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1 Mahanadi River System (Source: The Indian Express)

- **Fact**: It is the third-largest peninsular river system and the largest in Odisha.
- **Mahanadi River Basin States**: Chhattisgarh, Odisha, Jharkhand, Maharashtra, and Madhya Pradesh.
- **Borders**: Central India hills on the north, the Eastern Ghats on the south and east, and the Maikala range on the west.
- **Source**: The northern foothills of Dandakaranya in Raipur District, Chhattisgarh.
- **Dam**: The largest dam on the river is the Hirakud Dam.
- **Tributaries**
  - **Left Bank**: Seonath, Hasdeo, Mand, and Ib rivers.
  - **Right Bank**: Ong, Tel, and Jonk rivers.
- **Religious Significance**: The pilgrimage site of Puri is located at its mouth.
- **Economic Significance**: The region is known for its Iron and Steel plant at Bhilai, aluminum factories at Hirakud and Korba, the paper mill near Cuttack, and the cement factory at Sundargarh.

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2 Samudra Manthan (National Offshore Exploration Scheme)

(Source: The Hindu)

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3 Factors Influencing Indian Monsoon (Source: The Indian Express)

Somali Jet

- *The Somali Jet is a fast-moving air stream over the Horn of Africa, flowing from southwest to northeast over the Arabian Sea during the Southwest Monsoon (June to September).*
- It plays a vital role in the onset of the Indian Southwest Monsoon, helping to pull moist air from the Indian Ocean toward India, initiating monsoon rains.
- The jet is crucial for moisture transport, delivering moist air into the Indian subcontinent, which brings heavy rainfall during the monsoon.
- The strength and direction of the Somali Jet affect the distribution and amount of rainfall, with a strong jet ensuring more rainfall and a weak jet causing droughts or reduced rainfall.
- Monsoon breaks (dry spells during the monsoon) are influenced by shifts or weakening of the Somali Jet.
- The Somali Jet is impacted by climate phenomena like El Niño and La Niña, with El Niño weakening the jet and reducing monsoon rains, while La Niña strengthens it.
- The jet also interacts with the Indian Ocean Dipole (IOD), which can influence the jet's strength and the monsoon's performance.

EL -Niño / La – Nina

- **El Niño:**
  - Causes monsoon deficit and reduced rainfall in India.
  - Weakens the Somali Jet, decreasing moisture flow to India.
  - Leads to droughts, delayed monsoons, and crop failures.
- **La Niña:**
  - Causes above-average rainfall and intense monsoons in India.
  - Strengthens the Somali Jet, bringing more moisture to the subcontinent.

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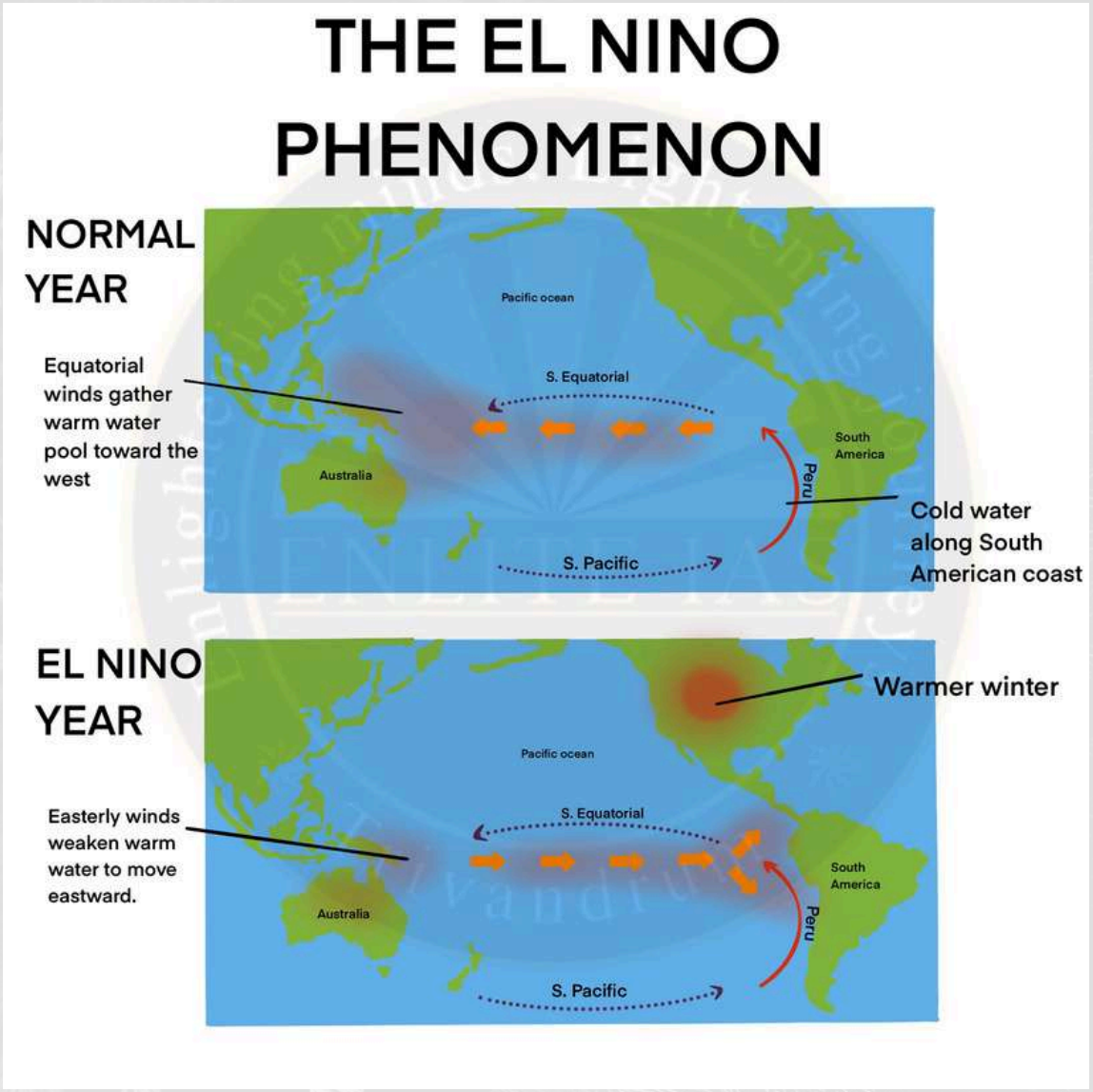
THE EL NINO PHENOMENON



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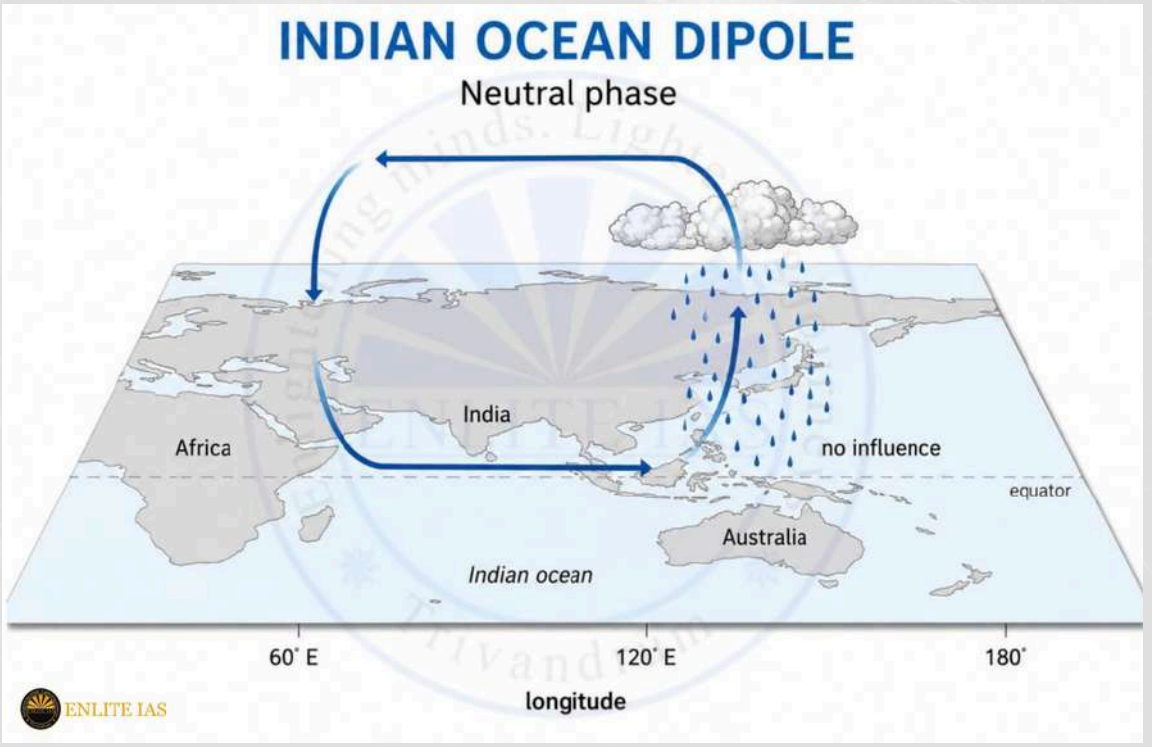
Indian Ocean Dipole (IOD)

- *The Indian Ocean Dipole (IOD) is a climatic phenomenon in the Indian Ocean that influences the monsoon season in India. It refers to the difference in sea surface temperatures between the western and eastern parts of the Indian Ocean.*
- Impact
  - **Positive IOD:**
    - Warmer western Indian Ocean, cooler eastern Indian Ocean.
    - Enhances monsoon rainfall over India.
    - Leads to stronger monsoon winds and better moisture supply.
    - Associated with above-average rainfall.
  - **Negative IOD:**
    - Cooler western Indian Ocean, warmer eastern Indian Ocean.
    - Weakens the monsoon and causes below-average rainfall.
    - Can lead to drought conditions in parts of India.



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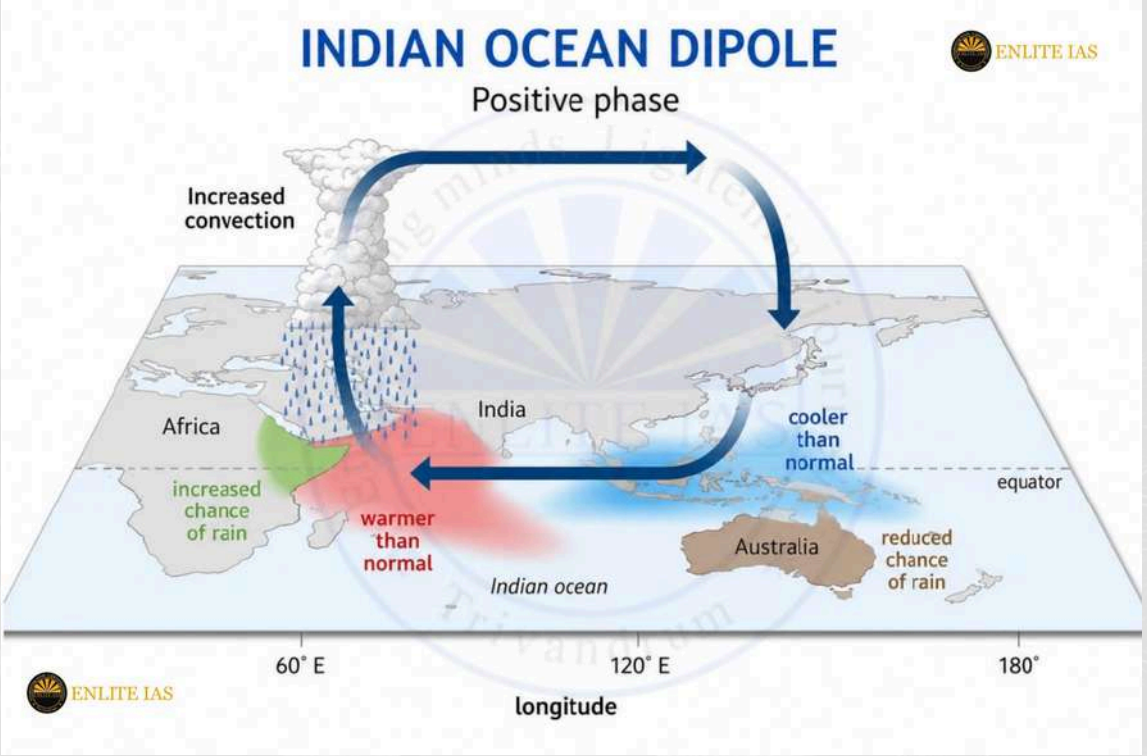

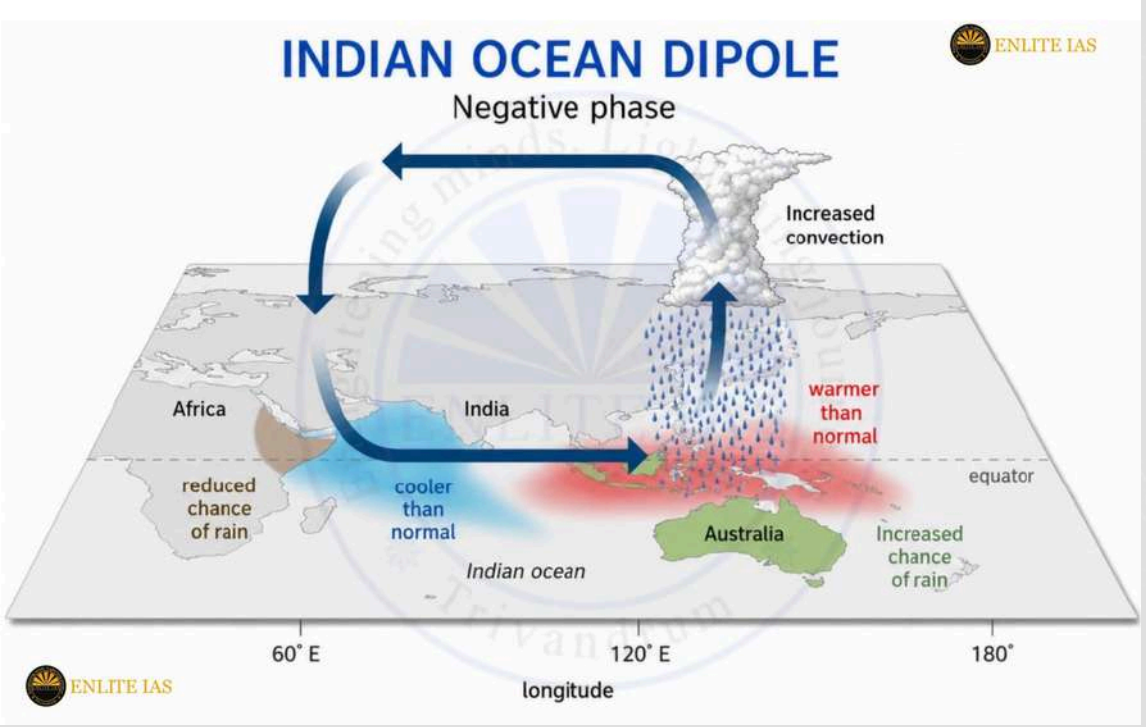

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Madden-Julian Oscillation (MJO)

A tropical atmospheric phenomenon with an eastward-moving pulse of convection and circulation, typically taking 30-60 days for a complete cycle.

- **MJO Phases:**
  - **Phase 1 (Convective)**: Enhances monsoon rainfall over India.
  - **Phase 2 (Suppressed)**: Reduces monsoon rainfall, causing dry spells.
  - **Phase 3 (Convective)**: Strengthens monsoon, leading to increased rainfall.
  - **Phase 4 (Suppressed)**: Causes drier conditions, leading to a break in the monsoon.
- **Monsoon Impact:**
  - **Active Phases (Phase 1 & 3)**: Result in enhanced rainfall and stronger monsoon conditions.
  - **Suppressed Phases (Phase 2 & 4)**: Lead to dry spells and reduced rainfall.