

CURRENT PULSE



MONTHLY
MAGAZINE

JUNE 01/2026 TO JUNE 30/2026

Right To Be Forgotten

Delhi High court in 'Laksh Vir Singh Yadav V. Union Of India & Ors' recognized an individual's 'Right To Be Forgotten' as an integral facet of the fundamental right to privacy under Article 21.



- **Right to be forgotten:** Right to seek removal or restricted access to personal information from public accessibility that no longer serves legitimate purpose.

Key Highlights of Judgement

- Sets out detailed principles for when **names can be de-indexed or masked in court records**.
 - **De-indexing** (to be operated globally): Removes a person's **name as a searchable key** without deleting the record, limiting access through name-based searches.
 - **Application:** Cases ending in acquittal, discharge, etc.
 - **Exceptions:** It can't be applied in **cases against women, children or breach of public trust**.
 - **Masking:** Replaces names and personal identifiers in judicial records with neutral labels (e.g. XYZ).

Right to privacy

SC balances child's right to know paternity and alleged father's right to privacy.



- The court has held that **DNA tests should not be ordered** routinely; however, when paternity is disputed, courts may direct a DNA test.

About Right to Privacy

- **The right to privacy** in India is a **fundamental right** protected under **Article 21** of the Constitution. (Justice K.S. Puttaswamy Judgment)
- **Article 12** of the **Universal Declaration of Human Rights, 1948** and **Article 17** of the **International Covenant on Civil and Political Rights (ICCPR), 1966**, legally protect persons against “arbitrary interference” with one’s privacy.
 - India signed and ratified **the ICCPR** on April 10, 1979, without reservation.

AI Use in Indian Judiciary



Supreme Court Publishes Draft Regulations on AI Use in Judiciary Prepared by the Supreme Court AI committee, 'Draft Regulations for Use of Artificial Intelligence (AI) in Courts, 2026' outlines the framework for the responsible adoption of AI in the Indian judiciary.

- **Application:** All judicial, adjudicatory, and administrative functions of the **Supreme Court, High Courts, other courts, tribunals, and statutory commissions** performing adjudicatory roles in India.

Key Highlights of Draft

- **Objectives:** To demonstrably improve access to justice, reduce delays, and enhance administrative efficiency.
- **Guiding Principles:** AI deployment must strictly adhere to human primacy, fairness, transparency, and data privacy (under Digital Personal Data Protection Act, 2023) and Indian Constitution.
 - **Judicial officers remain entirely accountable** for all decisions.
- **Permitted Uses:** AI is strictly an assistive tool allowed for administrative tasks, scheduling, legal research, translation, transcription, and accessibility services, subject to human verification.
- **Absolute Bans:** AI is strictly prohibited from deciding verdicts, evaluating bail or recidivism (risk scoring), predicting human behavior and surveillance (of judges, lawyers, litigants, or stakeholders, unless legally authorized).
- **Administration:** AI adoption, standards, and policy development will be regulated by a permanent national Apex Body, a research center (CoRE-AI), and dedicated AI Committees at every High Court.
- **Compliance & Oversight:** AI tools require pre-deployment impact assessments and annual internal audits.
 - Furthermore, lawyers and litigants must explicitly disclose any use of AI in preparing court documents.
- **Digital Inclusion:** AI tools must be accessible and should not widen digital divides.

AI Adoption in Indian Judiciary

- **Courtroom Transcription:** AI-enabled Automatic Speech Recognition (ASR) provides near real-time transcription of court proceedings.
- **Multilingual Justice:** AI-based SUVAS translates Supreme Court judgments into 18 Indian languages.
- **Filing & Registry Operations:** AI tools using Machine Learning and Optical Character Recognition automatically detect defects in e-filings.
- **Legal Research Assistance:**
 - **LegRAA (Legal Research Analysis Assistant)** analyzes documents and extracts relevant legal references.
 - **SUPACE (Supreme Court Portal for Assistance in Court Efficiency)** identifies precedents and clarifies case facts.
- **Voice-to-Text Dictation:** ASR-SHRUTI converts judges' speech into text for drafting orders and judgments.

E-governance in India

Recently the E-Jagriti platform of the Department of Consumer Affairs won the National Awards for e-Governance 2026.



- E- Jagriti is a **digital platform that computerizes and** connects Consumer Commissions nationwide to ensure transparent, efficient, and speedy consumer dispute resolution.

About E-Governance

- It refers to the use of **Information and Communication Technology (ICT)** in governance and public administration.
- It aims to improve **efficiency, transparency, accountability, responsiveness, and citizen participation.**

Transformative Role of E-Governance in India

- **Improved Service Delivery:** Faster and anytime access to government services. E.g., UMANG – single platform for multiple government services.
- **Transparency & Accountability:** Reduces corruption through digital and auditable processes. E.g., Government e-Marketplace (GeM) – **transparent public procurement.**
- **Financial Inclusion:** Expands access to digital payments and banking. E.g., UPI – **instant, cashless digital transactions.**
- **Citizen Empowerment:** Easier grievance **redressal and consumer protection.** E.g., **e-Jagriti** – online consumer complaint filing and tracking.
- **Last-Mile Connectivity:** Extends governance to remote areas. E.g., **Common Service Centres (CSCs).**
- **Capacity Building of Government Officials:** E.g., iGOT Karmayogi platform for **training and efficiency improvement of civil servants.**
- **Citizen Participation:** Encourages **public engagement** in policymaking. E.g., **MyGov platform.**



Cotton

Centre has temporarily exempted customs duty on cotton imports from 1 June–31 October 2026 to improve availability for the textile sector.



Cotton

- It is also termed as “**White-Gold**”.
- A soft, fluffy natural fibre grown around seeds in a boll; a shrub (**semi-xerophytic**) crop of **tropical and subtropical regions**.
- In India it is grown in the kharif season **in semi-arid regions of India**.
- **Temperature:** Minimum 15°C for germination; 21–27°C optimal for growth.
 - It can tolerate temperature to 43°C but temperature below 21°C is detrimental to the crop.
- **Soil:** Well-drained alluvial, black, and red soils; sensitive to waterlogging.
- **Species of cotton:** There are **four cultivated species of cotton** and India is the **only country cultivating all four cotton species** on commercial scale.
- India has the **largest area under cotton cultivation** and **second largest producer** of cotton after China.

ATF Price Stabilisation Fund

Cabinet approves Price Stabilisation Fund for Scheduled Indian Airlines towards ATF pricing.

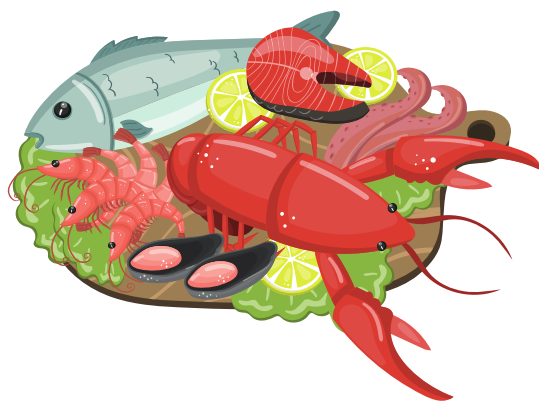


ATF Price Stabilisation Fund

About the Fund

- **Corpus:** Up to ₹10,000 crore.
- **Purpose:** Stabilise Aviation Turbine Fuel (ATF) prices amid global fuel price volatility.
- **Support Mechanism:** Interest-free advance to Oil Marketing Companies (OMCs) to compensate from losses from elevated global prices.
- **Other:** **Fixed ATF Price Arrangement** for domestic and international operations, **Exclusive rights of ATF supply to OMCs**.
- **Duration:** **36 months** (subject to annual review).
- **ATF Significance:** Accounts for nearly **40% of airline operating costs**.

India's Seafood Exports



India's Seafood Exports Reach Record High in FY 2025–26 Spanning a wide and diversified basket, the sector is a major contributor to food security, employment, export earnings and sustainable livelihoods.

Key Highlights

- **All Time High Exports (Both Volume and Value):** India exported 19,72,018 metric tonnes (MT) of seafood valued at USD 8.46 billion during FY 2025–26.
- **Leading Export Item:** Frozen shrimp remained leading export item accounting for 40.19% of total export quantity and 66.52% of total export earnings in US dollar terms.
 - It was followed by Frozen fish and Dried Seafood.
- **Top Export Destinations:** United States and China.

Key Policy Recommendations to enhance Sector Competitiveness

- **Central Scheme for Development of Indigenous Broodstock:** To reduce reliance on expensive and pathogen-prone imported broodstock.
- **Central Scheme for Meeting Global Quality Standards for Seafood Products:** To ensure that Indian seafood meets global quality standards.
- **Ease of Export:** Managing country-specific export bans and mitigating freight costs.
- **Umbrella Body for Sector:** E.g. Seafood Sector Governing Council (SSGC) for collaboration, infrastructure support and development, etc.

Key Measures taken

- **Marine Products Export Development Authority (MPEDA):** Dedicated agency to facilitate seafood export under Ministry of Commerce and Industry.
- **Flagship Scheme:** Pradhan Mantri Matsya Sampada Yojana (PMMSY); Fisheries and Aquaculture Infrastructure Development Fund (FIDF), etc.
- **Others:** Enhanced duty-free import limit of specified inputs used in seafood processing; SHAPHARI certification, etc.

Key Challenges Persisting in India's Seafood Sector	
Challenge Area	Description / Impact
 Stringent Non-Tariff Regulations	▶ Strict sanitary, phytosanitary, and quality-control requirements in international markets often hinder seafood exports. Several consignments have been declined due to non-compliance with residue standards.
 Protective Trade Measures	▶ Importing countries may impose Anti-Dumping Duties (ADD) and Countervailing Duties (CVD), increasing costs and reducing the market competitiveness of Indian seafood products.
 Supply-Side Difficulties for Exporters	▶ Seafood exporters frequently encounter challenges in securing consistent raw material supplies because of seasonal fluctuations, uneven availability, and quality inconsistencies.
 Weak Cold Chain Network	▶ Effective seafood preservation depends on reliable temperature-controlled storage and transport systems. Even slight disruptions can affect product quality, freshness, texture, and storage life.

India's New Middle Class

India's middle class is growing rapidly, driven by rising incomes, urbanisation, and economic growth.



- India's middle class expanded at **6.3% annually (1995–2021)** and constitutes **~31% of the population**.
- **India will surpass China** in middle-class population by **2030–35. (OECD)**

Economic contribution of Middle class

- **Driver of Domestic Consumption:** By **2036**, India's middle class will account for **93% of all spending** (up from 80% in 2026). (WEF)
- **Human Capital:** Investment in **education, healthcare** to enhance workforce productivity.
- **Entrepreneurship Driver:** Supports **startups, MSMEs, and innovation**.
- **Tax Contribution:** **Income tax, GST, investments** support government revenues and capital formation.
- **Social Stabiliser:** Promotes social mobility, **economic stability**.

Challenges

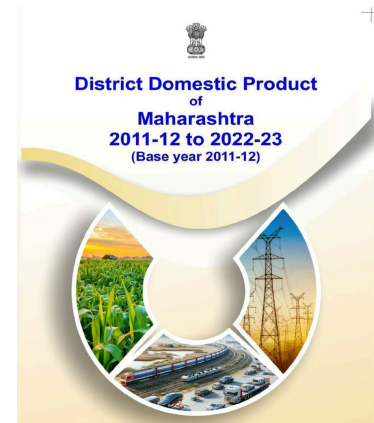
- **Stagnant Income:** **Weak real wage growth** despite overall economic expansion.
- **Rising Cost of Living:** Expensive **housing, healthcare, education**, and food.
- **Job Insecurity:** Automation, AI, gig work are **increasing employment uncertainty**.
- **Consumption-led Financial Stress:** Lifestyle inflation and consumerism are **encouraging debt-financed spending**, reducing savings.
- **Inadequate Social Security:** Lack of health insurance, pension, and unemployment protection.

Initiatives for Middle Class

- **Financial Security:** Zero Tax on earnings up to ₹12 lakh annually, GST Reforms etc.
- **Financial Inclusion & Entrepreneurship:** PM Jan Dhan Yojana (PMJDY), JAM Trinity etc.
- **Housing:** PM Awas Yojana–Urban, **SWAMIH (Special Window for Affordable and Mid-Income Housing)** fund.
- **Connectivity:** Metro Rail Expansion, UDAN Scheme etc.
- **Healthcare:** **Eat Right India**, Ayushman Bharat–PMJAY etc.

District Domestic Product (DDP)

National Statistics Office (NSO) released Guideline for Compilation of Estimates of District Domestic Product (DDP) with Base Year 2022-23.



About District Domestic Product (DDP)

- District Domestic Product (DDP) measures the **total value of goods and services produced within a district** during a given period.
 - It is the district-level counterpart of **Gross State Domestic Product (GSDP)** and **Gross Domestic Product (GDP)**.
- **Significance:** Useful for comparing economic performance between districts, identifying backward regions, planning local development programs, and assessing regional human development for computing Human Development Index.
- **Components:** Includes estimates of **Gross District Domestic Product (GDDP)**, **Net District Domestic Product (NDDP)** and **Per Capita Income**.
- **Approaches:** Income originating and Income accruing.

FCNR(B) Accounts

The RBI has announced that the full hedging cost will be borne until 30 September 2026 for Authorised Dealer (AD) banks on fresh 3–5 year Foreign Currency Non-Resident Bank (FCNR(B)) deposits.



- This will help in attracting foreign currency into India's banking system

Foreign Currency Non-Resident Bank (FCNR(B)) deposits

- These are fixed deposits that allow Non-Resident Indians (NRIs) to hold their money in foreign currencies with Indian banks.
- Unlike standard non-resident external (NRE) or non-resident ordinary (NRO) accounts, which are maintained in Indian rupees, FCNR(B) accounts can be held in currencies such as the US dollar, British pound, etc.
- Interest is also paid in that foreign currency.
- **Benefits for NRIs:** Protects the depositor from currency depreciation risks.

White Paper on Kerala's Debt Crisis



KERALA'S FISCAL HEALTH

A Status Report

Kerala faces an outstanding liability of ₹5.07 lakh crore (35.5% of GSDP) with committed expenditures (salaries, pensions, interest) absorbing 77% of revenue expenditure, compressing capital expenditure to just 1.3% of GSDP.

Debt Crisis of Indian States

- State debt now accounts for **nearly one-third of India's general government debt** (NITI Aayog's Fiscal Health Index).
 - States like **Punjab, West Bengal, Kerala, and Andhra Pradesh** face persistent revenue and fiscal deficits, elevated debt levels (35–45% of GSDP), and high interest burdens.
- According to RBI, Indian States' consolidated **gross fiscal deficit increased to 3.3% of GDP** (2024-25) and the **outstanding liabilities to ~28% of GDP** (March 2024).

Key Drivers of Rising State Debt

- **Populist measures:** High spending on subsidies, welfare, and freebies strains budgets.
- **Committed expenditure:** Salaries, pensions, and interest consume 50–60%+ of revenue receipts (e.g., over 70–80% in Punjab/Kerala), **crowding out capital investment**.
 - States like Kerala face **ageing populations** (>15% over 60), raising pension and healthcare costs.
- **Revenue weaknesses:** Heavy reliance on **central GST devolution**; sluggish growth in own-tax revenues.
- **Other factors:** **Off-budget borrowings** to bypass FRBM limits, **COVID-era emergency loans**, and **escalating borrowing costs** (higher premiums).

Way Forward

- **Enforcing Macro-Prudential Caps:** Stricter enforcement of **FRBM targets** and **state-specific debt ceilings** linked closely to realistic GSDP metrics.
- **Broadening Own Revenue Streams:** Expanding local tax bases, ensuring higher GST compliance, and optimizing non-tax revenue collections.
- **Rationalizing Public Utility Tariffs:** Imposing user charges on state utilities like electricity and water to fully recover operation and maintenance expenses.
- **Refining Welfare Delivery:** Utilizing advanced **Direct Benefit Transfer (DBT)** models to tightly target beneficiaries, erase identity duplication, and minimize leakage.

Reforms in FPI Investment and G-Secs

Government Announces Reforms to Deepen G-Sec Market and Facilitate FPI in Equity Segment The reforms aim to reduce operational complexities, simplify market access, and expand the investor base for Indian equities and Government Securities.

Key Measures

Liberalisation of investment by individual Persons Resident Outside India (PROIs)

- PROIs permitted to invest in equity instruments of listed Indian companies through the **Portfolio Investment Scheme (PIS)**. (as announced in **Union Budget FY2026-27**)
 - Earlier, only **NRIs/OCIs** were allowed to invest in PIS.
- Individual investment limit for a PROI in a company doubled from 5% to 10% (aggregate Limit raised to 24%).

Tax Exemption for Foreign Portfolio Investments (FPIs) Investing in G-Secs

- **Income Tax on Interest and Capital Gain Tax** waived on FPIs and investments by **Bank for International Settlements** in G-Secs.

Reforms in FPI Investment in Government Securities (G-Secs)

- **Fully Accessible Route (FAR)**: expanded to include 15-, 30-, and 40-year tenor G-secs and Sovereign Green Bonds.
 - **FAR** allows non-residents to invest in "specified securities" without any quantitative restrictions
- Removed three restrictions under General Route, viz. short-term investment limit, concentration limit and the security-wise limit.

Key Terms

- **FPI**: Involves investors holding financial assets, such as stocks and bonds in another country. It does not provide direct ownership of company's assets and is relatively liquid, depending on volatility.
 - Investment by a single FPI (or investor group) in any Indian company must **not exceed 10%** of total paid-up equity capital.
- **G-Sec**: It is a tradeable instrument issued by Central or State Governments. It acknowledges the government's debt obligation.

UPI Linkage with Nepal

Launch of linkage between Unified Payments Interface (UPI) of India and National Payments Interface (NPI) of Nepal for facilitating remittances; took place during the External Affairs Minister of Nepal visit to India.



About UPI

- **Launched:** on 11 April 2016 by the National Payments Corporation of India (NPCI).
- **Development:** UPI is an **instant payment system** developed by **NPCI**, under the regulatory oversight of the Reserve Bank of India (RBI).
- **Boost to digital economy:** UPI captures nearly 85% in India's **Digital Payments** and 49% of global real-time payments **promotes financial inclusion**.
- **Features:**
 - **Two-Factor Authentication:** Secure transactions using a linked mobile number and UPI PIN as dual authentication factors.
 - **24/7 and Direct Transfers:** Enables instant fund transfers anytime, including weekends and bank holidays. Allows direct payments without beneficiary registration.
 - **Multiple Bank Accounts:** Supports linking and managing multiple bank accounts through a single UPI app.
 - **Supports Bill and QR Code-Based Payments:** Facilitates utility bills, recharges, EMIs, subscriptions, and recurring payments via AutoPay.
 - **Interoperability:** Enables seamless transactions across different banks and UPI-enabled apps.
 - **Record:** UPI transactions are recorded by banks and reflected in bank statements.
 - UPI is built over the **IMPS (Immediate Payment Service) infrastructure**.
- **Other Countries UPI is linked:** UAE, Singapore, Bhutan, Sri Lanka, France, Mauritius, and Qatar.
 - Recently India Launches UPI Payments in Cambodia partially.

Other India-Nepal Initiatives Launched

- **Earthquake Reconstruction Assistance:** India handed over 72 health facilities and 12 cultural heritage sector projects.
- **MoU between Digital India Bhashini and Kathmandu University:** For co-creating National Digital Infrastructure for “Voice First” Language Translation platform.
- **India-Nepal Mutual Legal Assistance Agreement (MLAA):** Welcomed the implementation of MLAA in Criminal Matters.

FSSAI



FSSAI, citing Food Safety and Standards (Packaging) Regulations, 2018, directed to discontinue newspapers for packing food items.

- It warned that printing inks contain harmful chemicals, e.g lead and other heavy metals, which pose long-term health risks.

About FSSAI (HQ: New Delhi)

- **Established:** Under Food Safety and Standards Act, 2006 as an independent **statutory Authority**.
- **Ministry:** Ministry of Health and Family Welfare.
- **Role:** Laying down science based standards for articles of food and to regulate their manufacture, storage, distribution, sale and import.
- It is also responsible for licensing and Registration of Food Business Operators and Monitoring safety
- **Composition:** One chairman and 22 members (one-third must be women).

Shangri-La Dialogue

India has signed a deal with Vietnam for supply of BrahMos at the Shangri-La Dialogue in Singapore.



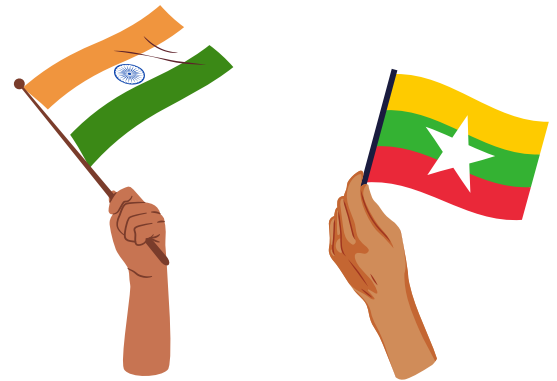
- BrahMos is a supersonic “Fire and Forget” cruise missile with Mach 2.8 speed, stealth capability and a 290 km range.

About Shangri-La Dialogue

- It is recognised as Asia's premier defence summit, held annually in Singapore and organised by International Institute for Strategic Studies (IISS).
- It brings together global defence leaders to discuss major security challenges.
- It serves as a platform for strategic debates, bilateral talks and defence cooperation.

India-Myanmar Relations

The Prime Minister of India and the President of Myanmar reviewed bilateral, regional and global issues of mutual interest including AI and Space.



- Both nations also welcomed the steady growth of the **Rupee-Kyat settlement mechanism** (operationalized in 2024) to facilitate easier bilateral trade.

Significance of India-Myanmar Relations:

- **Geo-strategic:** Myanmar lies at the confluence of India's **Neighbourhood First, Act East and MAHASAGAR** policies.
- **Connectivity:** **India-Myanmar-Thailand Trilateral Highway** and the **Kaladan Multi-Modal Project** to boost regional economic integration.
- **Security:** to manage **ethnic cross-border insurgencies (along 1,643 km long border)**, check arms and narcotics smuggling (Golden Triangle) into northeastern states.
- **Cultural Soft Power:** Deep-rooted historical ties built around shared Theravada Buddhist heritage.

India–Oman CEPA



India–Oman CEPA recently entered into force.

About India- Oman CEPA

- **Oman's offer:** 99.38% of India's exports (by value) will receive immediate zero-duty access to Oman.
 - 100% FDI for Indian companies in major services sector in Oman.
- **India's offer:** Tariff liberalisation on 77.79% of tariff lines covering 94.81% of imports from Oman, while protecting sensitive sectors like dairy, oilseeds and cereals.

About India-Oman Trade Relations

- Oman is India's second-largest trading partner in Gulf with ~\$11 bn bilateral trade.
- Oman's logistics hubs at **Sohar, Duqm and Salalah** provide access to India to wider Gulf Cooperation Council and East African markets.

India-Nepal Disputed Border Areas

The Prime Minister of Nepal acknowledged encroaching on certain Indian territories.



About India-Nepal Border

- **Length:** The India–Nepal border stretches 1,751 km.
- **Boundary:** With 5 states (Sikkim, West Bengal, Uttar Pradesh, Uttarakhand and Bihar).
- **Mechi bridge** connect Panitanki Bypass(West Bengal) in India with Kakarvitta in Nepal.

Disputed Border Areas

- **West:** Kalapani-Limpiyadhura-Lipulekh tri-junction (Uttarakhand)
 - **Kalapani** is located near the India-Nepal-China tri-junction, giving it strategic importance.
 - **Limpiyadhura:** Northwest of Kalapani, claimed by Nepal as the true source of the Kali (Mahakali) River under the Treaty of Sugauli.
 - **Lipulekh** is also an important mountain pass. Used by Indian pilgrims travelling to Kailash Mansarovar in Tibet.
- **East:** Susta area (Bihar).

India–China Boundary Dispute

The 35th meeting of the Working Mechanism for Consultation & Coordination on India-China Border Affairs (WMCC) reviewed the situation in the India-China border areas.



About India-China Border Dispute

- **Origin:** Different perceptions of the Line of Actual Control as India shares second longest land boundary with China (3488 km) only after Bangladesh (4096.7 km).
 - **In 1865, when WH Johnson**, a civil servant with the Survey of India, proposed the 'Johnson Line', which placed Aksai Chin within Jammu and Kashmir which Chinese dynasty refused.
 - **In Simla meeting, 1914**, between British India, Tibet and, China; proposed line from Bhutan to Burma (now Myanmar) (McMahon Line) but opposed by China.
- **Conflict: 1962 India–China War** when China attacked India.
- **Disputed Areas:** (Along three sectors)
 - **Western Sector (Ladakh–Aksai Chin):** China controls Aksai Chin, which India claims as part of Ladakh.
 - **Middle Sector:** Kaurik Lahaul and Spiti Valley (Himachal Pradesh), Bara Hoti and Nelang Valley (Uttarakhand).
 - **Eastern Sector (Mainly Arunachal Pradesh):** China claims Arunachal Pradesh, especially the Tawang region, as "South Tibet" (Zàng Nán).
 - **Sikkim Sector:** Nathu La pass, the Naku La sector, Cho La, Mount Gipmochi, Batang La, and the Doklam Plateau (Situated at the crucial tri-junction of India, China, and Bhutan) and adjoining Jampheri Ridge.

Principles India Should Follow for Dispute Settlement

- **Preserve the 2005 Framework:** A package settlement through a three-step process: political parameters, a settlement framework, and final delineation and demarcation of the boundary.
- **Focus on LAC Stability:** Make peace and tranquility on the LAC a precondition for progress; oppose unilateral changes and persistent buffer zones.
- **Seek a Comprehensive Political Settlement:** Push for meaningful political negotiations on the entire boundary issue.

India-Middle East-Europe Economic Corridor

**Future of India-Middle East-Europe Economic Corridor (IMEC) amid the Middle Eastern War
The Iran conflict strengthens the case for the IMEC while simultaneously complicating its execution.**

About India-Middle East-Europe Economic Corridor (IMEC)

- **IMEC is a multi-modal connectivity project** aimed at developing infrastructure of ports, railways, roads, sea lines and pipelines to enhance trade **between India, the Arabian Peninsula, the Mediterranean region and Europe.**
- **Announcement:** During the G20 Summit 2023, held under the presidency of India.
- **Signatories:** India, the United States, Saudi Arabia, the United Arab Emirates, France, Germany, Italy, and the European Union.
- **Two Key Corridors:**
 - The **East Corridor** connects India to the Arabian Gulf (linking South Asia and the Middle East).
 - The **North Corridor** extends from the Gulf to European markets.
- **Significance for India:** Estimated to **reduce transportation time by 40% and logistics costs by 30%**, providing an **alternative to congested routes (such as the Suez Canal).**

Current Vulnerabilities in IMEC:

- **Escalation of Iran- Israel War:** have intensified into a broader regional war, threatening IMEC's proposed transport corridors.
- **Trade Route Disruption:** Strategic chokepoints (**Strait of Hormuz**) have triggered spikes in oil prices and shipping risks, **undermining IMEC's economic feasibility.**
- **Breakdown of Regional Cooperation:** Strained critical diplomatic ties between Israel and Arab nations, stalling coordinated infrastructure development.
- **Execution Challenges:** Diverse stakeholder interests (between UAE and Saudi Arabia) further complicate the funding and timely execution of IMEC projects.

Way Forward

- **Strengthen West Asian Diplomacy:** Promote regional dialogue and cooperation to ensure the stability required for smooth project execution.
- **Phased Development:** Prioritize key infrastructure segments first to build momentum and show early results.
- **Deepen Partnerships:** Enhance economic and trade ties with key partners like the European Union and Gulf nations.

India- Venezuela Relations



Indian Prime Minister held talks with the Acting President of Venezuela in New Delhi and reviewed the full spectrum of bilateral relations and emphasizing cooperation within the Global South.

About India- Venezuela Relations

- **Bilateral trade:** US\$ 678.94 million (FY 2025-26) with Indian exports of US\$ 210 million
 - **India's exports:** Mineral fuels & oils, pharmaceuticals, cotton, and nuclear reactors/machinery.
 - **India's imports:** Crude oil, mineral waxes, iron & steel, aluminium, vegetables, copper, lead, and zinc.
- **Energy Partnership:** Venezuela possesses one of the **world's largest proven oil reserves**, and has **emerged as the 3rd largest oil supplier to India in May 2026**.
- **Cultural & People-to-People Ties:** Several spiritual organizations such as Sathya Sai Organization, Brahma Kumaris, and Radha Soami Satsang have established centres in Venezuela.

India–UK Critical Minerals GSCO



The India–UK Critical Minerals Global Supply Chain Observatory (GSCO) was formally launched.

- It was announced during the **India–UK Prime Ministers' bilateral engagement** in 2025 and formalized through a Research Collaboration Agreement signed in March 2026.

About Critical Minerals GSCO

- It is a **joint initiative of TEXMiN (TTRP, DST), IIT (ISM) Dhanbad, and the University of Cambridge**.
- **Aim:** To create a **data-driven platform** for monitoring and analysing global critical mineral supply chains.
- **Significance:** Identify supply risks and disruptions; generate market intelligence; support informed decision-making; and advance the goals of the National Critical Mineral Mission (NCMM).

Indus Water Treaty

Pakistan has accused India of violating the Indus Water Treaty (IWT) as India plans to divert Chenab river water to the Beas river.



- India put the IWT in "**abeyance**" after the Pahalgam terror attack.

About IWT

- **Origin:** Signed in 1960 between India and Pakistan mediated by the World Bank.
- **Governs sharing of Indus Basin rivers:** Sutlej, Beas, and Ravi (Eastern Rivers), and Indus, Jhelum, and Chenab (Western Rivers).
 - **India has unrestricted rights over the Eastern Rivers**, while the Western Rivers are largely reserved for Pakistan, subject to limited uses by India.
- **Three-tier mechanism for Dispute resolution:** Permanent Indus Commission (PIC), Neutral Expert, and Court of Arbitration for unresolved disputes.

Qeshm island

The US attacked surveillance facilities on Qeshm Island.



About Qeshm Island

- **Location:** Southern edge of the Zagros Mountain range, along sides the south coastline (Hormozgan) of the Iranian mainland.
- It is the biggest island in the **Persian Gulf near the straits of Hormoz**.
- It is also known as the "**island of seven wonders**".

Cambodia

NPCI partnered with ACLEDA Bank to launch Unified Payments Interface (UPI) acceptance in Cambodia.



• Political Features

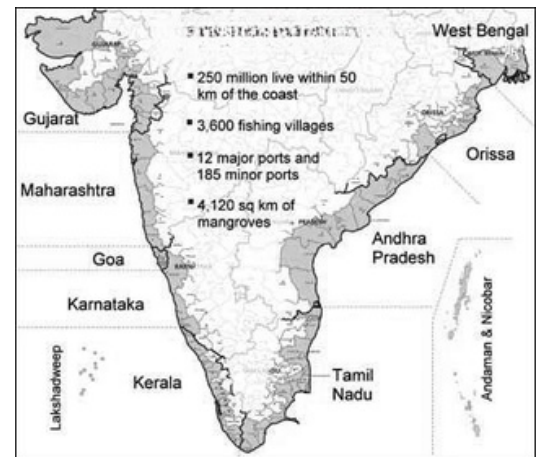
- **Location:** It is located in the **southern portion of the Indo China Peninsula in Southeast Asia**.
- **Bordering Countries:** Vietnam (east and southeast), Laos and Thailand (North).
- **Bordering Water Body:** Gulf of Thailand.

• Geographical Features

- **Major rivers:** Mekong and Tonle Sap.
- **Major mountains:** Dangrek Mountains, Krâvanh (Cardamom) and Dâmrei Mountains.
- **Highest Point:** Phnom Aural.
- **World Heritage Sites:** Angkor (including Temple of Angkor Wat), Temple of Preah Vihear (dedicated to Lord Shiva).

Climate Change Impact on India's Coastal Region

Azim Premji University's recent study warns of severe, hyper-local climate shifts across India's 11,000-km coastline.



Key Highlights

- **Coastal Erosion:** A 15 cm sea-level rise by 2050 will rapidly accelerate shoreline loss.
- **Cyclones:** Rapid ocean warming ($0.27^{\circ}\text{C}/\text{decade}$) is fueling more intense tropical storms.
- **Temperature Anomalies:** Around 40 districts will see summer peaks spike by $>1^{\circ}\text{C}$, approaching unsafe humidity-heat thresholds.
- **Polarized Rainfall Pattern:** While average precipitation will increase, the growth is concentrated on the western Coast.
- **Salinity:** Cyclone-driven storm surges are forcing seawater into fresh groundwater (e.g., **Sundarbans**), ruining drinking supply.

Ground-Level Ozone (O_3)

A recent analysis highlighted that ground-level ozone is emerging as a major air pollution challenge in Delhi.



About Ground-Level Ozone (O_3)

- It is a **secondary air pollutant (found in the troposphere)** formed by reactions between **Nitrogen Oxides (NO_x)** and **Volatile Organic Compounds (VOCs)** in the presence of sunlight.
 - **Formation:** $\text{NO}_x + \text{VOCs} + \text{Sunlight} \rightarrow \text{Ozone } (\text{O}_3)$
- **Major sources:** vehicles, industries and thermal power plants.
- Peaks **during summer** due to intense solar radiation.
- **Impact:** respiratory ailments, crop damage and photochemical smog.
- Unlike **stratospheric ozone** ("Good Ozone"), which shields Earth from UV rays, ground-level ozone is a **harmful pollutant** ("Bad Ozone").
- **Safe Limit:** $100 \mu\text{g}/\text{m}^3$ for 8-hourly monitored value and $180 \mu\text{g}/\text{m}^3$ for 1-hourly monitored value, both under WHO Standards as well as National Ambient Air Quality Standard (NAAQS), 2009.

Majuli Island

Recently a study reconstructed 4,000 years of climate history of Majuli Island using sediments from Sakali Wetland.



About Majuli Island

- World's largest river island located in Assam.
- It became India's first river island district in 2016.
- Bounded by Subansiri and its tributaries Ranganadi, Dikrong, Dubla, Chici and Tuni etc. on North west;
 - Kherkatia Suli (spill channel of Brahmaputra) in northeast and Brahmaputra on South and South west.
- **Key Features:** Region of fluvial geomorphology; formation of islets locally called Chaporis, hub of Assamese neo-Vaishnavite culture (known for tradition of Satras), etc.
- Included in Tentative List of UNESCO World Heritage Sites in 2004.

Blue Micromoon

A rare Blue Micromoon was observed globally on May 31, 2026, including in India.



About Blue Micromoon

- **Blue Moon:** It refers to the second full moon within a single calendar month, which typically happens every 2-3 years.
- **Micromoon:** This phenomenon occurs when a full moon coincides with its 'apogee' (the farthest orbital distance from Earth) making it appear smaller and dimmer.
- **Blue Micromoon:** The simultaneous convergence of a Blue Moon and a Micromoon, it is an exceptionally rare celestial event.
 - Despite its name, the Moon does not appear blue unless unusual atmospheric conditions exist.

El Niño

The World Meteorological Organization (WMO) has warned of an 80% probability of El Niño developing in the coming months.

- El Niño and La Niña are opposite phases of the **El Niño–Southern Oscillation (ENSO)**.
- **Southern Oscillation** is a coherent inter-annual fluctuation of atmospheric pressure over the tropical Indo-Pacific region.

El Niño

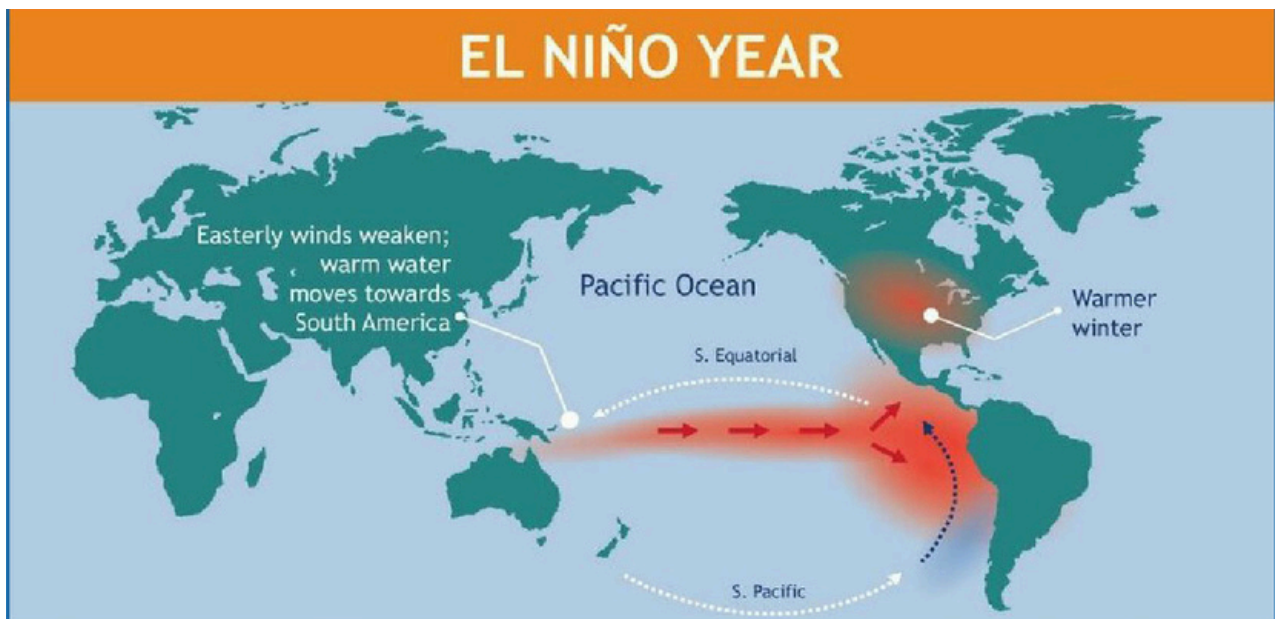
- El Niño means “Little Boy” in Spanish.
- Characterized by warming of sea surface temperatures in the **central and eastern equatorial Pacific Ocean**.
- Occurs every 2–7 years and typically lasts 9–12 months.
- Usually develops between March and June and peaks during November–February.

La Niña

- La Niña means “Little Girl” in Spanish.
- Characterized by cooling of sea surface temperatures in the central and east-central equatorial Pacific Ocean.

Impact of El Niño

- **Global:**
 - **Wetter conditions** in parts of southern South America, the southern United States, etc.
 - **Drier conditions** in northern South America, the Caribbean, Australia, and parts of South Asia.
 - **Weakened upwelling** (off the coast of Peru) reduces the supply of cold, nutrient-rich water, leading to lower **phytoplankton productivity** and disruption of marine food chains.
- **On India:**
 - It is associated with **below-normal southwest monsoon rainfall**, disrupting agriculture and water management.
 - On the other hand, **La Niña** strengthens the Indian monsoon, resulting in above-normal rainfall.
 - Increased risk of **extreme weather events** such as cyclones, wildfires etc., causing human and economic losses.



Illegal Sand Mining

Illegal Sand Mining in National Chambal Sanctuary SC took suo motu cognizance and severely reprimanded states of Rajasthan, Madhya Pradesh, and Uttar Pradesh over persistent illegal sand mining in and around National Chambal Gharial Sanctuary.



About Illegal Sand Mining

- **Legal Status:** Sand is classified as a **minor mineral** under Mines and Minerals (Development and Regulation) (MMDR) Act, 1957.
- **Definition:** Under **Minerals Concession Rules, 2016**, **illegal mining** means reconnaissance, prospecting, or mining without the required mineral concession.
 - As per **MMDR Act**, extraction or transportation of minerals without a valid prospecting licence, mining lease, composite licence, or in violation of rules under **Section 23C (rules made by state governments)** constitutes illegal mining.
- **Implications:** Causes ecological degradation, biodiversity loss, law-and-order challenges due to mining mafias, and socio-economic costs including revenue loss etc.

Protection Against Illegal Sand Mining

- **Guidelines:** MoEFCC's **Sustainable Sand Mining Management Guidelines (2016)** and **Enforcement & Monitoring Guidelines (2020)**.
- **Technology-Based Monitoring:** The **Mining Surveillance System (MSS)** uses satellite imagery.
- **Mineral Conservation and Development Rules, 2017:** It mandates end-to-end mineral accounting.
- **Penalties:** The **MMDR Amendment Act, 2015** provides for higher fines, imprisonment up to 5 years, and special courts for speedy trials.

National Chambal Gharial Sanctuary

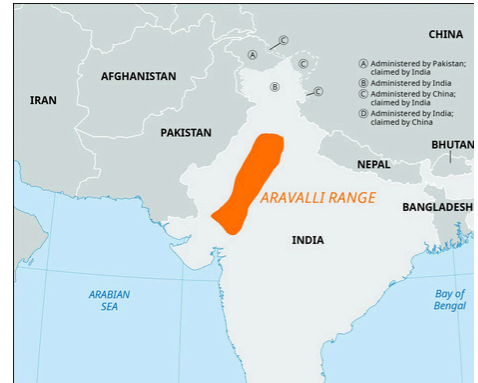
- It is a protected area **established in 1979**.
- **Location:** Located on the Chambal River near the tri-point of Rajasthan, Madhya Pradesh and Uttar Pradesh.
- **Other species:** Red-Crowned Roofed Turtle, Ganges river dolphin etc

About Gharial (*Gavialis gangeticus*)

- **Range:** In **tributaries of Ganga River** – Chambal and Girwa Rivers in India and Rapti-Naryani River in Nepal.
- **Conservation status:** IUCN (Critically Endangered); WPA (Schedule I and IV); CITES (Appendix I).

Importance of the Aravalli

Recently, massive dust storms in parts of Rajasthan highlighted the ecological importance of the Aravalli Range.



- This storm has been caused by Western Disturbances that brought high-speed winds and upward surge of hot air due to heating in Western Rajasthan.
- The Aravallis act as a **natural barrier between the Thar Desert and the Indo-Gangetic plains** whose degradation has increased intensity of such storms in Delhi and northern plains in the past.

Importance of the Aravalli Range

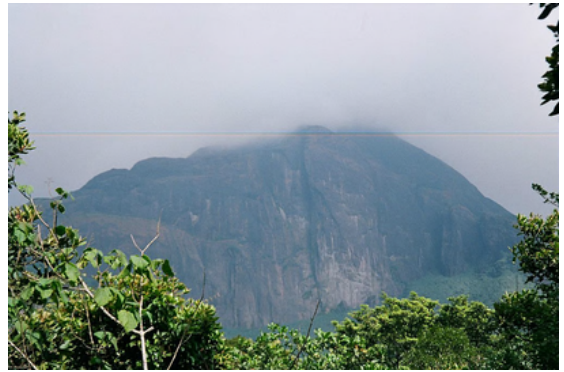
- **Geographical Importance:** It is one of the world's oldest fold mountain ranges that extends from Gujarat to Delhi over nearly 700 km.
- **Barrier Against Desertification:** The Aravallis prevent the eastward spread of the Thar Desert and reduce dust storms in northern India.
- **Ecological Importance:** The range supports rich biodiversity through forests, grasslands and wildlife habitats.
- **Hydrological Importance:** The range acts as a major watershed and is the source of rivers like Sabarmati, Luni and Banas.
- **Economic and Cultural Importance:** They support agriculture, livestock and mining while hosting important cultural and religious sites.

Measures to Protect the Aravallis

- **Aravalli Green Wall Initiative:** Large-scale restoration programme by MoEFCC focusing on Afforestation, Grassland restoration, Wetland restoration etc.
- **Control on Mining :** Strict regulation of illegal mining and encroachments along with enforcement of Supreme Court directives.
- **Soil Conservation:** Construction of check dams, contour trenches and rainwater harvesting structures.

KEY DRIVERS OF ARAVALLI ECOSYSTEM DEGRADATION		
CAUSE		EFFECT ON THE ARAVALLI ECOSYSTEM
	UNREGULATED MINING ACTIVITIES	Extensive mining has adversely affected hills, forest cover, soil health, and groundwater reserves.
	FOREST COVER REDUCTION	Declining forest areas have weakened the region's natural defense against desert expansion.
	URBAN EXPANSION AND LAND ENCROACHMENT	Rapid growth of settlements has disturbed forest and grassland habitats.
	UNSUSTAINABLE GRAZING PRACTICES	Excessive livestock grazing has diminished vegetation and accelerated land degradation.
	ECOSYSTEM FRAGMENTATION	Breaks in habitat continuity have disrupted wildlife movement and heightened human-animal interactions.

Agasthyamalai Biosphere Reserve



Supreme Court ordered immediate removal of encroachers and demolition of illegal structures across Agasthyamalai landscape comprising Agasthyamalai BR.

About Agasthyamalai Biosphere Reserve

- Located in southern Western Ghats, in Tamil Nadu and Kerala.
- Included in the World Network of Biosphere Reserves under UNESCO's Man and Biosphere (MAB) Programme (2016).
- The reserve includes three wildlife sanctuaries, Shendurney, Peppara and Neyyar, as well as the Kalakad Mundanthurai Tiger Reserve.

Martens

Yellow-throated marten was recently sighted for the very first time in the Kaziranga National Park and Tiger Reserve in Assam (UNESCO World Heritage Site).



Yellow-throated Marten (*Martes flavigula*)

- It is a diurnal and arboreal member of the mustelid family, a group of carnivorous mammals.
- **Features:** Golden-yellow throat, long tail, and defensive scent glands.
- **Behaviour:** Fearless, highly social, often hunts in pairs or small groups.
- **Ecological Role:** Functions as a **mesopredator**, controls rodent populations, aids **seed dispersal**, etc.
- **Distribution:** Found across Southeast Asia, eastern Russia, China, and the Korean Peninsula; in India, occurs mainly in the **Himalayas and Northeast**.
- **Conservation Status:** IUCN (Least Concern); protected under **Schedule II of the Wildlife (Protection) Act, 1972**.
- **Threats:** Habitat fragmentation, deforestation, and human encroachment.

Peatlands

On World Peatlands Day (2 June), the Food and Agriculture Organization highlighted the critical role of peatlands.



About Peatlands

- Peatlands are **waterlogged wetland ecosystems** formed from partially decomposed organic matter (peat).
 - Include **bogs, fens, mires and swamps**.
- **Functions:**
 - Cover only **3–4% of the Earth's land surface** but store nearly **30% of global soil carbon**.
 - **Carbon sinks:** Hold twice the carbon stock of the world's entire forest biomass.
 - Regulate climate, **water flow, reduce floods and droughts**, and support biodiversity.
- Degradation of peatlands releases **significant greenhouse gas emissions** and undermines ecosystem services.

Climate Finance in India

India requires adequate climate financing for energy transition, emissions reduction, climate adaptation and sustainable development.



Government Initiatives

- **National Adaptation Fund for Climate Change (NAFCC):** To support adaptation activities in the States and Union Territories (UTs) vulnerable to the adverse effects of climate change.
- **National Clean Energy and Environment Fund (NCEEF):** Finances and promotes clean energy, renewable energy technologies and related research and innovation in India.
- **Sovereign Green Bonds (SGBs):** Issuance of **₹477 billion SGBs** to finance green projects.
- **Priority Sector Lending (PSL) framework:** Includes Green activities and sovereign green bonds.
- **Others:** Climate Finance Taxonomy and Green Steel Taxonomy; RBI's Climate Finance and Climate Risk Management Directions (2025) etc.

Challenges

- **Massive financing gap** and inadequate international climate finance commitments.
- **Lack of a comprehensive climate finance architecture** and clear green classification.
- **Limited private-sector participation** due to high risks and low profitability of green technologies.
- **Inadequate integration of climate risks** into financial decision-making.
- **Other challenges:** Risk of greenwashing; limited borrowing capacity and access to states; etc.

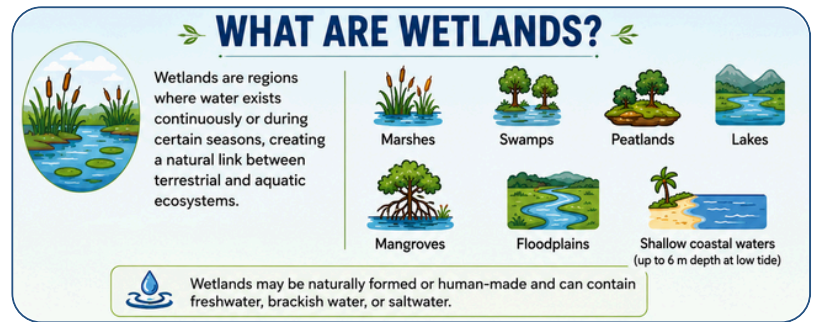
Conclusion

India can bridge its climate finance gap by swiftly implementing a robust Climate Finance Taxonomy, strengthening RBI's green finance regulations, expanding support for climate adaptation through PSL, establishing a dedicated State Climate Finance Facility and scaling up sovereign green bonds.

Major Global Climate Finance Mechanisms

- **Green Climate Fund (GCF):** Funds climate mitigation and adaptation projects.
- **Global Environment Facility (GEF):** Supports climate, biodiversity, and environmental projects.
- **New Collective Quantified Goal (NCQG):** Commits \$300 billion by 2035.
- **Others:** Adaptation Fund (AF); Least Developed Countries Fund (LDCF); Special Climate Change Fund (SCCF) etc.

Jai Prakash Narayan Bird Sanctuary



Jai Prakash Narayan Bird Sanctuary
designated as India's 100th Ramsar site

About Jai Prakash Narain Bird Sanctuary (Surha Tal)

- It is a **natural, perennial oxbow lake** (U-shaped waterbody formed when a wide meander from a river is cut off).
- Location:** Ballia district, Uttar Pradesh
- Origin:** Consolidated in **1991** from the land areas of 45 villages as Surha Tal. Renamed in 2002 to honour activist and political leader, Jai Prakash Narayan.
- Area:** ~3432 hectares which **expands to ~25,000 hectares during monsoons**.
- Significance:**
 - Rich avifaunal biodiversity:** Vital wintering ground for migratory birds traveling along the **Central Asian Flyway**.
 - Notable fish include the vulnerable **Wallago attu** and **Bagarius bagarius**.
 - The abundance of fish attracts the **vulnerable fishing cat (Prionailurus viverrinus)**.
 - Major source of **irrigation and groundwater recharge**.
 - Historical, cultural, and religious value.

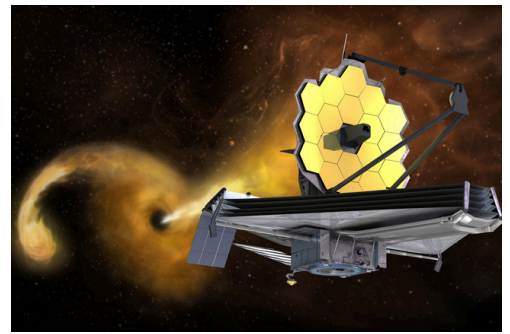
About Ramsar Convention

- It is the **intergovernmental treaty** that provides the framework for the **conservation and wise use of wetlands and their resources**.
- It was adopted in the **Iranian city of Ramsar in 1971** and came **into force in 1975**.
 - India ratified the Convention in **1982**.
- Three Pillars**
 - Conservation of **wetlands of international importance**.
 - Wise use** of all wetlands.
 - International cooperation** on shared wetlands and migratory species.
- Criteria:** A wetland must meet at least one of nine criteria established by the Convention.



James Webb Space Telescope

JWST Detects Weather Patterns on Exoplanet WASP-94A b Located 700 Light-Years Away

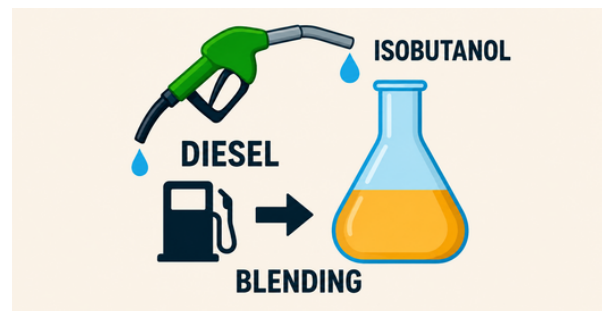


About James Webb Space Telescope (JWST)

- JWST is the largest, most powerful, and most advanced space telescope ever launched.
- **Partnership:** Joint mission of NASA, European Space Agency (ESA), and Canadian Space Agency (CSA).
- **Launch:** 25 December 2021.
- **Location:** Operates at Lagrange Point 2 (L2), about 1.5 million km from Earth.
- **Objectives:** Study the **early universe**, **galaxy evolution**, **star formation and death**, and **exoplanets/planetary systems** to understand cosmic history and the potential for life beyond Earth.

Isobutanol

India is likely to introduce blending of isobutanol with diesel.



About Isobutanol

- Isobutanol is a **four-carbon alcohol** ($C_4H_{10}O$), making it a **higher alcohol** compared to ethanol, which contains only two carbon atoms.
- Can be produced from **renewable sources** like biomass, agricultural waste, or through **processes linked to ethanol or sugarcane production**.
- **Uses:** **Industrial solvents** in products like paints, coatings; **potential biofuel** for transportation, etc.
- **Suitability in Blending with diesel:** Blends **uniformly without any additional additives**, **higher energy content**, **less volatile and corrosive** offering higher compatibility with existing engines and fuel infrastructure.

Rudram II

India successfully flight-tests indigenous RudraM-II Missile.

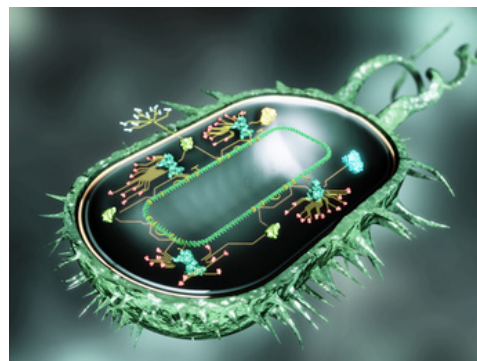


About RudraM-II

- Indigenous **air-to-surface missile** launched from an airborne platform.
- **Developed By:** Research Centre Imarat, Hyderabad a nodal laboratory of Defence Research and Development Organisation (DRDO) and other organizations.
- **Significance:** Strengthens India's indigenous defence capability and advances **Aatmanirbhar Bharat** in advanced weapon systems.

Synthetic Biology

Understanding of genes, cells, along with advances in AI have caused engineering cells and organisms on a genome-wide scale with desired properties.



About Synthetic Biology

- **Meaning:** Involves **redesigning organisms for useful purposes** by engineering them to have **new abilities**.
 - E.g. harnessing microorganisms for **bioremediation to clean pollutants**, modifying rice to **produce beta-carotene** for preventing Vitamin A deficiency, etc.
- **Comparison with Genome Editing:**
 - In synthetic biology, scientists **typically stitch together long stretches of DNA** (already found in an organism or entirely novel) and insert them into an organism's genome.
 - In genome editing, scientists **typically use tools to make smaller changes** (delete or add small stretches of DNA) to organism's own DNA.

Challenges and Concerns Associated with Synthetic Biology

- **Affordability** Personalized therapies could be **particularly expensive**.
- **Biosafety:** Potential **unintended risks of releasing genetically engineered microorganisms** into environment.
- **Biosecurity Risks:** Empower nefarious actors to **develop bioweapons** (e.g. by accelerating development of toxins).
- **Cyberbiosecurity:** Due to **growing interaction between biology and automation**.
- **Ethical challenges:** Issues regarding **engineering life, equity and distribution of risk, benefits, and access**, etc.

MAJOR APPLICATIONS OF SYNTHETIC BIOLOGY		
DOMAIN	APPLICATION AREA	BRIEF DESCRIPTION
 HEALTHCARE	 Precision Cell and Gene Treatments	Customized genetic and cellular interventions designed to address the fundamental causes of diseases.
	 Smart Drug Delivery	Engineered microbes can transport medicines directly to affected cells, improving treatment effectiveness and specificity.
	 Advanced Regenerative Therapies	Enables innovations such as biofabricated organs, tissue engineering, and cross-species organ transplantation.
 AGRICULTURE & SOIL RESTORATION	 Microbial Soil Enhancement	Designed microorganisms can act as biofertilizers, biological pest-control agents, and beneficial soil enhancers.
	 Environmental Soil Surveillance	Biosensor technologies facilitate continuous tracking of pollutants and other critical soil indicators.
 SUSTAINABILITY & EMISSION CONTROL	 Biological Carbon Capture	Synthetic biological systems can improve carbon fixation through innovative metabolic pathways.
	 Plastic Waste Reduction	Specialized enzymes and engineered microbes help decompose plastics and support the production of eco-friendly alternatives.
 DECENTRALIZED PRODUCTION SYSTEMS	 Localized Biomanufacturing	Promotes distributed production units located near biomass or raw-material sources, reducing logistical costs and emissions.

Environmental Cost of AI

UNU-INWEH report highlights threats to natural resources due to rapid growth of Artificial Intelligence (AI) use The report “Environmental Cost of AI’s Energy Use: Carbon, Water and Land Footprints” was released by the United Nations University Institute for Water, Environment and Health (UNU-INWEH) on its 30th anniversary.



- **UNU-INWEH** is one of 13 institutes comprising the United Nations University (UNU), the academic arm of UN and is headquartered in Ontario, Canada.

Environmental Cost of AI

- **Electricity:** By 2030, global data centers powering AI are projected to consume 945 Terawatt-hours (TWh) of electricity.
- **Carbon Emissions:** Producing that much electricity would have a **carbon footprint of 399 million tonnes CO₂e**, requiring 6.7 billion trees grown over 10 years to offset.
- **Resource Depletion:** Associated water footprint will equal the basic annual domestic water needs of all 1.3 billion people in Sub-Saharan Africa and land footprint will exceed 14,500 square kilometers.
- **E-Waste Crisis:** AI infrastructure could generate 2.5 million tonnes of e-waste annually by 2030, disproportionately affecting the Global South.
- **The Rebound Effect (Jevons Paradox):** Technological efficiency gains make AI cheaper, driving massive volume growth wiping out overall energy savings.
- **Global Digital Divide:** 90% of AI computing capacity is concentrated in just two countries (USA and China), shifting the environmental extraction burdens to developing nations.

Way Forward

- **Holistic Metrics:** Move beyond carbon-only assessments to require joint disclosures of carbon, water, and land footprints.
- **Demand-Side Guardrails:** Implement explicit limits on tokens, resolution, and default output lengths to curb unsustainable usage volumes.
- **Equitable Governance:** Integrate AI expansion into national water and energy planning, ensuring communities affected by data centres are engaged and protected.
- **International Standards:** International institutions should support harmonized measurement standards and disclosure practices, reduce incentives for cross-border burden shifting, and support participation and capacity in regions excluded from AI compute.

S-400 air defence system to India

The delivery is part of a \$5.43 billion agreement signed between India and Russia in 2018 for the acquisition of five S-400 regimental systems.



- Defence Acquisition Council (DAC) cleared proposal for procurement of five additional S-400 systems, which form a key pillar of **India's layered air defence architecture**.
- India's acquisition of S-400 systems from Russia triggered the threat of US' CAATSA sanctions but US has not yet imposed such sanctions on India.

About S-400

- **Origin:** Russian **Long-Range Surface-to-Air Missile (SAM)** system developed by Almaz-Antey and it is also known as SA-21 Growler (NATO Codename).
- **Integrated System:** Combines advanced **radars**, **missile launchers**, **command-and-control centre**, and autonomous **target detection** systems.
- **Layered Air Defence:** Employs **four missile types** with ranges of **40 km, 120 km, 250 km and 400 km**.
- **Target Spectrum:** Capable of engaging aircraft, stealth aircraft, UAVs, cruise missiles and ballistic missiles.
- **Detection Capability:** Can detect **aerial targets up to 600 km away** and track multiple targets simultaneously.
- **Mobility:** Road-mobile system capable of rapid deployment and redeployment.
- **AI enabled:** S-400 will be integrated with AI-enabled decision-support capabilities aimed at improving threat prioritisation and target selection.

Major Air & Missile Defence Systems

- **S-500 Prometey (Russia):** Next-generation air and missile defence system capable of intercepting ballistic missiles and hypersonic weapons, etc.
- **THAAD (USA):** Terminal High Altitude Area Defence system designed to intercept ballistic missiles during their terminal phase.
- **Iron Dome (Israel):** Short-range air defence system for intercepting rockets, artillery shells and drones.
- **Patriot PAC-3 (USA):** Air and missile defence system capable of engaging aircraft, cruise missiles and ballistic missiles.
- **HQ-9 (China):** Long-range surface-to-air missile system for air and missile defence, often compared to the S-300/S-400 family.

Flex fuel Vehicles

Hero MotoCorp launched its first flex-fuel motorcycle and Maruti Suzuki launched first flex fuel passenger vehicle.

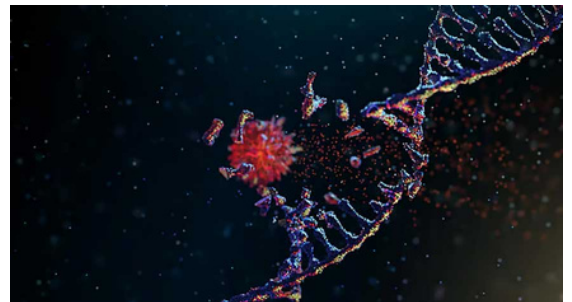


About Flex Fuel Vehicles (FFV)

- FFVs feature upgraded internal combustion engines running on petrol-ethanol blends ranging from E20 to E85 (85% ethanol).
- Flex-fuel technology can reduce carbon monoxide emissions by 77% and save ₹1.44 lakh crore in forex.
- Since 2014-15, India's ethanol blending programme has saved ₹1.84 lakh crore in forex, substituted 302 lakh metric tonnes of crude oil, and reduced CO₂ emissions by 909 lakh metric tonnes.

Gene silencing and Nanomedicine

Researchers have developed a targeted gene-silencing nanomedicine that can effectively inhibit breast cancer tumours.



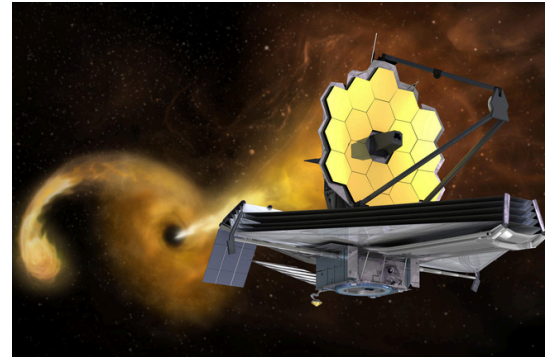
About Gene silencing Technique

- It is a biological process where a **cell specifically reduces or prevents** the expression of a **particular gene**.
- This mechanism **functions by intercepting the genetic instructions encoded in DNA**, thereby stopping the **production of the corresponding protein**.
 - It is a **natural form of cellular regulation** used by organisms to manage their internal functions.

About Nanomedicine

- It is the application of **nanotechnology in medicine**, where **nanoparticles** (typically 1–100 nanometres in size).
- **Use:** Diagnose, monitor, prevent, and treat diseases with improved precision, reducing side effects.

James Webb Space Telescope



NASA's James Webb Space Telescope has detected methane on interstellar comet 3I/ATLAS for the first time.

About James Webb Space Telescope

- It is the successor to the **Hubble Space Telescope**, designed to explore the Universe's origins by studying the formation of stars, planets, and the earliest galaxies.
- It is an international partnership between **NASA**, **ESA** (European Space Agency) and **CSA** (Canadian Space Agency).
- It observes the universe in the **infrared** spectrum.
- **Launch:** In 2021, aboard Ariane from Europe's Spaceport in French Guiana
- **Orbit:** Lagrange point 2, 1.5 million km from Earth

E85 fuel

The Union Minister for Petroleum and Natural Gas launched E85 fuel.

About E85 fuel

- E85 is a fuel blend containing **80–85% ethanol** and **15–20% petrol**.
- It is designed specifically for **Flex-Fuel Vehicles (FFVs)**.
 - FFVs are vehicles whose engines can operate on varying **ethanol-petrol blends**, from **E20** up to **E100 (100% ethanol)**.
- **Significance:**
 - Reduces **greenhouse gas emissions**.
 - Enhances **energy security** by **lowering crude oil imports**.
 - Supports **ethanol production from agricultural feedstock**, boosting farmers' incomes.



Abhilasha Biofuels

The Technology Development Board under the Department of Science and Technology has supported a project to establish a commercial-scale facility for producing Abhilasha Biofuels (ABF).



About ABF

- It is a **2nd Generation (2G)** diesel-equivalent biofuel and renewable **naphtha alternative**.
- 2G biofuels are biofuels produced from **non-food biomass**, such as **agricultural residues**, **forestry waste**, **crop stubble**, **sugarcane bagasse**, rice straw, and other lignocellulosic materials.
- Also, it is a drop-in fuel that can directly replace conventional diesel without requiring any modification to existing engines, fuel systems, or fuel distribution infrastructure.

Chloramphenicol and nitrofurans

India's shrimp exports faced export rejections in US, European Union and Japan markets due to presence of Chloramphenicol and nitrofurans.



- Both drugs are **banned in all food-producing animal rearing systems**.

About Chloramphenicol

- **Antibiotic** used in the treatment of bacterial infections.
- **Threats:** Can cause **aplastic anaemia** in humans (even if in small concentrations).

About Nitrofurans

- **Antibiotics** used for antibacterial and anti-inflammatory purposes.
- **Threat:** Banned due to **persistence** of their metabolites in animal **tissue** and their potential **carcinogenicity**.

5th Generation Su-57

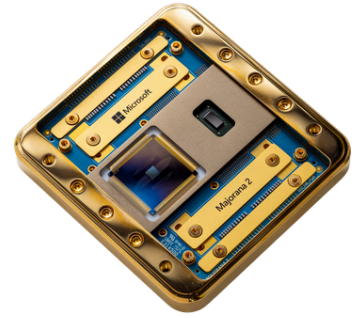


The Russian President has offered India Russia's fifth-generation stealth aircraft Sukhoi Su-57 and proposed its joint production in India.

About 5th Generation Su-57

- **Key features:**
 - **Capable of acting as an airborne command centre:** including for unmanned aerial vehicles.
 - **Stealth Capabilities:** Reduces radar, infrared, and visual signatures to evade detection.
 - **Supercruise:** Sustains supersonic speeds without afterburners, improving range and fuel efficiency.
 - **Integrated Avionics:** Fuses data from multiple sensors for superior situational awareness.
 - **Advanced Networking:** Enables secure, resilient, and real-time communication with allied platforms.
- **Other 5th Gen Jets:** US F-22 Raptor and F-35 Lightning II, China's Chengdu J-20 and Shenyang J-35, India's AMCA (Advanced Medium Combat Aircraft) in pipeline.

Microsoft unveiled Majorana 2



Majorana 2 is Microsoft's next-generation topological quantum chip, developed with assistance from its Microsoft Discovery agentic AI platform.

- The chip marks a significant leap forward in quantum computing, **overcoming key barriers related to reliability, speed, and size.**
- **Agentic AI** is a system that can **independently plan, make decisions, perform tasks, and improve its actions with minimal human intervention.**

Key features of Majorana 2

- **High reliability:** $\sim 1,000\times$ more reliable than Majorana 1
- **Long coherence:** ~ 20 seconds average qubit lifetime; up to 1+ minute
- **Advanced Materials Stack:** Lead-based topological superconductor replaces aluminum for better stability and error resistance

What is a Quantum Chip?

- A quantum computing chip is the **hardware component at the heart of a quantum computer**, designed to **process and manipulate** quantum information.
- Unlike classical computing chips, **which use bits as the basic unit of information (representing either 0 or 1)**, quantum computing chips use **quantum bits or qubits**, which can represent both 0 and 1 simultaneously.
- **Other Major Quantum Chips:** Google (Willow), IBM (Condor/Heron), Intel (Tunnel Falls), Amazon Web Services (AWS) (Ocelot), etc.

Kodaikanal Solar Observatory

Kodaikanal Solar Observatory provides valuable insights into the Solar Cycle. It uncovered how supergranulations respond to solar cycles, aiding cycle prediction.



- **Supergranulations** are giant **convection** cells (or patterns) that form a vast network structure on the surface of the Sun.

About Solar Cycle

- The solar cycle is a periodic rhythm of magnetic activity that Sun undergoes every **~11 years**.
 - **Mechanism:** The Sun is composed of electrically charged gas (**plasma**) that generates a massive magnetic field.
 - Every **11 years**, this field undergoes a flip (north-south poles switch)
- This periodic cycle undergoes distinct phases:
 - **Solar Minimum:** Cycle begins at solar minimum (low activity and few sunspots)
 - **Sunspots:** Dark, cooler regions on the Sun caused by strong magnetic activity.
 - Despite being cooler, more sunspots correlate with the Sun emitting more total energy.
- **Solar Maximum:** As activity builds toward solar maximum, Sun becomes "stormy," featuring the highest number of sunspots and frequent eruptions.
- **Impact on Space Weather:** During the more active phases, the Sun also experiences an increase in giant eruptions, such as **solar flares** and **coronal mass ejections (CMEs)**.
 - **Solar Flares:** Sudden bursts of X-rays and radiation (travelling at speed of light) caused by release of magnetic energy in sunspot regions.
 - **CMEs:** Massive bubbles of plasma and magnetic fields flung into space
 - **Impact:** They can disrupt power grids, navigation systems, radio communications, and satellite operations, affect astronauts, induce geomagnetic storms affecting magnetic fields and events like Auroras etc.

About Kodaikanal Solar Observatory

- Established in 1899 and subsumed then Madras Observatory.
- **Aim:** to obtain data on how Sun heats up Earth's atmosphere and to understand monsoon patterns.
- **Location:** under Indian Institute of Astrophysics and is located in Palani range (Tamil Nadu)
 - Chosen for its proximity to equator and its dust-free high-altitude location.

Lokmata Ahilyabai Holkar

Prime Minister pays tribute to Lokmata Ahilyabai Holkar on her birth anniversary.



About Ahilya Bai Holkar (1725 - 1795)

- She was the visionary queen of the Holkar dynasty who ruled Malwa in the 18th century.
- Known as the “Philosopher Queen”.

Early Life:

- Born in village of **Chondi, Ahmednagar (Maharashtra)**.
- Married to Malhar Rao Holkar.
- After the deaths of her husband, father-in-law and son, **she took charge of Malwa in 1767 (Indore was one of the major cities)**.

Key Contributions

- She promoted **trade, textile industries, education and public welfare**.
- Established a textile industry in **Maheshwar, famous for Maheshwari Sarees**.
- **Restored major temples like: Kashi Vishwanath Temple, Somnath Temple.**
- **Architectural Legacy:** Build Maheshwar Fort (Ahilya Fort) on the banks of Narmada River.

Exercise PRAGATI

India Concludes Maiden Multilateral Exercise PRAGATI (Partnership of Regional Armies for Growth And Transformation in the Indian Ocean Region) 2026 for Indian Ocean Region Partners.



About Exercise PRAGATI

- **Duration:** Two-week exercise.
- **Participating Nations:** India, along with 12 friendly regional partners- Bhutan, Cambodia, Indonesia, Laos, Malaysia, Maldives, Myanmar, Nepal, Philippines, Seychelles, Sri Lanka, and Vietnam.
- **Objectives:** Enhance counter-terrorism capabilities, specialized tactical skills, multinational interoperability, and intelligence-sharing among participating armies.

Pradhan Mantri Kaushal Vikas Yojana (PMKVY)



The Public Accounts Committee (PAC) pulled up the government over PMKVY mismatch between training and demand.

Key Issues raised by the PAC

- **Demand-Training Mismatch:** disproportionately focused on sectors with lower employment demand, such as apparel, electronics, and retail.
- **Certification Gap:** Against a set target of training and certifying 1.32 crore candidates, 1.10 crore candidates were certified.

About PMKVY:

- It is a **flagship scheme for skill certification** to help Indian youth take up industry-relevant skill training to get better livelihoods.
- **Launched:** In 2015 by the **Ministry of Skill Development and Entrepreneurship**.
- **Implementing Agency:** National Skill Development Corporation (NSDC).

Grand Slam tournaments

125th edition of the French Open, one of the four grand slam tournaments were recently concluded

- **Men's Singles Champion:** Alexander Zverev (Germany)
- **Women's Singles Champion:** Mirra Andrejeva (Russia)

About Grand Slam tournaments

- They consist of **4 major tournaments** played annually in a chronological order.
 - **Australian Open** (Hard Court), followed by **French Open** (Clay Court), **Wimbledon (Britain)** (grass), and **US open** (Hard)
- **Shared governance:** Managed through a board comprising the four Grand Slam Chairs
- **Eligibility:** Open for entry to **all internationally ranked** tennis players with a ranking of 500 or better.
 - Minors under the age of fourteen (14) are not eligible for entry.
 - **Doubles:** Uses the better of a player's individual singles or doubles ranking
 - A player **below 500 rank may still be able to compete** through wild cards.
- **Wild cards players:** Players included in a tournament drawn at the **sole discretion** of the individual Grand Slam event.
 - There is **no limit to the total number** of wild cards an individual player may receive to compete in Grand Slam Tournaments.
- **Prize:** On-site prize money based on performance of player.

