

Today's Prelims Topics

NASA's PUNCH Mission and the Solar Cycle

Context

NASA's solar mission is scheduled for launch on March 6, 2025, from Vandenberg Space Force Base, California.

About NASA's PUNCH Mission

- **Polarimeter to Unify the Corona and Heliosphere (PUNCH)** is a **NASA solar mission** which aims to **study the Sun's outer atmosphere (corona) and its interaction with the solar wind**.
- Objectives of the PUNCH Mission:
 - Study the Sun's Corona: Observe the structure and dynamics of the Sun's outer atmosphere.
 - **Understand Solar Wind:** Track solar wind expansion and acceleration as it moves toward Earth.
 - **Analyze Coronal Mass Ejections (CMEs):** Provide real-time imaging of **solar storms** that can impact Earth's satellites and power grids.
 - Improve space weather forecasting.
- Satellite Constellation:
 - PUNCH consists of **four small identical satellites**, each **suitcase-sized**.
 - These satellites will work together to continuously image the solar corona and solar wind.
 - The satellites will be placed in a **sun-synchronous polar orbit** around Earth.
- Advanced Imaging Technology:
 - Wide-Field Imagers: Capture the Sun's corona and track solar winds as they move through space.
 - **Polarization Measurements:** Help understand the magnetic structure of solar wind.

What is the Solar Cycle?

- The solar cycle is an 11-year cycle of the sun's magnetic field and activity.
- During this cycle, the number of sunspots on the sun's surface changes from a minimum to a maximum and back again.
- How Solar cycle works ?
 - The Sun has a magnetic field with north and south poles, similar to a bar magnet.
 - This field is generated by the movement of electrically charged particles within the Sun.
 - Approximately every 11 years, the Sun's magnetic poles switch places, marking the start of a new solar cycle.
- Role of Sunspots in Tracking the Solar Cycle:
 - Sunspots are dark, cooler regions on the Sun's surface where the magnetic field is particularly strong.
 - Scientists track the solar cycle by counting the number of sunspots:
 - More sunspots = Solar Maximum
 - Fewer sunspots = Solar Minimum



Phases of the Solar Cycle

- Solar Maximum:
 - Occurs when the **Sun is most active**.
 - The magnetic field flips during this phase.
 - The Sun releases intense bursts of radiation and particles into space.
 - There is an increase in solar flares and coronal mass ejections (CMEs).
- Solar Minimum:
 - The least active phase of the Sun.
 - Sunspots, flares, and eruptions decrease significantly.

Why Are More Solar Missions Being Launched Now?

- Current solar observations suggest that the **Sun is nearing its solar maximum**, although official confirmation is awaited.
- NOAA (National Oceanic and Atmospheric Administration) reports that solar activity has been above normal since May 2022 and continues to remain high in 2024.
- The next intense solar activity will not occur until 2035-2036, making this the best window for launching solar missions.

Source:

• Indian Express - Solar Maximum





Pradhan Mantri Shram Yogi Maandhan Yojana

Context

The budget allocation for the PM Shram Yogi Maandhan Yojana in 2025-26 has increased by 37% compared to the previous year.

About Pradhan Mantri Shram Yogi Maandhan Yojana (PM-SYM)

- It is a **voluntary and contributory pension scheme** launched by the **Government of India** in 2019 to provide **social security** to workers in the **unorganised sector**.
- It is a **Central Sector Scheme**.
- Nodal Ministry: Union Ministry of Labour & Employment.
- Pension Fund Manager: Life Insurance Corporation of India (LIC)
- Current Status of implementation:
 - o Coverage: 36 States/UTs
 - Enrollments: ~46,12,330 (March 2025)
 - **Top 3 States:** Haryana, Uttar Pradesh, Maharashtra.

Key Features of PM-SYM

- Pension Benefits:
 - Minimum assured pension of ₹3,000 per month after 60 years.
 - Family pension: Spouse receives 50% of pension in case of subscriber's death.
 - Family pension is applicable only to spouse.
- Voluntary & Flexible Contribution:
 - Workers contribute a **fixed monthly amount**, matched by the government.
 - The monthly contribution varies based on the enrolment age.
- Eligibility Criteria: To enroll in PM-SYM, individuals must meet the following criteria:
 - Age Limit: 18 to 40 years.
 - Income Limit: Monthly income ≤ ₹15,000.
 - Employment in Unorganised Sector: Includes street vendors, daily wage laborers, construction workers, beedi workers, domestic workers, fishermen, artisans, leather workers, etc.
- Exclusion Criteria: He/She

×	Should	not	be	covered	under	EPF,	ESIC,	or	NPS.
×	Shou	ld	not	be	an	ir	ncome	ta	xpayer.
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UPSC PYQ

Q. With reference to the Pradhan Mantri Shram Yogi Maan-dhan (PM-SYM) Yojana, consider the following statements: **(2024)**

- 1. The entry age group for enrolment in the scheme is 21 to 40 years.
- 2. Age specific contribution shall be made by the beneficiary.
- 3. Each subscriber under the scheme shall receive a minimum pension of ₹3,000 per month after attaining the age of 60 years.
- 4. Family pension is applicable to the spouse and unmarried daughters.

Which of the statements given above is/are correct?

- (a) 1, 3 and 4
- (b) 2 and 3 only
- (c) 2 only
- (d) 1, 2 and 4

Answer: B

Source:

• PIB - PMSYM



Supreme Court's Directive on Forest Identification and Protection

Context

The Supreme Court has ordered all **States and Union Territories** to complete the **identification of forests** in their jurisdiction **in letter and spirit**.

Key Highlights of the Supreme Court's Order

- The Supreme Court has warned that **Chief Secretaries of States** and **Administrators of Union Territories** will be held **personally liable** if they fail to constitute **expert committees** to identify **forests** in their jurisdiction within a **month**.
- Additionally, the court has mandated the preparation of **consolidated records** of these lands within the **next six months**.

Non-Compliance with the Van (Sanrakshan Evam Samvardhan) Adhiniyam Rules, 2023

- The Centre's legal representative pointed out that **most States** have not completed the **consolidation of forest land records** as required under **Rule 16(1) of the Van (Sanrakshan Evam Samvardhan) Adhiniyam Rules, 2023**.
- **Rule 16** mandates that "forest-like areas" and unclassed and community forest lands identified by expert committees be protected under law.

Amendments to the Forest (Conservation) Act, 1980

- The Forest (Conservation) Act, 1980 was enacted to prevent deforestation and maintain ecological balance.
- What Did the 2023 Amendments Change?
 - Introduced Section 1A, which narrowed the definition of 'forest' to:
 - Declared forests
 - Lands recorded as forests in government records after 1980
- Concerns Raised by Petitioners:
 - Petitioners argued that Section 1A weakened forest protection by: Excluding nearly 1.97 lakh sq km of undeclared forest lands

Supreme Court's Stand on the Definition of 'Forest'

- The Supreme Court reaffirmed that the term 'forest' will continue to have a broad meaning, as per the TN Godavarman Thirumulpad case (1996).
- This means forest lands will **not be limited to government-recognized forests**, but will also cover:
 - Forest-like areas
 - Unclassed forests
 - Community forest lands
- The **court ordered** that this broad definition **remain valid until** all States and UTs complete a **consolidated record of forest lands**.

Source:

• The Hindu - SC directives



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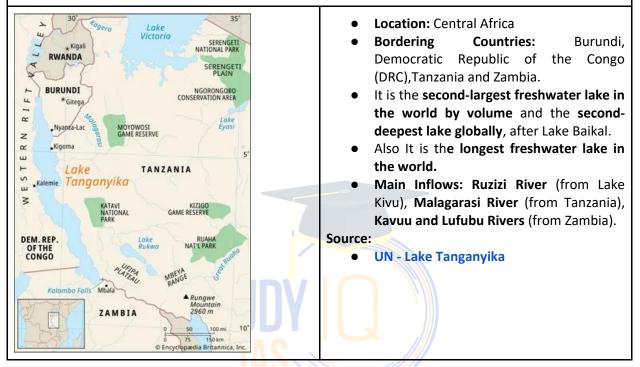
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Places in News

Lake Tanganyika

- Recently, the countries bordering Lake Tanganyika Basin have launched a five-year project to assess and address transboundary threats to the biodiversity of this lake basin.
- It is the UN Environment Programme (UNEP)-led initiative and funded by the Global Environment Facility (GEF).
- It aims to enhance transboundary cooperation among the four countries bordering Lake Tanganyika.



Dakshin Bharat Hindi Prachar Samiti (DBHPS)

- DBHPS is an institution dedicated to promoting Hindi education in South India. (HQ Chennai)
- It was formally created in **1927**, but **June 17**, **1918**, is considered its founding day when the first Hindi classes started in Madras (now Chennai).
- Gandhi ji was its founding President and remained at the position till his last breath.
- **States Covered:** Tamil Nadu, Karnataka, Kerala, Andhra Pradesh & Telangana.
 - It also has affiliated centers in Puducherry, Lakshadweep, and Andaman & Nicobar Islands.
- Recognition as an Institution of National Importance (1964):
 - **Parliament passed the Dakshina Bharat Hindi Prachar Sabha Act in 1964**, giving it the status of an **institution of national importance**.
 - This prevented DBHPS from being **dissolved or merged** without the **approval of the Indian government**.

Source:

• The Hindu - Hindi Prachar Samiti



Marbled Cat

• Recently Marbled cats were spotted in **Dehing Patkai National Park in Tinsukia district**, Assam.

About Marbled Cat

- It is a small, elusive wild cat species found in the forests of South and Southeast Asia.
- Characteristics:
 - It has dense, soft fur with a marbled pattern of dark blotches and stripes.
 - They are **excellent climbers**.
 - It has a Long tail, often equal to or longer than its body length, aiding in balance on trees.
 - The species is **territorial** and marks its territory with **urine and scent marking.**
 - Social Behavior: Solitary and elusive, rarely seen in the wild.
- Distribution: Native to South and Southeast Asia
 - In India, it is generally found in the forests of **Northeastern states**, including Arunachal Pradesh, Assam, Meghalaya and Nagaland.
- Conservation Status:
 - o IUCN: Near Threatened
 - CITES: Appendix-I
 - WPA: Schedule-I

Source:

• TOI - Marbled Cat

Ferrihydrite: The Iron-Rich Mineral Linked to Mars' Red Color

• A new study has revealed that Martian red colour is due to ferrihydrite than previously thought, hematite, present in the planet's dust.

About Ferrihydrite

- Ferrihydrite (Fe₅HO₈·4H₂O) is a poorly crystalline iron oxide-hydroxide mineral.
- It is a **nanoparticle-sized**, **rust-like compound** that commonly forms in **cool**, **watery environments** on Earth.
- It is a precursor to more stable iron oxides, e.g. hematite, goethite.
- It is used in sequestration of heavy element contaminants.

Ferrihydrite and Mars' Red Color

- Scientists suspect that Mars' iron-rich surface may contain ferrihydrite or its transformed products.
- Unlike dry oxidation (which creates rust without water), ferrihydrite forms in cool, wet conditions, suggesting that Mars had stable liquid water in the past.





- Over time, ferrihydrite can **dehydrate and transform into hematite**, another iron oxide that gives Mars its red hue.
- This supports the hypothesis that Mars had long-lasting water activity, rather than just short bursts of wet conditions.

Source:

• Deccan Herald - Ferrihydrite

Shendurny Wildlife Sanctuary

• Recently two new species of jumping spiders have been discovered from Shendurney Wildlife Sanctuary.

About Shendurny WLS

- Location: Western Ghat, Kerala (Kollam District).
- It is part of Agasthyamala Biosphere Reserve, and shares boundary with Kalakkad Mundanthurai Tiger Reserve and Nellai Wildlife Sanctuary of Tamil Nadu.
- Rivers flowing: Kallada River, Shendurney River
- Flora:
 - It features dense evergreen and semi-evergreen forests.
 - **Important Plant Species**: Mishmi Teak, Cullenia exarillata, Myristica swamps (rare wetland ecosystems).
- Fauna:
 - Elephant, Gaur, Sambar, Wild bear, Malabar giant squirrel, Nilgiri langur, Lion-Tailed macaque.
- Thenmala Eco-Tourism Project: India's first planned eco-tourism destination. It is located inside Shendurny WLS.

Source:

• The Hindu - Shendurny WLS

Gum Arabic

• The ongoing civil war between Sudan's national army and the paramilitary **Rapid Support Forces (RSF)** has significantly disrupted the legal supply chain of Gum Arabic.

About Gum Arabic

- It is a natural gum derived from the hardened sap of two species of the Acacia tree – Senegalia Senegal and Vachellia seyal.
- **Production:** Mostly in **Sudan (80%)** and throughout the **Sahel (from Senegal to Somalia).**
- It is **soluble** in water and edible.
- **Uses:** Food Industry, Cosmetics, and in Pharmaceuticals as Emulsifiers and stabilizers.

Impact of Sudan's Civil War on Trade

- RSF Seizure of Key Regions:
 - RSF took control of **Kordofan and Darfur**, the main gum-harvesting regions, in late 2023.
 - Sudanese traders must pay fees to RSF to market their products.
- Rise of Informal Trade Routes:
 - Gum Arabic is being smuggled into neighboring countries such as Egypt, Chad,





Cameroon, South Sudan, and Kenya.

• Traders are selling gum at lower prices without proper certification.

Source:

• Indian Express - Gum Arabic

Wallace Line

- Wallace Line is an invisible biogeographical boundary that separates the unique faunas of Asia and Australia.
- It was first proposed by Alfred Russel Wallace, an English naturalist, in the late 19th century after observing a dramatic shift in species composition as he moved through the Malay Archipelago.



Importance of the Wallace Line Today

- Ecological and Conservation Significance:
 - The Indo-Malayan archipelago has one of the highest rates of habitat destruction in the world.
 - Understanding biogeography can help:
 - Predict how species will respond to habitat loss.
 - Develop better conservation strategies to protect biodiversity.

Source:

• The Hindu - Wallace Line



Editorial Summary

Evolving US and Russia Relation

Context

There has been a sudden thaw in relations between Russia and the United States with the return to office of President Donald Trump.

Historical U.S.-Russia Relations and Their Evolution Cold War Era (1947-1991)

- After World War II, the U.S. and the Soviet Union (USSR) became geopolitical rivals, leading to the Cold War.
- The rivalry was marked by ideological opposition (capitalism vs. communism), nuclear arms race, proxy wars (Korea, Vietnam, Afghanistan), and political standoffs (Cuban Missile Crisis, Berlin Blockade).
- The 1970s saw détente, with arms control agreements like **SALT I & II** and cultural exchanges.
- However, the 1980s saw renewed tensions, particularly with the Soviet invasion of Afghanistan (1979) and Reagan's Strategic Defense Initiative (SDI).
- The Cold War ended with the **dissolution of the Soviet Union in 1991**, leading to improved U.S.-Russia ties.

Post-Cold War (1991-2014)

- In the 1990s, U.S.-Russia relations were marked by cooperation but also tensions.
- Russia transitioned to capitalism with Western aid, but the economic crisis and NATO's expansion eastward (including Poland, Hungary, and Czech Republic in 1999) created resentment.
- The 2000s saw fluctuating ties, with cooperation on counterterrorism post-9/11 but tensions over NATO expansion, U.S. withdrawal from the Anti-Ballistic Missile (ABM) Treaty, and the 2008 Russia-Georgia War.
- Relations worsened with the **2014 annexation of Crimea**, leading to Western sanctions on Russia and deep distrust.

2014-Present: Deterioration and Possible Reset

- **Obama years (2014-2016)**: Sanctions on Russia after Crimea, increased NATO presence in Eastern Europe, and diplomatic isolation of Moscow.
- **Trump years (2017-2020)**: Attempted rapprochement with Russia but constrained by allegations of Russian interference in U.S. elections.
- Biden years (2021-2024): Further deterioration due to Russia's invasion of Ukraine in 2022, leading to massive U.S.-led sanctions, military aid to Ukraine, and NATO expansion (Finland & Sweden).
- **Trump's return (2025)**: Potential thaw in U.S.-Russia ties, including diplomatic engagement, possible easing of sanctions, and a shift in U.S. policy from confrontation to strategic accommodation.

Implications of Evolving U.S.-Russia Relations

- Global Power Balance: If U.S.-Russia ties improve, it could weaken the China-Russia strategic partnership and create a more multipolar world.
 - A Russo-American rapprochement might force China to recalibrate its foreign policy.
- Impact on Ukraine & NATO: Trump's potential disengagement from Ukraine could shift the war's dynamics in Russia's favour.



- European allies may need to take greater responsibility for Ukraine's defense.
- NATO's internal cohesion may be tested, particularly if Trump questions U.S. commitments.
- Energy & Economic Implications Lifting U.S. sanctions could revive Russia's economy, particularly in oil, gas, and minerals.
 - It may also impact global energy markets, reducing volatility in oil prices.
- Arms Control and Security: A new arms control agreement could emerge, reducing nuclear risks.
 Russia may push for a reduction in NATO military buildup in Eastern Europe.
- India's Strategic Position: India could benefit from reduced U.S.-Russia tensions, allowing it to maintain strong ties with both powers.
 - It may also gain diplomatic flexibility in balancing relations with China, Russia, and the U.S.
- Shift in Global Alliances: A U.S.-Russia thaw could impact existing alliances, including BRICS and the Shanghai Cooperation Organisation (SCO), where Russia plays a key role.
 - It could also alter **U.S.-China competition**, leading to new geopolitical dynamics.

Source: Indian Express: Russia in Trump's World





Income-Tax Bill, 2025

Context

In February 2025, the Union Finance Minister introduced the Income-Tax Bill, 2025, in Parliament.

Key Provisions of the Income-Tax Bill, 2025

- Introduction of the 'Tax Year' Concept: The traditional *assessment year* has been removed. Now, the *tax year* aligns with the financial year (April 1 – March 31). For businesses or newly established professions, the tax year starts from the date of commencement.
- **Expanded Definition of Income**: Virtual digital assets (VDAs) such as cryptocurrencies and NFTs are now categorized as capital assets, similar to land, shares, and bullion, impacting tax treatment.
- **Simplified Drafting for Clarity**: The Bill reduces excessive provisos and cross-references, making tax laws more concise and easier to interpret without referring to multiple sections.
- Streamlined Tax Compliance: Provisions related to TDS, assessment timelines, dispute resolution, and deductions have been structured into tables for better accessibility and understanding.
- Elimination of Outdated Exemptions: Redundant provisions like Section 54E (capital gains exemption for pre-1992 asset transfers) and obsolete clauses from past amendments have been removed.
- Integration of Other Tax Laws: Provisions from the Wealth Tax Act and regulations for inventory valuation and revenue recognition in service contracts have been incorporated to ensure consistency across tax laws.

What are the Concerns Associated with It?

- Superficial Simplification: The bill only makes cosmetic linguistic changes without simplifying the law for taxpayers.
 - Definitions still refer back to the 1961 Act, raising doubts about the necessity of a complete overhaul.
 - Merely rearranging compliance timelines into tables does not eliminate the inherent complexity.
- Unchanged Taxation Philosophy: The fundamental policy approach to taxation remains unaltered, meaning that the core challenges—high compliance burdens and frequent litigation—persist.
 - Rather than introducing substantive reforms, the bill mostly rehashes existing provisions.
- Higher Risk of Litigation: The bill's textual alterations could reopen settled legal interpretations, leading to a fresh wave of disputes.
 - Ambiguous terms like "risk management strategy" remain undefined, creating scope for arbitrary application of laws.
- Expansion of Government Powers: The most concerning provision is the expansion of search and seizure powers into the digital domain.
 - Officials can now inspect **emails, social media accounts, and cloud storage**, with no judicial oversight.
 - This raises **serious privacy concerns** in light of the Supreme Court's 2017 ruling on the right to privacy.

Way Forward

• Enhance Digital Privacy Safeguards: Introduce judicial oversight for digital searches to prevent potential misuse of government authority.



- **Strengthen Tax Dispute Resolution**: Establish mediation mechanisms to expedite case resolution and minimize tax litigation.
- **Define Key Tax Terms Clearly**: Provide precise definitions for terms like "risk management strategy" to eliminate legal uncertainties.
- **Simplify Tax Compliance**: Reduce excessive documentation requirements and streamline tax return processes to ease taxpayer obligations.
- **Ensure Seamless Transition to New Tax Year**: Develop clear implementation guidelines to help businesses adapt smoothly to the revised tax year framework.

Source: The Hindu: Little has changed in the Income-Tax Bill, 2025





Detailed Coverage

Delimitation

Context

There has been a renewed debate about delimitation after the issue was raised by the Chief Minister of Tamil Nadu.

What is Delimitation?

- Delimitation is the process of redrawing boundaries of Parliamentary and Assembly constituencies to ensure equal representation based on population changes.
- It also involves fixing the number of seats allocated to each state in Lok Sabha and State Assemblies.
- The process is carried out by an independent body called the **Delimitation Commission**.
- Importance of Delimitation:
 - **Ensures Equal Representation:** Each constituency should have roughly the same population size to ensure fair voting power.
 - **Reflects Population Growth Trends:** Helps in adjusting representation as populations increase or decrease over time.
 - **Prevents Political Imbalance:** Without delimitation, some areas may have **more MPs per voter**, leading to **under-representation** elsewhere.

Legal and Constitutional Basis for Delimitation

- Article 82: Requires Parliament to revise the allocation of Lok Sabha seats among states after every Census.
- Article 170: States that the number of seats in State Legislative Assemblies must also be readjusted.
- Delimitation Act: Passed whenever delimitation is needed, and a Delimitation Commission is set up.
- Till date 4 Delimitation Commissions have been formed in 1952, 1963, 1973 & 2004. (UPSC Prelims 2024)

Related Constitutional Amendments

- 42nd Amendment (1976): Froze the number of Lok Sabha and Assembly seats until the 2001 Census to encourage population control.
- 84th Amendment (2002): Extended the freeze until 2026.

Delimitation Commission: Composition and Powers

- It is a temporary body set up by the Government of India whenever delimitation is required.
- Composition:
 - A retired/working Supreme Court judge (Chairperson)
 - Chief Election Commissioner.
 - State Election Commissioners of the concerned states
- Powers and Functions:
 - Redraws constituency boundaries based on latest Census data.
 - Allocates seats fairly among states and constituencies.
 - **Consults political parties** and stakeholders before finalizing boundaries.
 - Decisions cannot be challenged in court (Article 329).



• Delimitation Commission's orders are laid before the Lok Sabha and the legislative assemblies concerned, but they cannot affect any modifications in the orders. (UPSC Prelims 2012).

Issues with Delimitation

 Uneven Population Growth: Northern states like UP, Bihar, MP, and Rajasthan have seen higher population growth compared to southern and smaller northern states, leading to potential disparities in seat allocation.

he number of he population	f seats in the L	ok Sabha, b re. However,	ased on t	ntation he 1971 Census, en, it has been fr	was fixed at !		e
	ats are retained States based o			Exhibit 2 : If the based on the 20			ed to 8
State	Number of seats at present	Number of seats projected	Net Gain/ (Loss)	State	Number of seats at present	Number of seats projected	Net Gain
Uttar Pradesh	80	91	11	Uttar Pradesh	80	143	63
Bihar	40	50	10	Bihar	40	79	39
Rajasthan	25	31	6	Rajasthan	25	50	25
Madhya Pradesh	29	33	4	Madhya Pradesh	29	52	23
Tamil Nadu	39	31	-8	Tamil Nadu	39	49	10
Andhra Pradesh + Telangana	42	34	-8	Andhra Pradesh + Telangana	42	54	12
Kerala	20	12	-8	Kerala	20	20	-
Karnataka	28	26	-2	Karnataka	28	41	13

- **Disproportionate Representation**: If seats are redistributed based on projected population, southern states and smaller northern states may lose their relative share in Parliament, reducing their political influence.
- **Threat to Federalism**: A decline in proportional representation for some states could undermine the federal structure and create regional imbalances.
- **Uncertainty in Seat Distribution Formula**: Lack of clarity on whether seat allocation will be based on existing share or projected population raises concerns about fairness in representation.
- **Political Discontent**: States that have successfully controlled their population may feel penalized for their efforts, leading to dissatisfaction and political friction.

Solutions for Balanced Delimitation

Punjab

Himachal

Uttarakhand

Northeast-

ern States

(excluding Assam)

*projected figures

Pradesh

13

4

5

11

12

3

4

11

-1

-1

-1

Punjab

Himachal

Uttarakhand

Northeast-

ern States

(excluding

Assam)

Pradesh

13

4

5

11

18

4

7

11

5

2

- **Capping Lok Sabha Seats at 543**: Keeping the number of MPs fixed, as done in the U.S., would maintain the status quo in state-wise representation and uphold the federal principle.
- Increasing State Assembly Seats: To address democratic representation needs, the number of MLAs in State Legislative Assemblies can be increased based on population growth.



- Weighted Representation Model: A formula ensuring fair weightage for states with lower population growth can be considered to maintain regional balance.
- Incentivizing Population Control: States that have effectively managed their population growth should not be disadvantaged in seat allocation; a mechanism to reward them should be explored.
- **Consensus-Based Decision**: Engaging political leaders across regions to reach a balanced and widely acceptable solution can help prevent regional tensions.
- **Parliamentary Debate & Review**: A thorough discussion in Parliament, considering both numerical representation and federal equity, is essential before finalizing the new seat distribution.

Sources:

- The Hindu: What are the issues around delimitation?
- Indian Express Delimitation

