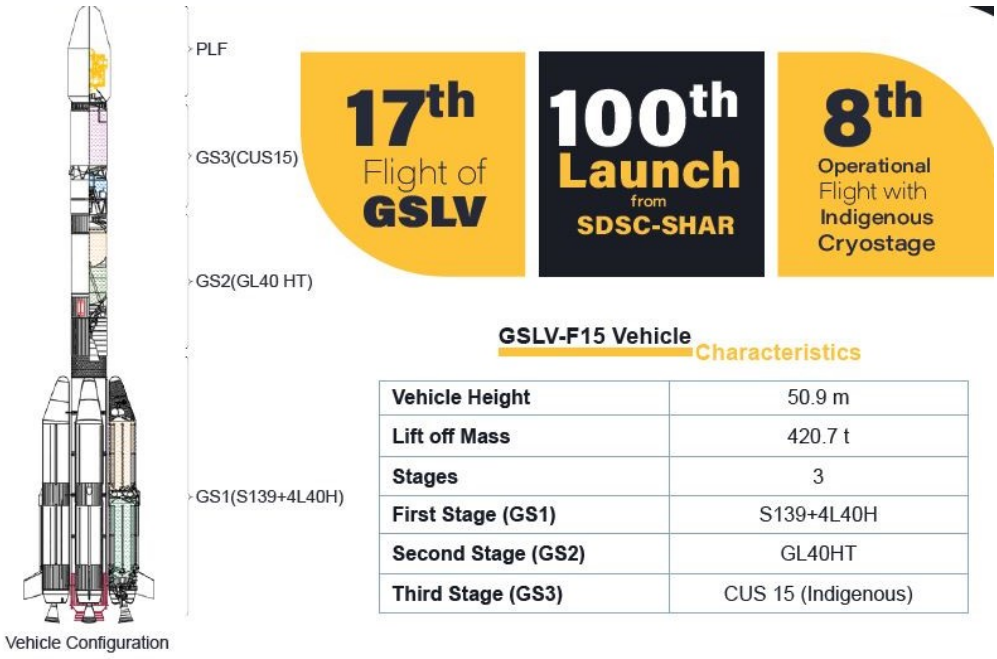
# UPSC Daily Current Affairs| Prelim Bits 25-01-2025

## GSLV-F15 NVS-02 Mission

### Why in News?

*GSLV-F15 NVS-02 mission is the 100th launch from the Satish Dhawan Space Centre in Sriharikota, scheduled for January 29.*

- **GSLV-F15 NVS-02** – Geosynchronous Satellite Launch Vehicle (GSLV)- F15/ Navigation with Indian Constellation-2 Satellite (NVS-2).
- **GSLV-F15** – **17th flight** of India's Geosynchronous Satellite Launch Vehicle (GSLV).
  - **11th flight with** – Indigenous Cryo stage.
  - **8th operational flight with** – Indigenous Cryogenic stage.
- **Payload** – Its fairing is a metallic version with a diameter of 3.4 meters.
- It will place NVS-02 satellite into a ***Geosynchronous Transfer Orbit (GTO)***.

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|---|---|
| **Vehicle Height** | 50.9 m |
| **Lift off Mass** | 420.7 t |
| **Stages** | 3 |
| **First Stage (GS1)** | S139+4L40H |
| **Second Stage (GS2)** | GL40HT |
| **Third Stage (GS3)** | CUS 15 (Indigenous) |

Vehicle Configuration

- **NVS-02 satellite** – It is the *2nd satellite* in the NVS series.
- **Navigation with Indian Constellation (NavIC)** – *NVS-02 satellite is part of NavIC*.
- It is India's independent regional navigation satellite system designed to provide accurate Position, Velocity and Timing (PVT) service to users in India.
- It *extends to region of about 1500 km beyond Indian land mass*.
- **U.R. Satellite Centre (URSC)** – *NVS-02* was designed, developed and integrated at the *U.R. Satellite Centre (URSC)* with the support of other satellite-based work centres.
- **Navigation Payloads** – It operates in L1, L5, and S bands and employs ***Tri-band***

***antenna***.

- **Rubidium Atomic Frequency Standard (RAFS)** – Is the main component of the navigation payload.
- RAFS is an ***atomic clock*** which acts as a stable frequency reference for the navigation payload.
- **Ranging Payloads** – It consists of ***C-band (CxC) transponder*** used for 2-way Code Division Multiple Access (CDMA) ranging to facilitate precise orbit determination.

> ***Code-Division Multiple Access (CDMA)*** *is a digital cellular technology that uses spread spectrum techniques to allow multiple users to share the same frequency band simultaneously.*

- **Lift off mass** – 2,250 kg.
- **Power handling capability** – Approximately 3 kW.
- **Usage** – A combination of indigenous and procured atomic clocks for precise time estimation.

**References**


1. The Hindu| 100th Launch from Satish Dhawan Space Centre
2. ISRO| GSLV-F15 NVS-02 Mission


## Tamilnadu Iron Age

### Why in News?

A groundbreaking study reveals that Tamil Nadu's Iron Age began as early as ***3,345 BCE***, predating the Hittite Empire's iron usage by a millennium.

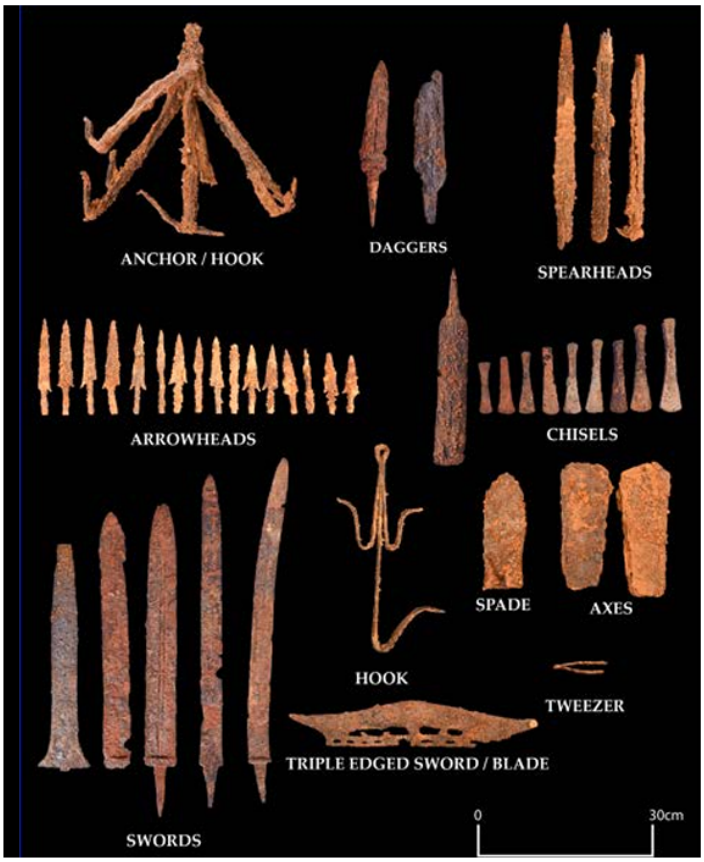
- **Sivagalai** -It is an Iron Age habitation-cum-burial site in the Thamirabarani river valley in Thoothukudi district.


- **Sivagalai excavation** - A total of 24 trenches were excavated at these sites, which exposed around 160 urns, a majority of them being redware
- **Findings** - Skeletal remains, paddy grains, over 85 iron objects including knives, arrowheads, chisels, axes, rings, and swords, were found at the site.

- **Radiometric dating** - The samples from Sivagalai were analyzed by three prestigious research institutions
    - Beta Analytics in the United States
    - Physical Research Laboratory in Ahmedabad
    - Birbal Sahni Institute of Palaeosciences in Lucknow.
- **Advanced dating techniques** - The samples from Sivagalai, however, were subjected to advanced dating techniques
    - Accelerometer mass spectrometry radiocarbon (AMS14C) dating for charcoal
    - Optically stimulated luminescence (OLS) dating for ceramics.

- **The Report** – Findings of the dating study were presented as 'Antiquity of Iron: Recent Radiometric Dates from Tamil Nadu', authored by K Rajan and R Sivanantham.
- **Findings** - Radiometric dating of burial urn samples from Sivagalai indicate a thriving Iron Age civilization in southern India in 4th millennium BCE, contemporaneous with copper civilization of  Indus Valley.
- While the regions to the north of the Vindhyas were still in the Copper Age, southern India may have entered the Iron Age due to a lack of commercially exploitable copper ores.
- **Adichanallur charcoal** - Adichanallur in Thoothukudi district, of Tamilnadu produced a charcoal sample associated with iron objects that was dated to 2517 BCE.
- **First smelted iron** - For the first time in the world, smelted iron has been dated back to the middle of the third millennium BCE.
- **Hittite Empire (in modern-day Turkey)**- This was believed to be the first civilization to use iron, with evidence dating back to around 1,380 BCE.
- **Other Iron regions of India** - Brahmagiri in Karnataka and Gachibowli near Hyderabad, were dated to around 2140 BCE and 2200 BCE, respectively.

**Adichanallur Iron Objects**




**References**

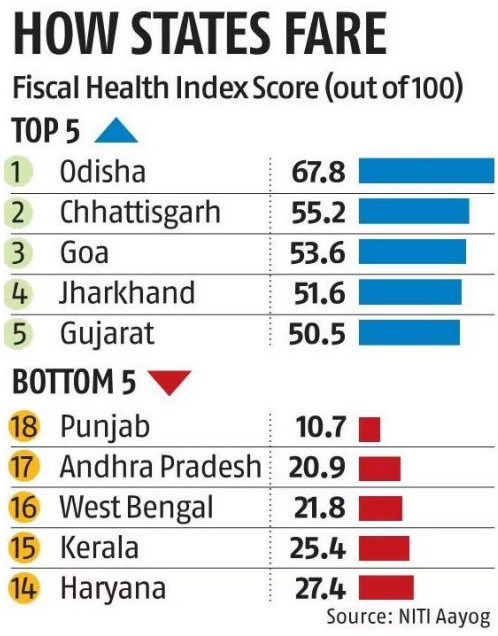

1. The Economic Times | Did the Iron Age actually begin in Tamil Nadu?
2. The Indian Express | Tamilnadu Iron Age
3. The Hindu | Sivagalai sheds light on iron's antiquity in Tamil landscape


## Fiscal Health Index (FHI), 2025

### Why in news?

*The Fiscal Health Index (FHI) was recently released by Niti aayog that provides a comprehensive assessment of the fiscal health of 18 major States.*

- **Aim** – To throw light on the fiscal status at the sub-national level and guide policy reforms for sustainable and resilient economic growth.
- **Fiscal Health Index 2025** – Is *first of kind in India*, a comprehensive assessment with insights into state-specific challenges and areas for improvement.
- **Five key sub-indices** – The index is based on 5 key sub-indices that include *Quality of Expenditure, Revenue Mobilisation, Fiscal Prudence, Debt Index, and Debt Sustainability*.
- **Launched by** – Niti Aayog.
- **18 major States** – The index assess the fiscal health of the only 18 major states.
- **Comptroller and Auditor General (CAG)** – The report uses the data from CAG.
- **Odisha** – With a cumulative *score of 67.8*, Odisha tops the ranking in fiscal health among 18 major States, *followed by Chhattisgarh and Goa* with scores of 55.2 and 53.6, respectively.
- Odisha tops the Debt Index (99.0) and Debt Sustainability (64.0) rankings with better than average scores under Quality of Expenditure and Revenue Mobilization.
- **Strong fiscal health** – The achiever States display strong fiscal health, excelling in revenue mobilization, expenditure management, and debt sustainability.
- **West Bengal and Punjab** – States like West Bengal and Punjab witnessed *growing debt burdens*, increasing debt-to-GDP ratios and raising serious concern about debt sustainability.




- **Significance** – FHI helps to promote more integrated approach to fiscal health and sustainable growth, with shared responsibility of both levels of government in achieving national prosperity.
- FHI offers a roadmap for achieving fiscal consolidation, improving transparency, and fostering effective resource management.
- FHI is not merely a ranking but *a tool designed to assess* and thereby improve the fiscal health of States.

- It provides *a framework to evaluate the financial well-being of state economies* through key fiscal indicators.

**References**


1. PIB| Launch of the Fiscal Health Index 2025
2. Business Standard| Fiscally Healthiest States


## India's Forests Fires

### Why in News?

*Recently, the data showed that in the past 5 fire seasons, over 11 lakh fires incidents reported in India.*

- **Ministry of Environment, Forest and Climate Change** – Mentioned that *4 states* have reported over *1 lakh forest fire incidents* each in the *last five forest fire seasons*.
- **4 States** – Odisha, Madhya Pradesh, Chhattisgarh and Maharashtra.
- They accounted for 4,73,834 forest fires, which constitutes approximately 43% of the total forest fire incidents in India.

> *India has reported a staggering 11,09,588 forest fires. Each year from November to June, forests across the country ignites, threatening ecosystems, wildlife and livelihoods.*

- **India State of Forest Report (ISFR) 2021** – Over 36% of the country's forest cover is estimated to be vulnerable to frequent forest fires.
  - **2.81%** - Extremely fire-prone.
  - **7.85%** - Very highly fire-prone category.
- **ISFR 2023** – Around 275 million rural people in India depend on forests for their livelihood security.
- Communities residing near forested areas rely heavily on forests for Non-Timber Forest Products (NTFPs).
- **Major Factors** – Collection of *tendu leaves and mahua flowers* contributing to forest fires.
- *Shifting cultivation practices* adopted by local farmers, where an estimated 4.35 million hectares (mha) of forest area is affected by fires.
- **Reasons for fires** – Unsustainable exploitation of forest resources and coupled with increasing human activities threat to the balance of forest ecosystems.
- **Impacts** – It leads to loss of:
  - Human lives
  - Depletion of biodiversity
  - Habitat destruction
  - Reduced agricultural productivity
  - Landscape degradation
  - Disruptions to local livelihoods

**Reference**

The Hindu Business Line| India's Forests Ablaze

## One Liners 25-01-2025

### History, Art and Culture

**76th Uttar Pradesh Foundation Day 2025**

• **Statehood Day** – *1950*, 24 January.
• **Historical background** – It is recognized in the later Vedic Age as *Brahmarshi Desha or Madhya Desha*.
• **1935** – Its name was shortened to *United Provinces*.
• **1950** – United Provinces was renamed as Uttar Pradesh.
• It is home to revered places such as,
  - Birthplace of Lord Ram in Ayodhya.
  - Lord Krishna in Mathura.
  - Holy city of Varanasi.
• It is a *"Holy Land"* in shaping India's history, mythological tales, and culture.

### Geography

**Uttar Pradesh**

• **Capital** – Lucknow.
• **Languages** – Hindi and Urdu.
• **Bordered by** – Uttarakhand and Himachal Pradesh in the north, Haryana in the west, Madhya Pradesh in the South and Bihar in the east.
• **Rivers** – Ganga, Yamuna, Gomti, Ram Ganga, Ghagra, Betwa, Ken.
• It is blessed with *fertile and mineral-rich soil*.

### Polity & Governance

**Mangrove Initiative for Shoreline Habitats and Tangible Incomes (MISHTI)**

• **Launched in** – 2023.
• **Aim** – *Restoration of mangrove forests* by undertaking mangrove reforestation/ afforestation measures along the coast of India.
• **Coverage** – 540 sq. km of mangroves across 9 coastal states and 4 Union territories.
• **Time period** – 2023-2028 (5-years).
• **Focused on** – Sundarbans delta, Hoogly Estuary in West Bengal and other wetlands.
• **Implementation** - Funding will be done from State CAMPA, National CAMPA &MGNREGA and also from other sources.
• **Mangrove Alliance for Climate** – "MISHTI" comes after India joined the Alliance.
• It was launched during the 27th Conference of Parties (COP27) of the United Nations Framework Convention on Climate Change held in Egypt in November 2022.

**Digital Tree Aadhaar programme**

• **Launched in** – 2021.
• **Launched by:**
  - Jammu and Kashmir Forest Department.
  - J&K Forest Research Institute (JKFI).
• **Objective** – To *conserve the iconic Chinar trees*, a symbol of the region's cultural and ecological heritage.
• It includes geo-tagging each tree with QR codes to record vital information, such as location, health and growth patterns.

**PM Suryaghar Muft Bijli Yojana.**

• **Launched in –** 2024.
• **Aim** – To *increase the share of solar rooftop capacity* and empower residential households to generate their own electricity.
• It is the *world's largest* residential rooftop solar initiative.
• **Time period** – Till 2026-27.
• **Implemented by** – A National programme Implementation Agency (NPIA) at the National level and by the State Implementation Agencies (SIAs) at the state level.
• **Working** – To provides for a subsidy of *60%* of the solar unit cost for systems up to *2kW capacity*.
• *40%* of additional system cost for systems between *2 to 3kW capacity*.

## Security

## Pralay

• **Pralay** – It is the *indigenous short-range* surface-to-surface quasi-ballistic missile.
• **Range** – Approximately *400 km.*
• It is the *1st ballistic missile in India* for conventional strikes.
• **Approved by** – Defence Acquisition Council (DAC).
• **Development by** – Research Centre Imarat, Hyderabad of DRDO
• **Capability** – To strike different types of targets using different types of warheads.
• **Deployment along** – Line of Control (LoC).
- Line of Actual Control (LAC).

## SANJAY - The Battlefield Surveillance System (BSS)

• **SANJAY** – It is an automated Battlefield Surveillance System (BSS) which integrates the inputs from all ground and aerial battlefield sensors.
• It produces a Common Surveillance Picture of the battlefield over secured Army Data Network & Satellite Communication Network.
• **Developed by** – Indian Army and Bharat Electronics Limited (BEL).
• **Applications -** Monitors vast land borders.
- Prevent intrusions.
- Assess situations with unparalleled accuracy.
- Prove to be a force multiplier in intelligence, surveillance & reconnaissance.

# Science

## International Solar Conference (ISC)

• **Conference on** – Sun, Space Weather and Solar-Stellar Connections.
• **Organised by** – Indian Institute of Astrophysics (IIA).
• **Purposes** – To commemorate the 125th anniversary of the *Kodaikanal Solar Observatory (KSO)*.
• **Themes** – Solar magnetism over long time scales.
- Solar magnetism in high resolution.
- Energetic phenomena.
- Solar-stellar connection.
- Heliosphere.
- Space weather.

## Kodaikanal Solar Observatory (KSO)

• **Established in** – 1899.
• **Location** – Palani hills, Tamil Nadu.
• **Operated by** – Indian Institute of Astrophysics.
• **Observation** – It houses a digital repository of *1.2 lakh digitized solar images and 1000s of other images of the Sun* recorded every day.
• It made understanding of sunspots, solar flares, coronal mass ejections and other solar phenomena.

## Artificial Sun

*Chinese scientists achieved a world record with artificial Sun.*
• **Artificial Sun** – It is a *mega nuclear fusion device*, which generates energy through a fusion process similar to that of the sun.
• **Aim** - To create *clean and sustainable energy* through a fusion process for global energy supply.
• **Conducted at** – Experimental Advanced Superconducting Tokamak (EAST).
• **Achievement** – Maintained plasma temperatures exceeding *100 million degrees Celsius for nearly 18 minutes.*

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