

1. Aditya-L1 Mission: India's first dedicated space-based solar mission, has made a ground-breaking observation by capturing the first-ever image of a solar flare 'kernel' in the lower solar atmosphere (photosphere and chromosphere) using its **Solar Ultraviolet Imaging Telescope (SUIT)** in the **Near Ultra-Violet (NUV)** band.

• **About Aditya-L1 Mission:**

- **Launched:** September 2, 2023, by **ISRO PSLV C-57 rocket**.
- **Orbit Placement:** Successfully placed in a large halo orbit around the first Earth-Sun Lagrange Point (L1) on January 6, 2024.
- **L1 Point:** Located 1.5 million km from Earth towards the Sun, allowing continuous solar observations without eclipses or occultations.

• **Scientific Payloads:**

- SUIT (Solar Ultraviolet Imaging Telescope) –in collaboration with ISRO Centres. **Developed by IUCAA**
- SoLEXS (Solar Low Energy X-ray Spectrometer) and HELIOS (High Energy L1 Orbiting X-ray Spectrometer) – Developed by UR Rao Satellite Centre (URSC), Bengaluru.
- These payloads detect and analyze solar flares across NUV, soft X-ray, and hard X-ray wavelengths.

• **About Solar Ultraviolet Imaging Telescope (SUIT)**

- Captures high-resolution images in 11 different NUV wavebands (200-400 nm).
- Observes the full solar disk or a specific region based on scientific interest.
- Helps study multiple layers of the Sun's atmosphere, their coupling, and dynamics.
- Works with SoLEXS and HELIOS, which monitor solar X-ray emissions to detect solar flare activity.

• **What is a Solar Flare?**

- A sudden, intense burst of solar energy from the Solar atmosphere caused by the Sun's dynamic magnetic field.
- When the magnetic field lines snap, they release energy as light/radiation and high-energy charged particles.

2. **Ramsar Convention:** Meghalaya High Court recently took **suo motu public interest litigation** to monitor wetland conservation in the State.
- **February 2** is observed as **World Wetlands Day** to mark the adoption of the **Ramsar Convention (1971)**.
 - The **2023 theme** was '**Protecting Wetlands for Our Common Future**', aligning with sustainable development principles from the **Brundtland Report (1987)**.
 - **About Ramsar Convention:** International treaty for "conservation and sustainable use of wetlands", signed on 2nd February 1971 in Ramsar, Iran. 172 parties have ratified the convention.
 - **Core principle:** "Wise use" of wetlands (maintenance of ecological character within sustainable development).
 - **Need for the Convention:** Wetlands provide essential ecosystem services like freshwater supply, food, biodiversity conservation, flood control, and climate change mitigation.
 - 64% of the world's wetlands have disappeared in the last century.
 - **About Wetland:** Defined broadly under Ramsar Convention. Includes lakes, rivers, underground aquifers, swamps, marshes, peatlands, wet grasslands, estuaries, mangroves, tidal flats, coral reefs, reservoirs, rice paddies, salt pans, fishponds, and other human-made sites.
3. **Sufi Tradition:** Recently, Prime Minister has attended the 25th Anniversary of the Sufi Music Festival 'Jahan-E-Khusrau' at New Delhi.
- **About Sufism:** It is a mystical Islamic belief system emphasizing **spiritual closeness to God** through love and devotion. It played a significant role in fostering **Ganga-Jamuni culture**, a syncretic blend of Hindu and Muslim traditions.
 - **Qawwali**, devotional music, is an essential part of Sufi tradition.
 - **Dargahs** (shrines of Sufi saints) serve as cultural and spiritual centers.
 - **About Sufi Tradition:** It emphasizes love, devotion, and unity with God over ritualistic practices.
 - It promotes values like peace, tolerance, and universal brotherhood.
 - Notable Sufi saints include Khwaja Moinuddin Chishti, Nizamuddin Auliya, and Amir Khusrau.
 - **About Amir Khusrau:** Known as 'Tuti-yi-Hind' (Parrot of India), a key figure in North India's syncretic culture.

- He contributed to Indian classical music, qawwali, and the development of Hindavi (a precursor to Hindi and Urdu).
 - **Khusrau's Life and Patronage:** Became a professional poet at 20 and served five Sultans – Muizuddin Qaiqabad, Jalaluddin Khalji, Alauddin Khalji, Qutbuddin Mubarak Shah, and Ghiyasuddin Tughlaq. He wrote in Persian (the court language) and Hindavi.
 - **Disciple of Nizamuddin Auliya:** Khusrau was the most beloved disciple of Nizamuddin Auliya.
 - **Khusrau's Legacy:** His poetry combined Persian, Turkic, and local influences, fostering Ganga-Jamuni tehzeeb.
4. **Foreign Portfolio Investment (FPI):** BSE Sensex fell more than 1.9% on February 28, marking a continued decline since February 4.
- **Key Reasons behind the Market Fall:** High stock valuations and economic slowdown led to a **foreign portfolio investor (FPI) outflow**. Not due to trade tariffs imposed by the Donald Trump administration.
 - **About:** Foreign Portfolio Investment (FPI) allows investors to invest in overseas economies through securities and financial assets.
 - Includes stocks, American Depositary Receipts (ADRs), bonds, debt instruments, and mutual funds or ETFs investing abroad.
 - Part of a country's capital account and recorded in its Balance of Payments (BOP).
 - Highly liquid, but subject to market volatility.
 - **About Foreign Portfolio Investors (FPIs):** FPIs pulling out funds is more linked to investor mood swings than fundamental economic issues.
 - Small- and mid-cap markets were overvalued, leading to a natural correction.
 - Multinational company (MNC) promoters have also exited due to high valuation levels.
 - Not solely due to external factors like tariff threats, but also domestic economic conditions.
5. **Golden Visas:** US President has recently announced a new pathway for foreign investors to obtain permanent residency in the United States, termed the **"Gold Card"**.
- **About Golden Visas:** A residence-by-investment program that grants residency rights in exchange for a significant financial contribution to the host country.
 - **Types: Golden Visa - Grants residence rights & Golden Passport (Citizenship by Investment) - Provides full citizenship rights.**

- **Advantages of Golden Visas:**

- **For Individuals:** Insurance against economic and political risk & Enhances global mobility and access to favorable jurisdictions.
- **For Host Nations:** Generates revenue through investment in real estate, bonds, and businesses, and helps countries revive struggling economies (e.g., Saint Kitts & Nevis in 1984, Portugal post-2008 financial crisis).
- **Countries Offering Golden Visas:** Over 100 countries, including - EU nations (Portugal, Spain, Greece, Malta) & Others (Australia, Canada, Italy, UK, Caribbean nations)

6. **Raman Effect:** February 28 is observed as **National Science Day** in India to commemorate the discovery of the **Raman Effect** by **Sir C.V. Raman** in **1928**.

- This discovery won him the **Nobel Prize in Physics (1930)**, making him the only Indian scientist to win a science Nobel while working in India.
- **National Science Day** was designated by the Government of India in **1986** and first celebrated in **1987** to highlight the importance of science and its applications.
- **Theme for 2025:** 'Empowering Indian Youth for Global Leadership in Science & Innovation for Viksit Bharat'.
- **About Raman Effect:** When light strikes a material, it interacts with its molecules and exchanges energy.
 - The scattered light contains a portion with a different wavelength and thus a different colour.
- **Example:** The blue colour of oceans is due to the scattering of sunlight by water molecules.
 - The blue colour of the sky is due to the scattering of sunlight by air molecules.
- **Applications of the Raman Effect:** It helps determine the structure of substances (solid, liquid, or gas) without breaking them apart. The discovery became widely useful with the advent of lasers in the 1960s.
- **Key applications:**
 - **Forensic Science:** Rapid analysis of illegal drugs without breaking the evidence seal.
 - **Industrial Chemistry:** Monitoring paint drying to understand chemical reactions as it hardens.
 - **Nuclear Science:** Using fiber-optic probes to analyze nuclear waste materials safely.

7. **Flash Floods:** A cloudburst and heavy rainfall triggered flash floods in Kangra district, Himachal Pradesh, severely affecting Luwai village in Chhota Bhanghal valley.
- **About Flash Floods:** Sudden and rapid floods occurring within hours of heavy rainfall or intense water accumulation.
 - **US National Weather Service:** Flash floods happen when rainfall causes flooding in less than 6 hours.
 - Marked by a **swift rise in water levels** in rivers, streams, or urban areas **with little warning**.
 - **Factors Responsible:** Heavy rain is the primary cause → Dam or levee failures → Ice or debris jams → Sudden release of water from glacial lakes or reservoirs.
 - In India, flash floods are often linked to cloudbursts (intense rainfall in a short period).
 - **Influencing factors:** Rainfall intensity & duration → Steep terrain & soil nature → Man-made structures impeding water flow.
8. **Soil Health: Experts at the Anil Agarwal Dialogue 2025 in Nimli, Rajasthan warned about the deteriorating health of India's soils and its grave consequences.**
- **About Soil Erosion in India:** Indian soil is highly vulnerable.
 - **Erosion Rate:** 20 tonnes per hectare per year (India) vs 2.4 tonnes per hectare per year (Global average).
 - Degraded lands lose natural resilience, making recovery difficult.
 - **Impact on Human Health:** Scientific research links soil health to human health.
 - Soil degradation leads to nutrient loss, causing malnutrition.
 - **August 2023 US study (Scientific Reports):**
 - Low soil zinc availability → Higher stunting & underweight cases.
 - Low soil iron availability → Increased anaemia cases.
 - **Climate Change & Soil Degradation:** Accelerating soil loss through increased rainfall & acidity.
 - Acidic soil area expected to rise by 40 million hectares.
 - Resilience of soil is declining.
 - **Need for Global Recognition:** Soil should be treated as a global common, like air, ocean, and biodiversity.
 - **State-wise Soil Vulnerability:** Nine of the 20 most erosion-prone districts are in Assam.