Chapter 4: Climate

1. Introduction to Climate

Weather: Refers to the atmospheric conditions of a place over a short period (like temperature, humidity, rainfall for a day or a week).

Climate: Refers to the average weather conditions of a place over a long period (typically 30 years or more).

India experiences a monsoon type of climate, which is characterized by seasonal reversal of winds.

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2. Climatic Controls

The factors that affect the climate of a place are known as climatic controls:

1. Latitude: The closer a place is to the equator, the warmer its climate. India lies in the tropical and subtropical regions.

2. Altitude: Places at higher altitudes are cooler than those at lower altitudes. For instance, Shimla is cooler than Delhi.

3. Pressure and Winds: India is influenced by several pressure systems, which in turn affect the monsoon winds.

4. Distance from the Sea: Places near the sea have a moderate climate (like Mumbai), while places far from the sea have extreme climates (like Delhi).

5. Ocean Currents: Ocean currents can influence coastal climates. For example, warm currents increase the temperature of coastal regions.

6. Relief Features: Mountains act as barriers for cold or hot winds. The Himalayas prevent the cold winds from Central Asia from entering India.

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3. Factors Affecting India’s Climate

India’s climate is influenced by the following factors:

1. Location and Latitude: The Tropic of Cancer passes through the middle of India, dividing the country into two parts – tropical and subtropical regions.

2. Distance from the Sea: Areas close to the sea (like Mumbai and Chennai) experience less variation in temperature than areas in the interior of the country (like Delhi and Jaipur).

3. Himalayan Mountains: The Himalayas act as a barrier to the cold winds coming from Central Asia, helping to keep much of northern India warm during the winter.

4. Jet Streams: The upper atmosphere over India is influenced by jet streams (high-altitude winds), which also affect the monsoon winds.

5. Monsoon Winds: India’s climate is greatly influenced by the monsoon winds which bring heavy rainfall during the summer months.

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4. The Indian Monsoon

The monsoon refers to the seasonal reversal of winds. India experiences two main monsoon seasons:

1. Southwest Monsoon (Summer Monsoon): Winds blow from the Indian Ocean to the land, bringing heavy rainfall. These winds pick up moisture as they move from the sea to the land.

2. Northeast Monsoon (Winter Monsoon): Winds blow from the land to the sea, resulting in dry conditions in most of India.

The southwest monsoon begins in June and lasts till September, while the retreating monsoon lasts from October to November.

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5. Seasons in India

India experiences four major seasons:

1. Cold Weather Season (Winter):

From December to February.

The temperature decreases from south to north.

The weather is influenced by the northeast trade winds.

2. Hot Weather Season (Summer):

From March to May.

The temperature rises, especially in northern India.

The loo, a hot dry wind, blows in the northern plains.

3. Advancing Monsoon (Rainy Season):

From June to September.

The southwest monsoon brings heavy rainfall to most parts of India.

Rainfall is unevenly distributed. For example, the Western Ghats receive heavy rainfall, while the Thar Desert remains dry.

4. Retreating Monsoon (Autumn):

From October to November.

The monsoon winds retreat, and the temperature begins to decrease.

This period is marked by cyclones, especially in the coastal areas of the Bay of Bengal.

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6. Distribution of Rainfall in India

Rainfall is unevenly distributed across India:

Western Coast and Northeast India receive heavy rainfall, more than 400 cm.

The Deccan Plateau and parts of northwest India receive less than 60 cm of rainfall annually.

The Thar Desert gets very little rainfall, less than 10 cm.

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7. Monsoon and its Importance

The monsoon is critical to Indian agriculture. Most farmers depend on monsoon rains for the growth of crops.

Irregular monsoon patterns can lead to droughts or floods, impacting agriculture and livelihoods.

Kharif crops like rice, maize, and cotton are sown during the monsoon season, while rabi crops like wheat and barley are grown in the winter.

NCERT Textbook Exercise Questions and Answers

Q1. Choose the correct answer from the four alternatives given below:

i. Which one of the following places receives the highest rainfall in the world?

a. Silchar

b. Mawsynram

c. Cherrapunji

d. Guwahati

Answer: b. Mawsynram

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ii. The wind blowing in the northern plains in summers is known as:

a. Kaal Baisakhi

b. Loo

c. Trade Winds

d. None of these

Answer: b. Loo

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iii. Which one of the following causes rainfall during winters in northwestern part of India?

a. Cyclonic depression

b. Western disturbances

c. Retreating monsoon

d. Southwest monsoon

Answer: b. Western disturbances

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iv. Monsoon arrives in India approximately in:

a. Early May

b. Early July

c. Early June

d. Early August

Answer: c. Early June

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v. Which one of the following characterizes the cold weather season in India?

a. Warm days and warm nights

b. Warm days and cold nights

c. Cold days and cold nights

d. Cold days and warm nights

Answer: b. Warm days and cold nights

Q2. Answer the following questions briefly:

i. What are the controls affecting the climate of India?

Answer:

The main factors controlling the climate of India are latitude, altitude, pressure and winds, distance from the sea, ocean currents, and relief features like mountains.

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ii. Why does India have a monsoon type of climate?

Answer:

India has a monsoon type of climate because of the seasonal reversal of winds.

In summer, the southwest monsoon brings heavy rainfall, while in winter, the northeast monsoon brings dry conditions.

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iii. Which part of India does experience the highest diurnal range of temperature and why?

Answer:

The Thar Desert in Rajasthan experiences the highest diurnal range of temperature. This is because of the dry and arid conditions, where there is a significant

difference between the daytime heat and nighttime cold.

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iv. Which winds account for rainfall along the Malabar Coast?

Answer:

The southwest monsoon winds account for the rainfall along the Malabar Coast.

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v. What are Jet Streams and how do they affect the climate of India?

Answer:

Jet streams are high-altitude, fast-moving air currents in the upper atmosphere. They influence the onset and withdrawal of the monsoon and also bring western disturbances during winter, causing rainfall in northwestern India.

Q3. Why is the monsoon considered a unifying bond?

Answer:

The monsoon is considered a unifying bond because:

It affects the entire subcontinent, binding the diverse regions of India together through a common climate pattern.

Agriculture across India depends on the monsoon, and it influences the economic and social life of the country.

The arrival of the monsoon is eagerly awaited as it brings relief from the summer heat and supports crop cultivation.

Important Extra Questions and Answers

Q1. Explain the distribution of rainfall in India.

Answer:

Rainfall in India is unevenly distributed:

Heavy rainfall occurs in the northeastern states and the Western Ghats, where the annual rainfall exceeds 400 cm.

Moderate rainfall occurs in central India, where it ranges between 60-120 cm.

The northwest regions, including Rajasthan and Gujarat, receive less than 60 cm of rainfall annually.

The Thar Desert receives the least rainfall, less than 10 cm annually.

Q2. Describe the role of the Himalayas in influencing the climate of India.

Answer:

The Himalayas play a crucial role in influencing the climate of India:

1. Barrier to Cold Winds: The Himalayas act as a natural barrier, preventing the cold winds from Central Asia from entering northern India. This keeps the region relatively warmer during winter.

2. Monsoon Winds: The Himalayas also block the southwest monsoon winds, forcing them to shed their moisture as rainfall over the northern plains and foothills. This contributes to heavy rainfall in areas like the Gangetic plains.

3. Western Disturbances: The Himalayas influence the western disturbances, which

bring winter rainfall to northwestern India, crucial for the rabi crops.

4. Temperature Moderation: The mountains help in maintaining moderate temperatures in the regions lying to the south by preventing extreme climatic conditions.

Q3. What is the difference between advancing monsoon and retreating monsoon?

Answer:

Advancing Monsoon:

Occurs from June to September.

The southwest monsoon winds blow from the sea towards the land, bringing heavy rainfall across most of India.

It marks the onset of the rainy season.

The rainfall is heavier and more widespread.

Retreating Monsoon:

Occurs from October to November.

The winds retreat from the land back to the sea.

It marks the withdrawal of the monsoon.

The rainfall is less intense and mainly occurs in coastal regions like Tamil Nadu.

Q4. How do Jet Streams influence the climate of India?

Answer:

The Jet Streams, especially the subtropical westerly jet stream, affect India's climate in the following ways:

1. Western Disturbances: The subtropical jet streams are responsible for bringing western disturbances during the winter

months, which result in rainfall in northern India.

2. Monsoon Onset and Withdrawal: The tropical easterly jet stream affects the onset and retreat of the monsoon. Its presence helps in pushing the monsoon towards the Indian subcontinent during the summer.

3. Temperature Regulation: The jet streams can influence temperature changes by steering weather patterns such as cyclones and depressions.