3 Climates of India

The Big Questions (Page 45).

1. **What makes India's climate so diverse?**

   Ans: India's climate is diverse due to various geographical and environmental factors:

   - **Latitude –** Regions closer to the equator are warmer (like Kanyakumari), while northern regions like Srinagar are cooler.
   - **Altitude –** Higher altitudes (like in hill stations such as Shimla and Ooty) are cooler due to lower air pressure and density.
   - **Proximity to the Sea –** Coastal areas like Mumbai have milder temperatures due to the moderating effect of the sea.
   - **Winds –** Winds from deserts or seas affect humidity and temperature. For example, desert winds cause heat waves, while monsoon winds bring rainfall.
   - **Topography –** Mountains like the Himalayas block cold winds, deserts like Thar receive little rainfall, and valleys or forests may have microclimates.

2. **What are the monsoons? How are they formed?**

   Ans: Monsoons are seasonal winds that bring rainfall and are central to life in India. The term comes from the Arabic word "mausim" meaning "season."

   - In summer, land heats up more quickly than the ocean, creating a low-pressure area. Moist winds from the ocean blow toward the land, bringing rain — this is the south-west monsoon.
   - In winter, the land cools down faster and forms a high-pressure area. Winds blow from land to ocean — these are the north-east monsoon winds. They bring dry weather but also some rainfall to eastern and southern India.

3. **What is the effect of climate on economy, culture, and society?**

   Ans: Following the effect of climate on economy, culture, and society:

   - **Economy**: Monsoon failures lead to poor agricultural output, water shortages, food price inflation, and migration of labourers.
   - **Culture**: Festivals like Pongal, Onam, Baisakhi, and Chhath Puja are linked to seasons and agricultural cycles.
   - **Society**: Seasonal changes influence food habits, clothing, and local customs. Climate also impacts infrastructure planning and health conditions.

4. **How can understanding the climate help us to prepare for natural disasters?**

   Ans: Understanding climate patterns helps us:

   - Predict cyclones, floods, and droughts, allowing early warnings and timely evacuations.
   - Develop disaster response systems like the National Disaster Response Force (NDRF).
   - Design infrastructure and city planning to prevent floods and landslides.
   - Encourage community preparedness and sustainable practices to reduce impact.

5. **What is climate change? What are its consequences?**

   Ans: Climate change refers to significant long-term changes in temperature, rainfall, and weather patterns.

   - **Causes**: Mainly due to human activities such as burning fossil fuels, deforestation, and pollution.
   - **Consequences**:
     - **i.** Rising temperatures and shorter winters (e.g., India had a milder winter in early 2025).
     - **ii.** Disruption of agricultural cycles and water availability.
     - **iii.** More frequent and severe natural disasters like cyclones, forest fires, and floods.
     - **iv.** Impact on biodiversity, health, and economic systems.

LET'S EXPLORE (Page 47)

1. **Which are your favourite seasons? Write a short essay explaining your reasons.**

   Ans. My Favourite Season: **Winter**

   - Among all the seasons, winter is my favourite. It usually lasts from November to February in most parts of India. I like winter because the weather is cool and pleasant. Unlike the hot summer, I can play outside without sweating too much. I also enjoy wearing woollen clothes, colourful sweaters, and mufflers.
   - Winter is also the season of festivals like Christmas, Lohri, and Makar Sankranti. These festivals bring joy, sweets, and family gatherings. The food in winter is delicious — we get to eat peanuts, gajak, hot soups, and green vegetables like mustard leaves (sarson ka saag).
   - In the early morning, the fog makes everything look magical. The nights are longer, so I sleep well. I love sitting in the sun during the day and drinking hot cocoa. This season makes me feel fresh, active and cheerful. That's why winter is my favourite!

2. **Discuss in groups of three or four and find out whether there are specific events connected to the seasons in your region. Collect information about them —songs, feasts with specific types of food, practices in different seasons, etc. Document these and share your discoveries with your class.**

   Ans. In our group, we discussed seasonal events and traditions from our region. Here is what we found:

Season	Event/Festival	Songs or Food	Practices
Spring	**Basant Panchami**	Saraswati Vandana, yellow sweets	Wearing yellow clothes, kite flying
Summer	**Mango Festival**	Mango-based dishes like aamras	Visiting orchards, drinking aam panna
Monsoon	**Teej / Raksha Bandhan**	Ghevar, jalebi	Swinging on trees, celebrating with family
Autumn	**Sharad Purnima**	Kheer kept under moonlight	Moon gazing, prayers for health
Winter	**Lohri / Makar Sankranti**	Revdi, popcorn, til laddoos	Bonfires, kite flying, sesame sweets

3. **Do you know which trees in your area change colours before the onset of winter? Are there trees that shed their leaves around this time? Why do you think this happens? Find out and document the local names of these trees.**

Ans. Yes, in our area, some trees start to change colour and shed leaves before the onset of winter. This usually happens in late October or November. Here are some examples:

Tree (Local Name)	Scientific Name	What Happens?
Peepal (पीपल)	*Ficus religiosa*	Leaves turn yellow and drop
Neem (नीम)	*Azadirachta indica*	Sheds leaves during colder months
Amaltas (गुलदाउदी)	*Cassia fistula*	Loses leaves and flowers bloom in spring
Bargad (बरगद)	*Ficus benghalensis*	Some branches dry, leaves fall

- **Why does this happen?-** Trees shed their leaves to conserve water and energy during the cold months when water is less available and sunlight is weaker. This natural process is called deciduous behavior. It helps trees survive and grow better when spring returns.

LET'S EXPLORE (51)

Udhagamandalam (Ooty) and Coimbatore are almost at the same latitude. The range of summer temperatures in Ooty is 10–25° while that in Coimbatore is 25 –38°. Why do you think there is such a difference in temperature between these two places?

Ans. Udhagamandalam (Ooty) and Coimbatore are located at almost the same latitude, which means they receive similar amounts of sunlight. However, there is a big difference in their summer temperatures because of their altitude.

- Ooty is a hill station located at a high altitude in the Nilgiri Hills. As we go higher above sea level, the temperature decreases. This is because the air becomes thinner and cooler at higher altitudes. That's why Ooty has a cooler climate with summer temperatures ranging from 10°C to 25°C.
- Coimbatore, on the other hand, is located in the plains at a much lower altitude. The air is denser and can hold more heat, so it gets hotter in summer, with temperatures between 25°C to 38°C.

Conclusion: Even though Ooty and Coimbatore are at the same latitude, the difference in altitude is the main reason why Ooty is cooler than Coimbatore.

LET'S EXPLORE (Page 56)

Since the ability to predict the monsoon rainfall has been an important aspect of life in India, our ancestors observed Nature around them carefully. They developed local traditional knowledge through their experience. This traditional knowledge is an important heritage we must preserve. For example, fishermen on the Konkan coast predict the onset of the monsoon when fishes that normally stay under water are seen at the surface; in parts of southern India monsoon is said to arrive within 50 days after the Golden Shower tree (Cassia fistula) blossoms. Some communities also believe that when crows build their nests high on tree-tops, it indicates less rainfall, whereas if the nests are lower, rainfall is likely to be heavy. Make a list of such local knowledge about rain, fog, snow or hail in your area.

Ans. Traditional Knowledge About Rain, Fog, Snow or Hail in My Area

In our region, people have been observing nature for generations to predict weather changes, especially the arrival of the monsoon and other weather events. Here are some examples of local traditional knowledge passed down by elders and farmers:

1. **Rain Prediction:**
   - Croaking of Frogs: Loud and continuous croaking of frogs is considered a sign of upcoming rain.

- Ants Moving Upwards: When ants climb walls or trees carrying food, people believe rain is near.
- Red Sunset or Sunrise: A deep red colour in the sky during sunset or sunrise often signals rain within the next 24–48 hours.

2. **Fog Indicators:**
   - Chirping of Birds Stops Suddenly in the Morning: It is believed that thick fog is likely when early morning bird sounds suddenly become silent.
   - Webs of Spiders on Plants: A high number of visible spider webs on leaves indicates dew and fog will form at night.

3. **Snow (in hilly areas):**
   - Thick Woolly Coats in Sheep or Goats (in Himachal/Uttarakhand): Local shepherds observe that animals grow thicker coats earlier when heavy snow is expected that winter.

4. **Hail Prediction:**
   - Sudden Cold Wind and Yellow-Grey Clouds: Farmers say that when the sky becomes yellowish with cold gusty winds, hailstorm may follow.

5. **Bird Behaviour:**
   - Crows building low nests → Heavy rainfall expected
   - Swallows flying close to the ground → Rain is near (due to insects flying lower in high humidity)

These observations show how nature acts as a guide, and our ancestors developed a deep understanding of it. Preserving this traditional wisdom helps us respect local culture and also build resilience to climate change.

LET'S EXPLORE (Page 56)

Reach out to your grandparents or elders in your neighbourhood. Ask them about the traditional festivals and dances they remember from their childhood and youth, especially those related to agriculture and rain. What rituals did they participate in? Then organise a cultural fest with your friends. You can showcase some of the dances, songs and activities your elders shared with you. Whether it is a dance, harvest ritual, or a simple story about a prayer to rain gods, try to bring these traditions to life for your classmates.

Ans. I spoke to my grandparents and a few elders in our neighbourhood. They shared some beautiful memories from their childhood about festivals, dances, and rituals that celebrated agriculture and rain. Here's what I found:

Traditional Festivals:

1. Makar Sankranti (Uttarayan)
- Celebrated in January after the winter harvest.
- People flew kites, prepared dishes like tilgul and khichdi, and prayed for a good crop cycle.

2. Teej and Hariyali Amavasya
- Celebrated during monsoon, mainly by women.

- Girls and women sang songs and danced on swings tied to trees. It was a way of thanking nature for the rain.

3. Pola (in Maharashtra/Madhya Pradesh)
- Festival where farmers decorate and worship their bullocks.
- Elders told us how they painted the horns, sang folk songs, and took the bullocks in a parade around the village.

4. Bhagoria Haat (Madhya Pradesh, by Bhil tribe)
- Celebrated before Holi, marking the end of harvesting.
- Involves vibrant tribal dances and singing in local dialects.

Folk Dances and Songs:
- Garba and Raas during Navratri, celebrating the changing season.
- Ghumar dance in Rajasthan, often performed during post-harvest celebrations.
- Jhijhiya folk dance from Bihar during the month of Ashwin to pray for rain and protection from drought.
- Songs about clouds, rain, and harvest were sung during sowing and reaping.

Rituals for Rain:
- Kāveri Puja and Varun Dev Pooja were done to ask the rain god for timely showers.
- In some areas, villagers worshipped frogs, believing it would bring rain.
- Some women performed jal yatra (carrying pots of water to the temple) as part of prayers for rainfall.

Cultural Fest Plan (For School Presentation):
- With friends, we planned a mini cultural fest in school:
- Dance Performance: Teej swing dance with folk songs
- Role Play: A bullock decorated for Pola
- Live Music: Students singing traditional rain songs
- Stalls: Display of harvest-related items and foods like bhutta (corn), kheer, and til laddoos
- Story Corner: Elders sharing short stories and rituals connected with rain

Conclusion: Our grandparents' memories are filled with rich traditions that connect deeply with nature and farming. Celebrating them helps us honour our culture, respect farmers, and understand the close relationship between climate and community life.

THINK ABOUT IT (Page 59)

What are clouds? White lumps in the sky, you might say. But what are they made of? The answer is simple — water. But not just any water; clouds are masses of water droplets, ice crystals, or a mixture of both, that are suspended in the atmosphere.

Ans. Clouds are masses of tiny water droplets, ice crystals, or sometimes a mixture of both, that are suspended in the atmosphere. They form when warm, moist air rises and cools down. As the air cools, the water vapour in it condenses around tiny dust particles to form droplets, which together appear as clouds.

Although they look like white, fluffy lumps in the sky, clouds are actually made of very fine and light particles of water or ice that float because they are spread out and carried by air currents. When these droplets combine and become heavy, they fall as rain, snow, or hail, depending on the temperature.

LET'S EXPLORE (Page 60)

Have you seen or read about floods? Look at the physical map of India. Discuss in pairs why you think floods occur in the areas mentioned above.

Ans. Yes, I have read and seen news reports about floods, especially during the monsoon season in India. Floods cause a lot of damage to homes, crops, roads, and even claim lives. According to the textbook, states like Uttar Pradesh, Bihar, Kerala, Andhra Pradesh, and Assam are more prone to floods.

After looking at the physical map of India, here are some reasons why floods occur in these regions:

Reasons for Floods in These Areas:

1. Ganga and Brahmaputra River Basins (Uttar Pradesh, Bihar, Assam):
   - These areas are located in low-lying plains with many rivers.
   - During monsoons, rivers overflow due to heavy rainfall and cause floods.
   - In Assam, the Brahmaputra river often floods its banks.
2. Heavy Rainfall in Coastal Areas (Kerala and Andhra Pradesh):
   - These states lie along the coastline and receive intense monsoon rains.
   - Sometimes, cyclones bring additional rain, causing rivers and lakes to overflow.
3. Poor Drainage and Urbanisation:
   - In cities, concrete surfaces and blocked drains don't allow water to soak into the ground.
   - This leads to urban flooding during heavy rain, especially in low-lying areas.
4. Deforestation and Soil Erosion:
   - In some regions, cutting trees has reduced natural water absorption, leading to more run-off and floods.

Conclusion: Floods in India occur due to a mix of natural causes like heavy rain and rivers overflowing, and human factors like poor drainage and deforestation. Studying maps and geography helps us understand which areas are more at risk and how to plan better to reduce the damage.

LET'S EXPLORE (Page 62)

1. Observe Fig. 3.15. Describe the effects they may have on people, plants, animals and economic life.

Ans.

Disaster	Effects on People	Effects on Plants & Animals	Effects on Economy
Floods	Loss of life, damage to homes, spread of diseases	Crops submerged, animals drowned or displaced	Crop failure, transport disruption, increased food prices
Cyclones	Evacuation needed, injuries or deaths, destruction of homes	Trees uprooted, livestock killed	Damage to buildings, roads, power supply, fishing losses
Landslides	Deaths or injuries, blocked roads, people trapped	Forest areas destroyed, animal habitats lost	Road/rail blockages, loss of agricultural land
Forest Fires	Breathing problems, forced migration	Wildlife loss, trees burned, soil quality destroyed	Loss of forest produce, tourism affected, environmental damage

2. In groups of four or five, identify in each of the above disasters the part of natural causes and the part of human causes. Compare your conclusions.

Ans.

Disaster	Natural Causes	Human Causes
Floods	Heavy rainfall, overflowing rivers	Deforestation, poor drainage, construction on wetlands
Cyclones	Low pressure over oceans, climate patterns	Climate change due to pollution, poor planning in coastal areas
Landslides	Earthquakes, heavy rain, steep slopes	Cutting hills, removing trees, unsafe construction
Forest Fires	Dry weather, lightning, high temperatures	Carelessness (campfires, cigarettes), deforestation, burning waste

Conclusion: Many disasters are made worse by human activities, even if they start due to natural reasons. For example, cutting down trees can increase the chance of landslides and floods.

3. Discuss in the same groups series of preventive measures that could help avoid the above disasters.

Ans.

Disaster	Preventive Measures
Floods	Build embankments, plant more trees, maintain drainage systems, avoid plastic waste
Cyclones	Build strong houses in coastal areas, early warning systems, plant coastal vegetation
Landslides	Avoid cutting hills, afforestation, proper land-use planning
Forest Fires	Educate people, stop open burning, monitor forest areas, create fire breaks

Questions and activities (65 & 66).

1. **Match the climatic factors with their effects:**

Column A	Column B
(1) Latitude	(a) Brings wet air to India during summer
(2) Altitude	(b) Creates different climates in the north and south
(3) Proximity to the ocean	(c) Keeps higher places cooler
(4) Monsoon winds	(d) Moderates the temperature

Ans. **1. ⟶ (b)**
2. ⟶ (c)
3. ⟶ (d)
4. ⟶ (a)

2. **Answer the following questions.**

a) What is the difference between weather and climate?

Ans.

- **Weather** refers to day-to-day atmospheric conditions like rain, sunshine, wind, and temperature.
- **Climate** is the average pattern of weather in a region over a long period, usually 30 years or more.

b) Why do places near the ocean have milder temperatures than places far away from it?

Ans. Oceans act as temperature moderators. Coastal areas experience cooler summers and warmer winters because water heats and cools slowly, reducing extreme temperature variations.

c) What role do monsoon winds play in affecting India's climate?

Ans. Monsoon winds bring seasonal rainfall, which is essential for agriculture, rivers, and life.

- In summer, moist winds from the ocean bring heavy rains.
- In winter, dry winds from the land lead to cooler, drier weather.

d) Why is Chennai warm or hot throughout the year, while Leh is cold?

Ans.

- **Chennai** is near the Equator and the sea, so it remains warm or hot most of the year.
- **Leh**, in the Himalayas, is at a high altitude and far from the sea, making it cold throughout the year.

3. **Look at a map of India given at the end of this book. Identify the climate for these cities —Leh, Chennai, Delhi, Panaji and Jaipur.**

- **Is the place near the sea, in the mountains, or in the desert?**
- **How do these factors affect the climate there?**

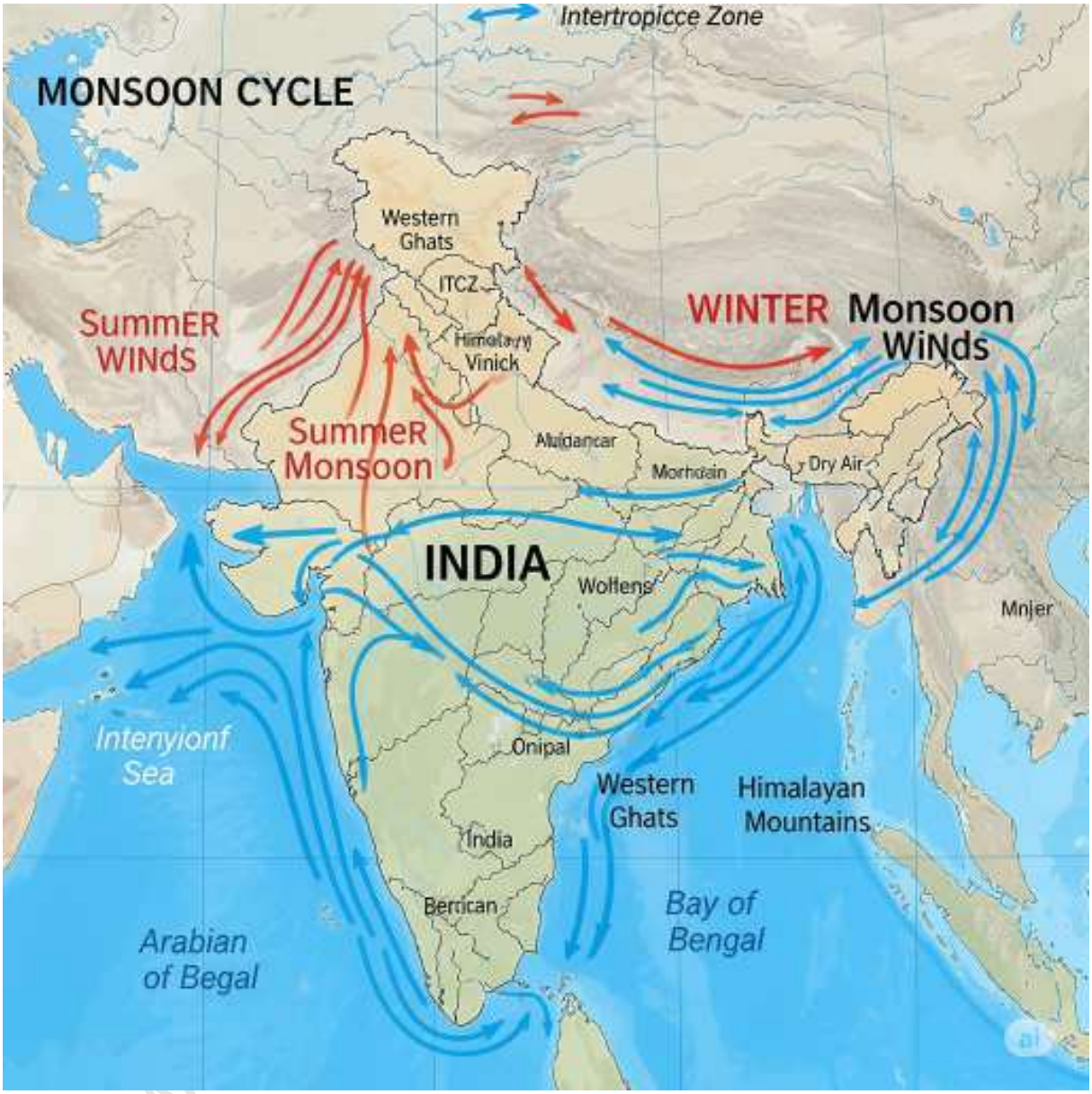
Ans.

City	Location Type	Climate Type	Reason
Leh	Mountains (Himalayas)	Alpine climate	High altitude, cold and snowy
Chennai	Coastal (South India)	Tropical, hot and humid	Near sea and Equator
Delhi	Plains (North India)	Subtropical	Hot summers, cold winters
Panaji	Coastal (West India)	Tropical wet	Heavy monsoon rain
Jaipur	Desert (Thar Desert)	Arid, very hot summers	Dry, very little rainfall

4. **Draw the monsoon cycle in summers and winters on a map of India.**
   - **Label where the winds blow in summer and winter**
   - **Show the direction of winds during the monsoon**

   Ans.
   - **Summer Monsoon (June to September):** Winds blow from the southwest (from the Indian Ocean) bringing moisture and rain to India. The rains start in the southern tip and move northward, covering the entire subcontinent by mid-July.

- **Winter Monsoon (October to February):** Winds reverse and blow from land to the sea, bringing dry weather and cool temperatures. These winds bring some moisture to parts of East and South India.



5. **Make a colourful poster showing festivals in India linked to farming and weather (e.g., Baisakhi, Onam). Add pictures or drawings of these festivals.**

Ans.

Festival	Linked Season/Weather	Region
Baisakhi	Harvest (Rabi crop)	Punjab
Onam	End of monsoon	Kerala
Pongal	End of harvest season	Tamil Nadu
Lohri	Winter harvest	North India
Chhath Puja	After monsoon harvest	Bihar, UP

Include images of farmers, crops, and celebrations such as dances and traditional food associated with these festivals.

Here is the sample Poster:

6. **Imagine you are a farmer in India. Write a short diary entry about how you would prepare for the rainy season.**

Ans. Farmer's Diary Entry – Preparing for Rainy Season

Date: 10th June

Dear Diary,

The sky looks darker each day — the monsoon is near! I've cleaned the canals in my field so the water can flow smoothly. I've sown paddy seeds and stored fertilizers safely. The old well has been repaired and the cowshed roof fixed. I'm praying for timely rain — without it, our crops won't survive. If the rains are good, we'll celebrate Onam with joy!

— Ramu, a farmer from Kerala

7. **Identify a natural disaster (e.g., cyclone, flood, landslide, or forest fire) and write a short essay that includes the causes and impacts. Suggest actions that individuals, communities and the government can take to reduce the impact.**

Ans. Short Essay – Flood (Natural Disaster)

Title: Understanding Floods – Causes, Impact, and Solutions

Floods occur when water overflows into dry land, often due to heavy rainfall, poor drainage, or rivers overflowing. States like Bihar, Assam, and Kerala often suffer during monsoons.

- **Causes:**
  - **i.** Excess rainfall
  - **ii.** Poor city drainage
  - **iii.** Deforestation
  - **iv.** Encroachment on waterways
- **Impacts:**
  - **i.** Loss of lives and homes
  - **ii.** Damage to crops, roads, and bridges
  - **iii.** Waterborne diseases
  - **iv.** Migration of rural people
- **Solutions:**
  - **i.** Individuals: Avoid dumping waste in drains; plant trees
  - **ii.** Communities: Build local flood shelters; keep waterways clear
  - **iii.** Government: Improve early warning systems; build dams, embankments; train disaster response teams (e.g., NDRF)