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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.



2 Samudra Manthan (National Offshore Exploration Scheme) (Source: The Hindu)



SAMUDRA MANTHAN

(NATIONAL OFFSHORE EXPLORATION SCHEME)

EXPLORING THE DEPTHS. POWERING INDIA'S ENERGY FUTURE.

Samudra Manthan is a comprehensive national initiative to de-risk and accelerate domestic offshore oil & gas exploration, strengthen India's energy security and build a globally competitive offshore ecosystem.

 MINISTRY Ministry of Petroleum & Natural Gas, Government of India	 SCHEME TYPE Central Sector Scheme (100% Centrally Funded)	 IMPLEMENTATION TIMELINE Up to FY 2030-31	 TOTAL OUTLAY ₹84,084 crore	 AIM Boost domestic oil & gas production, reduce import dependence and build an indigenous, globally competitive ecosystem.
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KEY FEATURES

1 STRATEGIC ALLOCATION FOR HIGH-RISK DEEPWATER DRILLING



₹43,200 crore to subsidize deepwater and ultra-deepwater exploratory drilling.

Up to 50% of drilling cost or up to ₹650-₹675 crore per well.

2 COMPREHENSIVE DATA ACQUISITION



₹28,534 crore for large-scale acquisition, processing and interpretation of high-quality seismic data.

Focus on frontier and underexplored basins to build a strong exploration pipeline.

3 FRONTIER BASIN RESEARCH



₹5,000 crore for geoscientific studies, basin modelling and assessment of new frontier basins.

Improves understanding of unexplored areas and reduces geological uncertainty.

4 COMMON EVACUATION INFRASTRUCTURE



₹7,350 crore for development of common evacuation infrastructure.

Enables cost-effective monetization of discoveries and attracts more investments.

EXPECTED OUTCOMES



Increase in domestic oil & gas reserves and production



Reduced import dependence and stronger energy security



Attraction of private investment and global participation



Development of indigenous technology, services and skilled workforce



Boost to coastal economies and employment generation



Supports India's long-term energy transition and climate goals

A BOLD STEP TOWARDS UNLOCKING INDIA'S OFFSHORE POTENTIAL AND BUILDING A SELF-RELIANT ENERGY FUTURE.

WHY IT MATTERS?

- India's offshore potential is vast but high-risk.
- Public support reduces exploration risk.
- Creates an ecosystem for sustainable exploration and long-term energy security.



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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

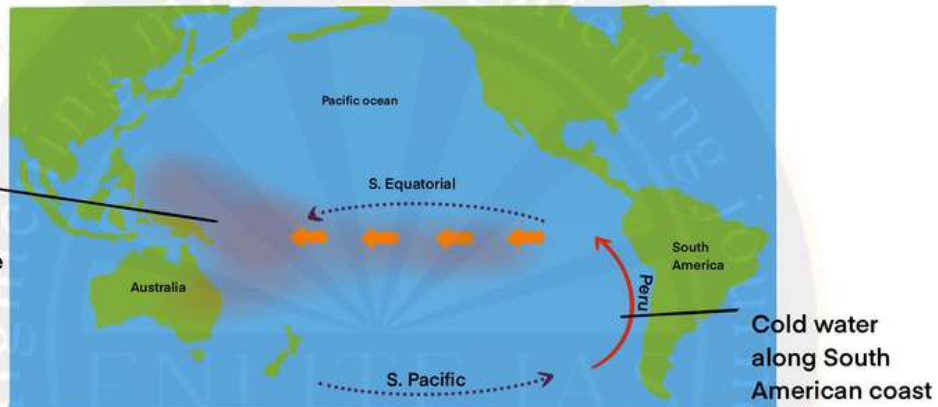
- **El Niño:**
 - Causes monsoon deficit and reduced rainfall in India.
 - Weakens the Somali Jet, decreasing moisture flow to India.
 - Leads to droughts, delayed monsoons, and crop failures.
- **La Niña:**
 - Causes above-average rainfall and intense monsoons in India.
 - Strengthens the Somali Jet,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

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THE EL NINO PHENOMENON

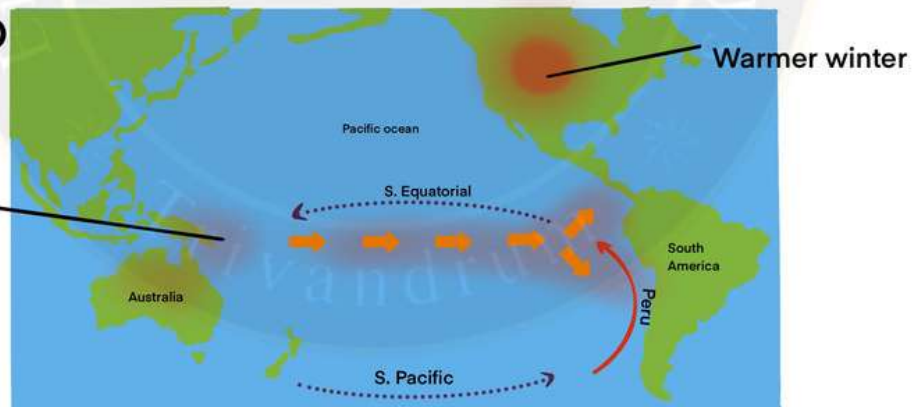
NORMAL YEAR

Equatorial winds gather warm water pool toward the west



EL NINO YEAR

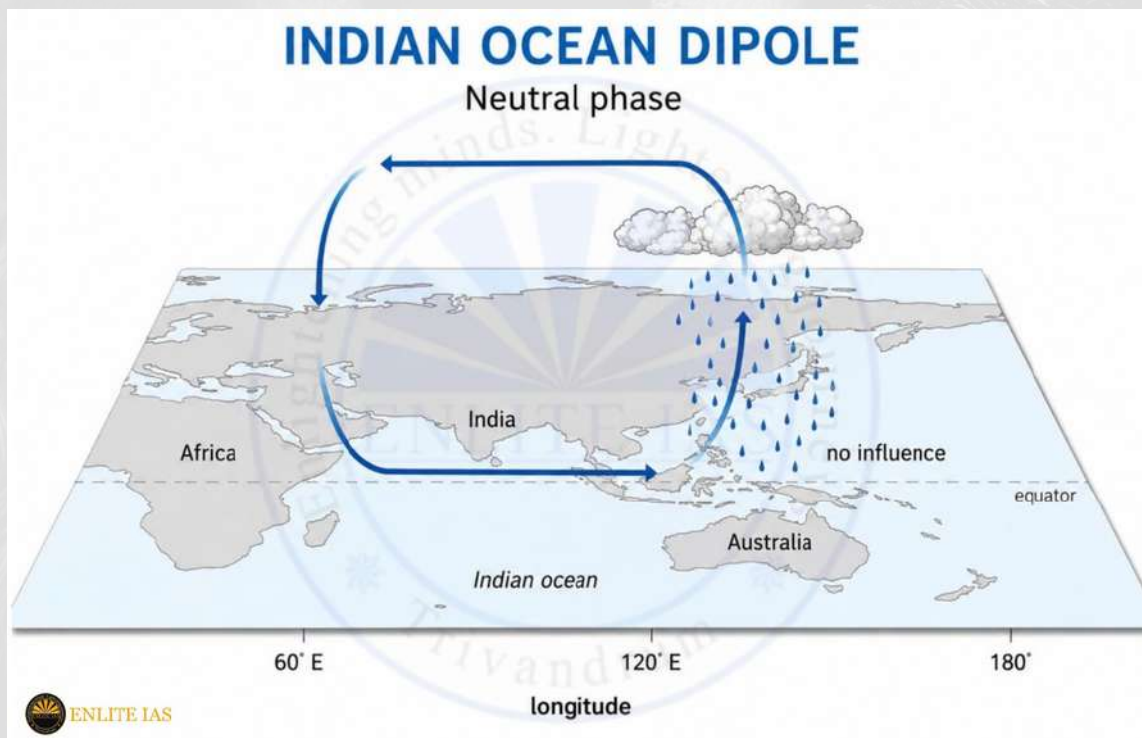
Easterly winds weaken warm water to move eastward.



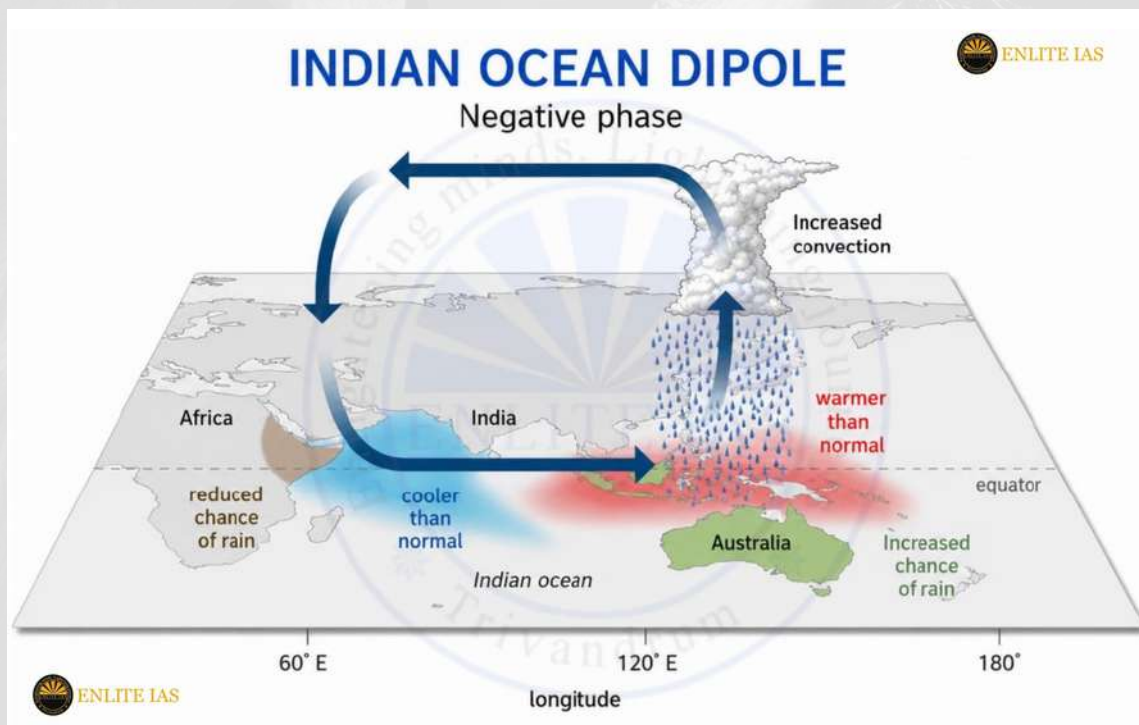
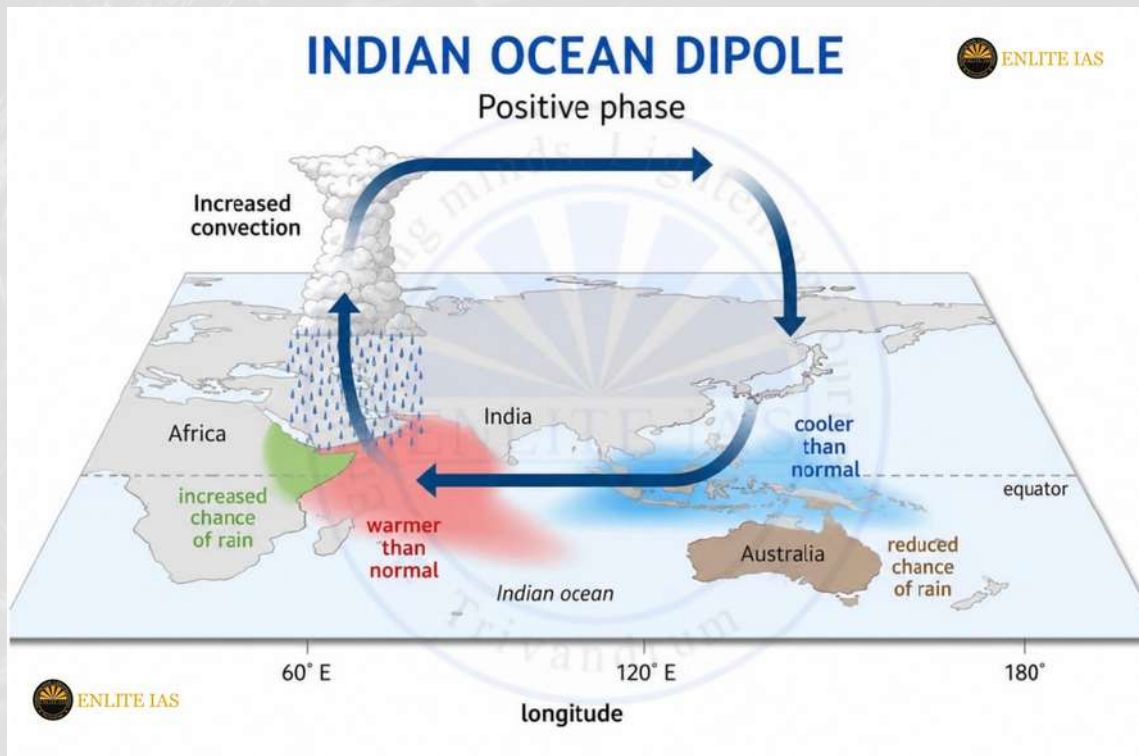
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Indian Ocean Dipole (IOD).

- 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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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.

