effect on south-west monsoon of India, but La Nina has no effect on monsoon climate.
- Which of the statements given above is/are correct?  
(a) 1 only  
(b) 2 only  
(c) Both 1 and 2  
(d) Neither 1 nor 2
18. A person stood alone in a desert on a dark night and wanted to reach his village which was situated 5 km east of the point where he was standing. He had no instruments to find the direction but he located the polestar. The most convenient way now to reach his village is to walk in the  
(a) Direction facing the polestar  
(b) Direction opposite to the polestar  
(c) Direction keeping the polestar to his left  
(d) Direction keeping the polestar to his right
19. Consider the following statements:  
1. The duration of the monsoon decreases from southern India to northern India.  
2. The amount of annual rainfall in the northern plains of India decreases from east to west.

Which of the statements given above is/are correct?

- (a) 1 only (b) 2 only  
(c) Both 1 and 2 (d) Neither 1 nor 2

20. Which one of the following is the characteristic climate of the Tropical Savannah Region?

- (a) Rainfall throughout the year  
(b) Rainfall in winter only  
(c) An extremely short dry season  
(d) A definite dry and wet season

21. Westerlies in southern hemisphere are stronger and persistent than in northern hemisphere. Why?

1. Southern hemisphere has less landmass as compared to northern hemisphere.  
2. Coriolis force is higher in southern hemisphere as compared to northern hemisphere

Which of the statements given above is/are correct?

- (a) 1 only  
(b) 2 only  
(c) Both 1 and 2  
(d) Neither 1 nor 2

22. Consider the following agricultural practices:

1. Contour bunding  
2. Relay cropping  
3. Zero tillage

In the context of global climate change, which of the above helps/help in carbon sequestration/storage in the soil?

- (a) 1 and 2 only (b) 3 only  
(c) 1, 2 and 3 (d) None of them

23. The lower Gangetic plain is characterized by humid climate with high temperature throughout the year. Which one among the following pairs of crops is most suitable for this region?

- (a) Paddy and cotton  
(b) Wheat and Jute  
(c) Paddy and Jute  
(d) Wheat and cotton

24. Which of the following is the chief characteristic of 'mixed farming'?

- (a) Cultivation of both cash crops and food crops
- (b) Cultivation of two or more crops in the same field
- (c) Rearing of animals and cultivation of crops together
- (d) None of the above

25. A particular State in India has the following characteristics:

- 1. It is located on the same latitude which passes through northern Rajasthan.

- 2. It has over 80% of its area under forest cover.
- 3. Over 12% of forest cover constitutes protected Area Network in this State.

Which one among the following States has all the above characteristics?

- (a) Arunachal Pradesh
- (b) Assam
- (c) Himachal Pradesh
- (d) Uttarakhand

CHRONICLE  
IAS ACADEMY

1 (b)

2 (b)

3 (a)

4 (c)

5 (c)

6 (d)

7 (a)

8 (a)

9 (c)

10 (a)

11 (b)

12 (b)

13 (b)

14 (b)

15 (a)

16 (b)

17 (a)

18 (c)

19 (c)

20 (d)

21 (a)

22 (a)

23 (c)

24 (c)

25 (a)

