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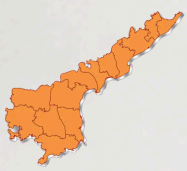
MUST READ!

- Uniform Civil Code (UCC)
- Special Intensive Revision (SIR) of Electoral Rolls
- India–Switzerland Bilateral Relations
- Fiscal Federalism in India
- 12 Years of Make in India
- Nuclear Waste Management in India
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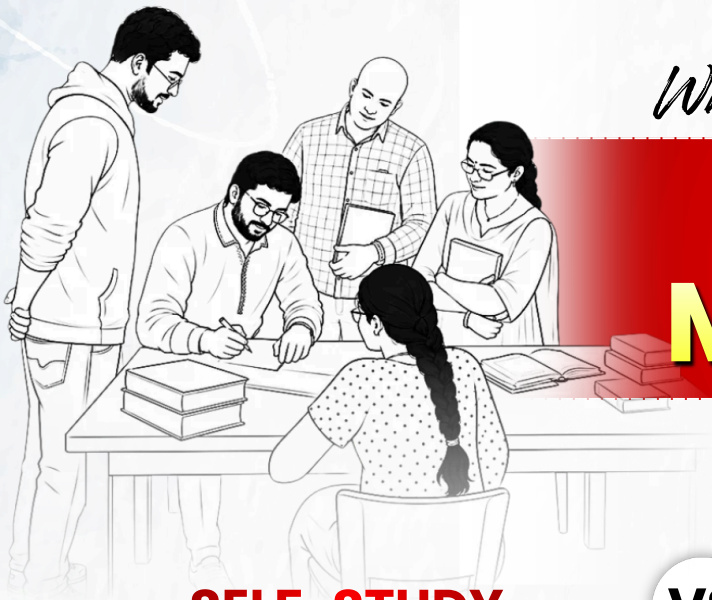
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PREFACE

Welcome to our monthly current affairs magazine! We are thrilled to provide you with the latest information and updates on the most important events that happened in our country and around the world in the month of November 2026. Our magazine is designed to help you prepare for competitive examinations like UPSC and other State PSC Exams, and we hope that you will find it informative, engaging, and useful.

In this magazine, you will find a wide range of topics covering current affairs, including politics, economics, sports, science and technology, and many more. Our team of writers and editors work hard to bring you the most accurate and up-to-date information, so you can stay informed and prepared for any competitive exam.

We understand that preparing for competitive exams can be a daunting task, but we are here to make it easier for you. Our magazine is designed to be easy to read and understand, with clear and concise articles that will help you stay on top of the latest news and events.

We believe that knowledge is power, and we are committed to helping you achieve your goals. Whether you are preparing for a government job, entrance exam, or any other competitive exam, our magazine will provide you with the information and insights you need to succeed.

Thank you for choosing our magazine, and we hope that you find it helpful and informative.

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ACKNOWLEDGMENTS

We extend our heartfelt gratitude and appreciation to the exceptional team of content developers who have played a pivotal role in shaping our UPSC Current Affairs Magazine. Your unwavering dedication, extensive research, and commitment to delivering high-quality content have been instrumental in making this publication a trusted resource for our readers.

Your relentless pursuit of current affairs, profound understanding of complex issues, and the ability to distil them into informative, concise, and engaging articles have set a benchmark in the field of competitive examination preparation.

We are proud to have a team that goes above and beyond, ensuring that our readers are well-informed and well-prepared for the UPSC examinations. Your exceptional contributions are the driving force behind our magazine's success.

Thank you for your hard work, expertise, and passion for delivering top-notch content. Your efforts have not only enriched our magazine but have also played a significant role in the educational journey of countless aspiring civil servants.

We look forward to continuing this remarkable journey of knowledge dissemination with your continued support and excellence.

With deep appreciation,

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POLITY AND GOVERNANCE

RIGHT ISSUES

RIGHT TO INTERNET ACCESS AS A FUNDAMENTAL RIGHT

SOURCE: THE HINDU

Why in News?

In **Just Rights for Children Alliance v. S. Harish (2026)**, the Supreme Court reportedly recognised children's right to access and use the internet under **Articles 19(1)(a) and 21**.

Constitutional Basis

- **Article 19(1)(a):** Protects freedom of speech and expression, including expression through digital platforms.
- **Article 19(1)(g):** Protects the freedom to practise a profession or conduct lawful trade, including through the internet.
- **Article 21:** Guarantees life and personal liberty, including judicially recognised dimensions such as privacy and dignity.
- **Article 19(2):** Permits reasonable restrictions on freedom of expression on specified constitutional grounds.

Important Supreme Court Judgments

- **Anuradha Bhasin v. Union of India (2020):** Recognised constitutional protection for speech and business conducted through the internet; restrictions must satisfy legality and proportionality.
- **K.S. Puttaswamy v. Union of India (2017):** Recognised the **right to privacy** as a fundamental right.
- **Secretary, Ministry of I&B v. Cricket Association of Bengal (1995):** Recognised the importance of receiving and communicating information under freedom of expression.
- **Just Rights for Children Alliance v. S. Harish (2026):** According to the supplied report, emphasised children's digital rights and rejected blanket restrictions.

Benefits of Internet Access for Children

- **Education:** Access to online classes, digital libraries and learning resources.
- **Digital Inclusion:** Greater opportunities for children in remote and disadvantaged areas.
- **Communication:** Connection with teachers, family members and support services.
- **Skill Development:** Improved digital literacy and technological awareness.
- **Participation:** Opportunities for creativity, expression and access to information.

Risks of Unregulated Internet Use

- **Cyberbullying:** Online harassment affecting emotional well-being.
- **Online Exploitation:** Grooming, abuse and circulation of child sexual exploitation material.
- **Privacy Risks:** Unauthorised collection and misuse of children's personal information.
- **Excessive Screen Use:** Potential effects on sleep, physical activity and concentration.
- **Algorithmic Influence:** Recommendation systems may repeatedly expose users to harmful or unsuitable content.

Legal and Regulatory Framework

- **Information Technology Act, 2000:** Provides the legal framework for electronic transactions and certain cyber-related offences.
- **IT Rules, 2021:** Establish due-diligence and grievance-related obligations for intermediaries.
- **Section 79, IT Act:** Provides conditional legal protection, commonly called **safe harbour**, to intermediaries.
- **POCSO Act, 2012:** Protects children against sexual offences, including offences involving online exploitation.
- **Digital Personal Data Protection Act, 2023:** Establishes safeguards concerning children's personal data, including parental consent requirements subject to applicable provisions and exemptions.

Challenges in Protecting Children Online

- **Privacy versus Age Verification:** Intrusive identification systems may create surveillance and data-security risks.

- **Digital Divide:** Unequal access to devices, affordable internet and digital skills.
- **Parental Awareness:** Many families need support in understanding online safety tools.
- **Platform Accountability:** Harmful content may spread rapidly through recommendation algorithms.
- **Blanket Bans:** Broad restrictions may interfere with education and encourage migration to less-regulated platforms.

Way Forward

- **Child-Safe Platform Design:** Age-appropriate settings and private-by-default accounts.
- **Digital Literacy:** Include cyber hygiene, consent and online safety in school education.
- **Effective Reporting:** Strengthen mechanisms for reporting and removing child exploitation material.
- **Privacy Protection:** Use proportionate, data-minimising age-assurance methods.
- **Shared Responsibility:** Encourage cooperation among government, technology companies, schools, parents and civil society.

Conclusion

India must protect children's digital freedom through proportionate regulation, stronger platform accountability, privacy safeguards and universal digital literacy.

UNIFORM CIVIL CODE (UCC)

SOURCE: THE HINDU

Why in News?

Recently Union Home Minister **Amit Shah** announced plans to introduce the **Uniform Civil Code (UCC)** in all **21 BJP-led NDA-ruled states** before the **2029 Lok Sabha elections**.

About Uniform Civil Code

- The **Uniform Civil Code** refers to a common set of civil laws governing **marriage, divorce, adoption, maintenance and inheritance**, irrespective of religion.
- It seeks to establish equal legal rights while respecting India's diverse social and cultural traditions.

Constitutional Provisions

- **Article 44:** A **Directive Principle of State Policy (DPSP)** directing the State to endeavour to secure a UCC.
- **Article 14:** Equality before the law.
- **Article 15:** Prohibition of discrimination on specified grounds, including religion and sex.
- **Article 21:** Protection of life and personal liberty.
- **Article 25:** Freedom of conscience and religion, subject to constitutional limitations.
- **Entry 5, Concurrent List:** Both Parliament and state legislatures can legislate on marriage, divorce, adoption and succession.

Historical Background

- **Constituent Assembly: Dr B.R. Ambedkar** and **K.M. Munshi** supported legal reform, while others expressed concerns about religious autonomy.
- **Hindu Code Reforms (1955–56):** Modernised laws relating to marriage, succession, adoption and guardianship.
- **Goa:** Retains a common civil-law framework derived from Portuguese-era legislation.
- **Uttarakhand:** Implemented a state UCC in **January 2025**, becoming the first state after Independence to introduce such a comprehensive framework.

Arguments in Favour of UCC

- **Gender Justice:** Can address discriminatory inheritance, divorce and maintenance provisions.
- **Equal Citizenship:** Promotes similar civil rights irrespective of religious identity.
- **Legal Simplicity:** May reduce confusion arising from multiple personal-law systems.
- **Women's Empowerment:** Equal property and inheritance rights can improve financial independence.
- **Child Welfare:** Can encourage gender-neutral guardianship and adoption rules.
- **Constitutional Goals:** Advances equality and social reform under **Articles 14, 15 and 44**.

Challenges in Implementation

- **Religious Freedom:** Communities may fear interference with traditional practices.
- **Cultural Diversity:** Marriage and inheritance customs differ across regions and communities.
- **Tribal Autonomy: Articles 371A and 371G** protect specified customary practices in Nagaland and Mizoram.
- **Sixth Schedule:** Autonomous councils possess powers over certain customary and social matters.
- **Federalism:** Both Union and states have legislative authority over personal-law subjects.
- **Public Trust:** A poorly designed code may create concerns about cultural assimilation.

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Important Supreme Court Judgments

- **Shah Bano Case (1985):** Highlighted the need for reform in maintenance laws.
- **Sarla Mudgal Case (1995):** Discussed legal difficulties arising from conflicting personal laws.
- **Shayara Bano Case (2017):** Invalidated the practice of instant triple talaq.
- **Jose Paulo Coutinho Case (2019):** Referred positively to Goa's common civil-law framework.

Law Commission Recommendations

- **21st Law Commission (2018):** Favoured removing discrimination through reforms in family laws rather than immediately introducing a nationwide UCC.
- **22nd Law Commission (2023):** Invited fresh public views on the subject.

Way Forward

- **Rights-Based Approach:** Prioritise equal civil rights rather than identical religious rituals.
- **Gradual Reform:** Address discriminatory provisions through carefully planned legislation.
- **Tribal Consultation:** Protect constitutional safeguards and involve indigenous communities.
- **Public Participation:** Consult women's groups, religious communities, states and legal experts.
- **Legal Awareness:** Improve access to family-law information and affordable dispute resolution.

Conclusion

An inclusive UCC should promote gender equality and constitutional justice while protecting cultural diversity, tribal rights and cooperative federalism.

ELECTIONS AND RPA

SPECIAL INTENSIVE REVISION (SIR) OF ELECTORAL ROLLS

SOURCE: THE HINDU

Why in News?

The **Special Intensive Revision (SIR)** of electoral rolls has raised concerns over the reported deletion of **13–14 crore voter entries**.

About Special Intensive Revision

- **Special Intensive Revision (SIR)** is a detailed verification exercise conducted by the **Election Commission of India (ECI)** to update electoral rolls.
- It aims to remove **deceased, duplicate, shifted and ineligible voters**, while ensuring that all eligible citizens remain registered.
- The exercise must balance **electoral integrity** with **universal adult franchise**.

How SIR Works

- **House-to-House Verification:** Booth Level Officers (BLOs) collect and verify voter details.
- **Document Examination:** Relevant records are checked to establish eligibility.
- **Draft Electoral Roll:** Proposed additions and deletions are published.
- **Claims and Objections:** Citizens can seek corrections or challenge exclusions.
- **Final Electoral Roll:** Published after the prescribed verification process.

Major Concerns

- **Large-Scale Deletions:** The supplied report estimates **13–14 crore deletions**, but these figures require independent official confirmation.
- **Wrongful Exclusion:** Living citizens may be incorrectly marked as deceased or shifted.
- **Migrant Workers:** Frequent changes of residence can create registration difficulties.
- **Documentary Barriers:** Poor households may lack old records or supporting documents.
- **Digital Errors:** Incorrect database matching can affect genuine voters.
- **Administrative Pressure:** Heavy workloads on BLOs may reduce verification quality.
- **Social Inequality:** Women, minorities, Dalits, Adivasis and nomadic communities may face greater documentation challenges.

Why Electoral Roll Accuracy Matters

- **Free and Fair Elections:** Accurate lists help prevent duplicate or fraudulent voting.
- **Political Equality:** Every eligible citizen should have an effective opportunity to vote.
- **Public Confidence:** Transparent verification strengthens trust in electoral institutions.
- **Democratic Participation:** Wrongful exclusion can weaken representation of vulnerable groups.
- **Administrative Efficiency:** Updated rolls support smoother election management.

Constitutional and Legal Framework

- **Article 324:** Gives the ECI authority over the supervision, direction and control of elections.

- **Article 325:** Provides for one general electoral roll and prohibits exclusion solely on grounds of religion, race, caste or sex.
- **Article 326:** Establishes **adult suffrage** for citizens aged **18 years and above**, subject to legal disqualifications.
- **Representation of the People Act, 1950:**
  - **Section 19:** Conditions for voter registration.
  - **Section 21:** Preparation and revision of electoral rolls.
  - **Section 22:** Correction and deletion of entries.
  - **Section 23:** Inclusion of names in electoral rolls.
- **Registration of Electors Rules, 1960:** Prescribe procedures for registration, verification and objections.

Key Challenges

- **Accuracy versus Inclusion:** Removing invalid entries without excluding genuine voters.
- **Migration:** Ensuring voters can transfer registration after changing residence.
- **Natural Justice:** Providing proper notice and an opportunity to respond before deletion.
- **Technology:** Preventing automated errors from becoming final administrative decisions.
- **Accountability:** Ensuring that Electoral Registration Officers review disputed cases fairly.

Way Forward

- **Mandatory Notice:** Inform affected voters before removing their names.
- **Physical Verification:** Confirm doubtful cases through reliable field checks.
- **Public Scrutiny:** Display draft lists at accessible local offices.
- **Easy Appeals:** Provide simple, time-bound grievance and correction procedures.
- **Migrant Inclusion:** Improve registration and transfer facilities for mobile workers.
- **Independent Audits:** Examine unusual deletion patterns and administrative errors.
- **BLO Training:** Provide adequate staffing, supervision and technical support.
- **Digital Transparency:** Maintain verifiable records of corrections and deletions.

Conclusion

Electoral roll revision must remove ineligible entries without denying genuine voters their constitutional right to democratic participation.

INSTITUTIONS IN NEWS

NATIONAL HUMAN RIGHTS COMMISSION (NHRC)

SOURCE: INDIAN EXPRESS

Why in News?

National Human Rights Commission (NHRC) came into focus after taking cognisance of allegations concerning the involvement of **children in a protest in Mumbai** and ordering an investigation into possible child-rights violations.

About NHRC

- The **NHRC** is a **statutory body** established on **12 October 1993** under the **Protection of Human Rights Act, 1993**.
- It protects rights relating to **life, liberty, equality and human dignity**, guaranteed by the Constitution or recognised under applicable international human rights instruments.
- **Headquarters:** New Delhi.

Composition and Appointment

- **Composition:** One Chairperson, **five full-time members** and **seven deemed (ex-officio) members**.
- **Chairperson:** A person who has served as the **Chief Justice of India or a Supreme Court judge**.
- **Members:** Include judicial members and **three persons with knowledge or practical experience in human rights**, at least one of whom must be a woman.
- **Appointment:** By the **President of India** on the recommendation of a six-member committee headed by the **Prime Minister**.
- **Selection Committee:** Prime Minister, Lok Sabha Speaker, Union Home Minister, Rajya Sabha Deputy Chairman and Leaders of the Opposition in both Houses.
- **Tenure: Three years or until 70 years of age**, whichever is earlier; reappointment is permitted.

Major Functions

- **Investigation:** Inquires into human rights violations or negligence by public servants.
- **Complaints:** Acts on petitions or takes **suo motu cognisance** of alleged violations.

- **Prison Inspections:** Visits jails and other institutions to examine living conditions.
- **Judicial Intervention:** May intervene in relevant court proceedings with the court's permission.
- **Legal Review:** Examines safeguards for human rights and recommends improvements.
- **Awareness:** Promotes human rights education, research and public awareness.

Powers of NHRC

- Has certain **civil court powers** during inquiries, including summoning witnesses and requiring documents.
- Can recommend **compensation, prosecution or disciplinary action**.
- May approach the **Supreme Court or High Courts** for appropriate directions.
- Its recommendations are generally **not legally binding**.

Major Challenges

- **Weak Enforcement:** Cannot directly punish offenders or compel implementation of recommendations.
- **Institutional Independence:** Government involvement in appointments and investigations raises autonomy concerns.
- **Investigative Dependence:** Reliance on police and government agencies may create conflicts of interest.
- **Limited Jurisdiction:** Generally cannot inquire into violations occurring **more than one year earlier**.
- **Armed Forces:** Complaints follow a restricted procedure under **Section 19**.
- **Representation:** Concerns persist regarding diversity and civil-society participation.

GANHRI Accreditation Issue

- **GANHRI:** Global Alliance of National Human Rights Institutions.
- **Paris Principles (1993):** International standards concerning independence, pluralism, resources and effectiveness.
- The supplied report states that an accreditation review recommended downgrading India's NHRC from **A-status to B-status** in **March 2025**.
- According to the report, the downgrade remained **unfinalised in October 2026**, with further review expected in November 2026.

Measures to Strengthen NHRC

- **Legal Reforms:** Improve implementation and monitoring of recommendations.
- **Transparent Appointments:** Strengthen independence and public confidence.
- **Independent Investigation:** Reduce reliance on agencies facing allegations.
- **Greater Diversity:** Improve representation of women and human rights experts.
- **Institutional Capacity:** Provide adequate staff, technology and financial resources.
- **Faster Justice:** Strengthen digital case management and complaint tracking.
- **International Compliance:** Address concerns under the Paris Principles.

Conclusion

Strengthening the NHRC's independence, investigative capacity and accountability is essential for effective human rights protection and constitutional governance in India.

GOVERNANCE

LOTTERY REGULATION IN INDIA

SOURCE: THE HINDU

Why in News?

A **Recent policy debate** highlighted the risks of illegal lotteries and offshore betting platforms. It raised the question of **strict regulation versus complete prohibition** of lotteries in India.

About lottery

- A **lottery** is a scheme in which participants purchase tickets for a chance to win prizes through a random draw.
- In India, lotteries are governed by the **Lotteries (Regulation) Act, 1998**, along with relevant state laws.
- The major policy challenge is balancing **consumer protection, state revenue, employment and prevention of illegal gambling**.

Constitutional and Legal Framework

- **Union List – Entry 40:** Parliament regulates lotteries organised by the Union or state governments.
- **State List – Entry 34:** States have legislative powers over **betting and gambling**.
- **State List – Entry 62:** Provides for taxation of betting and gambling, subject to constitutional changes under the GST framework.

- **Lotteries (Regulation) Act, 1998:** Establishes conditions for state-organised lotteries and restrictions on their sale.
- **Lotteries (Regulation) Rules, 2010:** Provide operational requirements, including safeguards for online lottery systems.
- **Income Tax:** Lottery winnings are generally subject to **30% tax**, plus applicable surcharge and cess, under the relevant tax provisions.
- **GST:** The supplied article reports a **40% GST rate from September 2025** for lotteries and specified gambling-related supplies.

Important Supreme Court Judgments

- **State of Bombay v. R.M.D. Chamarbaugwala (1957):** Gambling is treated as **res extra commercium**, meaning it does not enjoy ordinary constitutional protection as trade.
- **B.R. Enterprises v. State of Uttar Pradesh (1999):** A state operating its own lottery cannot selectively prohibit lotteries organised by other states.
- **Skill Lotto Solutions v. Union of India (2020):** Upheld the inclusion of lottery-related actionable claims within the **GST framework**.

Major Concerns

- **Financial Hardship:** Repeated lottery purchases may increase debt among vulnerable households.
- **Gambling Addiction:** Excessive participation can damage family finances and mental well-being.
- **Illegal Markets:** Prohibition may shift demand towards **matka, satta and unauthorised online platforms**.
- **Fraud and Money Laundering:** Unregulated operations may facilitate financial crimes.
- **Revenue Loss:** Illegal sales reduce legitimate tax collections.
- **Livelihood Concerns:** Sudden restrictions can affect small lottery vendors and distributors.
- **Misleading Advertisements:** Jackpot promotions may hide the extremely low probability of winning.

Regulation Versus Prohibition

Arguments for Prohibition

- Reduces legal access to potentially harmful gambling products.
- Protects vulnerable groups from aggressive marketing.
- Supports public-health objectives.

Arguments for Regulation

- Enables **government monitoring and financial audits**.
- May reduce opportunities for illegal operators.
- Generates revenue for public programmes.
- Allows age restrictions, spending limits and consumer safeguards.

Kerala Model

- **Kerala** operates a state-run lottery system under government supervision.
- It provides employment opportunities for registered lottery sellers.
- Lottery-related public revenue supports welfare activities, including healthcare initiatives.
- The model demonstrates how **public oversight and welfare objectives** can be linked.

Way Forward

- **Independent Regulation:** Separate lottery operations from auditing and supervision.
- **Transparent Draws:** Introduce independent verification of lottery software and draw mechanisms.
- **Consumer Protection:** Enforce age verification, spending limits and clear disclosure of winning probabilities.
- **Responsible Advertising:** Restrict misleading claims and aggressive promotions.
- **Digital Enforcement:** Strengthen action against illegal offshore betting and unauthorised payment channels.
- **Inter-State Coordination:** Improve cooperation between governments to prevent regulatory loopholes.
- **Welfare Funding:** Ensure transparent accounting and responsible use of lottery revenue.

Conclusion

India needs a transparent and accountable lottery policy that protects vulnerable citizens, limits illegal gambling and ensures responsible use of public revenue.

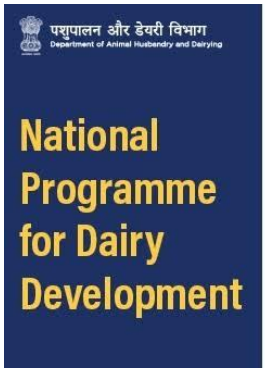
PRELIMS POINTERS IN NEWS

NATIONAL PROGRAMME FOR DAIRY DEVELOPMENT (NPDD)

SOURCE: THE HINDU

Why in News?

The Union Minister of Fisheries, Animal Husbandry and Dairying is set to inaugurate a **microbiology laboratory** for the **Sikkim Milk Union**.





About NPDD

- The **National Programme for Dairy Development (NPDD)** is a **Central Sector Scheme** launched in **2014**.
- It aims to strengthen **milk testing, chilling, processing and marketing infrastructure** while increasing farmers' participation in organised dairy markets.

Key Features

- **Launched:** 2014.
- **Nodal Ministry:** Ministry of Fisheries, Animal Husbandry and Dairying.
- **Implementing Department:** Department of Animal Husbandry and Dairying (**DAHD**).
- **Scheme Type:** Central Sector Scheme.
- **Restructured:** July 2021.
- **Beneficiaries:** Dairy farmers, cooperatives, **SHGs, FPOs** and milk producer companies.

Major Objectives

1. **Quality Improvement:** Promote safe milk production through modern testing facilities.
2. **Infrastructure Development:** Expand milk chilling, storage and processing facilities.
3. **Organised Procurement:** Increase milk collection through registered dairy institutions.
4. **Farmer Income:** Improve market access and ensure transparent payments.
5. **Value Addition:** Encourage production of **paneer, cheese, butter, curd and other dairy products**.

Major Components

Component A – Dairy Infrastructure Development

- Strengthens **milk testing laboratories, primary chilling facilities and procurement infrastructure**.
- Supports dairy cooperatives, milk unions and producer-owned institutions.
- Helps reduce milk spoilage and improve food safety.

Component B – Dairying Through Cooperatives

- Supports expansion of **organised dairy markets** and processing infrastructure.
- Improves the institutional capacity of dairy cooperatives.
- Includes assistance through the **Japan International Cooperation Agency (JICA)**.

NATIONAL SOCIAL SECURITY BOARDS FOR UNORGANISED, GIG AND PLATFORM WORKERS

SOURCE: THE HINDU

Why in News?

The **Ministry of Labour and Employment** has notified National Social Security Board arrangements for **unorganised, gig and platform workers**.

Key Features

- **Governing Law:** Code on Social Security, **2020**.
- **Nodal Ministry:** Ministry of Labour and Employment.
- **Legal Provision: Section 6** of the Code.
- **Chairperson:** Union Minister for Labour and Employment.
- **Meetings:** At least **three times annually**.
- **Implementation Update:** The Code on Social Security came into force on **21 November 2025**.

Composition

The statutory board framework includes representation from:

- **Central Government** and State Governments.
- **Employers** and workers' organisations.
- **Gig and platform workers**, as applicable.
- **Aggregator companies**, under the relevant board composition.
- Social security institutions and other specified representatives.

Major Functions

1. Policy Recommendations

- Recommends suitable **social security schemes** to the Central Government.
- Identifies welfare requirements of vulnerable workers.

2. Monitoring Welfare Schemes

- Reviews the implementation of centrally administered welfare programmes.
- Promotes effective delivery of benefits.

3. Advisory Role

- Advises the Central Government on matters referred under the Code.

4. Record Review

- Reviews relevant worker records maintained at the State level.
- Supports better identification of eligible beneficiaries.

5. Financial Oversight

- Reviews expenditure from applicable social security funds and accounts.

Categories of Workers

Unorganised Workers

- Include home-based, self-employed and wage workers in the unorganised sector.
- Examples include **street vendors, domestic workers and agricultural labourers**.

Gig Workers

- Earn income through work arrangements outside traditional employer–employee relationships.
- Often undertake short-term or task-based assignments.

Platform Workers

- Provide services through **online platforms** connecting workers and customers.
- Examples include **app-based delivery partners and ride-hailing drivers**.

Important Provisions of the Code

- Recognises **gig workers and platform workers** within the social security framework.
- Provides for schemes covering **life insurance, disability, accidents, health, maternity and old-age protection**.
- Provides for aggregator contributions of **1–2% of annual turnover**, subject to a ceiling of **5% of payments to gig and platform workers**.
- Enables worker registration to facilitate access to welfare benefits.

PRADHAN MANTRI VIKSIT GRAM SWARAJ YOJANA (PM VGSY)

SOURCE: PIB

Why in News?

The **Union Cabinet** approved the **Pradhan Mantri Viksit Gram Swaraj Yojana (PM VGSY)** with an outlay of **₹7,395.55 crore**.



Key Features

- **Nodal Ministry:** Ministry of Panchayati Raj.
- **Implementation Period: 2026–27 to 2030–31**.
- **Total Outlay: ₹7,395.55 crore**.
- **Coverage:** All States and Union Territories, including traditional local bodies in **non-Part IX areas**.
- **Beneficiaries:** Over **2.55 lakh Panchayats** and approximately **32 lakh elected representatives, officials and other stakeholders**.

Major Components

1. Village Development Planning

- Supports preparation of around **2.55 lakh Gram Panchayat Development Plans (GPDPs)** annually.
- Uses the **eGramSwaraj portal** to integrate local needs, available funds and departmental programmes.

2. Capacity Building

- Provides annual training and digital assistance to approximately **32 lakh stakeholders**.
- Improves skills in planning, budgeting, administration and service delivery.

3. Financial Accountability

- Targets at least **2.55 lakh online audit plans annually**.
- Uses **AuditOnline** to improve financial monitoring, transparency and public disclosure.
- Encourages Panchayats to increase their **Own Source Revenue (OSR)**.

4. Citizen Participation

- Promotes public involvement through **Gram Sabhas** and awareness campaigns.
- Uses **PANCHAM**, a two-way communication platform available in **17 Indian languages**.
- Each coordinated outreach exercise aims to reach at least **one crore citizens**.

Implementation

- States and UTs submit **Annual Action Plans** for appraisal by a **Central Empowered Committee**.
- Technical support may be provided through contractual personnel without creating permanent posts.

Constitutional Significance

- **73rd Constitutional Amendment Act, 1992:** Granted constitutional status to Panchayati Raj Institutions.
- **Part IX:** Articles **243–243O**, concerning Panchayats.
- **Eleventh Schedule:** Contains **29 subjects** related to Panchayat functions.
- **Article 243G:** Concerns powers and responsibilities of Panchayats.

PM-DHARA SCHEME

SOURCE: THE HINDU

Why in News?

The **Union Cabinet** reportedly approved **PM-DHARA** to strengthen **intra-State electricity transmission networks**.

Key Features

- **Nodal Ministry:** Ministry of Power.
- **Implementation Target:** FY **2032–33**.
- **Central Financial Support: ₹54,082 crore**.
- **Renewable Energy Evacuation:** Up to **135 GW**.
- **Battery Energy Storage Systems (BESS): 50 GWh**.
- **Focus:** Intra-State transmission infrastructure, grid flexibility and affordable electricity.

Major Components

1. Transmission Infrastructure

- Strengthens electricity transmission within States.
- Helps transfer renewable electricity from generation centres to demand areas.
- Reduces network congestion and power evacuation difficulties.

2. Central Financial Assistance

- Provides financial support to offset **intra-State transmission charges**.
- Seeks to limit electricity cost increases for consumers.
- Encourages investment in renewable energy projects.

3. Battery Energy Storage Systems (BESS)

- Supports deployment of **50 GWh** of battery storage capacity.
- Storage facilities may be located at renewable generation sites or other important grid locations.
- Stores surplus electricity for use when generation is insufficient.

Importance of BESS

- **Grid Stability:** Balances fluctuations in solar and wind power.
- **Peak Demand Management:** Supplies stored electricity during high-demand periods.
- **Reduced Curtailment:** Prevents wastage of renewable electricity.
- **Energy Security:** Reduces dependence on conventional backup generation.

NATIONAL COASTAL MISSION (NCM) 2.0

SOURCE: INDIAN EXPRESS

Why in News?

The **Ministry of Environment, Forest and Climate Change (MoEFCC)** reportedly released implementation guidelines for **National Coastal Mission 2.0** on **30 September 2026**.



Key Features

- **Nodal Ministry:** Ministry of Environment, Forest and Climate Change.
- **Focus Areas:** Coastal conservation, climate adaptation and sustainable development.
- **Coverage:** Coastal States and Union Territories.
- **Implementation Approach:** Coordination among Central Government, State Governments and local stakeholders.
- **Major Objective:** Strengthen **coastal resilience** and promote the **Blue Economy**.

Major Objectives

1. Coastal Resilience

- Reduce vulnerability to **cyclones, coastal erosion, sea-level rise and storm surges**.
- Promote climate-resilient infrastructure and disaster preparedness.

2. Ecosystem Restoration

- Restore degraded **mangroves, wetlands, coral reefs and coastal habitats**.
- Encourage nature-based solutions for coastal protection.

3. Biodiversity Conservation

- Protect marine species and ecologically sensitive coastal areas.
- Improve ecosystem monitoring and habitat management.

4. Pollution Management

- Reduce **marine litter, plastic pollution and untreated wastewater**.
- Encourage sustainable waste-management practices.

5. Sustainable Tourism

- Promote **eco-tourism** without damaging fragile coastal ecosystems.
- Create livelihood opportunities for coastal communities.

Implementation Strategy

- Adopts a **whole-of-government approach**.
- Encourages cooperation between Central and State agencies.
- Integrates coastal development with existing government programmes.
- Strengthens **climate vulnerability assessments, research and capacity building**.
- Promotes integrated coastal spatial planning and accountability.

AYUSHMAN VAY VANDANA INITIATIVE

SOURCE: INDIAN EXPRESS

Why in News?

The **Ayushman Vay Vandana initiative** completed two years in **October 2026**.

Key Features

- **Launched:** 2024.
- **Nodal Ministry:** Ministry of Health and Family Welfare.
- **Implementing Agency:** National Health Authority (**NHA**) with State Health Agencies.
- **Eligibility:** All citizens aged **70 years and above**, irrespective of economic status.
- **Health Coverage:** Up to **₹5 lakh annually** on a family basis for eligible senior citizens.
- **Target Population:** Approximately **6 crore senior citizens** from **4.5 crore families**.
- **Identification:** Special **Ayushman Vay Vandana Card**.

Major Benefits

1. Cashless Hospitalisation

- Provides cashless treatment at empanelled public and private hospitals.
- Covers eligible **secondary and tertiary healthcare services**.

2. Additional Health Coverage

- Senior citizens belonging to families already covered under **AB PM-JAY** receive an **additional ₹5 lakh annual cover**.
- This additional cover is exclusively for family members aged **70 years and above**.

3. Universal Income Eligibility

- No income restriction applies to citizens aged **70 years and above**.
- Helps elderly people access treatment without depending entirely on personal savings.

4. Nationwide Portability

- Beneficiaries can obtain treatment at empanelled hospitals across India.

5. Pre-existing Diseases

- Eligible pre-existing illnesses are covered from the beginning of enrolment without a waiting period.

Registration Process

- Eligible citizens can register through the **Ayushman App** or the official PM-JAY beneficiary portal.
- **Aadhaar-based e-KYC** is required.
- A separate **Ayushman Vay Vandana Card** is issued after verification.
- Beneficiaries of certain other government health schemes may choose between their existing scheme and PM-JAY, subject to applicable conditions.

Significance

- **Financial Protection:** Reduces catastrophic hospital expenditure.
- **Social Inclusion:** Extends healthcare protection beyond income-based eligibility.
- **Healthy Ageing:** Improves access to treatment for age-related illnesses.
- **Family Welfare:** Reduces financial pressure on families supporting elderly members.
- **Universal Health Coverage:** Supports **SDG 3 – Good Health and Well-being**.

INDIA'S FIRST MOTION OF CONFIDENCE (1952)

SOURCE: THE HINDU

Why in News?

The **1952 Aruppukottai Lok Sabha by-election** has received attention for its connection with India's first legislative **confidence motion**.

Historical Background

- **First General Elections:** Held during **1951–52**.
- **Chief Minister:** C. Rajagopalachari assumed office on **10 April 1952**.
- The **Congress** emerged as the largest party but lacked an absolute majority.
- The government depended on support from other political groups.

Aruppukottai By-election

- The parliamentary seat became vacant after **U. Muthuramalinga Thevar**, a Forward Bloc leader, resigned.
- **Rajathi Kunjithapatham** contested as the Congress candidate.
- **M.D. Ramasamy** represented the Forward Bloc (Marxist Group).
- The Forward Bloc candidate won by **18,835 votes**.
- Rajaji had presented the election as a test of public support for his government.

First Confidence Motion

- **Moved by:** C. Subramaniam, Finance Minister and Leader of the House.
- **Date:** 30 June 1952.
- **Speaker:** J. Sivashanmugam Pillai.
- **Debate:** Continued until **3 July 1952**.
- **Participation:** 71 members spoke during the debate.
- **Result:** The government won by **200 votes to 151**, with one member remaining neutral.
- As specific Indian procedural rules were unavailable, **British parliamentary practice** guided the proceedings.

Constitutional Significance

- Established the importance of proving **majority support on the floor of the House**.
- Strengthened the principle of **collective ministerial responsibility**.
- Demonstrated that electoral setbacks do not automatically remove an elected government.

Important Articles:

- **Article 164(2):** State Council of Ministers is collectively responsible to the **Legislative Assembly**.
- **Article 75(3):** Union Council of Ministers is collectively responsible to the **Lok Sabha**.
- **Article 163:** Provides for the State Council of Ministers to aid and advise the Governor.
- **Floor Test:** A legislative vote used to determine majority support.
- **No-confidence Motion:** Expresses that the House no longer supports the government.

FIVE DIGITAL IDENTITY INITIATIVES OF UIDAI

SOURCE: PIB

Why in News?

The **Unique Identification Authority of India (UIDAI)** launched five digital initiatives at the **Aadhaar Samvaad conference in Kolkata** on **29 September 2026**.

Five Major Initiatives

1. Face Authentication for ePDS

- Introduces **consent-based, contactless facial authentication** for ration beneficiaries.
- Developed jointly by **UIDAI, Department of Food and Public Distribution (DFPD)** and **National Informatics Centre (NIC)**.
- Provides an additional authentication option when fingerprints are difficult to verify.
- Helps improve access to benefits under the **Public Distribution System (PDS)**.

2. SWIK Portal 2.0

- Simplifies approval procedures for Aadhaar authentication under the **Aadhaar Authentication for Good Governance framework**.
- Allows eligible **non-government entities** to submit authentication proposals online.
- Promotes faster approvals, transparency and efficient digital governance.

3. Sub-AUA/Sub-KUA (LITE) Framework

- **AUA:** Authentication User Agency.
- **KUA:** KYC User Agency.
- Enables organisations with limited authentication needs to use existing **AUA/KUA infrastructure**.
- Reduces technical expenses and encourages wider adoption of Aadhaar-based services.

4. New Token Management System

- Introduces digital appointment and queue management at **UIDAI State and Regional Offices**.
- Helps reduce waiting periods and improve grievance handling.
- Makes Aadhaar-related services more organised and citizen-friendly.

5. Revamped UIDAI Website and Career Portal

- Provides an improved interface for accessing Aadhaar information and services.
- Includes **screen-reader compatibility, keyboard navigation and accessibility improvements**.
- Integrates **BHASHINI** for multilingual access.
- Simplifies recruitment-related applications through the Career Portal.

INTELLIGENT TRAFFIC MANAGEMENT SYSTEM (ITMS)

SOURCE: INDIAN EXPRESS

Why in News?

The **Union Cabinet** reportedly approved Delhi's **Intelligent Traffic Management System (ITMS)** under the initiative **One Network, Smarter Traffic**.

About ITMS

- The **Intelligent Traffic Management System (ITMS)** is a technology-based approach to managing urban road traffic.
- It uses **Artificial Intelligence (AI), sensors, cameras and real-time data** to reduce congestion and improve traffic regulation.

Key Features

- **Project Location:** Delhi.
- **Estimated Cost: ₹1,789.52 crore**, including taxes.
- **Implementing Agency:** Delhi Police.
- **Coverage: 42 major traffic corridors**.
- **Implementation Period: 24 months** in three phases.
- **Operation and Maintenance:** Five years after implementation.
- **Main Focus:** Adaptive traffic signals, automated enforcement and emergency vehicle movement.

Major Components

1. AI-Enabled Traffic Signals

- Replaces fixed-timing signals with **adaptive traffic control systems**.
- Adjusts signal timings according to real-time traffic conditions.
- Helps reduce unnecessary waiting and congestion.

2. Emergency Vehicle Priority

- Provides priority movement for **ambulances and emergency services**.
- Supports the creation of **green corridors** during emergencies.
- Helps reduce emergency response time.

3. Automated Traffic Enforcement

- Uses technology to identify traffic violations.
- Supports detection of **signal jumping, speeding and other violations**, depending on deployed equipment.
- Reduces dependence on manual monitoring.

4. Real-Time Traffic Monitoring

- Integrates traffic information through a **central command-and-control system**.
- Enables quicker identification of congestion and traffic incidents.
- Supports data-based decisions by traffic authorities.

CENTENARY OF THE UNION PUBLIC SERVICE COMMISSION (UPSC)

Why in News?

The **Union Public Service Commission (UPSC)** completed **100 years on 1 October 2026**, marking a century since the establishment of India's first Public Service Commission in **1926**.

Historical Evolution of UPSC

- **1855:** Competitive examinations for the **Indian Civil Service (ICS)** began in London.
- **1863: Satyendranath Tagore** became the first Indian to clear the ICS examination.
- **1919:** The **Government of India Act, 1919** provided for a Public Service Commission.
- **1924:** The **Lee Commission**, headed by **Lord Lee of Fareham**, recommended establishing a Public Service Commission.
- **1 October 1926:** India's first **Public Service Commission** was established, with **Sir Ross Barker** as its first Chairman.
- **1937:** It became the **Federal Public Service Commission** under the Government of India Act, 1935.
- **26 January 1950:** It was transformed into the **Union Public Service Commission** under the Constitution.

Constitutional Provisions

- **Article 315:** Establishment of Union and State Public Service Commissions.
- **Article 316:** Appointment and term of office of members.
- **Article 317:** Removal and suspension of members.
- **Article 318:** Regulations concerning service conditions.
- **Article 319:** Restrictions on employment after leaving office.
- **Article 320:** Functions of Public Service Commissions.
- **Article 321:** Extension of functions by legislation.
- **Article 322:** Expenses charged on the **Consolidated Fund of India**.
- **Article 323:** Submission of annual reports.

Composition and Tenure

- Consists of a **Chairperson and other members** appointed by the **President of India**.
- **Tenure: Six years or until 65 years of age**, whichever is earlier.
- Members can resign by submitting their resignation to the President.
- Removal follows the constitutional procedure under **Article 317**.

Major Functions

- **Competitive Examinations:** Conducts **CSE, IFoS, NDA, CDS, Engineering Services and CAPF** examinations.
- **Direct Recruitment:** Selects candidates for specialised government posts.
- **Advisory Functions:** Advises on recruitment rules, appointments, promotions and disciplinary matters.
- **All India Services:** Advises on specified recruitment and promotion processes.
- **Police Reforms:** Participates in the process of preparing panels for appointment of state **DGPs**, under applicable Supreme Court directions.

Safeguards for Independence

- **Security of Tenure:** Members cannot be removed arbitrarily.
- **Removal Procedure:** Certain grounds require a **Supreme Court inquiry**.
- **Financial Protection:** UPSC expenses are charged on the Consolidated Fund of India.
- **Post-Retirement Restrictions:** Constitutional limits reduce the possibility of external influence.
- **Annual Reporting:** Promotes accountability to Parliament through the President.

Major Achievements and Modernisation

- **Inclusive Recruitment:** Wider participation of women and disadvantaged communities.
- **Women in NDA:** Women candidates became eligible to appear in the examination in **2021**.
- **Digital Reforms:** Online applications and technology-based examination management.
- **2025–26 Initiatives:** Reported introduction of **Universal Registration Number, Pratibha Setu and AI-enabled identity verification**.

Institutional Continuity: Maintained competitive recruitment through major political and administrative changes.

Challenges and Way Forward

- **Examination Integrity:** Prevent impersonation, fraud and paper leaks.
- **Accessibility:** Improve facilities for candidates with disabilities.
- **Language Inclusion:** Strengthen fair access across linguistic backgrounds.
- **Competency-Based Assessment:** Test analytical ability, ethics and administrative judgment.
- **Transparency:** Maintain public confidence through clear procedures.
- **Candidate Welfare:** Improve grievance redressal and examination-related communication.

Conclusion

UPSC's centenary reflects India's commitment to merit-based public recruitment, constitutional independence and building an efficient, inclusive and accountable civil service

INTERNATIONAL RELATIONS

INDIA RELATIONS WITH OTHER NATIONS

INDIA–POLAND BILATERAL RELATIONS

SOURCE: INDIAN EXPRESS

Why in News?

Polish Prime Minister Donald Tusk visited India with a **100-member business delegation**.



Historical Background

- **World War II Connection:** Maharaja **Digvijaysinhji Ranjitsinhji of Nawanagar**, remembered as the **Good Maharaja**, provided shelter to Polish refugee children.
- **Kolhapur's Contribution:** The princely state of Kolhapur also accommodated Polish refugees during the war.
- **Diplomatic Relations:** India and Poland established formal diplomatic relations in **1954**.
- **Operation Ganga (2022):** Poland assisted in the evacuation of Indian citizens during the Russia–Ukraine conflict.
- **Cultural Relations:** Polish universities have a long tradition of studying **Sanskrit, Indian history and Indology**.

Major Areas of Cooperation

A. Trade and Investment

- Both countries aim to **double bilateral trade by 2030**, according to the supplied account of the recent meeting.
- Opportunities exist in **pharmaceuticals, information technology, automobiles, machinery and food processing**.
- Stronger **India–European Union trade relations** could improve market access.

B. Defence Cooperation

- A proposed **Defence Industry Dialogue** would encourage cooperation between defence companies.
- Both sides are exploring **joint manufacturing, technology transfer and military equipment development**.

- An agreement on protecting **classified information** could support sensitive defence projects.

C. Critical Minerals and Technology

- Cooperation is being explored in **mining, rare-earth processing and battery recycling**.
- Polish expertise in **mining technology and industrial engineering** can support Indian manufacturing.

D. Connectivity and Multilateral Cooperation

- Discussions include improved **air connectivity, logistics and scientific collaboration**.
- Poland has supported India's aspirations for a greater role in the **United Nations Security Council**.

Importance of Poland for India

- **Gateway to Europe:** Poland connects India with markets in **Central and Eastern Europe**.
- **European Union Partner:** Poland's EU membership makes it important for trade and regulatory cooperation.
- **Supply Chain Diversification:** Industrial partnerships can reduce dependence on limited suppliers.
- **Strategic Connectivity:** Poland's transport infrastructure can support Indian businesses entering European markets.
- **Energy Transition:** Collaboration in recycling and critical minerals supports **clean-energy technologies**.

Major Challenges

- **Russia–Ukraine Conflict:** Poland strongly supports Ukraine, while India maintains **strategic autonomy** and relations with both Russia and Ukraine.
- **Limited Trade:** Bilateral trade remains modest compared with the economic potential of both countries.
- **Regulatory Barriers:** European standards and certification requirements can affect Indian exports.
- **Defence Restrictions:** Sensitive technology-sharing requires strong legal and security safeguards.
- **Connectivity Gaps:** Limited direct transport links may increase business costs.

Way Forward

- **Expand Trade:** Improve market access for pharmaceuticals, engineering products and services.
- **Strengthen Defence Ties:** Develop secure frameworks for technology sharing and joint production.
- **Secure Critical Minerals:** Promote cooperation in extraction, processing and recycling.
- **Improve Connectivity:** Encourage direct flights, logistics links and business exchanges.
- **Enhance People-to-People Relations:** Expand educational, cultural and youth exchange programmes.
- **Maintain Diplomatic Dialogue:** Manage differences over European security through regular consultations.

Conclusion

India and Poland can strengthen their strategic partnership through deeper trade, defence collaboration, technological cooperation and sustained diplomatic engagement.

INDIA–SWITZERLAND BILATERAL RELATIONS

SOURCE: THE HINDU

Why in News?

Swiss President Guy Parmelin visited India, where both countries signed **five agreements**. The agreements focus on **defence, civil nuclear energy, research, mobility and infrastructure**.

Historical Background

- **1948 Friendship Treaty:** India and Switzerland signed the **Treaty of Friendship and Establishment**, strengthening diplomatic relations.
- **Industrial Cooperation:** Swiss companies contributed to India's development in engineering, manufacturing and transportation.
- **Financial Transparency:** Cooperation under the **Automatic Exchange of Information (AEOI)** framework strengthened efforts against tax evasion.
- **Innovation Partnership:** Institutions such as **Swissnex in Bengaluru** promote scientific research, entrepreneurship and academic exchanges.

Economic and Trade Relations

- **Bilateral Trade:** Trade stood at approximately **USD 19.55 billion in 2024–25**, according to the supplied article.
- **Major Imports:** India imports **gold, machinery, precision instruments and chemicals** from Switzerland.

- **Major Exports:** Indian exports include **pharmaceuticals, organic chemicals, textiles and engineering products**.
- **Foreign Investment:** Switzerland is an important source of **Foreign Direct Investment (FDI)** in India.
- Swiss companies such as **Nestlé, ABB and Schindler** operate in the Indian market.

India–EFTA Trade and Economic Partnership Agreement (TEPA)

- **EFTA** comprises **Switzerland, Norway, Iceland and Liechtenstein**.
- The **India–EFTA TEPA** was signed on **10 March 2024** and entered into force on **1 October 2025**.
- It aims to improve **market access, investment, employment and trade cooperation**.
- EFTA countries have committed to promoting **USD 100 billion in investment in India over 15 years**, with an associated target of **one million direct jobs**.
- Switzerland is an important partner in implementing this agreement.

Major Outcomes of the 2026 Visit

. Defence and Security

- Both countries explored **defence manufacturing, military exchanges and technology cooperation**.
- Swiss expertise in precision engineering can support India's defence industry.

B. Civil Nuclear Energy

- Cooperation was discussed in **peaceful nuclear technology, research and energy security**.

C. Migration and Mobility

- A **Migration and Mobility Partnership** seeks to improve opportunities for students, professionals and skilled workers.
- A proposed **Young Professionals Scheme** would encourage employment experience and professional exchanges.

D. Infrastructure Development

- Cooperation covers **tunnelling, ropeways, sustainable transport and electric mobility**.
- Swiss technology can support infrastructure development in India's mountainous regions.

E. Science and Innovation

- The **Department of Science and Technology (DST)** and Swiss research institutions aim to strengthen collaboration.

Priority areas include **healthcare, clean energy, artificial intelligence and advanced technologies**.

Importance of Switzerland for India

- **Investment:** Provides capital for manufacturing and infrastructure.
- **Technology:** Offers expertise in precision engineering and research.
- **Clean Energy:** Supports India's sustainable development and energy-transition goals.
- **European Market Access:** Strengthens India's economic connections with Europe.
- **Skilled Employment:** Encourages innovation, entrepreneurship and professional mobility.

Major Challenges

- **Trade Imbalance:** India's substantial gold imports contribute to a trade deficit.
- **Investment Treaty Differences:** Disagreements over **investor–state dispute settlement** remain a concern.
- **Intellectual Property Rights:** Differences exist over pharmaceutical patents and access to affordable medicines.
- **Defence Restrictions:** Swiss neutrality policies and export-control rules can limit military cooperation.
- **Mobility Barriers:** Visa conditions and professional recognition may restrict skilled-worker movement.

Way Forward

- **Implement TEPA Effectively:** Convert investment commitments into actual projects and employment.
- **Expand Technology Cooperation:** Promote joint research in AI, clean energy and biotechnology.
- **Resolve Trade Barriers:** Improve regulatory coordination and market access.
- **Strengthen Infrastructure Partnerships:** Use Swiss expertise in railways, tunnels and sustainable transport.
- **Promote Talent Mobility:** Expand educational exchanges and skilled-worker opportunities.
- **Improve Investment Protection:** Continue negotiations on a balanced investment framework.

Conclusion

India and Switzerland can deepen their partnership through investment, advanced technology, sustainable infrastructure and stronger people-to-people cooperation.

GLOBAL ISSUES

STRUCTURAL DIMENSIONS OF UNREST IN FRANCE

SOURCE: THE HINDU

Why in News?

France has witnessed recurring **strikes, pension reform protests and suburban unrest**.

Background

- France has experienced repeated public protests over **pension reforms, rising living costs, unemployment and policing**.
- These disturbances reflect deeper problems involving **social integration, economic pressures and political institutions**.
- Understanding these challenges offers important lessons for **inclusive governance in India**.

Social and Demographic Factors

- **Republican Universalism:** France emphasises equal citizenship rather than officially recognising separate ethnic or religious communities.
- **Data Limitations:** Restrictions on collecting certain identity-based statistics can make social inequalities harder to measure.
- **Suburban Segregation:** Many disadvantaged communities live in outer-city neighbourhoods called **banlieues**.
- **Unequal Opportunities:** Poor transport, unemployment and educational disadvantages limit social mobility.
- **Youth Alienation:** Some young people experience discrimination and exclusion, weakening their trust in public institutions.

Economic Causes

- **Welfare Expenditure:** France maintains an extensive social security system covering healthcare, pensions and unemployment support.
- **Fiscal Pressure:** Public debt, an ageing population and budgetary constraints have encouraged reforms in welfare spending.
- **Pension Reforms:** The decision to increase the statutory retirement age from **62 to 64 years** triggered major protests in 2023.
- **Cost of Living:** Rising housing, energy and food costs have placed pressure on household incomes.
- **Labour Market Inequality:** Workers on permanent contracts (**CDI**) generally enjoy greater employment security than those on fixed-term contracts (**CDD**).
- **Youth Unemployment:** Difficulty obtaining stable employment contributes to economic insecurity among younger workers.

Political and Institutional Factors

- **Fifth Republic:** Established in **1958**, it provides for a strong presidency and a **semi-presidential system**.
- **Executive Dominance:** The central government exercises significant authority over national policymaking.
- **Article 49.3:** Allows the government to secure passage of certain legislation without an ordinary final vote unless a **motion of no confidence** succeeds.
- **Weakening Political Representation:** Declining confidence in traditional parties has reduced their ability to mediate public grievances.
- **Digital Mobilisation:** Social media helps organise large protests, sometimes without centralised leadership.

Policing and Internal Security

- **Centralised Policing:** France relies heavily on national police and gendarmerie structures.
- **Public Distrust:** Allegations of excessive force and discriminatory identity checks have increased tensions in some communities.
- **Protest Management:** Confrontational crowd-control practices may intensify demonstrations.
- **Community Relations:** Limited trust between residents and law-enforcement agencies can obstruct peaceful conflict resolution.

Impact on India

- **Economic Relations:** Prolonged disruptions may affect trade, tourism and business operations involving France.
- **Indian Diaspora:** Strikes and unrest can disrupt transport, education and everyday activities of Indian residents and students.
- **Strategic Partnership:** India and France cooperate in **defence, space, maritime security and clean energy**.
- **Governance Lessons:** The French experience highlights the importance of consultation, inclusive urban development and responsive policing.

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Lessons for Indian Governance

- **Social Inclusion:** Protect cultural diversity while ensuring equal opportunities under **Articles 15, 16, 29 and 30**.
- **Urban Development:** Strengthen affordable housing, public transport and employment access through programmes such as **PMAY-Urban and AMRUT**.
- **Public Consultation:** Encourage stakeholder participation before major policy reforms.
- **Community Policing:** Promote trust-building approaches such as Kerala's **Janamaithri Suraksha Project**.
- **Youth Employment:** Expand skill development, apprenticeships and entrepreneurship opportunities.

Way Forward

- **Participatory Governance:** Strengthen dialogue with trade unions, local bodies and civil society.
- **Suburban Development:** Improve education, transport and employment opportunities in disadvantaged neighbourhoods.
- **Police Accountability:** Encourage transparent investigations and de-escalation methods.
- **Balanced Welfare Reforms:** Combine fiscal sustainability with protection for vulnerable citizens.
- **Social Integration:** Address discrimination and improve equal access to public services.

Conclusion

Lasting social stability in France requires inclusive economic growth, accountable policing, public consultation and stronger trust between citizens and democratic institutions.

PRELIMS POINTERS IN NEWS

GANGA WATER TREATY

SOURCE: INDIAN EXPRESS

Why in News?

Ahead of the **Ganga Water Treaty's expiry on 12 December 2026**, India reiterated the existence of a bilateral mechanism to address treaty-related issues.

About Ganga Water Treaty

- The **Ganga Water Treaty, 1996** is a **30-year bilateral agreement** between **India and Bangladesh**.
- It regulates sharing of the **Ganga River's water at Farakka Barrage, West Bengal**, during the **lean season (1 January–31 May)**.



Key Features

- **Signed:** 12 December 1996.
- **Signatories:** Prime Ministers **H. D. Deve Gowda** and **Sheikh Hasina**.
- **Duration:** 30 years, with provision for renewal by mutual consent.
- **Monitoring:** Joint monitoring arrangements involving both countries.
- **Allocation Period:** Water-sharing calculations are made in **10-day periods**.

Major Water-Sharing Provisions

- **70,000 cusecs or less:** India and Bangladesh receive **50% each**.
- **70,000–75,000 cusecs:** Bangladesh receives **35,000 cusecs**; India receives the balance.
- **75,000 cusecs or more:** India receives **40,000 cusecs**; Bangladesh receives the balance.
- **11 March–10 May:** Each country is assured **35,000 cusecs in alternate three 10-day periods**, subject to treaty provisions.
- **Emergency Consultation:** If water availability falls below **50,000 cusecs**, both countries immediately consult to make emergency adjustments.

Bangladesh's Major Concerns

- Renewal before the treaty expires in **December 2026**.
- Greater protection during periods of low river flow.
- Inclusion of **environmental flows and climate change** considerations.
- Some proposals favour involving **Nepal** in broader basin-level cooperation.

BADR MEMORANDUM OF UNDERSTANDING (MoU)

SOURCE: PIB

Why in News?

Pakistan, Turkey, Qatar and Indonesia reportedly signed the **Badr Memorandum of Understanding (MoU)** on **21 October 2026**.

Key Features

- **Participating Countries:** Pakistan, Turkey, Qatar and Indonesia.
- **Agreement Type:** Multilateral defence cooperation MoU.
- **Reported Signing Date:** 21 October 2026.
- **Primary Objective:** Strengthen defence manufacturing and technological cooperation.
- **Badr:** An Arabic word meaning **full moon**, also associated with the historic **Battle of Badr (624 CE)**.

Governance Structure

1. Executive Board

- Responsible for preparing **joint production plans**.
- Coordinates technical requirements and industrial cooperation.
- Identifies possible defence manufacturing projects.

2. Strategic Board

- Takes major decisions regarding **budgets and production locations**.
- Provides strategic direction to cooperative defence projects.

Contributions of Member Countries

1. Turkey

- Offers advanced **defence manufacturing technology**.
- Has expertise in drones, military electronics and defence equipment.

2. Pakistan

- Contributes **industrial infrastructure, skilled workers and defence production experience**.
- Supports joint manufacturing and technical cooperation.

3. Qatar

- Provides potential **financial investment and funding support**.
- Helps mobilise resources for defence projects.

4. Indonesia

- Contributes **technical capabilities and a large domestic defence market**.
- Supports industrial collaboration and regional market access.

Major Areas of Cooperation

- **Joint Defence Production:** Development of shared manufacturing facilities.
- **Research and Development:** Cooperation in advanced military technologies.
- **Technology Transfer:** Exchange of technical knowledge and expertise.
- **Supply Chains:** Development of integrated defence production networks.
- **Training:** Skill development and technical defence training.
- **Production Facilities:** Turkey has been identified as a possible manufacturing location.

13TH ASEAN DEFENCE MINISTERS' MEETING-PLUS (ADMM-PLUS), 2026

SOURCE: THE HINDU

Why in News?

The **13th ADMM-Plus** was scheduled for **28–29 October 2026** in **Lapu-Lapu City, Cebu, Philippines**.



About ADMM-Plus

- The **ASEAN Defence Ministers' Meeting-Plus (ADMM-Plus)** is a multilateral platform for defence dialogue between **ASEAN countries and eight dialogue partners**.
- It promotes **regional peace, military cooperation, mutual trust and collective responses to security challenges**.

Key Features

- **Established:** 2010.
- **First Meeting: 12 October 2010**, Hanoi, Vietnam.
- **2026 Host:** Philippines.
- **2026 Theme: Navigating Our Future, Together**.
- **Members: 11 ASEAN countries and eight dialogue partners**.
- **Chairmanship:** Rotates with the ASEAN Chair.
- **Meeting Frequency:** Annual meetings since **2017**.

Member Countries

11 ASEAN Members

- **Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste and Vietnam**.

Eight Dialogue Partners

- **India, United States, China, Russia, Japan, South Korea, Australia and New Zealand**.

Major Objectives

1. Regional Security

- Strengthens cooperation against **terrorism, maritime threats and cyberattacks**.
- Promotes peaceful resolution of security challenges.

2. Defence Cooperation

- Encourages **military dialogue, joint exercises and information sharing**.
- Builds confidence among regional defence establishments.

3. Humanitarian Assistance

- Improves coordination during **natural disasters and humanitarian emergencies**.
- Supports disaster response capabilities.

Seven Areas of Practical Cooperation

1. **Counter-Terrorism**
2. **Maritime Security**
3. **Humanitarian Assistance and Disaster Management**
4. **Peacekeeping Operations**
5. **Military Medicine**
6. **Humanitarian Mine Action**
7. **Cyber Security**

India's Role

- India co-chairs the **Experts' Working Group on Counter-Terrorism** with **Malaysia** for **2024–2027**.
- Supports **ASEAN Centrality** and the **Act East Policy**.
- Promotes a **free, open, inclusive and rules-based Indo-Pacific**.
- Strengthens maritime security and defence partnerships with Southeast Asian countries.

EASTERN MARITIME CORRIDOR (EMC)

SOURCE: INDIAN EXPRESS

Why in News?

Geopolitical tensions around the **Strait of Hormuz and Red Sea** have highlighted India's need to diversify international shipping and energy supply routes.



Key Features

- **Partner Countries:** India and Russia.
- **Initiated: 2019**, during the Eastern Economic Forum in Vladivostok.
- **Indian Port:** Chennai, Tamil Nadu.
- **Russian Port:** Vladivostok, Russia.
- **Approximate Distance: 5,647 nautical miles (10,458 km)**.
- **Estimated Transit Time:** Around **24 days**, compared with approximately **40 days** through the traditional route.

Maritime Route

- **Vladivostok → Sea of Japan → East China Sea → South China Sea → Strait of Malacca → Andaman Sea → Bay of Bengal → Chennai**.
- The corridor connects **South India with resource-rich eastern Russia**.
- It offers an alternative to longer shipping routes passing through the **Suez Canal**.

Major Objectives

1. Improve Maritime Connectivity

- Establishes a shorter trade connection between Indian and Russian ports.
- Strengthens commercial shipping and logistics networks.

2. Reduce Transportation Costs

- May reduce shipping distance by approximately **40%** compared with some traditional routes.
- Lower travel time and avoidance of Suez Canal charges can reduce freight expenses.

3. Strengthen Energy Security

- Facilitates imports of **crude oil, coal, LNG and other energy resources**, subject to commercial feasibility.
- Diversifies India's energy supply routes.

4. Expand Bilateral Trade

- Supports India and Russia's ambition of achieving **US$100 billion in annual bilateral trade by 2030**.
- Encourages cooperation in energy, mining, logistics and infrastructure.

Strategic Significance

- **Act East Policy:** Strengthens India's engagement with the Indo-Pacific region.
- **Russian Far East:** Provides access to natural resources and investment opportunities.
- **Maritime Diversification:** Reduces dependence on longer westward shipping routes.
- **Trade Connectivity:** Promotes cooperation between Indian and Russian port industries.

KALININGRAD AND SUWAŁKI GAP

SOURCE: DTE

Why in News?

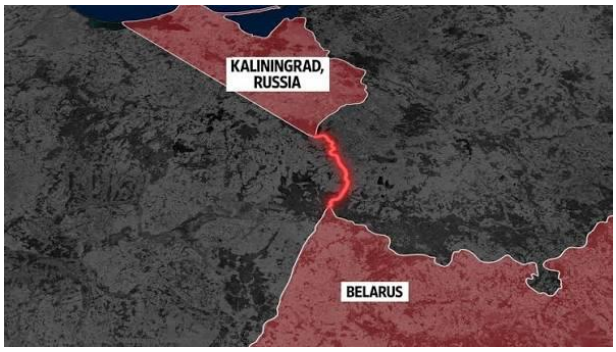
Kaliningrad and the **Suwałki Gap** have gained strategic attention amid increasing tensions between **Russia and NATO** in Eastern Europe.

- **Kaliningrad** is a Russian **exclave** separated from mainland Russia, while the **Suwałki Gap** is a strategically important land corridor between **Poland and Lithuania**.
- Both are important in understanding the security relationship between **Russia, Belarus and NATO**.

About Kaliningrad

1. Geographical Location

- Located between **Poland (south)** and **Lithuania (north and east)**.
- Has a coastline along the **Baltic Sea**.
- The city of Kaliningrad lies on the **Pregolya River**, which drains into the **Vistula Lagoon**.
- **Political Status:** Part of the **Russian Federation**.
- **Population:** Approximately **one million** in the Kaliningrad region.



2. Historical Background

- Formerly known as **Königsberg**, the capital of **East Prussia**.
- Captured by the **Soviet Red Army in 1945** during World War II.
- Transferred to Soviet control after the war.
- Renamed **Kaliningrad in 1946**.

3. Strategic Importance

- Provides Russia with a major **military foothold in the Baltic region**.
- Hosts important **naval, air-defence and missile facilities**.
- Its location allows Russia to project military power near NATO countries.

About Suwałki Gap

1. Location

- A narrow land corridor along the **Poland–Lithuania border**.
- Lies between **Kaliningrad (Russia)** and **Belarus**.
- Extends approximately **65–100 km**, depending on the measurement used.



2. Strategic Significance

- Provides a vital **land connection between the Baltic States and other NATO members**.
- Supports military transport, supplies and reinforcement.
- Any hostile takeover could disrupt NATO's land access to **Estonia, Latvia and Lithuania**.

Major Security Concerns

- **NATO–Russia Tensions:** Increased following Russia's invasion of Ukraine in **2022**.
- **Military Vulnerability:** Kaliningrad could face supply difficulties during conflict.
- **Regional Stability:** Any military confrontation could involve NATO's collective defence commitments.

CARDIFF MEMORANDUM OF UNDERSTANDING (MoU)

SOURCE: INDIAN EXPRESS

Why in News?

Leaders associated with **Scotland, Wales and Northern Ireland** reportedly signed the **Cardiff Memorandum of Understanding (MoU)** in October 2026.

Key Features

- **Participants:** Political representatives associated with Scotland, Wales and Northern Ireland.
- **Nature:** Political understanding rather than a legally enforceable treaty.
- **Main Objective:** Greater regional autonomy and democratic decision-making.
- **Major Focus:** Constitutional reform and self-determination.



Major Provisions

1. Right to Self-Determination

- Supports the principle that people should have a democratic voice in determining their political future.
- Highlights regional demands for greater constitutional autonomy.

2. Greater Devolution

- Advocates transferring additional powers from **Westminster** to regional institutions.
- Seeks greater control over regional policies and administration.

3. Constitutional Reforms

- Encourages debate on restructuring the UK's political system.
- Promotes recognition of the distinct identities of its constituent nations.

4. Opposition to Centralisation

- Questions excessive concentration of political power in the UK Parliament.
- Supports greater regional participation in national decision-making.

5. European Union Relations

- Reflects concerns about the economic and political consequences of **Brexit**.
- Some regional political groups favour closer relations with or rejoining the **European Union (EU)**.

Constitutional Background

- **United Kingdom:** Comprises **England, Scotland, Wales and Northern Ireland**.
- **Devolution:** Transfer of certain legislative and executive powers from the UK Parliament to regional institutions.
- **Scotland Act, 1998:** Established the modern Scottish Parliament.
- **Government of Wales Act, 1998:** Established devolved government arrangements in Wales.
- **Good Friday Agreement, 1998:** Important framework for peace and power-sharing in Northern Ireland.

INDIA–EFTA TRADE AND ECONOMIC PARTNERSHIP AGREEMENT (TEPA)

SOURCE: THE HINDU

Why in News?

The **India–EFTA Trade and Economic Partnership Agreement (TEPA)** completed its first year of implementation on **1 October 2026**.

Key Features

- **Signed:** 10 March 2024.
- **Entered into Force:** 1 October 2025.
- **EFTA Members: Switzerland, Norway, Iceland and Liechtenstein**.
- **Investment Commitment:** Facilitate **USD 100 billion in investments** in India over **15 years**.
- **Employment Target:** Creation of **1 million direct jobs** in India.
- **Nodal Ministry:** Ministry of Commerce and Industry.

Major Provisions

1. Tariff Liberalisation

- EFTA countries offer tariff concessions on approximately **92.2% of tariff lines**.
- India offers concessions on approximately **82.7% of tariff lines**.
- India protects sensitive sectors, including **dairy, agriculture and certain industrial products**.

2. Investment Promotion

- Encourages long-term investment in **manufacturing, infrastructure and technology**.
- Supports job creation and industrial development.

- The investment target is a commitment to promote investment, **not an unconditional financial guarantee**.

3. Services and Intellectual Property

- Promotes cooperation in **professional services, financial services and technology**.
- Includes provisions on **intellectual property rights** and regulatory cooperation.

Significance for India

- **FDI Growth:** Encourages investment from advanced European economies.
- **Employment:** Supports skilled and industrial jobs.
- **Technology Transfer:** Improves access to advanced manufacturing expertise.
- **Export Diversification:** Expands India's trade opportunities in Europe.
- **Make in India:** Supports domestic manufacturing and global value chains.

FIRST INTERNATIONAL CARGO SHIPMENT FROM DIBRUGARH TO BANGLADESH

SOURCE: PIB

Why in News?

On **5 October 2026**, the first international cargo shipment from **Bogibeel Terminal, Dibrugarh**, was flagged off for Bangladesh.

Key Features

- **Origin:** Bogibeel Terminal, Dibrugarh, Assam.
- **Destination:** Pangaon Inland Container Terminal, near Dhaka, Bangladesh.
- **Cargo: 540 metric tonnes of methanol**.
- **Manufacturer: Assam Petro-Chemicals Limited (APCL)**, Namrup.
- **Cargo Vessel: DLB Patkai**.
- **Tug Vessel: Kushal Konwar**.
- **Flagged Off By:** Union Minister **Sarbananda Sonowal**.
- **Total Distance:** Approximately **1,300 km**.

Major Route

- The vessel travels along **National Waterway-2 (NW-2)** on the Brahmaputra.
- It covers approximately **768 km** towards the India–Bangladesh border.
- It then follows the **Indo-Bangladesh Protocol Route** to reach Bangladesh.

Significance

1. Revival of River Trade

- Restores international cargo movement from Upper Assam.
- Revives the region's historical importance in riverine commerce.

2. Lower Transportation Costs

- Inland waterways can offer economical transportation for **bulk commodities**.
- Reduce pressure on road and railway networks.

3. Regional Connectivity

- Strengthens **India–Bangladesh economic cooperation**.
- Improves access to international markets for industries in Northeast India.

4. Environmental Benefits

- Water transport can reduce **fuel consumption and carbon emissions per tonne-kilometre** compared with road transport.

MONGOLIA'S FIRST-EVER OIL REFINERY

SOURCE: INDIAN EXPRESS

Why in News?

Mongolian President **Ukhnaagiin Khurelsukh** visited the construction site of Mongolia's first oil refinery in **Dornogobi Province**.

Key Features

- **Location:** Altanshiree Soum, Dornogobi Province, near Sainshand.
- **Annual Capacity: 1.5 million metric tonnes (MMTPA)** of crude oil.



- **Financial Support:** Approximately **USD 1.7 billion** in Indian credit assistance.
- **Initial Commitment: USD 1 billion Line of Credit (LoC)** announced in 2015.

- **Project Type:** Government-to-Government cooperation.
- **Project Consultant: Engineers India Limited (EIL)**.
- **Construction Participation:** Indian companies, including **Megha Engineering and Infrastructures Limited (MEIL)**.

Major Objectives

1. Energy Security

- Reduce Mongolia's dependence on imported petroleum products.
- Strengthen domestic fuel availability and supply stability.

2. Domestic Fuel Production

- Produce **petrol, diesel, aviation turbine fuel and liquefied petroleum gas (LPG)**.
- Improve access to refined petroleum products for transport and industry.

3. Industrial Development

- Create opportunities for **employment, infrastructure development and technical training**.
- Encourage growth of supporting industries.

4. India–Mongolia Cooperation

- Deepen bilateral relations through **development assistance and technology cooperation**.
- Strengthen India's strategic engagement with Mongolia.

Significance for India

- **Act East Policy:** Supports India's engagement with East and Northeast Asia.
- **Strategic Partnership:** Strengthens ties with a democratic partner located between Russia and China.
- **Development Diplomacy:** Demonstrates India's role in financing infrastructure abroad.
- **Economic Opportunities:** Creates opportunities for Indian engineering and construction companies.

INDIA'S RESIDENT DIPLOMATIC MISSION IN COSTA RICA

SOURCE: THE HINDU

Why in News?

India operationalised a new **resident diplomatic mission in San José, Costa Rica**, on **10 October 2026**.



Key Features

- **Host Country:** Costa Rica.
- **Capital:** San José.
- **Operationalised: 10 October 2026**, according to the reported announcement.
- **Nodal Ministry:** Ministry of External Affairs (**MEA**).
- **Previous Arrangement:** India's diplomatic relations with Costa Rica were handled through its mission in **Panama**.
- **Additional Representation:** An honorary consular presence existed in San José.

Major Objectives

1. Strengthening Diplomatic Relations

- Promotes regular political dialogue between India and Costa Rica.
- Improves coordination on bilateral and international issues.

2. Expanding Trade and Investment

- Encourages cooperation in **pharmaceuticals, information technology and manufacturing**.
- Supports business partnerships and investment opportunities.

3. Improving Consular Services

- Provides more accessible assistance to **Indian nationals** in Costa Rica.
- Facilitates diplomatic communication, documentation and emergency assistance.

4. People-to-People Relations

- Encourages **cultural exchanges, education and tourism**.
- Strengthens academic and professional cooperation.

5. Multilateral Cooperation

- Supports collaboration in international organisations.
- Encourages cooperation on **climate change, sustainable development and renewable energy**.

Strategic Significance

- **Central American Outreach:** Expands India's diplomatic engagement beyond traditional partners.
- **Global South Cooperation:** Encourages development partnerships among emerging economies.
- **Economic Diplomacy:** Creates opportunities for Indian businesses.
- **Diplomatic Presence:** Improves India's ability to respond to regional developments.

INDIA'S UNSC BID FOR 2028–29

Why in News?

India intensified its campaign for a **non-permanent UNSC seat for 2028–29**. **Tajikistan's competing candidature** has created a diplomatic challenge for India.

About United Nations Security Council

- The **United Nations Security Council (UNSC)** is responsible for maintaining international peace and security.
- India seeks a **ninth non-permanent term** to strengthen its influence in global decision-making.
- The bid also supports India's long-standing demand for **UNSC reforms and permanent membership**.

Structure of the UNSC

- **Total Members:** 15, comprising **5 permanent** and **10 non-permanent** members.
- **Permanent Members (P5):** United States, United Kingdom, France, Russia and China.
- **Non-Permanent Members:** Elected by the **United Nations General Assembly (UNGA)** for **two years**.
- **Regional Distribution:**
  - **Africa:** 3 seats.
  - **Asia-Pacific:** 2 seats.
  - **Latin America and Caribbean:** 2 seats.
  - **Western Europe and Others:** 2 seats.
  - **Eastern Europe:** 1 seat.
- **Election Process:** Candidates require a **two-thirds majority of members present and voting** in the UNGA.
- If all **193 UN members** cast valid votes, at least **129 votes** are required.
- **Immediate Re-election:** A retiring non-permanent member cannot be immediately re-elected.

India's Previous UNSC Membership

India has served **eight terms**: **1950–51**, **1967–68**, **1972–73**, **1977–78**, **1984–85**, **1991–92**, **2011–12** and **2021–22.**

Important achievements:

- India received **187 votes in 2010** for the 2011–12 term.
- It secured **184 votes in 2020** for the 2021–22 term.
- During its last tenure, India emphasised **counter-terrorism, maritime security, peacekeeping and multilateral reform**.

Why India Wants UNSC Membership

- **Global Leadership:** Strengthens India's role in international security decisions.
- **Global South Representation:** Provides a platform for developing countries' concerns.
- **Counter-Terrorism:** Supports international cooperation against terrorism and its financing.
- **Strategic Interests:** Allows India to participate in decisions affecting Asia and the Indo-Pacific.
- **UN Reforms:** Reinforces India's demand for a more representative Security Council.
- **Peacekeeping:** Recognises India's long-standing contribution to UN peacekeeping operations.

Major Challenges

- **Competing Candidature:** Tajikistan's bid could prevent an uncontested Asia-Pacific election.
- **Regional Politics:** Support from neighbouring countries and regional organisations may influence voting.
- **Small-State Representation:** Smaller countries seek fair opportunities to serve on the UNSC.
- **Diplomatic Competition:** India must build support across different political and regional groups.
- **Permanent Membership Obstacles:** Disagreements among UN members continue to delay Security Council expansion.
- **Veto Power:** Existing permanent members possess special powers that complicate institutional reform.

Strategic Options for India

- **Diplomatic Campaign:** Seek support from Africa, ASEAN, Europe, Latin America and Pacific Island countries.
- **Regional Negotiations:** Engage Tajikistan to explore a mutually acceptable arrangement.
- **Consensus Building:** Work through the **Asia-Pacific Group** to reduce electoral competition.

- **Global South Outreach:** Highlight India's contributions to development, peacekeeping and humanitarian assistance.
- **Long-Term Reform:** Continue cooperation with the **G4 countries** to pursue permanent UNSC membership.

India's Demand for UNSC Reforms
• The UNSC's permanent membership largely reflects the **post-1945 international order**. • **Africa, Latin America and much of Asia** lack permanent representation. • India supports expansion of both **permanent and non-permanent categories**. • The **G4 grouping** comprises **India, Brazil, Germany and Japan**. • The **Uniting for Consensus (UfC)** group opposes creating additional individual permanent seats and supports alternative expansion proposals.

Conclusion

India must combine diplomatic consensus-building with sustained UNSC reform efforts to strengthen its global role and advance fairer international representation.



ECONOMY

UNEMPLOYMENT

GLOBAL JOBS CRISIS: BRIDGING THE 800-MILLION EMPLOYMENT GAP

SOURCE: THE HINDU

Why in News?

The **World Bank** warned that **1.2 billion young people** could enter the workforce in developing economies over the next decade.

Major Causes of the Global Jobs Crisis

A. Rapid Population Growth

- Developing countries have large numbers of young people entering the labour market.
- Job creation is not keeping pace with this expanding workforce.

B. Automation and Artificial Intelligence

- **Robotics, AI and automated machinery** reduce the need for workers in some industries.
- Modern manufacturing increasingly requires advanced technical skills.

C. Premature Deindustrialisation

- Some developing economies are experiencing a decline in manufacturing's employment potential before achieving high income levels.
- This weakens the traditional pathway from **agriculture to factory employment**.

D. Skill Mismatch

- Educational qualifications do not always match industry requirements.
- Many graduates lack practical, digital and vocational skills.

E. Weak Industrial Ecosystem

- High logistics costs, limited credit and complex regulations restrict business expansion.
- **Micro, Small and Medium Enterprises (MSMEs)** often struggle to become large employers.

Employment Challenges in India

- **Agricultural Dependence:** Agriculture employs a much larger share of workers than its contribution to economic output.
- **Disguised Unemployment:** More people work on farms than are required for existing production.
- **Educated Unemployment:** Many qualified young people struggle to find suitable employment.
- **Informal Employment:** A large workforce lacks stable wages and social security.
- **Gender Gap:** Unpaid care responsibilities and workplace barriers limit women's access to paid employment.
- **Regional Inequality:** Employment opportunities are concentrated in major cities and industrial centres.

Consequences of the Jobs Crisis

- **Poverty and Inequality:** Insufficient employment reduces household income.
- **Demographic Burden:** A growing workforce without jobs can weaken economic development.
- **Social Instability:** Persistent unemployment may increase frustration and social tensions.
- **Distress Migration:** Workers may migrate to cities without adequate housing or services.
- **Low Consumption:** Weak earnings reduce demand and discourage private investment.

Sectors with High Employment Potential

A. Care Economy

- Expand **healthcare, childcare, nursing and elderly care** services.
- This can create jobs while supporting women's workforce participation.

B. Agro-Processing

- Promote **food processing, cold storage, packaging and rural logistics**.
- These industries can generate employment near farming communities.

C. Tourism and Hospitality

- Develop **eco-tourism, heritage tourism, homestays and handicrafts**.
- Such activities create opportunities for local youth and small businesses.

D. Green Economy

- Encourage jobs in **solar energy, electric vehicles, recycling and waste management**.
- Support labour-intensive green manufacturing alongside advanced technology.

E. MSMEs

- Improve access to **affordable credit, digital tools, markets and infrastructure**.

- Encourage small enterprises to expand and hire more workers.

Government Initiatives in India

- **Make in India:** Promotes domestic manufacturing and investment.
- **Skill India Mission:** Develops industry-relevant skills.
- **PMKVY:** Provides short-term vocational training and skill certification.
- **PMEGP:** Supports employment through micro-enterprise development.
- **MUDRA Yojana:** Facilitates loans for eligible micro-enterprises.
- **PM GatiShakti:** Improves infrastructure connectivity and logistics.
- **MGNREGA:** Provides a legal guarantee of wage employment to eligible rural households.

Way Forward

- **Promote Labour-Intensive Industries:** Support textiles, footwear, food processing and tourism.
- **Strengthen Apprenticeships:** Link education with practical workplace training.
- **Increase Public Investment:** Develop transport, industrial clusters and digital infrastructure.
- **Support Women Workers:** Expand safe transport, childcare and flexible work opportunities.
- **Encourage Entrepreneurship:** Simplify compliance and improve credit access.
- **Improve Job Quality:** Strengthen wages, social protection and workplace safety.
- **International Cooperation:** Mobilise development finance for employment-intensive projects.

Conclusion

Bridging the global employment gap requires labour-intensive growth, practical skill development, stronger MSMEs and greater investment in inclusive, productive jobs.

FISCAL POLICY

FISCAL FEDERALISM IN INDIA

SOURCE: THE HINDU

Why in News?

Centre–State financial relations have raised concerns over **tax devolution, GST revenue and borrowing restrictions**.

About Fiscal federalism

- **Fiscal federalism** refers to the distribution of **taxation powers, financial resources and expenditure responsibilities** among different levels of government.
- In India, it seeks to balance **national development** with the **financial independence of states**.
- It is essential for **cooperative federalism, balanced regional growth and effective public service delivery**.

Constitutional Provisions

- **Article 246:** Distributes legislative powers between the Union and states through the **Seventh Schedule**.
- **Article 270:** Provides for sharing specified Union taxes with states.
- **Article 275:** Allows statutory **grants-in-aid** from the Union to states.
- **Article 280:** Provides for the establishment of the **Finance Commission**.
- **Article 282:** Permits the Union and states to provide grants for public purposes.
- **Article 293:** Regulates state borrowing and, in specified circumstances, requires Union consent.
- **Article 279A:** Establishes the **GST Council**, which recommends GST-related measures.

Role of the Finance Commission

- The **Finance Commission** is a constitutional body constituted by the **President of India**.
- It recommends the distribution of financial resources between the Union and states.

Major Functions:

- **Vertical Devolution:** Determines the recommended share of the divisible tax pool going to states collectively.
- **Horizontal Devolution:** Recommends how that share should be distributed among individual states.
- **Grants-in-Aid:** Recommends financial assistance based on states' requirements.
- **Local Bodies:** Suggests measures to strengthen the finances of **Panchayats and Municipalities**.

Important Recommendations:

- **14th Finance Commission:** Increased states' share in the divisible pool from **32% to 42%**.
- **15th Finance Commission:** Recommended **41%** for 2021–26, reflecting the changed number of states after Jammu and Kashmir's reorganisation.

Major Challenges to Fiscal Federalism

A. Growing Dependence on the Union

- States rely heavily on **central tax transfers and grants**.
- This can reduce their flexibility in planning development expenditure.

B. Increasing Cesses and Surcharges

- **Cesses and surcharges** are generally excluded from the divisible tax pool.
- Their growing use can reduce the proportion of Union tax collections shared with states.

C. GST-Related Concerns

- GST has reduced states' independent control over several indirect tax rates.
- Revenue uncertainty and disagreements over tax-sharing arrangements create financial difficulties.

D. Borrowing Restrictions

- State borrowing is subject to fiscal limits and constitutional conditions.
- Restrictions can reduce states' ability to respond to economic emergencies.

E. Centrally Sponsored Schemes (CSS)

- Many schemes require states to contribute matching funds.
- Detailed central guidelines may limit spending according to local priorities.

F. Regional Inequality

- States differ in **income, population, development needs and revenue-raising capacity**.
- Balancing the demands of better-performing and poorer states remains difficult.

Importance of Fiscal Federalism

- **State Autonomy:** Enables states to address local development needs.
- **Balanced Development:** Helps reduce economic differences between regions.
- **Public Welfare:** Supports expenditure on health, education and infrastructure.
- **Accountability:** Encourages governments to manage public money responsibly.
- **Cooperative Federalism:** Promotes coordination between different levels of government.

Way Forward

- **Fair Tax Devolution:** Ensure predictable and transparent financial transfers.
- **Rationalise Cesses:** Reduce excessive dependence on non-shareable tax collections.
- **Strengthen the GST Council:** Resolve disagreements through consultation and consensus.
- **Reform CSS:** Allow greater flexibility in scheme design and implementation.
- **Improve State Revenues:** Strengthen property taxation, compliance and revenue administration.
- **Responsible Borrowing:** Balance fiscal discipline with states' development requirements.
- **Empower Local Bodies:** Provide Panchayats and Municipalities with adequate funds and taxation powers.

Conclusion

Strong fiscal federalism requires fair revenue sharing, greater state autonomy, responsible borrowing and effective cooperation between all levels of government.

AGRICULTURE AND ALLIED

ILLEGAL HERBICIDE-TOLERANT BT (HTBT) COTTON CULTIVATION IN INDIA

SOURCE: THE HINDU

Why in News?

A **South Asia Biotechnology Centre (SABC) study** estimated illegal **HTBt cotton cultivation on 65–72 lakh acres** in 2025–26.

- This accounts for an estimated **24–30% of India's cotton acreage**, despite the absence of government approval.

What is Bt Cotton?

- **Bt cotton** is genetically modified using genes obtained from the soil bacterium **Bacillus thuringiensis**.
- These genes produce **Cry proteins**, which protect cotton against certain insect pests, particularly bollworms.
- **2002:** India approved the first Bt cotton hybrids containing the **cry1Ac gene**.
- **2006:** Second-generation **Bollgard II** cotton, containing **cry1Ac and cry2Ab**, was approved.
- Bt cotton remains the **only GM crop approved for commercial cultivation in India**.

What is HTBt Cotton?

- **HTBt cotton** combines insect resistance with an additional **herbicide-tolerance trait**.
- It allows cotton plants to survive applications of specific herbicides, particularly **glyphosate**.
- Farmers can control weeds without destroying the cotton crop.
- **Key Difference:**

- **Bt Cotton:** Protects against certain insect pests.
- **HTBt Cotton:** Provides insect resistance along with **herbicide tolerance**.

- HTBt cotton's unauthorised status reflects the absence of regulatory approval, not a conclusive finding that every HTBt variety is inherently unsafe.

Why Are Farmers Adopting HTBt Cotton?

- **Labour Shortages:** Agricultural workers are increasingly difficult to find during peak weeding periods.
- **Rising Costs:** Manual removal of weeds requires substantial labour expenditure.
- **Lower Weeding Expenses:** The SABC study estimates herbicide-based weeding costs of **₹750–850 per acre**, compared with **₹12,000–15,000 per acre** for manual weeding.
- **Convenience:** Chemical weed control can cover large areas quickly.
- **Farm Productivity:** Effective weed management reduces competition for **water, sunlight and nutrients**.

Major Concerns

- **Illegal Seed Trade:** Unapproved seeds may be sold without proper quality checks or traceability.
- **Biosafety Risks:** Unregulated cultivation bypasses scientific assessment and environmental monitoring.
- **Herbicide Resistance:** Repeated glyphosate use can encourage the development of **herbicide-resistant weeds**.
- **Biodiversity Loss:** Broad-spectrum herbicides may destroy plants that support insects and other organisms.
- **Health and Environmental Concerns:** Improper herbicide application can increase occupational exposure and environmental contamination.
- **Farmer Vulnerability:** Unauthorised seeds may lack reliable quality assurance and grievance-redress mechanisms.
- **Pest Resistance:** Continued dependence on Bt traits can encourage resistant insect populations if resistance-management practices are neglected.

Regulatory Framework in India

- **Environment (Protection) Act, 1986:** Provides the legal basis for regulating genetically modified organisms.
- **Rules, 1989:** Govern the manufacture, use, import, export and environmental release of genetically engineered organisms.
- **Genetic Engineering Appraisal Committee (GEAC):**
  - Functions under the **Ministry of Environment, Forest and Climate Change (MoEFCC)**.
  - Appraises proposals involving the environmental release of genetically engineered organisms.
- **Review Committee on Genetic Manipulation (RCGM):** Functions under the **Department of Biotechnology (DBT)** and monitors research-related biosafety aspects.
- Commercial cultivation of **unapproved HTBt cotton remains unauthorised**.

Way Forward

- **Scientific Assessment:** Evaluate HTBt cotton through transparent field trials and biosafety studies.
- **Seed Regulation:** Strengthen action against illegal seed production and distribution.
- **Farmer Awareness:** Explain the risks of unapproved seeds and improper herbicide use.
- **Integrated Weed Management:** Combine mechanical, biological and chemical methods.
- **Resistance Management:** Promote herbicide rotation and responsible pest-control practices.
- **Affordable Alternatives:** Encourage mechanised weeding and locally suitable agricultural technologies.
- **Evidence-Based Policy:** Address farmers' economic needs without weakening environmental safeguards.

Conclusion

India must combine strict biosafety regulation with affordable weed-management solutions to protect farmers, agricultural productivity and the environment.

INDUSTRY AND INDUSTRIAL POLICIES

12 YEARS OF MAKE IN INDIA

SOURCE: THE HINDU

Why in News?

Make in India completed 12 years on 25 September 2026. Government data showed growth in **electronics, defence and steel manufacturing**, alongside continuing employment and investment challenges.

Objectives of Make in India

- **Manufacturing Growth:** Increase the manufacturing sector's contribution to the economy.
- **Employment Generation:** Create jobs, particularly for young people.
- **Foreign Investment:** Attract **Foreign Direct Investment (FDI)**.
- **Ease of Doing Business:** Simplify regulations and reduce administrative delays.
- **Technological Development:** Encourage research, innovation and modern production.
- **Export Promotion:** Improve India's participation in **Global Value Chains (GVCs)**.

Major Achievements

A. Electronics Manufacturing

- Electronics production increased from approximately **₹1.9 lakh crore in 2014–15** to **₹13.11 lakh crore in 2025–26**.
- India has emerged as the **world's second-largest mobile phone manufacturer**.
- Smartphone exports have strengthened India's position in global electronics supply chains.

B. Defence Manufacturing

- Indigenous defence production has expanded significantly.
- Domestic production of equipment such as **Tejas fighter aircraft** supports **Atmanirbhar Bharat**.
- Defence exports and private-sector participation have increased.

C. Automobile and Steel Industries

- Vehicle production reached approximately **3.10 crore units in 2024–25**.
- Crude steel production increased from **81.7 million tonnes in 2014–15** to approximately **170 million tonnes in 2025–26**.

D. Pharmaceuticals

- India is among the world's leading producers of medicines by volume.
- Growth in **pharmaceuticals and medical devices** has strengthened domestic manufacturing capabilities.

E. Production Linked Incentive (PLI) Schemes

- PLI schemes cover **14 key sectors**.
- According to the reported June 2026 figures, they attracted approximately **₹2.6 lakh crore in investment**.
- They generated around **₹23.8 lakh crore in production and sales** and **14.6 lakh jobs**.

Important Initiatives

- **Make in India 2.0:** Focuses on **27 priority sectors**, including manufacturing and services.
- **PLI Schemes:** Provide incentives linked to additional production.
- **PM GatiShakti:** Improves infrastructure planning and multimodal connectivity.
- **National Logistics Policy, 2022:** Aims to improve logistics efficiency.
- **India Semiconductor Mission:** Promotes semiconductor manufacturing and design.
- **National Manufacturing Mission:** Seeks to strengthen industrial competitiveness.
- **BHAVYA:** Supports the development of investment-ready industrial parks.

Major Challenges

- **Low Manufacturing Share:** Manufacturing's contribution to **Gross Value Added (GVA)** remains below the earlier **25% ambition**.
- **Limited Employment:** Industrial growth has not created enough labour-intensive jobs.
- **Import Dependence:** Many industries still import essential components and machinery.
- **Weak Private Investment:** Private capital expenditure remains uneven.
- **MSME Constraints:** Small firms face difficulties accessing credit, technology and markets.
- **Low R&D Spending:** Limited research investment reduces innovation.
- **Logistics Costs:** Transport and infrastructure bottlenecks affect export competitiveness.
- **Global Competition:** India faces strong competition from established manufacturing economies.

Way Forward

- **Increase Domestic Value Addition:** Manufacture more components instead of relying mainly on assembly.
- **Support MSMEs:** Improve access to finance, technology and industrial infrastructure.
- **Promote Labour-Intensive Industries:** Expand textiles, footwear, food processing and other employment-generating sectors.
- **Strengthen R&D:** Encourage collaboration between universities and industries.
- **Improve Skill Development:** Align training with modern manufacturing requirements.
- **Reduce Logistics Costs:** Connect industrial clusters with ports, railways and freight corridors.
- **Encourage Green Manufacturing:** Promote renewable energy, recycling and resource efficiency.

Conclusion

Make in India's long-term success depends on deeper domestic manufacturing, stronger innovation, greater private investment and large-scale employment generation.

PRELIMS POINTERS IN NEWS

INDIA'S FIRST BLUE BOND INITIATIVE

SOURCE: THE HINDU

Why in News?

SEBI has recognised **blue bonds** as sustainable finance instruments supporting water and ocean-related projects.

About blue bond

- A **blue bond** is a debt instrument used to raise funds for projects that protect oceans, coastal ecosystems and water resources.
- It is a form of **sustainable finance** that combines investment returns with environmental objectives.

Key Features

- **Proposed Bond Size:** ₹1,000 crore.
- **Issuing Institution: Sagarmala Finance Corporation Limited (SMFCL)**.
- **Regulator:** Securities and Exchange Board of India (**SEBI**), for regulated securities issuance.
- **Purpose:** Financing sustainable maritime and water-related projects.
- **Nature:** A thematic debt instrument within sustainable finance.

How Blue Bonds Work

1. **Fundraising:** An issuer raises capital from investors.
2. **Project Allocation:** Funds are directed towards eligible ocean or water-related projects.
3. **Investor Returns:** Interest and principal are paid according to bond terms.
4. **Impact Reporting:** Issuers disclose fund utilisation and environmental outcomes.
5. **Transparency:** Verification and reporting help prevent **bluewashing**.

Major Areas of Investment

- **Sustainable Fisheries:** Promote responsible fishing and marine resource management.
- **Marine Conservation:** Protect coastal ecosystems and biodiversity.
- **Pollution Control:** Support wastewater treatment and marine waste reduction.
- **Clean Maritime Transport:** Encourage environmentally sustainable shipping.
- **Coastal Resilience:** Improve protection against climate-related disasters.

Significance

- **Blue Economy:** Mobilises private capital for sustainable ocean development.
- **Environmental Protection:** Encourages conservation of marine ecosystems.
- **Financial Innovation:** Expands India's sustainable investment market.
- **Employment:** Supports livelihoods in fisheries, ports and coastal industries.
- **SDG 14:** Contributes to **Life Below Water**.

MAHARASHTRA'S FIRST STEEL BRIDGE FOR BULLET TRAIN

SOURCE: INDIAN EXPRESS

Why in News?

A **100-metre-long steel bridge** was installed over **National Highway-3** at Dive-Anjur village in Maharashtra's Thane district.

- It is Maharashtra's **first steel bridge** under the **Mumbai–Ahmedabad High-Speed Rail (MAHSR) Project**.

Key Features

- **Project:** Mumbai–Ahmedabad High-Speed Rail Corridor.
- **Total Length:** Approximately **508 km**.

- **Bridge Location:** Dive-Anjur, Bhiwandi, Thane district, Maharashtra.
- **Bridge Length: 100 metres**.
- **Weight:** Approximately **1,405 metric tonnes**.
- **Height:** Around **14 metres**.
- **Implementing Agency:** National High Speed Rail Corporation Limited (**NHSRCL**).
- **Technical Cooperation:** Japan, using **Shinkansen technology**.

Major Engineering Features

1. Indigenous Manufacturing

- The bridge was fabricated in **Tiruchirappalli, Tamil Nadu**.
- Components were transported approximately **1,300 km** to Maharashtra.
- Supports the **Make in India** initiative and domestic engineering capabilities.

2. Advanced Installation

- An **automated launching system** was used to position the bridge.
- Installation took place during scheduled night-time traffic restrictions.
- This reduced disruption to highway users.

3. Safety and Durability

- A specialised **protective painting system** improves corrosion resistance.
- **Elastomeric bearings** help accommodate structural movements and vibrations.
- Steel construction provides strength for high-speed railway operations.

Project Progress

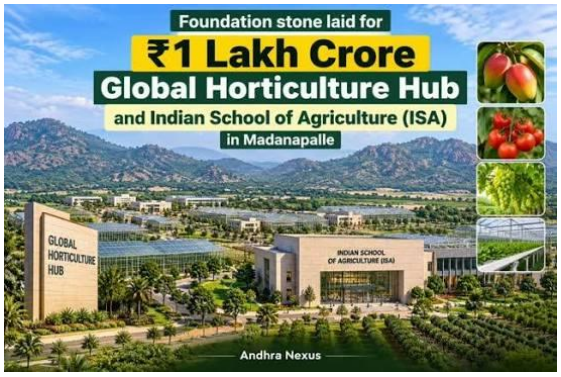
- According to the reported update, **16 of the 28 planned steel bridges** had been completed.
- The corridor will connect major economic centres in **Maharashtra and Gujarat**.
- High-speed trains are expected to substantially reduce travel time.

GLOBAL HORTICULTURE HUB AT MADANAPALLE

SOURCE: THE HINDU

Why in News?

The **Andhra Pradesh Government** launched the **Global Horticulture Hub at Madanapalle** on **2 October 2026**.



Global Horticulture Hub

- The **Global Horticulture Hub** is a large agricultural development initiative focused on improving fruit and vegetable production, processing and marketing.
- It seeks to develop Rayalaseema as the **Fruit Bowl of India** through modern infrastructure and technology-based farming.

Key Features

- **Location:** Madanapalle, Andhra Pradesh.
- **Region:** Rayalaseema and surrounding horticultural areas.
- **Proposed Investment: ₹1 lakh crore**.
- **Government Contribution:** Over **₹40,000 crore**.
- **Private Investment:** Approximately **₹60,000 crore**.
- **Coverage: 10 districts and 201 clusters**.
- **Cultivation Target:** Around **6 lakh hectares**.
- **Expected Beneficiaries:** Approximately **9.6 lakh farmers**.
- **Implementation:** Three phases.

Major Objectives

1. Modern Horticulture Production

- Promote **high-value fruits, vegetables and plantation crops**.
- Encourage improved seeds, efficient irrigation and scientific cultivation.

2. Post-Harvest Infrastructure

- Develop **cold storage facilities, food-processing units and logistics networks**.
- Reduce losses caused by poor handling and storage.

3. Market Connectivity

- Link farmers with **domestic and international markets**.
- Encourage agricultural exports and better price realisation.

4. Technology-Based Agriculture

- Promote **Artificial Intelligence (AI), precision farming and smart irrigation**.

- Improve productivity while conserving water and other resources.

Indian School of Agriculture

- A related initiative focuses on **agricultural innovation, research and skill development**.
- Proposed partnerships with private organisations aim to support technology adoption.
- Encourages data-based farming and modern agricultural practices.

HIGH-LEVEL COMMITTEE ON BANKING FOR VIKSIT BHARAT

SOURCE: THE HINDU

Why in News?

The Union Government reportedly constituted a **High-Level Committee on Banking for Viksit Bharat**, chaired by **Suresh N. Patel**.

Committee Composition

- **Chairperson:** Suresh N. Patel, former Central Vigilance Commissioner.
- **Members:** Shirish Chandra Murmu, Padmaja Chunduru and N. S. Vishwanathan.
- **Member Secretary:** Joint Secretary (Banking), Department of Financial Services.
- **Reported Tenure:** Six months.
- **Expected Report:** April 2027.

Major Terms of Reference

1. Global Competitiveness

- Recommend reforms to develop **strong, efficient and internationally competitive banks**.
- Improve the banking sector's capacity to finance long-term economic growth.

2. Regulatory Reforms

- Review laws governing **commercial banks, Regional Rural Banks (RRBs) and cooperative banks**.
- Simplify regulations while maintaining financial stability.

3. Capital and Investment

- Assess capital requirements of banks, **NBFCs and Development Financial Institutions (DFIs)**.
- Explore opportunities for responsible private investment.

4. Digital Banking and AI

- Promote **Artificial Intelligence (AI)** and digital innovation in banking.
- Recommend safeguards against **cybersecurity threats, fraud and data misuse**.

5. Financial Inclusion

- Review the **Priority Sector Lending (PSL)** framework.
- Improve credit access for farmers, MSMEs and underserved regions.
- Examine the effectiveness of the **Lead Bank Scheme**.

6. Workforce Development

- Recommend modern recruitment, training and skill-development strategies.
- Prepare banking professionals for technology-driven financial services.

INDIA'S SOYBEAN IMPORTS IN 2025–26

SOURCE: THE HINDU

Why in News?

India's **soybean imports** reportedly reached a record during the **2025–26 marketing year**, ending September 2026.

Key Highlights

- **Reported Imports:** Approximately **1.1 million metric tonnes**.
- **Previous Year:** Around **2,000 tonnes**, according to the supplied report.
- **Major Supplier: Niger**, reportedly supplying over **4.3 lakh tonnes**.
- **Other Sources:** Benin, Togo and Nigeria.
- **Soymeal Exports:** Reportedly declined to around **1 million tonnes**.

Reasons for Rising Imports

1. Higher Domestic Prices

- Increased soybean prices made imported supplies attractive to some processors.
- Processing mills sought alternative sources of raw material.

2. Limited Domestic Availability

- Supply constraints affected soybean processing and related industries.
- Imports helped address short-term procurement difficulties.

3. Non-GM Import Requirements

- India regulates the import of **genetically modified (GM) soybean seeds and beans**.
- Importers focus on permitted **non-GM soybean supplies**.

Major Concerns

- **Import Dependence:** Rising imports may expose industries to global price fluctuations.

- **Farmer Interests:** Cheap imports can create price pressure on domestic producers.
- **Origin Verification:** Suspected misdeclaration of country of origin raises customs concerns.
- **Soymeal Exports:** Lower availability of processing material can affect export competitiveness.

Significance

- **Edible Oil Security:** Soybean supports domestic vegetable oil production.
- **Livestock Sector:** Soymeal is an important protein source in animal and poultry feed.
- **Trade Policy:** Highlights the need to balance farmers' interests and industrial requirements.
- **Food Security:** Encourages stronger domestic oilseed production.

OECD'S ECONOMIC GROWTH FORECAST FOR INDIA

SOURCE: HINDUSTHAN TIMES

Why in News?

The **Organisation for Economic Co-operation and Development (OECD)** reportedly raised India's **FY 2026–27 GDP growth forecast to 7.1%**.

Key Highlights

- **Revised Growth Forecast: 7.1%** for FY 2026–27.
- **Upward Revision: 80 basis points**, or **0.8 percentage points**.
- **Previous Forecast: 6.3%**.
- **Reported June Quarter Growth: 7.8%**.
- **Major Drivers:** Private consumption, government investment, manufacturing and services.

Major Growth Drivers

1. Strong Domestic Demand

- Higher household spending supports economic activity.
- Consumer demand encourages production and business expansion.

2. Government Capital Expenditure

- Public investment in **roads, railways, energy and infrastructure** supports growth.
- Infrastructure development can attract private investment.

3. Manufacturing Sector

- Industrial production and domestic manufacturing contribute to economic expansion.
- Programmes such as **Production Linked Incentive (PLI)** schemes support selected industries.

4. Services Sector

- **Information technology, financial services and business services** support economic activity.
- Services exports contribute to foreign exchange earnings.

Major Economic Risks

- **Global Energy Prices:** Higher crude oil prices may increase import costs.
- **Geopolitical Tensions:** Conflicts can disrupt trade and supply chains.
- **Inflation:** Persistent price pressures may reduce household purchasing power.
- **Interest Rates:** Tighter monetary policy can increase borrowing costs.
- **External Demand:** Slower global growth may affect Indian exports.

INDIA'S FIRST MICE INCENTIVE PORTAL

SOURCE: THE HINDU

Why in News?

The **Odisha Government** launched India's first dedicated **MICE Incentive Portal** to promote business tourism.

About MICE

- **MICE** stands for **Meetings, Incentives, Conferences and Exhibitions**.
- **MICE tourism** involves organised travel for business meetings, professional events, exhibitions and corporate incentive programmes.

About the MICE Incentive Portal

- **Launched by:** Government of Odisha.
- **Nodal Department:** Tourism Department, Odisha.
- **Status:** Reported as India's first dedicated State-level MICE incentive portal.
- **Objective:** Promote Odisha as a leading destination for **business and event tourism**.
- **Beneficiaries:** Event organisers, tourism operators, convention planners and hospitality businesses.

Key Features

1. Single Digital Platform

- Provides an online system for applying for tourism-related incentives.
- Reduces paperwork and simplifies administrative procedures.

2. Faster Approvals

- Supports quicker processing of applications for eligible events.
- Improves transparency and coordination among departments.

3. Promotion of Tourism

- Encourages **corporate conventions, exhibitions and business conferences**.
- Also supports eligible **destination weddings, sporting events and cultural programmes**.

4. Investment Promotion

- Encourages private investment in hotels, convention centres and event infrastructure.
- Strengthens Odisha's tourism and hospitality ecosystem.

RBI REMOVES PAYTM PAYMENTS BANK FROM SCHEDULED BANKS LIST

SOURCE: TIMES OF INDIA

Why in News?

The **Reserve Bank of India (RBI)** reportedly removed **Paytm Payments Bank Limited (PPBL)** from the **Second Schedule of the RBI Act, 1934**.

Regulatory Background

- **March 2022:** RBI prohibited PPBL from onboarding new customers due to supervisory concerns.
- **January 2024:** RBI imposed major business restrictions following compliance concerns.
- **March 15, 2024:** Deadline after which fresh deposits, credits and top-ups were generally prohibited, subject to specified exceptions.
- **2026 Report:** PPBL was reportedly removed from the scheduled banks list following further regulatory action.

Major Reasons for RBI Action

- **Regulatory Non-Compliance:** Concerns regarding adherence to banking regulations.
- **Customer Protection:** Need to safeguard depositors and payment-system users.
- **Supervisory Concerns:** Issues identified through regulatory examinations.
- **Financial Integrity:** Importance of maintaining effective banking controls.

About Payments Banks

- Recommended by the **Nachiket Mor Committee (2014)**.
- Operate under the regulatory supervision of the **RBI**.
- Can accept eligible **demand deposits**, subject to regulatory limits.
- **Maximum end-of-day deposit balance:** ₹2 lakh per individual customer.
- Cannot undertake conventional **lending activities**.
- Cannot issue **credit cards**, but may provide permitted payment and debit-card services.

MISSION FOR AATMANIRBHARTA IN PULSES

Why in News?

The **Mission for Aatmanirbharta in Pulses** has shown initial progress in implementing its agricultural interventions.

Objectives of the Mission

- **Self-Sufficiency:** Reduce India's dependence on imported pulses.
- **Higher Production:** Improve yields through modern farming practices and better seeds.
- **Area Expansion:** Bring an additional **35 lakh hectares** under pulse cultivation.
- **Farmers' Income:** Provide better market opportunities and price support.
- **Crop Diversification:** Encourage farmers to shift towards pulses where suitable.
- **Sustainable Agriculture:** Promote soil health and efficient use of natural resources.

Major Features of the Mission

A. Expansion of Cultivation

- An additional **35 lakh hectares** will be targeted for pulse cultivation.
- Special attention will be given to **rice fallow lands**, where pulses can be grown after paddy harvesting.
- **Intercropping and crop diversification** will be encouraged.

B. Quality Seed Distribution

- The mission plans to distribute **126 lakh quintals of certified seeds**.
- Around **88 lakh seed kits** will be provided free of cost to farmers.
- Priority will be given to **high-yielding, pest-resistant and climate-resilient varieties**.

C. Strengthening Seed Production

- States will prepare **five-year rolling seed production plans**.
- The **Indian Council of Agricultural Research (ICAR)** will supervise breeder seed production.
- Improved seed availability is expected to raise crop productivity.

D. Assured Procurement

- The government will strengthen procurement of **Tur, Urad and Masoor** under the **Price Support Scheme (PSS)**.
- **NAFED** and **NCCF** will undertake **100% procurement of eligible produce** from registered farmers in participating states, subject to scheme conditions.
- This aims to reduce market uncertainty and protect farmers against sharp price declines.

E. Processing Infrastructure

- The mission proposes the establishment of **1,000 pulse-processing units**.
- Financial assistance of up to **₹25 lakh per eligible unit** will support processing and packaging.
- Better infrastructure can reduce post-harvest losses and increase value addition.

F. Farmer Training

- Farmers and seed growers will receive training in **modern cultivation methods, pest management and sustainable agriculture**.
- A **cluster-based approach** will address region-specific production challenges.

Importance of the Mission

- **Food Security:** Pulses are an affordable source of plant-based protein.
- **Import Reduction:** Higher domestic production can reduce foreign exchange expenditure.
- **Nutritional Security:** Pulses support balanced diets and help address protein deficiencies.
- **Soil Fertility:** Pulses are **leguminous crops** that support biological nitrogen fixation through root-associated bacteria.
- **Water Conservation:** Many pulses require less irrigation than water-intensive cereals.
- **Rural Employment:** Processing, storage and marketing can create local employment.
- **Price Stability:** Increased domestic availability can help control fluctuations in pulse prices.

Major Challenges

- **Low Productivity:** Pulse yields are often affected by poor soil conditions and limited technology adoption.
- **Rainfall Dependence:** Many pulse-growing regions depend on monsoon rainfall.
- **Pest and Disease Attacks:** Crop losses discourage farmers from expanding cultivation.
- **Price Volatility:** Market prices may fall during periods of high production.
- **Seed Availability:** Farmers may face shortages of suitable improved varieties.
- **Procurement Gaps:** Limited procurement centres and registration difficulties can reduce benefits.

Way Forward

- **Strengthen Research:** Develop high-yielding, drought-tolerant and pest-resistant varieties.
- **Improve Irrigation:** Promote micro-irrigation and water-efficient farming.
- **Ensure Timely Procurement:** Expand procurement centres and simplify farmer registration.
- **Promote Crop Diversification:** Encourage pulses in suitable rice fallows and intercropping systems.
- **Develop Value Chains:** Improve storage, processing, transportation and market access.
- **Strengthen Farmer Organisations:** Support **Farmer Producer Organisations (FPOs)** for collective marketing.

Conclusion

The Mission for Aatmanirbharta in Pulses can strengthen India's nutritional security, reduce imports and improve farmers' incomes through higher productivity, assured procurement and sustainable cultivation.

HISTORY

PRELIMS POINTERS IN NEWS

BHAI PARMANAND

SOURCE: THE HINDU

Why in News?

Prime Minister **Narendra Modi** paid tribute to **Bhai Parmanand** during the reported **139th episode of Mann Ki Baat**.



About Bhai Parmanand

- **Bhai Parmanand (1876–1947)** was an Indian **freedom fighter, nationalist thinker, educationist and Arya Samaj leader**.
- He played an important role in spreading nationalist ideas in India and among overseas Indians.

Early Life

- **Born:** 4 November 1876, in **Kariala village, present-day Pakistan**.
- **Ideological Influence:** Teachings of **Swami Dayanand Saraswati** and the **Arya Samaj**.
- **Popular Description:** Remembered as **Devata Swarup** for his dedication to public service.

Major Contributions

1. Revolutionary Nationalism

- Associated with the **Ghadar Movement**, which aimed to overthrow British colonial rule.
- Helped spread nationalist ideas among Indians living abroad.
- Encouraged revolutionary leaders, including **Lala Har Dayal**.

2. International Activities

- Travelled abroad for **Arya Samaj activities and nationalist mobilisation**.
- Interacted with Indian communities in **South Africa** and other regions.

3. Imprisonment

- British authorities sentenced him to **transportation for life** in connection with revolutionary activities.
- He was imprisoned in the **Cellular Jail, Andaman Islands**, popularly known as **Kala Pani**.

4. Education and Social Reform

- Promoted education, social awareness and national consciousness.
- Associated with educational institutions linked to nationalist movements.

BEKAL FORT

SOURCE: INDIAN EXPRESS

Why in News?

Hindustan Aeronautics Limited (HAL), the **National Culture Fund (NCF)** and the **Archaeological Survey of India (ASI)** reportedly signed an agreement for heritage conservation.

About Bekal Fort

- **Bekal Fort** is a historic coastal fort located in **Kasaragod district, Kerala**.
- It is widely recognised as the **largest fort in Kerala** and an important example of maritime defence architecture.

Historical Background

- **Location:** Bekal, Kasaragod district, Kerala.
- **Period:** Mainly associated with the **17th century**.
- **Construction:** Traditionally attributed to **Shivappa Nayaka of the Keladi dynasty**.
- **Later Control:** Came under the **Kingdom of Mysore**, including the rule of **Hyder Ali and Tipu Sultan**.
- Subsequently passed into **British control**.

Major Architectural Features

1. Coastal Location

- Built beside the **Arabian Sea**.
- Its strategic position helped monitor maritime movements and protect coastal territory.

2. Defensive Structure

- Features **strong laterite walls, bastions and defensive openings**.

- The entrance has a **zigzag arrangement** to restrict enemy movement.

3. Observation Tower

- A prominent observation tower provided a wide view of the surrounding coast.
- Helped defenders monitor possible attacks.

4. Water Management

- Contains a **water tank and access steps**.
- Demonstrates the importance of water availability during prolonged defence.

Significance

- **Military History:** Reflects coastal warfare and regional power struggles.
- **Architectural Heritage:** Demonstrates traditional fortification techniques.
- **Tourism:** Attracts visitors to Kerala's northern coastal region.
- **Conservation:** Highlights the need to preserve historic structures.

SIRPUR CULTURAL AND ARCHAEOLOGICAL LANDSCAPE

SOURCE: THE HINDU

Why in News?

The **Sirpur Cultural and Archaeological Landscape** in Chhattisgarh has reportedly been added to **UNESCO's World Heritage Tentative List**.



About Sirpur

- **Sirpur**, historically known as **Shripura**, is an important archaeological settlement on the **Mahanadi River**.
- It was a major cultural, political and religious centre of **Dakshina Kosala** during the early medieval period.

Location and History

- **District:** Mahasamund, Chhattisgarh.
- **River:** Located near the **Mahanadi River**.
- **Historical Period:** Flourished mainly between the **5th and 12th centuries CE**.
- **Political Importance:** Associated with the **Panduvanshi rulers** and later regional dynasties.

Major Archaeological Features

1. Hindu Temples

- Contains important **Shaiva and Vaishnava monuments**.
- **Lakshmana Temple**, dating to approximately the **7th century**, is a major example of ancient brick architecture.
- The temple is dedicated to **Lord Vishnu**.

2. Buddhist Heritage

- Contains remains of **Buddhist monasteries, stupas and meditation spaces**.
- Demonstrates Sirpur's importance as a centre of Buddhist learning.

3. Jain Heritage

- Archaeological remains indicate the presence of **Jain religious traditions**.
- Reflects the coexistence of different faiths.

4. Urban Settlement

- Excavations have revealed **residential structures, public spaces and water-management systems**.
- Shows evidence of organised urban life and trade.

RANI ABBAKKA CHOWTA

SOURCE: PIB

Why in News?

Rani Abbakka Chowta has received renewed attention for her courageous resistance against **Portuguese colonial expansion**.



About Rani Abbakka Chowta

- **Rani Abbakka Chowta** was a **16th-century queen of Ullal**, a coastal trading centre near **Mangaluru, Karnataka**.
- She is remembered as one of the earliest Indian rulers to challenge Portuguese control over maritime trade.

Historical Background

- **Dynasty:** Chowta dynasty of the **Tulu Nadu region**.
- **Capital:** Ullal, near the **Netravati River**.
- **Religion:** Associated with **Jainism**, while supporting a religiously diverse administration.

- **Matrilineal Tradition:** The ruling family followed **Aliyasantana**, under which inheritance passed through the female line.
- **Portuguese Objective:** Control important ports, trade routes and customs revenue along India's western coast.

Major Contributions

1. Resistance to Portuguese Expansion

- Refused to accept Portuguese dominance over Ullal's maritime trade.
- Successfully resisted several military expeditions.

2. Military Leadership

- Used coastal knowledge, local forces and surprise attacks.
- Traditional accounts describe a successful counterattack against Portuguese forces in **1567**.

3. Strategic Alliances

- Cooperated with regional powers, including the **Zamorin of Calicut**.
- Historical traditions also associate her resistance with wider Deccan alliances.

4. Social Unity

- Her forces included **Hindus, Muslims and local fishing communities**.
- Demonstrated the importance of collective resistance.

Legacy and Recognition

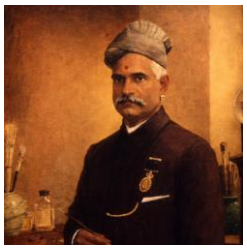
- Popularly remembered as **Veera Rani Abbakka**.
- **ICGS Rani Abbakka**, an Indian Coast Guard patrol vessel, was named in her honour.
- **Veera Rani Abbakka Prashasti** recognises women's achievements.
- Her memory is preserved through local cultural events and memorials.

RAJA RAVI VARMA

SOURCE: HINDUSTHAN TIMES

Why in News?

Radhikaraje Gaekwad, Maharani of Baroda, announced plans to exhibit original paintings of **Raja Ravi Varma** across India and abroad.



About Raja Ravi Varma

- **Raja Ravi Varma (1848–1906)** was a renowned Indian painter who combined **Indian mythology with European realism**.
- He played a pioneering role in popularising modern Indian painting and making religious art accessible to ordinary people.

Early Life

- **Born:** 29 April 1848, at **Kilimanoor, Travancore (present-day Kerala)**.
- **Family:** Belonged to an aristocratic family.
- **Training:** Learned painting at the Travancore royal court.
- **Influences:** Indian court artists and European oil-painting techniques.
- **Patronage:** Received support from the royal families of **Travancore and Baroda**.

Artistic Style

- **Fusion of Traditions:** Combined Indian cultural subjects with Western artistic techniques.
- **Realism:** Used oil colours, perspective, light and shadow to create lifelike figures.
- **Mythological Themes:** Depicted stories from the **Ramayana, Mahabharata and Puranas**.
- **Portraiture:** Painted royalty, women and historical personalities.

Famous Paintings

- **Shakuntala Looking for Dushyanta**
- **Damayanti Talking to a Swan**
- **Jatayu Vadha**
- **Nair Lady Adorning Her Hair**
- **Yashoda and Krishna**

Major Contributions

1. Popularisation of Indian Art

- Established a **lithographic printing press in 1894**.
- Produced affordable reproductions of mythological paintings.
- Helped religious images reach ordinary households.

2. National Cultural Identity

- Created widely recognised visual representations of Hindu deities.
- Influenced popular religious imagery and emerging Indian visual culture.

3. International Recognition

- His paintings received recognition at exhibitions in India and abroad.
- Awarded the **Kaiser-i-Hind Gold Medal in 1904**.

GEOGRAPHY

PRELIMS POINTERS IN NEWS

SHEY-PHOKSUNDO LAKE

SOURCE: THE HINDU

Why in News?

Six Indian tourists reportedly went missing while trekking towards **Shey-Phoksundo Lake** following heavy snowfall.

About Shey-Phoksundo Lake

- **Shey-Phoksundo Lake** is a high-altitude **freshwater alpine lake** in Nepal, famous for its turquoise waters and Himalayan landscape.

Geographical Features

- **Location:** Dolpa district, northwestern Nepal.
- **Protected Area: Shey-Phoksundo National Park**.
- **Elevation:** Approximately **3,611 metres** above sea level.
- **Area:** Around **494 hectares**.
- **Maximum Depth:** Approximately **136.2 metres**, according to a 2019 survey.
- **Formation:** Believed to have formed behind an ancient **landslide dam**.
- **Waterfall:** Its outflow forms the spectacular **Phoksundo Waterfall**.

Ecological Importance

- **Oligotrophic Lake:** Contains low nutrient levels and generally supports limited aquatic productivity.
- **Ramsar Status:** Designated a **Wetland of International Importance in 2007**.
- **Biodiversity:** The surrounding national park protects Himalayan ecosystems and wildlife, including the **snow leopard**.

Cultural Importance

- The landscape contains **Buddhist stupas and monasteries**.
- It is associated with **Tibetan Buddhist and Bon religious traditions**.

HODEIDAH PORT

SOURCE: INDIAN EXPRESS

Why in News?

Saudi-led coalition strikes on **Ras Issa Port and oil facilities** in Yemen's Hodeidah region injured several people.



About Hodeidah Port

- **Hodeidah Port**, also written as **Al Hudaydah**, is one of Yemen's most important commercial and humanitarian seaports.
- It plays a major role in transporting **food, fuel, medicines and essential supplies**.

Geographical Location

- **Country:** Yemen.
- **Region:** Western Yemen.
- **Coast: Red Sea**.
- **Coastal Plain: Tihamah Plain**.
- **Nearby Facility: Ras Issa oil terminal**, north of Hodeidah.

Strategic Importance

1. Humanitarian Lifeline

- Provides an essential entry point for food and relief materials.
- Supports populations affected by Yemen's prolonged conflict.

2. Economic Importance

- Handles commercial imports and fuel shipments.
- Supports trade and economic activity in western Yemen.

3. Military Significance

- Located in an area controlled by the **Houthi movement**.
- Its proximity to major shipping routes increases strategic sensitivity.

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NOYYAL RIVER

SOURCE: THE HINDU

Why in News?

Excessive **foaming in the Noyyal River** near Tiruppur triggered public debate about water pollution.

Geographical Features

- **Origin: Vellingiri Hills**, Western Ghats, near Coimbatore.
- **State:** Tamil Nadu.
- **Length:** Approximately **175 km**.
- **Catchment Area:** Around **3,500 sq. km**.
- **Confluence:** Joins the **Cauvery River** near Noyyal village in Karur district.
- **Historical Name: Kanchi Nadi**.

Major Features

- **Tributaries:** Include the **Chithirai Chavadi, Kanchimanadhi and other seasonal streams**.
- **Irrigation Network:** Traditionally connected to numerous **tanks, canals and anicuts**.
- **Major Reservoir: Orathuppalayam Dam**.
- **Historical Importance:** Ancient irrigation structures supported agriculture in the Kongu region.

Environmental Concerns

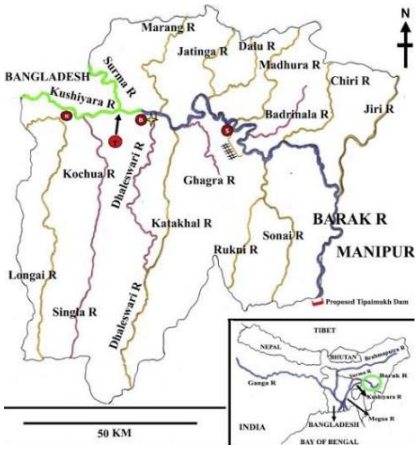
- **Industrial Pollution:** Textile dyeing and bleaching units can release untreated or inadequately treated effluents.
- **Domestic Sewage:** Adds organic pollutants and detergents.
- **Foaming:** May result from **surfactants and other pollutants**, requiring scientific testing to identify causes.
- **Agricultural Impact:** Poor water quality can damage soil and irrigation resources.

BARAK RIVER

SOURCE: INDIAN EXPRESS

Why in News?

Two Bangladeshi nationals were reportedly arrested following an incident involving the **Barak River** in Assam's Cachar district.



Geographical Features

- **Origin: Manipur Hills**, near the Senapati region.
- **Indian Course:** Flows through **Manipur and Assam**, with its basin extending into neighbouring northeastern states.
- **Length in India:** Approximately **564 km**.
- **Important City: Silchar**, Assam.
- **Barak Valley:** Comprises **Cachar, Hailakandi and Sribhumi districts** of Assam.

River System

- Near the Bangladesh border, the Barak divides into the **Surma and Kushiyara rivers**.
- These rivers contribute to the **Meghna River system**, which ultimately drains into the **Bay of Bengal**.
- **Major Tributaries: Jiri, Jatinga, Dhaleswari, Sonai, Katakhal and Longai**.

Economic and Strategic Importance

- **Agriculture:** Supports irrigation and livelihoods.
- **Inland Navigation:** Facilitates transport in the Barak Valley.
- **Border Connectivity:** Links Northeast India with Bangladesh.
- **Flood Management:** Requires cooperation due to seasonal flooding.

ATACAMA DESERT

SOURCE: THE HINDU

Why in News?

Indian researchers identified geological locations in **Tamil Nadu and Chile's Atacama Desert** with similarities to the Martian environment.



Geographical Features

- **Location:** Northern Chile, along the **Pacific Ocean**.
- **Length:** Approximately **1,000 km**.
- **Eastern Boundary: Andes Mountains**.
- **Western Boundary: Chilean Coastal Range**.
- **Climate:** Predominantly **cold desert climate (BWk)**.
- **Rainfall:** Extremely low, with some areas receiving only a few millimetres annually.

Reasons for Extreme Aridity

1. **Rain Shadow:** The Andes block moisture-bearing winds from the east.
2. **Humboldt Current:** Cold Pacific waters reduce evaporation and rainfall formation.
3. **Subtropical High Pressure:** Descending dry air suppresses cloud development.

Major Characteristics

- **Terrain:** Salt flats, volcanic formations and high-altitude lagoons.
- **Minerals:** Rich in **copper, lithium, nitrates and borates**.
- **Biodiversity:** Specialised organisms survive in extremely dry conditions.
- **Astronomy:** Hosts the **Atacama Large Millimeter/submillimeter Array (ALMA)**.

Significance for Mars Research

- Extremely dry soils resemble some conditions on **Mars**.
- Useful for testing **planetary instruments and life-detection methods**.
- Helps study microbial survival in extreme environments.

COLORADO RIVER

SOURCE: TIMES OF INDIA

Why in News?

A recent study reported major **groundwater losses in the Upper Colorado River Basin** during the **2020–2022 drought**.

Geographical Features

- **Origin: Rocky Mountains**, Colorado, United States.
- **Length:** Approximately **2,330 km**.
- **Flow Direction:** Generally southwestward.
- **Mouth: Gulf of California**, Mexico, although modern withdrawals often prevent water from reaching the sea.
- **Basin:** Covers parts of **seven US states and two Mexican states**.

Major Tributaries

- **Green River:** Largest tributary by length.
- Other tributaries include **Gunnison, San Juan, Little Colorado, Gila and Virgin rivers**.

Major Dams and Reservoirs

- **Hoover Dam:** Forms **Lake Mead**.
- **Glen Canyon Dam:** Forms **Lake Powell**.
- **Parker Dam:** Forms **Lake Havasu**.

Major Features

- **Grand Canyon:** Carved by the Colorado River over millions of years.
- **Grand Canyon National Park:** UNESCO World Heritage Site.
- **Horseshoe Bend:** Famous river meander in Arizona.

Environmental Concerns

- **Prolonged Drought:** Reduces river flow and reservoir storage.
- **Groundwater Depletion:** Excessive extraction threatens long-term water security.
- **Climate Change:** Higher temperatures increase evaporation and water demand.
- **Overuse:** Agriculture and urban consumption place pressure on river resources.

KHARG ISLAND

SOURCE: INDIAN EXPRESS

Why in News?

Reports suggested that **Kharg Island**, Iran's major oil-export hub, could become a target amid rising regional tensions.



Geographical Features

- **Country:** Iran.
- **Location:** Northern **Persian Gulf**, approximately **25–30 km** from Iran's coast.
- **Area:** Around **20–25 sq. km**, depending on measurement.
- **Island Type:** Predominantly **coral and limestone formations**.
- **Climate:** Hot and humid.
- **Highest Point:** Approximately **87 metres** above sea level.

Economic Importance

- **Oil Export Hub:** Handles a major share of Iran's crude oil exports.
- **Deep-Water Access:** Allows large oil tankers to approach loading facilities.
- **Pipeline Network:** Connected to oil-producing regions in mainland Iran.
- **Storage Infrastructure:** Contains extensive petroleum storage and loading facilities.

Strategic Importance

- **Strait of Hormuz:** Located near a globally important maritime oil route.
- **Energy Security:** Disruption could affect Iran's export revenue and regional energy markets.
- **Geopolitical Sensitivity:** Its petroleum infrastructure makes it strategically vulnerable.

Historical Background

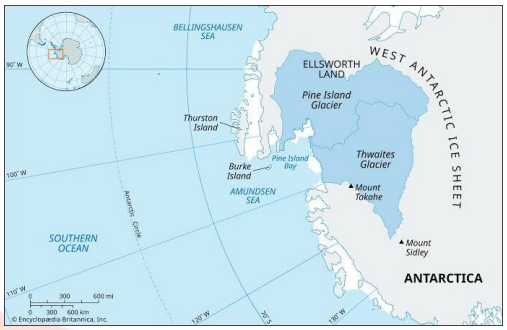
- Developed as a major petroleum terminal during the **1960s and 1970s**.
- Suffered repeated attacks during the **Iran–Iraq War (1980–1988)**.
- Oil infrastructure was subsequently repaired and expanded.

THWAITES GLACIER

SOURCE: INDIAN EXPRESS

Why in News?

A recent study suggested that the melting of **Thwaites Glacier** could contribute around **3 cm to global sea-level rise by 2100**.



About Thwaites Glacier

- **Thwaites Glacier**, popularly called the **Doomsday Glacier**, is a large, fast-moving glacier in **West Antarctica**.
- It is among the world's most closely monitored glaciers because of its potential contribution to **sea-level rise**.

Geographical Features

- **Location:** West Antarctica, adjoining the **Amundsen Sea**.
- **Area:** Approximately **192,000 sq. km**.
- **Width:** Its ocean-facing ice front extends roughly **120 km**.
- **Named After:** American glacial geologist **Frederik T. Thwaites**.
- **Ice Shelf:** Part of the glacier extends over seawater as a floating ice shelf.

Causes of Melting

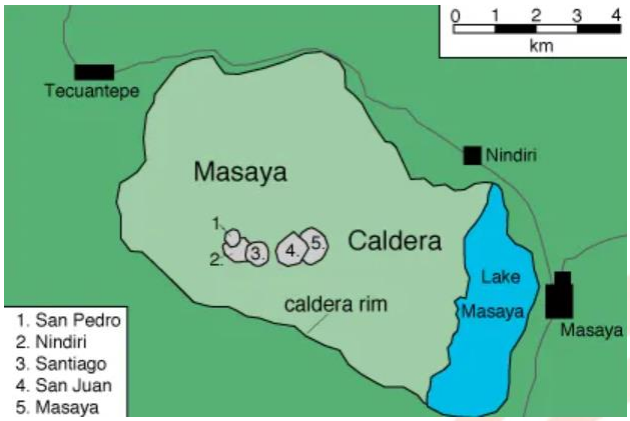
- **Ocean Warming:** Relatively warm seawater melts the glacier from below.
- **Grounding-Line Retreat:** The boundary between grounded ice and floating ice moves inland.
- **Climate Change:** Rising global temperatures increase the risk of ice loss.

MASAYA VOLCANO

SOURCE: THE HINDU

Why in News?

Satellite observations revealed possible **magma movement between underground reservoirs** beneath Nicaragua's **Masaya Volcano**.



Geographical Features

- **Location:** Approximately **20 km southeast of Managua**, Nicaragua's capital.
- **Volcanic Region: Central American Volcanic Arc**.
- **Type:** Basaltic **caldera volcanic complex**.
- **Major Caldera: El Ventarrón**, measuring approximately **6 × 11.5 km**.
- **Active Crater: Santiago Crater**.

Tectonic Formation

- Formed through the **subduction of the Cocos Plate beneath the Caribbean Plate**.
- Subduction produces magma that rises towards the Earth's surface.
- It is part of the volcanically active **Pacific Ring of Fire**.

Major Characteristics

- **Lava Lake:** Known for episodes of persistent molten lava within the crater.
- **Gas Emissions:** Releases significant amounts of **sulphur dioxide (SO_2)**.
- **Eruptions:** Can produce ash, lava fountains and explosive activity.
- **Monitoring:** Satellite measurements help detect ground deformation caused by magma movement.

TEESTA RIVER

SOURCE: THE HINDU

Why in News?

The **Bangladesh Government** reportedly sought **China's involvement** in the proposed **Teesta River restoration project**.

Geographical Features

- **Origin:** Glacial region around **Tso Lhamo Lake**, North Sikkim.
- **Source Elevation:** Approximately **5,280 metres**.
- **River Type:** Glacier-fed Himalayan river.
- **Indian Course:** Flows through **Sikkim and West Bengal**.
- **Bangladesh Course:** Enters northern Bangladesh and joins the **Jamuna (Brahmaputra)**.

Major Tributaries

- **Left Bank: Lachung Chhu, Dik Chhu and Rangpo Chhu**.
- **Right Bank: Rangit River**.
- **Basin Distribution:** Approximately **83% in India** and **17% in Bangladesh**, according to commonly cited estimates.

Economic Importance

- **Irrigation:** Supports farming in northern West Bengal and Bangladesh.
- **Hydropower:** Important for electricity generation in Sikkim.
- **Livelihoods:** Supports agriculture and river-dependent communities.
- **Water Security:** Crucial during the dry season.

ENVIRONMENT

CLIMATE CHANGE AND POLLUTION

UNEP EMISSIONS GAP REPORT 2026

SOURCE: THE HINDU

Why in News?

The **United Nations Environment Programme (UNEP)** released its **Emissions Gap Report 2026**, titled *The Point of Return: Urgent Emissions Cuts Needed to Come Back from Overshoot of 1.5°C*.

1. Major Findings of the Report

A. Breaching the 1.5°C Threshold

- The report indicates that exceeding **1.5°C warming** has become extremely difficult to avoid.
- Its lowest-overshoot pathway projects peak warming of around **1.7–1.8°C**.
- Returning to 1.5°C by 2100 would require rapid emissions reductions and large-scale carbon removal.

B. Future Temperature Projections

- **Current policies:** Approximately **2.8°C warming by 2100**.
- **Full implementation of NDCs:** Around **2.6°C**.
- **Fulfilment of net-zero pledges:** Around **2.1°C**.

C. Widening Emissions Gap

- The gap between climate commitments and the required emissions pathway remains substantial.
- The report estimates that global emissions must fall by approximately:
    - **18% by 2030**
    - **45% by 2035**
    - **69% by 2040**

These reductions are measured against **2025 emission levels**.

D. Responsibility of Major Emitters

- **G20 members**, excluding the African Union from the reported calculation, account for around **76% of global greenhouse gas emissions**.
- Their actions are therefore critical to achieving global climate goals.

E. Renewable Energy Progress

- Solar and wind capacity has expanded rapidly.
- However, continued fossil fuel consumption and deforestation threaten climate progress.

What is Temperature Overshoot?

- **Temperature overshoot** occurs when global warming temporarily exceeds a specified temperature limit.
- Even if temperatures decline later, overshoot can cause **irreversible environmental damage**.
- Risks include:
    - **Glacier melting** and rising sea levels.
    - **Coral reef destruction** and biodiversity loss.
    - More frequent **heatwaves, floods and droughts**.
    - Threats to **food security and human health**.

Implications for India

- **Low Per-Capita Emissions:** India's per-capita emissions remain below the global average.
- **Development Needs:** India must expand energy access while reducing emissions intensity.
- **Climate Vulnerability:** Agriculture, coastal regions and vulnerable communities face growing climate risks.
- **Renewable Energy:** Solar, wind and energy storage can reduce dependence on fossil fuels.
- **Industrial Transition:** Steel, cement and transport require cleaner technologies.
- **Climate Justice:** India emphasises **Common But Differentiated Responsibilities and Respective Capabilities (CBDR-RC)**.

Major Challenges

- **Inadequate NDCs:** Existing national commitments are insufficient.
- **Climate Finance Gap:** Developing countries lack affordable finance for clean-energy transitions.
- **Technology Barriers:** Advanced low-carbon technologies remain expensive.
- **Carbon Removal Uncertainty:** Large-scale carbon dioxide removal is costly and technologically challenging.
- **Fossil Fuel Dependence:** Coal, oil and gas continue to dominate many energy systems.

- **Trade Concerns:** Measures such as the EU's **Carbon Border Adjustment Mechanism (CBAM)** may affect developing-country exports.

Way Forward

- **Strengthen NDCs:** Countries must adopt more ambitious and achievable emissions targets.
- **Accelerate Renewable Energy:** Expand solar, wind, storage and electricity grids.
- **Reduce Fossil Fuel Dependence:** Promote energy efficiency and cleaner industrial processes.
- **Increase Climate Finance:** Developed countries should support vulnerable economies.
- **Control Methane Emissions:** Improve waste management, agriculture and energy-sector practices.
- **Protect Carbon Sinks:** Restore forests, wetlands and other ecosystems.
- **Strengthen Carbon Markets:** Improve transparency and effectiveness of carbon-credit systems.
- **Ensure Climate Justice:** Balance emissions reduction with poverty eradication and development.

Conclusion

The UNEP Emissions Gap Report 2026 calls for urgent emissions reductions, stronger climate finance and equitable global cooperation to limit warming and protect future generations.

WASTE MANAGEMENT

NUCLEAR WASTE MANAGEMENT IN INDIA

SOURCE: THE HINDU

Why in News?

India's expanding nuclear power programme has increased concerns about the safe management of radioactive waste.

1. What is Nuclear Waste?

- **Nuclear waste** contains radioactive substances that emit ionising radiation.
- It is generated during **nuclear power generation, fuel processing, research and medical activities**.
- Radioactive waste is broadly classified into:
    - **Low-Level Waste (LLW):** Includes contaminated clothing, tools and laboratory materials.
    - **Intermediate-Level Waste (ILW):** Includes radioactive resins, filters and reactor components.
    - **High-Level Waste (HLW):** Includes highly radioactive residues from spent-fuel reprocessing.

How Does India Manage Nuclear Waste?

A. Cooling and Storage

- Spent nuclear fuel is initially stored in **water-filled cooling pools**.
- Water removes heat and provides radiation shielding.

B. Reprocessing

- India recovers reusable **uranium and plutonium** from spent fuel.
- This supports resource efficiency and India's long-term nuclear energy programme.

C. Waste Conditioning

- Remaining radioactive residues are converted into stable forms.
- **Vitrification** involves immobilising high-level radioactive waste in glass for safer storage.

D. Final Disposal

- Long-lived radioactive waste requires secure isolation from people and the environment.
- **Deep Geological Repositories (DGRs)** are considered an important long-term disposal option.

What is a Deep Geological Repository?

- A **Deep Geological Repository** is an underground facility designed for the permanent isolation of long-lived radioactive waste.
- It uses **multiple safety barriers**, including waste containers, engineered materials and stable geological formations.
- Unlike temporary storage, its purpose is to prevent harmful radioactive releases over very long periods.
- India needs continued research, geological assessment and long-term planning for such facilities.

Major Challenges

- **Long-Term Radioactivity:** Some radioactive materials remain hazardous for thousands of years.
- **High Financial Costs:** Storage, monitoring, decommissioning and disposal require substantial expenditure.
- **Intergenerational Responsibility:** Future generations may bear costs created by today's electricity production.

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- **Private-Sector Accountability:** Responsibilities must remain clear even if a nuclear operator closes or changes ownership.
- **Public Opposition:** Communities may resist waste facilities because of health and environmental concerns.
- **Institutional Continuity:** Waste management requires effective monitoring and oversight over very long periods.
- **Transport Risks:** Moving radioactive materials requires specialised containers and strict safety procedures.

Regulatory Framework in India

- **Atomic Energy Act, 1962:** Provides the principal legal framework for atomic energy activities.
- **Atomic Energy Regulatory Board (AERB):** Regulates nuclear and radiation safety.
- **Department of Atomic Energy (DAE):** Oversees India's atomic energy programme.
- **Bhabha Atomic Research Centre (BARC):** Conducts nuclear research, including waste-treatment technologies.
- **Atomic Energy (Safe Disposal of Radioactive Wastes) Rules, 1987:** Provide regulatory requirements for radioactive waste disposal.

Way Forward

- **Dedicated Waste Fund:** Establish a protected fund financed through nuclear electricity generation.
- **Polluter-Pays Principle:** Ensure waste-management costs are included in nuclear power economics.
- **Clear Liability Rules:** Define the responsibilities of public and private operators.
- **Early Repository Planning:** Begin site assessment and geological investigations well in advance.
- **Independent Oversight:** Strengthen transparent safety monitoring and regulatory accountability.
- **Public Participation:** Involve local communities in consultations and environmental assessments.
- **Advanced Technology:** Invest in safer waste conditioning, storage and reprocessing methods.

Conclusion

India must combine nuclear energy expansion with safe waste disposal, clear financial responsibility and strong regulation to protect present and future generations.

RENEWABLE ENERGY

GREEN ENERGY CORRIDOR PHASE-III (GEC-III)

SOURCE: INDIAN EXPRESS

Why in News?

The **Union Cabinet approved Green Energy Corridor Phase-III (GEC-III)** with a reported outlay of **₹1.86 lakh crore**.

Green Energy Corridor (GEC)

- The **Green Energy Corridor (GEC)** is an infrastructure initiative designed to transmit electricity generated from **solar, wind and other renewable sources**.
- It helps connect renewable energy projects with electricity consumers while maintaining **grid stability**.
- The initiative is associated with the **Ministry of New and Renewable Energy (MNRE)** and supports India's clean energy transition.

Objectives of Green Energy Corridor

- **Renewable Energy Integration:** Connect renewable power plants with the national electricity network.
- **Transmission Infrastructure:** Expand electricity transmission lines and substations.
- **Grid Stability:** Manage fluctuations in solar and wind power generation.
- **Energy Security:** Reduce dependence on fossil fuels.
- **Climate Action:** Support India's clean energy and emission-reduction commitments.
- **Lower Power Losses:** Improve the efficiency and reliability of electricity transmission.

Key Features of GEC Phase-III

A. Renewable Energy Evacuation

- Targets the integration of up to **135 GW of renewable energy capacity**.
- Strengthens electricity infrastructure in renewable-rich states and Union Territories.

B. Intra-State Transmission System (InSTS)

- Focuses on expanding transmission networks **within states**.
- Connects renewable energy generation centres with substations and demand centres.

C. Battery Energy Storage Systems (BESS)

- The reported plan includes **50 GWh of battery storage**.
- Batteries can store surplus electricity and supply it when solar or wind generation is low.
- This helps reduce **renewable energy curtailment** and improve power reliability.

D. Project Implementation

- **State Transmission Utilities (STUs)** are key implementing agencies.
- **Greenfield projects** involve the construction of new infrastructure.
- **Brownfield projects** involve upgrading existing transmission facilities.

E. Financing and Execution

- New projects may use **Tariff-Based Competitive Bidding (TBCB)**.
- Existing network upgrades may follow a **cost-plus approach**.
- The targeted completion period is **FY 2032–33**.

Earlier Phases of Green Energy Corridor

Phase-I

- Covers **eight renewable-rich states**, including Rajasthan, Gujarat, Tamil Nadu and Karnataka.
- Planned approximately **9,700 circuit kilometres** of transmission lines.
- Intended to support around **24 GW** of renewable energy integration.

Phase-II

- Covers **seven states**, including Gujarat, Kerala, Rajasthan and Uttar Pradesh.
- Envisages approximately **10,750 circuit kilometres** of transmission lines.
- Designed to facilitate around **20 GW** of renewable energy integration.
- Supported through **Central Financial Assistance (CFA)**.

Importance of GEC-III

- **Energy Transition:** Enables greater use of renewable electricity.
- **Grid Reliability:** Improves the management of variable solar and wind generation.
- **Reduced Fossil Fuel Dependence:** Supports diversification of India's energy mix.
- **Investment and Employment:** Encourages infrastructure development and related industries.
- **Domestic Manufacturing:** Creates demand for transformers, cables, batteries and grid equipment.
- **Climate Commitments:** Supports India's target of **500 GW of non-fossil electricity capacity by 2030** and its **net-zero goal for 2070**.

Major Challenges

- **High Investment Requirements:** Transmission and storage infrastructure need substantial financing.
- **Land Acquisition:** Transmission projects may face land-related disputes.
- **Renewable Intermittency:** Solar and wind electricity depend on weather conditions.
- **Storage Costs:** Large-scale battery systems remain expensive.
- **Coordination Issues:** Implementation requires cooperation among states, utilities and regulators.
- **Environmental Concerns:** Transmission lines may affect forests, wildlife habitats and local communities.

Way Forward

- **Expand Energy Storage:** Promote battery and pumped-storage projects.
- **Improve Grid Forecasting:** Use artificial intelligence and real-time weather data.
- **Strengthen Coordination:** Improve cooperation between central and state electricity agencies.
- **Encourage Domestic Manufacturing:** Support Indian production of grid equipment and batteries.
- **Ensure Environmental Safeguards:** Plan transmission routes to minimise ecological damage.
- **Mobilise Investment:** Encourage public and private participation in transmission infrastructure.

Conclusion

Green Energy Corridor Phase-III can accelerate India's clean energy transition by strengthening transmission networks, improving grid stability and enabling greater renewable energy integration.

INDIAN INITIATIVES, EFFORTS AND COMMITMENTS

MAKING CEMENT GREENER – DECARBONISING INDIA'S CONSTRUCTION SECTOR

SOURCE: THE HINDU

Why in News?

India's growing construction sector has increased attention on **reducing carbon emissions from cement manufacturing**.

About Cement

- **Cement** is essential for housing, roads, bridges and other infrastructure.
- However, its production is energy-intensive and contributes approximately **7–8% of global CO_2 emissions**, with higher estimates depending on the accounting method.
- As the **world's second-largest cement producer**, India must balance infrastructure development with environmental sustainability.

India's Cement Industry

- **Global Position:** India is the second-largest cement producer after China.
- **Installed Capacity:** Approximately **668–700 million tonnes per annum**.
- **Production:** Around **490 million tonnes in FY 2025–26**, according to the supplied article.
- **Demand:** Housing, commercial buildings and public infrastructure are major consumers.
- **Core Industry:** Cement is one of India's **eight core industries**.
- **Major Producing States:** Rajasthan, Andhra Pradesh, Tamil Nadu and Chhattisgarh.

Why Does Cement Production Cause Pollution?

A. Process Emissions

- Limestone is heated to approximately **1,450°C** during clinker production.
- **Calcination** releases carbon dioxide through the reaction:

$CaCO_3 \rightarrow CaO + CO_2$

- These emissions occur even when clean energy is used.

B. Fuel Combustion

- Cement kilns traditionally depend on **coal, petroleum coke and other fossil fuels**.
- Burning these fuels produces additional greenhouse gases.

C. Limestone Mining

- Mining can cause **land degradation, habitat destruction and biodiversity loss**.

D. Transportation

- Transporting limestone, clinker and cement increases fuel consumption and emissions.

E. Air Pollution

- Cement plants can release **particulate matter, nitrogen oxides and sulphur dioxide**.

India's Cement Decarbonisation Challenge

- The industry's reported emissions intensity is approximately **0.62 tonnes of CO_2 per tonne of cement**.
- The roadmap cited in the article proposes reducing it to:
  - **0.56 tonnes by 2030**.
  - **0.51 tonnes by 2047**.
- However, growing infrastructure demand may increase total cement production.

Important: Lower emissions per tonne do not automatically mean lower **total emissions**.

Major Strategies for Green Cement

A. Reduce Clinker Content

- **Clinker** is the main emissions-intensive ingredient in conventional cement.
- Replacing part of it with **fly ash, blast-furnace slag or calcined clay** can reduce emissions.
- **Portland Pozzolana Cement (PPC)** and **Portland Slag Cement (PSC)** are important alternatives.

B. Cleaner Fuels

- Replace some fossil fuels with **renewable energy and suitable alternative fuels**.
- **Refuse-Derived Fuel (RDF)** from processed municipal waste can partly substitute conventional kiln fuels.

C. Carbon Capture

- **Carbon Capture, Utilisation and Storage (CCUS)** can capture emissions generated during calcination.
- However, high costs and limited infrastructure remain challenges.

D. Energy Efficiency

- Adopt modern kilns, waste-heat recovery systems and efficient grinding technologies.

E. Sustainable Construction

- Use climate-responsive designs, recycled materials and efficient structural planning.
- Reduce unnecessary cement consumption without compromising safety.

Traditional Low-Carbon Construction Methods

- **Rammed Earth:** Uses compacted soil for suitable building applications.
- **Compressed Earth Blocks:** Can reduce dependence on conventional fired bricks and cement.
- **Lime-Surkhi Mortar:** Uses lime and powdered burnt clay or brick.
- **Kath Kuni Architecture:** Traditional Himachal Pradesh construction using timber and stone.

- **Bamboo Construction:** Suitable for certain climate-responsive structures, particularly in Northeast India.

These methods must meet appropriate **structural and safety standards**.

Major Challenges

- **High Initial Costs:** Cleaner technologies may require substantial investment.
- **Limited Awareness:** Builders often prefer conventional cement.
- **Technology Gaps:** Carbon capture is not yet widely deployed commercially.
- **Material Availability:** Fly ash and slag supplies vary by region.
- **Quality Standards:** Alternative materials require testing and certification.

Way Forward

- **Green Public Procurement:** Prioritise low-carbon cement in government projects.
- **Research and Innovation:** Promote advanced binders and efficient manufacturing.
- **Circular Economy:** Encourage responsible reuse of industrial by-products.
- **Carbon Accounting:** Measure emissions across the complete building life cycle.
- **Financial Incentives:** Support cleaner technologies through targeted finance.
- **Stronger Standards:** Update construction codes to recognise safe low-carbon alternatives.

Conclusion

Decarbonising cement through cleaner energy, reduced clinker use, innovative materials and efficient construction is essential for India's sustainable infrastructure growth and net-zero ambitions.

DISASTER MANAGEMENT

CYCLONE ARNAB

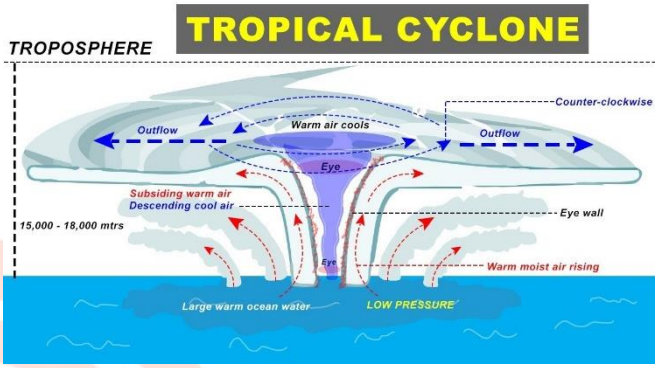
SOURCE: THE HINDU

Why in News?

Cyclone Arnab, which developed over the **Bay of Bengal**, reportedly made landfall near the **Andhra Pradesh–Yanam coast** in October 2026.

Tropical cyclone

- A **tropical cyclone** is an intense low-pressure system that develops over warm tropical oceans, producing strong winds and heavy rainfall.
- According to the supplied report, **Cyclone Arnab** was classified as a **Very Severe Cyclonic Storm (VSCS)** by the India Meteorological Department (IMD).
- The event highlights the importance of **early warning systems, coastal preparedness and climate-resilient infrastructure**.



Key Features of Cyclone Arnab

- **Origin:** Bay of Bengal.
- **Landfall:** Near the Andhra Pradesh–Yanam coast.
- **Intensity:** Very Severe Cyclonic Storm.
- **Reported Wind Speed:** Approximately **125–135 km/h**.
- **Name:** *Arnab* was proposed by **Bangladesh** and means **ocean or sea** in Bengali.
- **Rapid Intensification:** Warm seawater and favourable atmospheric conditions reportedly strengthened the cyclone.

Why is the Bay of Bengal More Cyclone-Prone?

- **Warm Ocean Waters:** Sea surface temperatures above approximately **26.5°C** favour cyclone formation.
- **High Moisture Availability:** Humid air supports cloud formation and intense rainfall.
- **Freshwater Inflow:** Rivers such as the **Ganga, Brahmaputra and Godavari** create a low-salinity surface layer.
- **Barrier Layer:** This surface layer can reduce the mixing of cooler deep water, helping maintain warm sea temperatures.
- **Low Wind Shear:** Weak differences in wind speed with height allow cyclones to strengthen.
- **Pacific Influence:** Remnants of storms from the western Pacific can sometimes enter the Bay of Bengal.

Factors Behind Cyclone Intensification

- **High Sea Surface Temperature:** Provides heat and moisture to developing storms.
- **Tropical Cyclone Heat Potential:** Warm water extending to greater depths supplies additional energy.
- **Low Vertical Wind Shear:** Helps maintain the cyclone's structure.
- **Atmospheric Circulation:** Steering winds influence the cyclone's movement and landfall.
- **Climate Change:** Ocean warming can increase the potential for intense rainfall and stronger cyclones.

Major Impacts of Cyclone Arnab

A. Agricultural Losses

- The article reports damage to over **80,000 hectares of crops**, including paddy and horticultural produce.

B. Coastal Flooding

- A reported **1–1.5 metre storm surge** caused seawater intrusion into coastal areas.

C. Livelihood Disruption

- Fishing, aquaculture and small coastal businesses faced losses.

D. Infrastructure Damage

- Strong winds and rainfall affected roads, electricity networks and buildings.

E. Environmental Damage

- **Saltwater intrusion** can reduce soil fertility and contaminate freshwater resources.

Disaster Management Measures

- **Early Warning:** IMD uses satellites, Doppler weather radars and forecasting models.
- **Impact-Based Forecasting:** Warnings identify likely effects on people, agriculture and infrastructure.
- **Evacuation:** The report mentions the evacuation of over **1.8 lakh people**.
- **Cyclone Shelters:** Provide temporary protection to vulnerable coastal communities.
- **Emergency Response: NDRF**, state agencies and local authorities coordinate rescue operations.
- **Financial Assistance:** The **State Disaster Response Fund (SDRF)** provides immediate relief, with additional support available through the **National Disaster Response Fund** under applicable norms.

Way Forward

- **Improve Forecasting:** Strengthen satellite monitoring and local warning systems.
- **Coastal Resilience:** Build cyclone-resistant housing and infrastructure.
- **Protect Mangroves:** Restore natural barriers against storm surges.
- **Community Preparedness:** Conduct evacuation drills and awareness programmes.
- **Climate Adaptation:** Promote salt-tolerant crops and resilient coastal livelihoods.
- **Better Coordination:** Improve cooperation among central, state and local disaster-management agencies.

Conclusion

Cyclone Arnab highlights the need for accurate forecasting, stronger coastal infrastructure, community preparedness and climate-resilient disaster management in India.

PRELIMS POINTERS IN NEWS

GREATER FLAMINGO

SOURCE: THE HINDU

Why in News?

Greater Flamingos were recently spotted at **Veeranam Lake in Cuddalore district, Tamil Nadu**, an unusual location for these birds.

Habitat and Distribution

- **Global Distribution:** Africa, southern Europe, the Middle East and the Indian subcontinent.
- **Habitats:** Coastal lagoons, estuaries, salt pans, mudflats and saline or alkaline lakes.
- **Indian Sites:** Important populations occur in **Gujarat, Rajasthan, Maharashtra and coastal wetlands**.
- **Breeding:** Usually nests in large colonies on mudflats and isolated wetland islands.

Physical Characteristics

- **Appearance:** Pale pink plumage, long neck and slender pink legs.
- **Wings:** Bright pink patches with **black flight feathers**.
- **Beak:** Downward-curved and specially adapted for filter feeding.
- **Diet:** Small crustaceans, algae, molluscs and aquatic microorganisms.
- **Pink Colour:** Mainly results from **carotenoid pigments** in food.

Conservation Status

- **IUCN Red List: Least Concern (LC)**.

- **Major Threats:** Wetland degradation, pollution, disturbance and changing water levels.

About Veeranam Lake

- **Location:** Cuddalore district, Tamil Nadu.
- **Type:** Ancient **man-made freshwater reservoir**.
- **Construction:** Associated with **Rajaditya Chola**, son of **Parantaka Chola I**, during the 10th century.
- **Water Source:** Fed through the **Vadavar channel**, connected to the Cauvery irrigation system.
- **Importance:** Supports **agriculture and Chennai's drinking-water supply**.
- **Literary Connection:** Featured in **Kalki Krishnamurthy's Ponniyin Selvan**.

RUGDA MUSHROOM

SOURCE: THE HINDU

Why in News?

Rugda Mushroom, a seasonal wild edible fungus, has gained attention for supporting the livelihoods of tribal communities in **Jharkhand**.



About Rugda

- **Rugda** is a locally valued wild mushroom found mainly in the forested regions of eastern and central India.
- It is an important **Non-Timber Forest Product (NTFP)** collected and sold by local communities during the monsoon.

Scientific Classification

- **Kingdom:** Fungi.
- **Genus: Astraeus**.
- **Scientific Names:** Commonly associated with **Astraeus hygrometricus** and related species, including **Astraeus asiaticus**.
- **Nature:** A wild, edible fungus with underground or partly buried young fruiting bodies.

Distribution and Habitat

- **Major Regions:** Jharkhand, Odisha, Chhattisgarh and West Bengal.
- **Geographical Region: Chota Nagpur Plateau**.
- **Forest Association:** Commonly found near **Sal trees (Shorea robusta)**.
- **Season:** Appears mainly after the arrival of **monsoon rainfall**.

Ecological Characteristics

1. Ectomycorrhizal Association

- Forms a mutually beneficial relationship with tree roots.
- The fungus helps trees absorb **water and mineral nutrients**.
- Trees supply the fungus with **carbohydrates produced through photosynthesis**.

2. Suitable Conditions

- Requires adequate **soil moisture, warmth and organic matter**.
- Decomposed Sal leaves help maintain a suitable forest-floor environment.
- Its seasonal appearance depends on local rainfall and soil conditions.

OSBECKIA ASSAMENSIS

SOURCE: INDIAN EXPRESS

Why in News?

Researchers identified a new flowering plant species, **Osbeckia assamensis**, in **Manas National Park, Assam**.



Scientific Classification

- **Kingdom:** Plantae.
- **Family: Melastomataceae**.
- **Genus: Osbeckia**.
- **Species: Osbeckia assamensis**.
- **Plant Type:** Perennial shrub.

Important Characteristics

- **Height:** Approximately **2–2.5 metres**.
- **Flowers:** Attractive **pink flowers**.

- **Leaves:** Large and oppositely arranged.
- **Stem:** Mostly unbranched, with distinctive hairs.
- **Inflorescence:** Around **30–35 flowers**, compared with fewer flowers in the related **Osbeckia nayarii**.
- **Flowering and Fruiting:** Mainly **September to February**.

Habitat and Distribution

- **Location:** Manas National Park, Assam.
- **Ecosystem:** Grasslands near the **Eastern Himalayan foothills**.
- **Conservation Status:** Reportedly assessed as **Data Deficient (DD)** under IUCN criteria.

Scientific Importance

- **Biodiversity Documentation:** Adds to knowledge of India's flowering plants.
- **Taxonomy:** Demonstrates the importance of comparing plant structures to identify new species.
- **Conservation Planning:** Helps identify habitats requiring protection.
- **Research:** Encourages further studies of rare and poorly documented plants.

About Manas National Park

- **State:** Assam.
- **Location:** Along the **India–Bhutan border**.
- **UNESCO World Heritage Site:** Inscribed in **1985**.
- **Tiger Reserve:** Part of India's **Project Tiger** network.
- **Biosphere Reserve:** Recognised under India's biosphere reserve programme.
- **Important Wildlife: Pygmy hog, golden langur, Bengal tiger and greater one-horned rhinoceros**.
- **River:** The **Manas River** flows through the landscape.

AMUR FALCON

SOURCE: THE HINDU

Why in News?

Two **satellite-tagged Amur Falcons** reportedly returned to **Manipur** after travelling across **23 countries in Asia and Africa**.



About Amur Falcon

- The **Amur Falcon (Falco amurensis)** is a small migratory bird of prey belonging to the **Falconidae family**.
- It is famous for undertaking one of the most remarkable long-distance migrations among raptors.

Habitat and Distribution

- **Breeding Grounds:** Southeastern **Siberia, northern China and neighbouring East Asian regions**.
- **Wintering Grounds: Southern and eastern Africa**.
- **Indian Stopover:** Mainly **Nagaland, Manipur and parts of Assam**.
- **Habitats:** Open forests, grasslands, agricultural fields and wetlands.

Physical Characteristics

- **Male:** Dark grey body with reddish-brown thighs.
- **Female:** Grey-brown upperparts and spotted underparts.
- **Distinctive Feature:** Orange-red **feet, eye-rings and cere**.
- **Diet:** Mainly insects, including **termites and flying insects**.
- **Hunting:** Uses sharp eyesight to catch prey during flight.

Migration Pattern

- Travels from East Asia towards Africa through parts of **Northeast India**.
- Undertakes a remarkable **non-stop flight across the Arabian Sea**.
- Uses seasonal winds and food availability to complete migration.
- Large flocks gather at communal roosting sites before continuing their journey.

Conservation Status

- **IUCN Red List: Least Concern (LC)**.
- **Major Threats:** Illegal hunting, habitat loss, disturbance and changing weather patterns.
- **Protection:** Covered under India's **Wild Life (Protection) Act, 1972**.

Conservation Initiatives

- **Nagaland:** Community-led conservation efforts have significantly reduced hunting.
- **Satellite Tagging:** Helps researchers track routes, stopovers and survival.
- **Community Participation:** Local residents protect roosting habitats.
- **International Cooperation:** Necessary because the bird crosses multiple countries.

MUSSEL

SOURCE: THE HINDU

Why in News?

The **ICAR–Central Marine Fisheries Research Institute (CMFRI)** at **Vizhinjam, Kerala**, launched its first full-fledged **open-sea mussel longline farming unit**.

About Mussels

- **Mussels** are aquatic **bivalve molluscs** enclosed within two hinged shells.
- They occur in both **marine and freshwater environments** and play an important role in aquatic ecosystems.

Classification and Distribution

- **Phylum:** Mollusca.
- **Class:** Bivalvia.
- **Marine Family:** Mytilidae.
- **Freshwater Families:** Include Unionidae.
- **Distribution:** Coastal seas, estuaries, rivers, lakes and ponds.
- **Indian Species:** Important cultured species include the **green mussel (Perna viridis)** and **brown mussel (Perna indica)**.

Major Characteristics

- **Shell:** Usually elongated, wedge-shaped or pear-shaped.
- **Colour:** Often dark green, blue or brown.
- **Byssus Threads:** Strong protein-based fibres that attach mussels to rocks and other surfaces.
- **Filter Feeding:** Feed by filtering plankton and organic particles from water.
- **Habitat:** Commonly form dense colonies.

Open-Sea Longline Farming

- Mussels grow on **ropes suspended from floating longlines** anchored in coastal waters.
- The system uses natural plankton as food.
- It can reduce pressure on wild mussel populations.
- Suitable site selection and regular water-quality monitoring are essential.

HOMOPORUS TRIDENTATA

SOURCE: INDIAN EXPRESS

Why in News?

Entomologists reported the discovery of a new parasitoid wasp species named **Homoporus tridentata**.



About Homoporus tridentata

- **Homoporus tridentata** is a newly described **parasitoid wasp** belonging to the genus **Homoporus**.
- Parasitoid wasps develop on or inside other insects and can help regulate pest populations.

Scientific Classification

- **Kingdom:** Animalia.
- **Phylum:** Arthropoda.
- **Class:** Insecta.
- **Order:** Hymenoptera.
- **Family: Pteromalidae**, under traditional classification.
- **Genus:** Homoporus.

Major Characteristics

1. Distinctive Facial Structure

- The **clypeus**, a plate-like structure on the insect's face, has **three teeth**.
- The middle tooth is longer than the two lateral teeth.
- This feature is reflected in the species name **tridentata**.

2. Body Appearance

- The reported male has a **metallic green head and thorax**.
- Its eyes and simple eyes, called **ocelli**, appear copper-brown.

3. Mandibles

- Possesses **asymmetrical jaws**.
- The right mandible reportedly has **four teeth**, while the left has **three**.
- This unequal tooth arrangement is described as **heterodonty**.

Ecological Importance

- **Natural Pest Control:** Related parasitoid wasps attack immature stages of other insects.
- **Biodiversity:** The discovery adds to knowledge of insect diversity.

- **Agriculture:** Parasitoids can support biological pest-management programmes.
- **Ecosystem Balance:** Help regulate populations of host insects.

VASUKI INDICUS

SOURCE: THE HINDU

Why in News?

Vasuki indicus, a giant extinct snake discovered in Gujarat, attracted renewed attention for its extraordinary estimated size.

About Vasuki indicus

- **Vasuki indicus** is an extinct, non-venomous snake species identified from fossil vertebrae discovered in **Gujarat**.
- Its discovery provides important evidence about **prehistoric biodiversity, evolution and ancient climatic conditions**.

Discovery and Classification

- **Discovery Site: Panandhro Lignite Mine**, Kutch district, Gujarat.
- **Fossils Found: 2005**.
- **Scientific Description:** Published in **2024**.
- **Family: Madtsoiidae**, an extinct group of snakes.
- **Geological Period: Middle Eocene**, approximately **47 million years ago**.
- **Name:** Inspired by **Vasuki**, the serpent associated with Lord Shiva in Hindu mythology.

Major Physical Features

- **Estimated Length:** Approximately **11–15 metres**, based on fossil measurements.
- **Fossil Evidence:** Large, broad **vertebrae**.
- **Body Structure:** Likely had a thick, cylindrical body.
- **Movement:** Probably relatively slow-moving.
- **Hunting Behaviour:** May have used **ambush predation and constriction**.

Scientific Significance

- **Evolutionary History:** Expands knowledge of ancient snakes in the Indian subcontinent.
- **Palaeoclimate:** Large cold-blooded reptiles suggest a relatively warm environment.
- **Biogeography:** Provides evidence about the distribution of extinct snake groups.
- **Fossil Research:** Highlights the importance of India's sedimentary and lignite deposits.

Comparison with Titanoboa

- **Vasuki indicus:** Discovered in **Gujarat, India**.
- **Titanoboa cerrejonensis:** Discovered in **Colombia, South America**.
- Both were giant extinct snakes that lived in warm prehistoric environments.
- Their exact maximum sizes remain estimates rather than direct measurements of complete skeletons.

KUFRI JAMUNIA

SOURCE: THE HINDU

Why in News?

ICAR–Central Potato Research Institute (CPRI) developed nutrient-rich coloured potato varieties, including **Kufri Jamunia**.

About Kufri Jamunia

- **Kufri Jamunia** is a **purple-fleshed potato variety** developed by **ICAR–CPRI**.
- It is designed to combine attractive colour, nutritional value and suitable agricultural performance.

Development and Cultivation

- **Developed by:** ICAR–Central Potato Research Institute.
- **Release Year: 2024**, according to the supplied report.
- **Crop:** Potato (*Solanum tuberosum*).
- **Recommended Region: North Indian plains**.
- **Maturity:** Medium-duration variety.
- **Plant Type:** Medium-tall plants with a semi-compact canopy.

Major Characteristics

1. Appearance

- **Skin:** Dark purple.
- **Flesh:** Purple.
- **Shape:** Oblong tubers with shallow eyes.
- **Texture:** Generally mealy after cooking.

2. Storage Quality

- **Dormancy:** Approximately **6–8 weeks**.
- Delayed sprouting improves short-term storage potential.
- Reportedly shows limited rotting and weight loss under suitable storage conditions.

3. Nutritional Features

- **Anthocyanins:** Natural pigments responsible for purple colour.
- **Antioxidants:** Help protect cells against oxidative damage.

- **Vitamin C:** Important for immune function and tissue maintenance.
- **Minerals:** Reportedly contains improved levels of **iron and zinc**.

Other Coloured Potato Varieties

- **Kufri Neelkanth (2018):** Purple-skinned variety with antioxidant-rich characteristics.
- **Kufri Manik (2021):** Red-skinned potato with yellow flesh.
- Both demonstrate efforts to diversify potato varieties.

JEYPORE GROUND GECKO

SOURCE: TIMES OF INDIA

Why in News?

Conservationists raised concerns that a proposed **bauxite mining project in Odisha** could threaten the habitat of the rare **Jeypore Ground Gecko**.

About Jeypore Ground Gecko

- The **Jeypore Ground Gecko (Cyrtodactylus jeyporensis)** is a rare, nocturnal reptile found in the **Eastern Ghats of India**.
- It is also called the **Jeypore Indian Gecko** or **Patinghe Indian Gecko**.

Scientific Classification

- **Class:** Reptilia.
- **Order:** Squamata.
- **Family: Gekkonidae**, in traditional classification; the genus is now commonly placed in **Gekkonidae**.
- **Scientific Name:** *Cyrtodactylus jeyporensis*.
- **First Described: 1878**, by British naturalist **Richard Henry Beddome**.

Physical Characteristics

- **Size:** Approximately **9 cm** in length.
- **Colour:** Yellowish-orange to brownish body with markings.
- **Head:** Comparatively large.
- **Activity:** Mainly **nocturnal**.
- **Diet:** Small insects and other invertebrates.

Habitat and Distribution

- **Region:** Northern **Eastern Ghats**.
- **States:** Southern **Odisha** and northern **Andhra Pradesh**.
- **Altitude:** Approximately **900–1,400 metres**.
- **Habitat:** Moist and semi-evergreen forests.
- **Distribution:** Highly restricted, making the species vulnerable to local habitat changes.

Major Threats

- **Bauxite Mining:** Forest clearance and habitat fragmentation.
- **Quarrying:** Destruction of rocky microhabitats.
- **Forest Fires:** Loss of vegetation and shelter.
- **Tourism:** Human disturbance and habitat degradation.
- **Climate Change:** Possible alteration of forest moisture conditions.

Conservation Status

- **IUCN Red List: Endangered (EN)**.
- **CITES:** Reported under **Appendix II**.
- **Conservation Priority:** Protection of high-altitude forest habitats.

ALPINE MUSK DEER

SOURCE: THE HINDU

Why in News?

A recent report highlighted concerns about the extremely small **captive Himalayan musk deer population in recognised Indian zoos**.



About Alpine Musk Deer

- The **Alpine Musk Deer (Moschus chrysogaster)** is a small, shy, mountain-dwelling mammal found in parts of the **Himalayan region**.
- It belongs to the **Moschidae family**, separate from true deer of the Cervidae family.

Scientific Classification

- **Class:** Mammalia.
- **Order:** Artiodactyla.
- **Family: Moschidae**.
- **Scientific Name:** *Moschus chrysogaster*.
- **Special Feature:** Adult males possess a **musk gland**.

Habitat and Distribution

- **Countries:** India, Nepal, Bhutan and China.
- **Indian Habitat:** Himalayan mountain forests and alpine regions.
- **Elevation:** Generally **3,000–5,000 metres**.
- **Vegetation:** Coniferous forests, mixed forests, shrubs and alpine vegetation.

Major Characteristics

- **Behaviour:** Mostly solitary and **crepuscular**, active around dawn and dusk.
- **Diet:** Herbivorous; feeds on grasses, leaves, shoots, mosses and lichens.
- **Teeth:** Males possess long, downward-projecting **canine teeth**.
- **Antlers:** Absent in both sexes.
- **Musk Sac:** Present in adult males and produces a strong-smelling secretion.

Major Threats

- **Poaching:** Illegal hunting for valuable **musk**.
- **Habitat Loss:** Forest degradation and infrastructure expansion.
- **Climate Change:** Changes in alpine habitats.
- **Small Populations:** Make conservation and breeding difficult.

Conservation Status

- **IUCN Red List: Endangered (EN)**.
- **CITES: Appendix I**, providing strict controls on international commercial trade.
- **Wild Life (Protection) Act, 1972: Schedule I**, providing high legal protection.

SARUS CRANE

SOURCE: INDIAN EXPRESS

Why in News?

The **Bombay Natural History Society (BNHS)** announced a nationwide survey to estimate the population of **Sarus Cranes**.

About Sarus Crane

- The **Sarus Crane (Antigone antigone)** is recognised as the **world's tallest flying bird**.
- It is a large, mainly non-migratory bird associated with wetlands and agricultural landscapes.

Scientific Classification

- **Class:** Aves.
- **Order:** Gruiformes.
- **Family: Gruidae**.
- **Scientific Name:** *Antigone antigone*.
- **Common Name:** Sarus Crane.

Habitat and Distribution

- **Global Distribution:** Indian subcontinent, parts of Southeast Asia and northern Australia.
- **Indian Distribution:** Mainly **Uttar Pradesh, Rajasthan, Gujarat and adjoining northern plains**.
- **Habitats:** Wetlands, marshes, shallow lakes, grasslands and agricultural fields.
- **Movement:** Generally **non-migratory**, with local seasonal movements.

Physical Characteristics

- **Height:** Can reach approximately **1.8 metres**.
- **Body:** Predominantly grey plumage.
- **Head and Neck:** Distinctive **red, largely featherless upper neck and head**.
- **Legs:** Long and pinkish-red.
- **Diet:** Omnivorous; consumes grains, aquatic plants, insects and small animals.

Behaviour

- **Monogamous:** Commonly forms long-lasting breeding pairs.
- **Courtship:** Famous for coordinated dances and loud calls.
- **Nesting:** Builds nests in shallow wetlands.
- **Territorial:** Breeding pairs defend nesting areas.

Major Threats

- **Wetland Loss:** Drainage and conversion of wetlands.
- **Agricultural Chemicals:** Pesticides can harm birds and their food sources.
- **Power Lines:** Collision and electrocution risks.
- **Human Disturbance:** Affects breeding and nesting success.

Conservation Status

- **IUCN Red List: Vulnerable (VU)**.
- **CITES: Appendix II**.
- **Wild Life (Protection) Act, 1972: Schedule I**.

State Bird: Uttar Pradesh.

GREEN CRACKERS IN DELHI-NCR: SUPREME COURT GUIDELINES

Why in News?

The **Supreme Court permitted the conditional use of certified green crackers** in Delhi-NCR on **7–8 November 2026**.

Green crackers

- **Green crackers** are specially developed firecrackers designed to release fewer pollutants than conventional varieties.
- They were developed through research led by **CSIR-NEERI** to reduce the environmental impact of fireworks.
- The Supreme Court's reported directions highlight the need to balance **individual freedoms with collective environmental rights**.

Major Supreme Court Guidelines

A. Restricted Bursting Hours

- According to the reported order, certified green crackers may be used during:
  - **Morning:** 6 a.m. to 7 a.m.
  - **Evening:** 8 p.m. to 10 p.m.
- The permission applies to **7 and 8 November 2026**.

B. Protection of Sensitive Areas

- Firecrackers are prohibited within a **300-metre radius** of:
  - Hospitals and nursing homes.
  - Health centres and educational institutions.
  - Old-age homes and notified silence zones.
- Authorities must identify and publicise these **no-cracker zones**.

C. Certification Requirements

- Only authorised **green crackers** meeting prescribed standards may be sold.
- Manufacturers must comply with requirements involving **CSIR-NEERI** and **PESO**.

D. Restrictions on Sale

- Permitted crackers must carry **product-specific QR codes** for identification.
- Firecracker chains or garlands, commonly called **ladis**, remain prohibited.
- Authorised products must be packaged separately from conventional crackers.

E. Enforcement

- Manufacturers and traders must follow licensing and financial-security requirements.
- Authorities are responsible for preventing illegal sales and ensuring compliance.

Constitutional Provisions Involved

Article 25 – Freedom of Religion

- Guarantees freedom of conscience and the right to profess, practise and propagate religion.
- However, this freedom is subject to **public order, morality, health and other Fundamental Rights**.
- Therefore, religiously associated activities may be regulated to protect public health.

Article 21 – Right to Life

- The Supreme Court has interpreted Article 21 to include the **right to a healthy environment**.
- Excessive air and noise pollution can interfere with this right.

Article 48A – Environmental Protection

- Directs the State to protect and improve the environment.

Article 51A(g) – Fundamental Duty

- Requires citizens to protect and improve the natural environment.

Environmental and Health Concerns

- **Air Pollution:** Firecrackers release particulate matter and gaseous pollutants.
- **Respiratory Diseases:** Pollution can worsen asthma and other breathing problems.
- **Noise Pollution:** Loud explosions disturb children, elderly people and patients.

- **Solid Waste:** Firecracker debris creates additional cleaning and disposal challenges.
- **Winter Conditions:** Low wind speeds and temperature inversions can worsen Delhi-NCR's pollution problem.

Importance of Green Crackers

- **Lower Emissions:** Approved formulations are designed to reduce particulate emissions compared with conventional crackers.
- **Scientific Innovation:** Encourage cleaner technologies through research.
- **Regulated Celebrations:** Offer a controlled alternative to unrestricted firecracker use.
- **Product Traceability:** QR codes help authorities identify authorised products.

However, green crackers are not pollution-free and can still harm air quality.

Major Implementation Challenges

- **Illegal Markets:** Unauthorised firecrackers may continue to be sold.
- **Weak Monitoring:** Checking compliance across Delhi-NCR requires extensive enforcement.
- **Public Awareness:** Consumers may struggle to identify genuine green crackers.
- **Multiple Pollution Sources:** Vehicles, construction dust and other emissions also contribute to poor air quality.
- **Inter-State Coordination:** Different authorities must implement restrictions consistently.

Way Forward

- **Strict Enforcement:** Monitor sales, manufacturing and bursting hours.
- **Public Awareness:** Educate consumers about certified products and health risks.
- **Scientific Monitoring:** Use air-quality data to assess the impact of restrictions.
- **Regional Cooperation:** Strengthen coordination among Delhi-NCR authorities.
- **Sustainable Celebrations:** Promote lamps, community activities and low-pollution alternatives.

Conclusion

The regulation of green crackers demonstrates that religious celebrations must be balanced with public health, environmental sustainability and effective enforcement of constitutional rights.



SCIENCE AND TECHNOLOGY

SPACE TECHNOLOGY

NUCLEAR POWER ON THE MOON – FISSION SURFACE POWER PROJECT

SOURCE: TIMES OF INDIA

Why in News?

NASA and the US Department of Energy (DOE) are accelerating the **Fission Surface Power (FSP) Project** to deploy a nuclear reactor near the Moon's south pole by **2030**.

What is the Fission Surface Power Project?

- **Implementing Agencies:** NASA and the US Department of Energy.
- **Objective:** Develop a compact nuclear fission reactor for use on the lunar surface.
- **Target:** Prepare a lunar reactor for deployment by **2030**.
- **Fuel:** The proposed technology uses **High-Assay Low-Enriched Uranium (HALEU)**.
- **Purpose:** Provide electricity for:
    - **Astronaut habitats** and life-support systems.
    - Scientific instruments and robotic vehicles.
    - Water-ice extraction and processing.
    - Future missions to **Mars**.

Why is Nuclear Power Needed on the Moon?

A. Long Lunar Night

- One lunar day-night cycle lasts approximately **29.5 Earth days**.
- Solar panels cannot generate electricity during prolonged darkness without substantial energy storage.

B. Permanently Shadowed Regions

- Some craters near the **lunar south pole** receive almost no sunlight.
- These regions may contain **water ice**, an important resource for future exploration.

C. Continuous Energy Supply

- Nuclear reactors can generate electricity independently of sunlight.
- They support essential services during extreme lunar temperatures.

D. In-Situ Resource Utilisation (ISRU)

- **ISRU** means using resources available at the exploration site.
- Lunar ice could potentially be processed into **drinking water, oxygen and rocket propellant**.

Nuclear Fission Reactor vs RTG

Nuclear Fission Reactor

- Produces heat through a **controlled nuclear chain reaction**.
- Can generate relatively large amounts of electricity.
- Suitable for long-term lunar settlements.

Radioisotope Thermoelectric Generator (RTG)

- Converts heat from the **natural radioactive decay** of materials into electricity.
- Does not involve a nuclear chain reaction.
- Generally provides much lower power than a reactor.

Strategic and Geopolitical Concerns

- **Competition for Resources:** Water-rich lunar locations may become strategically important.
- **Control Over Infrastructure:** Countries operating reactors could gain advantages in nearby areas.
- **Safety Zones:** Protective boundaries around nuclear facilities may create disputes over access.
- **Space Governance:** International rules must prevent the effective monopolisation of lunar territory.

Major Technical and Environmental Challenges

- **Radiation Protection:** Reactors require shielding to protect astronauts.
- **Heat Management:** The Moon lacks an atmosphere, making heat removal difficult.
- **Transportation:** Launching reactors and associated equipment is costly and technically demanding.
- **Autonomous Operation:** Systems must function with limited human maintenance.
- **Radioactive Contamination:** Accidents could damage scientifically valuable lunar environments.
- **Waste Disposal:** Clear rules are needed for handling and decommissioning spent reactors.

International Legal Framework
Outer Space Treaty, 1967 • Prohibits **national appropriation of the Moon and other celestial bodies**. • Requires states to consider the interests of other space-faring nations. **Article IX** • Calls for **due regard** and consultations where activities may cause harmful interference. **UN Principles on Nuclear Power Sources, 1992** • Provide **non-binding guidance** for the safe use of nuclear power sources in outer space. **Artemis Accords** • Promote peaceful exploration, transparency and measures to avoid harmful interference.

India's Position and Way Forward

- **ISRO and the Department of Atomic Energy (DAE)** are exploring nuclear technologies for future space missions.
- Nuclear power could support India's long-term lunar exploration ambitions.
- India should strengthen:
  - **Indigenous space nuclear technology**.
  - **ISRO–DAE cooperation**.
  - Research on radiation shielding and reactor safety.
  - International cooperation through **UN-COPUOS**.
  - Rules for lunar nuclear waste disposal and transparent safety zones.

Conclusion

Nuclear power can enable permanent lunar exploration, but its deployment must follow strict safety standards, responsible resource use and fair international space governance.

EMERGING TECHNOLOGY

NUCLEAR FUSION TECHNOLOGY – PRANOS FUSION

SOURCE: THE HINDU

Why in News?

Bengaluru-based startup **Pranos Fusion** is developing what is reported to be **India's first privately built tokamak**, with its design expected to be finalised by **2027**.

About Nuclear fusion

- **Nuclear fusion** is the process in which two light atomic nuclei combine to form a heavier nucleus, releasing enormous energy.
- It is the process that powers the **Sun and other stars**.
- Fusion research offers the possibility of producing **low-carbon electricity** with abundant fuel resources and potentially less long-lived radioactive waste than conventional nuclear fission.

What is Pranos Fusion?

- **Pranos Fusion** is a Bengaluru-based startup working on indigenous fusion technology.
- It aims to develop **tokamak reactors**, superconducting magnets and plasma-control systems.
- The startup is reportedly supported through incubation at the **Institute for Plasma Research (IPR)** and **Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)**.

Major Projects

- **PRAGYA:** A compact tokamak for testing plasma confinement, control and superconducting magnets.
- **PRANIK:** A proposed larger tokamak intended to investigate conditions required for nuclear fusion.
- **JENGA:** A simulation and control platform functioning as a **digital twin** of the reactor.
- **MAGGA:** A programme to develop **high-temperature superconducting (HTS) magnets**.

How Does Nuclear Fusion Work?

- Fusion commonly uses two hydrogen isotopes:
  - **Deuterium (^2H)** – Contains one proton and one neutron.
  - **Tritium (^3H)** – Contains one proton and two neutrons.
- At temperatures of around **100 million°C or higher**, fuel becomes **plasma**, an electrically charged state of matter.
- Under suitable conditions, deuterium and tritium combine to produce helium, a neutron and energy.

Fusion Reaction:bDeuterium + Tritium → Helium-4 + Neutron + Energy (17.6 MeV)

What is Tokamak Technology?

- A **tokamak** is a doughnut-shaped device designed to confine extremely hot plasma.
- It uses powerful **magnetic fields** to prevent the plasma from touching reactor walls.
- Its main components include:
  - **Vacuum Chamber:** Contains the plasma.

- **Magnetic Coils:** Confine and control the plasma.
- **Heating Systems:** Raise plasma temperature.
- **Divertor:** Helps remove impurities and excess heat.

Advantages of Nuclear Fusion

- **Low-Carbon Energy:** Fusion does not directly emit carbon dioxide during the reaction.
- **High Energy Density:** Small quantities of fuel can release large amounts of energy.
- **Fuel Availability:** Deuterium can be extracted from water.
- **Energy Security:** Could reduce long-term dependence on fossil fuels.
- **Safety:** Fusion does not involve the same type of self-sustaining chain reaction as fission.
- **Reduced Long-Lived Waste:** It may produce less long-lived radioactive waste than conventional fission reactors.

Major Challenges

- **Extreme Temperature:** Maintaining plasma above 100 million°C is technically difficult.
- **Plasma Instability:** Magnetic confinement must prevent sudden energy losses.
- **High Costs:** Superconducting magnets and reactor materials require major investment.
- **Tritium Supply:** Tritium is scarce and must eventually be bred using lithium.
- **Neutron Damage:** High-energy neutrons can damage reactor materials.
- **Commercial Viability:** Reliable and economically competitive fusion electricity has not yet been demonstrated.

India's Nuclear Fusion Initiatives

- **ADITYA:** India's indigenous tokamak developed by the **Institute for Plasma Research**.
- **ADITYA-U:** Upgraded tokamak for advanced plasma experiments.
- **SST-1:** Steady State Tokamak designed to study long-duration plasma operation.
- **ITER Participation:** India is one of the **seven members** of the international fusion project in France.
- **Private Innovation:** Startups such as Pranos Fusion can strengthen domestic research, manufacturing and technological capabilities.

Important Global Developments

- **ITER, France:** International project to demonstrate large-scale magnetic-confinement fusion.
- **JET, United Kingdom:** Achieved a record **69 megajoules** of fusion energy in experiments conducted in 2023.
- **National Ignition Facility, USA:** Achieved **fusion ignition in December 2022** using laser-driven inertial confinement.

Conclusion

Pranos Fusion represents an emerging step towards indigenous fusion technology that could strengthen India's scientific capabilities and future clean-energy security.

AI DATA CENTRES IN INDIA

SOURCE: THE HINDU

Why in News?

NITI Aayog's Frontier Tech Hub has proposed a policy framework to ensure sustainable development of **AI data centres in India**.

About Data centres

- **Data centres** are specialised facilities that store, process and manage digital information using servers, storage systems and networking equipment.
- **Artificial Intelligence (AI) data centres** use powerful computing systems, particularly **Graphics Processing Units (GPUs)**, for training and operating AI models.
- India's growing digital economy makes these facilities important for **technological self-reliance, economic growth and data security**.

Growth of AI Data Centres in India

- **Installed Capacity:** Approximately **1.6 GW by mid-2026**, according to estimates cited in the article.
- **Future Projection:** Capacity could reach around **6 GW by 2029**.
- **Investment Requirement:** Expansion may require approximately **USD 110 billion**.
- **Major Locations:** Mumbai, Chennai, Hyderabad, Noida and Visakhapatnam.
- **Growth Drivers:** Increasing internet usage, cloud computing, 5G networks and AI applications.

Why is India Emerging as an AI Data Centre Hub?

- **Digital Economy:** UPI, e-commerce, online education and digital services generate enormous amounts of data.

- **IndiaAI Mission:** Promotes domestic AI computing infrastructure and indigenous AI development.
- **Data Sovereignty:** Local infrastructure supports greater control over strategically important data.
- **Connectivity:** Submarine communication cables connect India with international digital networks.
- **Investment Opportunities:** Large technology companies are expanding cloud and AI infrastructure.
- **Skilled Workforce:** India's IT professionals support digital infrastructure development.

Major Challenges

A. High Electricity Consumption

- AI servers require continuous power.
- Large facilities can place pressure on **electricity grids and distribution companies (DISCOMs)**.

B. Water Consumption

- Some cooling systems use substantial quantities of water.
- This can increase competition for freshwater in **water-stressed regions**.

C. Limited Employment Generation

- Data centres require large investments but may create relatively few permanent direct jobs.

D. Environmental Pollution

- Diesel backup generators contribute to **air pollution and carbon emissions**.
- Frequent replacement of computing hardware generates **electronic waste**.

E. Infrastructure Pressure

- New facilities require reliable electricity, land, fibre-optic networks and cooling infrastructure.

NITI Aayog's Major Recommendations

A. Electricity-Grid Readiness

- Assess electricity availability before approving projects.
- Developers, DISCOMs and transmission utilities should prepare **power infrastructure plans**.
- Large facilities should adopt **demand-response systems** to manage electricity consumption.

B. Long-Term Water Assessment

- Conduct **20–30-year water availability studies**.
- Promote **treated wastewater, water recycling and efficient cooling**.
- Avoid excessive dependence on groundwater.

C. Performance-Based Incentives

- Link subsidies to measurable outcomes such as:
  - **Local employment generation**.
  - Domestic equipment procurement.
  - **Renewable energy adoption**.
  - Research and development.

D. Suitable Location Selection

- Identify **data-centre-ready zones** with adequate infrastructure.
- Restrict development in **ecologically sensitive and severely water-scarce areas**.

E. Environmental Monitoring

- The proposed framework calls for stronger monitoring of:
  - **Power Usage Effectiveness (PUE)**.
  - Water consumption.
  - Carbon emissions.
  - Renewable electricity use.

Significance of the Recommendations

- **Sustainable Growth:** Balances AI development with environmental protection.
- **Energy Security:** Reduces pressure on regional electricity systems.
- **Water Conservation:** Protects drinking water and agricultural requirements.
- **Economic Efficiency:** Ensures public subsidies deliver measurable benefits.
- **Digital Sovereignty:** Strengthens India's domestic computing capabilities.

Way Forward

- **Green Data Centres:** Encourage renewable electricity and energy-efficient computing.
- **Advanced Cooling:** Promote liquid cooling, closed-loop systems and wastewater reuse where suitable.
- **Better Planning:** Coordinate approvals among electricity, water and urban authorities.
- **Transparent Reporting:** Publish verified energy, water and emissions data.
- **Circular Economy:** Improve server repair, reuse and responsible e-waste recycling.
- **Balanced Development:** Encourage investment without compromising local resource security.

Conclusion

India must develop energy-efficient and water-responsible AI data centres to strengthen digital sovereignty while protecting natural resources and ensuring sustainable economic growth.

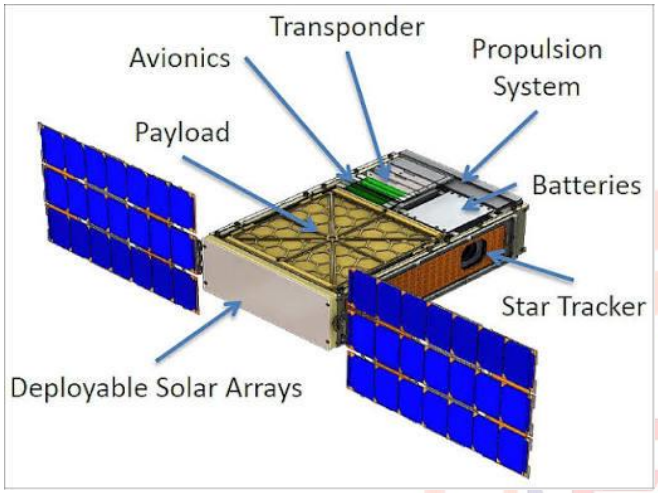
PRELIMS POINTERS IN NEWS

NASA's BIOSENTINEL MISSION

SOURCE: INDIAN EXPRESS

Why in News?

NASA's BioSentinel mission did not detect the expected growth of yeast cells carried to study biological responses to deep-space radiation.



About BioSentinel

- **BioSentinel** is a small spacecraft developed by **NASA's Ames Research Center** to investigate the effects of deep-space radiation on living organisms.
- It was the first long-duration biological experiment sent beyond LEO in nearly **50 years**.

Mission Profile

- **Space Agency:** NASA, United States.
- **Launch Date: 16 November 2022**.
- **Launch Vehicle: Space Launch System (SLS)**.
- **Mission: Artemis I**.
- **Spacecraft Type: 6U CubeSat**.
- **Primary Objective:** Study the biological effects of **ionising radiation** beyond Earth's protective magnetic environment.

Major Scientific Instruments

1. BioSensor

- Contains the budding yeast **Saccharomyces cerevisiae**.
- Uses **microfluidic technology** to maintain and monitor biological samples.
- Optical sensors were designed to detect changes in yeast growth and metabolic activity.
- Yeast was selected because several of its **DNA-repair mechanisms** are also found in human cells.

2. Radiation Detector

- Measures exposure to **ionising radiation**.
- Helps characterise the radiation environment encountered by the spacecraft.
- Provides data relevant to astronaut radiation protection.

Significance

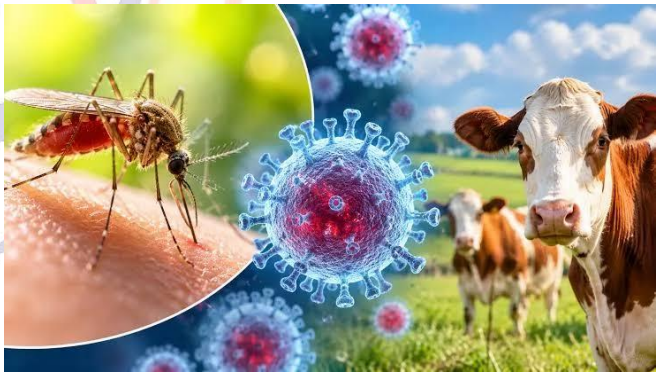
- **Human Spaceflight:** Supports research into biological risks during future Moon and Mars missions.
- **Space Biology:** Helps develop compact instruments for biological experiments.
- **Radiation Research:** Improves understanding of exposure beyond LEO.
- **Mission Lessons:** The absence of detected yeast growth demonstrates the difficulty of maintaining viable biological samples in space.

SHAMONDA VIRUS

SOURCE: THE HINDU

Why in News?

France reportedly identified the **first documented human infection involving Shamonda virus** in a seriously ill patient in October 2026.



About Shamonda virus

- **Shamonda virus** is an arthropod-borne virus mainly associated with infections in livestock.
- It belongs to the genus **Orthobunyavirus** and family **Peribunyaviridae**.

Origin and Distribution

- **First Isolation:** From cattle in **Nigeria in 1965**.
- **Distribution:** Reported in animals across parts of **Africa, Asia and Europe**.
- **Affected Animals:** Primarily cattle, with infections also reported in other domestic livestock.

Transmission

- **Primary Vectors:** Biting midges of the genus **Culicoides**.

- **Vector-Borne Spread:** Infected insects may transmit the virus while feeding on animals.
- **Vertical Transmission:** Infection can sometimes pass from a pregnant animal to its developing foetus.
- **Human Transmission:** The exact route and frequency of human infection remain uncertain.

Clinical Features

In Animals

- Fever and reduced productivity.
- Possible reproductive problems, including abortions and foetal abnormalities.
- Effects vary depending on the animal and infection.

Reported Human Case

- Severe neurological symptoms reportedly included **visual impairment, confusion and coma**.
- A single case cannot establish the usual symptoms or severity of human infection.

Prevention and Control

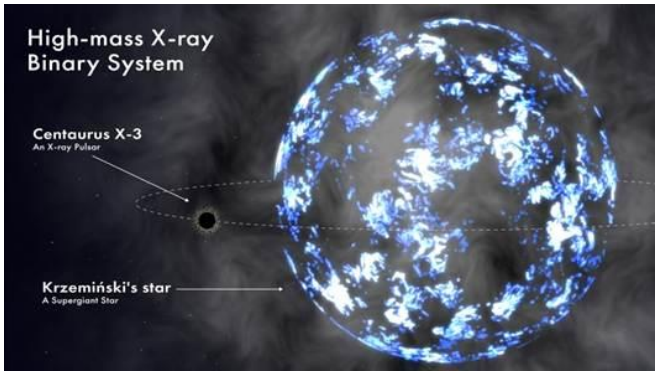
- **Vector Surveillance:** Monitor biting-midge populations.
- **Livestock Protection:** Use suitable insect screens and reduce exposure to vectors.
- **Veterinary Monitoring:** Investigate unexplained reproductive illness.
- **One Health Approach:** Coordinate human, animal and environmental health surveillance.

CENTAURUS X-3

SOURCE: INDIAN EXPRESS

Why in News?

Scientists reported evidence that **Centaurus X-3** receives matter through an **accretion disk**, an important feature of its X-ray emission.



About Cen X-3

- **Centaurus X-3 (Cen X-3)** is a bright **X-ray pulsar** located in the constellation **Centaurus**.
- It is a **high-mass X-ray binary (HMXB)** consisting of a neutron star and a massive companion star.

Major Characteristics

- **Location:** Approximately **24,000 light-years** from Earth.
- **Constellation:** Centaurus.
- **Binary Components:** A highly magnetised **neutron star** and a massive **O-type companion star**.
- **Companion Mass:** More than **10 times the Sun's mass**.
- **Pulsar Rotation:** Approximately **4.84 seconds**.
- **Orbital Period:** Around **2.087 days**.

How Centaurus X-3 Works

1. Accretion Process

- The neutron star attracts material from its massive companion.
- Transferred matter can form a rotating **accretion disk**.
- The neutron star's strong magnetic field channels material towards its magnetic poles.

2. X-ray Production

- Falling matter releases enormous energy near the neutron star's surface.
- This produces intense **X-ray radiation**.
- Rotation makes the X-ray emission appear as regular pulses.

3. Secondary Radiation

- Nearby material absorbs and re-emits some radiation.
- Studying this emission helps estimate the system's geometry and physical conditions.

Scientific Significance

- Helps scientists understand **mass transfer in binary systems**.
- Provides information about **extreme gravity and magnetic fields**.
- Supports research into the behaviour of matter under extraordinary physical conditions.

MARTIAN MOONS EXPLORATION (MMX) MISSION

SOURCE: INDIAN EXPRESS

Why in News?

Japan's **Martian Moons eXploration (MMX) mission** attracted attention for its plan to collect samples from **Phobos**, a moon of Mars.



About Martian Moons eXploration

- **MMX** is a robotic space mission led by the **Japan Aerospace Exploration Agency (JAXA)**.
- Its main objective is to study **Phobos and Deimos**, the two natural satellites of Mars, and return samples from Phobos to Earth.

Mission Profile

- **Lead Agency:** JAXA, Japan.
- **Launch Vehicle:** Japan's **H3 rocket**.
- **Mission Type:** Robotic **sample-return mission**.
- **Target: Phobos**, with additional observations of **Deimos**.
- **International Partners: NASA, CNES, DLR and ESA**.
- **Planned Sample Mass:** At least **10 grams** of material from Phobos.
- **Return Objective:** Deliver collected samples to Earth for laboratory analysis.

Major Components

- **Propulsion Module:** Supports travel towards Mars.
- **Exploration Module:** Carries scientific instruments for studying the moons.
- **Return Module:** Designed to transport samples back to Earth.

Scientific Instruments

- **MEGANE:** NASA-provided instrument using **gamma rays and neutrons** to study elemental composition.
- **Rover:** Developed through cooperation between **France and Germany** to investigate Phobos's surface.
- **Sampling Equipment:** Includes mechanisms designed to collect surface material.

Major Objectives

- **Moon Formation:** Determine whether Phobos and Deimos formed from captured asteroids or debris associated with Mars.
- **Surface Analysis:** Study minerals, dust and physical characteristics.
- **Planetary History:** Improve understanding of the evolution of the Martian system.
- **Future Exploration:** Demonstrate technologies useful for planetary sample-return missions.

TRISHNA SATELLITE

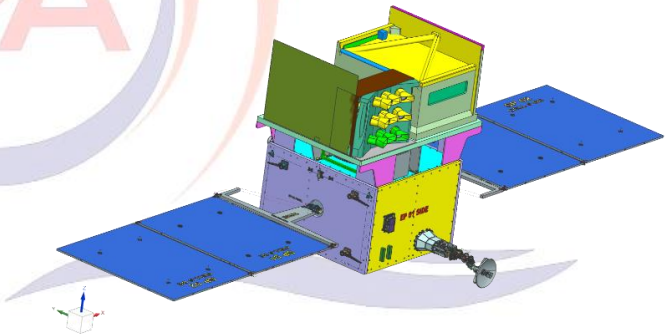
SOURCE: TIMES OF INDIA

Why in News?

The project leadership of **TRISHNA**, an Indo-French Earth observation satellite, indicated that its launch was expected within the next **12–16 months**.

About TRISHNA

- **TRISHNA** stands for **Thermal Infra-Red Imaging Satellite for High-resolution Natural Resource Assessment**.
- It is a joint Earth observation mission of **ISRO (India)** and **CNES (France)**, designed to study Earth's surface using thermal and optical measurements.



Background

- **Partner Agencies:** Indian Space Research Organisation and Centre National d'Études Spatiales.
- **Earlier Joint Satellites: Megha-Tropiques (2011)** and **SARAL (2013)**.
- **Mission Type:** Earth observation and natural resource monitoring.
- **Primary Focus:** Surface temperature, water availability and ecosystem health.

Major Payloads

1. Thermal Infrared (TIR) Instrument

- **Provided by:** CNES.
- Uses **four thermal infrared channels**.
- Measures **land and water surface temperatures**.

- Supports the estimation of **surface emissivity** and heat-related conditions.

2. VNIR–SWIR Instrument

- **Developed by:** ISRO.
- Uses **seven spectral bands** covering visible, near-infrared and shortwave-infrared wavelengths.
- Helps measure vegetation, soil and surface reflectance characteristics.

Major Objectives

- **Agriculture:** Detect crop water stress and support irrigation planning.
- **Water Resources:** Monitor evaporation, water use and inland water bodies.
- **Urban Planning:** Identify **Urban Heat Islands (UHIs)**.
- **Cryosphere:** Study snowmelt, glacier-related changes and runoff.
- **Disaster Monitoring:** Detect thermal anomalies associated with volcanic or geothermal activity.
- **Climate Research:** Improve understanding of Earth's **surface energy balance**.

PUFFINS TELESCOPE MISSION

SOURCE: THE HINDU

Why in News?

Bengaluru-born astronomer **Dr Ramya Anche** was reported to be leading NASA's approximately **$20 million PUFFINS space telescope mission**.

About PUFFINS

- **PUFFINS** is a proposed small space telescope mission selected under NASA's **Astrophysics Pioneers programme**.
- It aims to study tiny dust particles located in the space between stars.

Mission Profile

- **Full Form: Polarimetry in the Ultraviolet to Find Features in INterStellar dust**.
- **Funding Agency: NASA**.
- **Mission Category: SmallSat**.
- **Research Collaboration:** Includes the **University of Arizona**, McDonald Observatory and other scientific institutions.
- **Telescope Aperture:** Approximately **10 inches**.
- **Target Observations:** Ultraviolet light from about **70 stars**.

Scientific Method

- Uses **ultraviolet spectropolarimetry**.
- **Spectroscopy** studies light at different wavelengths.
- **Polarimetry** measures the orientation of light waves.
- Combining both techniques helps determine how dust particles interact with light and magnetic fields.

Major Objectives

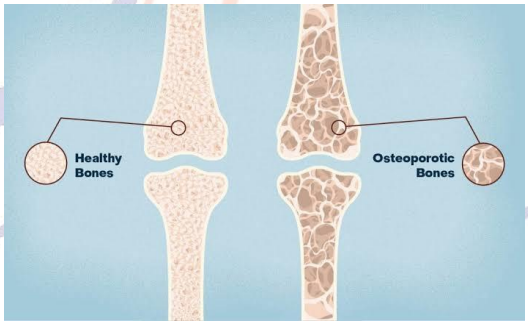
- **Dust Properties:** Study the size, composition and behaviour of very small interstellar grains.
- **Magnetic Fields:** Understand the relationship between dust alignment and the **Milky Way's magnetic field**.
- **Interstellar Medium:** Improve knowledge of matter distributed between stars.
- **Astronomical Observations:** Reduce uncertainty caused by dust-related absorption and scattering of starlight.

OSTEOPOROSIS

SOURCE: INDIAN EXPRESS

Why in News?

Growing concerns about **poor bone health among younger adults** have brought renewed attention to osteoporosis.



How Osteoporosis Develops

- Bones are living tissues that continuously undergo **remodelling**.
- **Osteoclasts** break down old bone, while **osteoblasts** form new bone.
- Osteoporosis develops when **bone breakdown exceeds bone formation** over time.
- This weakens bone structure and increases susceptibility to fractures.

Major Risk Factors

- **Ageing:** Bone density generally decreases with advancing age.
- **Hormonal Changes:** Reduced **oestrogen** after menopause accelerates bone loss.

- **Nutrition:** Inadequate **calcium, vitamin D and protein**.
- **Lifestyle:** Physical inactivity, smoking and excessive alcohol consumption.
- **Medical Conditions:** Certain hormonal and metabolic disorders.
- **Medicines:** Long-term use of **glucocorticoids** can increase risk.
- **Family History:** Genetic factors may influence bone strength.

Symptoms and Complications

- Often produces **no early symptoms**.
- **Fragility Fractures:** Fractures after minor falls or low-impact injuries.
- **Common Sites: Hip, spine and wrist**.
- **Vertebral Fractures:** May cause back pain, loss of height and a stooped posture.
- Severe fractures can reduce mobility and independence.

Diagnosis and Management

- **DEXA/DXA Scan:** Measures **bone mineral density (BMD)**.
- **T-score:** A score of **–2.5 or lower** is a standard diagnostic threshold for osteoporosis in appropriate adult groups.
- **Prevention:** Adequate nutrition, weight-bearing exercise and muscle-strengthening activities.
- **Treatment:** May include calcium and vitamin D when needed, fall prevention and prescribed bone-strengthening medicines.
- **Early Screening:** Especially important for older adults and people with major risk factors.

BUD ROT DISEASE

SOURCE: THE HINDU

Why in News?

Coconut farmers in **Tiptur taluk, Tumakuru district, Karnataka**, reported increasing damage to palms due to **Bud Rot Disease**.

About Bud Rot Disease

- **Bud Rot Disease** is a serious disease of coconut palms that damages the **terminal bud or growing point**.
- If the growing point is completely destroyed, the palm cannot produce new leaves and may eventually die.

Causative Organism

- **Pathogen:** *Phytophthora palmivora*.
- **Organism Group: Oomycetes**, commonly called water moulds.
- Although traditionally described as a fungal disease, the pathogen is **not a true fungus**.
- It spreads more easily under **wet and humid conditions**.

Favourable Conditions

- **Heavy Rainfall:** Encourages pathogen development and spread.
- **High Humidity:** Supports infection of tender tissues.
- **Waterlogging:** Creates conditions favourable for disease.
- **Poor Drainage:** Increases moisture around affected palms.
- **Young Palms:** Often particularly vulnerable.

Major Symptoms

1. Early Stage

- Yellowing or discolouration of the youngest leaves.
- Pale appearance of the central **spear leaf**.
- Softening and decay of tissues near the crown.

2. Advanced Stage

- The spear leaf becomes weak and may break or detach.
- Rotting tissues can produce a **foul smell**.
- Successive leaves droop as the infection progresses.
- Severe infection destroys the **apical meristem**, causing the crown to collapse.

Management Measures

- **Early Detection:** Regularly inspect palms, particularly during monsoon months.
- **Sanitation:** Remove infected tissues carefully and dispose of them safely.
- **Drainage:** Prevent standing water near palms.
- **Chemical Protection:** Apply recommended **copper-based treatments or Bordeaux paste** under agricultural expert guidance.
- **Preventive Care:** Monitor neighbouring palms and follow local agricultural department advisories.

NOBEL PRIZE IN PHYSICS 2026 – ICECUBE NEUTRINO OBSERVATORY

Why in News?

The **2026 Nobel Prize in Physics** was awarded to **Francis Halzen** for his pioneering contributions to the **IceCube Neutrino Observatory**.

What is the IceCube Neutrino Observatory?

- **Location:** Amundsen–Scott South Pole Station, Antarctica.
- **Completed:** December 2010.
- **Scale:** Uses approximately **one cubic kilometre of Antarctic ice**.
- **Equipment:** Contains **5,160 optical sensors** embedded deep underground.
- **Purpose:** Detect high-energy neutrinos from distant astronomical sources.
- **Key Scientist: Francis Halzen**, associated with the University of Wisconsin–Madison.

How Does IceCube Work?

- Neutrinos travel through space and matter with very few interactions.
- Occasionally, a neutrino collides with an atomic nucleus in Antarctic ice.
- This interaction produces **charged particles** travelling at very high speeds.
- These particles generate faint blue light called **Cherenkov radiation**.
- IceCube's optical sensors detect the light.
- Scientists use the signals to estimate the neutrino's **energy and incoming direction**.

Why Antarctica?

- Its deep ice is relatively **transparent, stable and dark**, making it suitable for detecting faint light signals.

What are Neutrinos?

- Neutrinos are **elementary particles** belonging to the **lepton family**.
- They have **no electrical charge** and extremely small mass.
- They interact mainly through the **weak nuclear force and gravity**.
- They can pass through enormous amounts of matter without being absorbed.

Major Sources

- The **Sun and other stars**.
- **Supernova explosions**.
- Cosmic-ray interactions.
- Nuclear reactors and radioactive decay.

Three Types of Neutrinos

- **Electron neutrino**.
- **Muon neutrino**.
- **Tau neutrino**.

Neutrino Oscillation: Neutrinos can change from one type to another while travelling, demonstrating that they possess mass.

Importance of Neutrino Astronomy

- **New Window into the Universe:** Studies cosmic events using particles rather than electromagnetic radiation.
- **Black Hole Research:** Helps investigate energetic regions around supermassive black holes.
- **Cosmic-Ray Origins:** Provides clues about sources that accelerate particles to extremely high energies.
- **Study of Supernovae:** Offers information about powerful stellar explosions.
- **Multi-Messenger Astronomy:** Combines neutrino observations with light and gravitational-wave signals.
- **Fundamental Physics:** Improves understanding of particle behaviour and the universe.

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India-Based Neutrino Observatory (INO)

- **Location Proposed:** Bodi West Hills, **Theni district, Tamil Nadu**.
- **Objective:** Study atmospheric neutrinos and their fundamental properties.
- **Main Detector: Iron Calorimeter (ICAL)**.
- **Planned Capacity:** Approximately **50,000 tonnes of magnetised iron**.
- **Working:** Magnetic fields help distinguish neutrino-induced particles from those produced by antineutrinos.
- **Underground Location:** Rock shielding reduces interference from cosmic rays.

Present Challenge

- The proposed project has faced **environmental concerns, wildlife-clearance issues and local opposition**.

India's Contribution to Neutrino Research

- In **1965**, scientists detected atmospheric neutrinos at the **Kolar Gold Fields, Karnataka**.
- This made India an early contributor to experimental neutrino physics.
- The proposed INO could strengthen:
    - **Fundamental scientific research**.
    - Advanced detector technology.
    - International scientific collaboration.
    - Training of Indian scientists and engineers.

Challenges in Neutrino Research

- **Rare Interactions:** Neutrinos are extremely difficult to detect.
- **Large Infrastructure:** Experiments require massive detectors and specialised equipment.
- **High Costs:** Construction and operation need long-term funding.
- **Background Interference:** Cosmic radiation can affect measurements.
- **Environmental Concerns:** Large scientific projects require careful site selection and public consultation.

Conclusion

The IceCube Neutrino Observatory has transformed our understanding of the universe, while India's neutrino research initiatives offer opportunities for scientific innovation and global collaboration.



SECURITY

EMERGING SECURITY CHALLENGES

INDIA'S SECURITY DOCTRINE

SOURCE: THE HINDU

Why in News?

At **DefCon 2026**, India's Defence Minister highlighted the limitations of traditional border security, describing them as the **perimeter fallacy**.

National security doctrine

- **National security doctrine** refers to the principles guiding a country's response to external and internal threats.
- India's security environment now includes **terrorism, cyber warfare, drones, economic coercion and information warfare**.
- Consequently, security planning increasingly combines **strong defence, credible retaliation and national resilience**.

What is the Perimeter Fallacy?

- The **perimeter fallacy** is the mistaken belief that protecting geographical borders alone ensures national security.
- Modern threats can cross borders without conventional military invasion.

Examples:

- **Cyberattacks** targeting banking and electricity systems.
- **Drones** carrying weapons or surveillance equipment.
- **Disinformation** creating social unrest.
- **Supply-chain disruptions** affecting essential imports.
- **Terrorist networks** operating through digital communication.

Deterrence Strategies

A. Deterrence by Denial

- Prevents aggression by making an attack unlikely to succeed.
- Focuses on **border fortifications, air defence, surveillance and cybersecurity**.

B. Deterrence by Punishment

- Discourages aggression by threatening **credible and significant consequences**.
- May involve proportionate military, diplomatic or economic responses.

India's Evolving Security Approach

A. Military Responses

- **2016 Surgical Strikes:** Demonstrated India's willingness to target terrorist launch infrastructure.
- **2019 Balakot Airstrikes:** Reflected a more assertive counter-terrorism response.
- **Operation Sindoor (2025):** Highlighted India's use of military action following a major terrorist attack.

B. Diplomatic Measures

- International cooperation against **terror financing** and terrorist organisations.
- Use of diplomatic pressure and multilateral platforms such as the **Financial Action Task Force (FATF)**.

C. Economic Measures

- Restrictions on trade and cross-border movement can form part of a broader security response.
- Following the **2025 Pahalgam attack**, India announced measures concerning the **Indus Waters Treaty** and the **Attari Integrated Check Post**.

Major Challenges to India's Security

- **Two-Front Threat:** Security pressures involving China and Pakistan.
- **Grey-Zone Warfare:** Hostile actions below the threshold of open war, including cyber espionage and proxy operations.
- **Cyber Vulnerability:** Risks to electricity grids, financial networks and communication systems.
- **Energy Dependence:** Heavy reliance on imported crude oil exposes India to global disruptions.
- **Critical Technology Imports:** Dependence on foreign semiconductors, rare earths and advanced defence components.
- **Institutional Gaps:** Uneven technological capabilities among state police and security agencies.

Measures to Strengthen National Security

A. Integrated Theatre Commands

- Improve coordination among the **Army, Navy and Air Force**.
- Enable joint planning and faster responses.

B. Defence Indigenisation

- Expand **Positive Indigenisation Lists**.
- Promote domestic manufacturing through **Make in India** and **iDEX**.

C. Cybersecurity

- Strengthen **CERT-In** and **NCIIPC**.
- Improve real-time intelligence sharing and protection of critical infrastructure.

D. Energy Security

- Diversify crude oil imports and expand **Strategic Petroleum Reserves**.
- Protect important maritime routes and supply chains.

E. Intelligence Coordination

- Improve cooperation among **NATGRID, intelligence agencies and state police**.
- Strengthen counter-terror financing and digital investigation capabilities.

F. Whole-of-Government Approach

- Coordinate defence, diplomacy, economic policy, technology and internal security.

Risks of Deterrence by Punishment

- **Escalation:** Retaliation may trigger a wider military confrontation.
- **Nuclear Risks:** Conflict between nuclear-armed countries requires careful crisis management.
- **Attribution Problems:** Identifying those responsible for cyberattacks can be difficult.
- **International Law:** Responses must remain consistent with applicable legal obligations.
- **Credibility:** Deterrence requires reliable capabilities and clear communication.

Conclusion

India needs a balanced security doctrine combining credible deterrence, strong defensive capabilities, technological self-reliance and diplomatic restraint to address modern threats.

PRELIMS POINTERS IN NEWS

AKASH MISSILE SYSTEM

SOURCE: THE HINDU

Why in News?

Reports suggested that India may export its indigenous **Akash surface-to-air missile system** to **Tajikistan and Turkmenistan**.

Akash Missile System

Akash is an indigenously developed **surface-to-air missile (SAM)** system designed to intercept hostile aerial targets.

- It was developed by the **Defence Research and Development Organisation (DRDO)** to strengthen India's air-defence capabilities.

Development and Production

- **Developer:** DRDO.
- **Major Manufacturer: Bharat Dynamics Limited (BDL)**, with contributions from other Indian defence companies.
- **Development Programme: Integrated Guided Missile Development Programme (IGMDP)**.
- **Users:** Indian Army and Indian Air Force.
- **Category:** Short-range to lower-medium-range air-defence system, depending on the variant.

Major Features

- **Operational Range:** Approximately **25–30 km** for the original Akash system.
- **Targets:** Fighter aircraft, helicopters, drones and certain cruise-missile threats.
- **Mobility:** Uses mobile launchers suitable for field deployment.
- **Radar Support:** The **Rajendra radar** provides target tracking and engagement support in the original system.
- **Multiple Engagements:** Designed to engage several aerial threats through a coordinated air-defence network.

Strategic Significance

- **Atmanirbhar Bharat:** Reduces dependence on imported defence equipment.
- **Air Defence:** Protects military formations and important installations.
- **Defence Exports:** Supports India's position as an emerging arms supplier.
- **Industrial Growth:** Encourages domestic electronics, missile and radar manufacturing.

EXERCISE AUSTRAHIND 2026

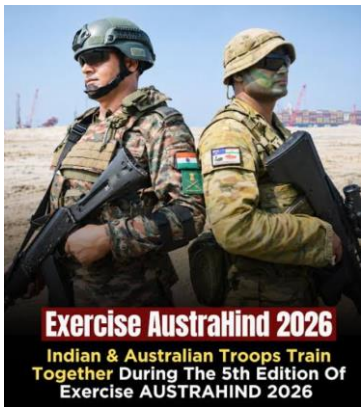
SOURCE: THE HINDU

Why in News?

The **fifth edition of Exercise AUSTRAHIND** reportedly began at the **Foreign Training Node, Thiruvananthapuram, Kerala**.

About AUSTRAHIND

- **AUSTRAHIND** is an annual bilateral military exercise between the **Indian Army and Australian Army**.
- It aims to improve **interoperability, coordination and mutual understanding** between the two forces.



Key Features

- **Participating Countries:** India and Australia.
- **Edition:** Fifth, in **2026**.
- **Venue:** Thiruvananthapuram, Kerala.
- **Indian Participation:** Personnel from the **Garhwal Rifles** and supporting arms and services.
- **Observer Participation:** A delegation from **New Zealand**, as reported.

Theme

- **Joint Sub-Conventional Operations in Island and Coastal Environment under Chapter VII of the UN Mandate**.
- The theme emphasises cooperation in complex security environments and coordinated responses.

Major Training Activities

- **Coastal Operations:** Practising operations in coastal and island terrain.
- **Surveillance:** Improving reconnaissance and situational awareness.
- **Critical Infrastructure:** Protecting strategically important installations.
- **Joint Drills:** Developing common tactics, techniques and procedures.
- **HADR:** Conducting **Humanitarian Assistance and Disaster Relief** exercises.

EXERCISE AKHAND PRAHAR-II

SOURCE: INDIAN EXPRESS

Why in News?

The **Indian Army** conducted **Exercise Akhand Prahar-II** in the desert region of **Jaisalmer, Rajasthan**.

About Akhand Prahar-II

- **Akhand Prahar-II** is an Indian Army military exercise designed to improve combat effectiveness in challenging battlefield conditions.
- It focuses on combining **modern equipment, trained personnel and coordinated military operations**.

Major Details

- **Location:** Jaisalmer, Rajasthan.
- **Conducted By:** Indian Army.
- **Participating Formations: Black Mace Brigade** and **Battle Axe Division**.
- **Previous Edition: Akhand Prahar-I**.
- **Operational Environment:** Desert terrain involving coordinated combat activities.

Major Objectives

- **Combat Readiness:** Test the ability of formations to respond quickly to threats.
- **Technology Integration:** Evaluate **New Generation Equipment (NGE)**.
- **Joint Coordination:** Improve cooperation among different Army combat elements.
- **Battlefield Adaptability:** Prepare soldiers for rapidly changing operational situations.

Key Features

- **Integrated Battle Drills:** Combined use of infantry, armoured and supporting capabilities.
- **Force Multipliers:** Technologies and systems that increase combat effectiveness.
- **Multi-Domain Operations:** Coordination of capabilities across land, air, cyber and other relevant domains.
- **Realistic Training:** Assessment of communication, mobility and battlefield decision-making.

Strategic Significance

- **Desert Warfare:** Improves preparedness for operations in western India's arid terrain.
- **Modernisation:** Supports the adoption of advanced defence technologies.
- **Operational Efficiency:** Helps identify weaknesses in tactics and coordination.
- **National Security:** Strengthens readiness against conventional and emerging threats.

CRPF – ZERO OPERATIONAL FATALITIES

SOURCE: THE HINDU

Why in News?

The **Central Reserve Police Force (CRPF)** reportedly completed **12 consecutive months without an operational fatality**, a major internal-security milestone.

About CRPF

- The **CRPF** is India's largest **Central Armed Police Force (CAPF)** and plays a major role in maintaining internal security.
- It operates under the **Ministry of Home Affairs (MHA)**.

Historical Background

- **Established: 27 July 1939** as the **Crown Representative's Police**.
- **Renamed:** Central Reserve Police Force under the **CRPF Act, 1949**.
- **Headquarters: New Delhi**.
- **Administrative Ministry:** Ministry of Home Affairs.

Major Responsibilities

- **Counter-Terrorism:** Supports security operations in Jammu and Kashmir.
- **Anti-Naxal Operations:** Works in **Left-Wing Extremism (LWE)** affected regions.
- **Internal Security:** Assists state police during serious disturbances.
- **Election Security:** Helps ensure peaceful conduct of elections.
- **Law and Order:** Provides support during riots and emergencies.

Factors Supporting Operational Safety

- **Improved Training:** Better preparation for complex field conditions.
- **Intelligence-Based Operations:** More accurate identification of threats.
- **Medical Support:** Faster evacuation and emergency treatment.
- **Protective Equipment:** Use of suitable safety and communication systems.
- **Operational Experience:** Applying lessons from previous missions.

Important Operations

- **Operation Black Forest:** A reported anti-Maoist operation in the **Kareguttalu Hills**, near the Chhattisgarh–Telangana border.
- The operation highlighted the importance of coordinated security action in difficult terrain.

INDIAN COAST GUARD – MAIDEN SAILING EXPEDITION

SOURCE: THE HINDU

Why in News?

The **Indian Coast Guard (ICG)** launched its maiden yacht sailing expedition aboard **Antara** from **Chennai**.

- The expedition formed part of activities associated with the ICG's **50th anniversary celebrations** and aimed to promote maritime skills.

Details of the Expedition

- **Vessel:** Sailing yacht **Antara**.
- **Starting Point: Chennai, Tamil Nadu**.
- **Flag-Off:** Reportedly by **Inspector General Yoginder Dhaka**, Commander, Coast Guard Region East.
- **Indian Coastal Route:** Chennai to **Kochi**.
- **International Destinations:** Planned passages to **Sri Lanka and the Maldives**.
- **Occasion:** Activities marking the Coast Guard's golden jubilee.

Major Objectives

- **Seamanship:** Improve practical sailing and vessel-handling skills.
- **Navigation:** Develop experience in coastal and offshore navigation.
- **Endurance:** Test physical and mental preparedness at sea.
- **Teamwork:** Strengthen cooperation and leadership among personnel.
- **Youth Inspiration:** Encourage interest in maritime careers.

Strategic Significance

- **Maritime Awareness:** Promotes understanding of India's surrounding seas.
- **Regional Cooperation:** Encourages maritime connections with neighbouring countries.
- **Professional Training:** Develops skills useful during demanding sea operations.
- **Maritime Culture:** Highlights India's long-standing seafaring traditions.

About the Indian Coast Guard

- **Established: 1 February 1977**, initially as an interim organisation.
- **Statutory Basis: Coast Guard Act, 1978**.
- **Headquarters: New Delhi**.
- **Parent Ministry: Ministry of Defence**.
- **Major Duties:** Maritime search and rescue, pollution response, coastal security and enforcement of maritime laws.

INS SAMARTHAK

SOURCE: THE HINDU

Why in News?

The **Indian Navy** announced plans to commission **Samarthak**, a new multi-purpose naval vessel, at **Karwar Naval Base, Karnataka**.

About INS Samarthak

- **INS Samarthak** is the first vessel of a new class of **Multi-Purpose Vessels (MPVs)** developed for the Indian Navy.
- It is designed to support diverse naval operations, including surveillance, trials and humanitarian missions.



Development and Features

- **Builder: Larsen & Toubro (L&T)**.
- **Programme:** Indigenous naval shipbuilding under **Make in India**.
- **Class:** Multi-Purpose Vessel.
- **Motto: Victory is Our Sole Aim**.
- **Crest:** Features an **Indian elephant emerging from waves**, symbolising strength, intelligence and agility.
- **Combat Systems:** Incorporates indigenous sensors, communication equipment and other naval systems.

Major Operational Roles

- **Maritime Surveillance:** Monitoring activities in strategically important waters.
- **Patrol Operations:** Supporting maritime security and situational awareness.
- **Low-Intensity Maritime Operations (LIMO):** Responding to limited maritime security threats.
- **Trials Platform:** Supporting testing of naval weapons and equipment.
- **Unmanned Systems:** Acting as a support platform for autonomous maritime vehicles.
- **HADR:** Providing **Humanitarian Assistance and Disaster Relief**.
- **Medical Support:** Potential conversion for limited hospital-ship duties.
- **Salvage Assistance:** Supporting recovery and emergency maritime operations.

Strategic Significance

- **Atmanirbhar Bharat:** Strengthens domestic defence manufacturing.
- **Operational Flexibility:** One platform can undertake several missions.
- **Maritime Security:** Improves the Navy's ability to respond to emerging challenges.
- **Shipbuilding Industry:** Encourages technological expertise and employment.

EXERCISE KONKAN-2026

SOURCE: THE HINDU

Why in News?

The Indian Navy's guided-missile stealth frigate **INS Trishul** was scheduled to participate in **Exercise KONKAN-2026** near **Plymouth, United Kingdom**.



Key Details

- **Participating Countries: India and United Kingdom**.
- **Edition:** KONKAN-2026.
- **Location:** Waters near **Plymouth, UK**.
- **Indian Warship: INS Trishul**, a guided-missile stealth frigate.
- **Nature:** Bilateral naval exercise involving harbour and sea activities.

Major Phases

1. Harbour Phase

- Professional discussions between naval personnel.

- **Cross-deck visits** to exchange operational experience.
- Cultural interactions and sports activities.
- Planning and coordination for sea exercises.

2. Sea Phase

- **Surface Warfare:** Coordinated ship manoeuvres.
- **Air Operations:** Naval responses to aerial threats.
- **Sub-Surface Operations:** Activities involving underwater threats.
- **Communication Drills:** Improving information sharing.
- **Joint Tactical Exercises:** Strengthening operational coordination.

Strategic Significance

- **India–UK Relations:** Supports their broader strategic partnership.
- **Maritime Security:** Promotes safe and secure international sea routes.

- **Interoperability:** Helps both navies operate together during multinational missions.
- **Indo-Pacific Cooperation:** Supports shared interests in a stable maritime order.
- **Defence Diplomacy:** Builds trust through regular professional exchanges.



SOCIETY

VULNERABLE SECTIONS OF SOCIETY

ADVANCING WOMEN'S EMPLOYMENT AND ECONOMIC EMPOWERMENT IN INDIA

SOURCE: THE HINDU

Why in News?

According to the **Periodic Labour Force Survey (PLFS)** figures cited in an October 2026 report, India's **female Labour Force Participation Rate (LFPR)** increased.

Key Trends in Women's Employment

- **Female LFPR:** Increased from **23.3% in 2017–18 to 40% in 2025**.
- **Worker Population Ratio (WPR):** Rose from **22% to 38.8%** during the same period.
- **Employment:** Approximately **20 crore women** aged 15 years and above were employed in 2025.
- **Women-Owned MSMEs:** Around **3.69 crore registered enterprises** by October 2026.
- **Startups:** Over **1.07 lakh recognised startups** had at least one woman director or partner by March 2026.

Women's Contribution to Emerging Sectors

- **Electronics Manufacturing:** Women form a significant share of India's mobile-phone manufacturing workforce.
- **Semiconductors:** Women are increasingly entering chip design and engineering.
- **Civil Aviation:** Women constituted approximately **15% of India's pilots** in June 2025.
- **STEM Research:** Women's participation has increased in science and technology research.
- **Entrepreneurship:** Women-led enterprises contribute to innovation, employment and local development.

Major Government Initiatives

A. Entrepreneurship Development

- **Swavalambini Scheme (2025):** Provides entrepreneurship training, mentorship and business guidance to young women.
- **Yashasvini Campaign (2024):** Encourages registration and growth of women-owned MSMEs.

B. Financial Inclusion

- **Pradhan Mantri MUDRA Yojana (2015):** Provides collateral-free credit to eligible micro-enterprises.
- **CGTMSE:** Facilitates institutional credit through guarantees for micro and small enterprises.
- **PMEGP:** Offers credit-linked subsidies for new micro-enterprises, with additional benefits for women.

C. Market Access

- **Womaniya Initiative:** Helps women entrepreneurs sell products through the **Government e-Marketplace (GeM)**.
- **TEAM Initiative:** Promotes digital market access through the **Open Network for Digital Commerce (ONDC)**.

D. Skill Development

- **PMKVY 4.0:** Supports training in AI, semiconductors and renewable energy.
- **NAVYA Initiative (2025):** Promotes vocational training for adolescent girls.
- **WISE-KIRAN:** Supports women's participation in scientific research.

Labour Reforms Supporting Women

- **Maternity Benefits:** Eligible women can receive up to **26 weeks of paid maternity leave**.
- **Crèche Facilities:** Required for covered establishments with **50 or more employees**.
- **Equal Pay:** The **Code on Wages, 2019** prohibits gender-based discrimination in wages for the same or similar work.
- **Night-Shift Employment:** Permitted subject to consent and prescribed safety measures.
- **Social Security:** Labour reforms aim to improve protection for eligible workers.

Major Challenges

- **Unpaid Care Work:** Household responsibilities reduce time available for paid employment.
- **Informal Employment:** Many women lack written contracts and social protection.
- **Gender Wage Gap:** Women often receive lower earnings than men.
- **Safety Concerns:** Unsafe transport and workplaces restrict employment opportunities.

- **Digital Divide:** Limited access to technology affects skills and entrepreneurship.
- **Credit Constraints:** Lack of collateral and financial awareness restrict business expansion.

Way Forward

- **Affordable Childcare:** Expand crèches and community childcare facilities.
- **Skill Development:** Train women for high-growth sectors such as AI and electronics.
- **Safe Workplaces:** Improve transport, grievance mechanisms and workplace security.
- **Financial Inclusion:** Strengthen access to affordable credit and digital banking.
- **Formal Employment:** Encourage secure jobs with fair wages and social protection.
- **Social Awareness:** Promote equal sharing of household and caregiving responsibilities.

Conclusion

India can achieve meaningful women-led development by combining higher workforce participation with decent jobs, equal wages, financial inclusion, skill development and safe workplaces.

HEALTH SECTOR

LEPROSY IN INDIA

SOURCE: INDIAN EXPRESS

Why in News?

Despite India achieving elimination of leprosy as a public health problem in 2005, the disease continues to spread in several regions, raising concerns about ongoing transmission and public health challenges.

What is Leprosy?

- **Causative Organisms:** Mainly *Mycobacterium leprae*; *Mycobacterium lepromatosis* can also cause the disease.
- **Transmission:** Primarily through prolonged, close contact with an untreated infected person, generally involving respiratory droplets.
- **Incubation Period:** Usually around **five years**, but symptoms may appear much later.
- **Symptoms:** Pale or reddish skin patches with reduced sensation, numbness, muscle weakness and nerve damage.
- **Treatment:** Curable using **Multidrug Therapy (MDT)**.
- **Important:** Leprosy is **not highly contagious**, and early treatment prevents most disabilities.

Present Status of Leprosy in India

According to the figures cited in the October 2026 article:

- India accounted for approximately **46% of reported childhood leprosy cases globally in 2025**.
- Only **148 districts** achieved interruption of transmission against a projected **300 districts**.
- High-burden areas include **Chhattisgarh, Jharkhand, Odisha and Maharashtra**.
- During **2025–26**, over **70 crore people** were screened in highly endemic areas.
- **Single-dose rifampicin prophylaxis** reached **91.1% of approximately 16.9 lakh eligible contacts**.
- Reported incidence exceeded projections by **41%**, childhood incidence by **91.6%**, and Grade-2 disability rate by **34%**.

Why Does Leprosy Continue in India?

- **Delayed Diagnosis:** Long incubation periods make early identification difficult.
- **Social Stigma:** Fear of discrimination discourages patients from seeking treatment.
- **Weak Surveillance:** Reduced attention after national elimination allowed some transmission hotspots to persist.
- **Misdiagnosis:** Early symptoms may be mistaken for ordinary skin conditions.
- **Geographical Concentration:** Persistent infections in certain districts sustain transmission.
- **Limited Awareness:** Misconceptions about contagion and treatment discourage timely medical care.
- **Prevalence-Based Monitoring:** Declining registered cases may conceal ongoing new infections.

Government Initiatives

A. National Leprosy Eradication Programme (NLEP)

- Provides **free diagnosis and multidrug treatment** through the public health system.
- Promotes early detection, disability prevention and rehabilitation.

B. National Strategic Plan and Roadmap (2023–2027)

- Focuses on **interrupting transmission**, detecting cases early and preventing disabilities.

C. Leprosy Case Detection Campaign

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- Uses **door-to-door screening** in high-risk areas to identify hidden infections.

D. Contact Management

- Provides **single-dose rifampicin post-exposure prophylaxis (SDR-PEP)** to eligible contacts after appropriate screening.

E. ASHA-Based Surveillance

- **ASHA workers** support community awareness, identification of suspected cases and referral for diagnosis.

F. Digital Monitoring

- Strengthens case tracking, contact tracing and identification of disease hotspots.

Major Challenges

- **Childhood Cases:** Indicate relatively recent transmission within communities.
- **Grade-2 Disability:** Visible deformities reflect delayed diagnosis and nerve damage.
- **Healthcare Gaps:** Shortage of trained personnel affects early detection.
- **Social Exclusion:** Discrimination can affect education, employment and marriage.
- **Uneven Progress:** National averages hide differences between districts.

Way Forward

- **Prioritise Transmission Interruption:** Monitor new cases, especially among children.
- **Strengthen Active Surveillance:** Focus on high-burden districts and vulnerable populations.
- **Expand Contact Tracing:** Identify eligible contacts and provide preventive treatment.
- **Train Healthcare Workers:** Improve recognition of early symptoms and nerve damage.
- **Reduce Stigma:** Promote awareness that leprosy is curable.
- **Prevent Disability:** Ensure timely treatment, rehabilitation and assistive care.
- **Use District-Level Data:** Direct resources towards persistent transmission hotspots.

Conclusion

India must move beyond low prevalence figures and prioritise early diagnosis, contact tracing, disability prevention and stigma reduction to permanently interrupt leprosy transmission.

PRELIMS POINTERS IN NEWS

GARO TRIBE

SOURCE: INDIAN EXPRESS

Why in News?

Elections to the **Garo Hills Autonomous District Council (GHADC)** were reportedly postponed after the Meghalaya government approved another extension of its term.

About Garo

- The **Garo**, who also identify as **A'chik**, are a major indigenous tribal community of **Meghalaya**.
- They are particularly known for their **matrilineal social organisation** and rich agricultural traditions.

Distribution and Language

- **Main Region:** Garo Hills, Meghalaya.
- **Other Areas:** Assam, Tripura, West Bengal and parts of Bangladesh.
- **Language:** Garo or **A'chik**, belonging to the **Tibeto-Burman language group**.
- **Status:** One of Meghalaya's major Scheduled Tribe communities.

Social and Economic Life

- **Matrilineal Society:** Clan identity and inheritance generally pass through the mother's line.
- **Property:** Traditionally, a designated daughter, often called **Nokna**, inherits family property.
- **Marriage:** Clan exogamy is traditionally followed.
- **Agriculture:** Both **jhum cultivation** and settled farming are practised.
- **Crops:** Rice, millet and vegetables.

Religion and Culture

- **Traditional Religion: Songsarek**, involving nature-related beliefs and rituals.
- **Present Religion:** Christianity is widely practised.
- **Major Festival: Wangala**, a post-harvest celebration.

Traditional Deity: Saljong, associated with fertility and agricultural prosperity.

NATIONAL COMMISSION FOR SCHEDULED TRIBES (NCST)

SOURCE: THE HINDU

Why in News?

The **National Commission for Scheduled Tribes (NCST)** received renewed attention in discussions on tribal rights and constitutional safeguards.

Constitutional Background

- **89th Constitutional Amendment Act, 2003:** Created separate commissions for Scheduled Castes and Scheduled Tribes.
- **NCST Established: 19 February 2004**.
- **NCSC:** Governed by **Article 338**.
- **NCST:** Governed by **Article 338A**.

Composition and Appointment

- **Members:** One Chairperson, one Vice-Chairperson and three other members.
- **Appointment:** By the **President of India**.
- **Tenure:** Generally **three years**, under applicable service rules.
- **Administrative Ministry: Ministry of Tribal Affairs**.

Major Functions

- **Safeguards:** Monitor constitutional and legal protections for STs.
- **Complaints:** Investigate grievances involving deprivation of tribal rights.
- **Development:** Advise on tribal socio-economic planning.
- **Evaluation:** Assess implementation of welfare measures.
- **Reports:** Submit reports to the President.

Powers

- Has powers similar to a **civil court while investigating specified matters**.
- Can summon individuals, examine witnesses and require relevant documents.
- Its recommendations are generally **advisory**, not equivalent to court judgments.

GHOOMAR DANCE

SOURCE: THE HINDU

Why in News?

Ghoomar, a prominent folk dance of Rajasthan, remains relevant to discussions on India's traditional performing arts.

Origin and Development

- **Traditional Roots:** Associated with the **Bhil tribal community**.
- **Cultural Spread:** Later became popular among **Rajput households**.
- **Present Importance:** Performed during weddings, festivals and community celebrations.

Major Features

- **Performers:** Traditionally performed by groups of women.
- **Dance Style:** Rhythmic circular movements and repeated twirling.
- **Costumes:** Colourful **ghaghara-choli** with **odhni** and traditional jewellery.
- **Visual Appeal:** Flowing skirts create patterns during rotation.
- **Music:** Accompanied by Rajasthani folk songs and percussion.

Musical Instruments

- **Dhol and Dholak:** Provide rhythmic accompaniment.
- **Sarangi:** Traditional bowed string instrument.
- **Shehnai:** Wind instrument used in ceremonial music.
- **Harmonium:** May accompany folk singing.

INDIA'S URBAN TRANSFORMATION

Why in News?

India's urban development is receiving renewed attention due to **fragmented governance, weak municipal finances, housing shortages and climate-related risks**.

Initiatives such as the **Urban Challenge Fund, City Economic Regions and PMAY-U 2.0** aim to promote sustainable and inclusive urban growth.

Major Developments in India's Urban Transformation

A. City Economic Regions (CERs)

- Promote integrated development of neighbouring cities and industrial centres.
- The **Union Budget 2026–27** proposed **₹5,000 crore per CER over five years**, linked to reforms and results.
- Example: **Bhubaneswar–Cuttack–Puri–Paradip Economic Region**.

B. Urban Challenge Fund

- A **₹1 lakh crore fund** approved in February 2026 to encourage urban infrastructure investment.

- Focuses on **reform-based financing and measurable outcomes**.

C. Transport Infrastructure

- Expansion of **metro rail, regional rapid transit and multimodal connectivity**.
- **Transit-Oriented Development (TOD)** encourages housing and commercial activities near public transport stations.

D. Affordable Housing

- **PMAY-U and PMAY-U 2.0** promote housing for eligible urban households.
- **Affordable Rental Housing Complexes (ARHCs)** support migrants and low-income workers.

E. Water and Waste Management

- **AMRUT 2.0** focuses on water supply, sewerage and water-body rejuvenation.
- **Biomining** helps reclaim land occupied by old municipal dumpsites.

Major Challenges of Urbanisation

A. Weak Urban Governance

- Multiple agencies manage transport, water, housing and land use, causing poor coordination.
- A **CAG assessment (2024)** found that only **four of 18 municipal functions** were effectively devolved on average in the states examined.

B. Financial Weakness

- Urban Local Bodies depend heavily on state and central transfers.
- Weak **property-tax collection and user charges** limit infrastructure maintenance.

C. Housing Inequality

- High land prices and inadequate affordable housing encourage the growth of informal settlements.
- Migrant workers often face insecure rental accommodation.

D. Traffic Congestion

- Rising private vehicle use causes pollution, longer travel times and economic losses.

E. Environmental Problems

- **Air pollution, untreated sewage and solid waste** threaten public health.
- Loss of wetlands and green spaces increases **urban flooding and heat-island effects**.

F. Climate Vulnerability

- Extreme rainfall, heatwaves and water scarcity disproportionately affect poorer urban communities.

3. Successful Models of Urban Development

- **Odisha's Jaga Mission:** Improves slum settlements through community participation and basic infrastructure.
- **Indore's Gobar-Dhan Plant:** Converts organic waste into **Bio-CNG and compost**.
- **Pimpri Chinchwad:** Promotes pedestrian-friendly streets, cycling infrastructure and innovative green financing.
- **Ahmedabad's Heat Action Plan:** Demonstrates preparedness against extreme heat.

Government Initiatives

- **Smart Cities Mission (2015):** Promotes improved urban infrastructure and technology-enabled services.
- **AMRUT 2.0 (2021):** Supports urban water security and sanitation.
- **Swachh Bharat Mission–Urban 2.0 (2021):** Focuses on waste management and sanitation.
- **PMAY-U 2.0 (2024):** Supports affordable urban housing.
- **Digital India Land Records Modernisation Programme (DILRMP):** Improves land-record management and transparency.

Way Forward

- **Strengthen Urban Local Bodies:** Ensure genuine transfer of functions, funds and functionaries.
- **Improve Municipal Finances:** Modernise property taxation and encourage responsible municipal bonds.
- **Sponge-City Planning:** Restore wetlands and use permeable surfaces to reduce flooding.
- **Affordable Housing:** Promote rental housing and mixed-income neighbourhoods.
- **Sustainable Mobility:** Expand public transport, walking and cycling networks.
- **Circular Economy:** Encourage waste segregation, recycling and resource recovery.
- **Digital Governance:** Use **GIS mapping, digital twins and real-time monitoring** for better planning.
- **Community Participation:** Involve residents in planning, budgeting and service monitoring.

Conclusion

India must empower urban local governments, strengthen municipal finances and adopt inclusive, climate-resilient planning to build sustainable and economically productive cities.

MUSI RIVER REJUVENATION PROJECT

The **Telangana government** is advancing the **Musi River Rejuvenation Project**, with renewed attention to river cleaning, flood management and sustainable urban development in Hyderabad.

Musi River Rejuvenation Project

- The **Musi River Rejuvenation Project** is a major urban development initiative aimed at restoring the ecological health of the **Musi River**, which flows through Hyderabad.
- Rapid urbanisation, untreated sewage, industrial pollution and encroachments have severely affected the river's natural condition.
- The project seeks to transform the Musi corridor into a **cleaner, safer and more sustainable urban space** while addressing flooding and improving public infrastructure.

About the Musi River

- **Origin:** The Musi River originates in the **Ananthagiri Hills**, near Vikarabad in Telangana.
- **River System:** It is a tributary of the **Krishna River**.
- **Course:** It flows through Hyderabad before joining the Krishna near **Wadapally in Nalgonda district**.
- **Historical Importance:** Hyderabad developed along the Musi, making it an important part of the city's history.
- **1908 Musi Floods:** Severe flooding caused widespread destruction and influenced Hyderabad's later urban planning.
- **Important Reservoirs: Osman Sagar and Himayat Sagar** were constructed to improve water supply and flood management.

Key Features of the Rejuvenation Project

A. River Cleaning and Pollution Control

- Reduce the discharge of untreated sewage and industrial wastewater.
- Strengthen **Sewage Treatment Plants (STPs)** and drainage infrastructure.
- Improve water quality through continuous monitoring.

B. Flood Management

- Restore the river's natural drainage capacity.
- Improve stormwater management and protect vulnerable settlements.
- Reduce flooding through scientifically planned infrastructure.

C. Riverfront Development

- Develop accessible public spaces, walking tracks and green areas.
- Improve urban connectivity and recreational facilities.
- Promote environmentally responsible tourism.

D. Ecological Restoration

- Restore riverbanks and protect existing natural habitats.
- Increase vegetation and improve biodiversity.
- Encourage **blue-green infrastructure** to manage rainwater naturally.

E. Urban Infrastructure

- Integrate river restoration with transport, sanitation and land-use planning.
- Improve public amenities while maintaining ecological safeguards.

Recent Developments

- In **October 2026**, the **Musi Riverfront Development Corporation Limited (MRDCL)** initiated tenders for major rejuvenation and infrastructure works.
- The project's initial phase focuses on approximately **21 km of the river corridor**.
- The reported approved cost for this phase is around **₹7,345 crore**, excluding land acquisition.
- The broader development vision covers approximately **55 km of the urban Musi corridor**.

These figures relate to the project's proposed and approved scope; they should not be interpreted as completed construction.

Significance of the Musi River Rejuvenation Project

A. Environmental Protection

- Reduces water pollution and improves river health.
- Protects aquatic ecosystems and supports biodiversity.
- Encourages sustainable management of urban water resources.

B. Flood Resilience

- Better drainage and river management can reduce urban flood risks.
- Restoration of floodplains can improve the city's capacity to handle heavy rainfall.

C. Public Health

- Cleaner water and improved sanitation can reduce exposure to waterborne diseases.

- Proper wastewater treatment improves living conditions in nearby communities.

D. Economic Development

- Improved public infrastructure may encourage investment and tourism.
- Construction and maintenance activities can generate employment.

E. Urban Liveability

- Green spaces and pedestrian facilities can improve recreational opportunities.
- River restoration can help reduce the **urban heat-island effect**.

Major Challenges

A. Rehabilitation and Displacement

- Families living near the river may face displacement due to proposed development works.
- **Fair compensation, secure housing and livelihood protection** are essential.
- Rehabilitation should follow transparent procedures and involve affected communities.

B. Environmental Concerns

- Excessive construction along riverbanks may damage natural floodplains.
- Riverfront development must not replace ecological restoration with unnecessary concretisation.

C. Sewage and Industrial Pollution

- Untreated wastewater continues to threaten river quality.
- Effective pollution control requires coordination among industries, municipalities and regulatory authorities.

D. Financial Requirements

- Large infrastructure projects require substantial public investment.
- Rising costs and long-term maintenance obligations may create financial pressure.

E. Administrative Coordination

- Multiple agencies are responsible for sanitation, drainage, urban planning and pollution control.
- Weak coordination can delay implementation and reduce accountability.

Government Initiatives and Institutional Framework

- **MRDCL:** Responsible for coordinating the Musi riverfront development initiative.
- **Hyderabad Metropolitan Water Supply and Sewerage Board (HMWSSB):** Plays an important role in sewage management and wastewater infrastructure.
- **Telangana Pollution Control Board:** Monitors pollution and enforces applicable environmental standards.
- **AMRUT 2.0:** Supports urban water supply, sewerage and water-body rejuvenation.
- **Swachh Bharat Mission–Urban 2.0:** Promotes sanitation and scientific waste management.

Way Forward

- **Prioritise River Health:** Focus first on sewage treatment, pollution control and ecological restoration.
- **Protect Floodplains:** Prevent construction that obstructs natural drainage.
- **Ensure Fair Rehabilitation:** Provide suitable housing, compensation and livelihood support to affected families.
- **Adopt Nature-Based Solutions:** Restore wetlands, native vegetation and permeable green spaces.
- **Strengthen Coordination:** Establish clear responsibilities among implementing agencies.
- **Improve Public Participation:** Involve local residents, environmental experts and civil society organisations.
- **Ensure Transparency:** Publish project expenditure, environmental assessments and rehabilitation progress.
- **Monitor Outcomes:** Measure improvements in water quality, biodiversity and flood resilience.

Conclusion

The Musi River Rejuvenation Project can become a model of sustainable urban development if Telangana prioritises ecological restoration, flood resilience, transparent governance and the rights of affected communities.

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POLAVARAM IRRIGATION PROJECT

The **Andhra Pradesh government** has reaffirmed its commitment to accelerating the **Polavaram Irrigation Project**, with major construction works targeted for completion during **2027**.

Polavaram Irrigation Project (PIP)

The **Polavaram Irrigation Project (PIP)** is a multipurpose national project being constructed across the **Godavari River** near Polavaram in Andhra Pradesh's **Eluru district**.

It aims to improve agricultural productivity, provide drinking water, generate hydroelectricity and support regional development.

The project gained additional importance following the **Andhra Pradesh Reorganisation Act, 2014**, which declared it a **National Project**.

Key Features of the Polavaram Project

- **River:** Godavari, India's second-longest river.
- **Location:** Polavaram, Eluru district, Andhra Pradesh.
- **Project Type:** Multipurpose irrigation and hydropower project.
- **Installed Hydropower Capacity:** Proposed **960 MW**, comprising 12 units of 80 MW each.
- **Irrigation Potential:** Approximately **7.2 lakh acres of new irrigation**, along with stabilisation of irrigation supplies across additional agricultural areas.
- **Drinking Water:** Intended to benefit around **28 lakh people**.
- **River Linking:** Includes provision for transferring **80 TMC of Godavari water** towards the Krishna basin.
- **Implementing Framework:** Andhra Pradesh government, with central support and oversight through the **Polavaram Project Authority (PPA)**.

Recent Progress and Development

A. Construction Progress

- In October 2026, reported overall physical progress reached approximately **90.1%**.
- Major structures, including the **spillway, diaphragm walls and cofferdams**, have recorded substantial progress.
- Construction of the **Earth-Cum-Rock-Fill (ECRF) dam** remains a major component.
- Important dam and connectivity works are scheduled for completion in **2027**.

B. Financial Support

- The Centre approved a revised **Phase-I cost of ₹30,436.95 crore**.
- Central funding supports construction, land acquisition and rehabilitation.
- Timely fund release is essential to avoid further delays.

C. Phased Development

- **Phase I:** Reservoir water level of approximately **41.15 metres**.
- **Phase II:** Proposed full reservoir level of **45.72 metres**.
- Full project benefits depend on completing the required infrastructure and rehabilitation measures.

Importance of the Polavaram Project

A. Agricultural Development

- Provides assured irrigation to drought-prone and rain-dependent agricultural regions.
- Reduces excessive dependence on seasonal monsoon rainfall.
- Encourages crop diversification and improves farm productivity.

B. Drinking Water Security

- Supports reliable drinking-water supply to rural and urban settlements.
- Can reduce pressure on groundwater resources.

C. Hydroelectric Power

- The proposed **960 MW hydropower capacity** can strengthen Andhra Pradesh's electricity supply.
- Hydropower can complement solar and wind energy by providing flexible generation.

D. Regional Economic Growth

- Improved irrigation can encourage **agro-processing, food industries and rural employment**.
- Better water availability may attract industrial investment.
- Construction creates opportunities for local workers and businesses.

E. Water Resource Management

- The project supports regulated water distribution across different regions.
- Its canal network can improve the use of available river water.

Major Challenges

A. Rehabilitation and Resettlement

- Reservoir submergence affects villages, agricultural land and forest-dependent communities.
- Many affected households belong to **Scheduled Tribes and other vulnerable groups**.
- Rehabilitation must include housing, livelihoods, community facilities and access to essential services.

B. Environmental Concerns

- Submergence can cause **forest loss, habitat fragmentation and biodiversity damage**.
- Changes in river flow may affect aquatic ecosystems and downstream conditions.
- Proper environmental safeguards and monitoring are essential.

C. Inter-State Issues

- **Odisha, Chhattisgarh and Telangana** have raised concerns related to backwater effects, flooding and submergence.
- Cooperation and scientifically assessed flood-management measures are necessary.

D. Technical Difficulties

- Dam construction involves complex engineering, including **diaphragm walls, foundation stability and seepage control**.
- Floods and heavy rainfall can disrupt construction schedules.
- Independent safety inspections are important.

E. Financial and Administrative Delays

- Rising construction costs and incomplete land acquisition create implementation difficulties.
- **Coordination between central agencies, the state government and contractors remains crucial.**

Rehabilitation: A Central Development Priority

The project's success should be measured not only by engineering progress but also by the welfare of affected families.

- Provide **fair and timely compensation** for acquired land and assets.
- Ensure rehabilitation colonies have drinking water, electricity, schools and healthcare.
- Restore **livelihood opportunities**, particularly for farmers and forest-dependent households.
- Protect the rights of tribal communities under applicable land acquisition and forest-rights laws.
- Establish transparent grievance-redressal mechanisms and involve affected families in decisions.

Way Forward

- **Time-Bound Completion:** Follow realistic construction schedules with regular monitoring.
- **Rehabilitation First:** Complete essential resettlement arrangements before displacement.
- **Dam Safety:** Conduct independent technical audits and maintain continuous monitoring.
- **Environmental Protection:** Implement catchment-area treatment, compensatory afforestation and ecological safeguards.
- **Inter-State Cooperation:** Address backwater and flood-related concerns through scientific studies and dialogue.
- **Financial Transparency:** Ensure timely funding and public reporting of expenditure.
- **Efficient Water Use:** Promote micro-irrigation, canal maintenance and sustainable cropping patterns.

Conclusion

The Polavaram Project can transform Andhra Pradesh's agriculture and water security, provided timely construction is combined with environmental protection, inter-state cooperation and fair rehabilitation of affected communities.

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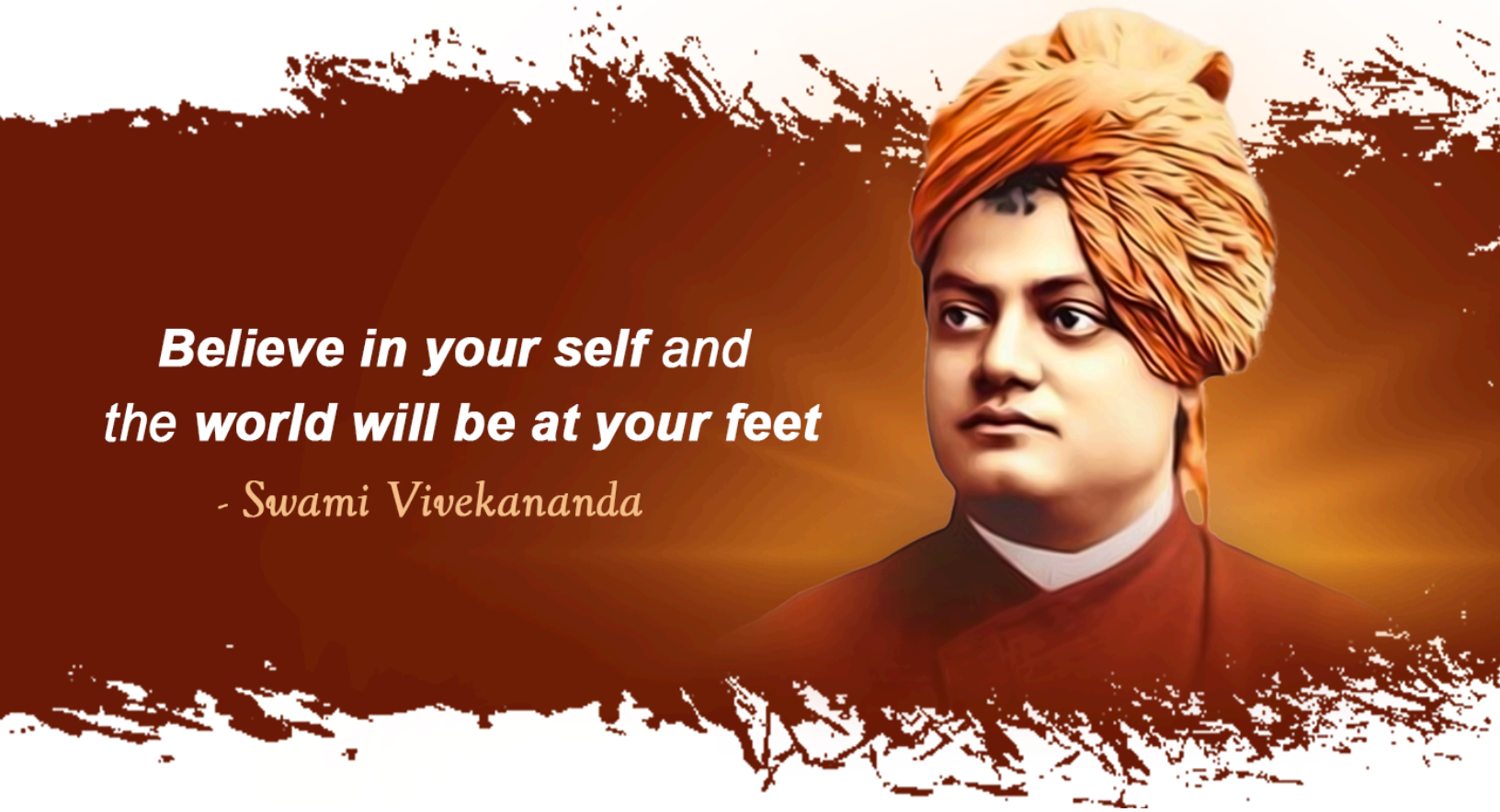
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