Today's Prelims Topics

Size of Cabinet of Legislative Assembly

Context

The opposition in Chhattisgarh has filed a **writ petition in the Chhattisgarh High Court** challenging the **expanded size of the State Cabinet**.

Constitutional Provision

- **Article 164(1A):** Provides that the **total number of Ministers**, including the Chief Minister, in the Council of Ministers of a State shall not exceed **15% of the total strength of the Legislative Assembly** of that State.
    - However, the number of Ministers, including the Chief Minister, shall **not be less than 12**.
- This provision was inserted by the **91st Constitutional Amendment Act, 2003**.
- **Objective:** To prevent jumbo-sized ministries and curb the practice of accommodating legislators in the Council of Ministers for political considerations (known as office of profit or political patronage).

Similar Provision in Centre

- **Article 75(1A):** Total number of Ministers, including the Prime Minister, shall not exceed **15% of the total strength of the Lok Sabha**.

Source: The Hindu

International Arbitration Centre

Context

Andhra Pradesh Chief Minister announced plans to establish an international arbitration centre in Vizag.

What is an Arbitration Centre?

- Arbitration is a form of **Alternative Dispute Resolution (ADR)** where parties to a dispute agree to submit their case to a neutral third party (the arbitrator) who makes a binding decision.
- It is an institution or facility set up to resolve disputes outside the traditional court system, using arbitration as the primary method.
- **Key Features of an Arbitration Centre:**
    - **Neutral Forum**: Provides a neutral space for resolving disputes, often chosen when parties are from different regions or countries.
    - **Arbitrators Panel**: Maintains a panel of expert arbitrators in various fields like trade, investment, commercial law, technology, etc.
    - **Efficiency**: Generally faster and less formal than courts, aiming for quicker dispute resolution.
    - **Confidentiality**: Proceedings are private, unlike court cases which are usually public.
    - **Flexibility**: Parties have flexibility in choosing arbitrators, language, rules, and procedures.
    - **Enforceability**: Arbitration awards are legally binding and enforceable, often internationally under treaties like the **New York Convention (1958)**.

Arbitration in India

- Governed mainly by the **Arbitration and Conciliation Act, 1996**, based on the **UNCITRAL Model Law** (United Nations Commission on International Trade Law).
    - Amended multiple times (2015, 2019, 2021).

Source: The Hindu

News In Short

SEMICON India 2025	**News?** The SEMICON India 2025, concluded in New Delhi. **Key Highlights** ● **Organised by:** India Semiconductor Mission (ISM) under the Ministry of Electronics and Information Technology (MeitY) ○ SEMI, the global semiconductor industry association ● **Outcome:** 20 MoUs on chip design, camera modules, packaging, talent development, showcased India's focus on indigenous capabilities, R&D, and workforce development. **Source:** PIB
Methandienone Long-Term Metabolite (LTM): A Reference Material (RM).	**News?** India develops high-purity reference material for advanced anti-doping detection. **About Methandienone LTM** ● **Developed by:** National Institute of Pharmaceutical Education and Research (NIPER) Guwahati (Dept. of Pharmaceuticals) in collaboration with National Dope Testing Laboratory (NDTL), New Delhi. ● **Nature:** A **rare, high-purity Reference Material (RM)** of *Methandienone Long-Term Metabolite (LTM)*. ● **Purpose in Anti-Doping:** ○ Detects **long-term metabolites** of Methandienone (an anabolic steroid). ○ Helps trace doping **months/years after substance use**, improving detection sensitivity. ○ Enhances India's contribution to the **World Anti-Doping Agency (WADA)** ecosystem by being shared with 30 WADA-accredited labs. **What is a Reference Material (RM)?** ● A **Reference Material (RM)** is a **highly purified and scientifically well-characterized substance** used as a **standard or benchmark** in laboratory testing and calibration. ● **Key Features:** ○ Provides **accuracy and reliability** in analytical results. ○ Used to **calibrate instruments, validate methods, and detect substances** in complex samples. ○ In **anti-doping**, RMs are pure forms of

	prohibited drugs or their metabolites that enable labs to detect banned substances. **Source:** PIB
Global Peace Index	**News?** India has been ranked 115th (up from 116th in 2024) in the **Global Peace Index (GPI) 2025.** **About GPI** ● It is published annually by the **Institute for Economics & Peace (IEP).** ● It ranks 163 countries (covering 99.7% of the world's population) using 23 indicators such as militarization, external conflicts, homicide rates, and terrorism. ● **2025 Rankings:** ○ **Top-ranked countries:** Iceland, Ireland, and New Zealand. ○ **Least peaceful countries:** Russia, Ukraine, Sudan, Democratic Republic of the Congo, and Yemen. ○ **Asia:** Singapore is the only Asian country in the **top 10**, despite its high military expenditure. ■ Pakistan is placed at 144th. **Source:** Financial Express
Kali (Dandeli- Anshi) Tiger Reserve	**News?** The Centre is probing allegations of **misuse of CAMPA funds and violation of FRA provisions** in the relocation of forest dwellers from Kali Tiger Reserve in Karnataka. **Kali (Dandeli–Anshi) Tiger Reserve** ● **Location:** Uttara Kannada district, Karnataka. ○ Lies in the **Western Ghats**, a UNESCO World Heritage Site. ● **History & Formation:** Originally two separate protected areas: **Dandeli Wildlife Sanctuary** and **Anshi National Park**. ○ In **2015**, both were merged and renamed as **Kali Tiger Reserve**. ○ Named after the **Kali River**, which flows through the reserve. **CAMPA Funds** ● When forest land is diverted for **non-forest use** (like mining, dams, industries), project developers are required to **compensate** by: ○ Paying for **afforestation** on non-forest land. ○ Covering the cost of ecosystem services lost. ● To manage this, the **Compensatory Afforestation Fund Management and Planning Authority (CAMPA)** was set up in **2009** (by SC order).

	Source: The Hindu
Mahi River	**News?** Five workers went missing after water from the Mahi river suddenly flooded a hydropower plant in Gujarat. **About Mahi River** ● **Origin:** Madhya Pradesh, in the **Vindhya Range**. ● **Course:** Flows through **Madhya Pradesh, Rajasthan, and Gujarat**. ● **Length:** ~583 km. ● **Unique Feature:** One of the few rivers in India that crosses the **Tropic of Cancer twice**. ● **Major Dams on Mahi River:** ○ **Kadana Dam** (Gujarat) – the source of water release in this incident. ○ **Mahi Bajaj Sagar Dam** (Rajasthan). ● **Tributaries:** Som, Anas, Panam, Heran. **Source:** The Hindu

Mains Topics

Women in STEM Education in India

Context

India has taken steps like quotas and special schemes to increase women's participation in Science, Technology, Engineering, and Mathematics (STEM) education. However, social pressures, institutional hurdles, and cultural attitudes still prevent women from achieving equal representation.

Current Status of Women in STEM in India

- **Overall representation:** Women constitute 43% of total STEM graduates in India (AISHE 2020–21), one of the highest globally.
    - In 2024, a record **28.13 lakh Class 12 girls** passed with science subjects-up from 25.58 lakh in 2023 and 23.3 lakh in 2022.
- **Research workforce**: Despite high graduation rates, women make up only **14% of India's R&D workforce** (DST data, 2023).
- According to UNESCO globally women form just **35% of STEM graduates**, with minimal change over the past decade.
- Female faculty in STEM across 98 institutions is a mere **13.5%**, with engineering being the lowest at **9.2%**
- **IITs and engineering**:
    - Female enrolment stagnates at **~20% in IITs** despite the **supernumerary quota introduced in 2018**.
    - Absolute numbers increased (16,053 in 2020 → 18,168 in 2025), but proportional growth is flat.
- **Medicine vs Engineering**: In medical education, women students now **outnumber men** (NMC data), but engineering admissions continue to show a skew.

Challenges Faced by Women in STEM

- **Social and Cultural Barriers:**
    - **Gender stereotypes**: Perception that boys are better at mathematics and technical subjects discourages girls.
    - **Family expectations**: Girls often steered towards "safe" fields like medicine or humanities.
    - **Patriarchal mindsets**: Social norms undervalue women in technical careers.
- **Institutional Challenges:**
    - **Male-dominated environments**: Engineering campuses like IITs often have poor gender ratios, creating a sense of isolation.
    - **Inadequate infrastructure**: Limited hostels, poor washroom facilities, unsafe recreational spaces.
    - **Lack of mentorship**: Few women role models in faculty positions; only **18% of full professors in STEM are women** (AISHE, 2021).
- **Structural Issues:**
    - **Leaky pipeline**: High numbers of women graduate in STEM but drop out during postgraduate, doctoral, and workforce stages.

- **Work-life balance pressures**: Career breaks due to caregiving responsibilities reduce women's participation in R&D.
- **Bias in hiring and promotions**: Studies by NITI Aayog (2022) highlight systemic gender bias in recruitment and leadership roles.

Impact of Low Enrolment and Retention of Women in STEM

- **Wasted human capital**: With India producing over **1.5 million engineering graduates annually**, excluding half the population reduces potential talent.
- **Innovation deficit**: Diversity leads to better innovation; underrepresentation of women narrows perspectives.
- **Economic cost**: World Bank estimates that **India's GDP could rise by 27%** if women participated in the workforce at par with men.
- **Global competitiveness**: Countries like China and South Korea leverage gender-inclusive STEM education for industrial growth.
- **Social impact:** Absence of women scientists reduces visible role models, perpetuating stereotypes for the next generation.

What National Institutes Are Doing to increase enrollment

- **IITs**: Introduced **supernumerary quota (2018)** → pushed women enrolment from 9% to ~20%.
- **Campus reforms**:
  - IIT Kharagpur: Created **Dean of Well-being** post.
  - IIT Delhi: Peer-support groups and AI-based mental health counselling.
  - Infrastructure improvements: Hostels, washrooms, safer recreational spaces.
- **IISc and IISERs**: Mentorship programmes and gender sensitisation workshops.
- **CSIR labs:** Fellowships for women researchers returning after career breaks.

Government Schemes Promoting Women in STEM

- **Vigyan Jyoti (2019):** Implemented by the **Department of Science & Technology (DST)**.
  - Targets **Class IX–XII girls from underrepresented districts**.
  - Provides exposure visits to IITs, NITs, IISERs; mentoring by women scientists.
- **UDAAN (CBSE initiative):** Provides free online resources, mentoring, and financial support for girl students preparing for **engineering entrance exams**.
- **GATI (Gender Advancement for Transforming Institutions):** Pilot programme in **30 institutions** to promote gender equity in STEM academia.
  - Inspired by the UK's Athena Swan Charter.
- **WISE (Women in Science and Engineering) Fellowship:** Supports women scientists in re-entering careers after breaks.
- **INSPIRE Scholarships:** Provides scholarships for meritorious students (including girls) in natural sciences.

Way Forward

- **School-Level Reforms:**
  - Reform pedagogy to **challenge gender stereotypes** early.
  - Showcase **women scientists in curricula** (e.g., Kalpana Chawla, Gagandeep Kang).
  - Encourage girls to **tinker and innovate** through Atal Tinkering Labs.

- **Campus and Institutional Changes:**
    - Ensure **inclusive infrastructure**: safe hostels, adequate washrooms, gender-neutral recreational spaces.
    - Mandatory **gender sensitisation workshops** for students and faculty.
    - Strengthen **mentorship and alumni networks** to guide young women.
- **Workforce Retention:**
    - Flexible work policies and childcare facilities in academia and R&D labs.
    - Expand **fellowships for women returning to research** after career breaks.
- **Policy and Governance:**
    - Strengthen **implementation of GATI** and expand it nationwide.
    - Introduce **mandatory gender audits** in national institutes.
- **Changing Social Mindsets:**
    - Public campaigns showcasing **women role models in STEM** (e.g., ISRO women leading Mangalyaan and Chandrayaan).
    - Encourage families to support girls in pursuing technical education.

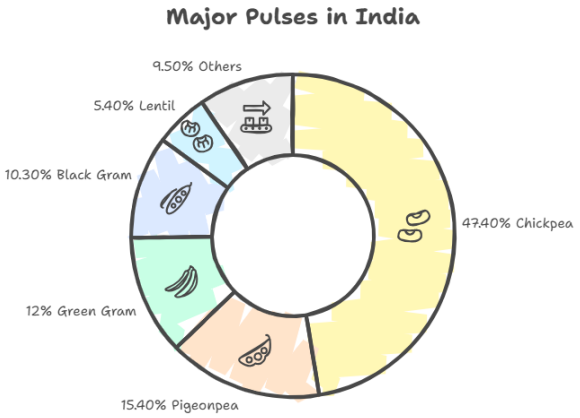
Pathway to achieve Self-Sufficiency in Pulses Production

Context

NITI Aayog has recently released a report titled "Strategies and Pathways for Accelerating Growth in Pulses towards the Goal of Atmanirbharta."The report outlines India's roadmap to achieve self-sufficiency in pulses production by addressing productivity gaps, reducing import dependence, and ensuring nutritional security.

Pulses Production in India

- **Global and National Context**
  - India is the **largest producer, consumer, and cultivator of pulses** in the world.
  - It contributes **38% of global area** and **28% of global production** of pulses.
  - Global productivity (2022): **0.989 t/ha**, while India's average (2018–22) is **0.740 t/ha**, showing a productivity gap.
- **Seasonal Contribution:**
  - **Rabi Pulses:** Contribute **67% of production** from **53% of area**.
    - Chickpea accounts for **~70% of Rabi pulses**.
  - **Kharif Pulses:** Cover **47% of area** but contribute only **33% of production**.



- **State-Wise Production:**
  - **Top three states:** Together, these three states contribute ~55% of production.
    - **Madhya Pradesh** – 22.1% of production, 18.7% of area.
    - **Maharashtra** – 16.5% of production, 15.7% of area.
    - **Rajasthan** – 16.3% of production, 20.9% of area (largest area).
  - Other major states: Uttar Pradesh, Karnataka, Gujarat, Andhra Pradesh, Jharkhand, Telangana, Tamil Nadu.
  - **Highest productivity:** Gujarat (1.333 t/ha).
  - **Lowest productivity:** Karnataka (0.623 t/ha).

Why India Needs Self-Sufficiency in Pulses

- **Nutritional Security:** Pulses are vital to address protein malnutrition; per capita availability lags behind ICMR-NIN dietary guidelines.
- **Food Sovereignty**: Over-reliance on imports exposes India to global price volatility. In 2023–24, a **90% surge in imports** led to domestic price spikes .
- **Soil Health & Sustainability**: Pulses fix atmospheric nitrogen, improve soil fertility, and reduce dependence on chemical fertilizers .
- **Rural Livelihoods**: ~30 million Indian farmers grow pulses; stable prices improve rural incomes.
- **Climate Resilience:** Pulses require less water and tolerate stress, making them suitable for rainfed areas

Challenges in Pulses Production

- **Low productivity:** National average yield (0.851 t/ha) remains well below global leaders like Canada (1.9 t/ha) .
    - **Wide state-level yield gaps:** Gujarat at 1.33 t/ha vs Karnataka at 0.62 t/ha .
- **Technological constraints**: Unlike rice and wheat, pulses have not seen widespread success from the Green Revolution. Mechanisation is also limited because most pulses are grown in small and fragmented landholdings.
- **Environmental vulnerability:** 80% of pulses are rainfed, making them prone to drought, flood, and climate shocks (El Niño, heat waves, unseasonal rains).
- **Biotic stresses**: Many farmers lack access to affordable pest management solutions, and the problem is aggravated by climate change increasing pest incidence.
    - Major insect pests like pod borers, aphids, thrips, pod fly, and diseases like wilt, yellow mosaic virus, and sterility mosaic cause significant crop losses.
- **Abiotic stresses**: Pulses are highly sensitive to extreme conditions such as high temperature, drought, frost, salinity, alkalinity, and waterlogging.
- **Cultivation on marginal & degraded lands**: Unlike cereals which are grown on fertile, irrigated lands, pulses are often cultivated on low-fertility soils with limited irrigation facilities.
- **Price Volatility and Market Uncertainty:** Pulses prices fluctuate widely due to seasonal shortages, import surges, and speculative hoarding. Farmers often face distress sales when prices crash below MSP, as procurement coverage is very limited compared to rice and wheat.
- **Low Economic Returns for Farmers:** Farmers prefer cereals and commercial crops (rice, wheat, cotton, sugarcane, soybean) which provide higher assured returns due to better procurement and export potential.
- **High Cost of Inputs:** The cost of fertilisers, pesticides, labour, and irrigation for pulses is high compared to the returns.
- **Weak marketing and procurement**: Farmers depend on traders due to limited MSP procurement and lack of local mandis.
- **Post-harvest losses**: 5–7% due to spillage, poor handling, pest damage, and lack of storage.
- **Consumption-production gap**: Demand exceeds domestic production, leading to heavy imports (4–5 MT annually).
- **Limited crop diversification**: Pulses not fully integrated in major cropping systems.
- **Seed system issues**: Shortage of quality certified seeds and lack of seed traceability.

Government Initiatives

- **National Food Security Mission – Pulses (NFSM-Pulses, 2007 onwards)**: Expanded area, productivity, seed hubs, cluster demonstrations; boosted output by >20% .
- **Targeting Rice Fallow Areas (TRFA)**: Promoting lentils and moong in fallow lands across 10 states; potential to add **2.85 MT** .
- **Mission for Atmanirbharta in Pulses (Budget 2025–26)**: Six-year plan focusing on tur, urad, and masoor → climate-resilient seeds, storage, procurement support .
- **Indian Council for Agricultural Research (ICAR) & Rishi Vigyan Kendra (KVK):** 150+ seed hubs, demonstration projects, farmer training .

Way Forward – Strategies for achieving Self-Sufficiency

Four Quadrant Strategy

It is a district-wise cluster approach to accelerate growth in pulses production. It categorizes districts into four clusters based on two parameters - Area under cultivation and Yield levels of pulse crops:

- **High Area -High Yield (HA-HY):** Districts with both high acreage and high productivity.
  - **Strategy**: Focus on *vertical expansion* to maximize yield using advanced technologies, precision agriculture, and global best practices.
  - **Eg:** Pigeonpea clusters in Jharkhand, Uttar Pradesh, Maharashtra, Gujarat .
- **High Area - Low Yield (HA-LY):** Large acreage but underperforming in yield.
  - **Strategy**: Prioritize *productivity enhancement* through quality seeds, better agronomy, irrigation, and pest management.
- **Low Area - High Yield (LA-HY):** Small area under pulses but high yield potential.
  - **Strategy**: Expand area horizontally by promoting pulses in **rice fallows, intercropping, and diversification**.
  - States like Uttar Pradesh, Bihar, Gujarat, Tamil Nadu show such potential .
- **Low Area - Low Yield (LA-LY):** Districts with low acreage and poor productivity.
  - **Strategy:** A combined approach of area expansion + yield improvement. These need intensive interventions, model farms, and incentives to scale up.

- **Focus on Area Retention and Diversification:** Use **rice fallow lands**: tapping 1/3rd of fallows across 10 states could add **2.85 MT** pulses annually. Promote intercropping with cereals and oilseeds.
- **Improved Seeds and Traceability:**
  - Large-scale distribution of quality seeds with treatment kits.
  - Promote **seed villages** and **block-level seed hubs** through FPOs.
- **Strengthening FPOs and Value Chains**
  - Build strong Farmer Producer Organisations to reduce dependence on middlemen.
  - Promote **direct-to-consumer (D2C)** models for better prices.
  - Establish local processing units – use by-products (husk, bran) for cattle feed.
- **Strengthening Procurement and MSP System:** Set up **doorstep procurement centre &** Improve MSP operations under **PM-AASHA scheme**.
- **Inclusion in Public Nutrition Schemes:** Mandate inclusion of pulses in **PDS, Mid-Day Meal Scheme, ICDS, Poshan Abhiyaan**. This will ensure nutrition security and create assured demand.

- **Mechanisation and Technology Adoption:** Promote **multi-crop harvesters** and threshers for pulses & Develop **machine-harvestable varieties** to reduce labour costs.
- **Promotion of Summer Pulses:** Expand summer cropping with short-duration, early-maturing varieties & Use micro-irrigation for efficient water use.
- **Research and Development**: Develop climate-resilient and nutrient-rich (biofortified) pulses & Explore biotechnology tools (CRISPR, molecular markers) for faster crop improvement.
- **Climate Management and Early Warning Systems:**
    - Strengthen weather forecasting, AI-based advisories, and mobile alerts.
    - Promote climate-smart practices (mulching, zero-tillage, drought-tolerant seeds).
- **Financial and Policy Support:** Subsidies for fertilisers, bio-fertilisers, and quality seeds. Incentivise farmers for ecosystem services (nitrogen fixation worth ₹8811 crore annually).