Today's Prelims Topics

Antarctic Ozone Hole Recovery

Context

Antarctic ozone hole closed unusually early in 2025, signalling strong recovery signs.

- The Antarctic ozone hole refers to a **seasonal and pronounced depletion** of stratospheric ozone over Antarctica, typically occurring from **August to November** during the Southern Hemisphere spring.
- In **2025**, the ozone hole reached a **maximum size of just over 21 million sq km**, significantly smaller than the **record 29 million sq km observed in 2006**.
- **Stratospheric ozone**, located at about **10–40 km altitude**, acts as a protective shield by **absorbing harmful ultraviolet (UV) radiation** from the Sun.

About Ozone Layer

- A region of relatively high ozone (O_3) concentration located in the stratosphere, between **10–40 km above in the stratosphere.**
- Formed through **natural photochemical reactions** when UV radiation splits oxygen molecules (O_2) into atoms that recombine to form ozone.
- Functions as a **protective shield**, absorbing most of the Sun's **harmful ultraviolet-B (UV-B) and UV-C radiation.**
- **Causes of Ozone Depletion:**
  - **Release of Ozone-Depleting Substances (ODS):** Human-produced chemicals such as chlorofluorocarbons (CFCs), halons, carbon tetrachloride, methyl chloroform, HCFCs, and methyl bromide release chlorine and bromine atoms in the stratosphere, which catalytically destroy ozone molecules.
  - **Extreme Cold and Polar Stratospheric Clouds (PSCs):** Antarctica's very low winter temperatures form PSCs that convert inactive chlorine/bromine into highly reactive forms, accelerating ozone destruction.
  - **Return of Sunlight in Southern Hemisphere Spring:** When sunlight returns in August–September, it triggers photochemical reactions that release active chlorine radicals, causing rapid ozone depletion.
  - **Polar Vortex Isolation:** The strong Antarctic polar vortex traps cold air and prevents mixing with ozone-rich air from lower latitudes, intensifying the seasonal ozone hole.

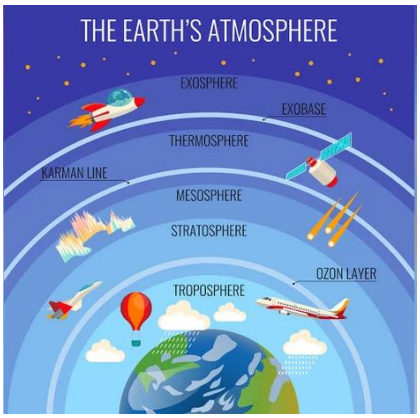
Source: DTE

Inhalable Microplastics

Context

A new multi-city study has identified inhalable microplastics (iMPs) as a new emerging air pollutant in Indian metropolitan markets.

What are Inhalable Microplastics (iMPs)?



- **Plastic particles smaller than 10 micrometres (µm)** that can enter the human respiratory system through inhalation.
- Much smaller than regular microplastics (less than 5 mm),

thus capable of **reaching deep lung tissues, alveoli, and even entering the bloodstream**.

- They originate from **synthetic clothing fibres (polyester), tyre wear, footwear erosion, packaging materials, and urban waste**.
- Due to their low density and aerodynamic properties, they **remain suspended in air for long periods**, increasing exposure risk.

Impacts of Inhalable Microplastics

- **Health Impacts:**
  - **Respiratory diseases:** Irritation, chronic inflammation, reduced lung function, increased asthma and COPD-like symptoms.
  - **Deep lung penetration:** Particles <2.5 µm interact with macrophages and reach alveoli; <1 µm particles cross into the bloodstream.
  - **Carriers of pathogens:** Found carrying fungi and bacteria like *Aspergillus fumigatus*, *Candida*, and antibiotic-resistant *Bacillus* species.
  - **Toxic chemicals exposure:** DEP (linked to hormonal imbalance, fertility issues), phthalates, and lead (damaging to brain, nerves, kidneys).
  - **Cancer risk:** Some identified polymers (PET, polyethylene, synthetic rubber) are associated with carcinogenic pathways.
  - **Systemic impacts:** Oxidative stress, immune suppression, reproductive and endocrine disruption.
- **Environmental Impacts:**
  - **Persistent pollutant:** Long atmospheric life; can travel across cities and deposit into rivers, soil, and oceans.
  - **Food chain contamination:** Airborne microplastics eventually enter water bodies and marine life, returning to humans via food and salt.
- **Urban Air Quality Impacts:**
  - **Constitute up to 5% of PM2.5 and PM10 load**, complicating traditional air pollution control strategies.
  - **Peak during winter inversion and crowded market hours**, increasing human exposure.

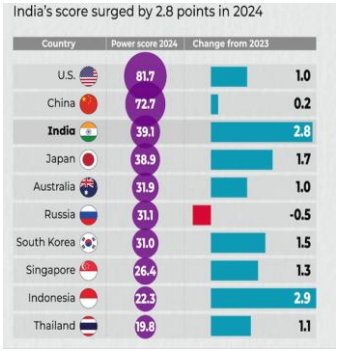
Source: DTE

Asia Power Index 2025

Context

India has secured the third rank in the Asia Power Index 2025.

About the Asia Power Index



- It is an **annual assessment** that gauges how effectively countries in Asia can **influence and respond to their external strategic environment, while mapping the region's power dynamics.**
- **Launched in 2018**, its **2025 edition marks the seventh release** of the index.
- It is **developed and published by the Lowy Institute**,(Australia).
- The index evaluates the **relative power of 27 countries and territories** across the Asian region.
- The eight thematic dimensions assessed are:
  - **Resources:** Economic Capability, Military Capability, Resilience, Future Resources
  - **Influences:** Diplomatic Influence, Economic Relationships, Defence Networks, Cultural Influence

Source: TOI

New GI Tag for Products from Tamil Nadu

Context

Some products from TN were accorded the GI tag recently.

1. Worayur Cotton Sarees	• Known for **thin borders, Korvai technique**, geometric motifs, and vibrant colour palettes (green, violet, vaadamalli, copper-brown). • Woven traditionally by the **Devanga community** with Chola-era heritage.
2. Thooyamalli Rice	• Native variety meaning **"pure jasmine"**, known as *pearl rice* due to its shine; rich in fibre and micronutrients.
3. Ambasamudram Wooden Toys (Choppu Samaan)	• Brightly coloured, **lacquered wooden toys** shaped like miniature kitchenware; eco-friendly, non-toxic, child-safe. • Made traditionally using woods like **kadamba, teak**, now rubberwood and eucalyptus; valued for artisans' craftsmanship.
4. Namakkal Soapstone Utensils.	• Known as **kalchatti** utensils, ideal for cooking acidic foods (tamarind, lime) as stone is corrosion-resistant. • • Highly durable, handmade stoneware used for **pickles, curd, milk**, lamps, idol making, dosa pans, and kitchenware.
5. Kavindapadi Nattu Sarkarai	• Hand-made traditional sugar with **golden-brown colour** and high sweetness; produced from cane fed by Bhavani river canals.

What is a GI Tag?

- It is a form of **intellectual property protection** for products that originate from a specific geographical region and possess qualities, reputation, or craftsmanship linked to that region.
- **Legal Framework:** Geographical Indications of Goods (Registration & Protection) Act, 1999.
- **Administered by:** Office of the Controller General of Patents, Designs & Trade Marks (CGPDTM), GoI.
- **Benefits of GI Tag:**
  - Ensures authenticity by preventing fake and unauthorized use of the product name.
  - Boosts marketability, exports, and premium pricing.
  - Supports traditional knowledge and rural/artisan livelihoods.

Related Facts

- With these additions, **Tamil Nadu's total number of GI-tagged products has increased to 74**.
- Tamil Nadu now holds the **second-highest number of GI products in India**, ranking just after **Uttar Pradesh**, which has **79 GI products**.

Source: HansIndia

Large Exposures Framework (LEF)

Context

RBI clarified that Indian branches of foreign banks must treat exposures to their head office and overseas

branches as normal counterparty exposures under LEF caps.

What is Large Exposures Framework (LEF)?

- It is an RBI rule that prevents banks from giving too much money or exposure to any single borrower or group of connected borrowers.
- Applies to **all scheduled commercial banks**, including **Indian banks and foreign banks operating in India**.
- Typically, a bank's exposure to a single borrower must **not exceed 20 % of its eligible capital base (Tier-1 capital),** though in some cases an additional 5 % cushion may be allowed.
- Exposure to a group of related borrowers (connected counterparties) must not exceed 25 % of capital base.
- LEF aligns with the **Basel Committee on Banking Supervision (BCBS) large exposure norms**, promoting uniform global prudential practices.

Source: Live Mint

Karahan Tepe

Context

New archaeological discoveries at Karahan Tepe have offered fresh insights into early Neolithic life.

About Karahan Tepe

- **Location:** Situated in the Southeastern Turkiye, within the Upper Mesopotamian region.
- **Age and Cultural Context:** Dates to the **Pre-Pottery Neolithic period (c. 9500–9000 BCE)**
- **Features:**
  - Also known as the **Sister site of Gobekli Tepe.**
  - Contains **T-shaped stone pillars**, similar to Göbekli Tepe.
  - Rich in **human-centred symbolism**, including stone figurines with stitched lips, carved faces, and symbolic objects.
  - Recent finds include a **serpentinite bead with expressive faces** carved on both sides.

Source: The Hindu

AstroSat

Context

The Indian Institute of Astrophysics (IIA) celebrated 10 years of successful operation of the UltraViolet Imaging Telescope (UVIT), the primary UV payload aboard AstroSat, India's first dedicated space observatory.

About Astrosat

- **Launched by**: ISRO
- **Launch Date**: 28 September 2015
- **Launch Vehicle**: PSLV-C30
- **Features:**
  - India's **first dedicated astronomy satellite**.
  - Provides **simultaneous multi-wavelength observations** of celestial objects.
  - Covers **X-ray, Ultraviolet (Near and Far), and limited optical ranges**.
  - Energy coverage: **0.3 keV to 100 keV**.
- **AstroSat has enabled major discoveries in:** Star formation and stellar evolution, Black hole and neutron star behaviour, Galaxy evolution and AGN studies, UV structures in nearby and

distant galaxies, Detection of high-energy cosmic events.

- **Payloads:**
  - **UVIT (Ultra-Violet Imaging Telescope)**: Far-UV, Near-UV, limited optical.
  - **LAXPC (Large Area X-ray Proportional Counter)**: High time resolution X-ray studies (3–80 keV).
  - **SXT (Soft X-ray Telescope)**: Imaging in 0.3–8 keV band.
  - **CZTI (Cadmium Zinc Telluride Imager)**: Hard X-ray spectroscopy (10–100 keV).
  - **SSM (Scanning Sky Monitor)**: Detects and monitors X-ray transients.

Source: DD News

Exercise Harimau-Shakti

Context

5th edition of Joint Military exercise "Exercise Harimau Shakti -2025" commenced in Rajasthan.

About Exercise Hatimau-Shakti

- **Type of Exercise:** A **bilateral joint military exercise** between the **Indian Army and the Malaysian Army**.
- **Started in:** 2012
- **Focus:** Jungle warfare and counter-insurgency operations.

Other Exercise between India and Malaysia

- Samudra Laksamana (bilateral maritime exercise), and Udara Shakti (bilateral air force exercise).

Source: PIB

Organisation for Security and Cooperation in Europe (OSCE)

Context

Ukraine wants "real peace, not appeasement" with Russia, its foreign minister said at the Organization for Security and Cooperation in Europe.

About OSCE

- **Headquarter:** Vienna
- **Member nations: 57 participating States** spanning **North America, Europe, and Asia**. (Note: **India is not a member**.)
- **Decision Making:** Organisation operates on the **basis of consensus-based decision-making.**
- **Governance Framework Includes:**
  - **Summits** as the highest decision-making authority
  - **Forum for Security Co-operation**, which handles the **politico-military aspects** of security
  - Additional bodies focused on human rights, economic cooperation, and conflict prevention.

Source: Reuters

Mahad Satyagraha

Context

Mahad became one of India's earliest human rights movements, shaping the ethical foundations of the Indian Constitution.

About Mahad Satyagraha

- Occurred in **Mahad** (present-day Raigad district, Maharashtra), then part of the **Bombay Presidency.**

Mahad Satyagraha 1.0 (March 19–20, 1927)

- Led by **Dr. B. R. Ambedkar**, supported by his followers (anuyayis).
- Asserted Dalits' right to draw water from the **Chavadar Tank** based on the **S. K. Bole Resolution (1923)** allowing untouchables access to public facilities.
- Despite rights granted, locals obstructed access; satyagrahis purchased water worth ₹40 to symbolically claim equality.
- Upper castes performed **purification rituals** afterward, reinforcing caste discrimination and triggering Ambedkar's next phase of agitation.

Mahad Satyagraha 2.0 (December 25–26, 1927)

- Held after courts issued a stay on Dalits' access, claiming the tank was private property.
- Ambedkar launched his journal **Bahishkrut Bharat** and addressed human rights, democratic values, and gender equality.
- At the conference, Ambedkar **burned the Manusmriti**, symbolically rejecting Brahmanical caste order.
- The event emphasised **women's rights**, marking early efforts to integrate gender into the struggle against caste oppression.

Source: The Hindu

Karthigai Festival

Context

The Karthigai Deepam festival celebration began in Tamil Nadu.

About Karthigai Festival

- It is a three-day festival celebrated in the Tamil month of **Karthigai** (November–December).
- It aligns with the **full moon (Pournami)** and is marked by the lighting of **clay oil lamps (agal vilakku)** to dispel negative forces.
- Dedicated to **Lord Karthikeya/Murugan**, symbolising light, valor, and protection.
- References to Karthigai Deepam appear in **Ahananuru**, a prominent work of **Sangam literature**.
- The revered Sangam-era poet **Avvaiyar** also mentions and celebrates the festival in her literary works.

Source: Indian Express

Food Irradiation

Context

The Ministry of Food Processing Industries (MoFPI) has invited proposals for setting up multi-product Food Irradiation Units under the ICCVAI component of the Pradhan Mantri Kisan Sampada Yojana (PMKSY).

What is Food Irradiation?

- Food irradiation is the **controlled exposure of food to ionising radiation** to destroy bacteria, insects, fungi, and parasites without making the food radioactive.
- It helps **extend shelf life**, prevent sprouting (potatoes, onions), and reduce microbial contamination in fruits, vegetables, spices, cereals, and pulses.
- Recognised as safe by global bodies such as **AMA, ADA, IFT**, and evaluated rigorously by national and international laboratories.
- Used in India for commodities like **mangoes, spices, potatoes, onions, cereals, pulses, oilseeds**, meeting quarantine and export norms.
- **Radiation Techniques Used in Food Irradiation:**
  - **Gamma Radiation:** Derived from **radioactive Cobalt-60** sources.
    - Deep penetration; suitable for bulk commodities (spices, grains, packed produce).

- **X-ray Irradiation:** Produced when high-energy electrons strike a heavy-metal target.
  - Offers high penetration similar to gamma rays.
  - Widely used in industrial and medical applications.
- **Electron Beam (E-Beam):** Uses high-energy electrons from an accelerator directed onto food.
  - Faster processing; ideal for surface treatment and thin products.
  - No radioactive source involved.

Source: PIB

Goldilocks period

Context

RBI's Monetary Policy Committee (MPC) has cut the repo rate by 25 bps to **5.25%**, completing **125 bps of rate cuts in 2025** amid sharp disinflation and strong growth.

- With inflation falling to **0.3%** and growth staying robust, Governor Malhotra called this India's "rare Goldilocks moment."

What is a Goldilocks Period?

- A *Goldilocks economy* refers to a macroeconomic phase where economic conditions are **"just right"**—neither too hot (high inflation) nor too cold (slow growth).
- It features **moderate, stable, and sustainable growth** alongside **low, controlled inflation**.
- The term is inspired by the children's story **"Goldilocks and the Three Bears"**, where Goldilocks finds the bowl of porridge that is "just right."
- Policymakers value this phase because it allows for **stable monetary policy**, supports investment, improves consumer confidence, and reduces the risk of overheating or recession.
- India's situation in 2025—**inflation below 2% and GDP growth above 8%**—fits this ideal macroeconomic description.

Source: Economic Times

Places in News

Thailand

News? Thailand seeks BRICS membership with India's support.

About Thailand

- **Located in: Southeast Asia**, forming part of the Indochinese Peninsula.
- **Capital:** Bangkok
- **Geography:**
  - Borders: **Myanmar** (West & Northwest), **Laos** (North & Northeast), **Cambodia** (Southeast), **Malaysia** (South)
  - Coastlines along the **Gulf of Thailand** (East) and **Andaman Sea** (West).
  - **Physiographic regions include:** Northern mountains, Central Plains (rice bowl of Thailand), Northeastern Korat Plateau, and Southern peninsula.
  - **Major rivers: Chao Phraya**, **Mekong** (forms part of boundary), **Mae Klong**.

Source: Wionews