



# **GEOGRAPHY (316)**

## CHAPTERWISE NOTES



## GEOGRAPHY

| Sl. No. | Module  | Chapters (Public Examination)  | Marks |
|---------|---|--|-------|
| 1       | <b>Module 1: Geography as a discipline</b>          | L-1. Nature and subject matter of Geography  | 2     |
| 2       | <b>Module 2: Dynamic &amp; Geomorphic Processes</b> | L-3. Exogenic Forces and their resultant landforms   | 10    |
| 3       | <b>Module 3: Domain of Water</b>                    | L-5. Hydrological Cycle and Ocean  | 6     |
| 4       | <b>Module 4: Dynamics of Atmosphere</b>             | L-7. Atmospheric pressure and winds<br>L-9. Climate and Climate Change   | 10    |
| 5       | <b>Module 8: Economic Geography of India</b>        | L-17. Agriculture and Food Security<br>L-18. Mineral and Energy Resources<br>L-20. FDI, Transport, Communication and Trade | 10    |

| Component                                       | Details                 | Marks        |
|---|-------------------------|--------------|
| <b>Public Exam (Selected Modules 1,2,3,4,8)</b> | Total Chapters : 8      | 38           |
| <b>Practical Exam</b>                           | Practical               | 20           |
| <b>TMA</b>                                      | Tutor Marked Assignment | 16           |
| <b>Final Possible Marks</b>                     |                         | <b>74</b>    |
|   |                         | <b>Marks</b> |

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## 1

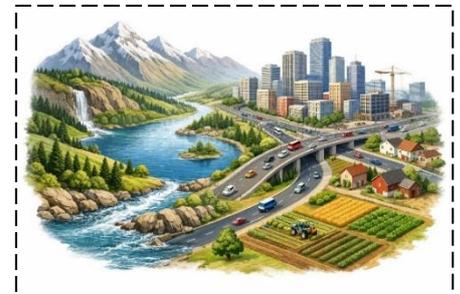
# NATURE AND SUBJECT MATTER OF GEOGRAPHY

## Introduction

Geography is the study of the **physical and human phenomena** found on the surface of the Earth and their interrelationships. The word 'Geography' was first used by **Eratosthenes**. This chapter briefly explains the nature, development, approaches and branches of Geography.

## Geography in Daily Life

1. The Earth's surface is dynamic and ever-changing.
2. Natural features (mountains, rivers, lakes) change slowly.
3. Human-made features (buildings, roads, crops) change rapidly.
4. Geography explains what a thing is, **where it is, and why** it is there.
5. It is helpful in development planning, disaster management, and resource utilization.



## Development of Geography

### 1. Ancient Period

- Contribution of Greek scholars.
- **Herodotus, Thales, Aristotle, Eratosthenes.**

### 2. Pre-Modern Period

- Period of explorations.
- **Columbus, Vasco-da-Gama, Magellan.**
- Development of cartography.



### 3. Modern Period

- Contribution of Ritter and Humboldt.
- Geography acquired a scientific form.

### 4. Recent Period

- Development after the Second World War.
- Use of quantitative techniques and regional studies.

## Approaches to the Study of Geography

### 1. Systematic Approach

1. Study of a specific natural or human phenomenon at the world level.
2. Propounded by Humboldt.

### 3. Main branches –

- Physical Geography
- Human Geography
- Biogeography
- Methods and Techniques in Geography



### 2. Regional Approach

1. Comprehensive study of a particular region.
2. Contribution of Ritter, Hettner, and Hartshorne.

### 3. Main parts –

- Regional studies
- Regional planning



- Regional development
- Regional analysis

### Methods and Techniques of Geography

1. **Globe** – A three-dimensional model of the Earth.
2. **Maps** – Flat representation of the Earth's surface.
3. **Cartography** – The art and science of making maps.
4. **Geographic Information System (GIS)** – Collection and analysis of geographical data.
5. **Global Positioning System (GPS)** – A system for determining location.
6. **Remote sensing** – Study of the Earth through satellites.
7. **Quantitative methods** – Numerical techniques for data analysis.
8. **Field survey** – Collection of information through direct observation.



### Branches of Geography

#### Physical Geography

1. Geomorphology
2. Climatology
3. Oceanography
4. Soil Geography
5. Biogeography

#### Human Geography

1. Population Geography
2. Social Geography



3. Cultural Geography
4. Economic Geography
5. Political Geography
6. Agriculture Geography
7. Industrial Geography
8. Transport Geography

### **Geography as an Integrating Discipline**

1. Related to both natural and social sciences.
2. Combined study of natural and human processes.
3. **Close relationship with other subjects** – Economics, Political Science, Sociology, Environmental Science.

## **TOP 5 QUESTIONS**

### **Q-1. Define Geography.**

**Answer-** Geography is the study of the physical and human phenomena found on the Earth's surface and their interrelationships. It explains what a thing is, where it is, and why it is there.

### **Q-2. What are the two main approaches to the study of Geography?**

**Answer- (1) Systematic Approach:** Study of a specific natural or human phenomenon at the world level.

**(2) Regional Approach:** Comprehensive study of a particular region.

### **Q-3. Write the difference between Physical Geography and Human Geography.**

**Answer-** Difference between Physical Geography and Human Geography:



| <b>Physical Geography</b>    | <b>Human Geography</b>           |
|------------------------------|----------------------------------|
| Study of natural elements    | Study of human activities        |
| Example – landforms, climate | Example – population, industries |
| Related to natural sciences  | Related to social sciences       |

**Q-4. What are the main branches of Geography?**

**Answer- (1) Physical Geography:**

- Geomorphology
- Climatology
- Oceanography
- Soil Geography

**(2) Human Geography:**

- Population Geography
- Social Geography
- Economic Geography
- Political Geography

**Q-5. Why is Geography considered an integrating discipline?**

**Answer-** Geography studies both physical and social phenomena together. It establishes a relationship between natural sciences and social sciences. Therefore, it is considered an integrating discipline.



## 2

# EXOGENIC FORCES AND THEIR RESULTANT LANDFORMS

## Introduction

The irregularities found on the Earth's surface are the result of the interaction between endogenic (internal) and exogenic (external) forces. This chapter studies exogenic forces, their processes and the major landforms formed by them.

## Exogenic Forces – Definition and Types

1. The forces which derive their energy from the earth's exterior or originate within the earth's atmosphere are called **exogenic forces**.
2. Their main function is land wearing and reduction of relief.
3. The two major sources of energy which power the various exogenic processes are –
  - Solar radiation
  - The gravitational attraction of the Earth



**Gravitational** attraction of the Earth causes the downslope movement of water, ice and particles of rock and soil, while solar radiation provides energy for evaporation and atmospheric processes.

## Types of Exogenic Processes

The gradational or plantation work of the earth's surface irregularities is accomplished through:

1. **Degradation (Denudational)** – Lowering of upstanding landmass by weathering, mass movements and erosional activities.
2. **Aggradation (Depositional)** – Deposition of weathered and eroded material which leads to level up.



## Mechanism of Exogenic Processes

Exogenic geomorphic processes are controlled by the following factors:

1. **Climate** – Variations in temperature and precipitation influence the intensity of processes.
2. **Vegetation** – Type, density and distribution of vegetation indirectly influence geomorphic processes.
3. **Nature and structure of rocks** – Hardness, softness, folds, faults, permeability and mineral composition affect the rate of processes.
4. **Aspect and slope direction** – Differences in insolation on north and south facing slopes create variation.

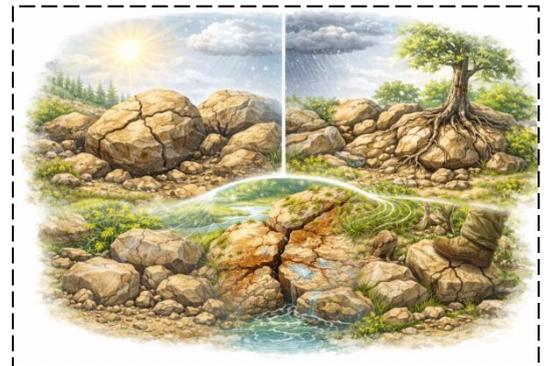
## Weathering and Mass Movements

### Weathering

1. Weathering is the action of elements of weather and climate over earth materials.
2. It is an in-situ or on-site process, as very little or no motion of materials takes place.

### Types of Weathering:

- Physical or Mechanical weathering
- Chemical weathering
- Biological weathering



### Mass Movements

1. Movement of rock-wastes or debris down the hill slope under the influence of gravity is called mass movement or mass wasting.
2. It is accelerated by the presence of water, ice and air.

## Erosion, Transportation and Deposition

Exogenic processes perform three-phase work:



1. **Erosion** – Acquisition and transportation of rock debris by geomorphic agents like running water, wind, waves and glaciers.
2. **Transportation** – Movement of sediments through traction, saltation, suspension and solution.
3. **Deposition** – Settling of transported material when velocity and energy decrease.

### **Major mechanisms of erosion include:**

- Corrasion or Abrasion
- Corrosion or solution
- Attrition
- Hydraulic action
- Deflation

**Major agents of erosion:** rivers, wind, sea waves, glaciers.

### **Resultant Major Landforms**

On the basis of dimension and scale, relief features are grouped into three orders:

1. **First Order** – Continents and ocean basins.
2. **Second Order** – Mountains, plateaus and plains.
3. **Third Order** – River valleys, deltas, sand dunes, etc.

### **Mountains**

A mountain is an elevated portion of the Earth's crust with steep sides and significant exposed bedrock. It covers around 27% of the total earth's surface.



## **Types of Mountains**

1. **Folded Mountains** – Formed due to folding of crustal rocks by compressive forces
2. **Block Mountains** – Formed due to faulting caused by tensile and compressive forces.
3. **Volcanic Mountains** – Formed due to accumulation of volcanic materials.
4. **Relict or Residual Mountains** – Formed after long-term denudation when hard rocks remain standing.

## **Significance of Mountains**

1. Storehouse of natural resources
2. Abundant sources of water
3. Generation of hydro-electricity
4. Formation of fertile plains downstream
5. Hotspots for biodiversity

## **Plateau**

A plateau is an extensive area of flat upland usually bounded by steep slopes. It covers about 18% of the earth's surface.

They differ in shape from mountains because their upper surface is relatively flat.

## **Classification of Plateaus:**

### **1. Intermontane Plateaus**

1. Surrounded by folded mountains.
2. Very high and vast.
3. Example: Tibetan Plateau.



## 2. Piedmont Plateaus

1. Located at the foot of mountains.
2. Mountains on one side, plain/sea on the other side.

## 3. Continental Plateau

1. Located in the interior part of the continent.
2. Composed of ancient hard rocks.

## Plains

A plain is a low-lying relatively flat or slightly rolling land surface with very gentle slope and minimum local relief. Plains occupy more than one-third of the earth's surface.

### Types of Plains:

1. **Structural Plains:** Formed from the Earth's internal structure.
2. **Erosional Plains:** Formed by long-term erosion.
3. **Depositional Plains**

Formed by the deposition of sediments brought by rivers.

- They are extremely fertile.

### Significance of Plains

- Most fertile soil
- Centres of civilizations
- Development of transportation and industry.



# TOP 5 QUESTIONS

**Q-1. What are exogenic forces? Write their major sources of energy.**

**Answer -** Exogenic forces are the forces which derive their energy from the earth's exterior or originate within the earth's atmosphere.

**Major sources of energy:**

- 1. Solar radiation** – It drives the processes related to water, air, and ice.
- 2. The Earth's gravity** – materials to slide downward along the slope.

**Q-2. Differentiate between Weathering and Erosion.**

**Answer - Differentiate between Weathering and Erosion:**

| Weathering                                | Erosion                             |
|---|-------------------------------------|
| Rocks breaking at their original place    | Breaking and removal of rocks       |
| No change in the location of material     | Change in the location of material  |
| A stationary process                      | A dynamic process                   |
| Causes: Temperature, chemicals, organisms | Causes: River, wind, glacier, waves |

**Q-3. Explain the three major phases of exogenic processes.**

**Answer -** The three major phases of exogenic processes:

- 1. Erosion** – Removal and transportation of rock debris.
- 2. Transportation** – Movement of materials by geomorphic agents.
- 3. Deposition** – Settling of materials when velocity decreases.

These three stages together form landforms.



**Q-4. Classify Mountains.**

**Answer –** Mountains are classified :

- 1. Folded Mountains** – Formed by folding of rocks (Example: Himalayas).
- 2. Block Mountains** – Parts uplifted due to cracks (faults).
- 3. Volcanic Mountains** – Formed by accumulation of lava and ash.
- 4. Relict or Residual Mountains** – Mountains remaining after long weathering.

**Q-5. Differentiate between Plateaus and Plains.**

**Answer -** Differentiate between Plateaus and Plains are:

| <b>Plateaus</b>                        | <b>Plains</b>                                     |
|--|---|
| Extensive flat upland                  | Low-lying flat or slightly rolling land surface   |
| Cover about 18% of the earth's surface | Occupy more than one-third of the earth's surface |
| Rich in minerals                       | Fertile and suitable for agriculture              |
| Often dissected by rivers              | Densely populated and developed                   |



## 3

# HYDROLOGICAL CYCLE AND OCEAN

## Introduction

Water is the basis of life on the Earth. In this chapter, the Hydrological Cycle, ocean relief, temperature, salinity and ocean movements have been studied.

## Importance of Ocean in Life

- Oceans are responsible for producing half of the world's oxygen.
- Oceans absorb more than 50 percent of carbon dioxide of our atmosphere.
- Oceans regulate climate.
- It provides home to number of species.



## Hydrological Cycle

The continuous movement of water from one state to another and from one place to another is called the Hydrological Cycle.

## Major Processes of Hydrological Cycle

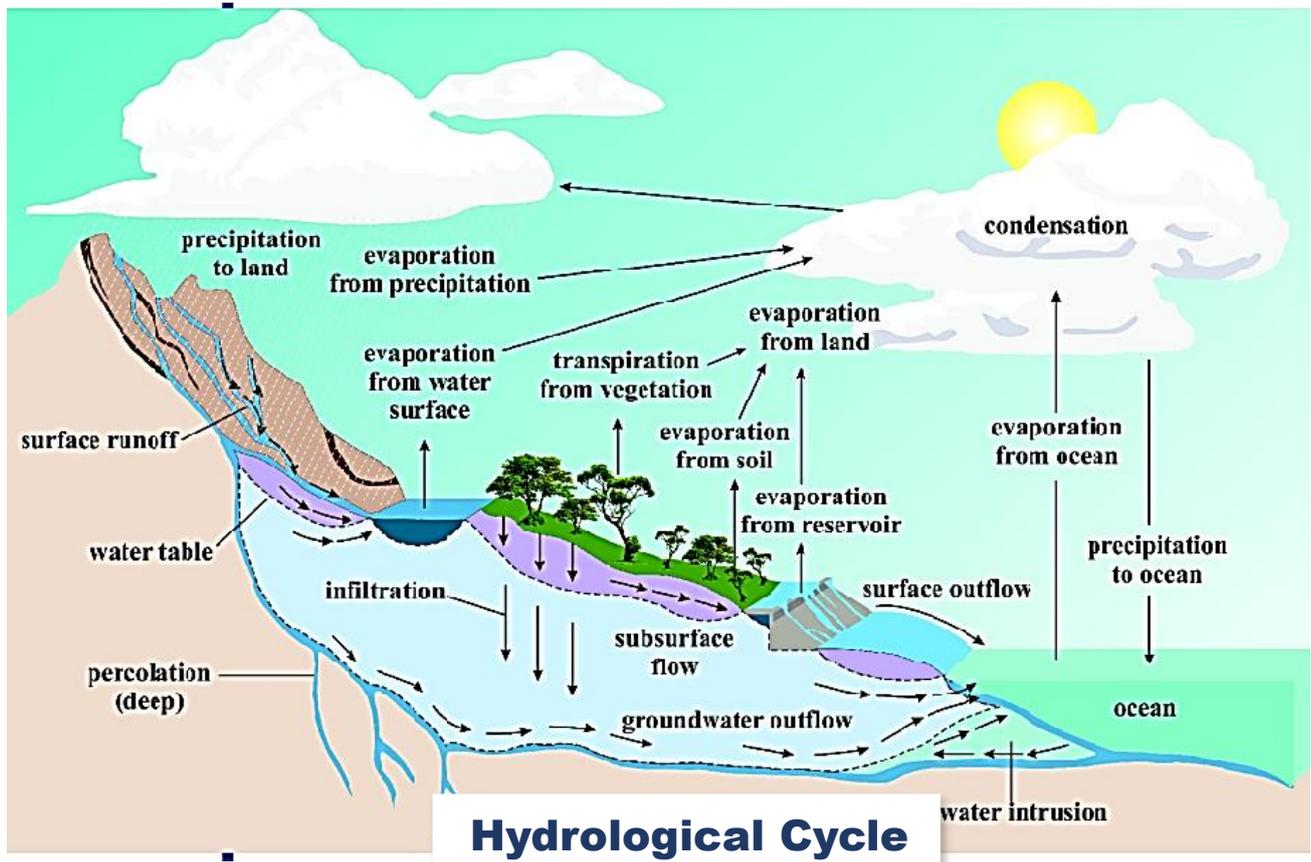
- (1) Evaporation:** The process through which water changes from liquid state to the gaseous state.
- (2) Condensation:** The process by which water from gaseous state changes into its liquid state (cloud formation).
- (3) Precipitation:** Water that got condensed forms clouds and returns to the land surface in the form of rain, snow, sleet, fog and hail.
- (4) Evapotranspiration:** The process by which water is transferred from the land to the atmosphere by evaporation from the soil and by transpiration from plants.
- (5) Runoff:** The form of precipitation that does not get infiltrated or absorbed by soil and gets collected to form rivers and oceans.



(6) **Infiltration:** The process of the absorption of the precipitated water into the soil.

(7) **Groundwater:** Water below the surface of the Earth occupying void spaces in soils or geologic strata.

(8) **Aquifer:** The underground layer of permeable rock, rock fractures or unconsolidated materials which bear the water.



### Importance of Hydrological Cycle

- Precipitation is essential for the growth of plants.
- Infiltration is essential for cleaning water and also helps in filtration.
- It sustains freshwater supply.

### Ocean Relief

The relief features of the ocean floor are divided into two parts:

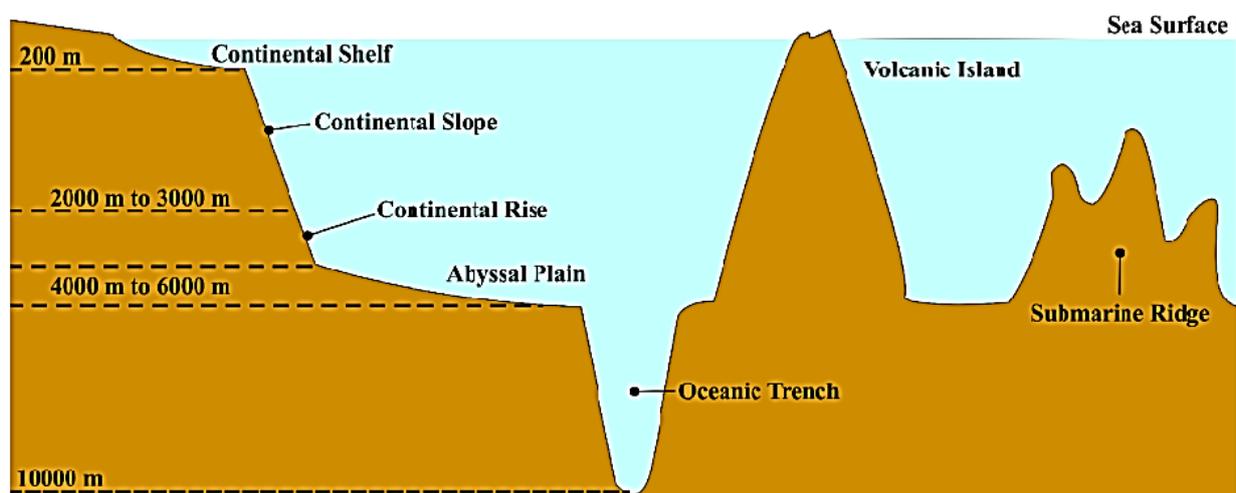


(1) Major relief features

(2) Minor relief features

### (1) Major relief features

1. **The Continental Shelf** – The continental margin which starts from the shoreline and extends upto the continental edge.
2. **The Continental Slope** – The connection between continental shelf and continental rise.
3. **The Continental Rise** – The link between continental slope and the deep sea or abyssal plain.
4. **The Deep Sea Plain or the Abyssal Plain** – The flattest and smoothest regions of the ocean basins.



### (2) Minor relief features

- **Mid-oceanic ridges** – The underwater mountain formed by plate tectonics (divergent boundaries).
- **Seamounts** – A mountain with pointed summits rising from the seafloor that does not reach the surface of the ocean.
- **Guyots** – The flat-topped seamounts.
- **Trenches** – Relatively long, steep-sided, narrow basins which are the deepest parts of the oceans.
- **Coral reefs** – Built by colonies of tiny marine animals.



- **Atolls** – Low islands consisting of coral reefs surrounding a central depression.

## Ocean Temperature

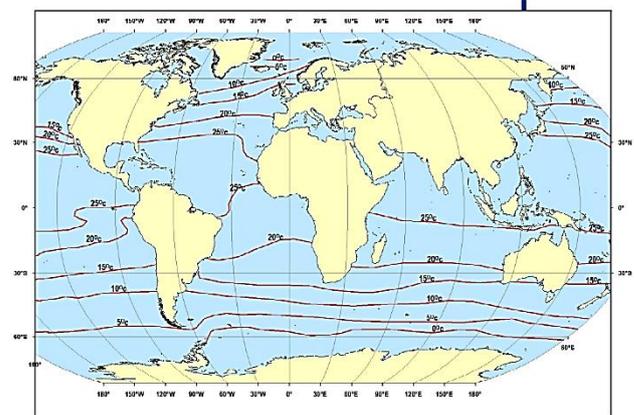
Oceans absorb about 80 percent of heat.

## Determinants of Ocean Temperature

- Latitude
- Prevailing winds
- Unequal distribution of Land and Water
- Evaporation Rate
- Ocean Currents

## Horizontal Distribution of Temperature

- Higher in lower latitudes (about 26°–27°C).
- Decreases towards the poles.



## Vertical Distribution of Temperature

1. Surface Zone or Mixed Zone (upto about 100 metres).
2. **Thermocline** – Zone of steep fall in temperature.
3. **Deep Zone** – Temperature remains almost constant.

## Ocean's Salinity

The salinity of ocean waters is measured by the amount of dissolved solids present in a unit weight of ocean water.

**Average salinity** = 35 parts per thousand



### Sources of Salinity

- Rivers
- Volcanic activity
- Weathering of rocks

### Determinants of Salinity

- Evaporation
- Temperature
- Precipitation
- Ocean Currents
- Influx of fresh water

### Distribution of Salinity

- Lower near the equator.
- Higher in the subtropical regions.
- Again lower towards the poles.

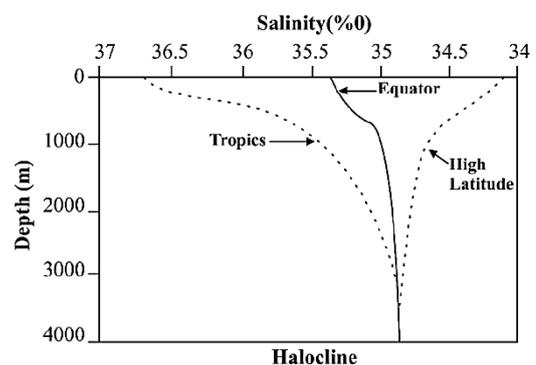
### Ocean Movement

Ocean water is very dynamic.

#### Three types:

1. Ocean waves
2. Tides
3. Ocean currents

### Ocean Waves



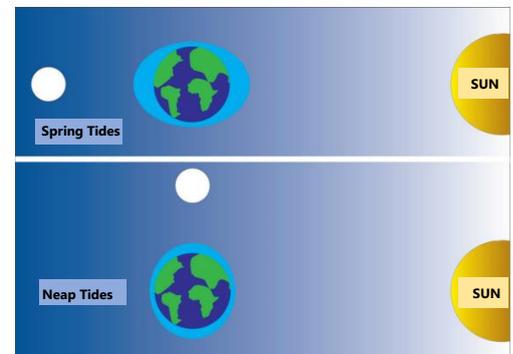
- Ocean waves are formed as wind blows across the surface of the ocean.
- Underwater disturbances can cause tsunamis.

## Tides

The periodical rise and fall of the water level in oceans and sea due to the gravitational pull of the sun and the moon is called a tide.

## Types of Tides

1. **Semi-diurnal Tide** – Two high tides and two low tides each day.
2. **Diurnal Tide** – One high tide and one low tide each day.
3. **Mixed Tide** – Variations in heights of tides.
4. **Spring Tides** – When the sun, moon and earth are aligned.
5. **Neap Tides** – When the sun and moon form a 90° angle.



## Importance of Tides

- Tides help in navigation.
- Tides make harbours useful.
- Tidal energy is used for electricity generation.

## Ocean Currents

- Large masses of surface water that circulate in regular patterns.
- Influence climate.
- Warm currents increase temperature, cold currents decrease temperature.

# TOP 5 QUESTIONS

**Q -1. What is Hydrological Cycle? Write its major processes.**

**Answer -** The continuous movement of water from one state to another and from one place to another is called the Hydrological Cycle.



**Major processes** – Evaporation, Condensation, Precipitation, Runoff, Infiltration, Evapotranspiration.

**Q -2. Write the major features of Ocean Relief.**

**Answer** - Major relief features of the ocean are:

1. The Continental Shelf
2. The Continental Slope
3. The Continental Rise
4. The Deep Sea Plain or the Abyssal Plain

**Q -3. Write the factors affecting Ocean Temperature.**

**Answer** - Factors affecting ocean temperature are:

1. Latitude
2. Unequal distribution of Land and Water
3. Evaporation Rate
4. Ocean Currents

**Q -4. What is Salinity? Write its determining factors.**

**Answer** - The salinity of ocean waters is measured by the amount of dissolved solids present in a unit weight of ocean water.

**Determinants** – Evaporation, Precipitation, Temperature, Ocean Currents, Influx of fresh water.

**Q -5. What are Tides? Write their types.**

**Answer** - The periodical rise and fall of the water level in oceans and sea due to the gravitational pull of the sun and the moon is called tides.

**Types** – Semi-diurnal Tide, Diurnal Tide, Mixed Tide, Spring Tides, Neap Tides.



## 4

# ATMOSPHERIC PRESSURE AND WINDS

## Introduction

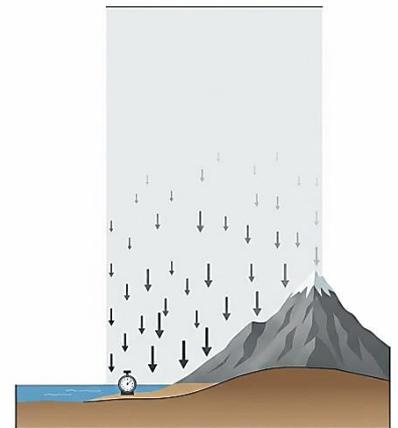
The weight of air is called **Atmospheric Pressure**. Winds are formed due to differences in air pressure. In this chapter, Atmospheric Pressure, Pressure Belts and different types of Winds have been studied.

## Atmospheric Pressure Belts

### Atmospheric Pressure

- The force per unit area exerted by the atmosphere on the earth's surface is called **Atmospheric Pressure**.
- It is measured by a **Barometer**.
- Unit – **Millibar (mb)**.
- The standard sea level atmospheric pressure is 1013.2 mb.
- Atmospheric pressure decreases with increasing height.

**Reason** – The weight of the air column above decreases with height.



### Types of Pressure

1. **High Pressure** – Area with more air.
2. **Low Pressure** – Area with less air.

### Air Motion

- **Horizontal motion** – In the form of wind.
- **Vertical motion** – Ascent and subsidence.



## Factors Affecting Atmospheric Pressure

- 1. Altitude** – Atmospheric pressure decreases with increasing height.
- 2. Temperature** – There is an inverse relationship between temperature and pressure.
- 3. Earth's Rotation** – Affects the pressure belts of the globe.
- 4. Water Vapour** – Greater concentration of water vapour reduces air density and pressure.



## Distribution of Atmospheric Pressure

### (A) Vertical Distribution

- Atmospheric pressure decreases with increasing height at the rate of 34 millibars per 300 metres.
- At the height of 5.5 km, air pressure decreases to 550 mb, which is half of the sea-level pressure.
- 99.9 percent of atmospheric pressure lies within 50 km of the earth's surface.

### (B) Horizontal Distribution – Major Pressure Belts

There are seven pressure belts on the earth.

- 1. Equatorial Low Pressure Belt (0°–5°)** – Due to intense heating, warm air rises and creates low pressure. It is also known as the Inter Tropical Convergence Zone (ITCZ) or Doldrums.
- 2. Sub-tropical High Pressure Belt (30°–35°)** – Formed due to subsidence of air and dynamic factors. Also known as Horse Latitudes.
- 3. Sub-Polar Low Pressure Belt (60°)** – Created due to convergence of westerlies and polar easterlies.
- 4. Polar High Pressure Belt (90°)** – Extremely low temperature leads to compression of air and high pressure.



## Seasonal Distribution

- **January** – The Sun is in the southern hemisphere, so the pressure belts shift southward.
- **July** – The Sun is in the northern hemisphere, so the pressure belts shift northward.

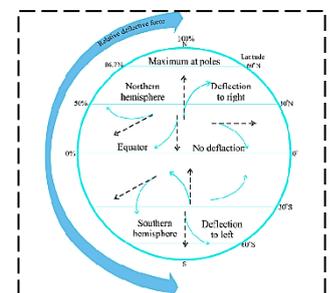
## Wind

Wind is the horizontal movement of air due to pressure difference.

Winds blow from high pressure to low pressure areas.

## Factors Affecting Wind Motion

1. **Pressure Gradient Force** – Generated due to horizontal difference in pressure.
2. **Coriolis Force** – Due to rotation of the earth. Winds are deflected to the right in the northern hemisphere and to the left in the southern hemisphere.
  - In the Northern Hemisphere, deflection is to the right.
  - In the Southern Hemisphere, deflection is to the left.



The coriolis force

## Types of Winds

### (1) Planetary Winds (Permanent Winds)

Blow throughout the year in the same direction.

- (i) **Trade Winds (Easterlies)** – Blow from sub-tropical high pressure to equatorial low pressure.
- (ii) **Westerlies** – Blow from sub-tropical high pressure towards poles.
- (iii) **Polar Easterlies** – Blow from polar high pressure to sub-polar low pressure.

### (2) Periodic (Seasonal) Winds

#### Monsoon Winds

- Seasonal reversal of winds.



- Blow from sea to land in summer.
- Blow from land to sea in winter.

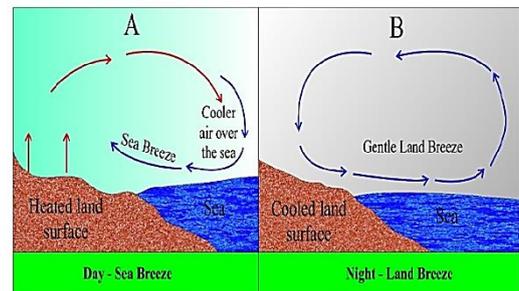
### **(3) Local Winds**

**(i) Land Breeze** – Wind blows from land to sea at night.

**(ii) Sea Breeze** – Wind blows from sea to land during the day.

### **(iii) Mountain and Valley Breezes**

- **Valley Breeze** – During the day, wind blows upslope.
- **Mountain Breeze** – During the night, wind blows downslope.



### **Important Hot Local Winds**

- **Loo** – Plain of north India
- **Fohn** – Alps mountain.
- **Chinook** – Eastern slopes of Rockies.
- **Sirocco** – Sahara desert.
- **Khamsin** – North Africa and Arabia.



# TOP 5 QUESTIONS

**Q-1. What is Atmospheric Pressure? Write the factors affecting its distribution.**

**Answer-** The force per unit area exerted by the atmosphere on the earth's surface is called Atmospheric Pressure. The factors affecting its distribution are:

- Altitude
- Temperature
- Earth's Rotation
- Water Vapour

**Q-2. Explain the major pressure belts of the world.**

**Answer-** The major pressure belts are:

- Equatorial Low Pressure Belt
- Sub-tropical High Pressure Belt
- Sub-Polar Low Pressure Belt
- Polar High Pressure Belt

**Q-3. What is Coriolis Force? What is its effect on winds?**

**Answer-** The deflection in the direction of moving winds due to the rotation of the Earth is called the **Coriolis force**. This force deflects winds to the right in the Northern Hemisphere and to the left in the Southern Hemisphere. Because of this, winds do not move in a straight line but instead follow a curved path. Without the Coriolis force, the present form of the global wind system would not be possible.

**Q-4. Write the major pressure belts of the world.**

**Answer-** The major pressure belts of the world:

1. Equatorial Low Pressure Belt
2. Sub-tropical High Pressure Belt
3. Sub-Polar Low Pressure Belt



4. Polar High Pressure Belt

**Q-5. Write the types of winds.**

**Answer-** There are three types of winds:

1. Planetary Winds

2. Periodic Winds

3. Local Winds

These all occur due to differences in pressure and affect the climate.



## 5

# CLIMATE AND CLIMATE CHANGE

## Introduction

Climate refers to the long-term averaged weather conditions of a particular area or region. It is formed by elements such as temperature, precipitation, humidity and wind. In this chapter, the difference between weather and climate, factors affecting climate, climatic regions, and the causes and consequences of climate change have been studied.

## Weather and Climate

### Weather

The state of general atmospheric conditions with respect to temperature and pressure is called weather.

### Climate

**Climate** refers to the long-term averaged weather conditions of a particular area or region.

- These are relatively permanent and long-lasting.

### Difference between Weather and Climate

- Weather is short-term, climate is long-term.
- Weather changes quickly, climate changes slowly.
- Weather affects a small area, climate affects a large area.



### Factors Affecting Climate

1. **Latitude** – Places near the equator have higher temperature, towards the poles it is lower.
2. **Elevation** – Temperature decreases with increasing height.
3. **Prevailing winds** – Distribute moisture and temperature.
4. **Ocean currents** – Warm currents increase temperature, cold currents decrease it.



**5. Relief** – Mountains influence the distribution of rainfall

**6. Vegetation** – Dense vegetation regulates temperature.

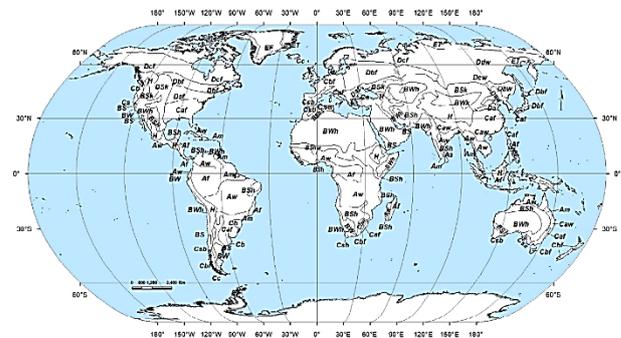
### **Climatic Regions**

An area which has homogenous climatic characteristics and has geographic continuity is known as **climate regions**.

### **Koppen's Classification of Climate**

Koppen divided the world into five major groups on the basis of temperature and precipitation –

- 1. Group A** – Tropical
- 2. Group B** – Dry
- 3. Group C** – Warm Temperate
- 4. Group D** – Cold
- 5. Group E** – Polar



This classification is based on the relationship between vegetation and climate.

### **Climate Change**

Climate change refers to significant changes in the average climatic conditions over a long period of time. It can occur due to both natural and human induced causes.

### **Difference between Climate Variability and Climate Change**

- Climate variability is short-term fluctuations.
- Climate change is long-term permanent change.

### **(Global Warming)**

- The continuous increase in the average temperature of the Earth over the past few centuries is called **global warming**.



- Its main cause is the increase in greenhouse gases.

### **Major Greenhouse Gases**

- Carbon dioxide
- Methane
- Nitrous oxide
- Chlorofluorocarbon

### **Causes of Climate Change**

#### **(A) Natural Causes**

1. Continental Drift
2. Ocean currents (such as El-Nino)
3. Volcanic eruption
4. Change in Solar radiation
5. Earth's orbital changes



#### **(B) Human Induced Causes**

1. Burning of fossil fuels
2. Land use change
3. Deforestation
4. Agricultural activities

After industrialisation, the amount of greenhouse gases has increased rapidly.

### **Consequences of Climate Change**

1. Melting of glaciers
2. Rising sea level



3. Increase in extreme weather events
4. Adverse impact on agriculture
5. Impact on human health

### **Global Initiatives on Climate Change**

To reduce the problem of climate change, several efforts have been made at the international level.

#### **1. United Nations Framework Convention on Climate Change (UNFCCC)**

- Adopted in 1992 at the Rio de Janeiro Conference.
- **Objective** – To stabilize the concentration of greenhouse gases.

It is the basis of global cooperation on climate change.

#### **2. Kyoto Protocol (1997)**

- Adopted under UNFCCC
- Binding targets for developed countries to reduce en

It was a legally binding agreement.

#### **3. Paris Agreement (2015)**

- Target to keep global temperature rise below 2°C.
- Participation of all countries.

Each country has to submit its Nationally Determined Contribution (NDC).

#### **IPCC (Intergovernmental Panel on Climate Change)**

- Established in 1988.
- Presents scientific assessment reports on climate change.

It provides scientific basis for policy making.



# TOP 5 QUESTIONS

**Q-1. Differentiate between Weather and Climate.**

**Answer-** Difference between Weather and Climate:

| Basis   | Weather                             | Climate                                 |
|---------|-------------------------------------|---|
| Period  | Short period (hours/days condition) | Long period (average of about 30 years) |
| Change  | Changes quickly                     | Changes slowly                          |
| Area    | Effect on limited area              | Effect on wide area                     |
| Example | Rainfall today                      | Average annual rainfall of a region     |

**Q-2. Write the factors affecting Climate.**

**Answer-** Climate is affected by **latitude, elevation, prevailing winds, ocean currents, relief and vegetation**. Places near the equator have higher temperature whereas temperature decreases with increasing height. Ocean currents and winds distribute temperature and moisture.

**Q-3. Write the features of Köppen's Classification of Climate.**

**Answer-** Köppen divided the world's climate into five major groups on the basis of temperature and precipitation – Tropical, Dry, Warm Temperate, Cold and Polar. This classification is based on the interrelationship between vegetation and climate and is widely used at the world level.

**Q-4. What is Global Warming? Write its causes.**

**Answer-** The continuous increase in the average temperature of the Earth is called global warming. Its main cause is the increase in greenhouse gases such as carbon dioxide, methane and nitrous oxide. Burning of fossil fuels and deforestation are its major causes.

**Q-5. Write the major consequences of Climate Change.**

**Answer-** Due to climate change, melting of glaciers, rising sea level and increase in extreme weather events are occurring. It has negative impact on agriculture, biodiversity and human health. The problem of floods and drought has increased in coastal areas.



## 6

# AGRICULTURE AND FOOD SECURITY

## Introduction

Agriculture is the backbone of the Indian economy. It not only provides employment to a large population of the country, but also supplies raw material to industries and food to the people. In this chapter, the types of agriculture, crops, agricultural development and various agricultural revolutions have been studied.

## Importance of Agriculture

1. More than half of India's population depends on agriculture.
2. Significant contribution to the Gross Domestic Product (GDP).
3. Provides raw material to agro-based industries.
4. Main source of rural employment.
5. Provides food for the growing population.



Therefore, agriculture is considered the backbone of the Indian economy.

## Major Practices in Agriculture

### 1. Subsistence farming

- The farmer cultivates for his own consumption.
- Use of traditional tools.

Production is low and sale in the market is limited.

### 2. Shifting Agriculture

- Forest is cleared for cultivation, then the land is left.



- The place is changed when soil fertility declines.

### **3. Intensive agriculture**

- More production on less land.
- Requires more labour and capital.

### **4. Extensive agriculture**

- Cultivation over a large area with less labour.
- Greater use of machines.

### **5. Commercial Agriculture**

- Production for the market.
- Profit earning is the main objective.

### **6. Plantation agriculture**

- Crops like tea, coffee, rubber.
- Single crop over a large area.

### **7. Dry land farming**

- Practised in areas with low rainfall.
- Crops like jowar, bajra.

### **8. Wetland farming**

- Practised in areas with high rainfall.
- Paddy is the main crop.

### **9. Terrace Agriculture**

- Steps are made on hill slopes for cultivation.



- Helps in preventing soil erosion.

### 10. Mixed and Multiple Farming

- Crop + livestock together.
- More than one crop in the same field.

### Cropping Pattern in India

In India, crops are grown in three seasons –

#### Rabi Crops

- **Sowing: October–November**
- **Harvesting: March–April**
- Require cold and dry climate.
- Require more irrigation.

**Major crops:** Wheat, Barley, Gram, Mustard.

#### Kharif Crops

- **Sowing:** June–July (with monsoon)
- **Harvesting:** September–October
- Require high temperature and rainfall.

**Major crops:** Paddy, Maize, Cotton, Jowar, Bajra.

#### Zaid Crops

- **Period:** March to June (between Rabi and Kharif)
- Irrigation-based farming.
- Short duration crops.



**Major crops:** Watermelon, Muskmelon, Cucumber, Vegetables.

### Major Crops of India

#### (A) Food Grains

- **Rice** – high rainfall and hot climate.
- **Wheat** – grown in winter season.



#### (B) Cash Crops

- **Sugarcane** – Uttar Pradesh is major producer.
- **Cotton** – grows well in black soil.

#### (C) Plantation Crops

- **Tea** – Assam, West Bengal.
- **Coffee** – Karnataka is major producer.

#### (D) Horticulture

Mango, Banana, Apple etc.

### Agricultural Development

#### Land Reforms

1. **Abolition of Zamindari System** – Intermediaries were removed.
2. **Ceiling on land holdings** – A limit was fixed on holding excess land.
3. **Distribution of land to the landless** – Attempt towards social equality.
4. **Tenancy reforms** – Security and rights were given to farmers.

#### Green Revolution

1. Started in the **1960s**.



2. Increase in wheat and rice production.
3. Greater use of fertilisers, pesticides and irrigation.
4. Success in Punjab, Haryana and Western Uttar Pradesh.



### **White Revolution**

1. Started with Operation Flood programme.
2. Establishment of dairy cooperative societies.
3. Development of Amul model.
4. India became a leading producer of milk in the world.



### **Blue Revolution**

Efforts made to increase fish production are called the Blue Revolution.

#### **Main points:**

1. Promotion of fish farming.
2. Shrimp farming and marine fisheries development.
3. Use of modern techniques.
4. Increase in exports.



### **Yellow Revolution**

The programme launched to increase oilseed production is called the Yellow Revolution.

#### **Main points:**

1. Emphasis on production of mustard, groundnut, soybean.
2. Use of improved seeds and technology.
3. Aim of self-reliance in edible oils.



**Objective:** To reduce oil imports.

### Environmental and Socio-economic Impacts

#### Positive impacts

- Increase in production
- Self-reliance
- Employment generation

#### Negative impacts

- Decline in soil fertility
- Fall in water table
- Decline in biodiversity

## TOP 5 QUESTIONS

**Q-1. What is the importance of agriculture in the Indian economy?**

**Answer-** Agriculture is the backbone of the Indian economy. It provides employment to a large population and contributes significantly to the GDP. Agriculture supplies raw material to industries and fulfills the food requirements of the country.

**Q-2. Write the difference between Subsistence farming and Commercial Agriculture.**

**Answer-** Difference between Subsistence farming and Commercial Agriculture:

| Basis      | Subsistence farming | Commercial Agriculture |
|------------|---------------------|------------------------|
| Objective  | For own consumption | For sale in the market |
| Production | Low                 | High                   |



|                   |             |        |
|-------------------|-------------|--------|
| <b>Technology</b> | Traditional | Modern |
|-------------------|-------------|--------|

**Q-3. Write the main results of the Green Revolution.**

**Answer-** The Green Revolution led to a remarkable increase in food grain production. India became self-reliant in food grains. With the use of irrigation, fertilisers and high yielding seeds, per hectare production increased.

**Q-4. What are the three major cropping seasons in India?**

**Answer-** Crops in India are grown in three major seasons – Rabi, Kharif and Zaid. Rabi crops are grown in winter, Kharif in the rainy season and Zaid crops in the summer season.

**Q-5. What was the objective of the White Revolution?**

**Answer-** The objective of the White Revolution was to increase milk production in the country and make India self-reliant in milk production. Through the Operation Flood programme, dairy cooperative societies were promoted.



## 7

# MINERAL AND ENERGY RESOURCES

## Introduction

The economic development of any country depends on its mineral and energy resources. Minerals provide raw material to industries and energy resources determine the pace of development. In this chapter, major minerals, their distribution and sources of energy have been studied.

## Importance of Minerals

1. Minerals provide essential raw material for industrial development.
2. About 90 types of minerals are produced in India.
3. Many minerals are non-renewable, therefore their conservation is necessary.
4. Iron and steel, cement, power and chemical industries depend on minerals.

## Classification of Minerals

### (1) Metallic Minerals

Minerals from which metals are obtained are called metallic minerals.

#### (i) Ferrous Metallic Minerals

- Iron, Manganese, Chromite.
- These are extremely essential for the iron and steel industry.

#### (ii) Non-Ferrous Metallic Minerals

- Bauxite, Copper, Lead, Zinc.
- These are used in electrical, transport and aircraft industries.



## **(2) Non-Metallic Minerals**

Minerals from which metals are not obtained are called non-metallic minerals.

- Limestone, Mica, Gypsum etc.
- Used in cement, glass and fertiliser industries.

## **Major Minerals**

### **Iron Ore**

- Main basis of iron and steel production.
- Haematite and Magnetite are major types.
- Odisha and Jharkhand are major producing states.



### **Manganese**

- Used in making iron and steel hard and strong.
- Odisha and Maharashtra are major producers.

### **Bauxite**

- Main source of aluminium production.
- Being a light metal, it is useful in aircraft and electrical industries.

### **Limestone**

- Main raw material of cement industry.
- Extremely important in construction activities.

## **Energy Resources**

Energy is essential for economic development and industrial progress.

### **(A) Conventional Sources of Energy**



### **Coal**

- Major source of energy in India.
- Used in thermal power plants.
- Jharkhand and Chhattisgarh are major regions.



### **Petroleum**

- Basis of fuel and chemical industry.
- Assam and Mumbai High are major regions.

### **Natural Gas**

- Clean and less polluting fuel.
- Used in power generation and fertiliser industry.

### **Atomic Energy**

- Obtained from Uranium and Thorium.
- Long-term energy solution.

### **(B) Non-Conventional Sources of Energy**



### **Hydroelectric Power**

- Renewable and environment friendly.
- Produced from dams on large rivers.

### **Solar Energy**

- Unlimited energy obtained from the Sun.
- More useful in dry regions.



### Wind Energy

- Energy is produced by rotating turbines through wind speed.
- Tamil Nadu and Gujarat are major states.

### Bio Energy

- Energy obtained from organic materials such as wood, dung, crop residues and biological wastes is called bio energy.
- Gas is produced through biogas plants.
- It is useful as fuel in rural areas.

### Tidal Energy

- Energy generated from the rise and fall of tides in the sea is called tidal energy.
- Electricity is produced by rotating turbines through the movement of water during high tide.
- It is a clean and renewable source of energy.

### Geothermal Energy

- Energy obtained from the internal heat of the Earth is called geothermal energy.
- It is used in hot water springs and volcanic areas.
- Steam is generated from it to produce electricity.

### Measures of Conservation

- Balanced extraction of minerals.
- Promotion of Recycling.
- Saving of energy.
- Increasing the use of renewable energy.
- Decline in biodiversity



# TOP 5 QUESTIONS

**Q-1. Write the difference between metallic and non-metallic minerals.**

**Answer-** Difference between metallic and non-metallic minerals:

| Basis                     | Metallic Minerals         | Non-Metallic Minerals |
|---------------------------|---------------------------|-----------------------|
| <b>Metal availability</b> | Metal is obtained         | Metal is not obtained |
| <b>Example</b>            | Iron ore, Bauxite         | Limestone, Mica       |
| <b>Use</b>                | Industry and construction | Cement, Fertiliser    |

**Q-2. Write the importance of iron ore.**

**Answer-** Iron ore is the main basis of the iron and steel industry. Machines, railway tracks and building materials are made from it. Most of its reserves in India are found in Odisha and Jharkhand.

**Q-3. Explain the importance of coal.**

**Answer-** Coal is the major source of energy in India and is widely used in thermal power generation. It is essential for industrial development. Its main reserves are found in the Gondwana region.

**Q-4. Write two advantages of non-conventional sources of energy.**

**Answer-** Non-conventional sources of energy are renewable and pollution free. They reduce dependence on conventional resources and help in environmental conservation.

**Q-5. Why is petroleum called "liquid gold"?**

**Answer-** Petroleum is a highly valuable and multipurpose source of energy. It is used in fuel, plastics, chemicals and transport. Due to its high demand and economic importance, it is called "liquid gold".



## 8

# FOREIGN DIRECT INVESTMENT (FDI), TRANSPORT, COMMUNICATION AND TRADE

## Introduction

Foreign Direct Investment (**FDI**), **transport, communication and trade** play an important role in the economic development of a country. They accelerate the progress of the country by giving momentum to agriculture and industry.

## Foreign Direct Investment (FDI)

When a foreign company or an individual establishes an industry in another country or acquires a lasting interest in it, it is called **Foreign Direct Investment (FDI)**.

1. It brings capital, modern technology and management skills into the country.
2. FDI increases employment opportunities and leads to growth in production and exports.



- After 1991, with economic liberalisation in India, FDI was promoted.

## Routes of FDI in India

1. Under the automatic route, prior approval of the Government is not required for foreign investment.
2. Under the government route, approval of the concerned Ministry has to be taken before investment.
3. The government route is adopted to maintain control in sensitive sectors.

## Importance of Transport

1. Transport is the lifeline of a country's economy.
  2. It connects production areas with consumption areas and makes distribution of goods possible.
  3. Effective transport accelerates trade and regional development.
- Being a vast country, India has developed various modes of transport.



### **Rail Transport**

1. Rail transport is a suitable means for carrying heavy goods and passengers over long distances.
2. The first train in India ran in 1853 between Mumbai and Thane.
3. The railway network is denser in the Northern Plains, whereas it is less developed in hilly regions.

- Electrification and broad gauge have increased the capacity of rail transport.



### **Road Transport**

1. Road transport is the most flexible and convenient means.
2. It provides door-to-door service and is highly suitable for short distances.
3. National Highways connect major cities, while rural roads connect villages to markets.

- Road transport is important for both trade and agriculture.



### **Pipeline Transport**

1. Petroleum and natural gas are transported through pipelines.
2. It is a safe means of transporting liquid and gaseous materials over long distances.
3. Initial cost is high, but operational cost is low.

- Pipelines have special importance in energy transport.



### **Water Transport**

1. Water transport is the cheapest means for heavy and bulk goods.
2. India's long coastline and numerous rivers make water transport possible.
3. The Ganga and Brahmaputra are major National Waterways.



### **Major National Waterways (NW)**

**National Waterway-1 (NW-1)** – 1620 km long waterway on the Ganga river from Haldia to Prayagraj, declared in 1986.

**National Waterway-2 (NW-2)** – 891 km long waterway on the Brahmaputra river from Bangladesh border to Sadiya, declared in 1988.

**National Waterway-3 (NW-3)** – 205 km long waterway on the West Coast Canal system of Kerala, declared in 1993.

**National Waterway-4 (NW-4)** – 1078 km long coastal waterway from Kakinada to Puducherry, declared in 2008.

**National Waterway-5 (NW-5)** – 623 km long waterway in the Brahmani river and East Coast Canal region, declared in 2008.

- Ports are being modernised under the Sagarmala Project.

### **Air Transport**

1. Air transport is the fastest means and covers long distances in a short time.

2. It is suitable for high value and perishable goods.

3. It plays an important role in international trade and tourism.

- Its importance is continuously increasing due to saving of time.



### **International Trade**

1. International trade involves the buying and selling of goods and services between different countries.

2. It strengthens economic relations between two or more countries.

- After liberalisation and globalisation, India's international trade has increased rapidly.

### **Major Trade Partners of India**

1. Major trade partners of India include the USA, Russia, countries of Western Europe, Japan and Australia.

2. These countries play an important role in both imports and exports.

- Trade relations strengthen India's economic position.



# TOP 5 QUESTIONS

## Q-1. What is Foreign Direct Investment (FDI)?

**Answer-** FDI is an investment in which a foreign company establishes an industry in a country or acquires a lasting interest in it. It increases capital, technology and employment opportunities. It helps in industrial development and growth of exports.

## Q-2. Write the importance of Rail Transport.

**Answer-** The importance of rail transport is as follows:

1. Suitable means for carrying heavy goods over long distances.
2. Convenient for large number of passengers.
3. Connects different regions of the country.
4. Plays an important role in industrial development.
5. Electrification has increased its capacity and speed.

## Q-3. Why is road transport important?

**Answer-** Road transport is a flexible and convenient means which provides door-to-door service. It connects rural areas with cities and is highly suitable for short distance transport.

## Q-4. Write two advantages of water transport.

**Answer-** Water transport is a cheap means for heavy and bulk goods. It provides long distance transport at low cost and plays an important role in international trade.

## Q-5. What is the contribution of trade in economic development?

**Answer-** Trade increases the exchange of goods and services. It earns foreign exchange and increases production and employment. Effective trade strengthens the economy of the country.

