

## Prelims Exam Topics

### POLAVARAM IRRIGATION PROJECT

#### Context

The Water Resources Department in Andhra Pradesh is focusing on completing the long-pending gap works in the Right Main Canal (RMC) of the Polavaram irrigation project in West Godavari district by June-July 2026.

#### Highlights of the Polavaram irrigation project

- **Location:** Situated on the Godavari River, upstream of Rajahmundry in Andhra Pradesh.
- **Objectives:** Irrigation (East/West Godavari, Krishna, Visakhapatnam), hydropower generation, and drinking water supply.
- **Interlinking of Rivers (ILR):** Crucial for diverting surplus Godavari water to the Krishna river basin.
- **National Status:** Declared a National Project under the AP Reorganization Act, 2014, making the central government responsible for its funding.



#### About Godavari River

- **Origin:** Trimbak Plateau, Maharashtra.
- **Mouth:** Bay of Bengal (near Kakinada/Antarvedi)
- **Length/Status:** Largest peninsular river; known as "Dakshin Ganga."
- **Left Bank Tributaries:** Pranhita, Indravati, Sabari.
- **Right Bank Tributaries:** Manjira.
- **Major Cities:** Nashik, Rajahmundry.
- **Major Dams:** Polavaram, Jayakwadi.
- **Delta:** Splits at Rajahmundry into a fertile delta system; divides into two distributaries namely Gautami and Vasishtha.

### CINBAX-II 2026

#### Context

The Indian Army contingent has for the second edition of India-Cambodia Bilateral Military Exercise CINBAX-II.

### About CINBAX-II 2026

- CINBAX-II is a bilateral military exercise between the Indian Army and the Royal Cambodian Army.
- **Location:** Hosted at the Techo Sen Phnom Thom Mreas Training Centre in **Kampong Speu Province, Cambodia**.
- **Mandate:** Operations are carried out under **Chapter VII of the UN Mandate**, focusing on sub-conventional environments.
- **Objective:** To improve **interoperability** and exchange tactical expertise for future UN Peacekeeping missions.
- **Focus Areas:** Training includes counter-terrorism, sniper skills, drone operations, and mortar tactics in semi-urban settings.

## HEALTH MINISTRY ISSUES GUIDELINES ON CHILDHOOD DIABETES CARE

### Context

On 3 May 2026, the Ministry of Health and Family Welfare introduced India's first comprehensive Guidance Document on Diabetes Mellitus in Children during the National Summit on Best Practices in Public Healthcare Service Delivery.

### Highlights of the guidance framework

- **Universal screening strategy:** The guidelines propose universal screening of children (0–18 years) through both community outreach and school-based platforms.
- **Free public healthcare services:** Public health institutions will provide essential services free of cost, including screening, diagnostic support, lifelong insulin supply, glucometers, test strips, and follow-up care.
- **Continuum of care model:** The framework connects community-level screening with district hospitals and advanced treatment at medical colleges, ensuring an integrated continuum of care across primary, secondary, and tertiary healthcare levels.
- **4Ts awareness model:** Toilet, Thirsty, Tired, and Thinner to help parents, teachers, and caregivers identify early symptoms of Type 1 diabetes.
- **Capacity building for caregivers:** by training them in insulin administration, blood sugar monitoring, emergency handling, and day-to-day disease management.
- **Long-term care support:** for children living with diabetes.

## SUSTAINABLE AND RESPONSIBLE MINING

### Context

As countries transition towards a low-carbon economy, the demand for critical minerals like lithium, cobalt, copper, and rare-earth elements has surged.

### About sustainable mining

- Aims to integrate economic benefits with environmental protection and social equity
- Emphasizes the efficient use of resources, the rehabilitation of mined land post-extraction, and the promotion of recycling and reuse to reduce the necessity for fresh mineral extraction.
- Since minerals are finite and non-renewable, this model is often linked to "**weak sustainability**," where mining is justified only if it generates lasting human, economic, and social value to offset the depletion of natural capital.
- Sustainable mining is **fundamentally unsustainable** because it relies on the depletion of **finite, non-renewable resources** through energy-intensive processes that cause irreversible ecological damage, permanent landscape alteration, and social displacement.

### About Responsible Mining

- The approach focuses on minimizing operational harm through clean energy use (solar, wind, green hydrogen) and strict pollution controls.
- Prioritizes community participation and consent, ensuring fair compensation and profit-sharing for affected populations while maintaining ethical labor practices and worker safety.
- Aligns operations with **Environmental, Social, and Governance (ESG) principles**, focusing on waste minimization and transparent resource utilization to improve corporate accountability.

## ABROLHOS REEF

### Context

Samples of coral collected from the Abrolhos National Marine Park in Brazil show that their biodiversity has dropped by around 15% over 18 years due to marine heatwaves.

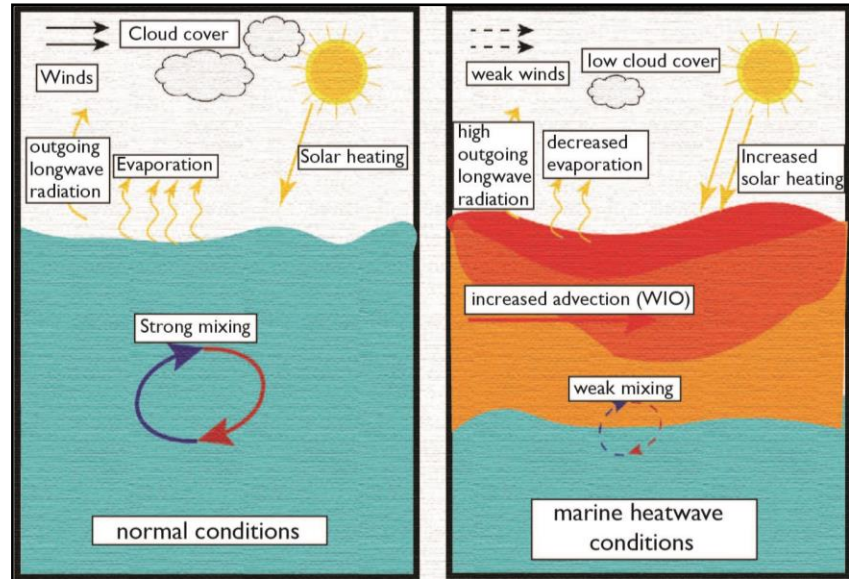
### About Abrolhos reef

- **Location and Protection:** Located in the South Atlantic, the Abrolhos Reef is a centerpiece of Brazil's Abrolhos Marine National Park.
- **Unique Geology:** It is renowned for its distinctive "**chapeirões**," which are massive, mushroom-shaped coral structures unique to this region.

### About marine heatwaves

- MHWs are extreme rises in ocean temperature for an extended period of time.
- It occurs when the surface temperature of a particular region of the sea rises to 3 or 4 degrees Celsius above the average temperature for at least five days.
- As global temperatures have soared to 1.3 degrees Celsius above the pre-industrial levels, 90% of the extra heat has been absorbed by the ocean.
- This has increased the global mean SST by close to 0.9 degrees Celsius since 1850, and the rise over the last four decades is around 0.6 degrees Celsius.

- Impact of marine heatwaves on coral reefs: Elevated temperatures stress coral reefs, causing bleaching and increased mortality rates.
  - E.g., An underwater survey showed that 85% of the corals in the Gulf of Mannar near the Tamil Nadu coast got bleached after the marine heatwave in May 2020.



## NEPAL RENEWS TERRITORIAL CLAIM

### Context:

Nepal has raised concerns over the resumption of the Kailash Mansarovar Yatra via the Lipulekh route.

### Passes for Kailash Mansarovar Yatra

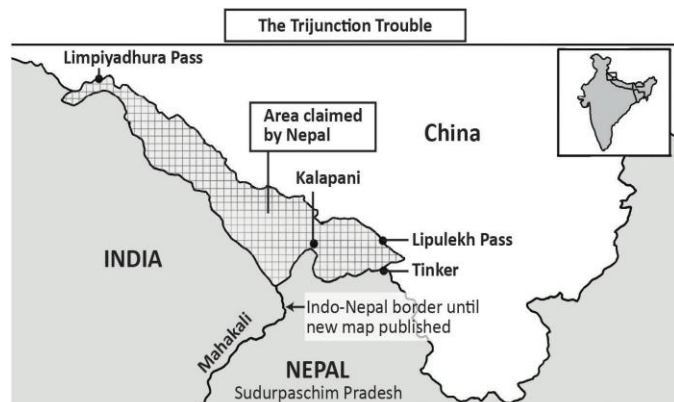
- **Lipulekh Pass:** High-altitude Himalayan pass in Uttarakhand near the India–China–Nepal tri-junction; key route for Kailash Mansarovar Yatra.
- **Nathu La Pass:** Mountain pass in Sikkim on the India–China border; serves as an alternative route for Kailash Mansarovar Yatra and a trade corridor.

### About India–Nepal Territorial Dispute (Kalapani Issue)

**Disputed Areas:** Includes **Kalapani, Lipulekh, Limpiyadhura and Susta** between India and Nepal.

### Historical Basis: Treaty of Sugauli (1816):

- Defined boundary along the **Kali River (Mahakali river)**
- Dispute arises over **source of the river**
  - **Nepal:** Kali originates at **Limpiyadhura** → area belongs to Nepal
  - **India:** Kali originates at **Kalapani** → area belongs to India



### India's Position

- Administrative control since **1950s**
- Presence of **infrastructure and military deployment**
- Historical records place region in **Uttarakhand (Pithoragarh district)**

### Nepal's Position

- Claims territory east of Kali river belongs to Nepal
- Includes Kalapani, Lipulekh and Limpiyadhura in its maps
- Cites Treaty of Sugauli as legal basis

### Strategic Significance

- Located at **India–Nepal–China tri-junction**
- Important for **border security and surveillance (China front)**
- Lies on **Kailash Mansarovar Yatra route (Lipulekh Pass)**

## INDIA'S PRIVATE EARTH OBSERVATION SATELLITE

### Context

Bengaluru-based startup GalaxEye has launched Mission Drishti

### About Mission Drishti

- **Basic Features**
  - **Type:** Earth Observation Satellite
  - **Weight:** ~190 kg
  - **Developer:** GalaxEye (India), Launched via SpaceX.
  - **Nature:** Dual-use (civilian and defence applications)
- **Unique Technology (OptoSAR):** World's first satellite integrating:
  - **Electro-Optical (EO) sensors** (high-resolution imagery in daylight)
  - **Synthetic Aperture Radar (SAR)** (all-weather, night imaging)
- **Advantage:** Enables **continuous imaging regardless of weather or lighting conditions.**
- **Capabilities**
  - **All-Weather Imaging:** Works through clouds, rain and darkness.
  - **High-Frequency Data:** Provides **reliable and consistent Earth observation data.**
  - **Multi-Sector Use:** Defence surveillance, Agriculture monitoring, Disaster management, Maritime tracking and Infrastructure planning
- **Strategic Significance**
  - **Private Sector Growth:** Reflects rise of India's private space industry supported by IN-SPACe.

- **Global Demand:** High interest from international clients for advanced data services.
- **Complement to ISRO:** Supports India's existing Earth observation network (~29 satellites).

## NASM-SR (NAVAL ANTI-SHIP MISSILE – SHORT RANGE)

### Context

DRDO and the Indian Navy successfully conducted a **salvo test** of the indigenously developed NASM-SR missile from a helicopter.

### About NASM-SR Missile

- Designed for **anti-surface warfare**, enabling ship-borne helicopters to strike enemy ships from a safe distance (without exposing naval vessels).
- **Propulsion System:** Solid booster rocket (initial thrust) and Sustainer engine (longer flight duration)
- **Key Components:**
  - **Seeker:** Detects and tracks targets
  - **Radio Altimeter:** Maintains low-altitude sea-skimming flight
  - **Two-way Data Link:** Enables real-time communication with operator
- **Key Features**
  - **Man-in-Loop Capability:** Allows operators to **change target or trajectory mid-flight** (useful in crowded maritime zones; reduces collateral damage and improves accuracy).
  - **Waterline Hit Capability:** Targets the **most vulnerable part of a ship (near waterline)** (causing flooding and higher chances of sinking).
  - **Salvo Launch Capability:** Multiple missiles fired in quick succession (overwhelms enemy defence systems).
  - **Sea-skimming trajectory** (low radar detection)
  - **Proximity fuse detonation** (explodes near target for maximum damage)
- **Difference from Earlier Sea Eagle Missile**
  - **Weight:** NASM-SR (380 kg) is **lighter** than Sea Eagle missile (580 kg) (allows more missiles per helicopter)
  - **Guidance:** NASM-SR has **man-in-loop control**, unlike Sea Eagle (fire-and-forget)
  - **Precision:** Includes **waterline targeting**, absent in Sea Eagle
  - **Range:** Lower range (55 km vs 110 km), but improved **modern capabilities and flexibility**

## SACHET EMERGENCY ALERT SYSTEM

### Context

India recently conducted a nationwide test of its cell broadcast-based alert system (SACHET).

### About Cell Broadcast Technology

- **One-to-Many Messaging System:** Sends alerts simultaneously to all mobile phones in a specific geographic area (used for disasters like earthquakes, floods, cyclones).
- **Tower-Based Transmission:** Messages are sent from cell towers to all connected devices (no need for individual phone numbers).
- **Developed by:** C-DOT under DoT which is under testing (expected to enhance disaster response)
- **Instant Delivery:** Bypasses network congestion (ensures rapid dissemination during emergencies).
- **Difference from SMS**
  - **Broadcast vs Individual:** One message reaches millions (unlike SMS one-to-one communication).
  - **No Registration Needed:** Works without storing user data (privacy-friendly system).
  - **Location-Specific Alerts:** Targets only affected areas (based on tower coverage).
- **Key Features**
  - **Unmissable Alerts:** Overrides silent mode, calls and apps (with loud tone and vibration).
  - **Persistent Notification:** Message stays until acknowledged (ensures visibility).
  - **Multi-Language Support:** Delivers alerts in local languages (improves accessibility).
- **Global Usage:** Used in countries like Japan (J-Alert), United States (WEA), and EU nations (standard global practice).

**PLACES IN NEWS: ARABSALIM**

**Context:**

Strike on Arabsalim killed at least one person and wounded three in Lebanon

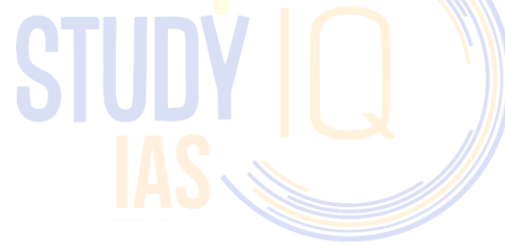
**About Arabsalim**

- Arabsalim is a municipality in the Nabatieh District of southern Lebanon.
- **Nabatieh District:** Located **north of the Litani River** in southern Lebanon

**Other locations in News**



Location	Key Details
<b>Litani River</b>	Major river in southern Lebanon; acts as a strategic boundary line (Israeli operations largely south of it; frequently referenced in ceasefire dynamics)
<b>Srifa</b>	Towns in southern Lebanon
<b>“Yellow Line” (Operational Boundary)</b>	Informal line marking Israeli-controlled area in southern Lebanon; Israel has warned of operations beyond this boundary



## Mains Exam Topics

### INDIA'S STRATEGIC RESPONSE TO THE EU'S BORDER ADJUSTMENT

#### MECHANISM

##### Context

The EU's Carbon Border Adjustment Mechanism (CBAM) came into force on **January 1, 2026**, marking a major shift in how global trade and climate policy intersect.

##### About Carbon Border Adjustment Mechanism

- It is a **European Union (EU) tariff on carbon-intensive products**.
- It is a new EU instrument for preventing carbon leakage, that is, the shifting of the production of goods to non-EU countries where there is a lower or no carbon cost associated with their production.
- **Purpose:** To put a fair price on the carbon emitted during the production of carbon-intensive goods that are entering the EU and to encourage cleaner industrial production in non-EU countries.

##### Current Status

- **Renewable Expansion:** Crossed 200 GW, and non-fossil capacity exceeds 51%.
- **Net-Zero Commitment:** Pledged a net-zero emissions target by the year 2070.
- **Green Hydrogen:** Targets 5 MMT annual production by 2030.
- **Carbon Market:** Carbon Credit Trading Scheme (CCTS) covers 490 obligated high-emission industrial entities.
- **Ethanol Blending:** Achieved 20% blending, reducing oil imports and transport emissions.

##### Associated Challenges

- **Unequal Carbon Cost Burdens:** EU industries enjoy decarbonisation subsidies and phased allowances until 2034, while Indian exporters bear the full CBAM charges without any state support.
- **No Exemption under India-EU FTA:** The FTA (January 27, 2026) offers India no special treatment, with the EU maintaining a uniform, inflexible approach.
- **Climate Justice and Sovereignty:** By retaining carbon revenues while offloading decarbonisation costs onto developing nations, the EU risks turning India into a rule-taker rather than a rule-maker in the global climate regime.

##### Does India needs a India Border Adjust Mechanism(IBAM)

**A Strategic Countermeasure:** India can respond proactively by introducing an India Border Adjustment Mechanism (IBAM), which would impose a **carbon-based charge on exports destined for CBAM-regulated markets**.

##### Need for Coordinated Implementation

- IBAM should not be implemented unilaterally. Instead, it must be developed through the institutional framework of Annex 14-A to ensure:
  - Recognition under CBAM Article 9
  - Seamless offsetting of CBAM liabilities
  - Policy credibility and international acceptance

**Capping the Carbon Burden:** If properly aligned with CBAM, IBAM can ensure that **Indian exporters do not face any higher net carbon cost** than what CBAM would impose alone.

#### Way Forward

- **Establishing a Carbon Market:** India's CCTS (2023) requires industrial installations to hold tradable carbon credits against verified emissions, establishing a measurable domestic carbon pricing framework.
- **Leveraging CBAM Article 9:** CBAM's Article 9 allows importers to deduct home-country carbon costs, creating a legal pathway for India's domestic carbon price to be recognised at the EU border.
- **Avoiding Double Pricing:** Crediting CCTS under Article 9 prevents double pricing, upholds environmental integrity, and ensures trade fairness.

Ultimately, "IBAM-ing the CBAM" reflects a broader vision engaging with a carbon-constrained world on equitable terms while preserving national sovereignty and developmental priorities.

## PORT CORPORATISATION IN INDIA: USHERING IN EFFICIENCY AND COMMERCIAL AUTONOMY

#### Context

India's heavy trade dependence on sea routes makes efficient port governance critical, yet major ports traditionally operated under the outdated Major Port Trusts Act, 1963.

#### What is Corporatisation?

- Corporatisation does not imply privatisation, as it allows ports to remain publicly owned while adopting commercial autonomy and professional management.
- It enhances operational efficiency by providing ports with the financial flexibility necessary to function like private enterprises while serving the public interest.

#### Key Highlights of Port Performance in FY 2025–26

- **Surpassing Targets:** The major ports collectively handled an unprecedented **915.17 million tonnes (MT) of cargo, successfully surpassing the annual target of 904 MT.**
- **Top Performers:** The top performers included **Deendayal Port Authority (160.11 MT)**, followed by Paradip Port Authority (156.45 MT) and **Jawaharlal Nehru Port Authority (JNPA) (102.01 MT)**.
  - Visakhapatnam Port Authority, Mumbai Port Authority, Chennai Port Authority, and New

Mangalore Port Authority also registered strong performances.

- **Highest Growth Rates:** In terms of growth rate, Mormugao Port Authority, Goa, recorded the highest increase at **15.91%**, followed by **Kolkata Dock System (14.28%)** and **JNPA (10.74%)**.

### Why Corporatisation Became Necessary

- **Outdated governance model:** The **Major Port Trusts Act, 1963** was designed for a different era and became less effective in a globalised, technology-driven environment.
- **Rise of private port competition:** Efficient private ports exposed the structural limitations of trust-based governance.
- **Bureaucratic inefficiencies:** Delays in decision-making on investments, tariffs, and operational strategies led to lost opportunities.
- **Limited financial autonomy:** Trust-based ports could not access financial markets or partnerships efficiently, hampering infrastructure expansion.
- **Global shift in port functioning:** Ports evolved into integrated logistics hubs supported by advanced technology and multimodal connectivity, a transition the old model could not support.
- **National policy demands:** Initiatives such as Sagarmala, the National Logistics Policy, and PM Gati Shakti required ports to function as integrated logistics hubs incompatible with the trust-based model.

### Benefits and Outcomes of Corporatisation

- **Global Competitiveness:** Ports can evolve into integrated logistics hubs with advanced technology and multimodal connectivity. Without reform, Indian ports risk losing their position in global shipping networks.
- **Financial Freedom:** Corporatised ports can access financial markets and partnerships more efficiently than traditional trust-based entities. Enables investment in deep-water berths, container terminals, and digital systems.
- **Faster Decision-Making:** Quicker decisions on investments, tariffs, and operational strategies prevent lost opportunities in a competitive environment.
- **Alignment with National Strategy:** Supports India's logistics vision under Sagarmala, National Logistics Policy, and PM Gati Shakti.

### Learning from Success stories:

- **Port of Rotterdam:** Operates as a corporatised public entity, balancing efficiency with public oversight.
- **PSA International (Singapore):** Demonstrates how government-linked corporations can achieve global leadership.
- **UK's privatised model:** Shows efficiency gains but may not fully align with India's strategic infrastructure needs.

## Conclusion

Corporatisation offers India's major ports a viable path to become competitive, efficient, and investment-ready while retaining public ownership.

## THE ATLANTIC MERIDIONAL OVERTURNING CIRCULATION (AMOC)

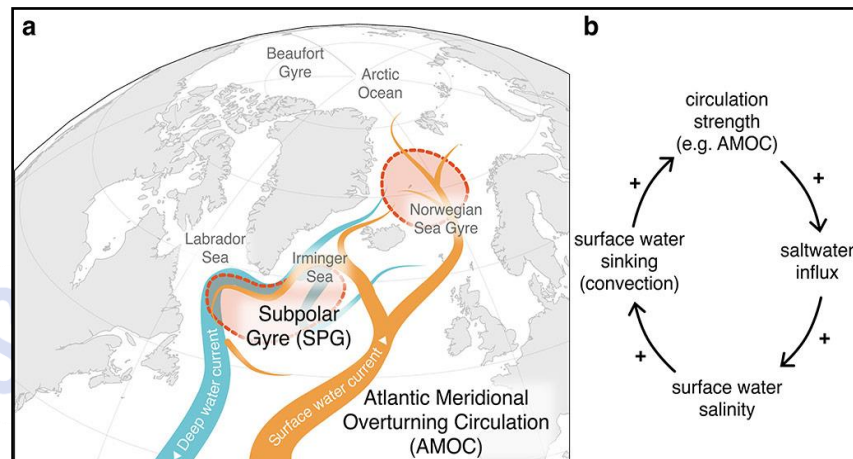
### SLOWDOWN

#### Context

New research suggests that the Atlantic Meridional Overturning Circulation (AMOC) could weaken by up to 59% by 2100.

#### About Atlantic Meridional Overturning Circulation (AMOC)

- The Atlantic Meridional Overturning Circulation (AMOC) is a large-scale ocean circulation system.
- It transports warm surface waters from the tropics towards the northern Atlantic and colder deep waters that are part of the thermohaline circulation, southward.



#### Mechanism of AMOC

- The Atlantic Ocean warm water cools as it travels north, and the evaporation raises its salt content.
- The cool water sinks deep into the ocean because of its increased density that is brought on by a combination of a low temperature and a high salt content.
- The difference in the salinity and temperature between the water forces the stream to run deep below steadily.
- Eventually the water returns to the surface after it warms up, thus, completing the circulation.
- Operates on a vast timescale; a single cubic meter of water takes approximately 1,000 years to complete the full circuit.

#### Significance of AMOC

- **Maintenance of Heat Budget:** AMOC helps to dissipate heat and energy throughout the earth and maintain the heat budget.
- **Climate Regulation:** AMOC plays an important role in decreasing the severity of the winters in Western Europe (Gulf of Stream, North Atlantic Drift)

- **Carbon sequestration:** The AMOC serves as a carbon sink by absorbing and storing carbon from the atmosphere.
  - It has profound effects on how anthropogenic global warming develops.
- **Impact on Polar Regions:** The distribution of heat in the polar regions is largely dependent on thermohaline circulation.
  - As a result, it impacts how quickly sea ice forms at the poles, which in turn affects other components of the climate system.

#### Impact of climate change on on AMOC

- **The "Freshwater Brake":** Climate change accelerates the melting of the Greenland ice sheet and Arctic sea ice, discharging massive amounts of freshwater into the North Atlantic that reduces water salinity and density.
- **Disruption of Deep-Water Sinking:** Because the diluted surface water is less dense, it loses its ability to sink into the deep ocean which inhibits the "pump" that drives the circulation, effectively slowing down the entire global conveyor belt.
- **Thermal Imbalance:** Global warming increases surface water temperatures, further reducing density and preventing the natural cooling process required for water to descend and return south as a cold deep-water current.

#### Impact of Slowing of AMOC

The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6) outlines several severe global consequences of an AMOC slowdown:

- **South Asian Monsoon:** A significant decrease in South Asian summer rainfall, threatening the agricultural backbone of India.
  - **Southward Rain Shift:** As the North Atlantic cools, the tropical rain belt (ITCZ) is pulled southward, moving moisture away from the Indian subcontinent.
  - **Weakened Winds:** The slowdown reduces the strength of the moisture-laden winds flowing from the Arabian Sea toward India.
- **El Niño Teleconnection**
  - **Extreme El Niño:** A sluggish AMOC traps heat in the Southern Hemisphere, which is expected to make El Niño events more extreme and unpredictable.
  - **Compounding Droughts:** Since El Niño typically suppresses Indian rainfall, the combination of a weak AMOC and intensified El Niño creates a "double-blow" of severe drought risks for India.
- **Marine Ecosystems:** A decline in marine productivity in the North Atlantic, impacting global fisheries.
- **Sea Level Rise:** A regional increase in sea levels along the northeast coast of North America.
- **Extreme Weather:** An increase in the frequency and intensity of storms in Northern Europe.
- **African Climate:** A decrease in summer rainfall in the Sahel region.