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Features :

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Why are so many helicopters crashing in Uttarakhand?

Source: The post **"Why are so many helicopters crashing in Uttarakhand?" has** been created based on **"Why are so many helicopters crashing in Uttarakhand? The risks explained"** published in **"Indian Express"** on 2nd November 2026.

UPSC Syllabus: GS 3-Disaster management

Context: A helicopter carrying six people, including the pilot, crashed while returning from Badrinath to Dehradun on October 30 amid adverse weather conditions, killing all six onboard. The incident has highlighted the challenges and safety risks of helicopter operations in Uttarakhand's difficult terrain and unpredictable weather.

Major Causes of Helicopter Accidents

1. Difficult Himalayan Terrain: The Char Dham route passes through deep valleys and steep mountains, leaving pilots with limited room to manoeuvre. Sudden weather changes or technical problems can increase the risk of collisions with mountains and other obstacles.

2. Unpredictable Weather Conditions: Mountainous regions experience sudden changes in wind patterns, cloud cover, mist, rain and visibility. These conditions make helicopter navigation difficult, particularly when flights depend on visual navigation.

3. Inadequate Weather Information: Weather conditions at a base helipad may differ significantly from those at the destination or along the connecting valleys. The absence of reliable, localised and real-time weather information can affect flight safety decisions.

4. Weak Air Traffic Management: Multiple operators often use common destinations, while limited air traffic control infrastructure in remote areas makes it difficult to coordinate helicopter movements and maintain safe separation.

5. Regulatory and Coordination Gaps: Unclear division of responsibilities and coordination challenges between the Directorate General of Civil Aviation (DGCA), the Uttarakhand Civil Aviation Development Authority (UCADA) and other stakeholders may weaken the consistent enforcement of safety standards.

6. Commercial Pressure During Pilgrimage Seasons: High demand for helicopter services during the Char Dham Yatra may encourage operators to maximise the number of daily trips. This can create pressure to operate in unfavourable weather or overlook technical and operational warnings.

7. Pilot Fatigue: Repeated flights through difficult terrain and changing weather conditions increase pilots' workload and fatigue, potentially affecting their ability to assess risks and make safe decisions.

Measures to Improve Aviation Safety and Disaster Preparedness

1. Strengthen Weather Monitoring: Install localised weather monitoring systems at helipads and along important flight routes to provide timely information on visibility, wind speed, cloud cover and rainfall.

2. Improve Air Traffic Management: Establish effective communication and flight coordination mechanisms in mountainous areas with high helicopter traffic. Clear procedures for departures, arrivals and aircraft separation should be followed.

3. Ensure Stronger Regulatory Oversight: Clearly define the responsibilities of the DGCA, UCADA and helicopter operators to eliminate jurisdictional ambiguity. Regular safety audits and strict enforcement of prescribed operational standards are essential.

4. Enforce Weather-Based Flight Restrictions: Establish clear criteria for suspending flights during unsafe weather conditions. Decisions to cancel or delay flights must take precedence over commercial considerations and pilgrimage demand.

5. Prevent Pilot Fatigue: Strictly enforce flying-hour limits and mandatory rest periods. Operators should ensure that pilots are physically fit and adequately rested, especially during peak pilgrimage seasons.

6. Strengthen Emergency Response Systems: Improve coordination among district administrations, aviation authorities, search-and-rescue teams and medical services. Emergency response plans should account for difficult terrain and limited accessibility to accident sites.

7. Conduct Regular Safety Audits: Examine helicopter operations, technical maintenance, safety procedures and previous accidents or near-misses. The findings should be used to address recurring weaknesses and prevent similar incidents.

8. Adopt Risk-Based Flight Planning: Assess weather conditions, terrain, traffic density and operational risks before each flight. Flight schedules and the number of daily trips should be planned according to safety requirements rather than commercial demand.

Conclusion: Helicopter services play an important role in connecting remote Himalayan pilgrimage sites, but their expansion must be supported by robust safety and disaster management systems. A combination of reliable weather forecasting, effective regulatory oversight, responsible flight operations and coordinated emergency response is essential to reduce aviation accidents and ensure safer pilgrimage tourism in Uttarakhand.

Question: Recent Helicopter accidents in Uttarakhand highlight the disaster risks associated with pilgrimage tourism in the Himalayan region. Discuss the major causes of such accidents and suggest measures to improve aviation safety and disaster preparedness.

Source: Indian Express

Why are so many helicopters crashing in Uttarakhand?

Source: The post **"Why are so many helicopters crashing in Uttarakhand?" has** been created based on **"Why are so many helicopters crashing in Uttarakhand? The risks explained"** published in **"Indian Express"** on 2nd November 2026.

UPSC Syllabus: GS 3-Indian Economy

Context: India's Gross Expenditure on Research and Development (GERD) increased from 0.71% of GDP in 2013–14 to 0.84% in 2023–24, with 0.9% projected for 2025–26. However, India continues to lag behind innovation-driven economies, and achieving the target of 2% of GDP by 2036 requires greater participation from business enterprises.

Key Trends in India's R&D Expenditure

1. Rising Business Participation: The share of Business Enterprise R&D (BERD) in GERD increased from 43.6% in 2014–15 to 49.3% in 2023–24.

2. Dominance of Multinational Companies: Indian and foreign multinational companies accounted for 71.3% of BERD in 2023–24, indicating a concentration of business-led research.

3. Sectoral Concentration: Transportation and pharmaceuticals together account for approximately 54% of BERD, reflecting the limited spread of R&D across industries.

4. International Comparison: Business enterprises account for more than 70% of total R&D expenditure in countries such as South Korea and China, highlighting the scope for greater private-sector investment in India.

Major Challenges in Scaling Up R&D

1. Low R&D Expenditure: India's GERD-to-GDP ratio remains below 1%, limiting its ability to develop advanced technologies and compete with innovation-driven economies.

2. Concentration Among Large Firms: R&D expenditure is concentrated in a few large companies and sectors, making the overall research ecosystem dependent on a limited number of enterprises.

3. Low R&D Intensity: Indian companies generally invest a smaller share of their sales in R&D than global leaders. For instance, the average R&D intensity of the top five global pharmaceutical firms was 22.4%, compared with a maximum of 8% among the eight Indian pharmaceutical and biotechnology firms.

4. Insufficient Support for Smaller Firms: Smaller enterprises, despite demonstrating high R&D intensity in certain sectors, require stronger fiscal incentives and financial support to expand their research activities.

5. Declining Fiscal Incentives: The weighted deduction for in-house R&D was reduced from 200% in 2010–11 to 150% in 2017–18 and subsequently to 100% in 2020–21, weakening an important incentive for research investment.

6. Limited Sectoral Diversification: Heavy dependence on transportation and pharmaceuticals restricts the broader development of R&D across strategic and emerging industries.

7. Long-Term Investment Requirements: Achieving the 2% target by 2036 requires sustained growth in business-led research, which cannot be achieved through the efforts of a few large enterprises alone.

Measures to Strengthen Business-Led R&D

1. Restore Fiscal Incentives: Reinstate enhanced tax deductions or equivalent incentives for in-house R&D expenditure, with greater benefits for smaller firms to encourage sustained research investment.

2. Promote MSME Participation: Design targeted incentives and accessible financing mechanisms for small and medium enterprises, particularly those demonstrating high R&D intensity and innovation potential.

3. Identify Strategic Sectors: Prioritise sectors based on economic competitiveness, national security and employment generation, and adopt mission-oriented policies to accelerate research and technological development.

4. Strengthen Strategic Missions: Build on initiatives such as the Quantum Mission, Semiconductor Mission and IndiaAI Mission to expand domestic technological capabilities.

5. Leverage the ₹1 Lakh Crore RDI Scheme: Use the Research, Development and Innovation scheme as a financing mechanism to support private-sector research and strategic technology missions.

6. Encourage Sectoral Diversification: Expand R&D investment beyond transportation and pharmaceuticals into scientific instruments and other strategic and emerging industries.

7. Adopt a Long-Term R&D Strategy: Establish a clear roadmap to increase BERD from approximately 0.42% to 1.4% of GDP by 2036, requiring business-led R&D to grow roughly twice as fast as nominal GDP.

Conclusion: India's transition towards a developed economy requires a broad-based and sustained expansion of research and innovation. Restoring fiscal incentives, supporting smaller enterprises and prioritising strategic sectors can help raise business-led R&D expenditure and achieve the target of 2% of GDP by 2036.

Question: Despite improvements in India's R&D expenditure, achieving the target of 2% of GDP by 2036 remains a challenge. Discuss the major constraints and suggest measures to strengthen business-led R&D in India.

Source: Business Line

Even as Unemployment Falls, Lack of 'Decent Work' in India

UPSC Syllabus: Gs Paper 3- Employment

Introduction

India's unemployment rate declined from **6.1% in 2017–18 to 3.2% in 2023–24**, alongside rising female workforce participation. Yet, employment does not always provide decent work—fair income, workplace rights, social security and dignity. The Decent Work Index improved, but remained low, while informality and unequal outcomes persisted across sectors, regions, caste and gender. The concern is therefore not how many jobs India creates, but their quality and security.

Progress in Employment Quality: Recent Trends

1. Meaning of Decent Work Index (DWI): The Decent Work Index (DWI) is a composite measure used to assess job quality across three dimensions: employment status, employment opportunity and social security.

2. Overall Improvement in Job Quality: India's DWI increased from 0.247 in 2017–18 to 0.302 in 2023–24, indicating improvement, although overall employment quality remained low.

3. Manufacturing Sector: The DWI rose from 0.324 to 0.411, reflecting gradual formalisation and digitalisation.

4. Transport Sector: The DWI improved from 0.285 to 0.350, driven by the expansion of urban logistics and app-based platform work.

5. Agriculture Sector: The DWI increased from 0.211 to 0.267, but agriculture remained the lowest-performing sector, with widespread self-employment, unpaid family work, unstable incomes and limited social protection.

6. **Regional Variation in Employment Quality:** Goa, Keralam, Tamil Nadu and Haryana perform substantially better in decent-work creation, while Bihar, Jharkhand and Uttar Pradesh continue to lag behind.

Key Concerns: Nature and Quality of Employment

1. **Widespread Informal Employment:** Nearly **90% of India's workforce** remains informally employed, with informality extending across organised industries, supply chains, logistics, gig work and home-based production.
2. **Inadequate Social Security:** Many workers lack **written contracts, paid leave, provident fund benefits and insurance coverage**, leaving them without adequate protection against income insecurity and economic shocks.
3. **Insecure Employment Arrangements:** Construction and retail workers often depend on **casual employment, subcontracting and insecure labour arrangements**, while contractualisation and outsourcing weaken employment security in other sectors.
4. **Limited Protection Despite Employment Growth:** Rising employment opportunities have not been matched by stronger labour protections, leaving many workers without stable livelihoods, workplace rights or adequate social security.

Structural Challenges to Decent Work

1. **Informalisation and Weak Formalisation:** Informality persists even within organised industries, as contractualisation and outsourcing expand, while formalisation policies often focus on business registration rather than actual working conditions.
2. **Implementation Gaps in Welfare Schemes:** Existing welfare schemes face implementation gaps that exclude millions of workers, preventing policy provisions from translating into effective social protection and livelihood security.
3. **Caste and Gender-Based Inequality:** Women from **Scheduled Tribes (STs) and Other Backward Classes (OBCs)** experienced declining decent-work outcomes between **2017–18 and 2023–24**, even as outcomes for men improved.
4. **Intersectional Labour Market Disadvantage:** The labour market penalty for being both female and socially marginalised has intensified after COVID-19, reflecting structural inequalities rooted in caste and gender hierarchies.

5. **Unequal Access to Education and Skills:** Education, skill training and formal enterprise employment improve decent-work outcomes, but unequal access to these opportunities restricts workers' entry into better-quality employment.
6. **Economic Costs of Poor-Quality Employment:** Workers without social security spend and save less, while informality depresses productivity, weakens tax capacity and increases inequality, affecting broader economic development.

Government Initiatives and Policy Framework

1. **Pradhan Mantri Viksit Bharat Rozgar Yojana (PM-VBRY):** Incentivises formal job creation through financial support for eligible first-time employees and employers creating additional formal employment, supporting workforce formalisation.
2. **National Career Service (NCS):** The **Ministry of Labour and Employment** operates an online platform connecting jobseekers, employers, vocational guidance and training providers to improve employment opportunities.
3. **PM Internship Scheme:** Provides structured corporate internship opportunities to youth, helping bridge the gap between educational learning and industry requirements through practical workplace exposure.
4. **Viksit Bharat–Guarantee for Rozgar and Ajeevika Mission (Gramin) Act, 2025:** Replaced MGNREGA from **1 July 2026**, providing a guarantee of **125 days of wage employment per financial year** to eligible rural households.
5. **e-Shram Portal:** Creates a national database of unorganised workers and facilitates access to social security and welfare schemes, although registration alone does not guarantee effective protection.
6. **Four Labour Codes:** Introduced in 2025 with the promise of simplifying labour regulation and expanding protections, but implementation remains partial and inconsistent, raising concerns about worker safeguards.

Way Forward

1. **Universal Social Protection:** Extend **portable and accessible social security** to gig and platform workers, self-employed individuals, farmers and informal workers, regardless of their employment status.
2. **Link Incentives with Worker Protection:** Make tax incentives and subsidies conditional on meaningful worker protections, including **written contracts, paid leave and social security contributions**, to encourage better employment practices.
3. **Focus Formalisation on Working Conditions:** Assess formalisation through actual labour conditions and worker protections rather than business registration alone, ensuring that formal enterprises provide decent employment.
4. **Adopt Gender-Responsive Labour Policies:** Provide **childcare facilities, safe transportation, skill training and safeguards against workplace discrimination**, particularly for women from marginalised caste groups.
5. **Strengthen Worker-Centric Labour Reforms:** Design labour reforms around workers' needs rather than primarily reducing business compliance costs, while ensuring that contractualisation does not weaken workplace protections.
6. **Ensure Effective Implementation:** Translate labour regulations and social security provisions into accessible benefits, enforceable workplace rights and meaningful protection for workers across different employment arrangements.

Conclusion

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India must move from counting jobs to improving their quality. Employment should provide fair income, dignity, security and social protection. Effective labour reforms, wider coverage and inclusive policies are essential to reduce inequality and make growth sustainable. **Decent work for all** must form a core part of the Viksit Bharat 2047 vision.

Question for practice:

Discuss the recent trends in employment quality in India and the performance of major economic sectors based on the Decent Work Index (DWI).

Source: The Hindu

An energy revolution in the making

UPSC Syllabus: Gs Paper 3- Infrastructure

Introduction

India's renewable energy transition is reshaping its energy system as electricity demand rises and climate commitments grow. Solar capacity has expanded rapidly, costs have fallen, and government support, private investment and technological progress have accelerated adoption. Beyond adding clean power, this shift is promoting decentralised generation, domestic manufacturing, employment and innovation. Its long-term success depends on financing, energy storage, stronger grids and skilled workers.

Current Status of Renewable Energy in India

1. **Renewable Energy Capacity:** India's renewable energy capacity, excluding large hydropower, reached approximately **204 GW** by late 2025, recording around **26% year-on-year growth**.
2. **Solar Energy Expansion:** Solar capacity increased from **2.8 GW in 2014** to approximately **171 GW in 2026**, reflecting rapid growth in solar power adoption.
3. **Recent Capacity Addition:** India added around **35 GW of solar capacity in 2025**, indicating the growing contribution of solar energy to the power sector.
4. **Solar Power Cost:** Solar power tariffs declined from around **₹8 per unit** in 2014–15 to **₹2.15 per unit** in the cited comparison, improving solar energy's affordability and competitiveness.
5. **Decentralised Solar Energy:** Rooftop solar adoption is expanding through household installations, while solar pumps and other **decentralised systems** are extending renewable energy access to rural areas.
6. **Domestic Manufacturing:** India's solar manufacturing base has expanded, with reported solar module manufacturing capacity exceeding **225 GW** and solar cell capacity around **45 GW**.

Major Government Initiatives

1. **PM Surya Ghar: Muft Bijli Yojana:** The scheme promotes residential rooftop solar installations. More than 24 lakh households had adopted rooftop solar under the scheme by late 2025..
2. **Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM):** The scheme promotes solar pumps and decentralised solar power in agriculture. More than **30 lakh standalone solar pumps** have reportedly been installed, supporting clean energy adoption and reducing reliance on conventional electricity and diesel pumps.
3. **Production Linked Incentive (PLI) Scheme:** The scheme supports domestic manufacturing of **high-efficiency solar photovoltaic modules**, strengthening local production and reducing import dependence.

4. **Solar Manufacturing Policy Support:** Customs-duty exemptions and related measures have supported capital-goods manufacturing, although exemptions do not cover every input. Such measures can complement production incentives in building **domestic supply chains**.
5. **National Green Hydrogen Mission:** The mission seeks to develop India's **green hydrogen ecosystem**, promote electrolyser manufacturing and support industrial decarbonisation.
6. **Green Energy Corridor (GEC):** The initiative strengthens transmission infrastructure to integrate renewable electricity into the grid. The cited Phase III allocation is approximately **₹50,000 crore**; this supports grid development and should not be mistaken for the full cost of storage or all renewable integration needs.
7. **Green Finance Taxonomy:** A green finance taxonomy can classify environmentally sustainable activities, **improve transparency** and help direct investment towards credible clean-energy projects.

Global Cooperation

1. **International Solar Alliance (ISA):** Launched jointly by India and France in 2015, the ISA promotes cooperation in solar deployment, financing, capacity-building and technology sharing.
2. **G20 Cooperation:** At the 2023 G20 Summit, leaders agreed to work towards **tripling global renewable energy capacity by 2030**, strengthening international momentum for the energy transition.
3. **BRICS Cooperation:** The New Delhi Declaration supported the **Solar Photovoltaic Cooperation Roadmap**, encouraging collaboration in solar energy, smart grids and energy storage.
4. **International Investment and Technology Transfer:** Partnerships can help **mobilise capital**, improve **access to technology** and strengthen renewable energy supply chains.

Significance of Renewable Energy Expansion

1. **Energy Security:** Renewable energy can **reduce dependence on imported fossil fuels**, limit exposure to global energy-price volatility and strengthen India's energy security.
2. **Environmental Sustainability:** Replacing fossil-fuel-based electricity with renewable energy can **reduce greenhouse gas emissions and air pollution**, supporting India's climate commitments.
3. **Employment Generation:** Renewable energy **creates jobs** in manufacturing, installation, maintenance, research and development. Rooftop solar also generates local work in surveying, design, installation and servicing, while creating **opportunities for women**.
4. **Rural Development:** Solar pumps and decentralised power systems can **improve energy access**, support agricultural activities and promote livelihood opportunities in rural areas.
5. **Domestic Industrial Growth:** Expanding manufacturing can **strengthen domestic supply chains**, encourage innovation and create opportunities for Indian industries.
6. **Energy Democracy:** Decentralised renewable energy enables households, farmers and local enterprises to **participate in energy generation**, broadening access beyond centralised power systems.
7. **Global Solar Momentum:** The cited comparison notes that the **first 1,000 GW** of global solar capacity took about 25 years, while the next 1,000 GW was added in **roughly two years**, illustrating the acceleration of solar deployment worldwide.

Key Challenges

1. **Intermittency:** Solar and wind generation depend on weather conditions and time of day, complicating the maintenance of a reliable electricity supply.

2. **Energy Storage:** India requires substantial battery storage and other flexible resources. The cited requirement is approximately **236 GWh** of battery storage by **2031–32**.
3. **Grid Infrastructure: Transmission constraints**, grid congestion and limited flexibility can restrict renewable integration and contribute to power curtailment.
4. **Financing Constraints:** High capital requirements, **financing costs** and project-execution risks can slow renewable energy expansion.
5. **Manufacturing Dependence:** Gaps across the solar value chain and reliance on **imported inputs** can create supply-chain vulnerabilities despite rising domestic capacity.
6. **Land and Environmental Concerns:** Large projects and transmission lines may create competing demands over land, **local livelihoods and ecological protection**.
7. **Transition and Reliability: Renewable capacity growth alone** does not establish that fossil-fuel dependence has declined. India must balance rising electricity demand, energy security and decarbonisation while ensuring reliable supply.
8. **Skills and Implementation: Shortages of trained workers**, uneven implementation capacity and maintenance challenges can affect project delivery and long-term performance.

Way Forward

1. **Meet the 2030 Target:** Work towards India's target of **500 GW** of non-fossil energy capacity by **2030** through sustained investment and timely project execution.
2. **Strengthen Energy Storage:** Accelerate **battery storage** and **pumped-storage hydropower**, alongside other suitable options, to balance renewable generation and improve grid flexibility.
3. **Modernise the Electricity Grid:** Expand transmission networks, improve interstate power transfer and adopt **smart-grid technologies**, forecasting and demand-side management.
4. **Promote Distributed Solar:** Expand rooftop solar, agricultural solarisation and **decentralised renewable systems**, particularly in rural and underserved areas.
5. **Strengthen Domestic Manufacturing:** Promote research, innovation and investment across the **solar value chain**, including cells, modules, storage technologies and essential components.
6. **Improve Financing: Mobilise private investment**, develop suitable financing instruments and strengthen the financial viability of renewable energy projects.
7. **Promote Agricultural Photovoltaics:** Explore **proposals** such as PM-KUSUM 2.0 and agrivoltaics to combine solar generation with agriculture, subject to suitable policy design and implementation.
8. **Support MSMEs:** Promote energy audits, technical assistance and clean-energy adoption among **Micro, Small and Medium Enterprises (MSMEs)**, beginning with suitable industrial clusters.
9. **Develop a Skilled Workforce:** Expand **technical training**, certification and industry partnerships for installation, operation, maintenance and manufacturing.
10. **Advance Green Hydrogen:** Support **electrolyser manufacturing**, research and infrastructure while ensuring access to affordable renewable electricity.
11. **Improve Thermal Power Efficiency:** Explore **Advanced Ultra Supercritical (AUSC)** technology to improve coal-based generation efficiency during the transition, while recognising that efficiency improvements do not replace renewable energy expansion.
12. **Strengthen Carbon-Market Mechanisms:** Develop credible **carbon-market mechanisms** that encourage emissions reductions and support cost-effective decarbonisation.

Conclusion

India's renewable energy transition can strengthen energy security, support employment and advance sustainable development. Meeting the 2030 target will require investment, storage, modern grids, domestic manufacturing and skilled workers. Coordinated action by governments, industry and international partners can help build a **reliable, affordable and inclusive clean energy system.**

Question for practice:

Examine the role of renewable energy initiatives in promoting India's clean energy transition.

Source: The Hindu

Building immunity to shocks emanating from the Middle East tensions

Source: The post **"Building immunity to shocks emanating from the Middle East tensions"** has been created based on **"Building immunity to shocks emanating from the Middle East tensions"** published in **"Business Line"** on 3rd November 2026.

UPSC Syllabus: GS 3: Indian Economy

Context: India, as a major oil-importing country, has traditionally been vulnerable to fluctuations in international crude oil prices, particularly during geopolitical tensions in the Middle East. However, India has demonstrated considerable resilience to recent oil shocks due to structural changes in the energy sector, calibrated fiscal and monetary policies, and sustained economic growth. It is argued that India should move beyond merely absorbing external shocks and use them as an opportunity to strengthen its long-term economic resilience.

Why is India becoming more resilient to oil shocks?

1. **Declining energy intensity:** Lower energy intensity reduces the impact of rising oil prices on the overall cost of production.
2. **Energy substitution:** The growing use of alternative energy sources reduces dependence on conventional petroleum products.
3. **Diversification of oil supplies:** The emergence of new oil-producing regions reduces dependence on any single geographical area.
4. **Strong refining capacity:** India's large oil-refining capacity provides a degree of protection against external supply disruptions.
5. **Counter-cyclical fiscal and pricing policies:** Government excise duties and oil-pricing policies help moderate the transmission of international price fluctuations to domestic consumers.
6. **Inflation-targeting framework:** Monetary policy helps anchor inflation expectations and limits the extent to which firms pass higher costs on to consumers.
7. **Fiscal space:** Post-pandemic fiscal consolidation, declining debt ratios and stronger tax revenues associated with economic growth provide the government with greater capacity to respond to shocks.
8. **Lower real oil prices:** Although nominal crude oil prices may cross $100 per barrel, their inflation-adjusted levels remain substantially below those reached during earlier oil shocks, including in 2012.
9. **Sustained economic growth:** India's continued high growth despite elevated oil prices indicates that its economic performance is becoming less vulnerable to external energy shocks.

Macroeconomic policy design for managing shocks

1. **Strengthening supply-side policies:** India should continue fiscal consolidation while improving the quality and productivity of public expenditure.
2. **Using economic buffers effectively:** Foreign exchange reserves, fiscal space and appropriate regulations should be used strategically to absorb temporary shocks and reduce market volatility.
3. **Coordinating fiscal and monetary policies:** Fiscal policy should expand potential output, while monetary policy should help keep actual output close to its sustainable potential.
4. **Maintaining price stability:** Monetary policy should anchor inflation expectations and prevent temporary cost increases from generating persistent second-round inflation.
5. **Preserving central bank independence:** Fiscal-monetary coordination should not compromise the credibility or operational independence of the central bank.
6. **Avoiding excessive liquidity creation:** Excessive liquidity can increase financial and market volatility and should therefore be avoided.
7. **Protecting vulnerable groups:** Persistent shocks should be passed through where necessary to preserve fiscal consolidation and financial stability, while vulnerable groups receive targeted and time-limited liquidity and credit support.

Challenges

1. **Persistent oil shocks:** Prolonged increases in international crude oil prices can raise production costs, fuel inflation and adversely affect economic growth.
2. **Fiscal constraints:** Excessive subsidies and indiscriminate fiscal stimulus can weaken fiscal consolidation and increase public debt.
3. **Foreign capital outflows:** Prolonged global risk aversion can trigger capital outflows, putting pressure on the rupee and financial markets.
4. **Declining capital inflows:** Rising public debt in advanced economies and increased investment in artificial intelligence may reduce foreign capital flows to emerging markets.
5. **Dependence on foreign financing:** India's current account deficit creates a need for external financing, making the economy vulnerable to sudden changes in global capital flows.
6. **Uneven State-level development:** Differences in governance, accountability and public-service delivery across States weaken overall economic resilience.
7. **Resistance to structural reforms:** Political and social resistance may delay necessary reforms in areas such as fertiliser pricing and energy transition.
8. **Market misperceptions:** Financial markets may continue to overestimate India's vulnerability to oil shocks, creating a gap between perceived financial stress and actual economic performance.

Way Forward

1. **Accelerate the green transition:** Promote renewable energy, energy efficiency and alternative energy sources to reduce dependence on imported oil.
2. **Maintain fiscal discipline:** Continue fiscal consolidation while improving the quality of public expenditure and preserving adequate fiscal space to address future shocks.
3. **Adopt calibrated macroeconomic policies:** Coordinate fiscal and monetary policies to sustain growth, anchor inflation expectations and maintain financial stability without compromising central bank independence.
4. **Strengthen strategic buffers:** Use foreign exchange reserves, fiscal space and regulatory measures judiciously to manage temporary external shocks and reduce market volatility.

5. **Protect vulnerable sections:** Provide targeted and time-bound liquidity and credit support to vulnerable groups affected by persistent economic shocks.
6. **Diversify trade and boost exports:** Expand free trade agreements and strengthen net exports to reduce the current account deficit and dependence on foreign financing.
7. **Promote technology and productivity:** Harness technological advancements to improve competitiveness, generate employment and strengthen domestic production capacity.
8. **Reform fertiliser policy:** Link fertiliser reforms with soil health, nutritional balance and environmentally sustainable domestic production to improve agricultural sustainability.
9. **Strengthen cooperative and competitive federalism:** Promote decentralisation, State-level accountability and better public-service delivery to improve the quality of life and strengthen domestic resilience.
10. **Improve policy communication:** Clearly explain how fiscal, monetary, regulatory and supply-side measures complement one another in managing economic shocks.
11. **Convert shocks into opportunities:** Use external disruptions to accelerate structural reforms, strengthen domestic capabilities and transform economic resilience from a defensive mechanism into a long-term competitive advantage.

Conclusion: India's experience suggests that resilience should not be viewed merely as the ability to return to the pre-shock position. It should be used to accelerate structural reforms, strengthen energy security, improve fiscal and external stability, and enhance productivity. A calibrated policy framework, supported by strategic buffers, green substitution, trade diversification and accountable decentralisation, can transform external shocks into opportunities for sustainable and inclusive economic growth.

Question: "India's resilience to oil shocks should be converted into a long-term economic advantage." Discuss in the context of India's macroeconomic policy design, energy security and structural reforms.

Source: **Business Line**

How AI training models could compromise privacy

Source: The post **"How AI training models could compromise privacy"** has been created based on **"How AI training models could compromise privacy"** published in **"The Hindu"** on 3rd November 2026.

UPSC Syllabus: GS 3 – Science and Technology

Context: The right to privacy is a constitutional right upheld by the Supreme Court in Justice K. S. Puttaswamy v. Union of India (2017) judgment. The rapid development of Artificial Intelligence (AI) has raised concerns regarding the collection, processing and use of personal data, which may compromise individual privacy and fundamental rights.

How AI training models threaten privacy

1. **Unauthorised collection of data:** AI companies collect large amounts of personal information from the internet, including social media platforms, websites and other publicly accessible sources, often without users' informed consent.
2. **Extraction of personal information:** AI models may memorise sensitive information during training and reproduce it in response to specific queries, thereby exposing private information.

3. **Identification of individuals:** Studies suggest that AI models can be queried to extract personal details that they have memorised during training, potentially identifying individuals and building their profiles.
4. **Exposure of sensitive information:** Personal data may include names, gender, sexual orientation, institutional affiliations, images, videos, browsing history and other behavioural patterns.
5. **Lack of meaningful consent:** Users may not be adequately informed that their personal data is being used to train AI models, limiting their ability to exercise control over their information.
6. **Profiling and discrimination:** The misuse of personal data can facilitate profiling and discriminatory practices, affecting individual autonomy and fundamental rights.

Legal and regulatory concerns in India

1. **Digital Personal Data Protection Act, 2023:** The Act was enacted in 2023, and the DPDP Rules were notified in November 2025. The framework seeks to regulate the processing of digital personal data and strengthen data protection.
2. **Consent and safeguards:** The framework provides for consent, notice and other safeguards governing the processing of personal data, subject to applicable provisions and exemptions.
3. **Uncertainty regarding AI training:** Questions remain regarding the application of data protection requirements to information collected from publicly accessible sources and subsequently used for AI training.
4. **Limitations of the right to erasure:** The ability to delete personal data does not necessarily mean that information already incorporated into a trained AI model can be completely removed.
5. **Right to object:** Indian users currently lack a fully effective, general right to object to the use of their personal data for AI training.

Challenges arising from AI companies' practices

1. **Use of publicly available data**: Companies such as Meta, Amazon and Google collect publicly available information to train AI models, raising concerns about whether public accessibility should be treated as consent for AI training.
2. **Limited opt-out mechanisms:** Meta provides users in the European Union with an option to object to the use of their public data for AI training, while comparable protection is not available to Indian users.
3. **Weak accountability:** Companies may use personal data for purposes beyond those originally intended, while individuals may have limited knowledge of how their information is processed.
4. **Risk of commercial exploitation:** AI-driven profiling may allow corporations to derive sensitive insights about individuals, potentially weakening their autonomy and privacy.

Measures to protect privacy

1. **Strengthening legal safeguards:** India should ensure effective implementation of the Digital Personal Data Protection framework and clarify its application to AI training, inferred information and publicly available personal data.
2. **Ensuring transparency:** AI companies should clearly disclose the sources of training data, the purposes of processing and the safeguards adopted to protect personal information.
3. **Providing meaningful consent and opt-out options:** Users should have accessible mechanisms to object to the use of their personal data for AI training, wherever required under the applicable legal framework.

4. **Promoting privacy-by-design:** AI developers should incorporate privacy safeguards at every stage of model development, including data collection, training, deployment and subsequent processing.
5. **Limiting data collection:** Companies should collect and retain only the personal data necessary for legitimate purposes and adopt suitable techniques to reduce the exposure of sensitive information.
6. **Strengthening accountability:** Regulatory authorities should ensure compliance through appropriate monitoring, enforcement and penalties for violations.
7. **Improving technical safeguards:** AI developers should test models for memorisation and unintended disclosure of personal information and adopt appropriate measures to reduce such risks.
8. **Protecting vulnerable groups:** Special attention should be given to preventing discriminatory profiling and the misuse of personal data belonging to vulnerable individuals.
9. **Encouraging responsible innovation:** The government should promote AI innovation while ensuring that commercial interests do not undermine constitutional rights and individual privacy.

Conclusion: AI offers significant opportunities for economic and social development, but its benefits must not come at the cost of individual privacy. India needs a balanced approach combining effective data protection laws, transparency, accountability and privacy-preserving AI technologies to ensure responsible and rights-based AI development.

Question: "Artificial Intelligence training models pose significant challenges to individual privacy and data protection." Discuss the concerns associated with AI training models in India and suggest measures to address them.

Source: The Hindu

What is the Role of Legislative Councils?

UPSC Syllabus: Gs Paper 2- Parliament and State legislatures—structure, functioning, conduct of business, powers & privileges and issues arising out of these.

Introduction

Legislative Councils (Vidhan Parishads) are the **upper houses of state legislatures in India, where they exist**. They aim to improve lawmaking through legislative scrutiny, informed debate and wider representation. Recent elections to **28 Council seats** in Uttar Pradesh, Bihar, Maharashtra and Karnataka have renewed interest in their role, composition and electoral process. Their limited powers and dependence on political decisions raise questions about their effectiveness and continued relevance.

Background and Rationale of Legislative Councils

1. **Historical Evolution:** The **Government of India Act, 1935** introduced bicameral legislatures in **six provinces**: Madras, Bombay, Bengal, the United Provinces, Bihar and Assam, with highly restricted voting rights for wealthy and educated minorities.
2. **Original Legislative Role:** These Councils acted as **revising chambers** to review Provincial Legislative Assembly decisions and enjoyed **equal powers** in passing bills under the 1935 framework.
3. **Arguments in Favour:** Supporters in the Constituent Assembly viewed Councils as a **check on hasty legislation**, a source of diverse viewpoints and a forum for informed debate.
4. **Arguments Against:** Opponents considered Councils **costly** and capable of delaying government action, while political leaders could use membership to **reward loyalists**.

5. **Constitutional Compromise:** The Constitution allowed **states to choose** whether to have a second chamber, while **limiting its membership and powers** to balance representation with administrative efficiency.

Constitutional Framework and Structure of Legislative Councils

1. **Constitutional Provisions: Article 168** provides for Legislative Councils in states with bicameral legislatures, while **Article 169** deals with their creation and abolition.
2. **Present Status: Six states** have operational Councils: Andhra Pradesh, Bihar, Maharashtra, Karnataka, Uttar Pradesh and Telangana. Uttar Pradesh has the largest Council with **100 seats**, while Telangana has **40**.
3. **Membership Strength: Article 171** fixes the minimum strength at **40 members**, while the maximum cannot exceed **one-third** of the total membership of the State Legislative Assembly.
4. **Creation and Abolition:** Under **Article 169**, Parliament may create or abolish a Council through ordinary legislation only after the State Assembly passes a resolution by a **majority of its total membership** and at least **two-thirds of members present and voting**.
5. **Permanent Nature and Tenure:** Under **Article 172**, a Council is a continuing House and cannot be dissolved. Each member serves **six years**, with **one-third retiring every two years**.
6. **Political Instability:** Tamil Nadu abolished its Council in **1986**, considered revival in **2010** and opposed revival in **2011**; Andhra Pradesh abolished its Council in **1985** and recreated it in **2007**.
7. **Seat Allocation:** The **Representation of the People Act, 1950** provides the seat distribution for individual Councils, including provisions for Madhya Pradesh and Tamil Nadu, whose Councils are **not operational**.

Composition and Categories of MLC Members

Article 171 provides for the Council's composition, with the following proportions applying **as nearly as may be**.

1. **Representation through MLAs: One-third** of Council members are elected by State Legislative Assembly members, connecting the Council with elected state representatives.
2. **Representation through Local Bodies: One-third** are elected by members of municipalities and other local authorities, providing local governance institutions a voice in state-level lawmaking.
3. **Graduate Constituencies: One-twelfth** of members are elected by designated graduate electorates, providing eligible graduates a separate channel of representation.
4. **Teacher Constituencies: One-twelfth** of members are elected by eligible teachers, providing educational professionals a distinct role in legislative representation.
5. **Governor's Nomination:** The Governor nominates the remaining **one-sixth** of members, bringing expertise from literature, science, art, the cooperative movement and social service.

Eligibility, Nomination and Electoral Process

1. **Eligibility for MLC Membership:** A candidate must be an **Indian citizen**, at least **30 years old** and satisfy the other constitutional and statutory qualifications applicable to the election.
2. **Eligibility for Graduate Voters:** A voter must be an Indian citizen, ordinarily resident in the constituency and have been a graduate of an Indian university, or hold a legally recognised equivalent qualification, for **at least three years**.

3. **Eligibility for Teacher Voters:** A voter must have taught for at least **three years during the preceding six years** in prescribed educational institutions within the state, not lower in standard than **secondary school**.
4. **Local Authority and MLA Electorates: Only sitting members** of concerned local bodies can vote in local authority constituencies, while **only sitting MLAs** vote in MLA constituencies.
5. **Special Electoral Rolls:** Graduate and teacher electoral rolls are **prepared afresh** before every election, requiring existing voters to reapply and fulfil eligibility conditions from the **November 1** qualifying date.
6. **Nomination Criteria:** The Governor nominates state residents with **special knowledge or practical experience** in literature, science, art, the cooperative movement and social service.
7. **Single Transferable Vote:** MLC elections use **proportional representation** through the **Single Transferable Vote (STV)**, where voters rank candidates by marking their preferences on ballot papers.
8. **Vote Counting and Ballot Secrecy:** Candidates need a **prescribed quota of votes**, with surplus votes and preferences transferred during counting; unlike Rajya Sabha elections, MLA voting in Council elections **remains secret**.

Role, Significance, Powers and Limitations of Legislative Councils

1. **Legislative Scrutiny:** Councils provide an additional forum to **examine bills**, discuss their provisions and **suggest changes**, helping the Assembly reconsider legislation before final passage.
2. **Deliberative Value:** Members with **professional knowledge and practical experience** can contribute informed perspectives to legislative discussions and improve the **quality of debate**.
3. **Representation of Local Interests:** Members elected through local authorities provide a channel for **local governance concerns** to reach the state legislature.
4. **Participation in the Executive:** The **Chief Minister** and other ministers may be members of the Legislative Council, just as ministers at the Union level can belong to the Rajya Sabha.
5. **Limited Powers over Ordinary Bills:** Under **Article 197**, the Council can delay an ordinary bill for up to **three months** initially and **one month** after the Assembly passes it again, but **cannot permanently block it**.
6. **Powers over Money Bills:** Under **Article 198**, a Council can only recommend changes to a Money Bill and must return it within **14 days**; the Assembly may **accept or reject** its recommendations.
7. **Difference from Rajya Sabha:** Rajya Sabha is a **permanent parliamentary chamber**, whereas a State Council's existence depends on the constitutional process involving the State Assembly and Parliament.

Reforms and the Way Forward

1. **Implementing the Second ARC Recommendation:** The **Second Administrative Reforms Commission (ARC)**, in its **2007** Local Governance Report, proposed creating Legislative Councils in all states as **Councils of Local Governments**.
2. **Reforming Electoral Composition:** The ARC recommended **removing separate graduate and teacher electorates**, arguing that **rising literacy rates** reduced the need for these special constituencies.

3. Strengthening Local Representation: Enhance the **representation of local bodies** to strengthen grassroots participation in state-level legislation.

4. Ensuring Meaningful Functioning: Legislative Councils should **perform substantive roles in legislative scrutiny, debate and policy review** rather than functioning merely as an additional or ornamental chamber.

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5. Reviewing Institutional Relevance: States should **periodically assess whether their Legislative Councils are fulfilling their intended purposes** and contributing meaningfully to governance.

6. Establishing a National Policy: A **2013 Parliamentary Committee** recommended a national policy on the creation and abolition of Legislative Councils to ensure a **consistent approach** across states, rather than allowing such decisions to vary with the political preferences of the government in power.

Conclusion

Legislative Councils can add value to state governance when they ensure **meaningful scrutiny, informed debate and wider representation**. Their relevance depends on effective functioning, institutional stability and a clear purpose. Reforms in representation and a consistent policy on their existence can help them serve as useful deliberative institutions.

Question for Practice:

Discuss the role, significance, powers and limitations of Legislative Councils in India, and suggest measures to improve their effectiveness.

Source: The Hindu; Indian Express

COP31 and the World's 35×35 Plan

UPSC Syllabus: Gs Paper 3- Environment And Infrastructure

Introduction

The 31st Conference of the Parties (COP31) to the United Nations Framework Convention on Climate Change (UNFCCC) will be held in Antalya, Türkiye, from **November 9 to 20, 2026**. The Turkish presidency has proposed increasing electricity's share in global final energy consumption to **35% by 2035**, known as the 35×35 plan. The proposal aims to accelerate the transition away from fossil fuels through electrification and renewable energy. However, rising global emissions, unequal infrastructure and financing capacity raise concerns about its feasibility and implications for developing countries, particularly India.

The Need for Accelerated Electrification

1. **Record Global Emissions:** Global emissions reached a record **58 gigatonnes in 2025** and continue to rise, showing the gap between current climate action and the required emission reductions.
2. **Inadequate Climate Commitments:** Full implementation of revised **Nationally Determined Contributions (NDCs)** may reduce global emissions by only **5–8% by 2030**, compared with 2025 levels, which remains insufficient.
3. **Requirements of the 1.5°C Pathway:** Limiting global warming to 1.5°C requires emissions to fall by **over 43% from 2019 levels** and **18% from 2025 levels**.
4. **Electrification and Net Zero:** The **Intergovernmental Panel on Climate Change (IPCC)** identifies widespread electrification as a key feature of net-zero energy systems, with electricity supplying **48–58% of final energy consumption by 2050** in modelled 1.5°C pathways.
5. **Emission Reduction Potential:** Under the **International Energy Agency's (IEA)** High Electrification Scenario, achieving 35% electrification could reduce end-use emissions by **40% by 2035**.

6. **Energy Access and Development:** Around **730 million people** lack electricity access, making reliable and affordable electricity essential for meeting basic energy needs and supporting economic development.

The 35×35 Plan: Global Ambition and Sectoral Priorities

1. **Global Electrification Target:** The COP31 presidency proposes raising electricity's share in global final energy demand from **23% to 35% by 2035**, requiring annual progress of about **1.2 percentage points**, nearly **four times** the pace achieved since 2010.
2. **Economic Feasibility:** At 2026 costs and prices, raising electricity's share in global energy use to **around 33% is already cost-effective**, suggesting that the proposed target is economically within reach.
3. **Present Sectoral Electrification Gap:** Buildings meet nearly **40%** of their energy needs through electricity, industry **slightly below 30%**, and transport only **around 2%**, showing significant differences in electrification levels.
4. **Future Sectoral Electrification Requirements:** By 2035, electrification may need to reach **55% in buildings, 39% in industry and 13% in transport**, with major gains expected from heating, industrial heat and mobility.
5. **Sector-Specific Electrification Opportunities:** Buildings can expand **electric space and water heating**, industries can electrify **low- and medium-temperature heat**, while transport offers scope to electrify **oil-based mobility**.
6. **Different Priorities Across Countries:** Advanced economies and China have major opportunities in **heat pumps and electric cars**, while developing countries may focus on **electric two- and three-wheelers, clean cooking, irrigation and light industries**.

Major Challenges in Achieving the Global Target

1. **Inadequate Grid Infrastructure:** Achieving 35% electrification could increase electricity demand by around **1,400 terawatt-hours annually**, requiring grids to expand **40% faster** than their historical pace.
2. **Delayed Grid Connections:** More than **2,500 gigawatts (GW)** of renewable energy, storage and large-load projects remain stalled in grid-connection queues, delaying the use of newly developed energy infrastructure.
3. **Equipment Shortages and Rising Costs:** Longer equipment delivery times and an **80% rise in United States transformer costs over five years** demonstrate the growing constraints on electricity grid expansion.
4. **Financially Distressed Utilities:** Around **three-quarters** of utilities in sub-Saharan Africa and **nearly half** in developing Asia face poor financial health, weakening their ability to expand electricity services.
5. **High Investment Requirements:** Annual investment in end-use electrification must rise from **$320 billion to around $1 trillion by 2035**, while average annual global grid investment must reach about **$1 trillion during 2026–2035**.
6. **Unequal Financing Conditions:** Clean energy borrowing costs in emerging economies are **two to three times higher** than in advanced economies and China, increasing project costs and restricting investment.

India's Position: Opportunities and Limitations

1. **Current Electrification Level:** Electricity accounts for around **23%** of India's final energy consumption, indicating scope for electrification but also the importance of its existing energy structure.

2. **Dependence on Fossil Fuels:** Fossil fuels meet around **72%** of India's energy consumption, reflecting the continuing role of conventional energy in supporting economic growth.
3. **Uneven Renewable Energy Progress:** Renewables, including large hydropower, account for around **26%** of India's electricity generation, although their share in installed capacity **exceeds 50%**, reflecting lower capacity factors of solar and wind.
4. **Rising Energy Demand:** India's industrialisation and economic growth require higher energy consumption, while electricity's share may rise to only **about 24% by 2035** under the existing policy scenario.
5. **Sectoral Transition Constraints:** Industry and transport remain heavily dependent on fossil fuels, while their electrification depends on introducing alternative technologies and fuels such as **green hydrogen, biofuels and electric batteries**.
6. **Renewable Energy Generation Constraints:** India's rising energy demand relative to supply widens the gap between renewable installed capacity and actual generation, making **capacity additions alone insufficient** to meet growing needs.

India's Way Forward

1. Prioritise Renewable Electricity Generation: Increase renewables' share in electricity generation as a pragmatic near-term priority over a uniform electrification target.

2. Strengthen Transmission and Storage: Invest in transmission networks and energy storage to integrate renewable power and meet rising electricity demand.

3. Promote Alternative Technologies and Fuels: Expand green hydrogen, biofuels and electric batteries to reduce fossil fuel dependence in industry and transport.

4. Ensure Planned Infrastructure Investment: Direct public and private investments towards renewable infrastructure, transmission, storage and alternative fuels.

5. Align Transition with Developmental Goals: Balance India's energy transition with Viksit Bharat, rising energy demand and its long-term net-zero objective.

6. Strengthen International Financial Support: Seek predictable climate finance, affordable capital and technology access to support grids, clean cooking, mobility and small industries.

7. Adopt Equitable National Pathways: Ensure global climate cooperation respects differences in energy needs, infrastructure and financial capacity, avoiding disproportionate burdens on the Global South.

Conclusion

Electrification can accelerate decarbonisation, improve energy security and expand energy access. However, achieving the 35×35 plan requires reliable infrastructure, affordable finance and equitable international cooperation. India should prioritise renewable electricity generation, transmission and storage while promoting cleaner technologies. Its energy transition must balance rising energy demand, Viksit Bharat and its long-term net-zero objective.

Question for practice:

Discuss the objectives of the COP31 35×35 plan, the challenges in achieving its global electrification target, and India's approach to balancing energy transition with developmental priorities.

Source: Business Standard

A case for reforming APEDA

Source: The post **"A case for reforming APEDA"** has been created based on **"A case for reforming APEDA"** published in **"Business Line"** on 4th November 2026.

UPSC Syllabus: GS 3: Indian Economy

Context: The Agricultural and Processed Food Products Export Development Authority (APEDA) is responsible for developing, promoting and regulating India's agricultural and processed food exports. Despite India's significant agricultural potential, exports of several high-value agricultural products have not achieved their full potential, highlighting the need for reforms in APEDA. In this regard, there is a need for APEDA to move beyond its conventional role of regulating and monitoring exports and evolve into a professional think-tank.

About Agricultural and Processed Food Products Export Development Authority

1. Agricultural and Processed Food Products Export Development Authority was established in December 1985 under the Agricultural and Processed Food Products Export Development Authority Act, 1985.
2. Its headquarters is located in New Delhi.
3. It functions under the Ministry of Commerce and Industry.
4. APEDA serves as the Secretariat to the National Accreditation Board (NAB) and is responsible for implementing the accreditation of certification bodies under the National Programme for Organic Production (NPOP).
5. APEDA is responsible for export promotion, quality improvement, market and infrastructural development, certification and accreditation.

Challenges faced by APEDA

1. **Inadequate financial allocation:** APEDA has received an annual budget allocation of only ₹80 crore in most years since 2019-20, affecting its capacity to promote agricultural exports.
2. **Vacant leadership and staff positions:** The post of Director has remained vacant for over three years, while several other positions have also not been filled after the retirement of officials.
3. **Limited export diversification:** India's agricultural exports have remained concentrated in a few commodities. In 2023-24, marine products, non-basmati rice, basmati rice and buffalo meat accounted for nearly 50% of total exports worth $53.72 billion.
4. **Weak organic certification mechanism:** Irregularities in certification bodies have raised concerns regarding the credibility of India's organic exports. Out of nearly 20 lakh organic farmers, only six lakh have been verified so far.
5. **Export consignment rejections:** In 2010, the European Union rejected 1,200 containers of Indian table grapes due to excessive residues of a plant growth regulator, raising questions about quality monitoring and farmer awareness.

6. **Declining groundnut exports:** Indonesia suspended imports of Indian groundnuts and tightened aflatoxin standards. Consequently, India's exports declined from $300 million in 2024 to $190.86 million in 2025 and $72.59 million during January-August 2026.
7. **Weak protection of Geographical Indication (GI) tags:** APEDA's efforts to secure GI recognition for basmati rice in Australia, New Zealand and Kenya were rejected, while the European Union has delayed its decision since 2018.
8. **Inadequate international marketing:** Indian products such as bananas, mangoes and pomegranates have enormous export potential, but their unique qualities have not been adequately promoted in international markets.
9. **Dependence on the Indian diaspora:** Indian agricultural exports largely depend on expatriate consumers rather than reaching mainstream international retail chains such as Walmart, Tesco, Schwarz and Woolworths.
10. **Inadequate institutional focus:** APEDA has largely remained engaged in regulating and monitoring exports instead of developing strategic policies, market intelligence and proactive export promotion initiatives.

Way Forward

1. **Transform APEDA into a think-tank:** It should focus on research, policy formulation, market intelligence and strategic planning rather than merely regulating and monitoring exports.
2. **Strengthen financial and human resources:** Adequate budgetary support should be provided, along with the timely filling of vacant leadership and staff positions.
3. **Improve certification and quality assurance:** Organic certification bodies should be closely monitored, and the verification of organic farmers should be completed to ensure credibility in international markets.
4. **Strengthen food safety standards:** Farmers and exporters should be made aware of international standards relating to pesticide residues, aflatoxins and other quality parameters to prevent rejection of consignments.
5. **Diversify agricultural exports:** Greater attention should be given to high-potential products such as fruits, vegetables, processed foods, pulses and other value-added agricultural products.
6. **Strengthen international market access:** APEDA should proactively engage with foreign governments to resolve trade barriers and protect India's agricultural interests.
7. **Promote Indian products globally:** Indian agricultural products should be marketed through international retail chains and global supply networks rather than depending primarily on the Indian diaspora.
8. **Protect GI products:** Stronger diplomatic, legal and institutional efforts should be undertaken to secure international recognition and protection for products such as basmati rice.
9. **Encourage professionalism:** APEDA should adopt a professional, result-oriented approach by involving export experts, agricultural scientists, market specialists and industry stakeholders.

Conclusion: Agricultural exports can generate foreign exchange, improve farmers' incomes and strengthen India's position in global agricultural trade. Therefore, APEDA needs institutional restructuring, adequate resources and a proactive approach to transform itself from a regulatory body into a professional institution driving India's agricultural export growth.

Question: Discuss the challenges faced by the Agricultural and Processed Food Products Export Development Authority (APEDA) in promoting India's agricultural exports. Suggest measures to transform it into a more effective institution for export promotion.

Source: Business Line

Processing power key to India's mineral stockpile

Source: The post **"Processing power key to India's mineral stockpile"** has been created based on **"Processing power key to India's mineral stockpile"** published in **"Business Line"** on 4th November 2026.

UPSC Syllabus: GS 3: Indian Economy

Context: Critical minerals are essential for electric vehicles, batteries, defence equipment, electronics and energy infrastructure. India is planning to establish a strategic stockpile of critical minerals to reduce its dependence on global supply chains and protect domestic industries from supply disruptions. However, securing raw materials alone is insufficient without developing domestic processing and manufacturing capabilities. India must adopt an integrated approach combining strategic stockpiling, domestic processing, recycling, technological development and import diversification to achieve strategic autonomy and ensure uninterrupted industrial production.

About Critical Minerals

1. Critical minerals are a **category of non-fuel minerals and elements** which **satisfy two conditions:**
    a. **Economic development & National Security:** Essential for economic development and national security as **they are vital for development of materials for defense, aerospace, nuclear, and space applications.**
    b. **Supply chain vulnerability:** There are **associated risk of supply chain vulnerability and disruption with these minerals,** due to their lack of availability, and concentration of existence, extraction or processing of these minerals in few geographical locations.

Need of stockpiling of critical minerals

1. Supply chain security: Strategic reserves can protect Indian industries against global supply disruptions and geopolitical uncertainties.

2. Industrial continuity: The availability of critical minerals can help industries maintain production during temporary shortages of essential raw materials.

3. Strategic autonomy: Stockpiling can reduce India's vulnerability to external suppliers for minerals required in critical sectors such as defence, energy and electronics.

Challenges and limitations of stockpiling

1. Lack of domestic processing capacity: Possession of raw minerals does not guarantee the ability to convert them into finished industrial products.

2. Dependence on foreign technology: Processing critical minerals requires specialised technology, equipment, infrastructure and technical expertise.

3. Shortage of finished industrial inputs: Industries require specific grades, chemical forms and processed materials rather than merely raw minerals.

4. Disruption of manufacturing: Shortages of even small but essential components, such as rare-earth permanent magnets, can disrupt entire industries, including electric vehicle manufacturing.

5. High financial burden: Strategic reserves require substantial public investment for procurement, storage and replenishment. Fluctuations in global commodity prices can also increase financial risks.

6. Limited protection against prolonged disruptions: Stockpiling provides temporary relief, but without domestic processing facilities and manufacturing expertise, it cannot ensure long-term supply security.

7. Challenges in recycling: Recycling can recover critical minerals from discarded products, but its contribution depends on the availability and composition of waste materials.

Way Forward

1. Develop domestic processing capacity: India should invest in facilities that can convert raw minerals into processed materials and finished industrial components.

2. Promote integrated manufacturing: The government has approved a ₹7,280-crore scheme to establish an annual capacity of 6,000 tonnes for integrated rare-earth permanent-magnet manufacturing, covering the production chain from rare-earth oxides to finished magnets.

3. Diversify import sources: India should develop alternative international supply partnerships to reduce excessive dependence on individual countries.

4. Promote recycling: Efficient recycling systems should be developed to recover critical minerals from discarded batteries, electronics and other industrial products.

5. Ensure industry-oriented stockpiling: Strategic reserves should include not only raw minerals but also processed materials required by domestic manufacturers.

6. Establish clear utilisation guidelines: The government should define which industries can access reserves during shortages, the quantities to be released and the duration for which reserves can sustain production.

7. Encourage private sector participation: Private investment and commercial partnerships should be promoted to develop processing infrastructure and advanced manufacturing capabilities.

8. Identify critical dependencies: India should identify which mineral dependencies can be managed through imports, which require alternative sources and which need domestic production capabilities.

Conclusion: Strategic autonomy does not necessarily mean manufacturing everything domestically; rather, it means ensuring that external supply disruptions do not halt essential economic activities. Therefore, India must adopt an integrated approach combining mineral stockpiling, domestic processing, recycling, technological development and import diversification to secure its industrial future.

Question: India's mineral security requires not only access to critical minerals but also the domestic capacity to process them into finished industrial products. Discuss.

Source: Business Line

Need for a Unified Urbanisation Plan in India

UPSC Syllabus: Gs Paper 1- urbanisation, their problems and their remedies.

Introduction

India's urbanisation is expanding beyond municipal boundaries, while classification, planning and governance remain tied to administrative boundaries. The **2027 Census is expected to retain conventional urban criteria**, even as satellite estimates reveal a wider urban footprint. This gap affects access to planning, municipal finance and public services. A **National Urbanisation Policy (NUP)** is needed to effectively align classification, regional planning, finance and governance within a coherent, flexible framework.

Urbanisation in India: Current Status and Emerging Trends

1. **Growing Urban Population:** India had **377 million** urban residents across approximately 8,000 cities and towns in 2011, while the United Nations projects **over 720 million** urban residents by 2050.
2. **Changing Urban Estimates:** Satellite-based data cited in the Economic Survey 2025–26 estimated that **63%** of India's population was urban in **2015**, highlighting the gap between spatial estimates and official Census classification.
3. **Expansion of Statutory Towns:** Since 2011, States have notified another **1,000 statutory towns**, indicating that formal urbanisation also depends on administrative decisions.
4. **Uneven Settlement Distribution:** Nearly **94%** of urban settlements are small towns, while around **60%** of the urban population lives in Class I cities, reflecting India's diverse urban structure.
5. **Wide Variation in Urban Scale:** Greater Mumbai had nearly **12 million** residents in 2011, whereas Gangotri Nagar Panchayat had **only 110**, illustrating significant differences in settlement size.
6. **Rapid Peri-Urban Expansion:** Peri-urban areas are growing at approximately **4.15%** annually, compared with **2.9%** within administrative boundaries, highlighting the need to plan beyond municipal limits.
7. **Growing Policy Recognition:** The 2026 Union Budget allocated **₹5,000 crore each** to City Economic Regions, reflecting increasing policy attention towards regional economic development.

Rural–Urban Classification in India and Its Limitations

1. Statutory Town Classification: A settlement is classified as urban if it has a legally recognised Urban Local Body (ULB), such as a municipality, municipal corporation or cantonment board.

2. Census Town Criteria: A settlement qualifies as a Census town if it meets all three criteria: population of at least 5,000, density of at least 400 persons per sq. km and 75% of male main workers engaged in non-agricultural activities.

3. State Discretion in Urban Notification: Article 243Q(2) allows the Governor to specify urban areas through public notification, considering prescribed factors. Variations in State-level criteria create inconsistencies in urban classification.

4. Rural–Urban Binary Classification: Treating settlements as exclusively rural or urban overlooks transitional areas where built-up expansion and economic activities increasingly display urban characteristics.

5. Limitations of Urban Categories: Class I cities have populations of 1 lakh or more, encompassing settlements with widely differing economic functions, governance capacities and infrastructure requirements.

6. Classification-Linked Benefits: Urban classification influences access to master planning, municipal finance, Finance Commission grants, building regulations, environmental clearances and government schemes.

Emerging Challenges and Concerns in India's Urbanisation

1. **Peri-Urban Governance Gap:** Rapid urbanisation without administrative changes leaves rural Panchayats responsible for land use, waste, water and air quality, despite **lacking adequate mandates and technical capacity**.
2. **Inadequate Urban Planning Coverage:** Approximately **52%** of statutory towns and **76%** of Census towns **lack master plans**, weakening the basis for regulating land use and guiding development.
3. **Outdated Planning Legislation: Nine States** have not updated their planning legislation since the 74th Constitutional Amendment, while the widely used model law dates to **1985**.
4. **Inadequate Contemporary Planning Provisions:** Existing planning frameworks inadequately address the rural–urban continuum, land acquisition challenges and climate adaptation, limiting their ability to manage emerging urbanisation needs.
5. **Incomplete Devolution of Municipal Functions: Article 243W** makes devolution permissive, so urban notification does not automatically transfer **all 18 functions** listed in the Twelfth Schedule to municipalities.
6. **Fragmented Regional Governance:** Administrative jurisdictions often **fail to match functional urban regions**, limiting coordination among institutions responsible for infrastructure and environmental management.
7. **Jurisdictional Limits of Environmental Management:** Around **65%** of Delhi's PM2.5 **originates outside the city**, illustrating why city-level air-quality interventions alone cannot address regional pollution sources.
8. **Weak Municipal Finances:** Municipal revenue accounts for **approximately 1% of Gross Domestic Product (GDP),** compared **with 7.4% in Brazil and 6% in South Africa,** highlighting constraints on urban investment capacity.
9. **Limited Revenue and Financial Predictability:** Property tax contributes only **0.15% of GDP**, while piecemeal transfers and limited access to blended finance constrain municipal resource mobilisation.

Need for a National Urbanisation Policy: Objectives and Significance

1. **Establish a Coherent Policy Framework:** Align existing classification rules, fiscal transfers and government schemes under **common principles**, addressing fragmented urbanisation policies **without creating a parallel delivery system**.
2. **Recognise Transitional Settlements:** Establish **transparent recognition criteria and periodic reviews**, enabling urbanising settlements to access appropriate planning, infrastructure and governance arrangements.
3. **Promote Balanced Urban Development:** Recognise the **distinct needs** of megacities, intermediate cities, small towns and transitioning settlements, avoiding uniform policies for settlements with different capacities and requirements.
4. **Strengthen Cooperative Federalism:** Establish **shared national principles** while allowing States and local governments to develop context-specific approaches according to their institutional capacities and local conditions.

5. **Improve Institutional Accountability:** Clarify **institutional responsibilities** and coordination mechanisms, making authorities more accountable for the combined outcomes of classification, planning and financing decisions.

6. **Improve Fiscal Coordination:** Align municipal grants, funding mechanisms and reform incentives to improve **financial predictability** and encourage better urban governance and service delivery.

Key Pillars of a Unified Urbanisation Framework

A. Foundational Reforms

1. **Standardise Urban Classification:** Establish **common criteria** for recognising urban settlements, supported by geospatial data, built-up growth and economic activity, with **periodic reviews** beyond the Census.

2. **Modernise Spatial and Regional Planning:** Update planning laws, strengthen **regional planning** and require **peri-urban zoning**, ensuring development decisions reflect settlement expansion beyond municipal boundaries.

3. **Reorient Urban Finance:** Strengthen municipal **own-source revenues**, **predictable formula-based transfers** and project preparation capacity, enabling local governments to finance urban development and expanding responsibilities.

B. Institutional and Governance Reforms

4. **Establish a National Urbanisation Council:** Create a coordination mechanism connecting existing institutions, including the Inter-State Council, Central Council of Local Government and NITI Aayog, to align urbanisation policies.

5. **Strengthen Metropolitan and District Planning:** Improve Metropolitan Planning Committees and District Planning Committees under **Articles 243ZE and 243ZD**, extending coordination beyond major metropolitan areas.

6. **Align Governance with Functional Regions:** Develop **empowered institutions** at appropriate geographical scales, including airsheds, river basins and city regions, to address challenges exceeding municipal jurisdictions.

7. **Align Political and Fiscal Incentives:** Design suitable **reform-linked incentives** that encourage States and municipalities to improve urban governance, while respecting local autonomy and strengthening accountability.

C. Sectoral Reforms and Local Innovation

8. **Integrate Sectoral Planning:** Align infrastructure, land use, economic development and environmental management with **functional urban regions**, reducing fragmented interventions across sectors.

9. **Promote Knowledge Exchange and Local Innovation:** Support **knowledge-sharing**, institutional learning and **local innovation** across cities and towns, helping governments develop context-specific solutions and improve governance performance.

Way Forward

1. **Prioritise Foundational Reforms:** Sequence **classification, spatial planning and municipal finance** reforms first, establishing the institutional and financial foundations for effective urbanisation management.

2. **Introduce Periodic Urban Classification Reviews:** Review settlement status at **fixed intervals** using transparent criteria, satellite imagery, **geospatial information** and economic activity, rather than relying exclusively on decennial Census exercises.
3. **Strengthen the Legal Basis of Planning:** Modernise State planning legislation, provide **statutory backing** to regional plans and require **peri-urban zoning** to guide development beyond municipal boundaries.
4. **Extend Planning and Services to Transitional Settlements:** Provide appropriate planning, infrastructure and services **before formal urban notification**, preventing administrative classification from delaying essential development interventions.
5. **Strengthen Municipal Fiscal Capacity:** Improve **property tax administration**, **predictable transfers** and project preparation capabilities, enabling municipalities to mobilise resources and implement development priorities.
6. **Ensure Transparent Municipal Funding:** Provide **untied grants directly to municipalities** through **published allocation formulas**, improving transparency, financial predictability and local discretion in spending decisions.
7. **Build Multi-Level Institutional Coordination:** Strengthen cooperation among the **Centre, States, municipalities and regional institutions**, aligning responsibilities with functional geographical realities.
8. **Promote Local Innovation and Performance:** Support knowledge-sharing and local experimentation while linking appropriate incentives to **measurable governance improvements**, encouraging context-specific solutions rather than uniform implementation.

Conclusion

India needs a unified framework aligning classification, planning, finance and governance with changing settlement patterns. Common principles, stronger municipal capacity and regional coordination can help manage growth while respecting federal responsibilities. **Planning and essential services must reach transitioning settlements before formal urban recognition**, supporting a more inclusive and resilient urban future.

Question for practice:

Discuss the need for a National Urbanisation Policy in India and examine its key objectives and pillars for achieving inclusive and planned urban development.

Source: The Hindu; wri-India

What the BRICS carbon market partnership needs

Source: The post **"What the BRICS carbon market partnership needs"** has been created based on **"What the BRICS carbon market partnership needs"** published in **"The Hindu"** on 5th November 2026.

UPSC Syllabus: GS 3: Environment

Context: The 18th BRICS Summit, held in New Delhi, reaffirmed the commitment of BRICS countries to operationalise the Memorandum of Understanding on the BRICS Carbon Markets Partnership. The partnership

aims to promote cooperation through capacity-building, experience-sharing and harmonisation of carbon market mechanisms. However, its success requires a common framework rather than merely creating a common trading platform.

Present Status of Carbon Markets in BRICS

1. BRICS countries have developed different domestic carbon market mechanisms based on their respective economic and regulatory conditions.
2. China and India have adopted output-based emission-intensity benchmarks, while Brazil follows an absolute emissions cap.
3. China has a compliance carbon market covering sectors such as steel, cement and aluminium.
4. India's Carbon Credit Trading Scheme (CCTS) has notified emission-intensity targets for 490 entities across nine sectors.
5. Brazil's 2024 law establishes the Brazilian Greenhouse Gas Emissions Trading System (SBCE), a cap-and-trade mechanism.
6. South Africa, Indonesia and other BRICS members also operate voluntary carbon markets and host carbon credit projects.

Major Challenges in Integration

1. **Divergent regulatory frameworks:** Different emission benchmarks, compliance requirements and carbon pricing mechanisms make integration difficult.
2. **Different legal status:** In Brazil, carbon units are treated as securities, whereas in India, carbon credit certificates are traded through power exchanges under regulations issued by the Central Electricity Regulatory Commission (CERC).
3. **Limited mutual recognition:** China's compliance market primarily recognises Chinese Certified Emission Reduction credits, while India's market has restrictions on eligible project types.
4. **Lack of common accounting standards:** Differences in measurement, reporting and verification (MRV) systems make it difficult to compare carbon credits across countries.
5. **External regulatory pressures:** The European Union's Carbon Border Adjustment Mechanism (CBAM), followed by the United Kingdom's mechanism, creates pressure on exporters to demonstrate verified emissions data.
6. **Risk of double counting and friction:** Differences in national carbon accounting and credit classification may create disputes over ownership and corresponding adjustments.

Measures Required to Strengthen the BRICS Partnership

1. **Establishing a Common Framework**
    a. The first priority should be developing a common Measurement, Reporting and Verification (MRV) framework.
    b. BRICS countries should adopt comparable accounting standards, granular default values and interoperable systems to ensure consistency in carbon credit measurement.
    c. The partnership should build upon the principles of transparency, inclusiveness and fairness under the BRICS 2025 principles.
2. **Linking Domestic Carbon Markets**
    a. A BRICS rulebook should establish common monitoring rules consistent with ISO 14064 standards.

   b. Countries should mutually recognise verifiers accredited by their respective national accreditation bodies.
   c. Registry data fields should be harmonised to facilitate cross-border transactions and provide a common compliance pathway.
   d. This would help exporters deal with foreign regulators through a single compliance framework.

3. **Addressing CBAM Challenges**
   a. BRICS countries should collectively address unilateral and discriminatory trade measures such as CBAM.
   b. A common and credible carbon accounting system would help exporters demonstrate verified emission reductions and avoid punitive default values.
   c. Greater coordination would strengthen the negotiating position of BRICS members in international climate-related trade discussions.
4. **Developing a Pilot Exchange Mechanism**
   a. A small pilot exchange should be established to test cross-border trading of carbon credits.
   b. Article 6.2 of the Paris Agreement provides the legal basis for bilateral transfers of mitigation outcomes with corresponding adjustments.
   c. India's Joint Crediting Mechanism with Japan provides a possible model for such cooperation.
   d. The pilot should initially involve countries with approved methodologies and authorised volumes of carbon credits.
5. **Ensuring Institutional Coordination**
   a. The New Development Bank could establish a shared registry data facility or provide purchasing facilities for pilot transactions.
   b. The dialogue should also address carbon market adaptation, including the allocation of proceeds from intra-BRICS transfers.
   c. Common MRV rules and methodology-level pilots should be prioritised over complete integration of domestic compliance markets.

Way Forward

1. BRICS should initially focus on a low-cost and methodology-level pilot rather than attempting immediate integration of all domestic carbon markets.
2. A common rulebook should preserve national regulatory autonomy while ensuring transparency, comparability and credibility.
3. The partnership should strengthen institutional coordination, improve registry systems and facilitate mutual recognition of verified carbon credits.
4. Cross-border cooperation should also address carbon accounting, legal classification, sanctions, compliance settlement and retirement of credits.

Conclusion: The BRICS Carbon Markets Partnership offers an opportunity to convert fragmented national carbon markets into a coordinated framework for climate cooperation. Instead of pursuing complete market integration immediately, BRICS should adopt a phased approach based on common MRV standards, credible accounting and pilot cross-border transactions. Such an approach can strengthen climate cooperation while protecting national regulatory interests and improving the competitiveness of BRICS exporters in global markets.

Question: "The BRICS Carbon Market Partnership has the potential to transform fragmented national carbon markets into a coordinated trading framework. However, its success depends on harmonisation of standards, credible accounting mechanisms and institutional cooperation." Discuss.

Source: The Hindu

The North East as an engine of India's growth

Source: The post **"The North East as an engine of India's growth"** has been created based on **"The North East as an engine of India's growth"** published in **"Hindustan Times"** on 5th November 2026.

UPSC Syllabus: GS 3: Indian Economy

Context: The eight North Eastern states are strategically located, with nearly 98% of their boundaries adjoining international borders. As India moves towards the vision of Viksit Bharat 2047, the North East has the potential to emerge as a major driver of economic growth through its natural resources, human capital and cultural diversity. The region should be viewed as a family of diverse states rather than a homogeneous geographical entity.

Potential of the North East as an Engine of Growth

1. **Natural and Ecological Resources**
    a. Nearly two-thirds of the region remains under forest cover, providing immense potential for sustainable and nature-based development.
    b. Community ownership of land and forests promotes local participation in conservation and ensures that development benefits remain with local communities.
    c. Sikkim's success in organic agriculture, Meghalaya's Lakadong turmeric and community conservation practices in Khonoma village of Nagaland demonstrate the potential of sustainable development.
    d. The region offers opportunities in eco-tourism, organic farming, biodiversity conservation and forest-based livelihoods.
2. **Human Resource Potential**
    a. Many northeastern societies have traditionally accorded women a significant role in family and economic activities.
    b. The region records some of the highest levels of female workforce participation in India.
    c. Mizoram has consistently maintained high literacy levels.
    d. Knowledge of English alongside indigenous languages provides young people with an advantage in the global services economy.
    e. Sportspersons such as Mary Kom, Mirabai Chanu and Lovlina Borgohain reflect the region's immense sporting talent.
3. **Cultural and Creative Economy**
    a. Assam's tea and Muga silk, traditional handlooms, bamboo crafts and indigenous cuisine offer opportunities for local enterprises and exports.
    b. Events such as Nagaland's Hornbill Festival and Shillong's musical traditions can promote cultural tourism.
    c. Cultural and historical connections with Southeast Asia can strengthen India's diplomatic and economic engagement under the Act East Policy.

   d. The region's cultural diversity can become an important source of soft power and economic development.
4. **Strategic and Geographical Advantage**
   a. Nearly 98% of the region's boundaries are international, making it strategically important for India's connectivity and trade with Southeast and South Asia.
   b. Its geographical location provides opportunities for cross-border trade, tourism and regional economic integration.
   c. Infrastructure development can transform the region into a gateway for India's engagement with neighbouring countries.

Government Initiatives and Achievements

1. **Act East Policy (2014):** Strengthened India's focus on economic and strategic engagement with Southeast Asian countries.
2. **Infrastructure development:** Bogibeel Bridge, Dhola-Sadiya Bridge and Sela Tunnel have improved connectivity within the region and with the rest of India.
3. **Increased financial support:** The expenditure of the Ministry of Development of North Eastern Region (DoNER) increased from approximately ₹1,000 crore in 2022-23 to a budget allocation of ₹6,500 crore in 2026-27.
4. **Rising Northeast Investors Summit:** Generated investment interest exceeding ₹4 lakh crore, creating opportunities for industrial development and employment.
5. **Forest conservation in fiscal devolution:** The Finance Commission has begun recognising forest cover while recommending the distribution of resources among states.

Key Areas Requiring Further Government Intervention

1. **Trade and Connectivity**
   a. The Centre should develop stable cross-border arrangements for land ports, waterways and trade corridors.
   b. Better connectivity with Southeast and South Asia can promote regional trade and economic integration.
2. **Fiscal Partnership and Investment**
   a. Central assistance should be complemented by performance-based financial incentives to encourage better governance and development outcomes.
   b. Credit guarantees and risk-sharing mechanisms should be developed to facilitate access to finance for local entrepreneurs.
   c. Such financial arrangements must respect traditional community land ownership and tenure systems.
3. **Recognition of Ecological Contribution**
   a. States that protect forests, biodiversity and watersheds provide ecological benefits to the entire country.
   b. Fiscal devolution should increasingly recognise and reward their contribution to environmental conservation.
   c. Adequate financial support can encourage communities and state governments to pursue sustainable development.

Way Forward

1. The North East should be developed through a region-specific approach that respects the distinct geographical, cultural and constitutional characteristics of individual states.
2. Infrastructure development should be integrated with environmental conservation and community participation.
3. Local agriculture, tourism, handlooms, handicrafts and bamboo-based industries should be promoted to generate employment.
4. Investment commitments must be converted into actual enterprises, jobs and livelihood opportunities.
5. Greater coordination between the Centre, state governments and local communities is essential for inclusive and sustainable development.

Conclusion: The North East is not merely a strategically important border region but a significant economic, ecological and cultural asset of India. Its natural inheritance, talented population and cultural diversity provide the foundation for sustainable and inclusive growth. Transforming the North East from a geographically peripheral region into a central engine of India's development will be crucial for achieving Viksit Bharat 2047.

Question: The North Eastern region of India possesses immense natural, human and cultural resources that can make it an important engine of India's growth. Discuss its potential, challenges and the role of the Central Government in realising this potential.

Source: Hindustan Times

Poverty Reduction and Household Financial Security in India

UPSC Syllabus: Gs Paper 3- Indian economy

Introduction

Poverty reduction is a major indicator of development, but crossing a poverty line does not always mean that a household has achieved lasting financial security. Families may still face unstable earnings, debt, limited savings and high healthcare costs. Assessing progress therefore requires looking beyond poverty estimates to changes in living standards, employment, financial resilience and the distribution of income and opportunities across society in India over time.

India's Progress in Poverty Reduction

1. **Decline in Extreme Poverty:** The World Bank estimates that extreme poverty, measured at **$3** per day (**2021** Purchasing Power Parity or PPP), declined from **27.1%** in **2011–12** to **2.6%** in **2023–24**.
2. **Reduction in Lower-Middle-Income Poverty:**
   - The population below the **$4.20 daily** poverty line declined from **57.7%** to **16.1%**, lifting an estimated **496 million** people out of poverty.
   - Despite significant progress, approximately 233 million people remain below this poverty line, indicating the need for further poverty reduction.
   - The World Bank projects that the poverty rate will decline from 14.2% in 2026 to 12.1% by 2028.
3. **Global Significance:** The World Bank recognised India's poverty reduction between **2011** and **2023** as one of the fastest poverty declines globally.

4. **Comparison with China:** China lifted more than **800 million** people out of extreme poverty over **40 years**, representing another major achievement in poverty reduction on a comparable scale.
5. **State-Level Achievement:** Kerala became the first Indian state to officially declare itself free from extreme poverty, demonstrating progress in state-level poverty eradication.
6. **Poverty Measurement Debate:** The **2011–12** National Sample Survey (NSS) and **2023–24** Household Consumption Expenditure Survey (HCES), conducted by the National Sample Survey Organisation (NSSO), differ in survey design and data collection methods, requiring careful comparison of poverty estimates.

Major Factors Behind India's Poverty Reduction

1. **Economic Growth:** Economic liberalisation in the early 1990s supported more than three decades of economic growth, creating conditions for sustained poverty reduction.
2. **Rural Employment Guarantee:** The rural employment scheme introduced under former Prime Minister Manmohan Singh guaranteed rural households at least **100 days** of employment annually.
3. **Direct Cash Transfers:** Government cash transfers have expanded financial assistance to households, contributing to poverty reduction through direct support.
4. **Food Security Support:** Free food grains currently reach approximately **800 million** people, providing essential food support to a large section of the population.
5. **Housing and Sanitation Programmes:** Government initiatives expanded housing and toilet construction, improving access to basic facilities, particularly among rural households.
6. **Improved Drinking Water Access:** Rural household access to piped drinking water increased from less than **17%** in August **2019** to approximately **82%**, potentially reducing sickness and income losses.

Improvement in Household Living Standards and Financial Inclusion

1. **Electricity Access:** The population living in households with electricity increased from **67.9%** in **2005–06** to **98.3%** in **2023–24**, improving everyday living conditions.
2. **Sanitation and Clean Cooking Fuel:** Access to improved sanitation increased from **47.6%** to **89%**, while household use of clean cooking fuel rose from **28.5%** to **71.6%**.
3. **Expansion of Banking Access:** Access to a bank or post office account increased from **40.2%** to **98.2%**, expanding formal financial inclusion among households.
4. **Women's Digital Inclusion:** Internet usage among women aged 15–49 increased from **33.3%** under the National Family Health Survey-5 (NFHS-5) to **64.3%** under NFHS-6.
5. **Women's Financial Inclusion:** The proportion of women aged 15–49 using their own bank or savings accounts increased from **78.6%** to **89%**, although account ownership does not ensure independent financial control.
6. **Rising Consumption Expenditure:** Monthly per capita consumption expenditure reached **Rs 4,122** in rural areas and **Rs 6,996** in urban areas in **2023–24**, excluding the imputed value of free welfare items.
7. **Declining Consumption Inequality:** The consumption Gini declined from 0.266 to 0.237 in rural areas and from 0.314 to 0.284 in urban areas between **2022–23** and **2023–24**.

Challenges to Household Financial Security

1. **Rising Household Income:** NABARD's (National Bank for Agriculture and Rural Development) rural survey recorded a **57.6%** nominal increase in average monthly household income, from **Rs 8,059** in **2016–17** to **Rs 12,698** in **2021–22**.

2. **Rising Household Debt:** The share of rural households reporting outstanding debt increased from 47.4% to 52% between 2016–17 and 2021–22, indicating a rise in household debt.
3. **Limited Savings Capacity:** Rural households reporting savings increased from **50.6%** to **66%**, but their ability to repay debt and manage unexpected expenses remains important.
4. **Agricultural Income Uncertainty:** Average monthly agricultural household income increased from **Rs 6,426** in **2012–13** to **Rs 10,218** in **2018–19**, but real income from crop cultivation declined by **10.4%**.
5. **Changing Agricultural Income Composition:** Wages and salaries contributed **39.8%** of agricultural household income in **2018–19**, exceeding crop cultivation's **37.2%** and animal farming's **15.5%**.
6. **Employment Instability:** Casual labour declined from **29.9%** in **2011–12** to **19.8%** in **2023–24**, while regular wage employment fell from **22.8%** in **2017–18** to **21.7%**.
7. **Growing Self-Employment:** Self-employment increased to **58.4%**, but this category includes successful enterprises as well as unpaid family work, making household income stability uncertain.
8. **Healthcare Financial Burden:** The government's share in total health expenditure increased from **28.6%** in **2013–14** to **43.7%** in **2022–23**, while direct household payments declined from **64.2%** to **43.4%**.
9. **Limited Public Healthcare Investment:** Public healthcare spending remains just above **1%** of Gross Domestic Product (GDP), leaving public hospitals underfunded and overburdened.
10. **Nutritional and Fiscal Concerns:** Free food grains supplied to approximately **800 million** people mainly meet calorific needs, while their nutritional adequacy and long-term fiscal sustainability remain concerns.

Rising Income Inequality Despite Poverty Reduction

1. **Unequal Distribution of National Income:** The **2026** World Inequality Report estimates that the top **10%** receive approximately **58%** of national income, while the bottom **50%** receive only **15%**.
2. **Concentration of Wealth and Influence:** Unequal asset ownership and concentration of wealth allow a small group to capture economic gains and exercise greater influence over policies and institutions.
3. **Structural Inequalities:** Historical caste disadvantages, unequal ownership of assets and inadequate attention to primary education restrict opportunities for disadvantaged communities.
4. **Unequal Access to Public Services:** Insufficient investment in quality education and healthcare makes access to skills, better employment and economic security dependent on family resources.
5. **Wage Disparities:** Real wages have stagnated, while median earnings among the top **10%** of workers were approximately 13 times those of the bottom **10%** in **2023**.
6. **Youth Unemployment:** Youth unemployment increased from **13.8%** in April **2025** to **15.2%** in March **2026**, reflecting continuing difficulties in accessing employment.
7. **Graduate Unemployment:** Nearly **40%** of young graduates aged 15–25 and approximately **20%** of those aged 25–29 were unemployed, while unemployment among diploma and postgraduate holders reached **29.4%**.
8. **Inequality of Opportunity:** Unequal family resources affect access to education, healthcare, housing, business capital and better employment, restricting economic mobility.

Way Forward

1. **Progressive Taxation:** A progressive taxation system can support wealth redistribution and finance public services while distributing economic costs according to people's ability to pay.

2. **Universal Public Services:** Greater investment in quality public education and healthcare can reduce inequality and improve opportunities for disadvantaged households.
3. **Agricultural Productivity:** Improving agricultural productivity and rural incomes can strengthen household earnings and reduce dependence on uncertain cultivation income.
4. **Industrialisation and Rural Transformation:** Greater industrialisation and rural-to-urban migration can create employment opportunities and support broader economic transformation.
5. **Balanced Infrastructure Investment:** Physical infrastructure must be complemented by good government schools and hospitals so disadvantaged populations can benefit from economic opportunities.
6. **Better Food Subsidies:** More balanced and better-targeted food subsidies can improve nutritional outcomes and address food insecurity among genuinely poor households.
7. **Reliable Poverty Measurement:** India should develop its own poverty estimates reflecting changing consumption patterns, while considering the World Bank's methodology and the scrutiny it receives from Indian scholars and the government.

Conclusion

India's poverty reduction is significant, but its durability depends on whether households can maintain stable incomes, savings and affordable healthcare. Reducing inequality requires better public services, employment, agricultural growth and a fairer distribution of economic gains. The focus must shift from crossing the poverty line to achieving lasting financial security.

Question for practice:

Discuss the trends in poverty reduction and the challenges of achieving household financial security and reducing income inequality in India.

Source: Indian Express

Anaemia Burden — Iron Alone Is No Solution

UPSC Syllabus: Gs Paper 2- Health Sector

Introduction

India faces a **high burden of anaemia**, especially among women and children. Although iron deficiency is an important cause, it explains **only about half of anaemia cases globally**. **Double-Fortified Salt (DFS)**, which combines iron and iodine, is proposed as a convenient intervention. However, its dependence on salt consumption, **uncertain effectiveness and possible risks** raise concerns. Tackling anaemia requires **more than adding iron to food through one intervention**.

Understanding Anaemia and Iron Deficiency

1. **Meaning of Anaemia:** Anaemia is a condition in which **haemoglobin levels fall below normal**, reducing the blood's ability to carry oxygen.
2. **Iron Deficiency Anaemia:** It occurs when the body **lacks sufficient iron to produce haemoglobin**, making iron deficiency an important cause of anaemia.

3. **Iron Deficiency and Anaemia Are Different:** Globally, **roughly half of anaemia cases** are attributed to iron deficiency, showing that iron deficiency does not explain every case.
4. **Evidence from India:** The **Comprehensive National Nutrition Survey (CNNS, 2016–18)** found that iron deficiency explained **only part of anaemia** among Indian children and adolescents.

Status of Anaemia in India

1. **High Prevalence:** The fifth National Family Health Survey (NFHS-5) found that **more than half of Indian women** and **about two-thirds of young children** are anaemic.
2. **Iron Deficiency Burden:** Around **31% of children under five, 36% of women and 28% of the general population** have some degree of iron deficiency.
3. **Vulnerable Groups: Adolescent girls, pregnant women and young children** face greater risks due to menstruation, pregnancy and increased iron requirements during growth.
4. **Socioeconomic Vulnerability: Low-income rural households** face greater risks because access to iron-rich foods, fortified foods and supplements is often limited.
5. **Maternal and Child Health:** Anaemia **increases the risk of maternal and child deaths** during pregnancy and childbirth, affecting overall health outcomes.
6. **Cognitive and Educational Impact:** Iron deficiency during early childhood can **permanently affect brain development**, physical growth, energy levels and learning outcomes.
7. **Economic and Psychological Effects:** Anaemia **reduces work capacity and productivity**, while iron deficiency has also been linked to **heart problems and depressive symptoms**.

Government Initiatives and Other Interventions to Address Anaemia

1. **Anaemia Mukt Bharat (AMB):** The Government distributes **iron and folic acid (IFA) tablets** through this programme, although **coverage and compliance remain challenges**.
2. **7x7x7 Strategy:** India's revised anaemia strategy includes additional measures beyond existing interventions, recognising the need for a **broader approach to anaemia control**.
3. **Fortified Rice Distribution:** Iron-fortified rice is distributed through the **Public Distribution System (PDS)**, **Pradhan Mantri Poshan Shakti Nirman (PM POSHAN)** and **Integrated Child Development Services (ICDS)** to reach vulnerable groups.
4. **Wheat Flour Fortification: Fortify Health** partners with mills to add **iron, folic acid and vitamin B12** to wheat flour, improving access to fortified foods without major behavioural changes.
5. **Double-Fortified Salt (DFS):** DFS contains **iron and iodine** and is proposed as a convenient way to improve iron intake through a commonly consumed household food item.

Limitations and Concerns Associated with Double-Fortified Salt

1. **Conflict with Salt Reduction Goals:** Indians consume roughly **twice the World Health Organization (WHO)-recommended five grams of salt daily**, while DFS relies on regular salt consumption to deliver iron.
2. **Risk to Cardiovascular Health:** About **one in three Indian adults has hypertension**, while India's non-communicable disease (NCD) action plan targets a **30% relative reduction in salt intake**.
3. **Unequal Iron Consumption: Adult men generally consume the most salt**, while **women and young children consume the least**, potentially giving the groups with greatest iron needs smaller doses.

4. **Risk of Iron Overload:** The body has **no regulated mechanism to excrete excess iron**, which can accumulate, promote **oxidative stress** and has been linked to **metabolic disease**.
5. **Risks in Haemoglobinopathies:** People with **beta-thalassaemia**, particularly those receiving blood transfusions, face greater risks of iron overload; **sickle cell disease is concentrated in tribal areas**.
6. **Limited Screening Capacity:** The PDS reaches around **800 million people**, making **individual screening** for iron-related risks before nationwide DFS consumption **impractical**.
7. **Cumulative Iron Exposure:** Fortified rice, IFA tablets and DFS could expose children and adolescents to iron through **three or four government programmes simultaneously**, **without adequate assessment of total intake**.
8. **Poor Iron Absorption: Phytates** in cereals and pulses, **polyphenols** in tea and coffee, and **calcium in milk reduce the absorption of non-haem iron** from meals.
9. **Uncertain Household Effectiveness: Cooking losses, uneven dosing and variable diets** may reduce actual iron intake, while supervised trials cannot fully reflect household conditions.
10. **Infection-Related Limitations:** Infections and inflammation **increase hepcidin levels**, which **block iron absorption** and reduce the effectiveness of fortification in populations with higher infection burdens.
11. **Evidence of Potential Health Risks:** The **2006 Pemba trial in Tanzania** associated iron and folic acid supplementation with **increased hospitalisations and deaths** among children in a malaria-endemic setting; a **2015 Kenyan trial** found **increased pathogenic gut bacteria and diarrhoea** among infants receiving iron-fortified foods.

Why Iron Alone Cannot Address Anaemia

1. **Other Nutritional Deficiencies: Folate and vitamin B12 deficiencies** also cause anaemia and are common concerns among vegetarian populations.
2. **Infectious and Parasitic Diseases: Chronic inflammation, recurrent infections, malaria and hookworm** contribute to anaemia through pathways beyond insufficient dietary iron.
3. **Haemoglobin Disorders: Beta-thalassaemia and sickle cell disease** contribute to anaemia and require attention beyond routine iron supplementation or food fortification.
4. **Other Contributing Factors: Early marriage, pregnancy, adolescent undernutrition and menstrual blood losses** increase anaemia risks, while **low protein and vitamin A intake** add to nutritional deficiencies.
5. **Dietary Limitations:** The Indian diet is often monotonous and **low in haem iron**, while **poor affordability** limits access to diverse and nutritious foods.
6. **Diagnostic Gaps:** Haemoglobin testing alone **cannot identify the cause of anaemia**, while routine testing for **ferritin, vitamin B12 and inflammation markers** remains limited.
7. **Weak Programme Monitoring:** Digital tracking often **counts tests and tablets rather than health outcomes**, making it difficult to assess actual improvements in anaemia.
8. **Neglected Public Health Measures: Deworming, malaria control and water, sanitation and hygiene** require greater attention alongside nutritional interventions to address the wider causes of anaemia.

Way Forward

1. **Monitored District-Level Pilots:** India should conduct **district-level DFS pilots** before national expansion, measuring **haemoglobin, ferritin and inflammation** while monitoring potential harm in malaria-endemic and haemoglobinopathy-prone areas.
2. **Assess Cumulative Iron Intake:** The government should examine **iron exposure across existing food fortification and supplementation programmes** before introducing additional sources of iron.
3. **Targeted Food Fortification:** Fortification should be **targeted rather than universal** and use **better-absorbed iron forms** suited to local dietary patterns.
4. **Strengthen Diagnostic Facilities:** Testing should identify different causes of anaemia through **ferritin, vitamin B12 and inflammation markers** instead of relying only on haemoglobin measurements.
5. **Improve Dietary Diversity:** Affordable access to **eggs, dairy, green leafy vegetables, pulses and millets** should improve nutritional intake among vulnerable households.
6. **Strengthen Infection Control:** Greater investment in **deworming, malaria control, clean water, sanitation and hygiene** can address important non-dietary causes of anaemia.
7. **Learn from Global Experiences: Peru** combined **iron supplements, micronutrient powders, cash transfers and regional accountability**, while **Vietnam** used **weekly supplementation, deworming and iron-fortified fish sauce** alongside dietary improvements.

Conclusion

India should address anaemia through **accurate diagnosis**, **targeted supplementation and fortification**, diverse diets, **infection control** and stronger public health services. DFS **should not be expanded nationally without monitored pilots**, assessment of cumulative iron exposure and evidence of safety and effectiveness. The priority must be **better health outcomes**, not simply wider distribution of iron.

Question for practice:

Examine the causes of anaemia in India and discuss why iron fortification alone cannot effectively address the problem.

Source: The Hindu

Why revamped Agniveer scheme isn't a return to regular recruitment of troops

Source: The post **"Why revamped Agniveer scheme isn't a return to regular recruitment of troops"** has been created based on **"Why revamped Agniveer scheme isn't a return to regular recruitment of troops"** published in **"Indian Express"** on 6th November 2026.

UPSC Syllabus: GS 2: Governance

Context: On November 4, 2026, the Union Cabinet approved significant changes to the Agnipath scheme, providing an additional opportunity to the remaining Agniveers to join the Armed Forces as regular soldiers.

About Agnipath scheme

1. The Agnipath scheme was introduced in 2022 to recruit young personnel into the Indian Army, Navy and Air Force for a short-term engagement of four years.

2. Under the original scheme, only 25% of Agniveers were eligible for permanent absorption after completing four years, while the remaining 75% had to leave the services with a Seva Nidhi package.

Major changes introduced in the revamped Agnipath scheme

1. **Two-stage opportunity for permanent absorption**
    a. Under the revised arrangement, 25% of Agniveers will continue to be selected on merit for permanent absorption after completing their initial four-year tenure.
    b. The remaining 75%, who would otherwise leave the services, will be offered an additional two-year engagement.
    c. After completing six years of service, these Agniveers will get another opportunity to join the Armed Forces as regular soldiers, subject to their willingness and fulfilment of the military's objective selection criteria.
    d. Thus, all Agniveers will have an opportunity to be considered for permanent absorption, although their selection is not guaranteed.
2. **Enhanced financial benefits**
    a. Agniveers opting for the additional two-year engagement will receive enhanced pay.
    b. They will also receive an enhanced contributory Seva Nidhi package if they decide not to continue in the Armed Forces after six years.
3. **Seva Nidhi package**
    a. Under the existing arrangement, 30% of an Agniveer's monthly salary is contributed to the Agniveer Corpus Fund, with an equal contribution from the Government of India.
    b. On completion of four years, an Agniveer receives approximately ₹11.71 lakh, including interest, as a lump sum amount.
    c. This amount is exempt from income tax.
    d. Agniveers leaving the services do not receive monthly pension or gratuity benefits.
4. **Changes in post-service opportunities:** Agniveers undertaking the additional two-year engagement will no longer have opportunities to avail of reservations in paramilitary forces, Public Sector Undertakings and other State Government jobs.

Key features distinguishing the revised Agnipath scheme from the pre-COVID regular recruitment system

The revised scheme retains the fundamental structure of Agnipath and differs from the pre-COVID recruitment system in the following ways:

1. **Nature of recruitment**
    a. Under the pre-COVID system, personnel were recruited as regular soldiers from their first day of service.
    b. Under Agnipath, individuals initially join for a fixed four-year period as Agniveers and are not automatically granted permanent status.
2. **Two-stage selection process**
    a. Under the revised arrangement, the first 25% will be selected for permanent absorption after four years.
    b. The remaining eligible personnel will get another opportunity only after completing the additional two-year engagement.
    c. Therefore, permanent absorption is linked to successive selection stages rather than being assured at the time of recruitment.

3. **Different service conditions**
    a. Under the earlier recruitment system, personnel joined the permanent cadre and were entitled to associated service benefits, including pension eligibility under applicable rules.
    b. Agniveers who leave after four or six years receive the Seva Nidhi package but are not entitled to monthly pension or gratuity benefits.
4. **Greater career flexibility**
    a. Under the earlier system, personnel generally continued in service until voluntary retirement or separation through disciplinary action or other applicable service provisions.
    b. Under the revised Agnipath scheme, Agniveers have opportunities to choose whether to continue or pursue alternative careers at the end of four or six years.
5. **Continuation of the original framework**
    a. The Chief of Defence Staff, General N. S. Raja Subramani, clarified that the Agnipath scheme would continue with the newly introduced changes.
    b. Thus, the government has modified the retention mechanism without returning to the earlier system of regular recruitment.
6. **Seniority arrangements**
    a. Agniveers absorbed after completing six years will be placed immediately after their own batchmates who entered the regular cadre after four years.
    b. This provides a defined seniority arrangement between the two groups.

Benefits of the revised scheme for the Armed Forces

1. **Addressing manpower shortages**
    a. The suspension of regular recruitment during the COVID-19 period, combined with regular retirements, created manpower shortages in the Armed Forces.
    b. The revised scheme may help address these shortages by enabling the retention of a larger number of trained personnel.
2. **Availability of experienced soldiers**
    a. The additional two-year engagement will provide the Armed Forces with personnel having longer service experience.
    b. This will help retain soldiers who are already familiar with military procedures, equipment and operational requirements.
3. **Maintaining a youthful profile**
    a. The scheme aims to maintain a young age profile in the Armed Forces while retaining experienced personnel.
    b. According to the Chief of Defence Staff, the continued induction of young Agniveers will help maintain this balance.
4. **Promoting merit and competitiveness**
    a. Multiple stages of selection are expected to encourage Agniveers to improve their performance.
    b. The competitive selection process may reduce complacency and help retain personnel with better capabilities.
5. **Strengthening operational preparedness**
    a. Experienced manpower is particularly important in the evolving security environment following the Galwan incident and Operation Sindoor.
    b. Retaining trained personnel can help improve the operational readiness of the Armed Forces.
6. **Creating a skilled workforce for the civilian sector**

a. Agniveers who leave after four or six years will carry valuable military training, discipline, technical knowledge and professional skills.
b. These capabilities can help them pursue alternative career opportunities outside the Armed Forces.

Scale and immediate impact of the revised scheme

1. More than three lakh Agniveers are undergoing training at different stages across the three services.
2. Around 2.8 lakh Agniveers are in the Army, of whom approximately 19,000 will complete their initial four-year tenure.
3. Around 2,500 Agniveers in the Navy are scheduled to complete their four-year tenure in November 2026.
4. Another 2,900 Agniveers in the first IAF batch are scheduled to complete their training in December 2026.

Conclusion: The revamped Agnipath scheme represents an adjustment in the retention and absorption mechanism rather than a return to the pre-COVID recruitment system. By providing two opportunities for permanent absorption, the government seeks to address manpower shortages, retain experienced soldiers and maintain a youthful military profile. Its long-term success will depend on transparent selection, effective implementation and maintaining an appropriate balance between experienced manpower and youthful recruitment.

Question: The recent overhaul of the Agnipath scheme provides greater opportunities for Agniveers to join the Armed Forces as regular soldiers. However, it does not signify a return to the pre-COVID regular recruitment system. Examine the statement and discuss its implications for India's military preparedness.

Source: Indian Express

How do tokamaks work to make nuclear fusion possible?

Source: The post **"How do tokamaks work to make nuclear fusion possible?"** has been created based on **"How do tokamaks work to make nuclear fusion possible?"** published in **"The Hindu"** on 6th November 2026.

UPSC Syllabus: GS 3 – Science and Technology

Context: There is a growing global interest in nuclear fusion as a future source of clean energy and the role of tokamak technology is important in making commercial fusion power possible.

About Tokamak

1. A tokamak is a device that uses powerful magnetic fields to confine extremely hot plasma in a ring-shaped vacuum chamber to achieve controlled nuclear fusion.
2. Nuclear fusion is the process in which two light atomic nuclei combine to form a heavier nucleus, releasing an enormous amount of energy.
3. It is considered a promising technology for developing clean, sustainable and potentially abundant energy.

Working mechanism of Tokamak

1. Creation of Plasma: Plasma, the fourth state of matter, is created by heating gases until electrons separate from atomic nuclei, leaving charged particles.
2. Magnetic Confinement: Powerful magnetic fields confine the extremely hot plasma and prevent it from coming into contact with the reactor walls.
3. Doughnut-shaped Structure: The tokamak uses a toroidal (ring-shaped) chamber to prevent plasma from escaping through the ends of a straight tube.
4. Twisted Magnetic Fields: External magnetic coils and an electric current flowing through the plasma generate two magnetic fields, which combine to produce a helical magnetic field.
5. Stable Confinement: These magnetic fields help keep the plasma confined for sufficient time and at suitable conditions for fusion to occur.

How does Nuclear Fusion generate Energy?

1. Tokamaks primarily use deuterium and tritium, which are isotopes of hydrogen, as fusion fuel.
2. At extremely high temperatures, these nuclei overcome their mutual electrical repulsion and combine to form helium and a high-energy neutron.
3. The reaction releases approximately 17.6 MeV of energy, with about 80% carried by the neutron and 20% by the helium nucleus.
4. A kilogram of deuterium-tritium fuel, if fully fused, could release approximately 3.4×10^{14} joules of energy, roughly ten million times the energy released by the same quantity of coal.
5. The high-energy neutrons transfer their energy to a surrounding layer called the blanket, which absorbs heat to produce steam and drive turbines for electricity generation.
6. The blanket can also contain lithium, which reacts with neutrons to produce tritium, helping the reactor generate its own fuel.

Reason behind the doughnut shape of the Tokamak

1. Charged particles moving in a magnetic field tend to spiral around magnetic field lines.
2. In a straight tube, particles can escape through its ends, whereas a circular chamber eliminates these open ends.
3. However, a simple ring-shaped magnetic field is insufficient because the magnetic field is stronger on the inner side than on the outer side.
4. This variation causes charged particles to drift in opposite directions, creating an electric field that pushes plasma towards the outer wall.
5. To overcome this problem, an electric current is induced through the plasma, creating an additional magnetic field.
6. The combination of these magnetic fields produces a twisted magnetic field that helps maintain stable plasma confinement.

Challenges in Making Tokamak-based Fusion Successful

1. **Extreme Temperature:** Plasma must be heated to temperatures hotter than the Sun's core, making containment extremely difficult.
2. **Plasma Instability:** Maintaining stable plasma confinement without contact with the reactor walls remains a major engineering challenge.

3. **High Costs**: Large-scale fusion projects require substantial financial investment and advanced engineering capabilities.
4. **Fuel Availability:** Tritium is rare and radioactive, making its production and management an important challenge.
5. **Material Challenges:** Reactor components must withstand intense heat, radiation and continuous neutron bombardment.
6. **Energy Efficiency:** Although fusion reactions have been demonstrated experimentally, no tokamak has yet generated net energy for commercial electricity production.

Major Global Developments

1. **ITER (International Thermonuclear Experimental Reactor):** ITER is the world's largest international fusion research project, being developed at Cadarache in France.
    a. It involves seven members: China, the European Union, India, Japan, South Korea, Russia and the United States, representing more than 30 countries.
    b. It aims to demonstrate the scientific and technological feasibility of fusion energy.
    c. Its original cost estimate of €5 billion in 2005 has increased substantially.
    d. ITER has not yet been switched on and is designed to produce 500 MW of fusion power from 50 MW of input heating power once operational.
    e. It is an experimental project and will not convert the generated heat into electricity.
2. **China's EAST Tokamak:** China's Experimental Advanced Superconducting Tokamak (EAST), located in Hefei, achieved a high-confinement plasma duration of 1,066 seconds in January 2025.
    a. In January 2026, it reported operating at plasma densities above a long-standing empirical limit.

India's Progress in Tokamak Technology

1. **ADITYA:** India's first tokamak was developed at the Institute for Plasma Research (IPR), Gandhinagar, and began operating in 1989. It was subsequently rebuilt as ADITYA-U, which resumed operations in 2017.
2. **SST-1:** The Steady State Superconducting Tokamak produced its first plasma in 2013 and uses superconducting magnets.
3. **ITER Participation:** India is a member of ITER and contributes important components and technologies for the international project.
4. **PRAGYA:** Bengaluru-based Pranos Fusion has unveiled PRAGYA, described as India's first privately developed compact tokamak. It aims to develop capabilities in plasma control and magnetic confinement.

Alternatives to Tokamak-based Fusion

1. **Stellarators:** These devices use complex external magnetic coils to create twisted magnetic fields without relying on a plasma current. They offer steadier operation but are more difficult to design and construct. Germany's Wendelstein 7-X is a prominent example.
2. **Inertial Confinement:** This approach compresses a small fuel pellet using powerful lasers or other beams, causing fusion before the fuel can expand. The US National Ignition Facility demonstrated fusion ignition in 2022.
3. **Other Magnetic Configurations:** Mirror machines, field-reversed configurations and compact configurations are other approaches being explored for fusion energy.

Conclusion: Tokamak technology represents a promising pathway towards clean, low-carbon and potentially abundant energy. However, overcoming plasma instability, material limitations, high costs and the challenge of achieving sustained net energy remains essential. India's participation in ITER and its domestic research capabilities provide an opportunity to strengthen its position in the emerging field of fusion energy.

Question: What are tokamaks and how do they facilitate nuclear fusion? Discuss their working principles, potential for energy generation, challenges and India's progress in this field.

Source: The Hindu

Are Lower MRPs on Cancer Drugs Translating into Affordable Care?

UPSC Syllabus: Gs Paper 2- Issues relating to development and management of Social Sector/Services relating to Health.

Introduction

Cancer care in India remains costly, with high medicine prices and expenses on diagnosis, surgery, hospitalisation and follow-up placing a financial burden on families. Although the National Pharmaceutical Pricing Authority has reduced trade margins on several anti-cancer medicines, lower maximum retail prices do not necessarily make treatment affordable. The key question is whether these price cuts translate into actual patient savings and wider access to quality cancer care.

Current Status of Cancer Care and Affordability in India

1. **High Out-of-Pocket Expenditure:** The median expenditure on cancer treatment is approximately **₹4.1 lakh**, of which patients pay nearly **₹3.3 lakh (80%)** from their own pockets.
2. **Financial Distress:** Nearly **40% of cancer patients** borrow money or pledge their assets to finance treatment, increasing the risk of household poverty.
3. **Unequal Treatment Outcomes:** Approximately **65.5%** of women diagnosed with breast cancer in India survive for **at least five years**, compared with nearly **90%** in high-income countries, indicating a significant difference in survival outcomes.
4. **Dependence on Private Healthcare:** Most advanced cancer treatment facilities are concentrated in the **private sector**, limiting access to specialised treatment through public healthcare institutions.
5. **High Cost Beyond Medicines:** Cancer treatment also involves expenses on **diagnostics, surgery, hospitalisation, travel and follow-up care**, making the total treatment cost much higher than medicine prices alone.

Government Initiatives for Regulating Cancer Drug Prices

1. **NPPA's Trade Margin Rationalisation:** The National Pharmaceutical Pricing Authority (NPPA) capped trade margins at **30%** for **137 non-scheduled anti-cancer drugs**, reducing the prices of **nearly 900 medicine brands**.
2. **Existing Drug Pricing Framework:** The **Drugs (Prices Control) Order, 2013** regulates prices of essential medicines and limits annual price increases for non-scheduled formulations.
3. **Earlier Trade Margin Regulation:** In **2019**, trade margins were rationalised for **42 non-scheduled anti-cancer medicines**, providing an earlier example of direct intervention in medicine pricing.

4. **Health Insurance and Financial Assistance:** Ayushman Bharat and State government health insurance schemes provide financial support for cancer treatment, while some States also offer assistance through Chief Minister's relief funds.

Impact of Price Regulation

1. **Substantial Percentage Reductions:** Of **1,024 brands** analysed, **45.4%** recorded price reductions above **50%**, **19.6%** above **70%** and **0.8%** above **90%**.
2. **Limited Absolute Savings:** Only **16.5%** of brands recorded price reductions exceeding **₹10,000**, showing that large percentage reductions do not always translate into substantial monetary savings.
3. **Palbociclib Price Reduction:** The price of one Palbociclib brand fell from approximately **₹40,000** to **₹2,720**, although **767 other brands** were already available in the market between **₹2,800 and ₹9,000**.
4. **Enzalutamide Price Reduction:** One company's Enzalutamide price fell from **₹3.14 lakh** to **₹1.17 lakh**, although several other companies were already supplying the medicine at considerably lower prices.
5. **Actual Patient Savings:** A reduction in maximum retail prices **does not automatically guarantee equivalent savings** for patients if hospitals and pharmacies continue to charge substantial margins or other treatment expenses remain high.

Limitations of Trade Margin Rationalisation

1. **No Reduction in Several Brands:** Nearly **194 out of 1,024 brands** recorded no price reduction, with their prices ranging from over **₹1 lakh to ₹10 lakh**.
2. **High Prices of Newer Medicines:** Several **patented cancer medicines and immunotherapies** remain prohibitively expensive despite trade margin regulation, limiting patients' access to newer treatment options.
3. **Unchanged Prices of Key Medicines:** The prices of **Ribociclib**, a breast cancer medicine, and **Pembrolizumab remained unchanged** under the latest intervention.
4. **Unequal Returns from Uniform Margins:** A **30%** margin on a medicine priced at **₹8,000** gives hospitals a **higher return** than the same margin on a **₹2,000** medicine, potentially influencing their stocking decisions.
5. **Risk to Generic Competition:** Higher returns from expensive brands may discourage hospitals from stocking **cheaper generic medicines**, weakening competition based on affordability and higher sales volumes.

Key Challenges in Ensuring Affordable Cancer Care

1. **Excessive Supply-Chain Margins:** The difference between manufacturer, hospital and patient prices may include **legitimate storage and distribution costs**, but **excessive margins** captured by intermediaries and some hospitals increase patients' expenses.
2. **Limited Patient Bargaining Power:** Cancer patients have **limited treatment choices** and depend heavily on doctors and healthcare providers, making it difficult to question prescribed medicines or their prices.
3. **Information Asymmetry:** Patients often **lack sufficient information** about medicine prices and available alternatives, while healthcare providers have greater knowledge and influence over treatment decisions.

4. **Weak Price Transparency:** The absence of an **independent government pharmaceutical pricing database** makes it difficult to verify prices across manufacturers, stockists, retailers, pharmacies and hospitals.
5. **Lack of Healthcare Charge Regulation:** Hospitals have considerable bargaining power because of bulk purchases, but there is no comparable mechanism to **regulate healthcare charges**, unlike sectors such as **telecommunications and electricity**.
6. **Fragmented Medicine Procurement:** Different government agencies **purchase medicines separately**, limiting opportunities to negotiate lower prices through combined procurement.

Way Forward

1. **Independent Price Monitoring:** The **NPPA**, along with **State drug regulators**, should compare medicine prices before and after regulation to verify actual patient savings and monitor medicine availability.
2. **Independent Pharmaceutical Pricing Database:** The government should develop its **own pricing database** and require manufacturers, stockists, retailers and hospitals to disclose relevant price information.
3. **Transparent Hospital Billing:** Hospitals should disclose revised medicine prices and provide **itemised bills** so that patients can clearly understand their medicine and treatment expenses.
4. **Stronger Regulatory Enforcement:** Regulators should regularly check medicine prices, **investigate overcharging** and take action against excessive trade margins across the pharmaceutical supply chain.
5. **Strategic Pooled Procurement:** Government agencies and health insurance programmes should **purchase medicines together in larger quantities** to negotiate lower prices and reduce procurement costs.
6. **Cost-Based Treatment Regulation:** The government should introduce **cost-based caps** on cancer treatment, linked to **standard treatment protocols**, to control overall treatment expenses.
7. **National Cancer Mission:** India should establish a dedicated **National Cancer Mission** to strengthen public healthcare facilities, develop standard treatment protocols, provide systems for second opinions and improve cancer prevention and care.
8. **Comprehensive Financial Protection:** Ayushman Bharat and State insurance programmes should cover the **complete cancer treatment journey**, including medicines, diagnostics, surgery and follow-up care.
9. **Promoting Affordable Generic Medicines:** Doctors should consider effective and **quality-assured generic alternatives** before prescribing expensive branded medicines, without compromising treatment quality.
10. **Balancing Affordability with Research and Development:** Price regulation should prevent excessive trade margins while allowing pharmaceutical companies to recover legitimate investments in **Research and Development (R&D)** for developing new medicines.
11. **Encouraging Wider Healthcare Innovation:** Better manufacturing processes, **affordable diagnostics** and **improved medicine delivery systems** should be encouraged to reduce treatment costs and improve patient outcomes.
12. **Outcome-Based Healthcare Financing:** Public programmes and insurers should assess treatment value through **patient outcomes** rather than focusing only on the number of treatments financed or prices negotiated.

Conclusion

Lower medicine prices can ease patients' financial burden, but they cannot alone make cancer care affordable. India needs transparent pricing, stronger public treatment facilities and comprehensive financial protection. These measures must also protect medicine quality, reliable supply and research investment, so patients can access treatment without facing financial hardship.

Question for practice:

Examine whether the regulation of cancer drug prices has ensured affordable and equitable cancer care in India.

Source: The Hindu; Businessline

Balancing Safety and Freedom in Children's Internet Access

UPSC Syllabus: Gs Paper 2- Constitution of India

Introduction

Internet access gives children opportunities to learn, develop skills, express ideas and connect with others. In *Just Rights for Children Alliance v. S. Harish (2026)*, the Supreme Court recognised children's right to access and use the internet as a **fundamental right**. The challenge is to protect children from online abuse and harmful content without imposing blanket restrictions that deny their constitutional freedoms and support an informed society.

Constitutional and Legal Framework for Children's Digital Rights

1. **Internet as a Fundamental Right:** In Just Rights for Children Alliance v. S. Harish (2026), the Supreme Court **recognised children's right to access and use the internet**.
2. **Freedom of Expression:** Internet access is an essential part of freedom of speech and expression under **Article 19(1)(a)** of the Constitution.
3. **Right to Receive Information:** In Cricket Association of Bengal (1995), the Court linked Article 19(1)(a) with the **right to know and receive and impart information**.
4. **Online Freedoms in Earlier Rulings:** In Anuradha Bhasin (2020), the Court protected online speech and trade under **Articles 19(1)(a) and 19(1)(g)**, respectively.
5. **Digital Access and Right to Life:** In Pragya Prasun (2025), excluding persons with disabilities from digital KYC **violated Article 21**, as digital access forms part of the **right to life**.
6. **Authority-Liberty Coordination:** The Constitution must limit both **State authority and citizens' liberty**, as excessive State control may encourage **dictatorial tendencies** while unrestricted freedoms may lead to **anarchy**.

Significance of Internet Access for Children

1. **Access to Knowledge and Education:** The internet provides access to **knowledge and information across sectors**, expanding children's learning opportunities beyond their immediate surroundings.
2. **Capabilities and Technological Skills:** Digital technologies widen choices and develop children's **capabilities and technological skills**; **Amartya Sen** linked capability enhancement with development, while **Joseph Stiglitz** stressed transformation too.

3. **Creativity and Self-Expression:** Digital access gives children opportunities to **express their opinions**, **explore creativity** and share their ideas with others.
4. **Communication Across Boundaries:** The internet enables children to **connect with people across geographical boundaries** and exchange information and ideas.

Challenges and Risks Associated with Children's Internet Access

1. **Cyberbullying and Online Harassment:** Children may face **cyberbullying and online harassment**, which can make digital spaces unsafe and discourage their participation.
2. **Privacy Violations and Fraud:** Internet use can expose children to **privacy violations** and different forms of **online fraud**, threatening their safety and personal information.
3. **Harmful and Obscene Content:** Children may encounter **obscene or otherwise harmful material** online, making effective content controls and responsible platform practices necessary.
4. **Child Sexual Abuse Material (CSAM):** The continued circulation of CSAM, including through **alleged paid promotions and redirect links**, raises serious child-protection concerns.
5. **Complaint-Based Reporting Mechanism:** Existing mechanisms for reporting and removing CSAM **depend largely on individual complaints**, limiting the effectiveness of content removal.
6. **Limited Cross-Platform Detection:** When one platform detects and removes abusive material, the same content is **not automatically flagged on other platforms**, allowing its circulation to continue.
7. **Delayed Law-Enforcement Response:** The Centre pressed technology companies to report CSAM cases **directly to Indian law-enforcement agencies**, as the existing reporting process could **delay police intervention**.

Balancing Children's Digital Freedom with Online Safety

1. **Freedom and Safety Are Compatible:** The Supreme Court rejected the idea that children's **safety and internet freedom are opposing goals**; protection need not mean denying access.
2. **Rejection of Blanket Restrictions:** The Court **rejected blanket age-based restrictions** on internet access, holding that children retain the **fundamental right to access and use the internet**.
3. **Risks of Driving Children Towards Unsafe Platforms:** Age-based bans may push children towards **unregulated and potentially more dangerous websites** instead of making their online activity safer.
4. **Fear of Reporting Abuse:** Children who are enticed or threatened online may **avoid seeking help from trusted adults** if they fear punishment for breaking restrictions.
5. **Responsible Limits Rather Than Denial: Age-appropriate boundaries and safeguards** can address risks without preventing children from accessing information across different sectors.
6. **Different Regulatory Approaches:** Australia has implemented a ban on social media accounts for children **under 16**, while **Brazil**, China, Indonesia, Malaysia and the UAE have adopted restrictions, including screen-time limits. Brazil also requires children to link their social media accounts to a legal guardian. In India, **Andhra Pradesh and Karnataka** have considered screen-time curbs, while the Centre planned changes to restrict internet access for children **under 18**.

Way Forward

1. **National Databases of Hashes and URLs:** The Supreme Court directed the Centre to frame guidelines for **national databases of perceptual hashes and URLs** to identify matching CSAM across platforms.
2. **Coordinated Cross-Platform Action:** Platforms should use matching information to **detect and remove abusive material across services**, reducing delays caused by isolated reporting systems.
3. **Verification Before Action:** Content should not be removed or added to databases mechanically on the basis of one complaint; **multiple safeguards and verification** must come first.
4. **Grievance Redressal:** The framework must provide a **grievance mechanism** for people whose content is wrongly flagged through an **incorrect hash match or URL**.
5. **Limit Database Use:** Hash and URL databases must remain limited to identifying the specified abusive material and **must not be repurposed against other kinds of content**.
6. **Direct Reporting to Authorities:** Following discussions with the Centre, **Google and Meta** agreed to report CSAM cases **directly to Indian law-enforcement agencies** instead of routing them through a US-based non-profit first.
7. **Awareness from Primary School:** Online safety awareness and sensitisation should begin at the **primary school level**, helping children **recognise risks and seek help** when they face abuse or threats.
8. **Shared Responsibility and Prevention: Parents, government, schools and service providers** must work together to restrict harmful content and **prevent abuse** rather than curtail children's internet rights.

Conclusion

Children's online safety must be secured without denying their right to internet access. **Effective regulation, accountable platforms, cross-platform detection, safeguards against wrongful removal and early digital awareness** can reduce online harm. A coordinated effort by families, schools, government and service providers can protect children while preserving their freedom.

Question for practice:

Discuss the need to balance children's right to internet access with online safety and examine the measures required to create a safe digital environment for children.

Source: The Hindu ; IndiaToday

Delhi must look beyond GRAP to tackle winter air pollution

Source: The post **"Delhi must look beyond GRAP to tackle winter air pollution"** has been created based on **"Delhi must look beyond GRAP to tackle winter air pollution"** published in **"Indian Express"** on 6th November 2026.

UPSC Syllabus: GS 2- Governance

Context: Delhi's winter air pollution is a recurring environmental challenge caused by multiple factors, including vehicular emissions, stubble burning, construction activities, waste burning and unfavourable meteorological conditions. The Delhi Winter Action Plan, launched on November 1, includes restrictions on non-compliant vehicles, the 'No PUCC, No Fuel' policy and construction curbs. However, the deterioration of air

quality to the 'Very Poor' category highlights the need to move beyond temporary restrictions towards long-term, science-based solutions.

Factors Responsible for Delhi's Winter Air Pollution

1. **Meteorological factors**
    a. Slow wind speeds prevent the dispersion of pollutants and lead to their accumulation in the atmosphere.
    b. Delayed and milder winter conditions, influenced partly by Super El Niño, delayed the onset of the peak pollution season by nearly two weeks.
    c. Cyclone Arnab and associated unexpected rainfall further contributed to the delayed onset.
    d. The possible decline in western disturbances due to ENSO conditions may reduce rainfall and atmospheric cleansing during winter.
2. **Stubble burning and inaccurate emission estimates**
    a. Delayed paddy harvesting in Punjab and Haryana due to rainfall uncertainty has affected the timing of stubble burning.
    b. NASA's MODIS sensors often miss fire incidents because their satellite overpasses do not coincide with the actual timing of fires.
    c. More than 90% of stubble-burning incidents in Punjab during 2024 and 2025 reportedly occurred after 3 PM, compared to less than 3% in 2021.
    d. South Korea's geostationary KOMPSAT-2A satellite, using its Advanced Meteorological Imager (AMI), has detected significantly higher agricultural fire counts.
    e. NIAS modelling indicates that stubble burning contributed approximately 20% of Delhi's PM2.5 burden on November 1 when realistic additional emissions were incorporated.
3. **Local sources of pollution**
    a. Traffic congestion at road junctions and poorly maintained roads contribute to vehicular emissions.
    b. Ineffective traffic management increases pollution.
    c. Open waste burning and construction activities remain persistent sources of pollution.

Limitations of Graded Response Action Plan (GRAP)

1. Graded Response Action Plan (GRAP) provides emergency restrictions during periods of severe pollution but does not address the underlying causes.
2. It is comparable to an ICU intervention that stabilises a patient without curing the underlying disease.
3. Repeated restrictions cause public inconvenience and cannot ensure sustained reductions in emissions.
4. It focuses on managing pollution episodes rather than preventing pollution throughout the year.

Way Forward

1. **Adopt an airshed-based approach**
    a. Delhi should move towards airshed-based pollution management instead of limiting interventions to the boundaries of Delhi NCT.
    b. The present Delhi-centric approach addresses only 50–70% of the emission sources affecting the city.
    c. A pragmatic regional framework covering the relevant pollution airshed, rather than the entire NCR or Delhi alone, is required.

   d. The NIAS-proposed indigenous framework, AIRSHEDEM, can help achieve near-100% source coverage through airshed-based master planning.

2. **Strengthen scientific monitoring and data accuracy**
   a. Authorities should adopt appropriate satellite data, including geostationary satellite observations, to accurately detect stubble-burning incidents.
   b. Emission inventories and air-quality forecasts must incorporate realistic and updated ground-level data.
   c. Improved monitoring will enable accurate identification of pollution sources and effective policy interventions.
3. **Ensure sustained emission reduction**
   a. Long-term measures should address vehicular emissions, traffic congestion, construction dust and open waste burning.
   b. Effective traffic management and regular maintenance of roads should be prioritised.
   c. Stubble burning must be addressed through coordinated regional action involving Delhi, Punjab and Haryana.
   d. GRAP should function as an emergency response mechanism alongside structural pollution-control measures.
4. **Strengthen institutional coordination**
   a. Regional planning should involve neighbouring States and relevant government agencies.
   b. Pollution-control policies should be based on scientific evidence, accurate emission estimates and coordinated implementation.

Conclusion: Delhi needs to shift from seasonal crisis management to comprehensive, year-round air-quality management. GRAP is necessary for immediate relief, but lasting improvement requires accurate emissions data, airshed-based regional planning, scientific monitoring and sustained reduction of pollution at its source.

Question: Delhi's winter air pollution cannot be addressed through emergency measures alone. Discuss the limitations of the Graded Response Action Plan (GRAP) and suggest a comprehensive, science-based approach to tackle the problem.

Source: Indian Express

Supreme Court 24-Hour Detention Ruling

UPSC Syllabus: Gs Paper 2- Constitution of India

Introduction

The Supreme Court has clarified that the constitutional 24-hour limit for producing a detained person before a magistrate starts when their liberty is first curtailed, not when formal arrest is recorded. The ruling arose from an Narcotic Drugs and Psychotropic Substances (NDPS) case and rejects any investigative pause for search, seizure or questioning. It also places responsibility on magistrates to examine the timing and reasonableness of police detention.

Background of the Case

1. **Case Context:** The case arose from an anti-narcotics operation in Tripura, where customs officers intercepted persons carrying **60 kg of methamphetamine tablets**.

2. **Delayed Formal Arrest:** Although the accused were brought under the physical control of the search team, their **formal arrest was recorded only the following day**.
3. **Legal Dispute:** The investigating agency argued that the **24-hour deadline began with formal arrest**, while the accused maintained that it began when **their liberty was first curtailed**.
4. **Supreme Court Intervention:** The Supreme Court **set aside the Tripura High Court's refusal of bail** and examined whether investigative procedures before formal arrest could be excluded from the 24-hour constitutional deadline.

Constitutional and Legal Framework

1. **Article 21:** Protects the **life and personal liberty** of individuals and provides protection against unlawful detention.
2. **Article 22(2):** Requires every arrested and detained person to be produced before the nearest magistrate **within 24 hours**, **excluding necessary travel time**. No person can remain in custody beyond this period without the magistrate's authority.
3. **Section 58 of BNSS:** Section 58 of the **Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023**, states that a person arrested without a warrant cannot be detained for longer than a **reasonable period**.
4. **Meaning of Arrest and Detention:** Arrest is the **formal act of taking a person into custody** in connection with an offence, while detention involves **restricting a person's liberty**. The BNSS does not separately define detention but provides police powers to stop or temporarily hold people in specified situations.
5. **NDPS Act and Bail Restrictions:** The **Narcotic Drugs and Psychotropic Substances (NDPS) Act, 1985**, empowers officers to search, seize and arrest persons suspected of drug-related offences. **Section 37** of this Act imposes restrictions on bail in specified serious drug offences but **does not extend the period police can keep an arrested person in custody**.

Key Observations and Directions of the Supreme Court

1. **Actual Detention Determines the Deadline:** The Supreme Court held that the **24-hour period begins** when a person's **liberty is first effectively curtailed**, irrespective of formal arrest. It directed magistrates to **record the initial detention time** and calculate the deadline accordingly.
2. **Arrest and Detention Are Synonymous:** The Court interpreted the expression **"arrested and detained in custody"** under Article 22(2) conjunctively, treating arrest and detention as **synonymous** for calculating the constitutional deadline.
3. **No Investigative Buffer Zone:** The Court held that search, seizure and questioning **cannot suspend the 24-hour deadline** or create a temporary disruption of liberty. Referring to Justice V. R. Krishna Iyer's observations in Niranjan Singh (1980), it **rejected attempts to justify informal custody** without formal arrest.
4. **Earlier High Court Interpretations Rejected:** The Supreme Court disapproved the views of the Orissa High Court in Aryaman Pattnayak v. Union of India, Kerala High Court in Arun K Thomas v. Narcotics Control Bureau (2026) and Madras High Court in Kannan v. State of Tamil Nadu(2026). These High Courts held that the pre-arrest detention period could be excluded from the 24-hour limit under Article 22. The Supreme Court held that these decisions did not lay down the correct law under Article 22(2).
5. **Mandatory Production Before Magistrate:** The Court directed that a person detained beyond 24 hours without being produced before a magistrate **must be released immediately**. The necessary **travel time** to reach the magistrate is excluded from the calculation.

Protection of Fundamental Rights and Safeguards Against Custodial Violence

1. **Reasonableness of Detention:** The Court held that compliance with the 24-hour deadline **does not automatically make detention reasonable**. Magistrates must **independently examine** the grounds and duration of custody.
2. **Unexplained Detention and Police Remand:** The Court noted an unexplained **18-hour gap** between completion of the search and formal arrest. It held that magistrates **can refuse police remand** if detention within the 24-hour period was unreasonable.
3. **Fundamental Rights Override Special Laws:** The Court held that restrictions under **Section 37 of the NDPS Act must give way where Article 21 is violated**. It referred to Union of India v. K.A. Najeeb (2021), which recognised that constitutional rights can prevail over statutory restrictions on bail.
4. **Prevention of Custodial Violence:** The Court highlighted the **risk of torture and third-degree methods** during investigations, particularly when police attempt to extract information or confessions through prolonged or unrecorded custody.
5. **CCTV Surveillance in Investigating Agencies:** The Bench referred to earlier Supreme Court directions requiring CCTV cameras with **audio-video recording and night vision** in police stations and offices of agencies such as the **National Investigation Agency (NIA)**, **Central Bureau of Investigation (CBI)** and **Enforcement Directorate (ED)**, where interrogation and detention take place.
6. **Preservation of CCTV Footage:** CCTV recordings must be preserved for **at least 18 months** and for a longer period if a complaint of custodial violence is made.

Significance of the Judgment

1. **Clear Constitutional Safeguard:** Establishes a **clear starting point** for calculating the 24-hour deadline, irrespective of the terminology used by investigating agencies.
2. **Strengthening Judicial Oversight:** Makes the examination of **detention timing and reasonableness** an important part of magistrates' decisions on police remand.
3. **Greater Accountability in Investigation:** Reinforces transparency in police custody through **CCTV surveillance, recording and preservation** of footage.
4. **Constitutional Supremacy:** Reaffirms that statutory restrictions under special laws **cannot be used to dilute fundamental protections** guaranteed under the Constitution.

Conclusion

The ruling makes the actual loss of liberty—not the label used by an investigating agency—the starting point for constitutional safeguards. It requires magistrates to examine both the timing and reasonableness of custody, while reaffirming that investigative powers and special-law restrictions cannot displace the protections of personal liberty.

Question for practice:

Examine the Supreme Court's ruling on the 24-hour detention limit under Article 22(2) of the Constitution and its significance for the protection of personal liberty and prevention of arbitrary detention.

Source: The Hindu