

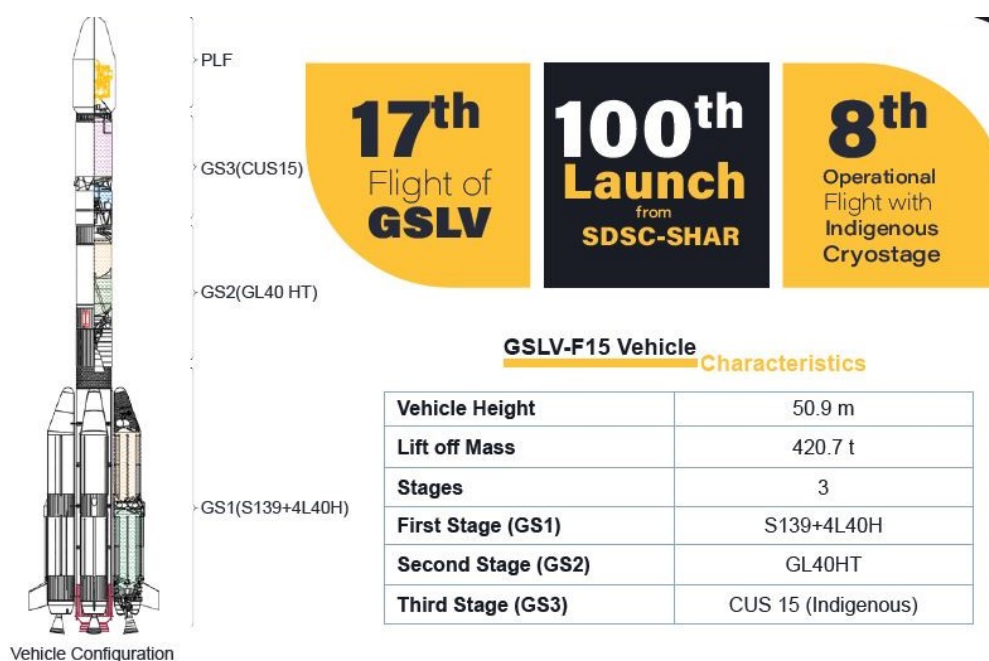
## UPSC Daily Current Affairs| Prelim Bits 25-01-2025

### GSLV-F15 NVS-02 Mission

#### Why in News?

GSLV-F15 NVS-02 mission is the 100<sup>th</sup> 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** - 17<sup>th</sup> flight of India's Geosynchronous Satellite Launch Vehicle (GSLV).
  - 11<sup>th</sup> flight with - Indigenous Cryo stage.
  - 8<sup>th</sup> 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)**.



- **NVS-02 satellite** - It is the 2<sup>nd</sup> 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| 100<sup>th</sup> 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.



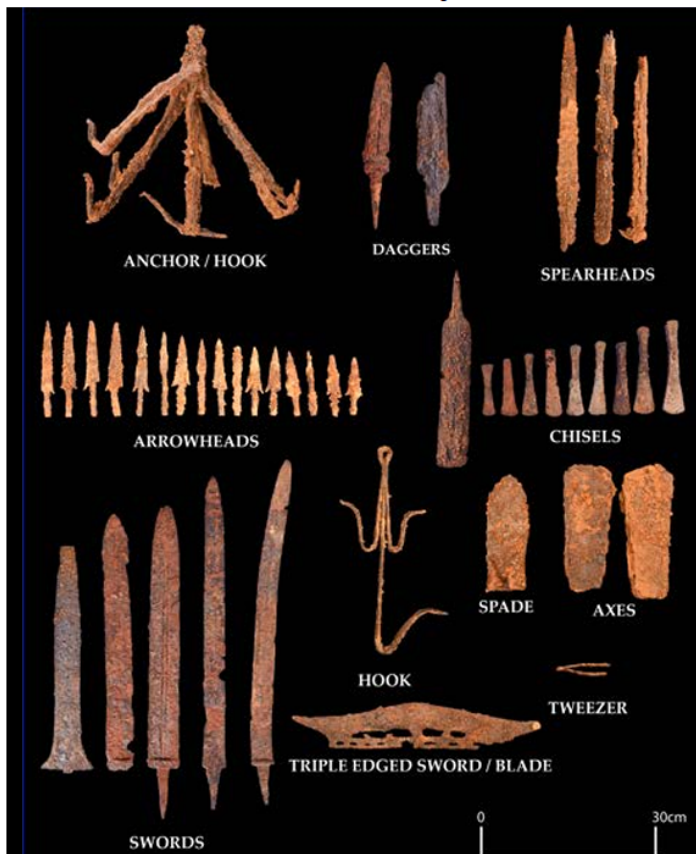
- **Sivagalai excavation** - A total of 24 trenches were excavated at these sites, which exposed around 160 urns, a majority of them being redware
- **Findings** - Skeletal remains, paddy grains, over 85 iron objects including knives, arrowheads, chisels, axes, rings, and swords, were found at the site.



- **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.

## HOW STATES FARE

Fiscal Health Index Score (out of 100)

### TOP 5 ▲

1	Odisha	67.8	<div></div>
2	Chhattisgarh	55.2	<div></div>
3	Goa	53.6	<div></div>
4	Jharkhand	51.6	<div></div>
5	Gujarat	50.5	<div></div>

### BOTTOM 5 ▼

18	Punjab	10.7	<div></div>
17	Andhra Pradesh	20.9	<div></div>
16	West Bengal	21.8	<div></div>
15	Kerala	25.4	<div></div>
14	Haryana	27.4	<div></div>

Source: NITI Aayog

- **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

##### **76<sup>th</sup> 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 Chinara 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 *1<sup>st</sup> 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 125<sup>th</sup> 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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*Information is Empowering*