

IAS ORIGIN

YOUR PATHWAY TO UPSC SUCCESS

WEEKLY CURRENT AFFAIRS

19TH OCT TO 25TH OCTOBER

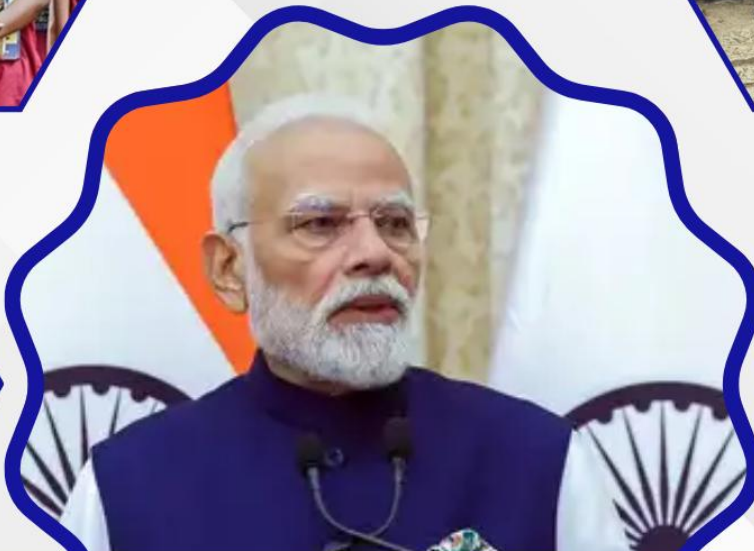


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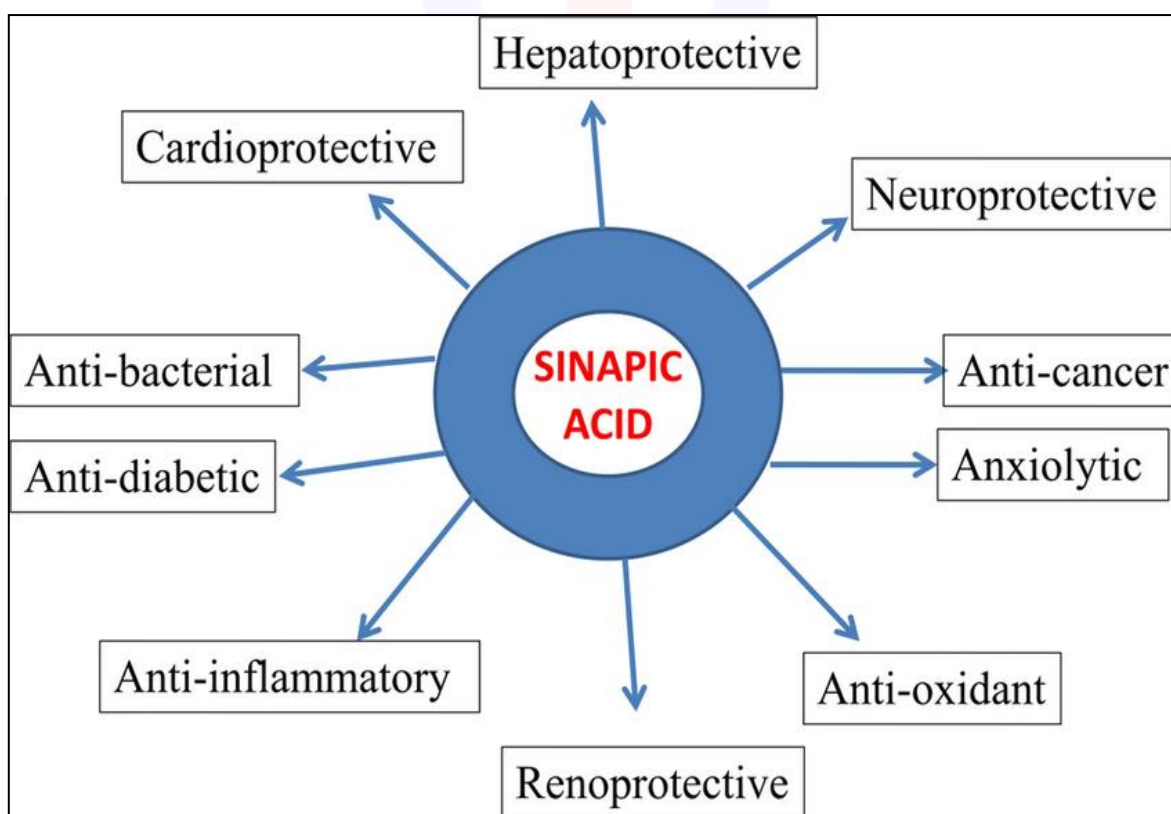
IAS ORIGIN
HERE IT BEGINS
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01**SINAPIC ACID**

Nagaland University researchers have identified a naturally occurring plant compound called 'Sinapic acid' that is capable of significantly accelerating wound healing in diabetic conditions.

DEFINITION & CLASSIFICATION

- **Sinapic acid** is a naturally occurring **phenolic compound** belonging to the **hydroxycinnamic acid family**, which are secondary metabolites in plants.
- **Chemical Name:** 3,5-dimethoxy-4-hydroxycinnamic acid
- **Molecular Formula:** $C_{11}H_{12}O_5$
- **Molecular Weight:** 224.21 g/mol
- It is a derivative of **cinnamic acid**, with both **hydroxyl (-OH)** and **methoxy (-OCH₃)** functional groups on the aromatic ring, responsible for its biological activities.

**OCCURRENCE AND NATURAL SOURCES**

Sinapic acid is **widely distributed in the plant kingdom**, mainly in **seeds, grains, fruits, and vegetables**.

MAJOR SOURCES:

- **Oilseeds:** Mustard (*Brassica juncea*), rapeseed (*Brassica napus*), sesame
- **Cereals:** Wheat, rye, oats, barley
- **Vegetables:** Broccoli, cabbage, spinach, kale (members of Brassicaceae)
- **Fruits:** Apples, pears, citrus fruits, blackcurrants
- **Spices:** Mustard and cumin
- **Byproducts:** Degradation of sinapine, a choline ester of sinapic acid found in mustard seeds



FACT FOR PRELIMS:

Sinapic acid and its derivatives are abundant in **Brassicaceae family (Cruciferous plants)**.

CHEMICAL STRUCTURE AND PROPERTIES

- **Type:** Hydroxycinnamic acid derivative
- **Functional groups:** Hydroxyl, methoxy, and carboxylic acid
- **Solubility:** Soluble in alcohol and alkaline solutions; slightly soluble in water
- **Stability:** Sensitive to oxidation and UV light

RELATED COMPOUNDS:

- **Caffeic acid, Ferulic acid, p-Coumaric acid** — all belong to the same phenylpropanoid pathway.
- Sinapic acid has higher antioxidant capacity than ferulic acid due to two methoxy groups.

BIOSYNTHESIS IN PLANTS

Sinapic acid is produced through the **phenylpropanoid pathway**, a key metabolic route responsible for synthesizing:

- **Lignin**
- **Flavonoids**
- **Coumarins**
- **Phenolic acids**

STEPS (SIMPLIFIED):

- **Phenylalanine** → **Cinnamic acid** (via Phenylalanine Ammonia Lyase enzyme)
- Cinnamic acid → **Ferulic acid**
- Ferulic acid → **Sinapic acid** (via O-methylation)

This pathway helps in **plant defense**, **UV protection**, and **cell wall formation**.

BIOLOGICAL AND PHARMACOLOGICAL SIGNIFICANCE

Sinapic acid exhibits multiple **bioactive properties**, making it a compound of scientific and pharmaceutical interest.

Activity	Description	Mechanism / Example
Antioxidant	Neutralizes reactive oxygen species (ROS), preventing cell damage	Donates hydrogen atoms or electrons to free radicals
Anti-inflammatory	Suppresses inflammatory mediators like TNF- α , IL-6, and COX-2	Reduces oxidative stress-induced inflammation
Antimicrobial	Inhibits bacterial and fungal growth	Alters microbial membrane integrity
Anticancer	Induces apoptosis in cancer cells	Prevents DNA damage and inhibits proliferation
Neuroprotective	Protects neurons from oxidative stress	Investigated for Alzheimer's and Parkinson's disease

Hepatoprotective	Prevents liver cell damage	Enhances antioxidant enzyme levels
Anti-diabetic	Improves glucose metabolism and insulin sensitivity	Suppresses lipid peroxidation

INDUSTRIAL AND ENVIRONMENTAL APPLICATIONS

Sector	Use of Sinapic Acid
Pharmaceuticals	Raw material for developing antioxidant and anti-inflammatory drugs
Food Industry	Natural preservative due to antimicrobial and antioxidant nature
Cosmetics	Used in skin-care formulations to prevent UV-induced aging
Agriculture	Acts as a natural defense compound against pathogens
Bioengineering	Genetic modification of plants to enhance sinapic acid for lignin control or antioxidant yield

ENVIRONMENTAL AND ECOLOGICAL IMPORTANCE

- Sinapic acid and its derivatives play a role in **allelopathy**, influencing the growth of neighboring plants.
- Helps plants withstand **oxidative stress** from UV radiation, drought, and pollutants.
- Regulates **lignin biosynthesis**, influencing plant structure and carbon storage.

RECENT RESEARCH & DEVELOPMENTS

- **Green extraction techniques** (like supercritical CO₂ extraction) are being developed to isolate sinapic acid from agricultural residues.
- **Nanoformulations** of sinapic acid are being tested for enhanced bioavailability in drug delivery systems.
- **Genetic engineering of Brassica species** is explored to increase sinapine content for sustainable bioactive compound production.

- **Pharmacognosy and nutraceutical studies** recognize it as a potential candidate in preventing chronic diseases linked to oxidative stress.

WHAT IS DIABETES MELLITUS?

- It is a metabolic disease, involving inappropriately elevated blood glucose levels
- It remains one of the world's most pressing chronic diseases, affecting hundreds of millions globally.



02

AUTHORIZED ECONOMIC OPERATOR (AEO) PROGRAMME

The World Trade Organization (WTO) recently praised India's liberalized Authorized Economic Operator (AEO) programme for significantly increasing the participation of micro, small, and medium enterprises (MSMEs) in international trade.



AUTHORIZED ECONOMIC OPERATOR (AEO) PROGRAMME

- The **Authorized Economic Operator (AEO)** Programme is a **voluntary trade facilitation initiative** under the **World Customs Organization's (WCO) SAFE Framework of Standards** to secure and facilitate global trade.
- It aims to enhance **international supply chain security** and **ease of doing business** by granting **recognition, trust, and benefits** to compliant and secure trade operators.
- In India, it is implemented by the **Central Board of Indirect Taxes and Customs (CBIC)** under the **Department of Revenue, Ministry of Finance**.

KEY IDEA:

An AEO is a business entity involved in international trade that has been approved by customs as compliant, secure, and **trustworthy across the global supply chain**.

GLOBAL BACKGROUND

- Launched globally in **2005** under the **WCO SAFE Framework of Standards to Secure and Facilitate Global Trade**.
- SAFE Framework encourages customs administrations to:

- Establish partnerships with the private sector.
- Recognize trusted traders.
- Secure the movement of goods across borders.
- Over **80 countries**, including India, the US, EU, Japan, and South Korea, have implemented AEO programmes.

AEO PROGRAMME IN INDIA

- **Introduced:** 2011 (initial phase)
- **Full-fledged implementation:** From **July 2016**, revised as the “**AEO Programme 2016**”
- **Administered by:** CBIC’s Directorate of International Customs
- **Legal basis:** Section **141(2)** of the **Customs Act, 1962**, and CBIC Circular **No. 33/2016-Customs** (dated 22 July 2016)

OBJECTIVE:

To enhance **trade facilitation**, **supply chain security**, and **mutual recognition** between Indian Customs and foreign administrations.

STRUCTURE OF AEO PROGRAMME IN INDIA

The Indian AEO programme is divided into **two main categories**:

Category	Eligible Entities	Sub-types / Tiers
AEO-T (Tier)	Importers and Exporters	AEO-T1, AEO-T2, AEO-T3 (progressively higher benefits)
AEO-LO	Logistics Operators, Customs Brokers, Warehouse Operators, Carriers, Terminal Operators	Separate certification

AEO-T1

- Entry-level certification for importers/exporters.
- **Benefits:** Faster processing, reduced document checks, direct port delivery.

AEO-T2

- Higher compliance and security standards verified through site visits.
- **Benefits:** Reduced examination, deferred payment of duty, priority in adjudication.

AEO-T3

- Highest tier — available to AEO-T2 holders with strong compliance for 2+ years.
- **Benefits:** Maximum facilitation, faster refunds, self-sealing privileges, and global recognition.

AEO-LO

- For logistics and supply chain operators like custodians, transporters, warehouse operators, etc.

ELIGIBILITY CRITERIA

To qualify for AEO status, an applicant must:

- Be a **legally established entity** in India engaged in Customs-related activity.
- Have handled a minimum of **25 import/export documents annually**.
- Maintain **good compliance records** under Customs, GST, and allied laws for at least **three financial years**.
- Maintain **proper accounting systems** and **security protocols** for premises and goods.
- Demonstrate **financial solvency** and absence of criminal proceedings.

OBJECTIVES OF THE PROGRAMME

- Facilitate **legitimate trade** while enhancing supply chain security.
- Reduce **customs clearance time** and transaction costs.
- Improve India's **Ease of Doing Business (EoDB)** ranking.
- Align Indian trade practices with the **WTO's Trade Facilitation Agreement (TFA)**.
- Promote **mutual recognition** with foreign customs administrations.

BENEFITS TO AEOS

For Importers/Exporters	For Logistics Operators
Faster clearance of consignments	Priority berthing and movement
Reduced examination and inspection	Waiver of bank guarantees

Direct Port Delivery (DPD) / Entry (DPE)	Faster approval for transshipment
Deferred payment of Customs duties	Simplified procedures
Self-sealing and self-certification privileges	Mutual Recognition in partner countries
Faster GST refunds & drawback	Enhanced credibility in international trade

FACT:

As of 2025, over **7,000 Indian entities** are AEO-certified by CBIC.

MUTUAL RECOGNITION AGREEMENTS (MRAS)

India has signed **Mutual Recognition Arrangements (MRAs)** with countries where AEO systems are operational, ensuring reciprocal benefits.

COUNTRIES WITH MRAS (AS OF 2025):

- **South Korea (2019)**
- **Hong Kong (2021)**
- **Taiwan (2021)**
- **United States (under discussion)**
- **United Kingdom, Japan, and UAE** – MRAs at advanced negotiation stages

PURPOSE:

To ensure that Indian AEOs get similar recognition abroad — facilitating faster movement of goods and reduced inspection overseas.

INSTITUTIONAL LINKAGES

- **WCO SAFE Framework (2005)** – provides the international model.
- **WTO Trade Facilitation Agreement (2017)** – encourages simplified and transparent customs procedures.
- **National Trade Facilitation Action Plan (NTFAP 2025)** – integrates AEO targets.
- **Digital initiatives** like **ICEGATE, SWIFT, and Turant Customs** strengthen its implementation.

IMPACT ON INDIA'S TRADE AND ECONOMY

Area	Impact
Trade Facilitation	Reduced dwell time at ports and faster cargo clearance.
Revenue Efficiency	Lower administrative burden for customs, better compliance monitoring.
Ease of Doing Business	Key driver in improving India's global EoDB ranking under the "Trading Across Borders" parameter.
Security Enhancement	Strengthens global supply chain integrity.
International Trust	Builds confidence in Indian exporters globally.

CHALLENGES AND ISSUES

- **Limited awareness** among small exporters and MSMEs.
- **Complex documentation and verification** procedures.
- **Slow MRA finalization** with major trade partners like the EU and the US.
- **Unequal benefits** — large corporations benefit more than smaller entities.
- **Technological and manpower constraints** in customs administration.

RECENT DEVELOPMENTS (2024–2025)

- **AEO 2.0 Initiative:** CBIC is working on a digital, AI-enabled verification system for quicker approval.
- **MSME Facilitation:** Simplified norms proposed to bring small traders into the AEO net.
- **Integration with PM Gati Shakti** for multi-modal logistics optimization.
- **Paperless Processing:** Complete digitalization through **Turant Customs** platform.

COMPARISON: AEO VS TRUSTED EXPORTER PROGRAMME

Aspect	AEO	Trusted Exporter (DGFT)
Administered by	CBIC (Customs)	DGFT (Commerce)

Focus	Security + Facilitation	Export promotion
Scope	All supply chain operators	Exporters only
Recognition	WCO-based (global)	India-specific
Goal	Secure and expedite global trade	Boost export compliance

QUICK FACTS

Feature	Detail
Implementing Agency	CBIC, Department of Revenue
Legal Basis	Customs Act, 1962
Global Framework	WCO SAFE Framework (2005)
Launch in India	2011 (revamped 2016)
Key Circular	CBIC Circular No. 33/2016-Customs
Tiers	AEO-T1, T2, T3, and AEO-LO
Objective	Trade facilitation & supply chain security
Related International Body	World Customs Organization (WCO)
India's MRA Partners	South Korea, Hong Kong, Taiwan

CONCLUSION

The **Authorized Economic Operator (AEO) Programme** represents India's shift from **control-based customs** to **trust-based trade facilitation**.

By rewarding compliant and secure traders, the AEO framework promotes **transparency, predictability, and security** in international trade — aligning with India's vision of becoming a **global logistics hub** under **PM Gati Shakti** and **Atmanirbhar Bharat**.

03**TETRATAENIUM MANILALIANUM**

Adding to the rich biodiversity of the Western Ghats, researchers recently discovered a new plant species named *Tetrataenium manilalianum*.

TAXONOMY & NAMING

- *Tetrataenium manilalianum* belongs to the genus *Tetrataenium*, which is part of the plant family Apiaceae (the carrot / parsley / umbellifer family).
- The species epithet *manilalianum* honours the eminent Indian botanist K. S. Manilal, founder-president of the Indian Association for Angiosperm Taxonomy.
- It has been described as a **new species (sp. nov.)** in a scientific paper (Rekha, Amruth, Manudev & Sujana) from Kerala.

**DISCOVERY & LOCATION**

- The species was discovered in the Eravikulam National Park, Idukki district, Kerala, situated in the high-altitude Western Ghats.
- It is found in the grassland/shola forest border region at elevations of approximately **1,200-1,800 metres** above sea level.
- The habitat: rocky, moist slopes in montane grasslands interspersed with shola forests.

MORPHOLOGICAL FEATURES

- Herbaceous plant, about **60-100 cm tall** with a tuberous rootstock.
- Basal leaves are ternate to bi-ternate (leaflets divided and possibly further divided); upper leaves simpler.

- It bears umbrella-shaped inflorescences (compound umbels) with white flowers — characteristic of the Apiaceae family.
- Fruits are elongated and ribbed.
- Phenology: Flowering between July and September; fruiting September to November.

SIGNIFICANCE

- **Biodiversity significance:** Its discovery adds to the rich floristic diversity of the Western Ghats, recognized as one of the world's biodiversity hotspots.
- **Endemism:** Known only from its type locality (so far), i.e., the grasslands of Eravikulam National Park in the Western Ghats. This makes it highly restricted in range.
- **Taxonomic importance:** The genus *Tetrataenium* is less commonly known in India; the discovery expands the genus's representation in this region.
- **Conservation implication:** Because of its restricted range and specialised habitat, the species may be vulnerable to habitat disturbance, climate change and invasive species.

CONSERVATION STATUS & THREATS

- The authors have provisionally assigned it a status of **Data Deficient (DD)**, given limited known occurrences and insufficient data on population size and trends.
- Potential threats:
 - Habitat alteration due to tourism, changing land use in montane grasslands.
 - Climate change impacting montane ecosystems (e.g., shifts in temperature, rainfall patterns).
 - Invasive species encroachment into high-altitude grasslands.
 - Small population size and narrow altitudinal range increase vulnerability.

ERAVIKULAM NATIONAL PARK

LOCATION & BASIC FACTS

- Eravikulam National Park is located in the southern Indian state of Kerala, primarily in the Idukki district (and partly Ernakulam district).
- It covers an area of around **97 km²**.
- It was officially declared a national park in **1978**.

- The park lies in the high-altitude Western Ghats region, with elevations ranging roughly from 2000 m and up (the highest peak in South India, Anamudi (2,695 m), is within the park).

ECOLOGICAL AND GEOLOGICAL FEATURES

- The terrain is a **rolling hill plateau**, with high altitude grasslands interspersed with “shola” forests (tropical montane forests) — a typical ecosystem of the southern Western Ghats.
- Vegetation zones include montane grasslands above ~2,000 m, shola forest patches in hollows and valleys, and streams flowing through the park.
- The park plays a key role in watershed functions: perennial streams in the park feed into tributaries of major rivers.



BIODIVERSITY IMPORTANCE

- **Fauna:** The park is home to around **26 mammal species**, and over 100 bird species and other fauna (amphibians, butterflies) are present.
- The park's flagship species is the Nilgiri Tahr (*Nilgiritragus hylocrius*), an endangered mountain ungulate endemic to the Western Ghats. A significant population of them live in this park.
- **Flora:** The unique high-altitude shola-grassland ecosystems are home to many endemic plants. Also notable is the seasonal bloom of the flower *Strobilanthes kunthiana* (“Neelakurinji”), which blooms (en masse) every 12 years in some Western Ghats high-altitude areas.

CONSERVATION & MANAGEMENT

- Given its ecological importance, the park has strict controls on tourism: for example, only designated tourism zones (like Rajamala) are open to tourists; core areas are restricted.
- The park is closed during critical seasons (for instance, during the calving period of the Nilgiri Tahr) to minimise disturbance.
- Recently, the park achieved a very high score (92.97 %) in the Management Effectiveness Evaluation (MEE) for protected areas in India (2020-25 cycle).

PRELIMS:

- Facts like “highest peak in South India (Anamudi) is within this park”, “area ~97 km²”, “location: Idukki district, Kerala”, “ecosystem: montane grassland-shola”, “flagship species: Nilgiri Tahr”, etc can be asked.
- The park being part of the Western Ghats, a UNESCO tentative list area, helps in comparative geography questions.

KEY FACTS FOR REVISION

- **Location:** Idukki (and partly Ernakulam) district, Kerala
- **Area:** ~97 km²
- **Declared:** 1978 (National Park)
- **Ecosystem:** High-altitude grasslands & shola forests in Western Ghats
- **Highest Peak:** Anamudi (2,695 m) within park
- **Flagship Species:** Nilgiri Tahr (endemic, endangered)
- **Unique phenomenon:** Neelakurinji bloom once in ~12 years
- **Management:** Tourism restricted zones; closed for calving season
- **MEE score (2020-25):** 92.97% — among the best in India

04

INS VIKRANT

Recently, the Prime Minister of India celebrated Deepavali aboard INS Vikrant and hailed armed forces' unity in Operation Sindoor.



ABOUT INS VIKRANT

- It is India's first indigenously designed and manufactured aircraft carrier.
- The ship has been designed in-house by the Indian Navy's Warship Design Bureau and constructed by M/s Cochin Shipyard Limited.
- It was commissioned into the Indian Navy in 2022.

FEATURES OF INS VIKRANT

- With a length of 262 metres and a width of 62 metres, the massive aircraft carrier boasts 14 decks.
- Displacement capacity: Its full-load displacement is 43,000 tonnes.
- Propulsion: It is powered by four Gas Turbines totaling 88 MW of power and has a maximum speed of 28 knots.
- Endurance: 8,600 miles (13,890 kilometres) and it is capable of functioning independently for up to 45 days at sea.
- It is capable of operating an air wing consisting of 30 aircraft comprising MIG-29K fighter jets, Kamov-31, MH-60R multi-role helicopters, in addition to indigenously manufactured Advanced Light Helicopters (ALH) and Light Combat Aircraft (LCA) (Navy).

- Using a novel aircraft-operation mode known as STOBAR (Short Take-Off but Arrested Landing), INS Vikrant is equipped with a ski- jump for launching aircraft and a set of 'arrester wires' for their recovery onboard.



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05**FINANCIAL ACTION TASK FORCE (FATF)**

The ongoing Financial Action Task Force (FATF) meetings in Paris are expected to deliberate on state sponsorship as a means to fund and support terrorism, including the financing of banned outfits and their proxies operating in Pakistan.

FINANCIAL ACTION TASK FORCE (FATF)

- The **Financial Action Task Force (FATF)** is an **inter-governmental policy-making body** that sets **global standards** to combat **money laundering (ML)**, **terrorist financing (TF)**, and **proliferation financing (PF)**.
- Established in **1989** during the **G7 Summit in Paris** by the **Organisation for Economic Co-operation and Development (OECD)**.
- FATF ensures that global financial systems are not misused for **illicit finance**, **terrorism**, or **organized crime**.

**HEADQUARTERS & MEMBERSHIP**

Parameter	Detail
Headquarters	Paris, France
Secretariat	Located at OECD Headquarters
Members	39 (37 countries + 2 regional organizations – European Commission & Gulf Cooperation Council)
Presidency (2024–25)	Currently held by Singapore (as of 2025)

India's Membership	Became full member in 2010
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OBJECTIVES OF FATF

- Set global standards for **Anti-Money Laundering (AML)** and **Countering the Financing of Terrorism (CFT)**.
- Monitor implementation through **peer reviews** (Mutual Evaluations).
- Identify and act against **high-risk and non-cooperative jurisdictions** (grey/black lists).
- Coordinate global cooperation among law enforcement and financial intelligence units.
- Address new threats — **crypto-assets, proliferation financing, and virtual currency misuse**.

FATF STRUCTURE

- **Plenary:** Main decision-making body (meets thrice a year).
- **President & Vice-President:** Elected for 1-year terms.
- **Secretariat:** Provides analytical and administrative support.
- **Working Groups:** Focus on typologies, mutual evaluations, risk trends, etc.

KEY DOCUMENTS & STANDARDS

FATF RECOMMENDATIONS (40 RECOMMENDATIONS)

- First issued in **1990**, revised in **2012**.
- Cover areas like:
 - Customer due diligence (Know Your Customer - KYC)
 - Beneficial ownership transparency
 - International cooperation
 - Regulation of virtual assets
 - Sanctions for non-compliance

METHODOLOGY FOR ASSESSING COMPLIANCE

- Countries are evaluated every few years for:
 - **Technical compliance** (laws/regulations in place)
 - **Effectiveness** (actual enforcement)

FATF LISTS

GREY LIST (JURISDICTIONS UNDER INCREASED MONITORING)

- Countries with strategic deficiencies in AML/CFT systems but committed to improvement.
- Consequences: Enhanced scrutiny, limited investment confidence, and potential downgrade to blacklist.
- Examples (as of 2025): Philippines, Syria, South Sudan, Yemen, etc.
- **Pakistan** was on the list from **2018–2022**, removed in **October 2022** after compliance.

BLACK LIST (HIGH-RISK JURISDICTIONS)

- Countries with serious deficiencies and non-cooperation.
- Examples: North Korea and Iran.

CONSEQUENCES OF BEING ON THE FATF BLACKLIST:

- No financial aid is given to them by the International Monetary Fund (IMF), the World Bank, the Asian Development Bank (ADB), and the European Union (EU).
- They also face a number of international economic and financial restrictions and sanctions.

FATF AND INDIA

- India joined FATF as a full member in **June 2010**.
- Member of FATF's **Asia/Pacific Group (APG)** and **Eurasian Group (EAG)**.
- Nodal agencies:
 - **Ministry of Finance** (Department of Revenue)
 - **Financial Intelligence Unit – India (FIU-IND)**
 - **Enforcement Directorate (ED)**
 - **RBI, SEBI, IRDAI** (regulatory bodies)
- India has **strict AML/CFT laws**, mainly:
 - **Prevention of Money Laundering Act (PMLA), 2002**
 - **Unlawful Activities (Prevention) Act (UAPA), 1967**
 - **FEMA (1999)**

- India's compliance enhances **credibility of its financial system** and **international cooperation** in combating terror finance (especially from Pakistan-based groups).

FATF AND PAKISTAN

- Pakistan's repeated grey-listing was due to:
 - Inadequate control over terror financing (Lashkar-e-Taiba, Jaish-e-Mohammad, etc.)
 - Weak financial oversight and enforcement.
- FATF's action forced Islamabad to enact legal reforms, arrest key terrorists, and improve banking transparency.
- India benefited diplomatically — FATF scrutiny exposed **cross-border terrorism links**.

GLOBAL SIGNIFICANCE

- FATF enhances **integrity and transparency** in global financial systems.
- Works with international partners like:
 - **UN Security Council (UNSC)**
 - **IMF & World Bank**
 - **Interpol**
 - **Egmont Group of FIUs**
- Has issued guidance on **Virtual Assets (Crypto)** and **Proliferation Financing** — relevant in modern financial crimes.

CHALLENGES

- **Lack of universal enforcement:** FATF relies on political pressure, not legal authority.
- **Crypto assets & digital finance:** Emerging technologies create new avenues for money laundering.
- **Politicization:** Accusations of selective pressure (e.g., some nations spared due to strategic interests).
- **Developing nations' capacity constraints** in implementing FATF standards.

06

DOCTRINE OF LIS PENDENS

The Delhi High Court has held that courts can exempt a property from the doctrine of lis pendens, to shield genuine owners from vexatious suits.

DOCTRINE OF LIS PENDENS

MEANING: THE TERM "LIS PENDENS" IS DERIVED FROM LATIN —

- "Lis" = Suit or litigation
- "Pendens" = Pending

Thus, **Lis Pendens** means "pending litigation".

In simple terms, the **Doctrine of Lis Pendens** states that **when a property is under litigation in a court of law, it cannot be transferred or otherwise dealt with in a way that affects the rights of the other party to the suit.**

LEGAL BASIS

- The Doctrine is **codified under Section 52 of the Transfer of Property Act, 1882.**

SECTION 52:

"During the pendency of any suit or proceeding in which any right to immovable property is directly and specifically in question, the property cannot be transferred or otherwise dealt with by any party to the suit so as to affect the rights of any other party under any decree or order that may be made therein except under the authority of the court."

SIMPLIFIED EXPLANATION

When a property dispute is in court, neither party can sell, lease, mortgage, or gift the property until the case is resolved.

If they do, the transfer **does not become invalid**, but it is **subject to the final judgment** — meaning the new buyer cannot claim independent rights against the eventual court decree.

EXAMPLE

Suppose:

- **A** and **B** are fighting a case over ownership of a piece of land.
- While the case is ongoing, **A sells the land to C.**

Here:

- C's purchase is **subject to the result of the case** between A and B.
- If the court rules in favor of B, **C's ownership has no independent validity**, even though he purchased it.

ESSENTIAL CONDITIONS (AS PER SECTION 52)

- **There must be a pending suit or proceeding** in a competent court.
- **The dispute must relate directly to an immovable property.**
- **The transfer must be made by one of the parties to the suit.**
- The transfer **must affect the rights of the other party.**
- The transfer **must be made during the pendency** of the suit (not before filing or after disposal).
- The transfer **must not have prior court approval.**

JUDICIAL INTERPRETATIONS

BELLAMY V. SABINE (1857)

- English origin of the doctrine.
- The court observed:
 - "It is not the doctrine of notice, but founded on expediency and good public policy — no party should be allowed to prejudice another by transferring property during litigation."

JAYARAM MUDALIAR V. AYYASWAMI & ORS. (1973)

- Supreme Court of India reaffirmed that:
 - "The doctrine is based on the principle that the decision of a court in a suit should be binding not only on the litigating parties but also on those who derive title pendente lite."

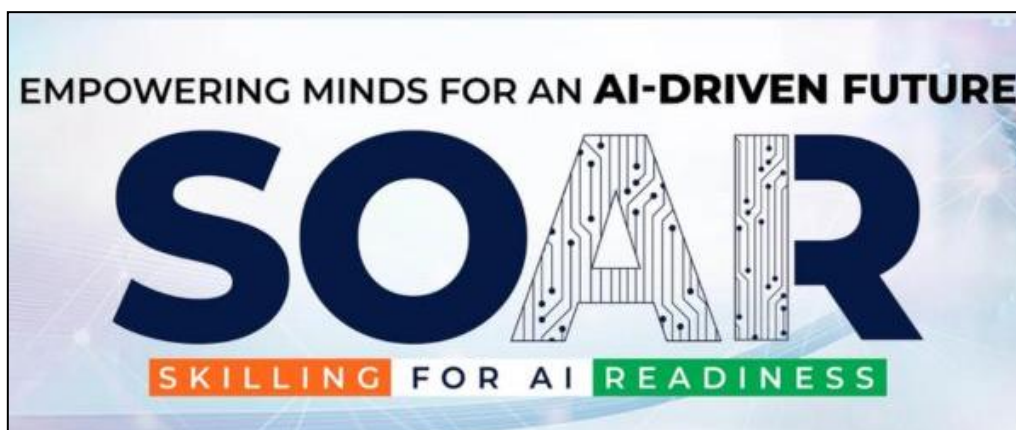
NATURE AND PURPOSE

- **Purpose:** To prevent **multiplicity of litigation** and **protect the interest of parties** in a property under dispute.
- **Nature:** It does **not invalidate the transfer** — it merely **makes the transfer subservient to the outcome** of the case.

07

SKILLING FOR AI READINESS (SOAR) PROGRAMME

India is taking a major step toward building an AI-ready generation through the Skilling for AI Readiness (SOAR) programme.



INTRODUCTION & CONTEXT

- The programme is an initiative of the Ministry of Skill Development & Entrepreneurship (MSDE), Government of India.
- It was formally launched on **22 July 2025** at the Bharat SkillNXT 2025 Summit, marking 10 years of the Skill India Mission.
- It comes against the backdrop of rapid advances in Artificial Intelligence (AI), the growing demand for AI-skills globally, India's intention to become a knowledge & innovation hub, and the vision of "Viksit Bharat 2047".

WHAT IS THE SOAR PROGRAMME

- **Full name:** Skilling for AI Readiness (SOAR).
- **The idea:** To integrate **AI awareness** and **foundational AI skills** into school education (Classes 6 to 12) and empower educators (teachers) with AI literacy.
- It is thus both a skilling and an educational initiative: early exposure to AI, and bridging the digital/skill divide.

KEY FEATURES / STRUCTURE

FOR STUDENTS (CLASSES 6–12):

- Three progressive modules of **15 hours each**:
 - AI to be Aware — introductory concepts of AI in daily life.

- AI to Acquire — basic programming, tools, practical AI.
- AI to Aspire — ethics, societal impacts, career pathways.

FOR EDUCATORS (TEACHERS):

- One independent **45-hour module** titled AI for Educators. Focuses on enabling teachers to teach AI, use AI tools, create projects, understand ethics etc.

ADDITIONAL FEATURES:

- Blended learning approach: online + workshops, hands-on.
- Targeting **digital inclusion**, i.e., ensuring access across geographies (urban and rural) and socio-economic groups.
- Alignment with other frameworks: e.g., the NEP 2020's emphasis on skills, India's AI strategy, skilling ecosystem.

OBJECTIVES

- **Early exposure:** Introduce AI concepts at school level so students develop computational thinking and readiness.
- **Bridging digital/skill divide:** Ensure equitable access to AI education regardless of region or background.
- **Teacher capacity building:** Empower educators to facilitate AI education effectively.
- **Aligning with future job market:** Prepare a workforce ready for AI-enabled economy and innovation.
- **Ethical and inclusive AI awareness:** Cover topics like ethics, AI in daily life, cybersecurity, career pathways.

IMPLEMENTATION & OPERATIONAL ASPECTS

- Module development in collaboration with education experts, EdTech, possibly industry partners.
- Delivery via blended formats (online, offline workshops) and platforms (digital hubs) for scalability.
- The MSDE mentions leveraging its digital ecosystem – e.g., the “KaushalVerse” digital enterprise portal of National Council for Vocational Education and Training (NCVET) for skill-training delivery.

- Funding/financing: A mention of the Skill Impact Bond (SIB) being mobilised by MSDE / NSDC (~US\$14.4 million) to support outcomes-based skilling ecosystem.
- Monitoring reach & implementation will be important (though detailed mechanisms may still evolve).

SIGNIFICANCE

FOR INDIA'S SKILL & EDUCATION LANDSCAPE

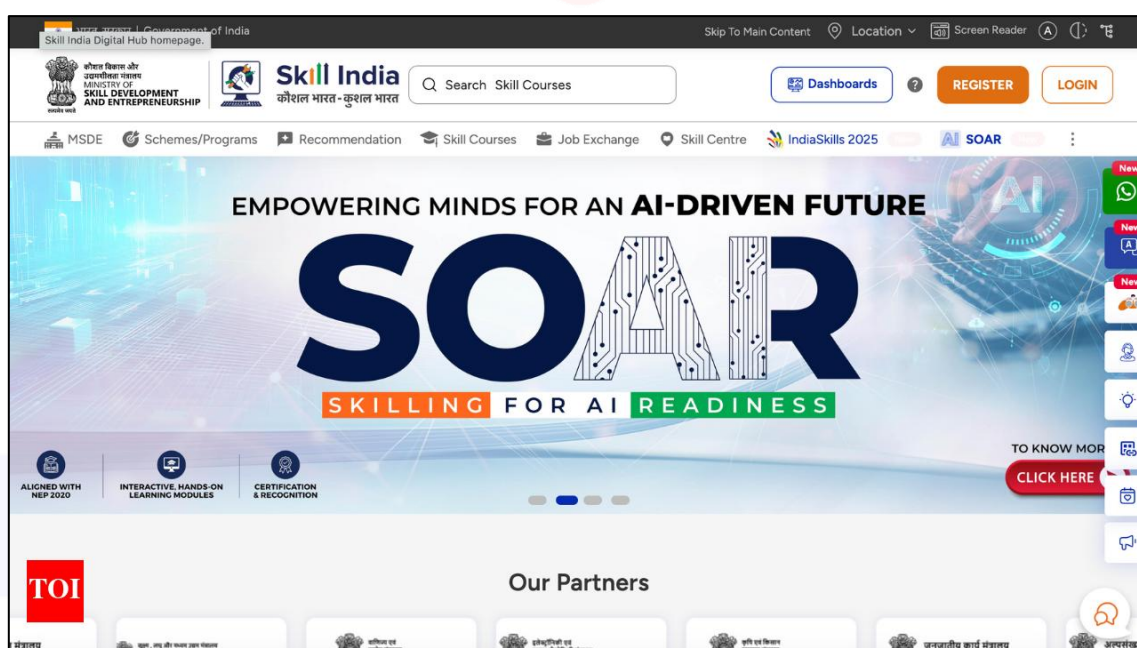
- Embeds AI education at school level, aligning with the shift from traditional rote to 21st-century skills (computational thinking, digital fluency).
- Helps India build a **talent pipeline** for AI and emerging technologies — critical given global competition and India's ambition in AI.
- Reinforces the “Skill India Mission” and the vision of preparing for a future of work.
- Shows policy coherence: linkages between skills, education, technology, and economy.



CHALLENGES & ISSUES

- **Digital infrastructure gap:** Many schools (especially in rural/remote areas) may lack devices, connectivity or labs to deliver AI modules effectively.
- **Teacher readiness:** Training large numbers of teachers to deliver AI content is resource-intensive and needs ongoing support.

- **Language and accessibility:** Ensuring modules in regional languages and suited to diverse educational backgrounds is crucial but challenging.
- **Curriculum overload:** Additional AI modules may add to student/teacher workload; integration needs careful planning.
- **Sustainability & scale:** Rolling out across India's large school system, ensuring quality and monitoring outcomes remains a large task.
- **Ethical, bias and societal implications of AI:** While modules mention ethics, making sure that children understand biases, privacy, misuse of AI is complex.
- **Outcome measurement:** Translating early exposure to meaningful skill acquisition and job readiness will take time and evaluation frameworks.



WAY FORWARD / SUGGESTIONS

- **Strengthen public-private partnerships:** Collaborate with industry, EdTech, academia to develop quality content, labs, mentorship.
- **Prioritise infrastructure investment:** Ensure connectivity, devices, AI labs in under-served schools.
- **Localise content:** Develop modules in regional languages, adapt pedagogy to local contexts.
- **Monitor & evaluate:** Build indicators to track reach, learning outcomes, application of AI skills, equity of access.
- **Sustainability:** Integrate AI modules into mainstream curriculum (schools, vocational training) rather than as isolated add-ons.

- **Focus beyond awareness:** Move from “AI awareness” to “AI creation/use” – enabling students to build projects, solve real-world problems.
- **Ethics & regulation:** Embed strong emphasis on responsible AI, data privacy, digital citizenship from early age.
- **Link to higher-order skills:** Connect school exposure to vocational/tertiary skilling in AI, machine learning, data analytics to maintain the pipeline.

CONCLUSION

The Skilling for AI Readiness (SOAR) programme is a forward-looking policy initiative that seeks to equip India’s next generation with foundational AI literacy and skills, starting at school level. It aligns with national visions of a technology-driven, inclusive and future-ready India.

Its significance lies not only in building capacity for AI, but also in addressing equity in access, preparing the workforce of tomorrow, and reinforcing India’s global competitiveness in technology. If implemented effectively, it could become a cornerstone of India’s skilling and education ecosystem in an AI-first world.

IAS ORIGIN
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08**INDIAN SCOPS-OWL**

In a rare and remarkable discovery, birdwatchers recently recorded the first-ever sighting of the Indian scops owl near the Daroji Sloth Bear Sanctuary in Karnataka.

**INDIAN SCOPS OWL (OTUS BAKKAMOENA)****INTRODUCTION**

The **Indian Scops Owl** is a **small nocturnal bird of prey** belonging to the family **Strigidae** (true owls).

It is one of the most widespread and commonly found owls in the Indian subcontinent, known for its **distinctive “hoot” call**, **cryptic plumage**, and **excellent camouflage**.

SCIENTIFIC CLASSIFICATION

Taxonomic Rank	Details
Kingdom	Animalia
Phylum	Chordata
Class	Aves
Order	Strigiformes
Family	Strigidae
Genus	Otus

Species	Otus bakkamoena
Common Name	Indian Scops Owl
Authority	(Pennant, 1769)

GEOGRAPHICAL DISTRIBUTION

- Found widely across **South Asia: India, Pakistan, Nepal, Sri Lanka, Bangladesh**, and parts of **Myanmar**.
- In India – occurs almost **throughout the country**, except the **very high Himalayas** and **extremely arid deserts**.
- Commonly seen in **forests, farmlands, urban parks, and even near human habitations**.

HABITAT

- **Preferred habitat:** Open woodlands, scrublands, agricultural fields, orchards, and city outskirts.
- Often roosts in **tree hollows, dense foliage, or crevices during the day** to remain camouflaged.
- **Altitude range:** Up to ~1500 m above sea level.

PHYSICAL CHARACTERISTICS

Feature	Description
Size	19–23 cm (small-sized owl)
Wingspan	About 50–60 cm
Coloration	Greyish-brown with streaks and mottling — highly camouflaged against tree bark
Ear tufts	Prominent and erect; helps distinguish it from similar species
Eyes	Large, typically orange or yellow
Call	Soft, single “whuk” or “hoot” repeated at intervals — often heard at night

Special Feature (for MCQs): The Indian Scops Owl can **flatten itself against tree trunks** and **close its eyes to narrow slits**, blending perfectly with the bark — a **defensive camouflage behavior**.

BEHAVIOR & ECOLOGY

- **Nocturnal:** Active at night; hunts small insects, rodents, lizards, frogs, and small birds.
- **Solitary or in pairs:** Rarely seen in groups.
- **Territorial:** Defends its territory through calls and displays.
- **Nesting:**
 - Usually in **tree holes, old woodpecker holes, or wall cavities.**
 - **Breeding season:** February–May in most parts of India.
 - **Clutch size:** 3–5 eggs.
- **Camouflage:** Among the best-camouflaged birds in India; difficult to spot even at close range.

SUBSPECIES (FOUND IN DIFFERENT REGIONS)

- **Otus bakkamoena bakkamoena** – Peninsular India & Sri Lanka
- **Otus bakkamoena gangeticus** – Northern India, Nepal, Bangladesh
- **Otus bakkamoena deserticolor** – Northwestern India (drier regions)
- **Otus bakkamoena plumipes** – Southern Iran to Pakistan

CONSERVATION STATUS

Organization	Status
IUCN Red List	Least Concern (LC)
CITES	Appendix II (trade regulated)
Wildlife Protection Act, 1972 (India)	Schedule IV — protected species but not endangered

09**ANAGYRUS LOPEZI**

Two years after scientists from the National Bureau of Agricultural Insect Resources (NBAIR), released a tiny parasitic wasp *Anagyrus lopezi* into South India's tapioca fields, the crop that once faced near devastation from an invasive pest is now thriving again.

**ANAGYRUS LOPEZI**

- **Common Name:** Parasitoid Wasp (specialized biological control agent)
- **Scientific Name:** *Anagyrus lopezi* (De Santis, 1964)
- **Belongs to:**
 - **Kingdom:** Animalia
 - **Phylum:** Arthropoda
 - **Class:** Insecta
 - **Order:** Hymenoptera
 - **Family:** Encyrtidae
 - **Genus:** *Anagyrus*
 - **Species:** *A. lopezi*

ORIGIN & DISTRIBUTION

Region	Status
Native to	Central and South America

Introduced to	Africa (1980s), Southeast Asia (2010s), and India (post-2013)
Purpose	Control of cassava mealybug infestations

BIOLOGICAL CHARACTERISTICS

Feature	Details
Type	Parasitic wasp (endoparasitoid)
Size	~1–2 mm (microscopic)
Color	Yellowish-brown with transparent wings
Lifecycle	Female lays eggs inside the cassava mealybug → larvae develop inside and consume the host → adult emerges, killing the pest
Reproduction	High reproductive rate under tropical conditions
Behavior	Host-specific (targets <i>Phenacoccus manihoti</i> only, does not harm other insects)

ROLE IN BIOLOGICAL CONTROL

MECHANISM:

- The wasp detects mealybugs using **chemical cues** (kairomones).
- It lays a single egg inside the mealybug.
- The **larva feeds internally**, killing the host.
- The adult wasp emerges, continuing the cycle.

ADVANTAGES:

- **Eco-friendly:** Reduces pesticide use.
- **Cost-effective:** Once established, maintains itself naturally.
- **Sustainable:** Long-term pest suppression.
- **Non-toxic:** Safe for humans, animals, and pollinators.

SUCCESS STORIES:

- **Africa (1980s):**
 - Released in 26 countries.
 - Saved the continent's cassava production, preventing **estimated losses worth over US \$20 billion**.
- **Southeast Asia (after 2009):**
 - Controlled the cassava mealybug in Thailand, Cambodia, and Vietnam.
- **India (after 2013):**
 - Successfully used in **Tamil Nadu, Kerala, and Andhra Pradesh** — major cassava-growing states.
 - **Tapioca farmers** saw drastic reductions in mealybug damage and pesticide expenditure.

SIGNIFICANCE FOR INDIA

Aspect	Importance
Agricultural Impact	Protects cassava (tapioca) — an important food security and industrial starch crop .
Environmental Impact	Reduces chemical pesticide use, aiding biodiversity.
Economic Impact	Boosts farmer incomes by reducing crop losses and input costs.
Scientific Value	Example of successful inter-continental biological control.
Policy Relevance	Aligns with National Mission on Sustainable Agriculture (NMSA) and FAO's IPM principles .

POTENTIAL RISKS / CHALLENGES

While highly effective, biocontrol introductions must be **scientifically regulated**:

- **Non-target risks:** Must ensure no attack on native beneficial insects.
- **Climate sensitivity:** Success may vary with humidity, temperature, and rainfall.
- **Monitoring:** Requires regular ecological monitoring post-release.

- **Public awareness:** Farmers need training in identifying beneficial vs pest insects.

However, studies so far show *A. lopezi* to be **highly host-specific and ecologically safe**.

ASSOCIATED INSTITUTIONS

- **IITA (International Institute of Tropical Agriculture)** – Nigeria (developed and deployed *A. lopezi* in Africa).
- **FAO & International Centre for Insect Physiology and Ecology (ICIPE)** – coordinated international releases.
- **ICAR-National Bureau of Agricultural Insect Resources (NBAIR)** – Bengaluru, India – reared and released the species in Indian fields.

CONSERVATION & REGULATORY FRAMEWORK

- **Under Indian law**, import and release of exotic biocontrol agents require approval of the **Department of Agriculture and Farmers' Welfare** and **NBAIR** (as per the Destructive Insects and Pests Act, 1914).
- Part of **Integrated Pest Management (IPM)** promoted by the **National Centre for Integrated Pest Management (NCIPM)**.

MCQ

Question1: Consider the following pairs:

	Biological Control Agent	Target Pest
1	<i>Anagyrus lopezi</i>	Cassava mealybug
2	<i>Trichogramma japonicum</i>	Rice stem borer
3	<i>Cryptolaemus montrouzieri</i>	Cotton bollworm

Which of the pairs given above are correctly matched?

- 1 and 2 only
- 1 and 3 only
- 2 and 3 only
- 1 and 2 only

(Pair 3 is incorrect – *Cryptolaemus montrouzieri* targets mealybugs, not bollworm.)

10

CENTRAL ASIAN MAMMALS' INITIATIVE

Representatives from a number of Central Asian countries have endorsed the Central Asian Mammals Initiative that identifies priority transboundary conservation regions important for conserving seventeen iconic mammal species of the region.



INTRODUCTION & BACKGROUND

- The Central Asian Mammals Initiative (CAMI) is a regional conservation framework developed under the Convention on the Conservation of Migratory Species of Wild Animals (CMS).
- It was **adopted at CMS COP11 in 2014** (Resolution 11.24) to address conservation of large migratory mammals in the broader Central Asian region.
- The initiative covers a large geographic region of Central Asia, and aims to coordinate cross-border conservation efforts for migratory and wide-ranging mammals whose habitats transcend national boundaries.

GEOGRAPHIC SCOPE & RANGE STATES

- CAMI spans up to **14 or more range states** (Central Asian, South Asian and neighbouring countries) that host one or more of the target species.

- Countries participating include: (but are not limited to) Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Mongolia, China, India, Pakistan, Nepal, Bhutan.
- The region includes a variety of ecosystems: high-mountain (Tian Shan, Altai), steppe and semi-desert (Central Asian plains), cold deserts, etc.

SPECIES COVERAGE

- CAMI currently includes a suite of large mammal species living in Central Asia, many of them migratory or wide-ranging, some endangered.
- Some of the listed species include:
 - Saiga Antelope (*Saiga tatarica*)
 - Bukhara Deer (*Cervus elaphus yarkandensis*)
 - Argali (*Ovis ammon*)
 - Snow Leopard (*Panthera uncia*)
 - Persian Leopard (added later)
 - Wild Yak (*Bos mutus*)
 - Wild Camel (*Camelus ferus*)
 - Goitered Gazelle (*Gazella subgutturosa*)
 - ...and others.
- The species are listed in CMS Appendix I and/or II (indicating endangered and migratory status).

OBJECTIVES & KEY ELEMENTS

- **Goal:** Improve the conservation status of large migratory mammals and their habitats in the Central Asian region by strengthening transboundary cooperation and coordinated action.
- **Key components:**
 - Harmonise and build synergies among existing instruments (MOUs, national action plans) under CMS.
 - Develop and implement a **Work Programme (PoW)** that sets concrete actions (2020-26, and onwards) for the listed species.
 - Focus on **transboundary priority conservation areas (TPCAs)/corridors**, since many species migrate or live across borders.

- Address major threats: poaching/illegal harvest, habitat fragmentation (railways, roads, fences), infrastructure development, climate change impacts.
- Promote information sharing, capacity building, enhanced enforcement, and multi-stakeholder partnerships (governments, NGOs, international bodies).

INSTITUTIONAL & LEGAL BASIS

- CAMI is anchored in the CMS (an international treaty under the UN Environment Programme).
- Resolutions: CMS COP11 (2014) adopted CAMI. Later COP13 (2020) revised its Work Programme (Rev. COP13) for period 2021-26.
- The initiative uses national and international mechanisms: workshops (e.g., Isle Vilm workshop May 2025) for technical design of the programme.
- Implementation is led by national agencies (wildlife, environment ministries) of the range states, supported by CMS Secretariat, IUCN, UNEP and other partners.

RECENT DEVELOPMENTS

- The **Third Meeting of Range States** for CAMI held in Tashkent (24-26 June 2025) marked review of progress, approval of new Work Programme (2026-32), and strengthening of transboundary approach.
- At this meeting, delegates emphasised the importance of cross-border corridors, climate resilience of species, and infrastructure mitigation.
- The initiative now explicitly integrates **climate change** adaptation for key species via linked project Central Asian Mammals and Climate Adaptation Project (CAMCA) covering Kazakhstan, Kyrgyzstan, Tajikistan.

SIGNIFICANCE & RELEVANCE FOR INDIA

- For India, involvement in CAMI signifies cooperation in a region where India shares ecosystems and migratory species (north-western Himalayas, Tibetan plateau fringe, Central Asian steppe linkages).
- India's participation strengthens its environmental diplomacy, especially regarding transboundary species, high-altitude ecosystem connectivity, and Central Asian partnerships.
- From an environmental governance / GS Paper 3 perspective: CAMI is an example of regional biodiversity cooperation, migratory species conservation, ecological connectivity, and nature-based solutions under climate change.

KEY CHALLENGES

- **Fragmentation of habitats and infrastructure development** (roads, railways, oil/gas pipelines) cut migration routes.
- **Illegal hunting/poaching** and trade in wildlife parts remain a major threat.
- **Climate change** impacts (glacier melt, desertification, changing precipitation) affecting habitats of high-altitude and steppe mammals.
- **Funding and capacity constraints** in many range states for monitoring and enforcement.
- **Coordination across many countries** with differing policies, institutional capacities and priorities — transboundary conservation is inherently complex.
- **Implementation gap:** Having Work Programmes is one thing; operationalising them (monitoring, patrolling, community engagement) is another.

KEY FACTS FOR REVISION

Feature	Detail
Full name	Central Asian Mammals Initiative (CAMI)
Adopted under	CMS COP11 (2014) – Resolution 11.24
Number of species initially	~15 large migratory mammal species
Number of range states	~14 + Central Asian and neighbouring states
Key threats addressed	Poaching, habitat fragmentation, climate change, migration barriers
Next Work Programme	2026-2032 (approved at 2025 meeting)
Nature of cooperation	Transboundary, multi-species, multi-state, multi-institutional

CONCLUSION

The Central Asian Mammals Initiative (CAMI) is a vital regional instrument for conserving migratory and wide-ranging mammals across Central Asia's vast and challenging landscapes. Its emphasis on **transboundary cooperation, species-wide**

action, integration of climate resilience, and ecosystem connectivity makes it a model for biodiversity conservation in an era of rapid environmental change. For India, it offers opportunities for regional ecological engagement, and from a UPSC perspective, it provides rich material under biodiversity policy, international environmental law, and sustainable development.

WHAT IS THE CONSERVATION OF MIGRATORY SPECIES?

- It is also known as the Bonn Convention, is an environmental treaty under the aegis of the United Nations Environment Programme.
- It provides a global platform for the conservation and sustainable use of migratory animals and their habitats.
- It was signed in Bonn, Germany, on 23 June 1979.
- It is the only global and UN-based intergovernmental organisation established exclusively for the conservation and management of terrestrial, aquatic and avian migratory species throughout their range.
- Activities by CMS Parties may range from legally binding treaties (called Agreements) to less formal instruments, such as Memoranda of Understanding.
- The Conference of Parties (COP) is the decision-making organ of this convention.

Question 1:	The Central Asian Mammals Initiative (CAMI) was adopted under which of the following international conventions?
Option A	Convention on Biological Diversity (CBD)
Option B	Convention on the Conservation of Migratory Species of Wild Animals (CMS)
Option C	Ramsar Convention on Wetlands
Option D	Convention on International Trade in Endangered Species (CITES)
Solution:	Answer: B Explanation: CAMI was adopted in 2014 under the CMS (Bonn Convention) to coordinate conservation of migratory mammals across Central Asia.

Question 2:	Which of the following species is NOT covered under the Central Asian Mammals Initiative (CAMI)?
Option A	Saiga Antelope

Option B	Snow Leopard
Option C	Wild Camel
Option D	Red Panda
Solution:	Answer: D Explanation: CAMI includes Saiga Antelope, Wild Camel, Snow Leopard, Bukhara Deer, Argali, etc. Red Panda is found mainly in the Eastern Himalayas, not part of CAMI's target species list.

Question 3:	Consider the following statements about CAMI: 1. It focuses on conservation of migratory birds across Central Asia. 2. It emphasizes transboundary cooperation among range states. 3. It is coordinated by the CMS Secretariat under UNEP. Which of the statements given above is/are correct?
Option A	1 only
Option B	2 and 3 only
Option C	2 only
Option D	1 and 3 only
Solution:	Answer: B Explanation: CAMI focuses on large migratory mammals, not birds. Statements 2 and 3 are correct — the initiative is under CMS/UNEP and promotes transboundary cooperation.

Question 4:	Which of the following countries is not among the typical range states of CAMI species?
Option A	Mongolia
Option B	Kazakhstan
Option C	Uzbekistan
Option D	Indonesia

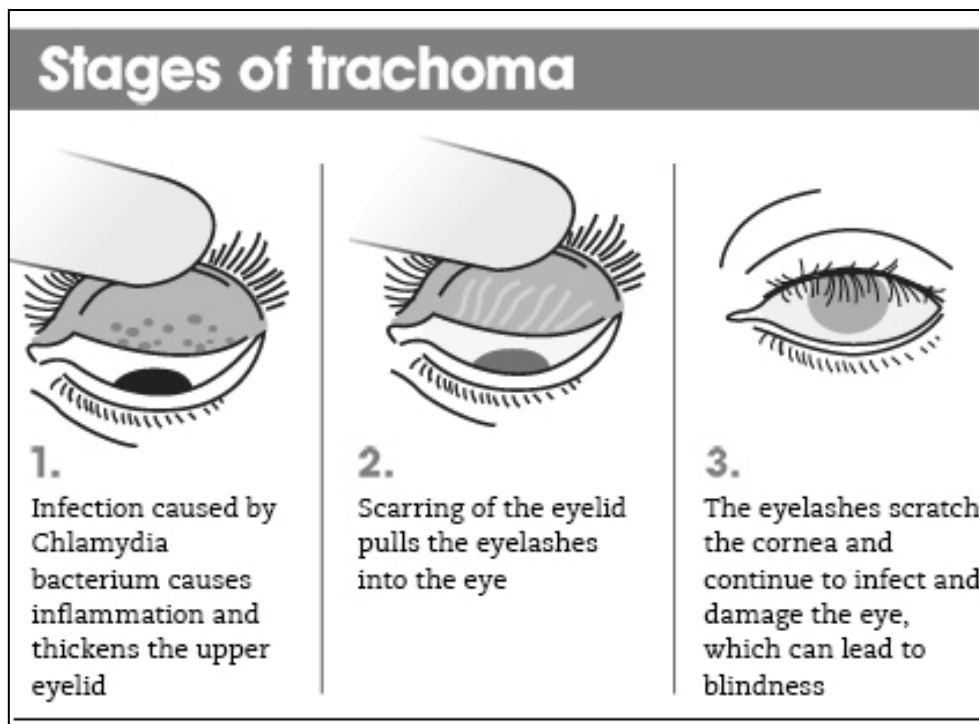
Solution:	Answer: D Explanation: Indonesia lies in Southeast Asia and is not part of the Central Asian ecosystem. CAMI focuses on Central Asian and neighbouring countries like Mongolia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and others.
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Question 5:	The Third Meeting of Range States for the Central Asian Mammals Initiative (CAMI) was recently held in:
Option A	Ulaanbaatar, Mongolia
Option B	Astana, Kazakhstan
Option C	Tashkent, Uzbekistan
Option D	Bishkek, Kyrgyzstan
Solution:	Answer: C Explanation: The Third Meeting of Range States to CAMI took place in Tashkent, Uzbekistan (June 2025) to adopt the new Work Programme (2026–2032).

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11**TRACHOMA**

Recently, Fiji became the 26th country to eliminate trachoma as a public health problem.

**TRACHOMA****DEFINITION**

- **Trachoma** is a **chronic infectious eye disease** caused by the **bacterium** Chlamydia trachomatis.
- It primarily affects the **conjunctiva and cornea**, and is the **leading infectious cause of blindness worldwide** (preventable blindness).

CAUSATIVE AGENT

Feature	Detail
Pathogen	Chlamydia trachomatis (serotypes A, B, Ba, C)
Type of microbe	Obligate intracellular Gram-negative bacterium
Reservoir	Human beings only
Mode of transmission	Direct contact (eye discharge, hands, towels, flies)

EPIDEMIOLOGY

- Trachoma mostly affects **children** (repeated infections) and **women** (caregivers exposed to children's secretions).
- It thrives in **areas with poor sanitation, lack of clean water, and overcrowding**.
- Found mainly in **Africa, parts of Asia, and Latin America**.

PATHOGENESIS AND SYMPTOMS

PATHOGENESIS:

- Repeated infections cause chronic inflammation of the **conjunctiva** → scarring → eyelashes turn inward (trichiasis) → scratching of the cornea → **corneal opacity and blindness**.

SYMPTOMS:

- Eye irritation, discharge, redness
- Swelling of eyelids
- Inward growth of eyelashes (trichiasis)
- Scarring of the cornea → gradual loss of vision

STAGES OF TRACHOMA (WHO SIMPLIFIED GRADING SYSTEM)

Stage	Description
TF (Trachomatous Inflammation – Follicular)	Early stage – follicles (bumps) on upper eyelid conjunctiva
TI (Trachomatous Inflammation – Intense)	More severe inflammation and thickening of eyelid
TS (Trachomatous Scarring)	Scarring of eyelid tissue
TT (Trachomatous Trichiasis)	Eyelashes turn inward and rub the cornea
CO (Corneal Opacity)	Clouding of cornea → irreversible blindness

GLOBAL BURDEN (AS PER WHO)

- As of **2023**, trachoma remains endemic in **44 countries**, mostly in **sub-Saharan Africa and Asia**.
- Around **1.9 million people** are **visually impaired or blind** due to trachoma globally.
- Over **136 million people** live in trachoma-endemic areas and remain at risk.

(Source: WHO – Global Trachoma Elimination Report 2024)

TRACHOMA IN INDIA

ELIMINATION STATUS

- **India eliminated trachoma as a public health problem in 2017** (declared by Ministry of Health and Family Welfare and WHO).
- Survey (2014–2017) showed:
 - Active trachoma prevalence in children aged 1–9 yrs < 5%
 - Trichiasis prevalence < 0.2% in adults (≥ 15 yrs)
- Major endemic areas earlier: Rajasthan, Haryana, Gujarat, Punjab, Uttar Pradesh, and Delhi.

KEY REASONS FOR SUCCESS

- Improved access to clean water and sanitation (Swachh Bharat Mission)
- Better facial hygiene and personal cleanliness
- National Programme for Control of Blindness & Visual Impairment (NPCBVI)
- Use of WHO-recommended SAFE strategy

SAFE STRATEGY (BY WHO)

Letter	Component	Description
S	Surgery	For trichiasis (to prevent blindness)
A	Antibiotics	Mass administration of azithromycin or topical tetracycline
F	Facial cleanliness	Promote hygiene, especially among children
E	Environmental improvement	Access to clean water, sanitation, fly control

This integrated approach forms the backbone of **Trachoma Elimination Programs** globally and in India.

GOVERNMENT OF INDIA INITIATIVES

- **National Programme for Control of Blindness & Visual Impairment (NPCBVI)** – Umbrella program addressing avoidable blindness, including trachoma.
- **Swachh Bharat Abhiyan** – Improved sanitation and hygiene indirectly reduced trachoma prevalence.
- **Azithromycin Distribution Campaigns** in endemic districts.
- **School Eye Screening Programmes** – for early detection among children.
- **IEC & Behavioural Change Campaigns** for hygiene awareness.

UPSC PRACTICE MCQS

Question 1:	Trachoma, recently in news, is caused by:
Option A	Chlamydia trachomatis
Option B	Haemophilus influenzae
Option C	Staphylococcus aureus
Option D	Adenovirus
Solution:	Answer: A

Question 2:	Consider the following statements: 1. Trachoma is a viral infection causing corneal blindness. 2. India was declared free from trachoma in 2017. 3. The SAFE strategy is recommended by WHO for its elimination. Which of the statements given above is/are correct?
Option A	1 only
Option B	2 and 3 only
Option C	2 only

Option D	1 and 3 only
Solution:	Answer: B

Question 3:	Which of the following is not a component of the WHO-recommended SAFE strategy for trachoma?
Option A	Surgery
Option B	Antibiotics
Option C	Facial cleanliness
Option D	Immunization
Solution:	Answer: D

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12**NINGOL CHAKOUBA FESTIVAL**

Every year, the Department of Fisheries, Manipur, organises the Annual Fish Fair cum Fish Crop Competition on the day ahead of the Ningol Chakouba festival.

**NINGOL CHAKOUBA FESTIVAL**

Aspect	Details
Type	Socio-cultural festival of Manipur
Celebrated by	The Meitei community (major ethnic group of Manipur)
Main participants	Ningol (married daughters/sisters) and their Chakouba (maternal families)
Time of celebration	Second day of the Manipuri lunar month of Hiyangei (October–November)
Nature of festival	Family and community-based — promotes love, unity, and respect between married women and their paternal homes

CULTURAL & SOCIAL SIGNIFICANCE

- **Symbol of women's dignity:** The festival honors married daughters (Ningols), reaffirming their emotional and familial connection with their birth families.
- **Strengthens family bonds:** The daughters are invited home for a **feast (Chakouba)**, symbolizing the renewal of affection and ties between siblings.
- **Cultural heritage:** Reflects the traditional **matriarchal respect** and high status of women in Manipuri society.

- **Community harmony:** Promotes a sense of **belonging and unity** beyond immediate families—neighbors and friends also take part.
- **Economic aspect:** Boosts local markets through traditional attire, jewelry, and gifts exchanged during the celebration.

RITUALS & CUSTOMS

- **Invitation:** Married daughters and sisters (Ningols) are formally invited to their parental homes.
- **Feast:** Elaborate meals with traditional Manipuri dishes are prepared.
- **Gifts exchange:** Parents and brothers give **clothes, sweets, and blessings** to Ningols.
- **Return:** In the evening, the women return to their homes with love and blessings.

GEOGRAPHICAL & CULTURAL CONTEXT

- **Region:** Manipur (North-East India)
- **Major locations:** Imphal Valley and adjoining Meitei-dominated regions
- **Ethnic group:** Meitei Hindus, but also observed by Manipuri Muslims and other ethnic groups, reflecting inter-community harmony.
- **UNESCO / tourism note:** Recognized by the **Manipur Tourism Department** as one of the most important cultural festivals attracting visitors each year.

HISTORY OF NINGOL CHAKOUBA

- It dates back to the time when King Nongda Lairen Pakhangba ruled in Manipur.
- The Queen Laisana used to invite her brother Poireiton to the King's palace for a feast once in a year. So, it was known as Piba (brother/son) Chakouba rather than Ningol Chakouba.
- The tradition changed during the time of King Chadrakirti Singh (1831-1886) in the 19th century. He invited his sisters for the feast as it was difficult for him to visit their places in one day.
- Thus, the tradition changed to Ningol Chakouba since then and continued to become an integral part of Manipur's rich culture and heritage.

PRELIMS POINTERS

- **State:** Manipur
- **Community:** Meitei

- **Month:** Hiyangei (October–November)
- **Theme:** Reaffirming family bonds between married daughters and their parental families
- **Similar festivals:**
 - Bhai Dooj (North India)
 - Raksha Bandhan (symbolic sibling bond)
 - Sama Chakeva (Mithila region)

UPSC SAMPLE MCQ

Question 1:	With reference to the Ningol Chakouba Festival, consider the following statements: 1. It is a harvest festival celebrated by the Naga tribes of Nagaland. 2. It is observed to honor married women visiting their parental homes. 3. It is celebrated in the month of November according to the Manipuri lunar calendar. Which of the above statements is/are correct?
Option A	1 only
Option B	2 only
Option C	2 and 3 only
Option D	1 and 3 only
Solution:	Answer: (c) 2 and 3 only

13

ASEAN

The Prime Minister decided not to travel to Malaysia to attend the 47th ASEAN summit and will attend it virtually.

ASSOCIATION OF SOUTHEAST ASIAN NATIONS (ASEAN)

OVERVIEW

- **Full form:** Association of Southeast Asian Nations
- **Establishment:** 8 August 1967
- **Founding Members:** Indonesia, Malaysia, Philippines, Singapore, and Thailand
- **Current Members (10):**
 - Indonesia
 - Malaysia
 - Philippines
 - Singapore
 - Thailand
 - Brunei Darussalam (joined 1984)
 - Vietnam (1995)
 - Laos (1997)
 - Myanmar (1997)
 - Cambodia (1999)



- **Headquarters:** Jakarta, Indonesia
- **Motto:** "One Vision, One Identity, One Community"
- **Official Language:** English

OBJECTIVES

As per the **ASEAN Declaration (Bangkok Declaration, 1967)**:

- Accelerate economic growth, social progress, and cultural development.
- Promote regional peace and stability through respect for justice and the rule of law.
- Enhance collaboration and mutual assistance on matters of common interest.
- Promote Southeast Asian identity and closer partnership among nations.

KEY ORGANS & FRAMEWORK

Body	Function
ASEAN Summit	Highest decision-making body, meets twice a year.
ASEAN Coordinating Council	Coordinates ASEAN Community Councils.
ASEAN Community Councils	3 pillars: Political-Security, Economic, and Socio-Cultural.
ASEAN Secretariat	Administrative body (Jakarta).
ASEAN Regional Forum (ARF)	Dialogue platform for security and political issues (includes India, US, China, Japan, etc.).

ASEAN ECONOMIC COMMUNITY (AEC)

- Established in **2015** to create a **single market and production base**.
- Aims for **free flow of goods, services, investment, skilled labor, and capital**.
- GDP (2024): ~US\$ 3.6 trillion — world's **5th largest economy**.

SECURITY AND POLITICAL COOPERATION

- Promotes **non-interference in internal affairs** (ASEAN Way).
- Establishes the **Treaty of Amity and Cooperation (TAC, 1976)** to maintain regional peace.
- Conducts **ASEAN Defence Ministers' Meeting (ADMM-Plus)** with dialogue partners like India, US, China, Japan, etc.

SOCIO-CULTURAL COOPERATION

- Focuses on **education, women empowerment, environment, disaster management, and health.**
- Launched the **ASEAN Agreement on Disaster Management and Emergency Response (AADMER).**
- Collaborates on climate change and biodiversity under **ASEAN Centre for Biodiversity (Philippines).**

INDIA-ASEAN RELATIONS

Aspect	Details
Formal Dialogue Partner:	1992
Summit-Level Partner:	2002
Strategic Partnership:	2012
India-ASEAN Free Trade Agreement (FTA):	2010 (Trade in Goods)
Trade in Services & Investment:	2015
Trade (2024):	Over US\$ 110 billion, making ASEAN India's 4th largest trading partner

INDIA-MYANMAR-THAILAND TRILATERAL HIGHWAY

KALADAN MULTIMODAL TRANSIT TRANSPORT PROJECT

- **Act East Policy (2014):** Strengthened engagement with ASEAN as the core pillar.
Forums:
 - East Asia Summit (EAS)
 - ASEAN Regional Forum (ARF)
 - ADMM-Plus
 - Mekong-Ganga Cooperation (MGC)

RECENT DEVELOPMENTS (2024-25)

- ASEAN working on **Timor-Leste's full membership** (observer since 2022).
- India and ASEAN discussing **FTA review** to make trade more balanced.

- **Maritime cooperation** in Indo-Pacific under **ASEAN Outlook on Indo-Pacific (AOIP)** and India's **Indo-Pacific Oceans Initiative (IPOI)**.
- ASEAN emphasizing **digital transformation and green economy** as new growth areas.

CHALLENGES

- **Myanmar crisis** (2021 coup) causing internal division.
- **South China Sea disputes** — ASEAN's limited ability to counter China's assertiveness.
- **Economic disparities** among members.
- **Slow decision-making** due to consensus-based "ASEAN Way".

PRELIMS POINTERS

- **Founded in 1967 at Bangkok.**
- **HQ – Jakarta, Indonesia.**
- **India became Dialogue Partner in 1992; Summit Partner in 2002.**
- **ASEAN+3:** Includes China, Japan, South Korea.
- **ASEAN Regional Forum (ARF):** Established in 1994 — promotes security dialogue.

SAMPLE MCQ

Question 1:	With reference to ASEAN, consider the following statements: 1. ASEAN was founded through the Treaty of Amity and Cooperation (TAC) in 1967. 2. Timor-Leste is the 11th full member of ASEAN as of 2025. 3. India-ASEAN Free Trade Agreement in goods came into force in 2010. Which of the above statements is/are correct?
Option A	1 and 2 only
Option B	2 only
Option C	3 only
Option D	2 and 3 only
Solution:	Answer: (c) 3 only

MAINS RELEVANCE

GS Paper 2: India and its neighborhood – relations; regional groupings and their effect on India’s interests.

Possible Question: “ASEAN remains central to India’s Act East Policy and Indo-Pacific vision. Discuss the major areas of cooperation and challenges in strengthening India–ASEAN ties.”



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14**BARNAWAPARA WILDLIFE SANCTUARY**

After being declared locally extinct for about 50 years, the blackbuck has made a remarkable comeback at Barnawapara Wildlife Sanctuary in Chhattisgarh thanks to a focused five-year revival plan.

**BARNAWAPARA WILDLIFE SANCTUARY**

Aspect	Details
Location	Mahasamund district, Chhattisgarh
Established	1976 under the Wildlife (Protection) Act, 1972
Area	Around 245 sq. km
Name origin	Derived from two adjoining forest villages — Bar and Nawapara
Governing body	Chhattisgarh Forest Department

GEOGRAPHICAL & ECOLOGICAL FEATURES

- **Terrain:** Undulating topography with **low and high hillocks** and **shallow plains**.
- **Altitude:** ~265–400 meters above sea level.
- **River system:** The **Jonk River**, a tributary of the **Mahanadi River**, flows through the sanctuary.
- **Soil:** Sandy-loam and lateritic soils with good drainage.
- **Vegetation type:**

- **Tropical Dry Deciduous Forests**, a part of the **Central Indian Dry Deciduous zone (Deccan Peninsula Biotic Province)**.
- Dominant tree species include:
 - Sal (*Shorea robusta*)
 - Teak (*Tectona grandis*)
 - Bija (*Pterocarpus marsupium*)
 - Saja (*Terminalia tomentosa*)
 - Mahua (*Madhuca indica*)

FAUNAL DIVERSITY

MAJOR MAMMALS

- Indian Bison (Gaur)
- Leopard
- Sloth Bear
- Wild Dog (Dhole)
- Sambar, Chital, Nilgai, Wild Boar, Jackal, Striped Hyena

AVIFAUNA (BIRDS)

- Over **150 species** of birds including:
 - Peafowl, Parakeets, Drongos, Bulbuls, Herons, Egrets, Kingfishers.

REPTILES & AMPHIBIANS

- Monitor lizard, Python, Cobra, and several smaller reptiles.

CONSERVATION IMPORTANCE

- Forms part of the **Eastern Chhattisgarh Elephant Corridor** connecting with **Udanti-Sitanadi Tiger Reserve** and **Debrigarh Sanctuary (Odisha)**.
- **Eco-tourism** hotspot of Chhattisgarh due to its proximity to Raipur (~100 km).
- Plays a role in conserving **Central Indian biodiversity**, serving as a buffer for nearby tiger habitats.
- Acts as a **carbon sink** and **watershed** for the Mahanadi basin.

CLIMATE

- **Type:** Tropical

- **Temperature:** 10°C (winter) to 45°C (summer)
- **Rainfall:** 1200–1400 mm annually (mainly during monsoon months June–September)

CONNECTIVITY

- **Nearest city:** Raipur (~100 km)
- **Nearest airport:** Swami Vivekananda Airport, Raipur
- **Nearest railway station:** Mahasamund (45 km)

CONSERVATION CHALLENGES

- **Man-animal conflict** due to habitat fragmentation and encroachment.
- **Illegal grazing** and **firewood collection** by nearby villages.
- **Tourism pressure** on core zones.
- **Seasonal forest fires** damaging dry deciduous flora.

RECENT DEVELOPMENTS (2024–25 RELEVANCE)

- Chhattisgarh Forest Department is promoting **eco-sensitive development** and **elephant movement corridor management** linking Barnawapara with nearby sanctuaries.
- Inclusion of the sanctuary in **state-level biodiversity monitoring** for sustainable eco-tourism.
- Efforts under the **Integrated Development of Wildlife Habitats (IDWH)** scheme by the **Ministry of Environment, Forest and Climate Change (MoEFCC)**.

PRELIMS POINTERS

Fact	Details
State	Chhattisgarh
River passing through	Jonk River (tributary of Mahanadi)
Vegetation type	Tropical Dry Deciduous
Major species	Gaur, Leopard, Sloth Bear, Wild Dog
Nearby protected areas	Udanti–Sitanadi Tiger Reserve, Debrigarh Wildlife Sanctuary (Odisha)

SAMPLE MCQ

Question 1:	Consider the following statements about Barnawapara Wildlife Sanctuary: 1. It is located in the state of Madhya Pradesh. 2. The Jonk River, a tributary of the Mahanadi, flows through the sanctuary. 3. It forms part of an elephant corridor linking Chhattisgarh and Odisha. Which of the above statements is/are correct?
Option A	1 and 2 only
Option B	2 and 3 only
Option C	3 only
Option D	1, 2 and 3
Solution:	Answer: (b) 2 and 3 only

MAINS RELEVANCE (GS PAPER 3 – ENVIRONMENT & ECOLOGY)

“Discuss the ecological importance of the Barnawapara Wildlife Sanctuary and highlight the conservation challenges faced by dry deciduous forests in Central India.”

WILDLIFE SANCTUARIES OF CHHATTISGARH

Wildlife Sanctuary	District / Location	River / Terrain	Major Flora & Fauna	Key Facts / Notes
Barnawapara WLS (1976)	Mahasamund	Jonk River (tributary of Mahanadi)	Gaur, Leopard, Sloth Bear, Wild Dog, Sambar	Tropical Dry Deciduous Forests; forms Elephant Corridor with Udanti–Sitanadi; ~245 sq. km
Sitanadi WLS (1974)	Dhamtari	Origin of Sitanadi River (joins Mahanadi)	Tiger, Leopard, Wild Dog, Gaur, Sambar	Forms core area of Udanti–Sitanadi Tiger Reserve ; rich in Sal & Teak forests

Udanti WLS (1974)	Raipur / Gariaband	Udanti River	Wild Buffalo, Sloth Bear, Hyena	Critical habitat of endangered Wild Buffalo (Bubalus arnee) — State Animal of Chhattisgarh
Achanakmar WLS (1975)	Bilaspur	Maniyari River	Tiger, Leopard, Gaur, Bison, Bear	Declared part of Achanakmar–Amarkantak Biosphere Reserve (UNESCO, 2005); connects to Satpura range
Badalkhol WLS (1975)	Jashpur	Mahan River basin	Elephant, Leopard, Barking Deer	Dense moist deciduous forest; linked with Sundargarh forests (Odisha)
Tamor Pingla WLS (1978)	Surajpur	Hasdeo–Rihand Basin	Elephant, Leopard, Gaur, Bear	Recently part of Lemru Elephant Reserve proposal; potential Tiger corridor
Gomarda WLS (1975)	Raigarh	Mahanadi River	Sloth Bear, Wild Dog, Elephant, Gaur	Undulating terrain; forms link with Odisha's Debrigarh WLS
Semarsot WLS (1978)	Surguja	Kanhar River (tributary of Son)	Tiger, Chital, Wild Boar, Bear	Northernmost sanctuary of the state; connects with Palamau Tiger Reserve (Jharkhand)

Pamed WLS (1983)	Bijapur	Indravati River Basin	Wild Buffalo, Bison, Tiger	Located in Dandakaranya region ; part of Indravati landscape
Bhairamgarh WLS (1983)	Bijapur / Dantewada	Near Indravati River	Leopard, Gaur, Wild Boar	Important for tribal co-existence and biodiversity ; under Naxal-affected zone
Kanger Valley National Park (1982)	Bastar	Kanger River (tributary of Kolab)	Bastar Hill Myna, Tiger, Bear	Famous for Kailash & Kutumsar Caves ; Bastar Hill Myna – State Bird
Indravati National Park (1981)	Bijapur / Dantewada	Indravati River	Tiger, Wild Buffalo, Hill Myna	Only Project Tiger Reserve in Chhattisgarh; core area of Indravati Tiger Reserve

QUICK SUMMARY BY ECOLOGICAL ZONE

Region	Key Sanctuaries / Parks	Ecological Character
Central Plains (Mahanadi Basin)	Barnawapara, Sitanadi, Udanti, Gomarda	Tropical Dry Deciduous Forests, Elephant Corridors
Northern Hills (Surguja Belt)	Tamor Pingla, Semarsot	Moist Deciduous & Riverine Forests
Southern Bastar Plateau	Indravati NP, Kanger Valley NP, Bhairamgarh, Pamed	Dense Sal & Teak forests; Tribal & Biodiversity Hotspot

PRELIMS QUICK FACTS

- **State Animal:** Wild Buffalo (*Bubalus arnee*)
- **State Bird:** Bastar Hill Myna (*Gracula religiosa peninsularis*)
- **Tiger Reserves:**
 - Indravati TR
 - Udanti–Sitanadi TR
 - Achanakmar TR
- **UNESCO Biosphere Reserve:** Achanakmar–Amarkantak (shared with Madhya Pradesh)
- **Elephant Corridors:** Barnawapara–Sitanadi–Debrigarh (Odisha) & Tamor Pingla–Lemru

UPSC PRACTICE MCQ

Question 1:	Consider the following pairs:		
		Wildlife Sanctuary	River flowing through it
	1	Barnawapara	Jonk River
	2	Udanti	Indravati River
	3	Sitanadi	Mahanadi River
Which of the pairs given above is/are correctly matched?			
Option A	1 only		
Option B	1 and 2 only		
Option C	1 and 3 only		
Option D	2 and 3 only		
Solution:	Answer: (c) 1 and 3 only		

15**NATIONAL MEANS CUM MERIT SCHOLARSHIP SCHEME**

The State Councils of Educational Research and Training (SCERTs) recently released the application forms for the National Means cum Merit Scholarship Scheme (NMMS) for various states.

**NATIONAL SCHOLARSHIP PORTAL**Ministry of Electronics & Information Technology,
Government of India**NMMS Scheme -National Means cum Merit Scholarship Scheme (NMMSS)****NATIONAL MEANS-CUM-MERIT SCHOLARSHIP SCHEME (NMMSS)****OVERVIEW**

Aspect	Details
Launched in	2008
Implementing Ministry	Ministry of Education (MoE) – Department of School Education & Literacy
Type of scheme	Centrally Sponsored Scheme (CSS)
Primary Objective	To reduce school dropout rate at Class VIII and encourage meritorious students from economically weaker sections (EWS) to continue secondary education (Classes IX–XII).

OBJECTIVES

- **Prevent dropouts** among bright but poor students after Class VIII.
- **Encourage secondary education** among EWS families.
- **Promote social equity** in access to quality education.
- Support the **RTE Act (2009)** and **NEP 2020** goals of inclusive education.

TARGET BENEFICIARIES

- **Students of Class IX to XII** studying in:
 - Government, Government-aided, or Local Body schools.
- **Private school students are not eligible.**
- **Selection through: a two-stage process** conducted by the **State/UT** authorities:
 - **Mental Ability Test (MAT)**
 - **Scholastic Aptitude Test (SAT)**

SCHOLARSHIP AMOUNT & TENURE

Class	Amount	Duration
Class IX–XII	₹12,000 per annum (₹1,000 per month)	Up to 4 years (renewable annually on good conduct & 55%+ marks)

Earlier it was ₹6,000 per annum, doubled in 2017.

ELIGIBILITY CRITERIA

Criterion	Details
Parental income ceiling	₹3,50,000 per annum (from all sources)
Minimum marks (Class VII)	55% (Relaxation of 5% for SC/ST students)
Type of school	Only Government, Government-aided, or Local body schools
Performance renewal	55% marks in each class (50% for SC/ST) to continue scholarship

IMPLEMENTATION MECHANISM

- **Nodal agency:** Department of School Education & Literacy, MoE.
- **Selection & distribution:** Through **State/UT Education Departments**.
- **Scholarship transfer:** Directly to student's **bank account via DBT (Direct Benefit Transfer)** through the **National Scholarship Portal (NSP)**.

- **Quota allocation:** Each State/UT is allotted a fixed number of scholarships based on Class VIII population and literacy rates.

FUNDING PATTERN

Centre-State share
Central Share: 100% of scholarship amount and administrative cost (since 2017).
States/UTs manage identification, examination, and verification.

RECENT UPDATES (2024–25)

- **Digital transparency:** Entire process—from selection to fund transfer—is online through **NSP (National Scholarship Portal)**.
- **Monitoring:** Integrated with **Aadhaar and UDISE+** databases to prevent duplication and ghost beneficiaries.
- **Expansion:** The Ministry has proposed to **increase the number of annual scholarships to 1 lakh** (currently ~68,000).
- **Alignment with NEP 2020:** The scheme complements NEP's emphasis on **equity and inclusion in secondary education**.
- **Special drive in Aspirational Districts** and tribal areas to increase participation of SC/ST/OBC and girl students.

PERFORMANCE

- Over **22 lakh scholarships awarded** since inception (as per MoE 2023 report).
- Dropout rates at secondary level reduced significantly in states implementing NMMSS efficiently (e.g., Kerala, Tamil Nadu, Himachal Pradesh).

SIGNIFICANCE

- Helps achieve **SDG 4 – Quality Education**.
- Promotes **inclusive growth** in education under the **National Education Policy (NEP) 2020**.
- Builds a **pipeline of meritorious rural students** into higher education.

CHALLENGES

- **Low awareness** among eligible rural students.
- **Delayed fund disbursement** in some states.

- **Complex documentation process** for verification.
- **Digital divide** affecting NSP application in remote areas.

PRELIMS KEY FACTS

Feature	Details
Launched	2008
Ministry	Ministry of Education
Type	Centrally Sponsored Scheme
Beneficiaries	Class IX–XII students of Govt./Govt.-aided schools
Amount	₹12,000 per year
Mode of transfer	DBT via National Scholarship Portal
Selection Test	MAT + SAT (conducted by State/UT)
Income Limit	₹3.5 lakh per annum
Goal	Reduce dropout rate after Class VIII

PRACTICE MCQ

Question 1:	With reference to the National Means-cum-Merit Scholarship Scheme (NMMSS), consider the following statements: 1. It is a Central Sector Scheme implemented by the Ministry of Education. 2. The scheme provides scholarship to meritorious students of economically weaker sections to prevent dropouts after Class VIII. 3. Only students from private schools are eligible to apply. 4. The scholarship amount is transferred directly through the National Scholarship Portal. Which of the statements given above are correct?
Option A	1 and 2 only
Option B	2 and 4 only
Option C	2, 3 and 4 only

Option D	1, 2 and 4 only
Solution:	Answer: (b) 2 and 4 only (Explanation: It is a Centrally Sponsored Scheme, not Central Sector; and private school students are not eligible.)

MAINS RELEVANCE (GS PAPER 2 – EDUCATION & WELFARE)

“Discuss the significance of the National Means-cum-Merit Scholarship Scheme in promoting equitable access to quality education at the secondary level in India.”



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16

HYUNMOO-5 MISSILE

South Korea is ready to deploy its 'monster missile' Hyunmoo 5 at the end of the year marking a significant conventional arsenal upgrade against its northern counterpart in the Korean peninsula.



HYUNMOO-5 MISSILE

- It is a ballistic missile developed by South Korea.
- It is designed for deep penetration strikes with a massive conventional warhead capable of destroying heavily fortified underground targets.
- It is part of South Korea's Korean Massive Punishment and Retaliation (KMPR) framework, which is designed to deter North Korean aggression without the use of nuclear weapons.
- It was officially unveiled in October 2024.

FEATURES

- It has been dubbed as the "monster missile" for its size, Hyunmoo 5 weighs around 36 tonnes.
- It can carry an eight-tonne warhead.

- Its range is set to vary from 600 km to more than 5,000 km, depending on payload.
- Its design features a payload composed of heavy metals, optimized to destroy bunkers or command centers located at great depth.
- It has the capability to destroy fortified underground facilities buried over 100 meters deep.
- In its descending phase, the missile can reach speeds close to Mach 10.
- It is capable of being launched from a mobile platform.

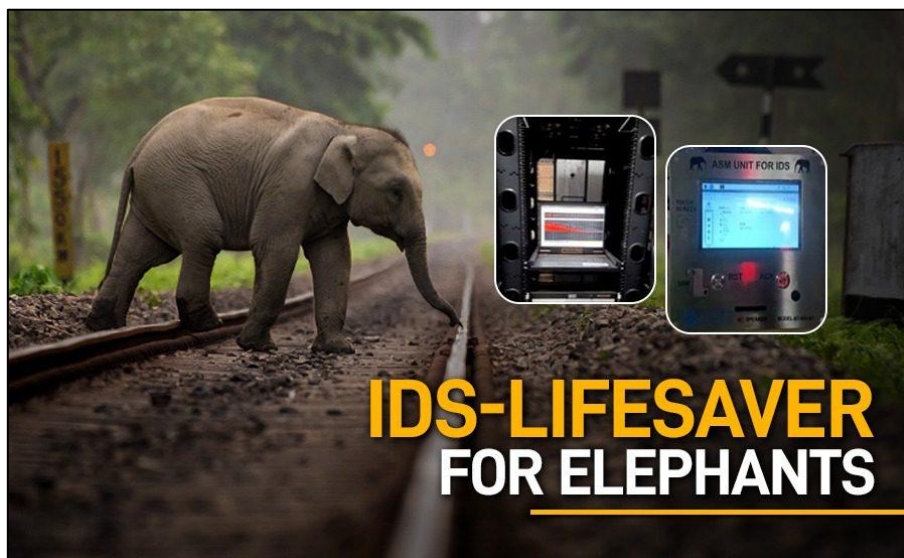
PRACTICE MCQ

Question 1:	With reference to the Hyunmoo-5 Missile, consider the following statements: 1. It has been developed by Japan as part of its Three-Axis Defense System. 2. It is capable of carrying one of the heaviest conventional warheads among non-nuclear ballistic missiles. 3. The missile was developed after the U.S. lifted missile range restrictions on South Korea. Which of the statements given above are correct?
Option A	1 and 2 only
Option B	2 and 3 only
Option C	1 and 3 only
Option D	1, 2, and 3
Solution:	Answer: (b) 2 and 3 only

17

INTRUSION DETECTION SYSTEM

Recently, the Northeast Frontier Railway (NFR) has successfully completed trial works of the Intrusion Detection System (IDS) in four key sections.



INTRUSION DETECTION SYSTEM

- The IDS initiative aims to strike a balance between operational efficiency and environmental protection.
- **Objective:** It is designed to protect wildlife and maintain operational efficiency, especially in areas where railway lines pass through forested and elephant-inhabited zones.
- It runs parallel to tracks at a distance of 10 metres.
- **Launched by:** This initiative has been launched by the Northeast Frontier Railway (NFR) under the Ministry of Railways.

WORKING OF INTRUSION DETECTION SYSTEM

- **Technology:** It uses advanced optical fibre sensing technology to detect elephant movement near railway tracks,
- **Real Time Alert:** It generates real-time alerts for train drivers and control rooms to take timely preventive action.
- When elephants come close to the railway tracks, the vibrations generated by their movement are detected by the sensor cables, which then transmit signals to the control room.

18**SEVILLA FORUM ON DEBT**

Recently, the Sevilla Forum on Debt was launched at the 16th United Nations Conference on Trade and Development (UNCTAD16) in Geneva.

**OVERVIEW**

- The Sevilla Forum on Debt was launched on **22 October 2025** during the 16th session of the United Nations Conference on Trade and Development (UNCTAD16) in Geneva.
- It is a Spanish-led, UN-supported initiative (by United Nations Conference on Trade and Development (UNCTAD) & UN Department of Economic and Social Affairs (UNDESA)) aimed at addressing the sovereign debt crisis facing many developing countries.
- It stems from the outcomes of the Fourth International Conference on Financing for Development (FfD4) (held in Seville, Spain) and is part of the “Sevilla Platform for Action” and “Sevilla Commitment” process.

KEY OBJECTIVES

- Provide an **inclusive, multistakeholder platform** where borrower sovereigns, creditor countries/institutions, private lenders, academics, civil society can engage in dialogue and action on debt.
- Promote **responsible borrowing and lending practices**, enhance transparency in debt contracts, and discourage terms that undermine development.

- Drive **reform of the global debt architecture**—making debt restructuring processes fairer, faster, more predictable.
- Ensure that debt servicing does not crowd out spending on social sectors (health, education) and climate resilience—thus supporting the SDGs.

KEY FEATURES

- **Host & Lead:** Spain will host and support the forum, with Geneva launch signalling a global commitment.
- **Scope:** The forum is not just for developing countries alone, but includes creditors, private sector and multilateral institutions—thus tackling debt from all sides.
- **Linkage to broader framework:** It is tied to the Sevilla Platform for Action (from FfD4) and complements initiatives like the Debt Pause Clause Alliance, debt-for-development swaps.
- **Focus on developing countries:** According to UNCTAD data cited at launch — global public debt hit **US\$102 trillion** in 2024; developing countries' share ~US\$31 trillion; about 3.4 billion people live in countries that spend more on debt servicing than on health or education.



UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

- It is the UN's leading institution dealing with trade and development.
- It is a permanent intergovernmental body established by the United Nations General Assembly in 1964.
- Functions: It provides economic and trade analysis, facilitates consensus-building and offers technical assistance to help developing countries use trade, investment, finance and technology for inclusive and sustainable development.

- Headquarter: Geneva, Switzerland.

REPORTS PUBLISHED BY THE UNCTAD

- Trade and Development Report
- World Investment Report
- The Least Developed Countries Report.

MCQ 1

Question 1:	With reference to the Sevilla Forum on Debt, consider the following statements: 1. It was launched during the 16th session of the UN Conference on Trade and Development (UNCTAD). 2. The forum is led by Spain and supported by UNCTAD and the UN Department of Economic and Social Affairs (UNDESA). 3. It aims to promote debt transparency and equitable restructuring mechanisms for developing countries. Which of the statements given above are correct?
Option A	1 and 2 only
Option B	2 and 3 only
Option C	1, 2 and 3
Option D	1 only
Solution:	Answer: (c) 1, 2 and 3 Explanation: The Sevilla Forum on Debt was launched on 22 October 2025 during UNCTAD-16 in Geneva, co-hosted by Spain, UNCTAD, and UNDESA, to ensure debt sustainability, transparency, and fair restructuring processes.

MCQ 2

Question 2:	The Sevilla Forum on Debt recently seen in the news is primarily associated with which of the following objectives?
Option A	Promotion of carbon trading and green finance mechanisms
Option B	Reforming the global sovereign debt architecture for developing nations

Option C	Establishing a framework for international cryptocurrency regulation
Option D	Launching an initiative for digital public infrastructure in developing economies
Solution:	Answer: (b) Reforming the global sovereign debt architecture for developing nations Explanation: The Forum focuses on restructuring global debt, making repayment frameworks fairer, faster, and more transparent, particularly for developing and least developed countries.



19**CALCIUM CARBIDE**

More than 60 people, primarily children, were hospitalized in Bhopal following severe injuries sustained from the use of makeshift “calcium carbide guns” during Diwali celebrations.

**CALCIUM CARBIDE**

- It is a compound with the chemical formula CaC_2 .
- It is commonly referred to as ‘masala’ in fruit markets.
- It is a grayish-black lump or crystalline powder with a garlic-like odor.
- It is manufactured by heating a lime and carbon mixture to 2000 to 2100°C (3632 to 3812°F) in an electric arc furnace.

CALCIUM CARBIDE USES

- It is primarily known for its use in the production of acetylene gas through hydrolysis.
- Calcium carbide reacts vigorously with water to produce acetylene gas. Acetylene is a colourless, odourless, extremely flammable gas.
- It is used as a reducing agent and in steel manufacturing and metal cutting.
- Several countries use calcium carbide as an artificial ripening agent.

CALCIUM CARBIDE HEALTH IMPACTS

- It can cause serious health issues such as dizziness, frequent thirst, irritation, weakness, difficulty in swallowing, vomiting, skin ulcers, etc.
- Additionally, acetylene gas is equally hazardous to those handling it.

- There are chances that calcium carbide may come in direct contact with fruits during application and leave residues of arsenic and phosphorus on fruits.
- It is banned under the Prevention of Food Adulteration Rules, 1955, and also under the Food Safety and Standards (Prohibition and Restrictions on Sales) Regulations, 2011, made thereunder.

Question 1:	Calcium carbide is primarily used in the production of which of the following gases?
Option A	Ethylene
Option B	Methane
Option C	Acetylene
Option D	Ethane
Solution:	Answer: C. Acetylene Explanation: Calcium carbide reacts with water to form acetylene (C₂H₂) and calcium hydroxide (Ca (OH)₂) : $\text{CaC}_2 + 2\text{H}_2\text{O} \rightarrow \text{C}_2\text{H}_2 + \text{Ca (OH)}_2$ Acetylene is used in oxy-acetylene welding, cutting, and formerly in lamps.

Question 2:	With reference to Calcium Carbide (CaC₂), consider the following statements: 1. It is manufactured by reacting calcium carbonate directly with coke at room temperature. 2. It is commonly used for artificial ripening of fruits and is approved by FSSAI for this purpose. 3. It reacts with water to produce acetylene gas. Which of the statements given above is/are correct?
Option A	1 and 2 only
Option B	3 only
Option C	1 and 3 only
Option D	2 and 3 only
Solution:	Answer: B. 3 only Explanation:

- Statement 1 – It is produced by reacting **lime (CaO)**, not CaCO_3 , with coke at $\sim 2000^\circ\text{C}$ in an **electric-arc furnace**, not at room temperature.
- Statement 2 – Its use for fruit ripening is **banned by FSSAI** due to health hazards.
- Statement 3 – It reacts with water to produce **acetylene (C_2H_2)** gas.

Question 3:	Why is the use of Calcium Carbide banned for fruit ripening in India?
Option A	It emits toxic sulphur dioxide.
Option B	It contains arsenic and phosphorous impurities harmful to health.
Option C	It slows down the natural ripening process.
Option D	It makes fruits lose their natural colour and taste.
Solution:	Answer: B. It contains arsenic and phosphorous impurities harmful to health. Explanation: Industrial-grade calcium carbide contains arsenic and phosphide impurities. During hydrolysis, it releases arsine (AsH_3) and phosphine (PH_3) — both toxic gases. Hence, its use in fruit ripening is prohibited under the Food Safety and Standards (Prohibition and Restrictions) Regulations, 2011.

Question 4:	Which of the following pairs are correctly matched?	
	Process	Major chemical used
	1. Artificial ripening (legal)	Ethylene
	2. Welding gas production	Calcium carbide
	3. Food-grade acetylene production	Calcium carbide
	4. Illegal ripening agent	Calcium carbide
	Select the correct answer using the code given below:	
Option A	1 and 2 only	

Option B	1, 2 and 4 only
Option C	2, 3 and 4 only
Option D	1, 3 and 4 only
Solution:	Answer: B. 1, 2 and 4 only Explanation: • Ethylene is the approved fruit-ripening agent. • Calcium carbide is used in acetylene gas generation for welding. • It is not used for food-grade acetylene; industrial grade is impure. • Its use for ripening is illegal, making option 4 correct.



20

JAIMEX 2025

Recently, Indian Naval Ship (INS) Sahyadri participated in the Sea phase of JAIMEX-25 (Japan India Maritime Exercise).



WHAT IS JAIMEX?

- JAIMEX is a bilateral naval exercise between the navies of India and Japan — formally called the **Japan-India Maritime Exercise**.
- It is part of the broader defence and maritime cooperation under the India-Japan Special Strategic & Global Partnership established in 2014.
- The exercise includes maritime operational drills (sea phase) and professional/cultural cooperation (harbour phase).

RECENT EDITION — JAIMEX-25

- The latest edition took place **16-18 October 2025** (sea phase) with a harbour phase at Yokosuka naval base in Japan on 21 October.
- Participating Indian ship: INS Sahyadri (a Shivalik-class guided missile stealth frigate) — part of India's Eastern Fleet.
- Japanese side: Japan Maritime Self-Defense Force (JMSDF) warships like JS Asahi, JS Oumi and submarine Jinryu.

- Key drills: advanced anti-submarine warfare (ASW), missile defence, flying operations, underway replenishment (ships refuelling/supply at sea).
- Harbour phase included cross-deck visits, professional exchanges, and even a joint yoga session for the crews.

OBJECTIVES

- To enhance **interoperability** between Indian Navy and JMSDF in complex maritime operations.
- To reaffirm commitment to a “free, open and inclusive Indo-Pacific” region — respecting maritime norms, freedom of navigation and peace in sea lanes.
- To deepen maritime diplomacy and strategic partnership with Japan — crucial for India’s Act East and Indo-Pacific strategies.

IT INVOLVED TWO PHASES

- Sea phase included advanced Anti-Submarine Warfare and missile defence drills, enhancing interoperability by undertaking flying operations and underway replenishment.
- Harbour Phase at Yokosuka includes engagement in a multitude of professional and cultural exchanges, cross-deck visits, collaborative operational planning, sharing of best practices.

STRATEGIC SIGNIFICANCE FOR INDIA

- India’s naval deployment in Japanese waters and participation with JMSDF enhances its presence in the Indo-Pacific theatre — signalling capability and intent.
- Conducting joint exercises off Japan’s western coast (Kyushu region) underlines India’s alliance depth and Japan’s reliance on India as a trusted strategic partner.
- Such drills help India hone skills (ASW, missile defence) that are vital given the evolving maritime challenge from the Indo-Pacific region, including China’s naval assertiveness.
- They complement India’s multi-lateral maritime engagements (e.g., with US, Australia, Quad etc.), reinforcing navy-to-navy linkages beyond the Indian Ocean.
- On the diplomacy front, these exercises contribute to defence exports, technology collaborations, logistics support agreements and bilateral defence infrastructure tie-ups.

Question 1:	With reference to JAIMEX, consider the following statements: 1. It is a bilateral naval exercise conducted between the Indian Navy and the Japan Maritime Self-Defense Force (JMSDF). 2. The primary focus of JAIMEX-25 was anti-submarine warfare and advanced maritime operations. 3. The harbour phase of JAIMEX-25 was held at Kochi, India. Which of the statements given above is/are correct?
Option A	1 and 2 only
Option B	1 and 3 only
Option C	2 only
Option D	1, 2 and 3
Solution:	Answer: A. 1 and 2 only Explanation: • JAIMEX is a bilateral naval exercise between India and Japan (JMSDF). • The 2025 edition focused on anti-submarine warfare (ASW), air defence, and missile drills. • The harbour phase took place at Yokosuka, Japan, not Kochi.

Question 2:	The ship INS Sahyadri, recently in news for participating in JAIMEX-25, belongs to which of the following classes?
Option A	Kolkata-class destroyer
Option B	Shivalik-class stealth frigate
Option C	Talwar-class frigate
Option D	Delhi-class destroyer
Solution:	Answer: B. Shivalik-class stealth frigate Explanation: INS Sahyadri (F49) is a Shivalik-class multi-role stealth frigate of the Indian Navy, part of the Eastern Fleet, based under the Eastern Naval Command (Visakhapatnam).

Question 3:	JAIMEX contributes directly to which of the following broader strategic frameworks? 1. Indo-Pacific Oceans Initiative (IPOI)
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	2. Act East Policy 3. QUAD Security Dialogue Select the correct answer using the code given below:
Option A	1 and 2 only
Option B	2 and 3 only
Option C	1 and 3 only
Option D	1, 2 and 3
Solution:	Answer: D. 1, 2 and 3 Explanation: JAIMEX enhances India–Japan maritime cooperation within the larger Indo-Pacific architecture. It complements the Indo-Pacific Oceans Initiative (IPOI), supports India’s Act East Policy, and strengthens QUAD interoperability (India, Japan, US, Australia).

Question 4:	Which of the following are key features of JAIMEX-25? 1. Cross-deck helicopter operations 2. Underway replenishment at sea 3. Anti-piracy and HADR drills 4. Joint yoga sessions onboard Select the correct answer using the code given below:
Option A	1 and 2 only
Option B	2, 3 and 4 only
Option C	1, 2 and 4 only
Option D	1, 2, 3 and 4
Solution:	Answer: D. 1, 2, 3 and 4 Explanation: The exercise included complex operational drills (ASW, missile defence, underway replenishment, cross-deck ops), humanitarian assistance and disaster relief (HADR) training, and even a joint yoga session to promote cultural camaraderie.

PRELIMS FACT SHEET: JAIMEX (JAPAN–INDIA MARITIME EXERCISE)

Aspect	Details
Full form	Japan–India Maritime Exercise (JAIMEX)
Nature	Bilateral naval exercise between Indian Navy & Japan Maritime Self-Defense Force (JMSDF)
First edition	2012 (formalised as “JAIMEX” later)
Latest edition (2025)	JAIMEX-25
Venue (2025)	Sea phase – Off Kyushu, Japan; Harbour phase – Yokosuka naval base
Indian participant	INS Sahyadri (Shivalik-class stealth frigate)
Japanese participants	JS Asahi, JS Oumi, Submarine Jinryu
Focus areas	Anti-submarine warfare, missile defence, air operations, underway replenishment, cross-deck flying ops
Significance	Strengthens Indo-Pacific security architecture; enhances interoperability and trust
Strategic importance	Supports Act East Policy, QUAD framework, and Indo-Pacific Oceans Initiative (IPOI)
Cultural component	Joint yoga sessions and professional interactions during harbour phase
Key message	Upholding a “Free, Open, and Inclusive Indo-Pacific” in alignment with maritime rules-based order

21

CHRYSANTHEMUM

Recently, Kashmir's first Chrysanthemum Garden was opened for tourists.



CHRYSANTHEMUM

- Chrysanthemums are a genus (Chrysanthemum) of about 30 species of perennial flowering plants in the family Asteraceae.
- It is native to Asia and northeastern Europe.
- Chrysanthemum is a perennial herbaceous plant that blooms in autumn.
- Appearance: The species of Chrysanthemum grows to 50-150 cm tall, with deeply lobed leaves and large flowerheads, white, yellow or pink in the wild species.

CLIMATIC CONDITIONS

- It is native primarily to subtropical and temperate areas.
- Climate: Tropical and subtropical climatic conditions are ideal.
- However, the best temperature for growing chrysanthemums is 20-28 degrees for day and 15-20 degrees Celsius for night.
- Soil: Well drained red loamy soil with pH of 6 to 7.
- Uses: It is commonly used as an herbal treatment for hypertension and is said to help treat fevers, headaches, and inflammation.

Question 1:	Chrysanthemum indicum, often seen in news for its flower shows, belongs to which of the following plant families?
Option A	Fabaceae
Option B	Asteraceae
Option C	Solanaceae
Option D	Liliaceae
Solution:	Answer: (b) Asteraceae



Powered by Ecoholics

22**DUTY-FREE TARIFF PREFERENCE (DFTP) SCHEME**

Recently, the World Trade Organization credits India's Duty-Free Tariff Preference (DFTP) scheme for boosting exports from the poorest nation.

**DUTY-FREE TARIFF PREFERENCE (DFTP) SCHEME**

- It was initiated in 2008 and offers Least Developed Countries (LDCs) preferential access to the Indian market.
- The DFTP scheme aims to boost LDCs' economic growth, diversify exports, and strengthen trade relations.
- Objective: The objective of the scheme for LDCs is grant of tariff preferences on the exports of the Least Developed Countries on imports to India.

KEY FEATURES OF DFTP SCHEME:

Aspect	Details
Beneficiaries	Least Developed Countries (LDCs) recognized by the United Nations
Coverage	India offers Duty-Free access to 98.2% of total tariff lines (goods categories)
Partial concession	1.8% of tariff lines are covered with partial tariff preference

Exclusion list	Only 25 tariff lines (mainly arms, alcohol, tobacco, and some sensitive products) are excluded from any benefit
Type of benefits	- Duty-Free (Zero duty) for most goods - Tariff Preference (Reduced duty) for few products
Implementation Authority	Directorate General of Foreign Trade (DGFT), Ministry of Commerce & Industry
WTO Compliance	Fully consistent with WTO's Hong Kong Ministerial Declaration (2005) on duty-free market access for LDCs
Documentation	Exporters must provide a Certificate of Origin from the LDC country concerned

PARTICIPATING COUNTRIES:

- As of **2024**, **33 LDCs** have become beneficiaries of India's DFTP Scheme.
- These include nations from **Africa (e.g., Tanzania, Ethiopia, Malawi)**, **Asia (e.g., Bangladesh, Nepal, Myanmar)**, and **Pacific islands**.

TRADE IMPACT:

- Enhanced India's imports from **African LDCs** (oil seeds, raw materials, textiles).
- Strengthened **India-Africa** and **India-ASEAN** economic relations.
- Supports India's image as a **responsible developing economy** contributing to **global equity in trade**.

RECENT CONTEXT (2025):

- In line with India's "**Global South Solidarity**", the DFTP Scheme remains one of India's key **development partnership initiatives**.
- India continues to encourage **non-reciprocal trade benefits** to LDCs, aligning with **UN Sustainable Development Goal (SDG) 17: Global Partnerships**.
- The scheme is discussed in global forums like **UNCTAD**, **WTO**, and **South-South Cooperation summits**.

Question 1:	The Duty-Free Tariff Preference (DFTP) Scheme launched by India primarily aims to—
Option A	Promote exports from Indian MSMEs to developed countries
Option B	Provide preferential market access to imports from Least Developed Countries (LDCs)
Option C	Offer export incentives to Indian IT companies

Option D	Facilitate foreign investment in India's SEZs
Solution:	Answer: (b) Explanation: The scheme provides duty-free or reduced-tariff access to exports from LDCs to India, promoting trade inclusivity.

Question 2:	Consider the following statements about India's DFTP Scheme: 1. It was launched in 2008 during the UNCTAD Conference in Accra. 2. It provides duty-free access to more than 98% of India's tariff lines. 3. The scheme is applicable to all developing countries. Which of the above statements are correct?
Option A	1 and 2 only
Option B	2 and 3 only
Option C	1 and 3 only
Option D	1, 2 and 3
Solution:	Answer: (a) Explanation: Statement 3 is incorrect — the DFTP is for Least Developed Countries (LDCs), not all developing countries.

Question 3:	The Duty-Free Tariff Preference Scheme of India is consistent with which of the following global commitments?
Option A	Paris Climate Agreement, 2015
Option B	WTO Hong Kong Ministerial Declaration, 2005
Option C	Rio+20 Declaration, 2012
Option D	Doha Development Agenda, 2001
Solution:	Answer: (b) Explanation: The WTO Hong Kong Declaration urged developed and developing

	countries to give duty-free, quota-free access to LDC exports , which India implemented via the DFTP Scheme.
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Question 4:	Which of the following commodities are excluded from India's Duty-Free Tariff Preference (DFTP) Scheme?
Option A	Tobacco and alcoholic beverages
Option B	Coffee and tea
Option C	Cotton textiles
Option D	Edible oils
Solution:	Answer: (a) Explanation: Tobacco, alcohol, and some arms-related products fall under the exclusion list of DFTP due to sensitivity and domestic policy reasons.



23**KOPI LUWAK**

A recent study revealed that civet-processed Robusta coffee, known as Kopi Luwak, differs significantly from naturally harvested Robusta beans in its fatty acid composition and total fat content, providing new scientific insight into the unique aroma and flavour that make it famous.

**KOPI LUWAK (CIVET COFFEE)**

- **Kopi Luwak** (also known as **Civet Coffee**) is one of the **world's most expensive coffees**, originating from **Indonesia**.
- The term “Kopi” means **coffee** in Indonesian, and “Luwak” refers to the **Asian Palm Civet** (*Paradoxurus hermaphroditus*), a small mammal found in **South and Southeast Asia**.

HOW IT IS PRODUCED

- **The Process:**
 - The **Asian Palm Civet** eats **ripe coffee cherries**.
 - The cherries pass through its **digestive tract**, during which **enzymes break down proteins** that contribute to coffee bitterness.
 - The **beans are excreted**, collected, thoroughly washed, dried, roasted, and brewed into coffee.
- **Result:**
 - The fermentation inside the civet's gut gives Kopi Luwak a **smooth, less acidic flavor**, which is considered exotic by coffee enthusiasts.

GEOGRAPHICAL DISTRIBUTION

- **Origin:** Indonesia (Sumatra, Java, Bali, Sulawesi islands)
- **Also produced in:**
 - **Philippines** (known as Kape Alamid),
 - **Vietnam** (Ca Phe Chon),
 - **Thailand**,
 - and to some extent **India** (especially in **Coorg**, Karnataka).

ECONOMIC IMPORTANCE

- Kopi Luwak is marketed as a **luxury commodity**, with prices reaching **\$250–\$1200 per kg** in international markets.
- It contributes to **eco-tourism and niche agriculture**, particularly in **Indonesia and the Philippines**.



ETHICAL & ENVIRONMENTAL CONCERNS

(A) ANIMAL WELFARE ISSUES

- In many commercial setups, **civets are captured and kept in cages** under poor conditions to mass-produce Kopi Luwak.
- This leads to **animal cruelty, malnutrition, and stress** among civets.

(B) ECOLOGICAL IMPACT

- Overexploitation and capture of civets from the wild disrupts **local ecosystems** and contributes to **biodiversity loss**.

(C) AUTHENTICITY ISSUES

- Up to **80% of Kopi Luwak** sold globally is **fake or blended**, undermining local producers.

CONSERVATION ASPECT

- The **Asian Palm Civet** is listed as **Least Concern** on the **IUCN Red List**, but **illegal trade and poaching** for coffee and perfume industries pose threats.
- Conservationists advocate **certified “wild-sourced” Kopi Luwak**, collected naturally (not from caged animals), to ensure **ethical and sustainable production**.

INDIA'S CONNECTION

- In **India**, Kopi Luwak is produced in **Coorg (Kodagu), Karnataka**, and **Chikmagalur** regions on a small scale.
- It is marketed as **“Coorg Civet Coffee.”**
- The **Coffee Board of India** monitors authenticity and branding to avoid unethical practices.

ASIAN PALM CIVET

- The Asian Palm Civet, also known as the Toddy Cat or Common Palm Civet, is a small, nocturnal mammal that is found throughout South and Southeast Asia, including India, Sri Lanka, Indonesia, and the Philippines.
- It is a member of the Viverridae family, which also includes other civet and mongoose species.
- Scientific Name: *Paradoxurus hermaphroditus*.

FEATURES:

- It has a long, slender body, short legs, and a pointed snout.
- It weighs between 2 to 5 kg and measures around 53 to 71 cm in length, including the tail.
- Its fur is brownish-gray with black spots, and it has a white mask-like marking around its eyes.
- It is a nocturnal animal and feeds on a variety of prey, including insects, small mammals, and fruits.
- They are also known for their strong sense of smell and excellent climbing skills, allowing them to easily climb trees and forage for food.

- They are not very social animals.

CONSERVATION STATUS:

- **IUCN Red List:** Least Concern.

Question 1:	Kopi Luwak, recently seen in the news, refers to which of the following?
Option A	A medicinal plant used in traditional Indonesian healing
Option B	A luxury coffee made using beans digested by civets
Option C	A fermented tea from East Asia
Option D	A volcanic mineral found in Java region
Solution:	Answer: (b) Explanation: Kopi Luwak is a rare coffee produced from beans excreted by the Asian Palm Civet after partial digestion.

Question 2:	Which of the following statements is/are correct about Kopi Luwak? 1. It is primarily produced in Indonesia, the Philippines, and India. 2. It is obtained from beans digested by the Asian Palm Civet. 3. The species involved is listed as Endangered on the IUCN Red List. Select the correct answer:
Option A	1 and 2 only
Option B	2 and 3 only
Option C	1 only
Option D	1, 2, and 3
Solution:	Answer: (a) Explanation: The Asian Palm Civet is listed as Least Concern , not Endangered.

Question 3:	With reference to the Kopi Luwak coffee, which of the following best describes an associated environmental concern?
Option A	It leads to deforestation due to plantation expansion
Option B	It causes methane emissions from livestock
Option C	It involves animal cruelty through caged civet farming
Option D	It reduces soil fertility through chemical usage
Solution:	Answer: (c) Explanation: Mass production of Kopi Luwak involves keeping civets in captivity , raising animal welfare and biodiversity issues.



24

PROJECT ARUNANK

Recently, the Project Arunank of the Border Roads Organisation (BRO) marked its 18th Raising Day.



PROJECT ARUNANK

- It has been implemented since 2008 by the Border Roads Organization (BRO) in Arunachal Pradesh.
- The name of the Project has been conceived from the name of the State of Arunachal Pradesh.
- Objective: To provide vital connectivity to remote valleys & forward areas of Arunachal Pradesh while meeting the operational requirements of the Armed Forces.
- It has adopted innovative and sustainable technologies such as Steel Slag, Cut-and-Cover Tunnels, Geo Cells, Plastic Sheets, GGBFS Concrete and Gabion Walls, enhancing the durability and environmental sustainability of road infrastructure in the region.

ACHIEVEMENTS OF PROJECT ARUNANK

- It has completed the 278 km Hapoli-Sarli-Huri Road, blacktopped for the first time since Independence, connecting one of the remotest regions of Kurung Kumey district.
- It played a critical role in developing communication systems for socio-economic and strategic growth in the region.



Question 1:	Project Arunank, often seen in the news, is implemented by—
Option A	National Highways Authority of India (NHAI)
Option B	Ministry of Home Affairs
Option C	Border Roads Organisation (BRO)
Option D	National Disaster Management Authority (NDMA)
Solution:	Answer: (c) Explanation: Project Arunank is a BRO project under the Ministry of Defence , focused on border infrastructure in Arunachal Pradesh.

Question 2:	With reference to Project Arunank, consider the following statements: 1. It is aimed at developing road connectivity in Arunachal Pradesh. 2. It is jointly implemented by the Ministry of Defence and the Ministry of Road Transport & Highways. 3. It covers infrastructure development along India's border with Myanmar. Which of the statements given above are correct?
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Option A	1 only
Option B	1 and 3 only
Option C	2 and 3 only
Option D	1, 2, and 3
Solution:	Answer: (a) Explanation: The project is implemented solely by the BRO under the Defence Ministry , and its focus area is Arunachal's LAC with China , not Myanmar.

Question 3:	The Se La Tunnel, constructed under Project Arunank, connects—
Option A	Assam with Nagaland
Option B	Tawang with the rest of Arunachal Pradesh
Option C	India with Bhutan
Option D	Itanagar with Guwahati
Solution:	Answer: (b) Explanation: The Se La Tunnel ensures all-weather connectivity between Tawang and West Kameng , crucial for defence mobility.

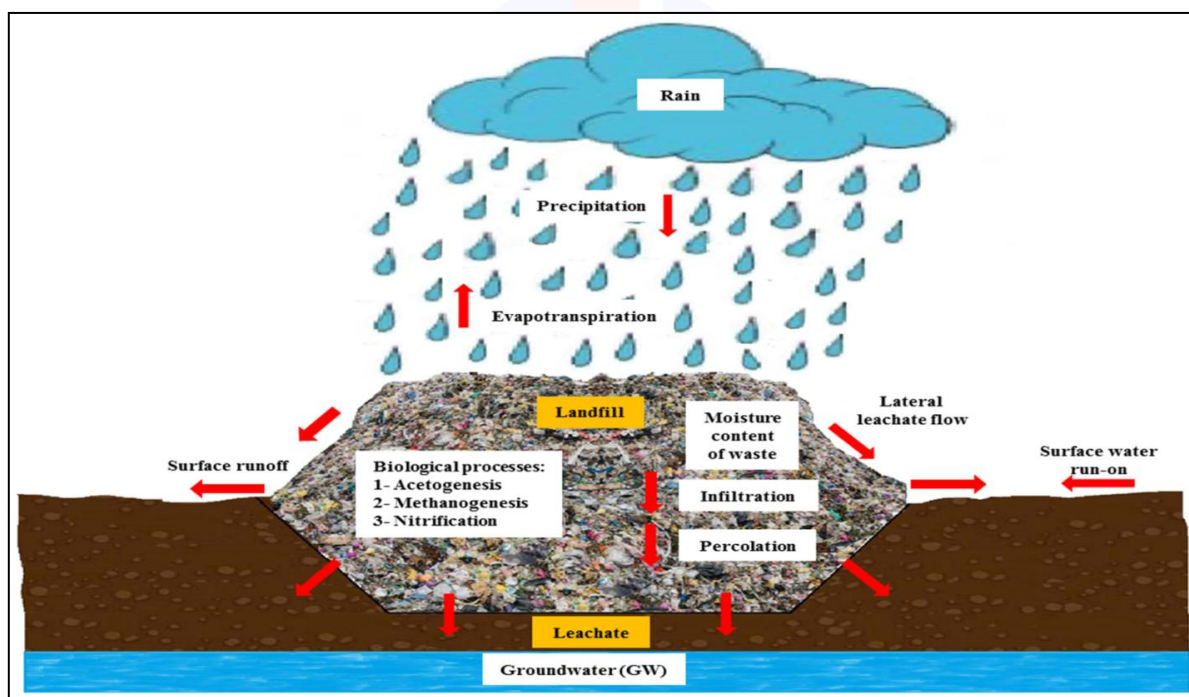
25**LEACHATE**

Environmentalists, wildlife activists, and locals recently sought immediate intervention by the Union Environment Ministry into the recurring illegal discharge of highly toxic, untreated leachate into the Aravalis.

DEFINITION

Leachate is a liquid that has percolated through solid waste (for example in a landfill) or other porous material and in doing so has extracted soluble or suspended solids, or other constituents from the material through which it has passed.

In landfill contexts, it is defined as “all water that has been in contact with waste stored in a landfill” that becomes contaminated.

**HOW/WHY IT FORMS**

- Rainwater and surface water seep into a landfill or waste disposal site, and also moisture generated by the breakdown of waste material itself.
- As the water percolates, it dissolves and entrains domestic, industrial and hazardous waste-derived pollutants (e.g., organic compounds, heavy metals, ammonia, etc).
- Older landfills evolve: initial aerobic decomposition gives way to anaerobic processes, leading to changes in leachate composition (higher salts, heavy metals, persistent organics) as time passes.

COMPOSITION & CHARACTERISTICS

- **Organic pollutants:** humic/fulvic acids, VOCs, short-chain acids, alcohols.
- **Inorganic components:** ammonium, chlorides, sulfates, heavy metals like lead, mercury, cadmium.
- **Physical:** Highly variable depending on waste type, age of landfill, rainfall, liner configuration.
- Typically, dark-coloured, strong odour, turbid.

ENVIRONMENTAL & PUBLIC-HEALTH IMPACTS

- **Groundwater contamination:** Leachate can percolate through subsurface and contaminate aquifers used for drinking water.
- **Soil degradation:** Toxic composition can impair microbial health, reduce fertility.
- **Surface water & ecosystems:** If leachate reaches rivers/lakes, toxic load affects aquatic life and biodiversity.
- **Air/gas issues:** Decomposition processes may produce gases (e.g., methane) that accompany leachate challenges.

MANAGEMENT & CONTROL MEASURES

- **Containment:** Use of impermeable liners (HDPE, clay) in landfill bottom layers prevents downward migration of leachate.
- **Collection & pumping systems:** Pipes, sumps, pumping systems to collect leachate and convey for treatment.
- **Treatment processes:** Biological treatment (e.g., Moving Bed Biofilm Reactor), chemical/physical filtration, reverse osmosis in some cases.
- **Minimisation strategies:** Reduce infiltration of water, proper waste segregation, recirculation of leachate, evapotranspiration covers.

QUICK REVISION FACTS

- **Leachate** = liquid percolating through waste and carrying contaminants.
- Main source: landfill (municipal or industrial).
- Key threats: groundwater + ecosystem contamination.
- Control: liners + collection + treatment.
- Age & waste type affect composition.

Question 1:	With reference to leachate, consider the following statements: 1. It is the liquid formed when rainwater percolates through waste at a landfill and carries soluble and suspended solids. 2. It always contains only inorganic salts and does not have organic pollutants. 3. One of the major risks of leachate is contamination of groundwater near waste disposal sites. Which of the statements given above are correct?
Option A	1 and 3 only
Option B	2 only
Option C	1 only
Option D	1, 2 and 3
Solution:	Answer: (a) Explanation: Statement 1 is correct (definition) and 3 is correct (groundwater risk). Statement 2 is incorrect because leachate often contains organic pollutants.

Question 2:	What are common management strategies for landfill leachate?
Option A	Installing impermeable liner systems
Option B	Collection and pumping of leachate to centralized treatment
Option C	Complete elimination of all waste decomposition in a landfill
Option D	Both (a) and (b)
Solution:	Answer: (d) Explanation: Effective management includes liners + collection/treatment. Complete elimination of waste decomposition (c) is not feasible in practice.

26

INTERNATIONAL CONVENTION AGAINST DOPING IN SPORT

India has been re-elected as the Vice-Chairperson of the Bureau for the Asia-Pacific (Group IV) at the 10th Session of the Conference of Parties (COP10) to the International Convention against Doping in Sport.

INTERNATIONAL CONVENTION AGAINST DOPING IN SPORT

- It is a multilateral treaty by which States agree to adopt national and international measures to prevent and eliminate doping in sport.
- The Convention was adopted during the 33rd session of UNESCO's General Conference (19 October 2005) and entered into force on 1 February 2007.
- **Members:** It consists of 192 States Parties, making it UNESCO's second most ratified treaty.
- **Aim:** The Convention aims to harmonize anti-doping legislation, guidelines, regulations, and rules internationally in order to provide a level and safe playing environment for all athletes.
- **Governance:** The Conference of Parties (COP) is the sovereign body of the Convention, meeting in ordinary session biennially.
- It has overall responsibility for its implementation and evolution.

FEATURES

- The convention allows governments to formally recognize the World Anti-Doping Agency (WADA) and the Code.
- It works under a positive implementation approach, providing guidance, financial support, skill-training and capacity-building to empower States Parties aiming to enhance their implementation of the Convention.
- It also provides a global forum for public and private stakeholders of the sport integrity ecosystem.
- **Funding mechanism:** Anti-Doping Fund was formed to create awareness about doping.

27

NOTICE TO AIRMEN (NOTAM)

India recently issued a Notice to Airmen (NOTAM) for a large-scale tri-services military exercise, “Ex Trishul,” to be conducted along the Pakistan border.

NOTICE TO AIRMEN (NOTAM)

DEFINITION

- **NOTAM** stands for **Notice to Airmen** (now gender-neutral: **Notice to Air Missions**).
- It is an **official notice** containing information **essential to flight operations**, issued to **alert pilots and aviation personnel** about potential **hazards or changes** that could affect flight safety or planning.
- These notices are **temporary or time-bound**, unlike the permanent information given in **Aeronautical Information Publications (AIP)**.

GOVERNING AGENCY (INDIA):

The **Airports Authority of India (AAI)**, through the **Aeronautical Information Services (AIS)**, issues NOTAMs in India.

GLOBALLY REGULATED BY:

The **International Civil Aviation Organization (ICAO)** under **Annex 15** of the **Chicago Convention (1944)** — which standardizes Aeronautical Information Services (AIS).



PURPOSE & FUNCTION

To **warn pilots and airlines** about short-term changes in:

- Airspace restrictions or closures
- Runway or taxiway conditions
- Military exercises or missile tests
- Navigation aid (NAVAID) failures
- Unserviceable equipment or lighting
- VIP movements and airspace congestion
- Temporary hazards (e.g. birds, construction cranes, parachute jumps)

TYPES OF NOTAM (AS PER ICAO CLASSIFICATION)

Type	Meaning / Purpose	Example
NOTAMN	New NOTAM issued	New runway closure
NOTAMR	Replaces an existing NOTAM	Updated information on runway repair
NOTAMC	Cancels a previously issued NOTAM	Cancellation after completion of work
NOTAMJ	Snow, ice, or runway condition reports	Seasonal conditions
ASHTAM	Relates to volcanic ash activity	Eruption near air routes
SNOWTAM	Special NOTAM on snow, ice, slush on runways	Winter operations

STRUCTURE / FORMAT OF A NOTAM

Each NOTAM follows a **standard coded format** defined by ICAO:

- Location indicator (airport code)
- Start of validity
- End of validity
- Description of hazard/change

Example:

A0204/25 NOTAMN Q) VECF/QMRLC/IV/NBO/A/000/999/2238N08826E005 A) VECC B) 251000Z C) 252000Z E) RWY 01L/19R CLOSED DUE MAINTENANCE

This means **Runway 01L/19R at Kolkata (VECC)** is **closed for maintenance** between specific dates/times.

GLOBAL RELEVANCE

- NOTAMs are transmitted through **ICAO's global Aeronautical Fixed Telecommunication Network (AFTN)**.
- Airlines must **check NOTAMs before every flight** — part of their mandatory pre-flight briefing.

NOTAM SYSTEM IN INDIA

- Managed by **Aeronautical Information Service Directorate, AAI**.
- India's **NOTAM Office (NOF)** functions at **Delhi, Mumbai, Chennai, Kolkata** — responsible for compiling and issuing national and international NOTAMs.
- Data is shared through **India's Aeronautical Information Management (AIM)** system and ICAO channels.

EXAMPLES IN INDIAN CONTEXT:

- **Drishti systems outage** at IGI Airport — NOTAM issued for visibility sensor failure.
- **Gaganyaan abort test (ISRO)** — NOTAM issued to block specific airspace for rocket launch safety.
- **VVIP movements (PM or President)** — NOTAMs issued restricting flight operations in specified air corridors.

RECENT EXAMPLE (2025 CONTEXT)

- In **October 2025**, NOTAMs were issued over the **Bay of Bengal and Arabian Sea** for **missile tests** and **rocket launches**.
- India routinely issues such NOTAMs before **Agni-series or BrahMos missile tests**.
- These NOTAMs specify **restricted zones and altitudes** to ensure civilian aircraft avoid danger zones.

Question 1:

With reference to the term 'NOTAM', sometimes seen in the news, consider the following statements:

1. It is a notice issued to inform airmen about potential hazards along a flight route.
2. In India, it is issued by the Directorate General of Civil Aviation (DGCA).

	3. It is a permanent record of airport infrastructure. Which of the above statements are correct?
Option A	1 only
Option B	1 and 2 only
Option C	2 and 3 only
Option D	1, 2 and 3
Solution:	Answer: (b) Explanation: NOTAMs are issued to pilots by AAI under DGCA supervision (statement 1 & 2 correct). They are temporary, not permanent (statement 3 incorrect).

Question 2:	A NOTAM is most likely to be issued when:
Option A	A new airport is inaugurated.
Option B	A runway is temporarily closed for maintenance.
Option C	A pilot applies for licence renewal.
Option D	A new aircraft model is certified.
Solution:	Answer: (b)

28**KERALA'S EXTREME POVERTY ERADICATION PROGRAMME**

Kerala will be officially declared free from extreme poverty on November 1, 2025, becoming the first Indian State to achieve this milestone.

The announcement marks the culmination of a four-year effort under the Extreme Poverty Eradication Programme (2021–2025).

Securing future

Through the Extreme Poverty Eradication Project launched in 2021, the Kerala government prepared micro-plans for every family

- **1,03,099** individuals from 64,006 families identified as extremely poor
- **21,263** families received essential documents
- **3,913** families were provided new houses
- **1,338** families were allotted land



- **5,651** families received up to ₹2 lakh each for house renovation
- **3,822** families got livelihood assistance

WHAT IS EXTREME POVERTY?

The World Bank defines extreme poverty as living on less than \$2.15 per day, indicating a level of absolute deprivation where basic needs such as food, shelter, and healthcare cannot be met.

- **Updated Benchmark (2025):** Reflecting inflation and higher living costs, the World Bank revised the threshold to \$3 per day (PPP 2021) for low-income nations.
- **Measurement Method:** The metric is based on Purchasing Power Parity (PPP), which equalises the cost of living across countries and uses Household Consumption Expenditure Survey (HCES) data.

EXTREME POVERTY ERADICATION PROGRAMME (2021–2025)

- Initiated in 2021 to make Kerala free from extreme poverty by addressing deprivations in food, health, housing, and livelihood under the support of Kudumbashree (women empowerment program).

- Identified 64,006 extremely poor families through door-to-door surveys using multidimensional poverty indicators. By 2025, 59,277 families were uplifted; 3,913 houses were built, 1,338 families were given land, and 21,263 individuals received essential IDs.
- Every beneficiary was geo-tagged, and micro-plans were prepared for each household to ensure long-term social and economic rehabilitation.

HOW KERALA BECAME INDIA'S FIRST EXTREME POVERTY-FREE STATE?

- **Data-Driven Targeting:** Smart Panchayat Project and Kerala State Poverty Eradication Mission (Kudumbashree) enabled accurate beneficiary identification via community data validation.
- **Integration of Welfare Schemes:** Converged State and Central welfare schemes into a unified beneficiary support plan. E.g. Life Mission: housing for landless families, Aardram Mission: primary healthcare for poor households, Ashraya Project: targeted welfare for destitute and elderly.
- **Decentralised Governance Model:** People's Plan Campaign (Janakeeya Aasuthranam) and Nava Kerala Mission ensured community-driven planning and financial autonomy at the local level.
- **Use of Technology:** Kerala State IT Mission developed GIS platforms for tracking assets, e-Sevanam Portal integrated service delivery and houses geo-tagging under Rebuild Kerala Initiative (RKI).
- **Political Consensus:** Idea of "Mission Mode Governance", aligning political consensus with social welfare targets, and Kerala Institute of Local Administration (KILA) training for local officers.

SIGNIFICANCE

- **SDG Alignment:** Works toward SDG 1 (No Poverty) and SDG 10 (Reduced Inequalities).
- **State Model:** Shows how a sub-national unit (Kerala) can design rights-based, data-driven approach to poverty elimination.
- **Inclusive Governance:** Focus on "no one left behind" — families outside welfare nets, multiple deprivation, personalised support.
- **Decentralisation & Community Role:** LSG involvement, use of local networks (Kudumbashree) exemplifies bottom-up governance.
- **Policy Innovation:** Use of micro-plans for each family is a move beyond broad welfare schemes.

CHALLENGES & CRITIQUES

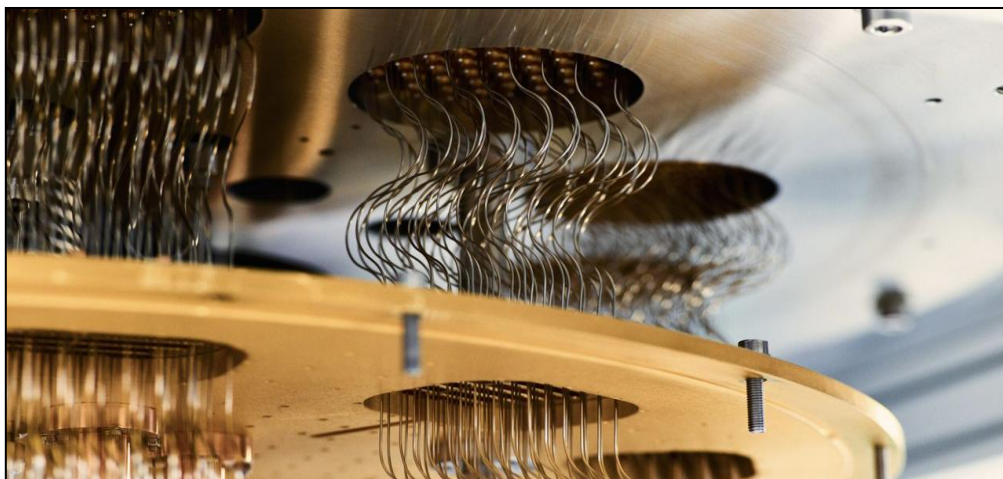
- **Tribal/Remote Areas:** Some tribal activists argue that even as state claims eradication, many tribal settlements still face hunger, homelessness and lack of land.
- **Sustainability:** Post-rehabilitation, ensuring families do not fall back into deprivation is a significant task.
- **Data/Verification Risk:** Accurate enumeration, avoiding exclusion or duplication, maintaining integrity.
- **Resource Intensity:** Requires coordinated action, cross-department implementation, devoted finance and monitoring.
- **Definition Boundaries:** “Extreme poverty” may involve setting thresholds — how defined and how inclusive? Vigilance needed.

SAMPLE MCQ

Question 1:	With reference to Kerala’s Extreme Poverty Eradication Programme, consider the following statements: 1. It was launched in 2021 with the aim of making Kerala free of extreme poverty by November 1, 2025. 2. It identifies families based solely on income deprivation below the national poverty line. 3. Implementation involves preparing a micro-plan for each identified family. Which of the statements is/are correct?
Option A	1 and 2 only
Option B	1 and 3 only
Option C	2 and 3 only
Option D	1, 2 and 3
Solution:	Answer: (b) 1 and 3 only Explanation: Statement 2 is incorrect because identification uses multiple deprivation indicators (food, health, income, housing) not only income.

29**QUANTUM ECHOES & QUANTUM ADVANTAGE**

Google's Quantum AI team (2025) developed a new quantum algorithm called Quantum Echoes, which they ran on their quantum processor "Willow chip". It is being hailed that the Willow chip has achieved verifiable quantum advantage.

**DEFINITIONS & CONTEXT****QUANTUM ADVANTAGE**

- Quantum Advantage refers to a situation where a quantum computer (or quantum algorithm) **performs a task significantly faster** or more efficiently than the best-known classical algorithm on classical hardware.
- It is often a milestone in the development of quantum computing — beyond mere theoretical “quantum supremacy” (where a quantum computer just does something classical can’t in a feasible time) — quantum advantage implies a **meaningful, practical task** where quantum yields benefit.
- It is **not** just speed for the sake of speed, but also includes verifiability, correctness, and usefulness of the result in a practical domain (chemistry, materials science, cryptography etc).

QUANTUM ECHOES

- Quantum Echoes is a **recent algorithmic breakthrough** (announced by Google in October 2025) that uses a technique known as an “**out-of-time-ordered correlator**” (**OTOC**) protocol to measure quantum systems’ behaviour via “echo” operations — evolve forward, perturb, evolve backward, measure the echo signal.
- In Google’s report, it ran on their quantum processor (the “Willow” chip) and achieved a **verifiable quantum advantage** — meaning: (i) it processed a task far

faster (~13,000×) than the best classical algorithms, and (ii) the result was **verifiable / reproducible**.

- The algorithm's name ("Echoes") comes from the process of creating a quantum "ping" or signal, letting it evolve, then reversing evolution to observe the echo, thus extracting deeper quantum correlation information.

WHY THEY MATTER & RECENT DEVELOPMENTS

RECENT BREAKTHROUGH

- Google announced its quantum chip "Willow" achieved this milestone in late October 2025. The algorithm Quantum Echoes ran ~13,000 times faster than the best classical supercomputers for a certain simulation task (molecular-structure modelling) on their quantum hardware.
- Importantly, the results were **verifiable**: they could be replicated/checked beyond just internal claims. That addresses an earlier criticism of quantum claims (lack of verification).
- The task was not purely contrived: it relates to **molecular geometry, NMR (Nuclear Magnetic Resonance)** type simulations — pointing toward real-world applications in **drug discovery, materials research, and chemistry**.

SIGNIFICANCE

- Marks a major step from "quantum research" toward **quantum practical use** (i.e., quantum computing being useful for industry, science) rather than only academic demonstration.
- Demonstrates that quantum computers may soon tackle tasks classical computers struggle with: large molecule simulation, battery materials, catalyst design.
- For India (and globally) this has several implications: strategic technology race (US, China, Europe, India), quantum-safe cryptography relevance (because quantum advantage can eventually break some classical cryptosystems), and nation-level investment in quantum research.
- The term "quantum advantage" becomes a policy term: when will quantum technologies deliver advantage for economy/defence/health? Governments need to prepare for regulatory, security, workforce, ethical issues.

HOW DOES "QUANTUM ECHOES" WORK (SIMPLIFIED)

- The algorithm uses the idea of **forward evolution** of a quantum many-body system, then a **small perturbation**, then a **backward evolution** to see how the

system diverged. The “echo” is essentially what remains of the initial state after this round trip — or how the disturbance spread out (quantum “scrambling”).

- This type of experiment is extremely hard for classical computers when the system is many-body and high entangled, because simulation grows exponentially. The quantum machine can do it more naturally.
- The “verifiable” nature means the output is not just random quantum noise but a measurable quantity (e.g., correlator) that classical experiment or another system can check.

CHALLENGES & LIMITATIONS

- Even though quantum advantage is claimed, it is for a **specific task**, not all computing. It does **not mean quantum computers can now replace classical for every problem**.
- Error correction, decoherence, scale (logical qubits) remain major hurdles before full general-purpose quantum computers.
- “Quantum advantage” needs to be clearly defined: speed-up, cost-reduction, energy advantage etc. Some prior claims were contested.
- Verification and reproducibility outside one company/hardware remain essential.
- Practical application deployment (industry, health, materials) still may be several years away — bridging lab results to commercial use is non-trivial.

TABLE FOR REVISION

Term	Definition / Detail
Quantum Advantage	When a quantum system outperforms the best classical system in a practical, verifiable task.
Quantum Echoes	An algorithm by Google (2025) running on the Willow quantum chip that achieved a verifiable quantum advantage (~13,000× speed-up) using OTOC approach.
Willow chip	Google’s 105-qubit (approx) superconducting quantum processor used for the breakthrough.
Out-of-Time-Ordered Correlator (OTOC)	A quantum mechanical quantity used to measure how information scrambles in a quantum system; core to Quantum Echoes technique.

Implications	Quantum computing, materials science, pharmaceuticals, encryption/cryptography readiness.
Major challenge	Scaling logical qubits, error-correction, commercialisation, verification.

Question 1:	With reference to quantum computing, consider the following statements: 1. A “quantum advantage” is achieved when a quantum computer completes a task faster than any classical algorithm, but the result may not be verifiable. 2. The algorithm “Quantum Echoes” uses a method based on forwarding and reversing quantum evolution to observe how perturbations spread in a quantum system. 3. The first verifiable quantum advantage claimed in 2025 was achieved by Google’s Willow chip using the Quantum Echoes algorithm. Which of the statements given above are correct?
Option A	1 and 2 only
Option B	2 and 3 only
Option C	1 and 3 only
Option D	1, 2 and 3
Solution:	Answer: (b) — Statements 2 & 3 are correct, while statement 1 is incorrect because quantum advantage also includes verifiability (or this version did).

30

MAKHANANOMICS

Prime Minister Narendra Modi described the newly launched **National Makhana Board** as a transformative “revolution” for the sector.

MAKHANA

- It is the dried edible seed of the prickly water lily or **gorgon plant (Euryale ferox)**, a species which grows in freshwater ponds across South and East Asia.
- It is known for its violet and white flowers, and massive, round and prickly leaves — often stretching more than a meter across.
- Makhana, traditionally consumed in ritual settings, has recently gained recognition as a nutrient-rich, low-fat “superfood” and healthy snack.

PRODUCTION AREAS

- Bihar is the leading producer of makhana in India, with cultivation concentrated in nine districts of the Mithilanchal region—particularly Darbhanga, Madhubani, Purnea, and Katihar, which account for 80% of the state’s output.
- Around 15,000 hectares are used for makhana farming, yielding approximately 10,000 tonnes of popped makhana annually.
- The global makhana market was valued at \$43.56 million in 2023, and expected to touch the \$100 million-mark by 2033.



ISSUES AND CONCERNS

- Bihar, despite being the top makhana producer, lacks food processing and export infrastructure, forcing it to sell raw fox nuts cheaply to other states like Punjab and Assam, which dominate exports.
- Poor market organization and multiple intermediaries result in low earnings for farmers and the state.
- Additionally, makhana cultivation remains labor-intensive and low in productivity, raising input costs.

GOVERNMENT INITIATIVES

- The government is promoting its commercial potential through marketing efforts, improved industrial infrastructure, and the formation of the **Makhana Board**.
- In 2022, 'Mithila Makhana' was conferred a **Geographical Indication (GI) tag**, a certification that signifies that a product can only be grown in a particular geographical location, and as a result, has unique characteristics (like Darjeeling's tea or Mysore sandal soap).

WAY AHEAD

- Makhanaomics envisions rural empowerment, economic growth, and regional development.
- With better infrastructure, supportive policies, and improved market access, Bihar's makhana sector could transform from a subsistence crop into a globally recognized superfood industry.

Question 1:	Consider the following statements about Makhana (<i>Euryale ferox</i>): 1. It is an aquatic crop belonging to the Water Lily family. 2. Bihar accounts for more than 90% of India's production. 3. It has been granted a Geographical Indication (GI) tag under the name "Mithila Makhana." 4. It is classified as a cereal crop under the National Food Security Mission. Select the correct answer:
Option A	1 and 2 only
Option B	1, 2 and 3 only
Option C	1, 3 and 4 only
Option D	1, 2, 3 and 4

Solution:	Answer: (b) Explanation: Makhana is an aquatic plant of the Water Lily family (Nymphaeaceae), mainly grown in Bihar, and has a GI tag as “Mithila Makhana.” It is not classified as a cereal crop .
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Question 2:	With reference to Mithila Makhana, consider the following: 1. It is grown mainly in the Darbhanga and Madhubani districts of Bihar. 2. It has been promoted under the PM Formalization of Micro Food Processing Enterprises (PMFME) Scheme. 3. Its cultivation requires saline soil and high temperature. Which of the statements given above are correct?
Option A	1 and 2 only
Option B	2 and 3 only
Option C	1 and 3 only
Option D	1, 2 and 3
Solution:	Answer: (a) Explanation: Makhana requires stagnant freshwater , not saline soil. Statements 1 and 2 are correct.

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CLOUD SEEDING

Delhi Chief Minister has said **cloud seeding is essential** for the national capital as it could play a key role in controlling rising pollution levels during the winter season.

WHAT IS CLOUD SEEDING?

- **Cloud seeding** is a **weather modification technique** that aims to **enhance precipitation (rain or snow)** by introducing substances into clouds that act as **condensation or ice nuclei**.
- The process **stimulates the natural rain formation** mechanism inside clouds, especially when atmospheric conditions are favorable but rainfall does not occur naturally.

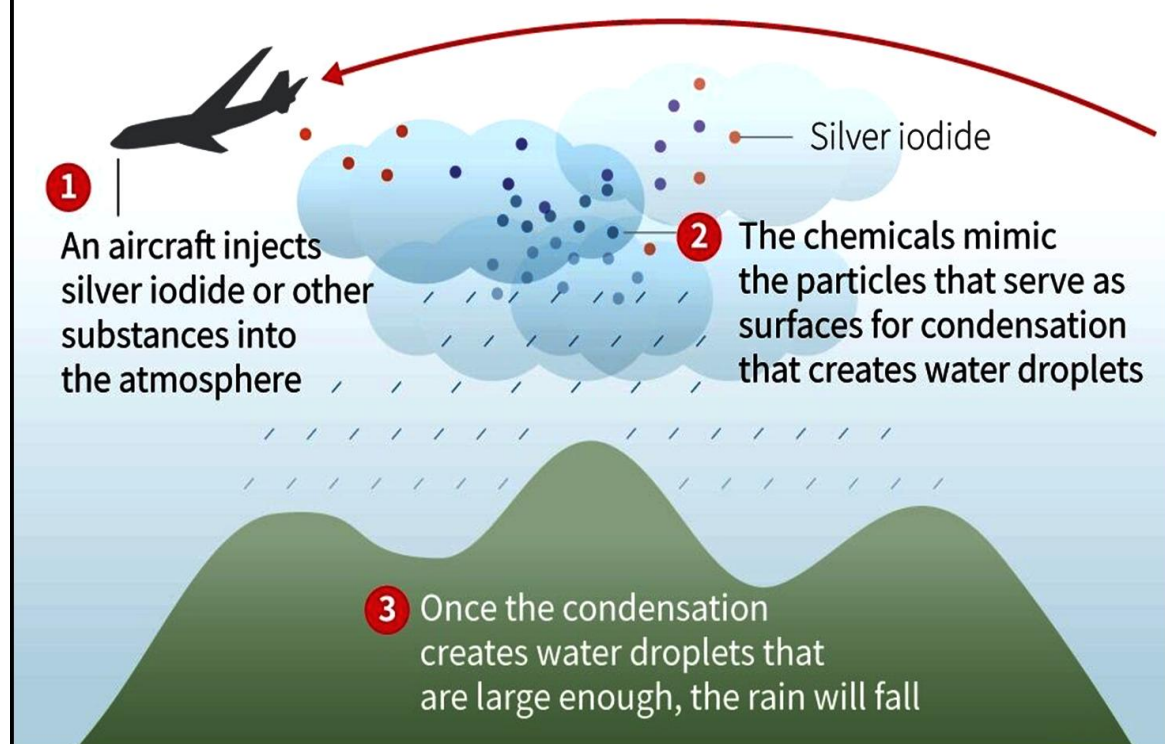
HOW IT WORKS

Cloud seeding introduces specific **chemical agents** into clouds to promote **droplet formation**:

- These agents attract water vapor → form droplets → combine → fall as **rain or snow** if they grow large enough.

Cloud seeding

Traditional method of rainmaking, in use since the 1940s



COMMON SEEDING AGENTS

Type	Example	Function
Silver iodide (AgI)	Most common	Acts as an ice nucleus, similar structure to ice crystals
Sodium chloride (NaCl)	Common salt	Enhances condensation in warm clouds
Potassium iodide, Dry ice (solid CO ₂)	Alternatives	Induce freezing or condensation

METHODS OF CLOUD SEEDING

- **Aerial Seeding** – Aircraft disperses seeding agents into clouds.
- **Ground-based Generators** – Burner's release particles that drift upward.
- **Rocket Seeding** – Rockets or artillery shells deliver seeding chemicals into the cloud layer.

TYPES OF CLOUDS USED

- **Cold Clouds:** Contain supercooled water droplets → silver iodide is effective.
- **Warm Clouds:** Found in tropical regions → common salt particles are used.

OBJECTIVES / APPLICATIONS

- **Enhancing Rainfall:** To alleviate drought and boost agriculture.
- **Snowpack Augmentation:** In mountainous regions for water supply.
- **Hail Suppression:** Reducing damage to crops and property.
- **Fog Dispersal:** Improving visibility near airports.

CLOUD SEEDING IN INDIA

INITIATIVES:

- States like Karnataka, Maharashtra, Tamil Nadu, and Andhra Pradesh have used cloud seeding during droughts.
- Project "Varshadhari" in Karnataka.
- Indian Institute of Tropical Meteorology (IITM), Pune conducts research.
- ISRO and IIT Kanpur have tested cloud seeding technologies using aircraft.

CHALLENGES

- **Effectiveness uncertain** – Depends on humidity, wind, and type of cloud.
- **Environmental concerns** – Silver iodide toxicity in long-term use.
- **Ethical and legal issues** – Weather modification across political borders.
- **High cost** – Operations are expensive with unpredictable success.

GLOBAL EXAMPLES

- **China:** One of the world's largest weather modification programs.
- **USA:** Used in western states to increase snowpack and rainfall.
- **UAE:** Uses drones for electric-charge-based cloud seeding.

FUTURE PROSPECTS

- **Artificial intelligence (AI) and drones** being used to optimize cloud identification.
- **Nanoparticles** may replace silver iodide in eco-friendly seeding.

WHAT CAN BE OTHER MEASURES?

- **Root Causes Identified by Science:** Long-standing scientific consensus attributes hazardous air quality to emissions from vehicles, industries, power plants, construction, waste burning, and agricultural stubble fires.
- **Known Long term Solutions:** Cleaner transport systems (electric mobility, public transport, emission norms).
 - Sustainable energy transition (phasing out coal, promoting renewables).
 - Effective waste management and dust control in construction.
 - Urban planning that minimizes congestion and reduces pollution sources.
- **Focus on Quick Fixes:** There is an increasing reliance on temporary measures like smog towers, artificial rain, or short-term bans though they are effective in short terms.
- **The Need for Evidence-Based, Ethical Action:** Real change demands systemic reforms and long-term enforcement of emission controls.

Question 1:	Which of the following substances is most commonly used in cloud seeding?
Option A	Calcium carbonate

Option B	Silver iodide
Option C	Potassium permanganate
Option D	Sodium bicarbonate
Solution:	Answer: (b) Silver iodide Explanation: Silver iodide's crystalline structure resembles that of ice, making it an ideal ice nucleus in clouds.

Question 2:	Cloud seeding is mainly aimed at:
Option A	Reducing air pollution
Option B	Increasing rainfall
Option C	Preventing cyclones
Option D	Controlling temperature
Solution:	Answer: (b) Increasing rainfall Explanation: Cloud seeding is primarily done to enhance precipitation (rain or snow).

Question 3:	Which Indian state launched the "Varshadhari" project related to cloud seeding?
Option A	Maharashtra
Option B	Karnataka
Option C	Tamil Nadu
Option D	Rajasthan
Solution:	Answer: (b) Karnataka Explanation: Karnataka initiated "Project Varshadhari" for inducing artificial rain during droughts.

Question 4:	Which of the following is not a potential environmental concern associated with cloud seeding?
Option A	Silver accumulation in soil

Option B	Depletion of ozone layer
Option C	Impact on natural rainfall distribution
Option D	(Cross-border legal issues
Solution:	Answer: (b) Depletion of ozone layer Explanation: Cloud seeding does not affect the ozone layer; its concerns are localized environmental and geopolitical issues.

Question 5:	Which of the following organizations in India is engaged in cloud seeding research?
Option A	Indian Meteorological Department (IMD)
Option B	Indian Institute of Tropical Meteorology (IITM)
Option C	CSIR-NGRI
Option D	ISRO only
Solution:	Answer: (b) Indian Institute of Tropical Meteorology (IITM) Explanation: IITM, Pune conducts extensive research on cloud microphysics and artificial rainfall.

IAS ORIGIN
HERE IT BEGINS
Powered by Ecoholics

32

SAUDI ARABIA ENDS KAFALA SYSTEM

In a landmark labour reform, Saudi Arabia has officially scrapped the decades-old Kafala (sponsorship) system.

BACKGROUND

- The **Kafala system**, or **Sponsorship system**, was introduced in the **1950s** in the **Gulf Cooperation Council (GCC)** countries to **regulate foreign labor**.
- It required **migrant workers** to have a **local sponsor (kafeel)**—typically their employer—who had **legal control** over their employment and residency status.
- This system applied to **over 10 million migrant workers** in Saudi Arabia, largely from **India, Bangladesh, Pakistan, Nepal, the Philippines, and African nations**.



FEATURES OF THE KAFALA SYSTEM

Aspect	Description
Sponsorship	Every foreign worker's visa and legal status were tied to a Saudi sponsor (employer).
Restrictions	Workers couldn't change jobs, leave the country, or return without the employer's consent.
Control	Employers could confiscate passports, withhold wages, or restrict mobility.
Impact	Often led to exploitation, forced labor, and human rights violations .

SAUDI ARABIA'S LABOR REFORMS (2021–2025)

Saudi Arabia officially **ended major elements of the Kafala system** under the **Labor Reform Initiative (LRI)** launched in **March 2021** as part of **Vision 2030**.

KEY PROVISIONS OF THE REFORMED SYSTEM:

- **Job Mobility:**
 - Workers can now **change jobs** without the employer's permission **after completion of the contract period**.
 - Workers can **transfer employment** under specific conditions even before the contract ends.
- **Exit and Re-Entry Visas:**
 - Employees can **travel abroad** (for personal or professional reasons) **without employer approval**.
- **Final Exit:**
 - Migrant workers can **leave Saudi Arabia permanently** after notifying their employers digitally.
- **Digital Platform:**
 - All procedures are managed via the **Absher and Qiwa online platforms** to enhance **transparency** and **reduce human interference**.

OBJECTIVE OF REFORMS

- **Align labor laws** with **international human rights standards**.
- Improve **labor market efficiency** and **foreign investment climate**.
- Reduce **human trafficking** and **labor exploitation**.

- Enhance Saudi Arabia's **global image** ahead of major international events and partnerships.
- Part of **Vision 2030**—Crown Prince **Mohammed bin Salman's modernization plan** to diversify the economy beyond oil.

IMPLICATIONS FOR INDIA

- **Positive Impacts:**
 - Around **2 million Indian workers** in Saudi Arabia benefit from better working conditions and freedom of movement.
 - Improves **India–Saudi labor relations** and **remittance stability**.
 - Reduces cases of **passport confiscation** and **contract substitution**.
- **Challenges:**
 - Implementation may vary across private employers.
 - Domestic workers (e.g., housemaids) were **initially excluded** from some reforms.
 - Enforcement and grievance redressal mechanisms are still evolving.

GLOBAL CONTEXT

- Similar reforms were earlier made by:
 - **Qatar (2020)** – first GCC nation to fully abolish the Kafala system.
 - **Bahrain (2009)** – introduced mobility between employers.
- The **ILO (International Labour Organization)** has welcomed Saudi Arabia's decision as a **“historic step”** toward **labor rights protection**.

SIGNIFICANCE

- Strengthens **human rights and labor governance** in the Gulf region.
- Boosts **Saudi Arabia's attractiveness for skilled foreign labor**.
- Enhances **Saudi Arabia's reputation** in international organizations like the **UN**, **ILO**, and **World Bank**.

Question 1:	The term Kafala system, recently in the news, is related to:
Option A	A religious sponsorship program in the Middle East
Option B	A system of labor sponsorship governing migrant workers in Gulf countries

Option C	A financial assistance scheme for oil-rich states
Option D	A refugee relocation mechanism under UNHCR
Solution:	Answer: (b) Explanation: The Kafala system regulates the relationship between employers and migrant workers in GCC countries, granting employers extensive control over workers' movement and employment.

Question 2:	With reference to Saudi Arabia's reforms under Vision 2030, consider the following statements: 1. Migrant workers can now change jobs without employer approval after completing their contracts. 2. The new system allows workers to travel abroad without the employer's consent. 3. Domestic workers are fully covered under the new labor reforms. Which of the statements given above is/are correct?
Option A	1 and 2 only
Option B	2 and 3 only
Option C	1 and 3 only
Option D	1, 2 and 3
Solution:	Answer: (a) Explanation: The reforms introduced under the Labor Reform Initiative (LRI) allow job mobility and freedom to travel. However, domestic workers are not yet fully covered under the new framework.

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EXERCISE OCEAN SKY 2025

The Indian Air Force (IAF) is participating in Exercise Ocean Sky 2025, a multinational air combat exercise hosted by the Spanish Air Force at Gando Air Base, Spain.



ABOUT

- **The exercise aims to foster mutual learning, enhance interoperability, sharpen air combat skills, and strengthen defence cooperation** with friendly nations.
- **The exercise brings together more than 50 aircraft** from Spain, Germany, Greece, Portugal, India, and the United States, including **India's Su-30MKI fighter jets**.

GROWING INDIA-SPAIN DEFENCE TIES

- In August 2025, India received the final delivery of **16 Airbus C-295 military** transport aircraft at the Airbus Defence and Space facility in Seville, Spain.
- The C-295 project marks **India's first private sector venture in military aircraft production**, under a partnership between Tata Advanced Systems Limited (TASL) and Airbus Spain.
- A Final Assembly Line is being set up in **Vadodara, Gujarat**, to manufacture the remaining 40 out of 56 aircraft in India.

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CARABID BEETLES

Recent research in Italy has shown that carabid ground beetles can serve as potential bioindicators of microplastic pollution in soil.



ABOUT CARABID BEETLES

- Carabid beetles, belonging to the **family Carabidae**, are **nocturnal predators** that inhabit nearly all terrestrial ecosystems worldwide.
- **Species diversity:** Around 34,000 species globally and over **1,000 species** recorded in India.
- **Physical traits:** Flattened, elongated bodies (**mostly dark or metallic-shiny**), and prominent mandibles for predation.
- **Ecological Role:**
 - **Natural pest controllers:** Feed on a variety of agricultural pests like caterpillars, slugs, aphids, weevils, and snails.
 - **Indicator of soil quality:** High carabid diversity reflects low pesticide use, good organic matter, and balanced soil moisture.

35**UN'S EARLY WARNINGS FOR ALL (EW4ALL) INITIATIVE**

The World Meteorological Organization (WMO) at its Extraordinary Congress in Geneva, rallied its 193 Member States to commit to universal early warning coverage by **2027** under the **UN's Early Warnings for All (EW4All) initiative**.

**UNITED NATIONS' EARLY WARNINGS FOR ALL (EW4ALL) INITIATIVE****INTRODUCTION**

- The **Early Warnings for All (EW4All)** initiative is a **United Nations-led global programme** launched to ensure that **everyone on Earth is protected by early warning systems by 2027**.
- It is a major step toward **disaster risk reduction, climate resilience, and sustainable development**.
- The initiative was **announced by UN Secretary-General António Guterres in March 2022** and formally launched at **COP27 (2022, Sharm el-Sheikh, Egypt)**.

WHY THE INITIATIVE WAS NEEDED?

- **Only half** of the world's countries have effective **multi-hazard early warning systems (MHEWS)**.
- Countries in **Africa, South Asia, Small Island Developing States (SIDS), and Least Developed Countries (LDCs)** are the most under-protected.

- According to the **World Meteorological Organization (WMO)**, early warnings can **reduce disaster-related deaths by up to 8 times** and **economic losses by 30%**.
- The world faces rising frequency and intensity of disasters due to **climate change, urbanization, and environmental degradation**.

LEAD AGENCIES AND COORDINATION

The initiative is **jointly led by four UN bodies**, each handling a key pillar:

Pillar	Lead Agency	Focus Area
Disaster Risk Knowledge	UNDRR (United Nations Office for Disaster Risk Reduction)	Risk data collection, hazard mapping
Observation & Forecasting	WMO (World Meteorological Organization)	Climate and weather monitoring systems
Warning Dissemination & Communication	ITU (International Telecommunication Union)	Reliable communication networks and digital alert systems
Preparedness & Response Capacity	IFRC (International Federation of Red Cross and Red Crescent Societies)	Local action, community-based disaster response

GOALS AND TARGETS

- Achieve **100% global coverage by early warning systems** by **2027**.
- Strengthen the **climate resilience** of vulnerable communities.
- Improve **data sharing, forecasting, and communication infrastructure**.
- Integrate early warning systems into **national disaster risk management plans**.
- Bridge the **digital divide** in low-income countries through affordable alert mechanisms (SMS, radio, satellite, apps).

IMPLEMENTATION STRATEGY

- Coordinated under the **UN Early Warnings for All Executive Action Plan (2023–2027)**.

- Funded through partnerships among **UN agencies, donor countries, development banks, and private sector actors.**
- The **Green Climate Fund (GCF)** and **Climate Risk and Early Warning Systems (CREWS)** initiative support implementation.
- Around **30 priority countries**, including **Bangladesh, Madagascar, Fiji, and Haiti**, have been identified for the **first phase**.

INDIA'S RELEVANCE AND ROLE

- India's **IMD (India Meteorological Department)** already provides **multi-hazard early warnings** for cyclones, floods, and heatwaves.
- India is among the few developing countries with **100% coastal population coverage** for cyclone alerts.
- India's success in **Odisha's Cyclone Early Warning System** (e.g., *Cyclone Fani, Phailin*) is cited by the UN as a **global best practice**.
- India collaborates with **WMO and UNDRR** to extend early warning support to **Indian Ocean and South Asian countries** under the **Coalition for Disaster Resilient Infrastructure (CDRI)** and **BIMSTEC**.

CHALLENGES

- Lack of infrastructure and data-sharing mechanisms in low-income regions.
- Limited financial resources for maintaining forecasting systems.
- Language and communication barriers in disseminating alerts.
- Integration of **scientific forecasts** with **local-level responses** is still weak.
- Need for trained personnel and **public trust** in warnings.

SIGNIFICANCE

Aspect	Benefit
Climate Adaptation	Builds resilience against floods, droughts, cyclones, and heatwaves.
Disaster Risk Reduction	Minimizes deaths, injuries, and economic losses.
Sustainable Development Goals (SDGs)	Supports SDG 13 (Climate Action) and SDG 11 (Sustainable Cities).

Global Solidarity	Promotes cooperation among developed and developing nations.
Technological Leap	Encourages AI, satellite data, and digital infrastructure in forecasting.

RELATED GLOBAL INITIATIVES

- **Sendai Framework for Disaster Risk Reduction (2015–2030)** – aims to reduce global disaster risk.
- **Paris Agreement (2015)** – recognizes the role of adaptation and resilience.
- **Global Framework for Climate Services (GFCS)** – supports climate-informed decision-making.
- **CREWS Initiative** – launched at COP21 to fund least developed countries' early warning systems.

KEY DATA (FOR MAINS)

- Between **1970 and 2021**, 11,000+ disasters linked to weather and climate caused **over 2 million deaths**.
- **60% of deaths** occurred in developing countries **without effective warning systems**.
- The cost of establishing a global early warning network: **~US\$ 3 billion**, while annual global disaster losses exceed **US\$ 200 billion**.

Question 1:	The Early Warnings for All (EW4All) Initiative, recently seen in the news, is coordinated by which of the following organizations? 1. UNDRR 2. WMO 3. ITU 4. UNEP Select the correct answer using the code below:
Option A	1, 2 and 3 only
Option B	1, 2, 3 and 4
Option C	1 and 2 only
Option D	2 and 4 only
Solution:	Answer: (a)

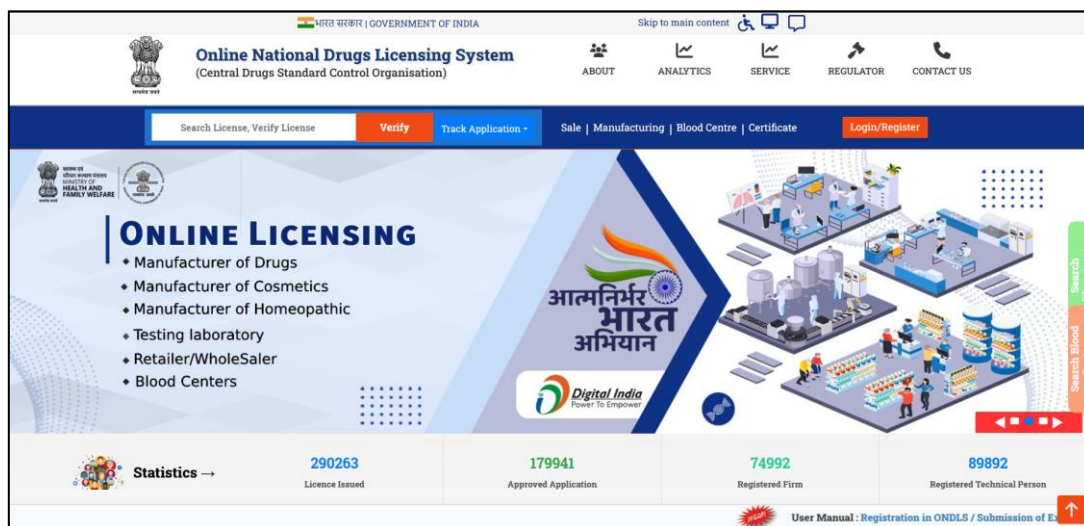
	Explanation: EW4All is jointly coordinated by UNDRR, WMO, ITU, and IFRC — not UNEP.
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Question 2:	With reference to the UN's Early Warnings for All (EW4All) Initiative, consider the following statements: 1. It aims to ensure that every person on Earth is protected by early warning systems by 2030. 2. The initiative is part of the Sendai Framework for Disaster Risk Reduction (2015–2030). 3. India is among the first countries to achieve 100% coastal population coverage under cyclone early warnings. Which of the statements given above are correct?
Option A	1 and 2 only
Option B	2 and 3 only
Option C	1 and 3 only
Option D	1, 2 and 3
Solution:	Answer: (b) Explanation: Target year is 2027 , not 2030. The initiative complements the Sendai Framework. India's coastal warning system is indeed a global model.

Question 3:	The EW4All initiative supports the achievement of which of the following Sustainable Development Goals (SDGs)?
Option A	SDG 6 (Clean Water and Sanitation)
Option B	SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action)
Option C	SDG 8 (Decent Work and Economic Growth)
Option D	(SDG 15 (Life on Land))
Solution:	Answer: (b)

36**ONLINE NATIONAL DRUGS LICENSING SYSTEM**

The Drugs Controller General of India (DCGI) has directed digital monitoring on the Online National Drugs Licensing System (ONDLS) for tracking the supply chain of high-risk solvents.

**ONLINE NATIONAL DRUGS LICENSING SYSTEM**

- ONDLS is a single-window digital platform in India for **processing drug- and cosmetic-related applications** for manufacturing and sales licences, and various certificates.
- It is developed by the **Centre for Development of Advanced Computing (CDAC)** in coordination with the **Central Drugs Standard Control Organisation (CDSCO)**.
- **Key Features:**
 - **Digital Tracking System:** The ONDLS portal now enables **real-time monitoring of solvent batches** used in drug manufacturing.
 - **Mandatory Registration:** All state drug regulators and pharmaceutical manufacturers must register on the portal.
 - **Batch-Wise Digital Record:** Every solvent batch must be digitally logged with details such as, Batch number, Quantity, Certificate of Analysis (CoA), Vendor or buyer information.
 - **Pre-Market Verification:** State regulators must ensure no batch is released until data has been uploaded and verified on the portal.

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INDIAN RAILWAYS DEPLOYS REAL-TIME HEAT-MAPPING AND CROWD CONTROL SYSTEM

With Chhath Puja witnessing one of the largest annual migration surges, the Indian Railways has introduced an AI-based real-time heat-mapping and crowd control system across 35 major stations.



ABOUT THE INITIATIVE

- **Technology Used:** Uses AI-enabled CCTV analytics, thermal sensors, and real-time data dashboards to detect crowd density and movement patterns.
- **Function:**
 - Generates heat maps of platforms and concourses showing congestion levels.
 - Enables automated alerts to station managers and Railway Protection Force (RPF) for quick crowd dispersal.
 - Integrates with Railway Helpline 139 and the Integrated Security System (ISS) for coordination.
- **Coverage:** Implemented at high-traffic stations such as Delhi, Patna, Varanasi, Lucknow, Kolkata, and Mumbai.

38**CASSAVA/TAPIOCA CROPS**

A tiny parasitic wasp, *Anagryus lopezi*, has been successfully used for biological control of the **invasive cassava mealybug** in **tapioca plantations**.

**CASSAVA / TAPIOCA CROPS**

- **Cassava** (*Manihot esculenta* Crantz) — also known as **Tapioca**, **Mandioca**, or **Yuca** — is a **tropical root crop** primarily grown for its **starchy tuberous roots**.
- It is a **major source of carbohydrates** and an important **food security crop** in tropical regions.
- Belongs to the **family Euphorbiaceae**.
- Origin: **South America (Brazil)**, later introduced to **Africa and Asia** by Portuguese traders.

IMPORTANCE AND USES

Use	Description
Food Source	Cassava roots and leaves are edible; roots provide carbohydrates, while leaves are rich in protein, vitamins, and minerals.
Industrial Use	Starch from cassava is used in textiles, paper, plywood, biofuel, and food processing industries.

Animal Feed	Dried chips and pellets used as livestock and poultry feed.
Biofuel Production	Cassava starch is used to produce ethanol , an emerging renewable energy source.

MAJOR PRODUCING COUNTRIES (2024 DATA)

Rank	Country	Share of Global Production
1	Nigeria	~20%
2	Thailand	~11%
3	Democratic Republic of Congo	~8%
4	Indonesia	~7%
5	Brazil	~6%

Africa produces about **65%** of global cassava, followed by **Asia (25%)** and **Latin America (10%)**.

CASSAVA IN INDIA

- Introduced by **Portuguese** in the **17th century**.
- Grown mainly in **southern India**, particularly:
 - **Kerala** (largest producer)
 - **Tamil Nadu**
 - **Andhra Pradesh**
 - **Assam** (minor cultivation)

PRODUCTION (2023–24 ESTIMATES):

- Area: **~250,000 hectares**
- Production: **~8–9 million tonnes**
- Productivity: **35–38 tonnes/ha** (one of the world's highest)

AGRO-CLIMATIC CONDITIONS

- **Temperature:** 25–35°C
- **Rainfall:** 1000–1500 mm annually

- **Soil:** Red lateritic, sandy loam, well-drained soil
- **Crop Duration:** 8–12 months
- **Propagation:** Through **stem cuttings**

ECONOMIC IMPORTANCE

- Cassava acts as a **subsistence and cash crop**.
- In India, tapioca starch supports:
 - **Sago industry** in **Tamil Nadu (Salem, Namakkal, Erode)**.
 - **Food industries** – chips, noodles, and bakery.
 - **Pharmaceutical and textile sectors** – starch thickener.
- India also **exports tapioca starch and chips** to **Sri Lanka, UAE, and Indonesia**.

GOVERNMENT SCHEMES & RESEARCH SUPPORT

Agency / Scheme	Role
Central Tuber Crops Research Institute (CTCRI) , Thiruvananthapuram	Premier ICAR institute for cassava research (since 1963).
National Mission on Sustainable Agriculture (NMSA)	Promotes cassava as a climate-resilient crop.
Mission for Integrated Development of Horticulture (MIDH)	Financial support for area expansion and post-harvest management.
Atmanirbhar Bharat Biofuel Push	Encourages ethanol production from non-sugar feedstocks like cassava.

ENVIRONMENTAL AND NUTRITIONAL ASPECTS

- **Drought-tolerant** crop, suitable for **climate-resilient agriculture**.
- Grows well on **marginal lands**, requiring less fertilizer.
- However, cassava roots contain **cyanogenic glycosides**, which can release **hydrogen cyanide (HCN)** if not processed properly — causing toxicity.
- **Proper processing (boiling, fermenting, drying)** removes toxins.

RECENT DEVELOPMENTS

- **Biofortified cassava varieties** are being developed to address **Vitamin A deficiency** in Africa and India.
- ICAR-CTCRI has developed **high-yielding, disease-resistant varieties** such as:
 - *Sree Vijaya* (early maturing)
 - *Sree Padmanabha* (high starch content)
 - *Sree Jaya* (drought-tolerant)
- **Genome editing and molecular breeding** under research to improve starch quality and pest resistance.

CHALLENGES

- Susceptible to **Cassava Mosaic Disease (CMD)** and **Cassava Bacterial Blight**.
- **Market price fluctuations** affect small farmers.
- **Lack of organized processing and marketing chains**.
- Competition from **maize and potato starch industries**.

GLOBAL RELEVANCE

- Recognized by **FAO** as a “**Future Food Crop**” for food security and biofuel potential.
- Cassava is part of the **UN’s Climate-Resilient Crops Programme (2023)** due to its adaptability to heat and drought.

Question 1:	Cassava (Tapioca), often mentioned in the context of food security and biofuel, belongs to which of the following plant families?
Option A	Fabaceae
Option B	Solanaceae
Option C	Euphorbiaceae
Option D	Asteraceae
Solution:	Answer: (c) Explanation: Cassava (<i>Manihot esculenta</i>) belongs to the Euphorbiaceae family.

Question 2:	With reference to the cultivation of Cassava in India, consider the following statements: 1. It is a major crop in the states of Kerala and Tamil Nadu. 2. It requires high rainfall and fertile alluvial soils. 3. It can be used for ethanol production. Which of the statements given above is/are correct?
Option A	1 only
Option B	1 and 3 only
Option C	2 and 3 only
Option D	(d) 1, 2 and 3
Solution:	Answer: (b) Explanation: Cassava prefers well-drained red or sandy loam soils, not necessarily fertile alluvial soils. It is used in bioethanol production.

Question 3:	The Central Tuber Crops Research Institute (CTCRI), which focuses on cassava and yam research, is located in:
Option A	Bengaluru
Option B	Thiruvananthapuram
Option C	Bhubaneswar
Option D	(Coimbatore)
Solution:	Answer: (b)

Question 4:	Which of the following are potential advantages of Cassava cultivation in India? 1. High starch yield per hectare. 2. Tolerance to drought and poor soils. 3. Suitability for ethanol production. 4. High nitrogen fixation ability. Select the correct answer using the code below:
Option A	1, 2 and 3 only

Option B	1, 2 and 4 only
Option C	2 and 3 only
Option D	1, 2, 3 and 4
Solution:	Answer: (a) Explanation: Cassava does not fix nitrogen; it is not a leguminous crop.



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5TH EDITION OF “AN EYE ON METHANE: FROM MEASUREMENT TO MOMENTUM”

The UN Environment Programme (UNEP) has released the fifth edition of its flagship publication — **“An Eye on Methane: From Measurement to Momentum”**, prepared by the **International Methane Emissions Observatory (IMEO)**.



KEY HIGHLIGHTS OF THE 2025 REPORT

- Methane emissions from energy, agriculture, and waste sectors remain high, despite available cost-effective mitigation technologies.
- Methane has **80 times more warming potential than CO₂ over 20 years**.
- Approximately **60% of current methane emissions** originate from human activities, with the largest contributors being agriculture, fossil fuel extraction and use, and landfill waste.
- The report calls for integrating methane data into **national climate strategies (NDCs)** and global stocktake under the **Paris Agreement**.
- The report highlights India's effective role in the **Global Methane Pledge (GMP)** and its efforts through **SATAT, National Biogas Mission, and waste-to-energy projects**.

40**GOVT. NOTIFIES AMENDMENTS TO IT RULES, 2021
TO REGULATE AI-GENERATED CONTENT**

The Ministry of Electronics and Information Technology (MeitY) has proposed amendments to the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021 under powers granted by the Information Technology Act, 2000.

ABOUT

A new amendment to the IT Rules, 2021 aimed at:

- Strengthening online content regulation and transparency in takedown procedures;
- Tackling AI-generated and synthetic media (deepfakes); and
- Ensuring that government orders for content moderation are lawful, proportionate, and accountable.

KEY PROPOSED AMENDMENTS

- **Authorized Officers for Content Regulation:** Only Joint Secretary-rank officers (or equivalent in Central Government) and Director General of Police-rank officers (for states) can issue takedown requests.
 - This would prevent misuse of lower-level bureaucratic orders and ensure accountability.
- **Legal Justification:** Every takedown order must clearly cite:
 - Statutory basis (specific provision under IT Act or related laws);
 - Precise URLs, posts, or content identifiers; and
 - Reasons for removal in writing.
 - Ensures decisions are traceable and subject to judicial review.
- **Review Mechanism:** All takedown actions will undergo a monthly review by a secretary-level officer to ensure legality, necessity, and proportionality.
 - This will enhance transparency and reduce arbitrary censorship.
- **Regulation of AI-Generated Content:** Introduces definition of “synthetically generated information” — any content (image, video, or audio) created or modified algorithmically to appear authentic.
 - Establishes legal clarity on what constitutes AI-manipulated media.

- **Labelling of Deepfakes:** Platforms must embed visible labels or metadata on AI-generated visuals and audios, covering at least 10% of the frame area or duration.
- **Platform Accountability:** Significant Social Media Intermediaries (SSMIs) — such as Facebook, Instagram, X, and YouTube — must:
 - Obtain user declaration while uploading potentially AI-altered content.
 - Use automated detection tools to identify and tag deepfakes or synthetic media.
- **Due Diligence Obligations:** Non-compliance with these norms will lead to loss of “safe harbour” protection under Section 79 of the IT Act, 2000.
 - Platforms can be held legally liable for unlawful or misleading content hosted.

SIGNIFICANCE

- Strengthens India’s digital governance framework and online safety ecosystem.
- Aligns with the government’s focus on tackling AI misuse, fake news, and deepfake threats.
- Reinforces trust and transparency in the digital space.

CONCERNS

- Risk of censorship and overreach by government-appointed fact-check bodies.
- Ambiguity in defining “fake” or “misleading” content.
- Challenges for smaller platforms in complying with technological requirements.

WAY FORWARD

- Need to ensure independent oversight in content moderation.
- Maintain a balance between freedom of speech and user protection.
- Encourage digital literacy and ethical AI use to complement regulatory measures.

41**ATLAS: THE RISE OF AI-POWERED BROWSERS**

OpenAI has launched its AI-powered browser Atlas, following Perplexity's release of Comet, marking a new phase in the generative AI competition.

ATLAS

- It is an AI-integrated browser designed around ChatGPT, without a traditional address bar.
- It features an Agent Mode that autonomously conducts searches for users.
- It is Available in preview for Plus, Pro, and Business users.
- It follows Perplexity's launch of its AI browser Comet, signaling a direct challenge to Google Chrome.

WHY AI COMPANIES ARE BUILDING BROWSERS

- Browsers are the primary gateway to online activities—search, shopping, banking, entertainment, and more.
- Controlling the browser interface allows companies to own user intent and data.
- Monetise traffic, similar to Google's ad model.
- Integrate AI into familiar user experiences.
- Launching AI browsers helps bridge the gap between chatbot interfaces and traditional web search.

HOW AI BROWSERS ARE CHANGING SEARCH

- Traditional search engines return multiple links; AI browsers offer direct, concise, and personalized answers.
- They also suggest related prompts, encouraging deeper exploration.
- This marks a shift in how users interact with the web, potentially reducing reliance on link-based navigation.

BROADER IMPLICATION

- The launch of AI browsers by OpenAI and Perplexity, combined with the rise of AI-generated search summaries, signals a paradigm shift in online discovery.
- As AI increasingly mediates how users access information, traditional web traffic models and publisher visibility are being disrupted—reshaping the future of search, content, and monetization.

42**INDIA MOVES UP TO 9TH POSITION GLOBALLY IN FOREST AREA**

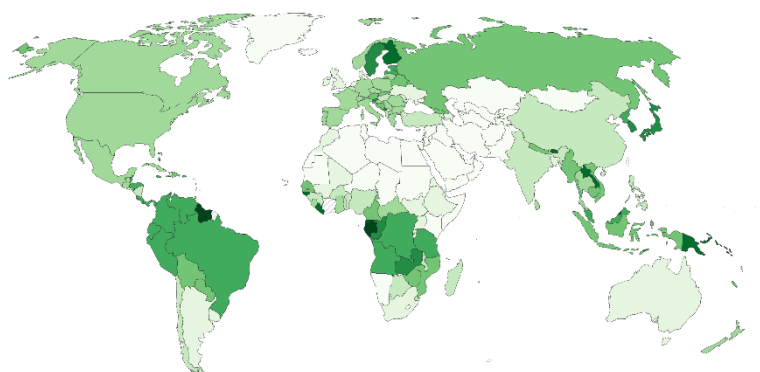
India has moved up to the **9th position** in terms of total forest area globally, as per the Global Forest Resources Assessment (GFRA) 2025, released by the **Food and Agriculture Organization (FAO)** in Bali. The GFRA is published **every five years**.

KEY FINDINGS

- Globally, forests cover **4.14 billion hectares**, accounting for about **32%** of total land area, translating to **0.5 hectares of forest per person**.
- **Russia** has the largest forest cover followed by **Brazil, Canada, the USA, China**, Congo, Australia, Indonesia, India and Peru.
- The report highlights that **global deforestation** has slowed in the past decade.
 - However, the world continues to lose **10.9 million hectares** of forest every year (**2015–2025**), a rate still considered alarmingly high.
- **India's Forest Cover Status:**
 - India's forest cover stands at **72.7 million hectares**, representing about **2%** of global forest area.
 - India has maintained its **third position** worldwide after **China and Russia** in terms of **annual forest gain**.
 - **India and Indonesia** together represent over **70%** of global agroforestry areas, indicating strong integration of trees in farmlands.

Share of land covered by forest, 2020

Forest area is land with natural or planted stands of trees at least five meters in height, whether productive or not, and excludes tree stands in agricultural production systems.



Source: Food and Agriculture Organization of the United Nations and historical sources
OurWorldInData.org/forests-and-deforestation • CC BY

SIGNIFICANCE OF INDIA'S ACHIEVEMENT

- **Climate Change Mitigation:** Expanding forest area enhances carbon sequestration, aiding **India's Nationally Determined Contributions (NDCs)** under the Paris Agreement.
- **Biodiversity Conservation:** Forests serve as habitats for a wide range of flora and fauna, supporting India's rich biodiversity.
- **Livelihood Support:** Over **275 million people** in India depend on forests for livelihood, making their sustainable management socio-economically crucial.
- **Land and Water Security:** Forests prevent soil erosion, regulate water cycles, and help maintain ecological balance in fragile ecosystems.
- **International Commitments:** Aligns with India's targets under the **UN Decade on Ecosystem Restoration (2021–2030)** and **SDG 15 (Life on Land)**.

GOVERNMENT INITIATIVES TOWARD FOREST CONSERVATION

- The **'Ek Ped Maa Ke Naam'** campaign has been instrumental in encouraging citizens to plant trees and enhance environmental consciousness.
- **National Mission for a Green India (GIM):** A mission under the National Action Plan on Climate Change (NAPCC) that aims to increase forest cover and improve existing forest quality to combat climate change.
- **Compensatory Afforestation Fund Act (2016):** An act that ensures funds for afforestation and related activities by requiring users of forest land for non-forest purposes to pay compensatory levies.
- **Eco-Sensitive Zones (ESZs):** Areas designated around Protected Areas (National Parks and Wildlife Sanctuaries) to act as a buffer and minimize the negative impact of certain human activities on fragile ecosystems.
- **Joint Forest Management (JFM):** A program that fosters partnerships between state forest departments and local communities to protect, and regenerate forest resources.

WHAT ARE THE CHALLENGES?

- **Development Projects:** Forest diversion for mining, roads, and urban expansion continues to threaten ecological stability.
- **Forest Degradation:** Over-extraction and encroachment affect forest health and connectivity.
- **Climate Extremes:** Rising temperatures and altered rainfall patterns affect forest regeneration and species composition.

- **Conservation and Livelihoods:** Ensuring local community welfare while maintaining conservation priorities remains a challenge.

CONCLUDING REMARKS

- India's progress in global forest rankings reaffirms the country's commitment to environmental sustainability and green growth.
- Continued focus on scientific forest management, local participation, and climate-resilient ecosystem restoration will be essential to sustain and enhance this momentum in the years ahead.

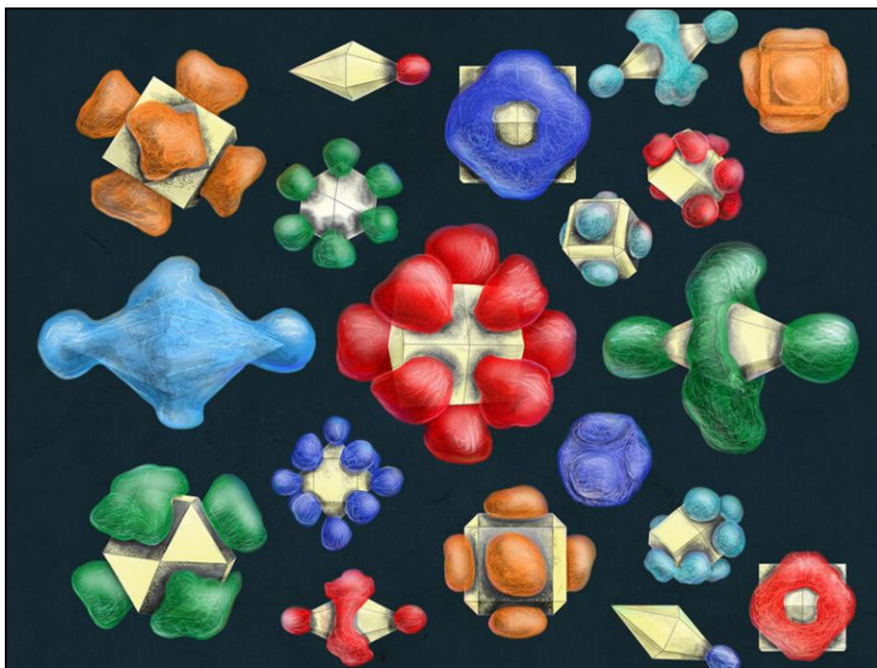


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SCIENTISTS USE 'ATOMIC STENCILS' TO MAKE DESIGNER NANOPARTICLES

Researchers have developed a method to precisely create patchy nanoparticles with atomic-level control called **atomic stenciling**.



ABOUT

- **Atomic Stencilling** allows scientists to selectively “paint” polymers onto gold nanoparticles to form distinct surface patterns.
- **Nanoparticles** are tiny particles, serving as the building blocks for revolutionary technologies in medicine, electronics, and energy.
 - However, to create truly complex and functional materials, **scientists need nanoparticles with different surface domains** that can guide how they connect together and organise particular patterns.
 - Creating these patchy nanoparticles with precision and in large quantities has been a major hurdle.
- Using the stencilling technique, the team successfully **created more than 20 types of patchy nanoparticles with unique patterns**.

SIGNIFICANCE

- This new level of control over nanoparticle design is a crucial step toward creating **metamaterials**, which are engineered materials with unique properties

not found in nature, such as the ability to manipulate light and sound in new ways.

- **The applications are vast**, potentially leading to advances in targeted drug delivery, ultra-efficient catalysts, next-generation electronics, and new classes of smart materials.

Question 1:	With reference to atomic stencilling in nanotechnology, consider the following statements: 1. It uses a sub-monolayer of mask atoms (e.g., iodide) on nanoparticle surfaces to control where other molecules can graft. 2. It was developed for top-down lithography of microchips rather than nanoparticles. 3. It allows nanoparticles to self-assemble into non-close-packed superlattices due to surface patch control. Which statements are correct?
Option A	1 only
Option B	1 and 3 only
Option C	2 and 3 only
Option D	1, 2 and 3
Solution:	Answer: (b) – Statements 1 and 3 are correct; statement 2 is incorrect because the method addresses nanoparticle (bottom-up) fabrication rather than traditional microchip lithography.

Question 2:	The recent technique of ‘atomic stencilling’ is important because:
Option A	It enables patterning of nanoparticle surfaces with atomic precision.
Option B	It only works for silver nanoparticles, not gold.
Option C	It eliminates the need for any polymer coatings.
Option D	It is a thermal etching process for bulk materials.
Solution:	Answer: (a)

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2025 SAKHAROV PRIZE

Two imprisoned journalists **Andrzej Poczobut** in **Belarus** and **Mzia Amaghlobeli** in **Georgia**—have won the **2025 Sakharov Prize**.



ABOUT THE PRIZE

- The **Sakharov Prize for Freedom of Thought** is the European Union's highest human rights award, established in **1988** and named after **Soviet dissident and Nobel Peace laureate Andrei Sakharov**.
- It honours individuals or groups defending **human rights and fundamental freedoms**.
- The final winner or winners of the Sakharov Prize are chosen by the **Conference of Presidents**, a European Parliament body led by the president, which includes the leaders of all the political groups represented in the Parliament, making the choice of laureates a truly European choice.
- The award carries an **endowment of €50,000** and is presented at the **European Parliament in Strasbourg** (France) each December.

DO YOU KNOW?

- Several Sakharov laureates, including **Nelson Mandela**, **Malala Yousafzai**, **Denis Mukwege**, and **Nadia Murad**, later went on to win the **Nobel Peace Prize**.

- Interestingly, **Venezuelan opposition leader María Corina Machado**, who won the 2025 Nobel Peace Prize earlier this month, received the **Sakharov Prize** last year.

Question 1:	With reference to the 2025 Sakharov Prize for Freedom of Thought, consider the following statements: 1. It was awarded to two imprisoned journalists, one from Belarus and one from Georgia. 2. The prize is awarded by the United Nations rather than a regional body. 3. It honours individuals and organisations defending human rights, freedom of expression and the rule of law. Which of the statements given above are correct?
Option A	1 and 3 only
Option B	2 and 3 only
Option C	1 and 2 only
Option D	1, 2 and 3
Solution:	Answer: (a) — Statements 1 and 3 are correct; Statement 2 is incorrect (the prize is awarded by the European Parliament, not the UN).

45**NET FDI INFLOW FELL BY 159%**

Net Foreign Direct Investment (FDI) into India fell 159% in August 2025, this is the **second time** this financial year that outflows have exceeded inflows.

**ABOUT**

- Gross investments into India stood at \$6,049 million in August 2025, 30.6% lower than their level in August last year.
- Net FDI in the April-August 2025 period was \$10,128 million, more than 121% higher than in the same period of last year.

NET FOREIGN DIRECT INVESTMENT

- **Net FDI** is gross FDI, which is the total money coming in, minus the money being repatriated out by foreign companies doing business in India and the outward FDI by Indian companies.
 - **Net FDI** = Gross FDI Inflows – (Repatriation by foreign firms + Outward FDI by Indian firms).
- **Key Components:**
 - **Gross FDI Inflows:** Total new investments made by foreign entities into the country. It includes setting up factories, acquiring local companies, or expanding operations.
 - **Repatriation & Disinvestment:** Profits or capital that foreign companies send back to their home countries. Includes sale of assets or shares in domestic firms.

- **Outward FDI:** Investments made by domestic companies in foreign countries (e.g., acquisitions, setting up subsidiaries).
- **Positive Net FDI:** Indicates more foreign investment is coming in than going out, often seen as a sign of economic attractiveness.
- **Low or Negative Net FDI:** May suggest capital is being withdrawn or domestic firms are investing more abroad than foreigners are investing locally.

WHY NET FDI MATTERS?

- **Indicator of Investor Confidence:** Positive net FDI shows foreign investors trust the country's economic and policy environment.
- **Source of Stable Capital:** FDI is long-term and less volatile than portfolio flows, helping maintain economic stability and balance of payments.
- **Boosts Production and Employment:** Brings capital, technology, and management expertise, enhancing manufacturing, productivity, and job creation.
- **Supports External Sector and Currency:** Improves foreign exchange reserves, strengthens the rupee, and helps finance the current account deficit.

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GALLANTRY AWARDS

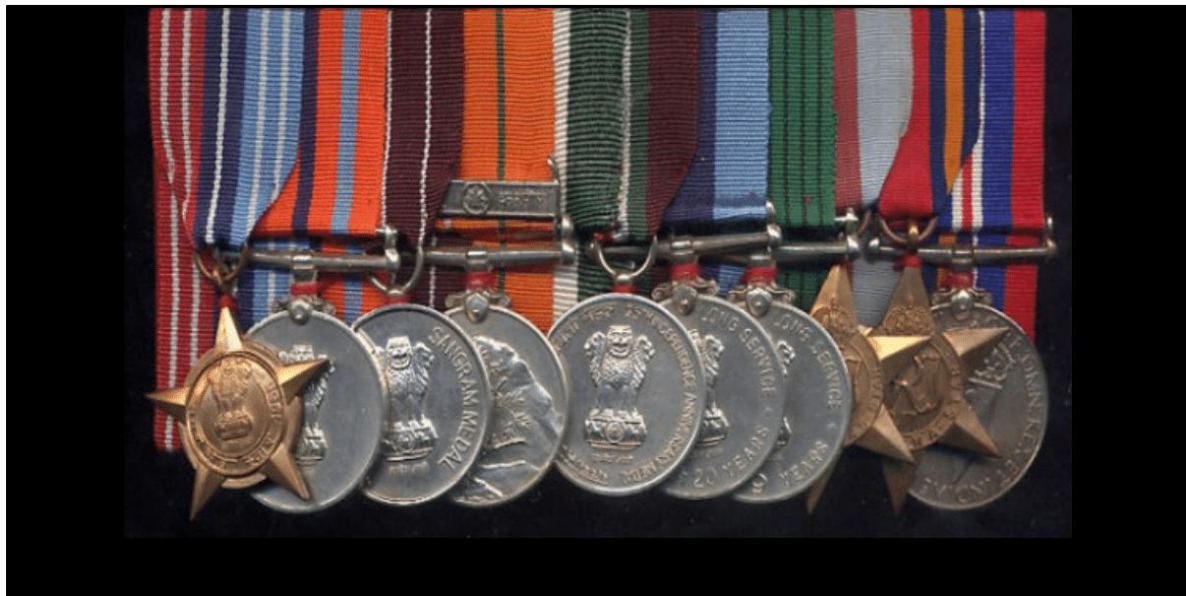
President Droupadi Murmu approved **127 Gallantry awards and 40 Distinguished Service awards to the Armed Forces.**



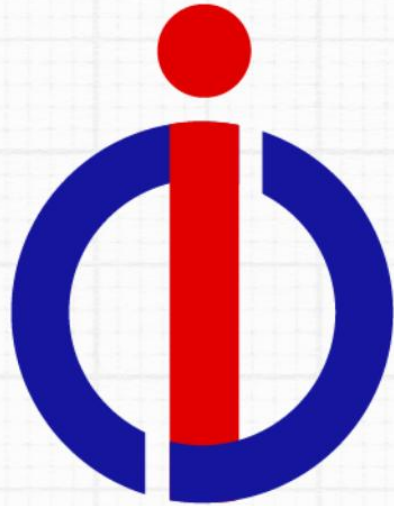
ABOUT GALLANTRY AWARDS

- **Gallantry Awards** are given by the Government of India to honour acts of bravery, sacrifice, and exceptional courage by **members of the armed forces, paramilitary forces, and civilians.**
- They are classified as **wartime (gallantry in the face of enemy) and peacetime awards.**
- **Administered by:** Ministry of Defence (for armed forces) and Ministry of Home Affairs (for police and civilians).
- **Awarded by:** President of India.
- These gallantry awards are **announced twice in a year** – first on the occasion of the Republic Day and then on the occasion of the Independence Day.
- **Wartime Gallantry Awards:** Param Vir Chakra (PVC), Mahavir Chakra (MVC) and Vir Chakra.
 - These were instituted on 26 January 1950, and were deemed to have effect from 15 August 1947, the date of India's independence.
- **Peacetime Gallantry Awards:** Ashok Chakra, Kirti Chakra, Shaurya Chakra.

- The Government instituted three more gallantry awards on 4 January 1952, also with retrospective effect from 15 August 1947.
- Originally, they were named as: Ashoka Chakra Class-I, Ashoka Chakra Class-II and Ashoka Chakra Class-III.
- **Order of Precedence:** Param Vir Chakra (PVC), Ashoka Chakra (AC), Maha Vir Chakra (MVC), Kirti Chakra (KC), Vir Chakra (VrC), Shaurya Chakra (SC).
- **All six awards can be conferred posthumously.**



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