

CLASS: VII

CHAPTER: 3

CLIMATES OF INDIA

Exam-Preparation Notes

Book: Exploring Society: India and Beyond, Part-I — latest NCERT Class 7 Social Science text.

Big Questions: What makes India's climate diverse? How are monsoons formed? How does climate affect life and the economy? How can climate knowledge help us prepare for disasters? What is climate change and what are its consequences?

1. WEATHER, SEASONS AND CLIMATE

Weather is what we experience from hour to hour or day to day—rain, sunshine, wind, heat, dryness and so on. Weather keeps changing.

Climate is the pattern of weather experienced by an area or region over a long period of time—several decades at least.

Climate varies from region to region.

Seasons recur every year. Seasons occur as the Earth revolves around the Sun and each season lasts for a few months.

India experiences a rainy season or monsoon along with spring, summer, autumn and winter. Traditionally, many parts of India recognise six *ṛitus*:

- Vasanta — spring
- Grīṣhma — summer
- Varṣhā — rainy season
- Śharad — autumn
- Hemanta — pre-winter
- Śhīśhir — winter

Climate influences crops, food, clothing, festivals, plants, animals and many aspects of daily life.

Remember: Weather = short-term conditions; Seasons = recurring yearly pattern; Climate = long-term pattern over decades.

2. TYPES OF CLIMATES IN INDIA

Region	Climate	Main Features
Himalayan mountains	Alpine	Cold, snowy winters and cool summers.
Lower Himalayas and many hilly areas	Temperate	Moderately cold winters and summers that are not too hot.
Northern plains	Subtropical	Very hot summers and cold winters; important wheat-growing region.
Thar Desert	Arid	Extremely hot days, cool nights and very little rainfall.
Western coastal strip	Tropical wet	Heavy monsoon rainfall; favourable for rice and spices.
Central Deccan Plateau	Semi-arid	Hot summers, mild winters and moderate rainy-season rainfall.
Eastern India and southern peninsula	Tropical	Mild winter and distinct wet and dry periods influenced by monsoon winds.

Exam point: India's climatic diversity is linked to its varied geography and to factors such as latitude, altitude, distance from the sea, winds and topography.

3. FACTORS DETERMINING CLIMATE

India's climate is determined by several factors working together.

A. LATITUDE

Latitude is the distance north or south of the Equator. Places near the Equator receive more direct solar energy and are warmer. At higher latitudes, the Sun's rays are more oblique and their energy is spread over a larger area, so temperatures are lower.

In India, Kanniyakumari and the Nicobar Islands, being closer to the Equator, remain warm or hot for much of the year, whereas places farther north such as Srinagar are cooler.

B. ALTITUDE

Temperature generally decreases as altitude increases. Higher places have lower atmospheric pressure and lower air density. Also, the farther air is from the Earth's heated surface, the cooler it tends to be.

This is why many hill stations are cooler than nearby plains. Examples include Ooty, Shimla, Nainital, Darjeeling, Mount Abu, Munnar and Shillong.

C. PROXIMITY TO THE SEA

The sea moderates temperature. Coastal areas usually have less extreme temperatures—summers are not as hot and winters are not as cold. Inland areas generally experience greater temperature extremes.

Example: Mumbai and Nagpur are at similar latitudes, but Mumbai's proximity to the sea gives it a smaller annual temperature range than Nagpur.

D. WINDS

Winds can transport warmer or cooler air and can affect temperature, humidity and precipitation. Winds coming from deserts can bring hot, dry air, while winds coming from the sea can bring moisture and rainfall.

E. TOPOGRAPHY

Topography means the physical surface features of an area, including mountains, hills, valleys, slopes and coasts.

The Himalayas and Karakoram help protect the Indian subcontinent from cold winds from Central Asia. The Western Ghats also influence the distribution of monsoon rainfall.

4. PUTTING THE FACTORS TOGETHER

The climate of a region is determined collectively by latitude, altitude, proximity to the sea, winds and topography. Climate descriptions consider long-term patterns of temperature, precipitation and wind conditions, generally over three decades or more.

Microclimate: A climate localised in a small area that differs from the surrounding region. It may have its own pattern of temperature, humidity and precipitation.

Urban heat island: A built-up city area with many buildings and concrete structures and little vegetation can trap heat and become warmer than the surrounding region.

5. THE MONSOONS

Monsoon comes from the Arabic word *mausim*, meaning “season”. It refers to seasonal winds over a large area of the Indian Ocean and surrounding regions, including South Asia.

The monsoon mechanism is closely connected with the different rates at which land and ocean heat and cool.

SUMMER / SOUTHWEST MONSOON

- As summer begins, the Asian landmass heats strongly.
- Heating creates a powerful low-pressure system over the land.
- Air moves from the cooler, relatively high-pressure ocean toward the hot, low-pressure land.
- The ocean winds carry moisture.
- Moisture condenses over land and produces heavy monsoon rainfall.
- The southwest monsoon normally advances from the southern tip of India in early June and spreads northward, covering the subcontinent by around mid-July.
- The Western Ghats act as a barrier. Their western slopes receive heavy rainfall, while the Deccan Plateau to the east generally receives less and may experience breaks in rainfall.

WINTER / NORTHEAST MONSOON

- In winter, the land cools faster than the ocean.
- The land develops relatively high pressure while the warmer ocean has relatively lower pressure.
- Winds reverse and blow from land toward the ocean.
- These winds are generally dry, but after passing over the Bay of Bengal they can pick up moisture and bring rainfall to parts of eastern and southern India.

Special fact: Mawsynram in Meghalaya receives about 11,000 mm of average annual rainfall, around 11 metres.

6. TRADITIONAL KNOWLEDGE ABOUT THE MONSOON

People in India have long observed Nature to predict the arrival and behaviour of the monsoon. Such traditional knowledge is an important part of local heritage.

- Fishermen on the Konkan coast observing fish appearing at the surface as a possible sign of monsoon onset.
- In parts of southern India, the flowering of the Golden Shower tree (*Cassia fistula*) is traditionally associated with the arrival of the monsoon within about 50 days.
- Some communities observe the height of crow nests as a traditional clue about expected rainfall.

7. CLIMATE AND OUR LIVES

Climate strongly influences people's lives, culture and economic activities.

- Culture: Festivals, dances, food habits, clothing and agricultural traditions are often connected with seasons, rainfall and harvests.
- Agriculture: Crop cycles depend strongly on the timing and amount of rainfall.
- Economy: A reliable monsoon supports agriculture and water availability. Monsoon failure can reduce agricultural production, increase migration and raise food prices.
- Industry: Many industrial activities depend on predictable weather and adequate water supplies.
- Daily life: Climate affects clothing, food, housing, work patterns and seasonal activities.

8. CLIMATE-RELATED DISASTERS

India's varied climate can produce extreme events such as cyclones, floods, landslides and forest fires. These can affect lives, agriculture, infrastructure and local economies.

A. CYCLONES

Cyclones frequently affect India's coastline, especially the eastern coast. They can cause loss of life, damage to property and infrastructure, uproot trees and cause soil erosion.

A cyclone can develop when a strong low-pressure system forms over the sea. Air moves toward the low-pressure area, bringing moisture and rain. When the low pressure becomes intense and winds become very strong, a cyclone may form.

Eye of a cyclone: The central, relatively cloudless region around which the surrounding winds and clouds rotate inward.

India Meteorological Department (IMD): Tracks cyclones and provides information about their formation, development and likely landfall.

NDRF: The National Disaster Response Force is specially trained to respond to natural and human-made disasters and has played an important role in rescue and evacuation.

B. FLOODS

A flood occurs when water overflows onto normally dry land. Heavy rainfall can create more runoff than the land can absorb, and rivers or lakes may overflow their banks.

Floods occur frequently during the monsoon. The chapter identifies Uttar Pradesh, Bihar, Kerala, Andhra Pradesh and Assam as particularly vulnerable areas.

In Himalayan regions, glacial lakes can overflow when excessive rainfall or rapid glacier melting causes water to break through a barrier of rock and ice. Poor drainage and unplanned urban construction can also worsen flooding.

C. LANDSLIDES

A landslide is the sudden collapse or movement of rock, soil or debris. Heavy rain, earthquakes and volcanic activity can trigger landslides.

They are common in hilly and mountainous areas such as Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh, the Western Ghats and other hilly regions.

Human activities such as deforestation, unsuitable infrastructure and construction that blocks natural drainage can increase the risk.

D. FOREST FIRES

Forest fires are uncontrolled fires that spread rapidly through vegetation. Dry conditions, drought, high winds and human carelessness can contribute to them.

They damage forests, wildlife and ecosystems, worsen air quality and may displace communities. Their effects are both environmental and economic.

9. CLIMATE CHANGE

Climate change means significant, long-term changes in climate, including shifts in temperature, precipitation and weather events.

Natural processes have caused climate change in the past. However, the chapter explains that since the 19th century, climate change has been largely driven by human activities such as burning fossil fuels, deforestation, harmful industrial practices and excessive or wasteful consumption.

Fossil fuels are energy sources formed from the remains of plants and animals buried for millions of years. They include coal, petroleum oil and natural gas.

10. GREENHOUSE EFFECT AND GLOBAL WARMING

The natural greenhouse effect occurs because gases such as carbon dioxide in the atmosphere trap some heat from the Sun, helping keep Earth warm enough to support life.

Human activities have greatly increased the amount of greenhouse gases released into the atmosphere. This extra trapping of heat contributes to global warming and disrupts climate patterns.

The chapter notes that rising temperatures are already perceptible in many parts of India and that unusually warm conditions can affect agriculture and small-scale industries.

11. CONSEQUENCES AND RESPONSES TO CLIMATE CHANGE

Climate change can increase challenges associated with extreme temperatures, changing precipitation and climate-related hazards. These changes can affect natural systems, agriculture, human health, livelihoods and economic activity.

Mitigation: Steps taken to slow global warming and reduce the causes of climate change, such as reducing greenhouse-gas emissions, planting trees, increasing renewable energy and improving energy efficiency.

Adaptation and resilience: Communities can prepare for changing conditions, improve disaster preparedness and strengthen their capacity to withstand or recover from difficulties.

Sustainable: Something that can be maintained over a long period of time without exhausting the resources or conditions needed for the future.

12. KEY TERMS FOR EXAM

- **Climate:** Long-term pattern of weather in a region.
- **Weather:** Short-term atmospheric condition at a particular time and place.
- **Monsoon:** Seasonal winds over a large region; in India the term is commonly associated with seasonal rains.
- **Latitude:** Distance north or south of the Equator.
- **Altitude:** Height above sea level.
- **Topography:** Physical surface features of an area.

- Microclimate: Climate of a small localised area that differs from its surroundings.
- Cyclone: Intense low-pressure system with strong winds and rain.
- Flood: Overflow of water onto normally dry land.
- Landslide: Sudden movement or collapse of rock, soil or debris.
- Forest fire: Uncontrolled fire spreading through vegetation.
- Climate change: Significant long-term changes in climate.
- Mitigation: Actions that reduce the causes or pace of climate change.
- Resilience: Capacity to withstand or recover from difficulties.

13. QUICK REVISION — ONE-MINUTE RECALL

- Weather → short-term conditions.
- Climate → long-term weather pattern over several decades.
- India → highly diverse climates because of geography and climatic factors.
- Five major factors → latitude, altitude, proximity to the sea, winds and topography.
- Summer monsoon → land heats → low pressure over land → moist winds from ocean → heavy rainfall.
- Winter monsoon → land cools → relatively high pressure over land → winds move toward ocean; some winds bring rain to parts of eastern and southern India.
- Western Ghats → receive heavy rain on western slopes and influence rainfall over the Deccan Plateau.
- Climate affects → agriculture, culture, festivals, food, clothing, livelihoods and economy.
- Major climate-related disasters → cyclones, floods, landslides and forest fires.
- Climate change → long-term shifts in temperature, precipitation and weather events, increasingly driven by human activities.

14. IMPORTANT FLOW CHARTS

Factors determining climate:

Latitude + Altitude + Proximity to Sea + Winds + Topography → Regional Climate

Summer monsoon mechanism:

Summer heating of land → Low pressure over land → Winds from ocean to land → Moisture carried inland → Condensation → Heavy rainfall

Winter monsoon mechanism:

Winter cooling of land → High pressure over land → Winds from land toward ocean → Some winds cross Bay of Bengal → Moisture gained → Rainfall in parts of east and south India

Climate change response:

Climate change → Impacts → Mitigation + Adaptation + Resilience + Sustainable practices

15. EXAM-READY DIFFERENCES

Weather	Climate
Short-term atmospheric condition.	Long-term pattern of weather.
Can change within hours or days.	Studied over several decades or longer.
Example: today's rain or heat.	Example: a region's usual seasonal pattern.

16. FINAL EXAM CHECKLIST

- ✓ Define weather and climate clearly.
- ✓ Learn India's major climate types and their regional features.
- ✓ Remember all five factors determining climate.
- ✓ Understand the summer and winter monsoon mechanisms.
- ✓ Know how climate affects agriculture, culture and economy.
- ✓ Learn the causes and basic effects of cyclones, floods, landslides and forest fires.
- ✓ Understand climate change, greenhouse effect, global warming, mitigation and resilience.
- ✓ Practise map-based identification of major climatic regions and important locations mentioned in the chapter.

Source note: Prepared from Chapter 3, Climates of India, Class VII, Exploring Society: India and Beyond, Part-I, using current NCERT-aligned chapter content.