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The economics behind fixing air fares

Source: The post **"The economics behind fixing air fares"** has been created based on **"The economics behind fixing air fares"** published in **"Business Line"** on 10th November 2026.

UPSC Syllabus: GS 3 – Indian Economy

Context: Passengers often complain about high airfares, particularly during festivals, holidays and peak travel seasons. Airfare determination is influenced not only by demand and supply but also by network economics, operating costs, pricing strategies and the degree of competition among airlines. The aviation sector follows a network-based business model in which airlines aim to maximise revenue through efficient utilisation of aircraft and cross-subsidisation between routes.

Economics Behind Fixing Airfares

1. **Network Economics:** Airlines operate through interconnected networks of routes. Their profitability depends on the performance of the entire network rather than individual routes.
2. **Cross-Subsidisation:** Airlines use profits generated from high-traffic routes to compensate for losses on low-traffic routes and vice versa.
3. **Aircraft Utilisation:** Airlines seek to maximise the use of aircraft by ensuring that aircraft do not remain idle or fly without passengers.
4. **Deadweight Loss:** An aircraft seat that remains vacant represents lost revenue because the opportunity to sell that seat expires once the flight departs.
5. **Dynamic Pricing:** Airlines increasingly use algorithms to adjust fares according to demand, route conditions and seat availability.

Ramsey Pricing and Price Elasticity of Demand

1. **Ramsey Pricing:** This principle suggests that prices should be determined according to the price elasticity of demand across different routes.
2. **Price Elasticity:** Routes with less price-sensitive passengers can bear relatively higher fares, whereas routes with highly price-sensitive passengers require lower fares.
3. **Revenue Maximisation:** The objective is to maximise revenue from the entire network rather than maximise profits from every individual route.
4. **Efficient Pricing:** This approach helps airlines recover network-wide costs while maintaining the economic viability of different routes.

Role of Cross-Subsidisation in Network Operations

1. Cross-subsidisation is an inherent feature of network-based businesses such as aviation, railways, telecommunications and electricity.
2. High-traffic routes can generate sufficient revenue to support low-traffic routes.
3. Such pricing strategies help airlines maintain connectivity across different cities.
4. The price structure becomes increasingly complex as airlines expand their networks and add more destinations.

Degree of Competition in the Aviation Sector

1. **Market Concentration:** Although India officially has nine airlines, only seven have a meaningful presence in the market.
2. **Limited Competition:** The number of airlines has declined considerably over the last three decades, from more than a dozen airlines to around two dominant players.
3. **Oligopolistic Market:** The presence of a few dominant airlines creates the possibility of oligopolistic behaviour and weakens competitive pressure.
4. **Entry Barriers:** High operating costs and the requirement for substantial investment make entry into the aviation market difficult.
5. **Price Gouging:** Limited competition can create conditions in which dominant airlines may charge higher fares without facing sufficient competitive pressure.

Role of Government

1. The government should ensure that the aviation market remains competitive and that dominant players do not misuse their market position.
2. It should create an enabling environment for new airlines to enter the market.
3. The government should address high operating costs, including the cost of airport infrastructure and related services.
4. Competition policy should focus on preventing anti-competitive practices rather than merely controlling airfare levels.
5. Greater competition can improve consumer choice, affordability and connectivity.

Conclusion: Airfare determination is a complex economic process involving network efficiency, cross-subsidisation, price elasticity and market competition. While airlines must be allowed to adopt commercially viable pricing strategies, the government must ensure a competitive market structure. A balanced approach between commercial viability, consumer interests and effective competition is essential for sustainable growth of India's aviation sector.

Question: Explain the economic principles governing airfares in the aviation sector. How do network economics, cross-subsidisation and the degree of competition influence airfare determination in India?

Source: Business Line

Why India needs nuclear power beyond solar

Source: The post "Why India needs nuclear power beyond solar" has been created based on "Why India needs nuclear power beyond solar" published in "Daily Pioneer" on 10th November 2026.

UPSC Syllabus: GS 3 – Indian Economy

Context: India's energy transition requires not only increasing electricity generation but also ensuring that electricity is clean, reliable, affordable and available throughout the day. The COP31 Presidency has set a target of increasing electricity's share to 35% of global final energy demand by 2035. For India, achieving this target requires faster electrification of the economy along with diversification of its energy sources, including solar, wind, storage and nuclear power.

India's Present Electricity and Energy Scenario

1. According to the Bureau of Energy Efficiency's India Energy Scenario 2024–25, electricity accounts for approximately 23% of India's final energy consumption.
2. When traditional fuels such as firewood, crop residue and dung are included, the share falls to approximately 19%.
3. The share of electricity in final energy consumption has increased only marginally from around 22% over the past five years.
4. Therefore, achieving 35% electrification by 2035 requires India to accelerate its pace of electrification several times.

Sectoral challenges:

1. Industry accounts for approximately 50% of India's final energy consumption, but electricity meets only 19% of its energy requirements.
2. Coal continues to meet nearly 58% of industrial energy demand.
3. Electrification of industrial heating and manufacturing processes requires a continuous supply of clean, reliable and affordable electricity.
4. Rising energy demand means that India must expand electricity generation both to meet economic growth and to replace conventional fossil fuels.

Reasons Why Solar Energy Alone Is Not Sufficient

1. **Intermittency of solar energy**
    a. Solar power generation depends on sunlight and is therefore unavailable during the night.
    b. On 29 July 2025, renewable energy met a record 51.5% of India's electricity demand.
    c. However, electricity demand continues during evening and night hours when solar generation declines.

2. **Changing pattern of electricity demand**
    a. Buildings account for approximately one-third of India's electricity consumption.
    b. Household electricity consumption nearly doubled from 217 billion units in 2014–15 to approximately 409 billion units in 2024–25, largely due to fans and air conditioners.
    c. Electric vehicles, which account for approximately 8% of new vehicle registrations, are increasingly charged during evening hours.
    d. Data centres and steel furnaces require uninterrupted electricity supply throughout the day.

3. **Increasing pressure on the electricity grid**
    a. The midday decline in net load, after subtracting solar generation, has increased from approximately 25 GW in 2023 to 64 GW in 2026.
    b. Electricity generated through solar power during the daytime needs to be replaced by alternative sources after sunset.
    c. At present, coal largely meets this evening electricity demand.

4. **Limitations of battery storage**
    a. By mid-2026, India had installed approximately 9.3 GWh of battery storage.
    b. Against this, the Central Electricity Authority's plan envisaged a requirement of approximately 35 GWh by 2026–27.

c. Batteries can shift solar electricity across a few hours but are less suitable for meeting prolonged energy requirements during cloudy weeks, monsoons and winter evenings.
d. Therefore, India requires firm, low-carbon electricity sources that can provide power irrespective of weather conditions.

Significance of Nuclear Energy for India

1. **Ensuring reliable and uninterrupted electricity**
   a. Nuclear energy provides firm, low-carbon electricity and can operate independently of daily weather conditions.
   b. It can complement intermittent renewable sources by supplying electricity during periods of low solar and wind generation.

2. **Supporting industrial growth**
   a. Industries such as steel, cement, fertilisers and chemicals require large quantities of uninterrupted electricity.
   b. Small modular and small nuclear reactors can potentially provide captive or cluster-level electricity to industrial units.
   c. Nuclear power can also meet the continuous electricity requirements of data centres.
3. **Reducing dependence on coal**
   a. Nuclear energy can help reduce dependence on coal for meeting electricity demand during non-solar hours
   b. It can prevent the possibility of an economy becoming increasingly electrified while continuing to depend on fossil fuels for electricity generation.
4. **Supporting long-term decarbonisation**
   a. Nuclear power is a firm, low-carbon source of electricity.
   b. It can complement solar, wind and battery storage in achieving India's long-term climate and energy transition objectives.
5. **Strengthening energy security**
   a. India's domestic nuclear technology and fuel-cycle expertise provide an opportunity to develop nuclear power at scale.
   b. Diversification of energy sources can reduce dependence on a single source of electricity generation.

India's Nuclear Energy Potential and Recent Developments

1. Nuclear energy currently contributes approximately 3% of India's total electricity generation.
2. With projects under construction, India's nuclear capacity is expected to reach approximately 22.4 GW by 2034.
3. The Government of India has set a target of achieving 100 GW of nuclear power capacity by 2047.
4. The SHANTI Act, 2025, allows private companies to build, own, operate and decommission nuclear power plants, subject to central licensing and regulatory approval.
5. Private sector participation is expected to mobilise investment and accelerate nuclear capacity expansion.

Major private sector initiatives:

1. NTPC has planned approximately 30 GW of nuclear capacity across at least 14 states.

2. The Adani Group has announced plans for up to 10 GW of nuclear capacity by 2035.
3. Bharat Small Reactors offer an opportunity to explore nuclear power for captive industrial consumption and cluster-level electricity supply.

Three Major Reforms Required to Strengthen Nuclear Energy

1. **Paying for reliability rather than merely electricity generation**
    a. India's electricity markets largely reward the cheapest electricity available at a particular time.
    b. This approach supports solar power but does not adequately recognise the value of reliable electricity available during evening and night hours.
    c. Capacity payments, two-part tariffs and procurement mechanisms based on round-the-clock electricity supply should be introduced to encourage firm power sources such as nuclear energy.
2. **Matching small reactors with high-demand industrial sectors**
    a. Small nuclear reactors should be strategically deployed in industrial clusters involving steel, cement, fertilisers and chemicals.
    b. Bharat Small Reactors can provide captive or cluster-level electricity to industries requiring continuous power.
    c. This approach can also reduce pressure on electricity transmission infrastructure.
3. **Reducing the cost of capital**
    a. A major portion of nuclear power costs arises from financing rather than fuel expenses.
    b. Long-tenure concessional loans, sovereign green bonds and the inclusion of nuclear energy in India's green finance taxonomy can reduce financing costs.
    c. The COP31 Presidency's focus on financial mobilisation and technology transfer can support such investments.
4. **Importance of Integrated Energy Planning**
    a. Nuclear energy, renewable energy, battery storage and transmission infrastructure should be planned together.
    b. Energy planning should be based on hourly electricity demand rather than annual generation and consumption figures alone.
    c. Such an integrated approach will help maintain grid stability, ensure reliable electricity supply and optimise the use of different energy sources.

Conclusion: Solar and wind energy will remain the primary drivers of India's immediate energy transition, while nuclear power will play a crucial role in ensuring long-term energy security. India's 2035 electrification target can be supported by renewable energy, but maintaining clean and uninterrupted electricity supply beyond 2035 will require firm, low-carbon sources such as nuclear energy. Therefore, India must pursue a balanced energy strategy combining renewable energy, nuclear power, storage and transmission infrastructure to achieve sustainable economic growth and long-term decarbonisation.

Question: India's transition towards a clean energy economy cannot rely solely on renewable energy sources such as solar and wind. In this context, examine the significance of nuclear energy in ensuring India's energy security and achieving its long-term decarbonisation goals.

Source: Daily Pioneer

A Case for Nepal Suing Major Carbon Emitters for Floods

UPSC Syllabus: Gs Paper 3- Environment

Introduction

The August 2026 floods in Nepal, triggered by a mountain glacier collapse, killed **more than 1,300 people** and left **over 5,000 missing**. Despite contributing **less than 0.1% of global greenhouse gas emissions**, Nepal has sought **$20 million in compensation**. The disaster raises a wider question: can climate-vulnerable communities and states hold major emitters legally accountable for climate-related harm through courts and international mechanisms?

Climate Justice: Principles and Nepal's Vulnerability

1. **Meaning of Climate Justice:** It is a moral and ethical principle that addresses the unequal impact of climate change on vulnerable communities and future generations.
2. **Unequal Distribution of Climate Impacts:** Countries contributing very little to global emissions often face severe climate-related losses, while major emitters contribute significantly to cumulative greenhouse gas (GHG) emissions.
3. **Nepal's Low Emissions:** Nepal contributes **less than 0.1%** of global GHG emissions and generates most of its electricity from renewable energy, yet faces severe climate risks.
4. **Accelerating Himalayan Glacier Loss:** Glaciers across the Hindu Kush Himalaya lost ice **65% faster** during 2011–2020 than in the previous decade, while Nepal lost nearly one-third of its glacier ice volume in about three decades.
5. **Exposure to Glacial Lake Outburst Floods (GLOFs):** Communities in Nepal's Trishuli and Bhote Koshi river basins have faced GLOF risks for three decades, while glaciers in the Tibetan Autonomous Region have retreated faster since 2010.
6. **Future Climate Risks:** Scientists predict that mountain glaciers will lose most of their volume by the end of the 21st century, threatening alpine ecosystems and human populations.
7. **Economic Losses:** Preliminary estimates by Nepal's National Disaster Risk Reduction and Management Authority put property, housing and infrastructure losses from the floods at approximately **$2.56 billion**.
8. **Beyond Financial Assistance:** Climate justice seeks to move beyond aid and charity towards accountability, compensation and recognition of losses suffered by vulnerable countries.

Climate Litigation: Concept and Legal Basis

1. **Meaning of Climate Litigation:** It involves legal claims against governments and private corporations for their contribution to climate-related harm, with affected individuals bringing such cases in several European and US jurisdictions.
2. **Grounds for Legal Claims:** Plaintiffs have approached courts citing serious risks to life, well-being, health, property, privacy and family life arising from climate change.
3. **Difficulty in Establishing Causation:** Establishing a direct link between an entity's failure to restrict GHG emissions and a specific disaster remains legally difficult because emissions have global and long-lasting effects.
4. **Incremental Contribution to Climate Change:** Individual emitters add to cumulative global GHG concentrations, increasing the likelihood of adverse physical events whose impacts depend on exposure, vulnerability and resilience.

5. **Identification of Climate Victims and Legal Standing:** Identifying individuals or communities specifically exposed to climate risks, rather than the general population, provides the basis for invoking individual or collective rights and seeking compensation.
6. **Establishing Imminent Climate Risks:** Existing GLOF threats in the Trishuli and Bhote Koshi river basins, along with accelerating glacier retreat, may help establish the imminence of climate-related catastrophes.

Global Judicial Precedents on Climate Accountability

1. **Lliuya v. RWE (Germany):**
   - A Peruvian national sued German energy company RWE under German private nuisance law, alleging that its coal-fired power generation threatened glacier stability near his home.
   - On **May 28, 2025**, the Higher Regional Court of Hamm recognised that individual emissions could proportionally contribute to climate risks abroad and that an emitter could, in principle, face liability under German civil law.
   - However, the specific claim was dismissed due to insufficient evidence of an imminent flood risk.
2. **Milieudefensie v. Royal Dutch Shell (Netherlands):** On **November 12, 2024**, the Dutch Court of Appeal recognised Shell's obligation to contribute to combating climate change under Dutch tort law and human rights standards. However, it overturned the earlier order requiring a 45% reduction in emissions by 2030.
3. **Asmania v. Holcim (Switzerland):** Four Indonesian islanders filed a climate lawsuit against Swiss building-material company Holcim, seeking reductions in greenhouse gas emissions and compensation for present and future climate-related damages.
4. **Relevance for Nepal:** These cases demonstrate growing judicial recognition of corporate climate responsibilities and provide legal arguments that Nepalese flood victims could explore, although they do not establish binding precedents for Nepal.

International Framework for Climate Justice and Compensation

1. **UN Loss and Damage Fund:** Established in 2022 under the Paris Agreement framework, the fund aims to address climate-related loss and damage in vulnerable developing countries.
2. **Nepal's Compensation Demand:** Nepal's Ministry of Finance and Ministry of Environment jointly requested **$20 million** from the United Nations to address losses caused by the catastrophic floods.
3. **Funding Shortage:** The United Nations Loss and Damage Fund faces a **$2.8 billion** funding gap as it prepares to approve its first climate recovery projects.
4. **ICJ Advisory Opinion (2025):** In **July 2025**, the International Court of Justice (ICJ) affirmed that states have binding obligations under climate treaties and customary international law to prevent significant climate harm.
5. **State Responsibility and Reparations:** States breaching their international climate obligations may be required to provide **full reparations**, including compensation, provided a sufficiently direct and certain causal link between wrongful conduct and injury is established.
6. **Legal Significance of the Advisory Opinion:** Although non-binding, the ICJ opinion clarifies existing international legal obligations and provides an important basis for climate-vulnerable countries to seek accountability.

7. **Changing International Climate Negotiations:** Earlier discussions on compensating climate-affected countries gradually shifted towards providing financial assistance to developing countries for addressing climate change.

Challenges in Securing Climate Justice

1. **Difficulty in Proving Legal Responsibility:** The cumulative nature of GHG emissions and multiple contributing factors make it difficult to establish the responsibility of individual emitters for specific climate-related damage.
2. **Absence of Binding Judicial Precedents:** International climate litigation cases do not create binding precedents for other jurisdictions, limiting their direct application to Nepal's legal claims.
3. **Reluctance of Developed Countries:** Wealthy countries may resist compensation claims because accepting such responsibility could establish a precedent for similar demands from other climate-vulnerable countries.
4. **Shift from Compensation to Assistance:** International climate negotiations gradually moved away from compensation claims towards financial assistance, making direct compensation for climate-related losses difficult.
5. **Domestic Development Challenges:** Nepal's government has been criticised for not giving climate resilience sufficient priority in its national budget despite repeated climate-related disasters.

Way Forward

1. **Pursuing Climate Litigation:** Nepalese flood victims can explore legal action against major GHG emitters, using existing international cases to support arguments for corporate accountability.
2. **Strengthening International Climate Finance:** Major emitting countries, particularly those from the Global North, should increase their contributions to the Loss and Damage Fund to support vulnerable countries.
3. **Compensation and Community-Based Support:** Financial assistance should reach affected communities as compensation **rather than loans**, supporting their recovery and rehabilitation.
4. **Integrating Climate Resilience into Development:** Nepal should make sustainability and climate resilience essential parts of its development model, while ensuring development partners and investors prioritise sustainable investments.
5. **Strengthening Domestic Climate Governance:** The government should give climate action greater priority in its budget and support clean hydropower, forestry and other climate-related programmes.
6. **International Cooperation:** Countries should accelerate efforts to **phase out fossil fuels** and address climate change to reduce the growing risks faced by vulnerable populations.

Conclusion

Nepal's case tests whether climate responsibility can translate into **legal accountability and fair compensation**. International law and climate litigation offer possible routes, but claims require evidence linking wrongful conduct to harm. Justice also depends on **adequate climate finance** and Nepal's own commitment to **climate-resilient, sustainable development** for vulnerable communities.

Question for practice:

Discuss the concept of climate justice and examine the legal and international mechanisms available to hold major carbon emitters accountable for climate-related losses, with special reference to Nepal.

Source: The Hindu

A Tax Fix That Can Attract More Foreign Capital

UPSC Syllabus: Gs Paper 3- Indian Economy

Introduction

India is facing sustained foreign capital outflows from its equity markets, while its corporate debt market also needs deeper domestic and foreign participation. **With the interest-rate gap between India and the US near historic lows**, raising domestic rates to support the rupee could increase borrowing costs and weaken corporate earnings. **Tax reforms offer an alternative** by improving post-tax returns and strengthening market liquidity.

Why Is Foreign Capital Leaving Indian Markets?

1. **Declining foreign investment:** Foreign investors' holdings in Indian stocks have reached an all-time low of **14%**, reflecting weaker interest in Indian equities.
2. **Large capital outflows:** Foreign investors withdrew a net **$18.9 billion** in 2025 and more than **$30 billion** so far in 2026, indicating sustained withdrawals.
3. **Poor market performance:** India ranked the **third worst-performing market** after Indonesia and Turkey between January and October 2026. The Nifty 50 had declined nearly 9%.
4. **Expensive market valuations:** India's rolling 12-month forward price-to-earnings (P/E) ratio stood at **18.6**, above Taiwan's **16.8** and Korea's **3.9**, making alternative markets relatively cheaper.
5. **Disappointing earnings growth:** India's forecast earnings growth is **11%**, against the emerging-market average of **45%**, weakening the justification for its higher market valuations.
6. **Rising investment risks:** Strained US ties, higher energy prices, rupee depreciation, geopolitical tensions and uncertainty over artificial intelligence have increased perceived investment risks.
7. **Changing relative returns:** Foreign investors invested **₹570 billion** in September 2024, but withdrew **₹940 billion** in October to pursue cheaper Chinese stocks, despite unchanged Indian tax rates.

Tax-Related Barriers to Foreign Investment in India

1. **Higher LTCG tax burden:** The long-term capital gains (LTCG) tax was increased in 2024, prompting the market regulator and PHD Chamber of Commerce and Industry to demand its removal for foreign portfolio investors (FPIs).
2. **Uncertain treaty benefits:** The Principal Purpose Test under the India-Mauritius Double Taxation Avoidance Agreement (DTAA) allows authorities to deny treaty benefits when obtaining those benefits is one of the principal purposes of an arrangement.
3. **Limited India-US tax exemption:** Article 13 of the India-US DTAA allows both countries to tax capital gains under domestic law, while Article 25 provides relief from double taxation, subject to US tax rules.
4. **Rupee-based capital gains calculation:** India calculates capital gains in rupees, so depreciation can create taxable gains even when foreign investors sell their investments at unchanged dollar values.
5. **Lower post-tax returns:** High taxes reduce the attractiveness of Indian debt investments when global funds compare post-tax returns across different investment markets.

Need for Tax Parity Between Debt and Equity Investments

1. **Unequal tax treatment of debt and equity funds:** Equity funds face **12.5%** tax on long-term gains and **20%** on short-term gains, while specified debt-fund gains are taxed at marginal rates, reaching **30%** for the highest tax bracket before cess and surcharge.
2. **Need for greater domestic participation:** Favourable debt-fund taxation can increase domestic investment and assets under management (AUM), expanding the investor base and improving corporate bond market depth.
3. **Importance of pooled investment vehicles:** Debt mutual funds and corporate bond Exchange-Traded Funds (ETFs) provide diversified exposure, avoiding the difficulty of purchasing and holding individual corporate bonds.

Proposed Tax Reforms to Attract Foreign Capital

1. **Review foreign equity LTCG:** The market regulator and PHD Chamber have urged the removal of LTCG tax for foreign investors, while the Finance Minister has agreed to consider the demand.
2. **Rationalise debt-fund taxation:** Bringing debt-fund tax treatment closer to equity funds could reduce the existing disadvantage and encourage greater domestic investment.
3. **Reduce tax on foreign debt investments:** Lower taxation on debt gains can improve post-tax returns and reduce the disadvantage arising from rupee depreciation when foreign investors calculate returns in their home currencies.
4. **Extend government-security tax incentives:** Eligible foreign investors already receive income-tax exemptions on interest and capital gains from government securities. Extending similar incentives to corporate debt could attract foreign investment and deepen the market.

How Can Tax Reforms Strengthen India's Financial Markets?

1. **Support foreign exchange inflows:** Greater foreign investment can increase foreign exchange inflows and support rupee stability, reducing excessive dependence on scarce foreign exchange reserves.
2. **Improve corporate bond liquidity:** Greater domestic participation can expand the investor base, strengthen trading activity and improve liquidity in the corporate bond market.
3. **Facilitate large-volume transactions:** A deeper market allows foreign investors to trade substantial volumes without causing sharp price movements or incurring substantial losses.
4. **Reduce pressure for interest-rate hikes:** Tax reforms offer an alternative to raising domestic interest rates, which increase borrowing costs, squeeze corporate profit margins and weaken earnings growth.

Limitations of Tax Cuts and the Need for Broader Reforms

1. **Revenue loss for the government:** Tax reductions would lower government revenue, making the Finance Minister cautious about removing or reducing capital gains taxes.
2. **Importance of strong economic fundamentals:** Tax cuts alone cannot reverse capital outflows. Investors also need predictable earnings growth and reasonable valuations to justify India's premium over competing markets.
3. **Persistent geopolitical and technological risks:** Geopolitical tensions and uncertainty surrounding artificial intelligence can continue to weaken long-term growth expectations, even after improvements in tax rules.
4. **Limited impact of temporary market support:** Lower global bond yields and expectations of rupee support through central bank intervention may improve market sentiment, but cannot resolve structural investment concerns.

Conclusion

India needs a competitive tax regime for both equity and debt investments. **Reviewing LTCG taxation and reducing the disadvantage faced by debt funds** could improve post-tax returns, deepen corporate bond markets and support foreign exchange inflows. However, sustained investment will also depend on **stronger earnings, reasonable valuations and lower economic uncertainty.**

Question for practice:

Discuss how tax reforms can help attract foreign capital, strengthen India's financial markets and address the challenges of declining foreign investment.

Source: Businessline

The missing architecture of inclusion for para athletes

Source: The post **"The missing architecture of inclusion for para athletes"** has been created based on **"The missing architecture of inclusion for para athletes"** published in **"Business Line"** on 11th November 2026.

UPSC Syllabus: GS 2-Governance

Context: India's para-athletes have brought international recognition through their achievements. However, it has been observed that there is disability-related exclusion which is largely a result of poorly designed infrastructure and fragmented institutional support rather than the athletes' physical limitations.

About Para-athletes

1. **Para-athletes are** sportspersons with **a physical, visual, or intellectual disability** who compete in **adaptive sports at national and international levels,** including the **Paralympic Games and Asian Para Games**
2. India's para-athletes have brought international recognition through their achievements, **including 29 medals at the Paris 2024 Paralympics and 114 medals at the Asian Para Games 2026.**
3. However, their achievements contrast with the lack of accessible infrastructure and institutional support, indicating that inclusion in sports remains a systemic challenge.

Challenges faced by para-athletes

1. Inaccessible transport: Para-athletes face difficulties in accessing railway coaches, platforms, public buses and taxis due to the absence of ramps and other accessibility facilities.

2. Poor sporting infrastructure: Many sports venues lack proper ramps, tactile pathways, accessible toilets and wheelchair-friendly spectator arrangements.

3. Inadequate accommodation: Hotels and hostels often lack accessible rooms and basic facilities required by athletes with disabilities.

4. High cost of assistive equipment: Sports wheelchairs cost around ₹45,000, while racing wheelchairs cost ₹4.5–5 lakh. Specialised prosthetics and replacement sockets are also expensive and largely dependent on imports.

5. Fragmented institutional support: Responsibilities are divided among the Ministries of Sports, Social Justice and Empowerment, Education and Transport, resulting in gaps in coordination and implementation.

6. Limited policy implementation: Schemes such as TOPS and cash awards mainly support athletes after they achieve recognition, while adequate support during their training and development remains limited.

7. Lack of mainstream integration: Para-sports largely operate through separate federations, while accessible school infrastructure, adaptive physical education and trained classifiers remain inadequate.

Way Forward

1. Universal accessibility: Sporting venues, schools, public transport and accommodation facilities should be designed according to universal accessibility standards.

2. Affordable assistive technology: Domestic manufacturing of sports wheelchairs, prosthetics and other specialised equipment should be encouraged to reduce dependence on costly imports.

3. Institutional coordination: Sports, Education, Transport and Social Justice ministries should work together to develop an integrated support system for para-athletes.

4. Grassroots inclusion: Inclusive school infrastructure, adaptive physical education and trained coaches should be promoted to identify and nurture talent from an early age.

5. Continuous institutional support: Financial assistance, training facilities and accessible infrastructure should be provided throughout an athlete's journey, rather than focusing only on medal winners.

6. Accountability and monitoring: Accessibility audits and transparent reporting of expenditure on inclusive sporting facilities should be institutionalised.

Conclusion: India must move beyond event-based support and adopt an ecosystem-based approach to inclusive sports. Inclusion should be treated as a matter of equal opportunity and accessible design, rather than charity or an exception.

Question: Despite the achievements of Indian para-athletes at international sporting events, inadequate accessible infrastructure and institutional support continue to hinder their participation. Discuss the challenges faced by para-athletes in India and suggest measures to promote inclusive sports infrastructure.

Source: Business Line

Post-1991 reforms left India short on manufacturing, growth and jobs

Source: The post **"Post-1991 reforms left India short on manufacturing, growth and jobs"** has been created based on **"Post-1991 reforms left India short on manufacturing, growth and jobs"** published in **"Business Standard"** on 11th November 2026.

UPSC Syllabus: GS 3-Indian Economy

Context: The 1991 economic reforms marked a major shift in India's economic policy from a public-sector-dominated model towards greater private-sector participation. However, three decades of experience indicate that while delicensing expanded private enterprise and services, it did not significantly accelerate manufacturing growth.

Background of Industrial Reforms

1. The year 1991 marked a major transition in India's economic policy, with the removal of industrial licensing and greater promotion of the private sector.

2. However, the process of liberalisation had started during the 1980s, when the public sector's share in manufacturing investment declined from around 40% in 1980-81 to 24% in 1991-92.

3. Earlier, the 1979 report of the Committee on Controls and Subsidies, chaired by Vadilal Dagli, had also recommended reducing industrial controls and replacing physical output quotas with fiscal and financial instruments.

4. Several recommendations were implemented only after 1991.

Impact of Delicensing on the Indian Economy

1. Expansion of the private sector

a. The private sector expanded its presence in manufacturing, infrastructure, banking and other economic activities.
b. Its role increased in electricity generation, road construction, airports and seaports.
c. The public sector's share in infrastructure investment declined from around 69% in 1991-92 to 44% in 2023-24.

2. Growth of private business groups

a. Major business groups such as Tata, Reliance, Aditya Birla and Adani expanded rapidly.
b. Reliance witnessed an approximately 1,000-fold increase in market capitalisation.
c. However, many large business groups diversified into low- and medium-technology sectors rather than developing specialised technological capabilities.

3. Limited impact on manufacturing

a. Manufacturing's share in GDP increased from around 12% in 1950-51 to 18-19% by the mid-1990s but remained largely stagnant thereafter.
b. It subsequently declined to around 14% in 2024-25.
c. Manufacturing's share in total employment declined from 41% in 2011-12 to 32% in 2023-24, while its share in overall employment remains around 10-11%.
d. Only three Indian companies feature among the world's top 100 non-US companies by market capitalization, indicating weak global competitiveness in **manufacturing.**

4. Growth of the services sector

a. Software exports increased from approximately $400 million in 1991-92 to $240 billion in 2025-26.

b. Software services now account for 28% of India's exports and employ around six million people.
c. The growth of software services was supported by the 1983 liberalisation of computer imports, which facilitated computerisation in banking, railways and other sectors.

5. Development of the financial sector

a. Private-sector banks increased their share of total bank advances from 17% in 2004-05 to 39% in 2024-25.
b. Their share in total banking employment also increased from 10% to 43%.
c. The growth of private mutual funds, which manage assets worth approximately ₹87 trillion, and the expansion of stock markets strengthened India's financial system.
d. Market capitalisation has risen to nearly 120% of nominal GDP.

6. Expansion of the software industry

- India's software industry emerged as one of the biggest beneficiaries of economic liberalisation.
- However, the sector now faces challenges from artificial intelligence, which may affect future export and employment growth.

Why did de-licensing not deliver the desired manufacturing growth?

1. Inadequate technological development: India has not developed enough globally competitive manufacturing firms specialising in advanced technologies.

2. Lack of active government support: Unlike successful manufacturing economies, India has not provided sufficient targeted support to develop specific industries and technological capabilities.

3. Weak global competitiveness: China's manufacturing output is nearly ten times that of India, and it has a stronger presence in technologically advanced sectors.

4. Limited employment generation: The manufacturing sector has not generated employment on the scale required to absorb India's growing workforce.

5. Unbalanced economic growth: While services and financial markets have expanded, agriculture and manufacturing continue to require greater policy attention.

Way Forward

1. Reorient industrial policy: India needs to move beyond delicensing and adopt targeted policies to strengthen manufacturing and technological capabilities.

2. Promote advanced manufacturing: Greater emphasis should be placed on research, innovation, technology adoption and the development of globally competitive enterprises.

3. Strengthen government support: Targeted policy support and infrastructure development should encourage investment in strategic manufacturing sectors.

4. Generate employment: Policies should focus on labour-intensive manufacturing to create employment opportunities for lower-income groups and improve living standards.

5. Strengthen agriculture: Agricultural reforms and productivity improvements should receive equal attention to ensure balanced economic development.

6. Address emerging challenges: India should prepare its software and services sectors for technological disruptions arising from artificial intelligence.

Conclusion: The experience since 1991 shows that delicensing expanded private-sector participation, financial markets and services but did not deliver the expected transformation in manufacturing. Therefore, liberalisation alone cannot guarantee economic growth; it must be complemented by active government support, technological development and employment-oriented policies.

Question: Did the industrial de-licensing reforms of 1991 accelerate India's economic growth? Examine their impact on the manufacturing and services sectors and discuss the need for a new policy approach.

Source: Business Standard

Strategic Autonomy Must Guide India's Starlink Policy

UPSC Syllabus: Gs Paper 3- Industrial Policy

Introduction

India has recorded 1,114.17 million internet subscriptions, highlighting the growing demand for connectivity. Satellite internet services like Starlink can extend connectivity to remote and inaccessible areas. However, their dependence on foreign-controlled satellites, software and operational decisions raises concerns about national security, digital sovereignty and strategic autonomy. The key challenge for India is to expand connectivity while retaining control over essential communications during emergencies and geopolitical conflicts.

Understanding Starlink and Its Strategic Importance

1. **Different strengths of satellite and traditional networks:** Fibre and mobile networks serve large populations in concentrated areas, while Starlink provides connectivity to remote locations without towers or cables.
2. **Limited regional capacity:** Starlink cannot serve unlimited users in one region and has previously stopped accepting residential customers in areas where its network reached capacity.
3. **Connectivity in inaccessible regions:** Satellite internet is particularly useful for isolated settlements, border regions, ships and disaster-affected areas where traditional communication infrastructure is difficult to establish.
4. **Importance for defence operations:** Starlink can connect soldiers, drones, sensors and command centres without traditional connectivity, making satellite communication important for military operations.
5. **Support for essential services:** Reliable satellite connectivity can support governments, emergency responders and other essential services operating in geographically inaccessible areas.

India's Regulatory Framework for Satellite Internet

1. **Space sector reforms, 2020:** India opened its space sector to non-governmental entities, allowing private companies greater participation in satellite communication and other space activities.
2. **Liberalisation of foreign investment:** In 2024, India allowed **74% Foreign Direct Investment (FDI)** through the automatic route for satellite operations, with higher investment requiring government approval.
3. **Shift towards advanced satellite systems:** India encouraged **Low Earth Orbit (LEO)** and **Medium Earth Orbit (MEO)** satellite systems to improve broadband connectivity in remote villages, border areas, small islands and the Northeast.
4. **Starlink's Indian regulatory approvals:** Starlink received **Global Mobile Personal Communication by Satellite (GMPCS)** authorisation from the Department of Telecommunications (DoT) in June 2025, Indian National Space Promotion and Authorization Center (IN-SPACe) authorisation in July 2025 and provisional spectrum allocation in August 2025. However, its commercial launch remained subject to security clearance from India's Ministry of Home Affairs (MHA).
5. **Additional security conditions:** In May 2025, the DoT issued **29 additional security conditions** for satellite communication licensees to strengthen India's control over their operations.
6. **Key regulatory requirements:** These include locating gateways and essential network control functions in India, providing lawful interception facilities, establishing monitoring zones extending **50 km inside international borders** and across coastal waters up to **200 nautical miles**, and ensuring accurate geo-fencing.
7. **Indigenous security requirements:** Providers must achieve **20% indigenisation of the ground segment after five years of commercial operation** and transition to **Navigation with Indian Constellation (NavIC) by 2029**.

Challenges to India's Sovereign Control over Starlink

1. **Foreign control over critical infrastructure:** Although India can license and penalise Starlink, SpaceX retains direct control over its satellites, software and terminal access, limiting India's operational control.
2. **Uncertainty during national emergencies:** During Ukraine's 2022 counter-offensive near Kherson, reported Starlink restrictions disrupted military communications and affected efforts to encircle Russian positions. In September 2022, Musk also declined Ukraine's request to activate coverage over Crimea for a planned drone operation.
3. **Difficulty in enforcing national regulations:** Iran's experience demonstrates the difficulty of enforcing national laws against foreign satellite operators. Despite repeated Iranian complaints, unauthorised Starlink transmissions continued, while Ukraine cooperated with SpaceX to identify authorised terminals and block those used by Russian forces.
4. **Limitations of international enforcement mechanisms:** Iran repeatedly approached the **International Telecommunication Union (ITU)**, but its Radio Regulations Board could not suspend the relevant satellite frequency assignments. In October 2026, the Board again noted that unauthorised Starlink transmissions in Iran were continuing.

5. **Limited independent monitoring:** Indian authorities can inspect domestic gateways, but verifying whether Indian traffic is routed through foreign gateways or mirrored abroad remains difficult and partly depends on information supplied by SpaceX.
6. **Conflict between security and network reliability:** Restrictions on inter-satellite links prevent Indian traffic from being rerouted through foreign gateways when domestic gateways become unavailable, reducing one source of network redundancy.
7. **Dependence on American government decisions:** SpaceX relies on American regulatory approvals and government contracts, giving Washington considerable influence over the company. In February 2025, reports indicated that US negotiators had raised the possibility of restricting Ukraine's Starlink access during negotiations over a proposed **US$500 billion critical minerals deal**.
8. **Military connectivity disruptions in 2026:** Ukrainian officials reported that Starshield terminals travelling above approximately **160 km/h** lost connectivity on October 14, disrupting drone missions and frontline logistics. The disruption coincided with American pressure on Ukraine, although its cause and responsibility remained contested. Normal service was restored on October 24.

Strategic and Internal Security Concerns for India

1. **Foreign legal jurisdiction and surveillance:** SpaceX's obligations under US law may conflict with Indian laws. The US **Clarifying Lawful Overseas Use of Data (CLOUD) Act** and **Executive Order 12333** provide legal avenues for American authorities to access foreign users' communications and data through companies under US jurisdiction.
2. **Strategic importance of military links:** Starlink's global reach, integration with American defence programmes such as **Starshield** and concentrated operational control increase its strategic importance and the risks of dependence on foreign-controlled communication systems.
3. **Potential misuse by insurgent groups:** In December 2024, the Indian Army recovered a Starlink antenna and router alongside weapons during operations in Manipur, raising concerns about unauthorised use. However, Musk stated that Starlink's satellite beams had never been activated over India, and the actual use of the recovered device remained unestablished.
4. **Risks of cross-border connectivity:** Inaccurate geo-fencing could allow connectivity to spill over from neighbouring countries such as Bangladesh, where Starlink is licensed, and Myanmar, where satellite terminals have been used regularly.
5. **Use in maritime criminal activities:** In November 2024, smugglers used a Starlink Mini device for navigation when the Indian Coast Guard seized over **6,000 kg of methamphetamine worth approximately US$4.25 billion** in Andaman waters.
6. **Threat to intelligence gathering:** Satellite communication channels operating outside the law can make real-time intelligence gathering difficult for Indian agencies and create wider threats to national security.
7. **Wider risks of foreign technology dependence:** Microsoft's withdrawal of Office 365 services from Nayara Energy in 2025 and restrictions on advanced AI models under US export controls in 2026 demonstrated the risks of depending on foreign-controlled digital infrastructure. Nayara disputed the legal basis for Microsoft's action, and access was later restored.

Connectivity Benefits versus Sovereignty Risks

1. **Last-mile connectivity:** Starlink can provide broadband to remote border villages, small islands and regions where laying fibre or constructing mobile towers is physically difficult or expensive.
2. **Benefits for public services:** Satellite broadband can improve access to education, telemedicine, disaster response and public services in geographically isolated areas.
3. **Gaps in ground connectivity:** Only **30% of gram panchayats had functional BharatNet connections as of February 2026**, indicating the need to strengthen existing ground infrastructure.
4. **Balancing connectivity with sovereignty:** Although satellite internet can improve connectivity in remote regions, excessive dependence on a foreign provider could make essential communications vulnerable to unilateral service restrictions and weaken India's sovereign control.

Way Forward

1. **Enforce existing security conditions:** India should retain strict licensing requirements and strengthen its independent capacity to verify compliance with security and data-routing conditions.
2. **Maintain alternative communication systems:** Military forces and essential services should maintain backup connections and regularly tested procedures for switching between communication networks.
3. **Diversify satellite service providers:** Using multiple satellite internet providers from countries under different jurisdictions would reduce dependence on the decisions of one company or government.
4. **Expand terrestrial connectivity:** Strengthening BharatNet, fibre networks and mobile coverage would reduce the number of communities for which Starlink remains the only practical option.
5. **Develop indigenous satellite capabilities:** India should encourage domestic satellite constellations and strengthen its satellite manufacturing and rocket industries to build independent space and communication capabilities.
6. **Build indigenous GMPCS capabilities:** India should develop its own **Global Mobile Personal Communication by Satellite (GMPCS)** capabilities to reduce dependence on foreign-controlled satellite communication networks.

Conclusion

India should use satellite internet to connect remote areas without creating dependence on a single foreign-controlled network. Strong enforcement, backup systems, diversified providers and indigenous GMPCS capabilities can protect essential communications. The aim must be to expand connectivity while ensuring that India retains effective control during emergencies and geopolitical conflicts.

Question for practice:

Examine the challenges posed by Starlink's entry into India and the measures needed to protect the country's digital sovereignty and strategic autonomy.

Source: The Hindu; ORF

What Did the Supreme Court Clarify on the OBC Creamy Layer?

UPSC Syllabus: Gs Paper 2- Constitution of India

Introduction

The Supreme Court has clarified that parental salary alone cannot determine an Other Backward Classes (OBC) candidate's creamy layer status. The authorities must apply the 1993 Office Memorandum and consider the status and category of the parent's post. The ruling rejects the 2004 clarification insofar as it adds a salary-based condition, while the November 2026 order explains how the March judgment applies to selections and appointments.

Evolution of the OBC Creamy Layer Concept

1. Origin and Objective of Creamy Layer (1992): In Indra Sawhney v. Union of India (1992), the Supreme Court upheld **27% OBC reservation** in central government services while requiring the exclusion of **socially and economically advanced sections**.

2. Purpose of Creamy Layer Exclusion: The concept aims to ensure that **reservation benefits reach disadvantaged OBC members** rather than families that have achieved sufficient social and economic advancement.

3. Identification of Advanced Sections: The creamy layer criteria consider **parental employment status**, **service category**, professional background, property ownership and income or wealth to identify socially advanced families.

4. Exclusion from Reservation Benefits: OBC candidates classified under the creamy layer are **not entitled to OBC reservation benefits**, while eligible non-creamy layer candidates can claim these benefits.

Evolution of Government Guidelines and Background of the Case

1. Introduction of 1993 Office Memorandum: In **September 1993**, the Department of Personnel and Training (DoPT) issued an **Office Memorandum** (OM) specifying the criteria for identifying creamy layer members among OBCs.

2. Occupational and Service-Based Criteria: The OM covered constitutional post holders, **Group A/Class I** and **Group B/Class II** officers, **Armed Forces officers**, **Public Sector Undertaking** (PSU) employees, professionals, persons in trade and industry, and property owners.

3. Exclusion of Salary and Agricultural Income: The original 1993 OM **excluded salary income** and income from **agricultural land** from the income or wealth test for identifying the creamy layer.

4. Introduction of 2004 DoPT Clarification: The DoPT clarified that salaries of PSU and private-sector employees could be considered where **equivalence** between their posts and public employment had not been established.

5. Three-Year Salary Threshold: Under the 2004 clarification, children of employees whose salaries exceeded the prescribed limit for **three consecutive years** could be classified under the creamy layer.

6. Implementation and Exclusion of Candidates: The 2004 clarification was applied rigorously from Civil Services Examination (CSE) 2015 (2016 batch), excluding **dozens of OBC candidates** whose parents' salaries exceeded the prescribed limit, sometimes due to pay revisions without changes in occupational status.

7. High Court Intervention and Government Appeals: Several **High Courts** granted relief to affected candidates, finding **unequal treatment** between similarly placed government and PSU or private-sector employees; the Union Government challenged these decisions.

8. Equivalence Guidelines (2017): The Cabinet approved equivalence guidelines in **2017**, but a **parliamentary committee** criticised them over several issues.

Key Clarifications by the Supreme Court (March 2026)

1. Salary Cannot Be the Sole Determining Factor: The Court held that **parental salary alone** cannot justify excluding children of PSU and private-sector employees from **OBC non-creamy layer benefits**.

2. Status and Category of Employment: Authorities must examine the **status and category** of parents' posts, along with the **nature of their employment**, while determining creamy layer eligibility.

3. Equivalence Between Employment Sectors: The Court rejected unequal treatment of children of similarly placed government, PSU and private-sector employees, holding that such distinctions could amount to **hostile discrimination**.

4. 2004 Clarification Cannot Override 1993 Office Memorandum (OM): The Court ruled that a clarificatory letter **cannot introduce a new substantive condition** that does not exist in the original policy.

5. Application of Income and Wealth Test: Where equivalence of posts has not been established, children of PSU and private-sector employees must be assessed under the 1993 OM's **income/wealth test**, which considers **income from other sources** and prescribed wealth criteria while **excluding salary and agricultural income**.

6. Constitutional Equality and Fair Classification: The Court emphasised that candidates **cannot be treated differently** merely because their parents receive salaries from different employment sectors.

7. Directions for Implementation: The Court directed the Centre to implement its principles within **six months** and create **supernumerary posts** wherever required for eligible non-creamy layer candidates.

Supreme Court's Latest Ruling (November 2026)

1. Centre's Concern Over Retrospective Implementation: The Centre argued that applying the March judgment retrospectively could disturb **completed Civil Services selections** and service allocations, including those from earlier examinations.

2. Rejection of Reconsideration Plea: The Court **refused to reconsider** its interpretation of the 1993 OM and 2004 clarification, stating that miscellaneous applications cannot be used to reopen settled legal issues.

3. Clarification on Retrospective Application: The Court clarified that it **had not directed the reopening** of completed selections, appointments or service allocations through retrospective implementation of the judgment.

4. Limited Scope of Six-Month Deadline: The six-month deadline applied to examining the **claims of the respondents** and did not require a general review of every recruitment year.

5. Rules for Pending and Future Allocations: All selections, appointments and roster allotments must follow the 1993 OM as interpreted in March, without allowing the 2004 clarification to override it.

6. Reaffirmation of March Judgment: The Court reaffirmed that **salary alone cannot determine creamy layer status** and that parental service status and category must also be considered.

Constitutional and Social Significance

1. Protection of Constitutional Equality: The ruling prevents arbitrary classification based on parental employment sectors and ensures **equal treatment** of similarly placed OBC candidates.

2. Objective of Affirmative Action: The creamy layer principle seeks to **exclude socially advanced OBC sections** while ensuring that **reservation benefits reach disadvantaged members** of the community.

3. Prevention of Arbitrary Exclusion: The ruling protects **eligible candidates** from losing reservation benefits solely because their parents' salaries increased **without corresponding changes in their occupational status**.

Challenges in Implementing OBC Reservation

1. Inconsistent Implementation of Guidelines: The government's use of the 2004 clarification created **inconsistency** in applying the original 1993 OM and resulted in the exclusion of **eligible OBC candidates**.

2. Delay in Service Allocations: The government stalled service allocations following **CSE 2025**, **delaying relief** for candidates who satisfied the non-creamy layer criteria.

3. Unequal Representation in Higher Positions: The **2024–25** DoPT Annual Report recorded OBC representation at **26.3%** in central government employment, with representation declining steadily towards higher positions.

4. Unequal Distribution Within OBC Communities: The **Justice G. Rohini Commission** indicated that reservation benefits are **distributed unevenly** among OBC communities, highlighting inequalities within the category.

5. Lack of Publicly Available Commission Report: The Justice G. Rohini Commission submitted its report in **2023**, but it **remains unpublished**, limiting public understanding of inequalities among OBC communities.

Way Forward

1. Creation of Supernumerary Posts: The government must create **supernumerary posts** for **legitimate claimants** to provide relief without disturbing completed selections and existing service allocations.

2. Equal Access to Legal Remedies: The government must implement corrected eligibility rules for **pending allocations** without restricting relief to candidates who can **afford lengthy litigation**.

3. Detailed Caste-Wise Data Collection: The coming Census includes **caste enumeration**, but policymakers also need data on each caste's **education, occupations, assets and landholdings** to understand internal inequalities.

4. Evidence-Based Distribution of Reservation Benefits: Policymakers must establish the **extent and causes of inequalities** within OBC communities before making assumptions about the concentration of reservation benefits among higher-income families.

Conclusion

The ruling requires fair application of the 1993 **Office Memorandum** (OM), with parental service status considered alongside the prescribed tests. The Centre must provide relief to eligible claimants through supernumerary posts and apply the rules to pending cases. Better caste-wise data is also needed to assess inequalities within OBC communities and distribute reservation benefits fairly.

Question for practice:

Examine the Supreme Court's clarification on the OBC creamy layer criteria and its implications for ensuring fair implementation of reservation benefits.

Source: The Hindu

One Nation, One Ration Card

Source: The post **"One Nation, One Ration Card"** has been created based on **"One Nation, One Ration Card"** published in **"PIB"** on 12th November 2026.

UPSC Syllabus: GS 2-Governance

Context: The One Nation One Ration Card (ONORC) scheme was launched in 2019 as a major reform of the Public Distribution System (PDS), enabling nationwide portability of ration cards and beneficiaries covered under the National Food Security Act (NFSA).

About the One Nation One Ration Card (ONORC)

1. One Nation One Ration Card (ONORC) scheme was launched in 2019 by the Department of Food and Public Distribution to ensure nationwide portability of ration cards under the National Food Security Act (NFSA), 2013.
2. It enables beneficiaries to access their entitled subsidised foodgrains from any Fair Price Shop (FPS) across the country without obtaining a new ration card.
3. The scheme aims to address the problem of migrant workers who often lose access to subsidised foodgrains when they migrate to other States in search of employment.

Significance of ONORC

1. **Nationwide Portability:** It enables beneficiaries to access foodgrain entitlements from any FPS across the country, irrespective of their State of residence.
2. **Food Security for Migrants**: It protects migrant workers and their families from losing access to subsidised foodgrains due to inter-State and intra-State migration.
3. **Inclusive Welfare Delivery:** It ensures that NFSA beneficiaries can access their entitlements wherever they live and work.
4. **Universal Coverage:** The scheme has been implemented across all 36 States/UTs, covering 100% of PMGKAY beneficiaries.
5. **Large-scale Transactions:** It facilitates approximately 3.27 crore portability transactions every month and has recorded over 233 crore transactions since inception, distributing more than 614 LMT of foodgrains.
6. **Transparency and Accountability:** Digital authentication through e-PoS devices helps prevent irregularities and ensures proper recording of foodgrain distribution.
7. **Technology-driven Governance:** Digitisation of ration cards, Aadhaar seeding and computerisation of supply chains have improved the efficiency of PDS.
8. **Ease of Access:** The Mera Ration mobile application, available in 13 languages, helps beneficiaries check entitlements, transaction history, Aadhaar-seeding status and locate nearby FPSs.

Challenges in Implementation

1. **Inter-State Portability Gap:** Despite nationwide implementation, inter-State portability remains low, with only 0.7% of total transactions being inter-State, indicating limited utilisation by migrant workers.
2. **Biometric Authentication Failures:** Elderly persons and manual labourers often face fingerprint authentication failures due to worn-out fingerprints, resulting in denial of foodgrain entitlements to genuine beneficiaries.
3. **Low Awareness Among Migrants**: Many migrant workers are unaware that they can access ration benefits outside their home State. Dependence on smartphones and digital literacy further limits awareness.
4. **Exclusion of Vulnerable Beneficiaries:** ONORC covers only NFSA beneficiaries. The beneficiary list, based on the 2011 Census, excludes many newly vulnerable households and migrant workers who do not possess ration cards.
5. **Reluctance of FPS Dealers:** Fair Price Shop dealers in destination States may be reluctant to serve interstate migrants due to difficulties in stock allocation, subsidy reconciliation and financial uncertainty.

6. **Inadequate Stock Management**: Sudden migration during harvesting and construction seasons can increase demand at certain FPSs, creating shortages due to inadequate advance stocking.
7. **Migration-related Data Management**: Tracking seasonal and temporary migration and updating beneficiary records across States remains challenging.
8. **Inter-State Coordination:** Differences in State PDS systems, administrative procedures and foodgrain allocation mechanisms create difficulties in seamless implementation.
9. **Digital Connectivity Issues:** Poor internet connectivity and technical problems with e-PoS devices can interrupt biometric authentication and portability transactions.
10. **Dynamic Foodgrain Allocation:** Changing migration patterns require flexible allocation of foodgrains among States and effective coordination between FCI and State Warehousing Corporations.

Recent Technology-driven Initiatives

1. **SARTHAK-PDS:** It provides financial support for intra-State transportation, handling and FPS dealer margins, while strengthening last-mile delivery and minimising leakages. It aims to strengthen food security under NFSA up to 31 March 2031.
2. **NIRMAL:** It strengthens data architecture and analytics for improved management of PDS.
3. **SAKSHAM:** It promotes real-time data integration, including Vehicle Location Tracking Systems, from procurement to distribution.
4. **SMART-PDS:** It digitally integrates ration cards, foodgrain distribution, supply chains and grievance redressal through an integrated central system.

Measures to Address the Challenges

1. **Strengthening Digital Infrastructure:** All FPSs should be equipped with functional e-PoS devices, with reliable internet connectivity and offline authentication facilities.
2. **Improving Data Integration:** States should regularly update migration-related beneficiary records and integrate their PDS databases with the Central repository.
3. **Flexible Foodgrain Allocation:** Foodgrain allocation should be made responsive to actual consumption patterns and seasonal migration trends.
4. **Strengthening Supply Chains:** FCI and State Warehousing Corporations should improve coordination to ensure timely transportation and adequate availability of foodgrains.
5. **Alternative Authentication:** Robust alternative authentication mechanisms should be available to prevent genuine beneficiaries from being denied foodgrains due to biometric or connectivity failures.
6. **Awareness Generation**: Migrant workers should be informed about ONORC through local languages, awareness campaigns and the Mera Ration application.
7. **Effective Grievance Redressal:** Toll-free helplines and online grievance mechanisms should be strengthened to address complaints promptly.

Conclusion: ONORC represents a shift from location-based foodgrain distribution to a portable and beneficiary-centric food security system. Its effective implementation requires universal technological infrastructure, inter-State coordination, reliable authentication and efficient supply chain management. It can strengthen the right to food under NFSA by ensuring that no eligible beneficiary is deprived of subsidised foodgrains merely because of migration or change of residence.

Question: Discuss the significance of the One Nation One Ration Card (ONORC) scheme in ensuring food security for migrant workers. Examine the challenges in its implementation and suggest measures to address them.

Source: PIB

India needs tax reform to reduce distortions and lift investment growth

Source: The post **"India needs tax reform to reduce distortions and lift investment growth"** has been created based on **"India needs tax reform to reduce distortions and lift investment growth"** published in **"Business Standard"** on 12th November 2026.

UPSC Syllabus: GS 3- Indian Economy

Context: An efficient tax system is essential for resource mobilisation, fiscal stability, equitable distribution of income and economic growth. However, India's tax system continues to face challenges such as a narrow tax base, multiple exemptions, complex compliance requirements and distortions in investment decisions. Recent tax reforms have improved the tax structure, but continuous reforms are required to enhance revenue collection while encouraging investment, productivity and competitiveness.

Need for Tax Reforms

1. **Broadening the Tax Base:** A wider tax base is necessary to increase government revenue without imposing an excessive burden on existing taxpayers.
2. **Fiscal Deficit Management:** Higher and more stable tax revenues can help reduce the fiscal deficit and dependence on borrowings.
3. **Promoting Investment:** Rational tax rates and fewer distortions can encourage domestic and foreign investment.
4. **Improving Competitiveness:** A simplified tax structure can reduce the cost of doing business and improve India's competitiveness.
5. **Ensuring Equity:** A well-designed tax system can ensure a fair distribution of the tax burden across different income groups and economic sectors.

Major Challenges in India's Tax Structure

1. **Narrow Tax Base:** A significant number of individuals and businesses remain outside the tax system due to non-registration and exemptions, limiting revenue mobilisation.
2. **Multiple Tax Exemptions:** Numerous exemptions under GST and income tax create unequal treatment among taxpayers and distort economic decisions.
3. **Cascading Effect of Taxes:** Incomplete input tax credit under GST and exclusion of petroleum products lead to taxes being imposed on costs already bearing taxes, increasing production and transportation costs.
4. **Investment Distortions:** Tax incentives favouring selected sectors, assets and firms divert investment from more productive areas and increase the cost of capital.
5. **Complex Tax Administration:** Complicated procedures, compliance requirements and refund delays increase the burden on businesses, particularly MSMEs.
6. **Discrimination in Corporate Taxation:** Differences in tax treatment between domestic and foreign companies can affect investment decisions and reduce tax neutrality.
7. **Distortionary Transaction Taxes:** Taxes on securities and commodity transactions may discourage investment and affect the development of financial markets.

8. **Disincentive to Employment:** Poorly designed personal income tax structures and withdrawal of social security benefits as income increases can discourage work effort, particularly among lower-income groups.
9. **Resistance to Reforms:** Governments often prefer the existing tax structure due to resistance from interest groups that benefit from existing exemptions and incentives.

Specific Issues in India's GST and Income Tax System

1. **GST Exemptions**: Despite recent rationalisation, 148 commodities under the four-digit HSN classification continue to remain outside the GST system.
2. **Input Tax Credit:** The composition scheme for taxpayers with turnover below ₹150 lakh excludes a large number of resellers from availing input tax credit.
3. **Petroleum Products:** Their exclusion from GST creates cascading effects and increases transportation costs.
4. **Corporate Income Tax:** Differences in tax treatment between domestic and foreign companies affect tax neutrality and investment.
5. **Capital Gains Tax:** The existing capital gains tax regime and transaction taxes on securities and commodities require reconsideration.
6. **Personal Income Tax:** Multiple exemptions and incentives create distortions and complicate the tax structure.

Recent Reforms and Developments

1. **GST Rationalisation:** The rationalisation exercise undertaken in September 2025 addressed some existing distortions in the GST structure.
2. **Simplification of Tax Administration:** Reforms introduced from 1 November 2026 aim to ease tax administration, compliance and refund procedures.
3. **Review of Capital Gains Tax:** The government has indicated its willingness to reconsider the existing capital gains tax regime.

Way Forward

1. **Broaden the Tax Base:** Reduce unnecessary exemptions and bring more individuals and businesses into the formal tax system.
2. **Rationalise Tax Incentives:** Eliminate unnecessary sector-specific exemptions and incentives that divert investment from productive sectors.
3. **Reduce Cascading Taxes:** Expand input tax credit under GST and address the taxation-related distortions arising from the exclusion of petroleum products.
4. **Simplify Tax Administration:** Reduce compliance requirements, improve digital tax administration and ensure timely processing of refunds.
5. **Ensure Tax Neutrality:** Maintain a level playing field between domestic and foreign companies to encourage investment.
6. **Rationalise Capital Gains Tax:** Review transaction taxes on securities and commodities to minimise distortions in financial markets.
7. **Reform Personal Income Tax:** Reduce unnecessary exemptions and design tax rates that encourage employment, work participation and savings.
8. **Tax Economic Rents:** Rationalise incentives and appropriately tax economic rents to improve revenue mobilisation without discouraging productive investment.

9. **Promote Cooperative Federalism:** Centre and States should coordinate to ensure a stable, predictable and simplified tax framework.

Conclusion: Tax reforms should not be treated as one-time exercises but as a continuous process of adapting to changing economic conditions. India needs a tax system that balances revenue mobilisation with investment, employment generation, productivity and competitiveness. The focus should shift from merely increasing tax rates to broadening the tax base, simplifying compliance and minimising economic distortions.

Question: Recent changes in India's tax system are welcome, but continuous reforms are needed to broaden the tax base and minimise tax distortions. Discuss the challenges in India's tax structure and suggest measures to make it more efficient and growth-oriented.

Source: Business Standard

Turning Battery Waste into Strategic Mineral Wealth

UPSC Syllabus: Gs Paper 3- Indian Economy

Introduction

Rising electrification of transport, energy storage and industries is increasing demand for lithium, nickel and cobalt. Their limited availability, geographically concentrated supply chains and China's dominance in processing expose countries to geopolitical and trade disruptions. For India, which depends heavily on imports, securing reliable supplies is a strategic priority. Recycling end-of-life batteries and retaining their mineral-rich Black Mass can turn domestic waste into a valuable secondary resource.

Battery Waste as a Source of Strategic Minerals

1. **Valuable Minerals in Discarded Batteries:** End-of-life (EoL) lithium-ion batteries contain economically valuable lithium, cobalt, nickel and other minerals that can be recovered through recycling.
2. **Meaning of Black Mass:** Black Mass is the powdery material produced by shredding EoL lithium-ion batteries and battery manufacturing waste. It contains recoverable quantities of lithium, cobalt, nickel and manganese.
3. **Sources of Battery Waste:** Mobile phones, electronic devices, electric vehicles (EVs) and battery manufacturing activities generate waste streams containing valuable minerals for domestic recovery.
4. **Waste-to-Wealth Opportunity:** Instead of treating discarded batteries as waste, India can convert them into secondary mineral resources through organised collection, recycling and refining.
5. **Rising Availability of Spent Batteries:** More than 8.7 million EVs were running on Indian roads by FY 2025–26, indicating a growing future supply of retired batteries.

Potential of Battery Recycling in India

1. **Supplementing Domestic Mineral Supply:** Recycling could meet approximately 10–12% of India's lithium demand for EV battery manufacturing, providing an additional source alongside mining and overseas sourcing.
2. **Developing Processing Capabilities:** Battery recycling can help India develop critical mineral separation and refining capabilities, an industrial capacity currently dominated by China.

3. **Supporting Domestic Resource Security:** Recovered minerals can provide a strategic secondary source of critical minerals and offer a buffer against disruptions in international supply chains.

Challenges in India's Battery Recycling Ecosystem

1. **Inefficient Informal Recycling:** Discarded batteries often enter landfills or informal recycling channels operated by kabadiwalas, where manual recovery methods are inefficient and unsafe.
2. **Low Material Recovery Rates:** Informal recycling reportedly recovers only 10–20% of materials, compared with over 90% in formal facilities, resulting in significant mineral losses.
3. **Inadequate Feedstock Availability:** Domestic recycling and refining facilities remain underutilised because insufficient battery waste and Black Mass are available to meet their processing requirements.
4. **Technological and Economic Limitations:** Different battery chemistries make mineral recovery difficult, while unattractive recycling economics create challenges in achieving higher recovery rates and purity.
5. **Investment and Capacity Utilisation Risks:** Recycling plants require advance investment, but initially low battery volumes may cause underutilisation and uncertainty over revenue generation and financing costs.
6. **Weak Collection Mechanisms:** Difficulty in collecting retired batteries from EV users restricts the supply of recyclable materials and makes large-scale circular economy development challenging.

Government Measures to Promote Domestic Battery Recycling

1. **Battery Waste Management Rules, 2022:** These rules establish an Extended Producer Responsibility (EPR) framework, making producers responsible for ensuring proper management of battery waste.
2. **National Critical Mineral Mission (NCMM):** The mission supports domestic critical mineral security and strengthens India's capacity to recover and process minerals from secondary resources.
3. **₹1,500 Crore Incentive Scheme:** Approved by the Union Cabinet in September 2025, the scheme supports recycling capacity for separating and producing critical minerals from battery waste and electronic waste (e-waste).
4. **Directorate General of Foreign Trade (DGFT) Export Prohibition:** The DGFT prohibited the export of lithium-ion battery Black Mass, changing its export policy from 'Free' to 'Prohibited' with immediate effect until further orders.

5. Coverage and Transitional Arrangements: The export prohibition applies to lithium-ion battery Black Mass, with transitional arrangements under the Foreign Trade Policy (FTP), 2023 applicable.

Significance of Retaining Black Mass within India

1. **Assured Feedstock for Recyclers:** Retaining domestically generated Black Mass can provide a reliable supply of raw material to Indian recycling and mineral-refining facilities.
2. **Better Utilisation of Existing Capacity:** Improved feedstock availability can increase plant utilisation, address material shortages and reduce the need for domestic recyclers to import Black Mass.
3. **Higher Domestic Mineral Recovery:** Domestic processing can increase the recovery of lithium, cobalt, nickel and other critical minerals, strengthening India's secondary mineral supply and reducing foreign exchange outgo.

4. **Investment and Employment Generation:** Greater availability of raw materials can encourage investment in recycling facilities and create employment opportunities across the domestic recycling and refining sector.
5. **Stronger Industrial Supply Chains:** Domestic mineral recovery can strengthen supply chains for battery manufacturing, electric vehicles, energy storage and clean-energy technologies.
6. **Environmental and Economic Benefits:** Domestic recycling can promote a circular economy and urban mining, reducing dependence on primary mining while supporting environmentally sound processing of hazardous battery waste.

Way Forward

1. **Integrating Recycled Minerals into Strategic Planning:** The proposed national critical mineral stockpile should include a mandated share of recycled minerals to create predictable demand for domestic secondary resources.
2. **Promoting Recovery Beyond Black Mass:** Recyclers should be encouraged to recover and refine individual critical minerals rather than limit their operations to producing intermediate Black Mass.
3. **Strengthening Research and Development:** Industries and research laboratories should develop technologies that improve mineral recovery rates and purity while minimising environmental impacts.
4. **Establishing Quality Standards and Testing Infrastructure:** India needs standards for battery characterisation, recycled mineral quality and second-life applications, supported by adequate testing infrastructure.
5. **Promoting Sustainable Battery Design:** Manufacturers should adopt a design for repurposing and recycling approach to make batteries easier to reuse and recover materials from.
6. **Improving Collection and Buy-back Systems:** EV manufacturers, dealers and service networks should provide remunerative take-back or buy-back options to encourage users to return retired batteries.
7. **Providing Patient Capital:** Battery recyclers need long-term financial support because recycling facilities have long gestation periods and may initially face low utilisation and uncertain revenues.

Conclusion

Battery recycling can strengthen India's critical mineral security by recovering valuable materials from domestic waste. Retaining Black Mass and expanding domestic processing can reduce import dependence and support battery, EV and clean-energy industries. Timely investment, better technology and effective collection are essential to build a circular battery economy before spent-battery volumes rise.

Question for practice:

Examine how battery recycling can strengthen India's critical mineral security and promote a circular economy.

Source: The Hindu; PIB

The Potential of India's Clean Power Ambition

UPSC Syllabus: Gs Paper 3- Infrastructure

Introduction

India's clean power transition is both an energy-security priority and a major economic opportunity. The ambition to achieve 900 GW of non-fossil power capacity by 2035, alongside net-zero emissions by 2070, requires large investments in renewable generation, storage, transmission and domestic manufacturing. Success depends on making electricity affordable and reliable while meeting rising demand, supporting economic growth and reducing long-term dependence on imported fossil fuels and technologies.

Current Status of India's Clean Energy Transition

1. **Non-Fossil Installed Capacity:** Non-fossil sources accounted for **54.2%** of India's total installed power capacity by **June 2026**, showing significant progress in clean-energy deployment.
2. **Renewable Electricity Generation:** Renewable sources contribute around **one-fourth** of actual grid electricity generation, despite their growing share in installed capacity.
3. **Expansion of Solar Energy:** Around **8 GW** of open-access solar capacity came online in **2025**, mainly driven by industrial and commercial consumers purchasing electricity directly.
4. **Unutilised Renewable Capacity:** Around **40 GW** of auctioned low-cost solar projects remain **without buyers**, showing a mismatch between renewable power availability and electricity procurement.
5. **Changing Electricity Prices:** Solar-rich afternoons experience abundant electricity and **near-zero exchange prices**, while post-sunset prices have repeatedly reached **₹10 per unit** and **₹37 in Tamil Nadu**.
6. **Growing Renewable Manufacturing:** India's solar module manufacturing capacity has increased from around **2 GW** a decade ago to **over 200 GW**, strengthening domestic production capabilities.

Significance of Clean Power Transition

1. **Strengthening Energy Security:** Solar plants, batteries and transmission networks provide electricity services **for decades**, reducing the need for repeated purchases of **imported oil and gas**.
2. **Supporting Economic Development:** Affordable and reliable electricity can support India's ambition of becoming a **developed economy by 2047** without locking future growth into fossil fuels.
3. **Meeting Climate Commitments:** Increasing non-fossil electricity generation will help India pursue its **net-zero target by 2070** while contributing to global climate goals.
4. **Meeting Rising Electricity Demand:** Population growth, urbanisation, industrial expansion, air-conditioning and data centres will **increase electricity demand**, making clean power essential for future energy requirements.
5. **Supporting Industrial Electrification:** Affordable renewable electricity can **replace imported gas** in industrial heating and support **green hydrogen** production and cleaner industrial processes.
6. **Creating Employment Opportunities:** Renewable energy expansion can generate **green jobs** in manufacturing, installation, transportation, servicing, battery production and other supporting activities.
7. **Expanding Household Benefits:** Rooftop solar can **reduce household electricity expenses**, provide **surplus electricity** for sale to the grid and improve access to affordable power.

Potential of India's Clean Power Ambition

1. **Large Investment Opportunity:** India's net-zero transition presents an estimated **$22.7 trillion** investment opportunity **through 2070**, covering renewable energy, transmission, storage and emerging technologies.
2. **Attracting Global Capital:** Domestic resources can cover **just over 70%** of the total investment requirement, leaving a funding gap of approximately **$6.5 trillion** to be met substantially through overseas capital and development finance.

3. **Reducing Electricity Procurement Costs:** A least-cost clean-power pathway could reduce average electricity procurement costs by around **15%** in real terms, saving **over ₹2 lakh crore annually by 2035**.
4. **Affordable Round-the-Clock Electricity: Solar Energy Corporation of India Limited (SECI)'s 1,000-MW thermal-mimic auction** secured renewable electricity with storage at ₹5.25–5.26 per unit, with prices fixed for 25 years, demonstrating the potential to provide reliable electricity similar to coal-based power.
5. **Domestic Retention of Economic Value:** Depending on project economics, **over 70%** of a battery project's lifetime economic value could potentially **remain within India**, even with imported cells.
6. **Developing Clean-Energy Industries: Battery storage**, power electronics, energy-management software, **green hydrogen** and **electrified transport** can create investment opportunities across manufacturing and infrastructure.
7. **Large-Scale Storage Potential:** Around **200 GW** of storage, supported by transmission expansion and flexible demand, could be critical for integrating **900 GW** of non-fossil capacity **by 2035**.

Key Challenges in India's Clean Energy Transition

1. **Mismatch Between Generation and Demand:** Cheap solar electricity is abundant during daytime, but **evening shortages** and **high market prices** make it difficult for utilities to procure power efficiently.
2. **Intermittency of Renewable Energy:** Dependence on sunlight and wind creates **supply fluctuations**, requiring **battery storage, flexible demand and transmission expansion** to maintain reliable electricity supply.
3. **Financial Weaknesses of DISCOMs: Distribution companies (DISCOMs)** face **financial losses, delayed payments** and procurement obligations, limiting their ability to purchase available renewable electricity.
4. **Financing and Regulatory Barriers: High financing costs**, **unpredictable regulations** and **weak grid infrastructure** can discourage global investors from financing long-term clean-energy projects.
5. **Dependence on Imported Technologies:** India's dependence on **imported battery cells, critical minerals and technologies** creates vulnerabilities in clean-energy supply chains.
6. **Transmission Infrastructure Gaps: Inadequate grid connectivity** and underutilised existing infrastructure restrict renewable projects from supplying electricity when and where it is needed.
7. **Risk of Fossil-Fuel Lock-in:** Long-term coal power contracts lasting **25–30 years** can create **expensive commitments** and restrict the adoption of cheaper renewable alternatives.

Government Initiatives and Policy Framework

1. **PM-KUSUM:** The **Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM)** has provided **more than 30 lakh farmers** access to solar-powered irrigation, while solarisation of agricultural feeders creates additional daytime demand.
2. **PM Surya Ghar Muft Bijli Yojana:** Launched in **February 2024**, the scheme targets rooftop solar installations in **one crore households**, with **over 65 lakh homes** joining the campaign.
3. **COP-26 Commitment:** India committed to achieving **500 GW** of non-fossil fuel capacity **by 2030** and achieved its target of meeting **50%** of installed power capacity through non-fossil sources in 2025, **five years ahead of schedule**.
4. **Electricity Act and Open Access:** The Electricity Act provides an institutional foundation for **open access, captive and group-captive generation**, allowing consumers to procure electricity directly.
5. **Renewable Energy Auctions: Competitive auctions** help discover **affordable electricity prices** and enable procurement based on supply requirements rather than dependence on particular technologies.

6. **National Green Hydrogen Mission:** The mission targets production of **five million tonnes** of **green hydrogen** by the end of this decade, including its use in transport.
7. **Green Energy Corridors:** The government is developing **transmission lines and substations** to transfer renewable electricity from generation-rich regions to demand centres, with an investment target of **nearly ₹2 lakh crore**.
8. **One Nation, One Power Grid:** Integration of **five regional grids** into **one national network** has strengthened electricity transmission across the country.
9. **Domestic Manufacturing Promotion:** Make in India and Atmanirbhar Bharat initiatives have supported solar manufacturing, increasing module capacity **beyond 200 GW** and cell capacity to **nearly 40 GW**.
10. **International Solar Alliance (ISA):** The initiative promotes international cooperation in renewable energy by facilitating access to finance, technology and expertise, including a proposed **$200-million Africa Solar Facility**.

Way Forward

1. **Prioritise Renewable Energy and Storage:** Utilities should compare **renewables, storage, demand flexibility and existing thermal capacity** before signing expensive, long-term coal power contracts.
2. **Introduce Technology-Neutral Auctions:** Electricity procurement should specify **peak-hour supply, availability and reliability** rather than particular technologies, allowing auctions to identify the **lowest-cost energy mix**.
3. **Improve Grid Connectivity:** Solar and storage projects should be allowed to use **underutilised grid connections** of existing solar projects during **nighttime hours**.
4. **Introduce Time-Based Electricity Pricing:** Consumers should receive **substantial discounts** during solar-rich hours, while peak-hour electricity prices should reflect the **actual cost of supply**.
5. **Expand Consumer Choice:** Large consumers should, **by default**, procure their own electricity to seek better deals, while DISCOMs remain **suppliers of last resort** with **explicitly funded subsidies**.
6. **Strengthen Domestic Battery Manufacturing:** India should **import battery cells** where necessary while developing **domestic manufacturing** of battery packs, power electronics, controls and energy-management software.
7. **Develop Battery Recycling Capacity:** Recycling facilities should **recover critical materials** from imported batteries, **reducing supply-chain risks** and supporting domestic manufacturing.
8. **Promote Innovation and Local Participation:** Startups, **Indian Institutes of Technology (IITs)**, investors and local bodies should develop **affordable storage**, solar-powered household appliances and agricultural technologies through innovation and **healthy competition**.

Conclusion

India's 900-GW clean power ambition can support economic growth, energy security and climate goals while creating an investment opportunity. Its success depends on reliable storage and grids, financially stronger utilities, flexible electricity markets, domestic manufacturing and recycling. A balanced transition can deliver affordable electricity without delaying development or creating long-term dependence on fossil fuels and imported technologies.

Question for practice:

Discuss India's clean power ambition, its potential benefits, major challenges and the measures required for its successful implementation.

Source: Businessline ; Economic Time

In a dilemma: On Sheikh Hasina and India-Bangladesh ties

Source: The post **"In a dilemma: On Sheikh Hasina and India-Bangladesh ties"** has been created based on **"In a dilemma: On Sheikh Hasina and India-Bangladesh ties"** published in **"The Hindu"** on 13th November 2026.

UPSC Syllabus: GS 2 – International Relations

Context: The political developments in Bangladesh following the 2024 uprising have created a diplomatic dilemma for India, particularly regarding former Prime Minister Sheikh Hasina, who is currently residing in India.

Major Developments:

1. Sheikh Hasina recently applied for a new Bangladeshi passport and national identity card through the Bangladesh High Commission in Delhi.
2. Bangladesh's interim government, led by Prime Minister Tarique Rahman, rejected the application and indicated that it would seek her return through the extradition agreement as a prisoner transfer process.
3. Hasina has expressed her intention to return to Bangladesh in December to defend her case and rebuild her political party, the Awami League.
4. She was convicted by a tribunal for ordering a crackdown on thousands of students during the 2024 protests and was sentenced to death.
5. The political environment in Bangladesh remains hostile towards her, with bipartisan support for banning the Awami League from politics.
6. The Bangladesh Nationalist Party (BNP) government faces a dilemma because allowing her to return could trigger protests and violence, while preventing her return could strengthen its opposition, Jamaat-e-Islami.
7. Any execution of Hasina could also invite strong international criticism.

Challenges for India:

1. **Diplomatic Relations:** India-Bangladesh relations have deteriorated following Hasina's announcement of her return and the cancellation of the Bangladeshi Prime Minister's visit to India.
2. **Extradition Dilemma:** India must balance its bilateral extradition obligations with concerns regarding Hasina's safety and the circumstances of her possible return.
3. **Regional Stability:** Her return could trigger political protests and violence in Bangladesh, affecting regional stability.
4. **Water Diplomacy:** The India-Bangladesh Ganga Water Treaty is due to expire, and negotiations for its extension have also suffered.
5. **Humanitarian Concerns:** India cannot physically prevent Hasina from travelling to Dhaka or crossing the land border at Petrapole, and must remain concerned about her welfare.

Way Forward:

1. India must strengthen diplomatic engagement with the Bangladeshi government to restore mutual trust.
2. Both countries should separate bilateral cooperation from their differences over Hasina's political future.
3. India must carefully handle the extradition issue while considering legal obligations, due process and humanitarian concerns.
4. Both countries should prioritise the extension of the Ganga Water Treaty and other areas of mutual cooperation.
5. India must continue its diplomatic efforts to improve bilateral relations while ensuring the safety and welfare of Sheikh Hasina.

Conclusion: India needs a balanced diplomatic approach that protects its strategic interests, maintains regional stability and safeguards humanitarian considerations while strengthening bilateral ties with Bangladesh.

Question: India must balance its bilateral relations with Bangladesh while ensuring the safety and welfare of former Bangladesh Prime Minister Sheikh Hasina. Discuss the diplomatic challenges involved and suggest a way forward.

Source: The Hindu

Inheritance Rights in Grandfather's Property: Supreme Court's Ruling

Source: The post **"Inheritance Rights in Grandfather's Property: Supreme Court's Ruling"** has been created based on **"Inheritance Rights in Grandfather's Property: Supreme Court's Ruling"** published in **"Indian Express"** on 13th November 2026.

UPSC Syllabus: GS 2 – Indian Polity

Context: The recent case concerned the property of N. Ramakrishnan, which was divided among his legal heirs following a partition suit filed by his daughter in 1993. His son, M. Kumaran, received a plot under a compromise deed in February 1994 and subsequently sold it in April 1997. Kumaran's son, Rajesh, challenged the sale, claiming that the property was ancestral and that he had acquired coparceny rights by birth. In this case, the Supreme Court has clarified that a grandson does not automatically acquire a share in his grandfather's property merely by birth. His inheritance rights depend upon the nature of the property and the applicable provisions of the Hindu Succession Act, 1956.

Legal Framework related to right by birth in his grandfather's property under Hindu Law:

1. **Dayabhaga School:**

   a. It is mainly followed in West Bengal and Assam.
   b. A son does not acquire any right in his father's property by birth. His inheritance rights arose only after his father's death.

2. **Mitakshara School:**

a. It is followed in most other parts of India.
b. A son traditionally acquires an interest by birth in ancestral coparcenary property and can claim partition of his share.

3. **Section 8 of the Hindu Succession Act, 1956:**

a. It provides for the devolution of property of a Hindu male dying intestate (without a valid will).
b. Class I heirs include sons, daughters, widows, mothers and the son of a predeceased son.
c. However, the son of a living son is not included as a Class I heir.

4. **Section 19 of the Act:**

a. When two or more heirs inherit property, they hold it as tenants in common and not as joint tenants.
b. This means that each heir receives an individual share and becomes its independent owner.

Key Findings of the Supreme Court:

1. **No Automatic Right by Birth:** The grandson cannot directly claim his grandfather's property under Section 8 when his father is alive and is himself a legal heir.
2. **Individual Ownership after Partition:** Once the grandfather's property was divided among his legal heirs, each heir became the exclusive owner of the share allotted to them.
3. **Right to Transfer Property:** The plot allotted to Kumaran became his individual property, and he was legally entitled to sell it without obtaining his son's consent.
4. **Non-continuation of Coparcenary:** The Court held that the earlier principle of Hindu personal law granting a grandson rights by birth was not expressly preserved by the Hindu Succession Act, 1956, in the circumstances of this case.
5. **Timing of Succession:** The Court observed that succession had opened upon the grandfather's death before the grandson was born. Therefore, the grandson was not a surviving coparcener when succession opened.

Conclusion: The judgment clarifies that birth alone does not confer inheritance rights in every category of grandfather's property. It distinguishes between ancestral coparcenary property and property inherited as an individual share under Section 8. It also reinforces the importance of statutory provisions in determining inheritance rights.

Question: Does a grandson acquire an automatic right by birth in his grandfather's property under Hindu law? Discuss the Supreme Court's recent ruling in this regard with reference to the Hindu Succession Act, 1956.

Source: Indian Express

New Deal On COP31 and Lofty Climate Goals

UPSC Syllabus: Gs Paper 3- Environment

Introduction

The Conference of the Parties (COP) is the annual meeting of countries that are parties to the United Nations Framework Convention on Climate Change (UNFCCC), established in 1992. It guides global action on emissions,

adaptation and climate finance. COP31, held in Antalya, Türkiye, is hosted by Türkiye, with Australia leading negotiations. Its central test is turning **existing climate promises into practical action**, beyond new targets.

COP31 and Its Key Focus Areas

1. **Delivery of Existing Climate Finance Commitments:** COP31 aims to advance the delivery of **$300 billion annually by 2035**, agreed at COP29 in Baku. This funding is intended to support climate action in developing countries.
2. **Tripling of Adaptation Finance:** COP30 called for **tripling international public adaptation finance** for developing countries by **2035**. Developed countries must establish clear plans and milestones for its delivery.
3. **Second Global Stocktake:** COP31 marks the beginning of the **second global stocktake**. It periodically assesses progress under the **Paris Agreement** and the effectiveness of national climate commitments.
4. **Proposed Global Electrification Target:** Türkiye has proposed increasing electricity's share in global energy consumption from around **23% to 35% by 2035**. This makes electrification a central part of the negotiations.
5. **Fossil Fuel Transition Roadmap:** COP30 concluded **without a formal roadmap** for moving away from fossil fuels. The voluntary roadmap ahead of COP31 remains **outside the formal negotiating text**.
6. **Climate Finance Implementation Framework:** Decisions on how climate funds will be mobilised, allocated and delivered have been deferred to **COP32**. This delays clarity on the practical implementation of financial commitments.

Major Demands and Positions of World Leaders

1. **UN Secretary-General's Call for Faster Emission Reductions:** António Guterres demanded a **6% annual reduction in global emissions**. Current national climate plans deliver only about **one-third** of the reductions required for the **1.5°C target**.
2. **Phase-out of Fossil Fuels:** Guterres called for phasing out unabated coal by **2040**. He also demanded a **one-third reduction** in oil and gas consumption and an end to new coal, oil and gas infrastructure.
3. **Just Energy Transition and Corporate Accountability:** Guterres urged governments to prepare credible roadmaps for a **just energy transition**. He also called on profitable **fossil fuel companies** to contribute towards climate damage and its associated costs.
4. **Australia's Demand for Climate Partnerships:** Prime Minister Anthony Albanese emphasised that **vulnerable Pacific island nations** need international **partnerships and concrete action**. He stressed that these communities need support rather than sympathy to protect their future.
5. **Ethiopia's Focus on Climate Finance and Restoration:** Prime Minister Abiy Ahmed called for **advance climate finance** and reforms in multilateral development bank lending. Ethiopia has planted over **56 billion seedlings** to restore degraded land, create livelihoods and encourage community participation.
6. **Brazil's Three Climate Roadmaps:** President Luiz Inácio Lula da Silva called for mobilising **$1.3 trillion** in climate finance, transitioning away from fossil fuels and ending deforestation. He also highlighted a **71% reduction in Amazon deforestation** between **2022 and 2026**.
7. **Türkiye's Implementation and Investment Agenda:** President Recep Tayyip Erdoğan emphasised practical climate action. Renewable energy accounts for **60% of Türkiye's installed power capacity**, while the country targets net-zero emissions by **2050**. He also announced the **Climate Implementation BRIDGE** initiative.

8. **India's Position on Climate Commitments:** India has **refused to sign Türkiye's electrification pledge**. It demands **predictable climate finance**, **technology transfer** and nationally determined approaches to climate mitigation.
9. **Saudi Arabia's Position on Energy Security:** Saudi Arabia's Energy Minister stressed the need for an **uninterrupted supply of all forms of energy**. He argued that climate measures should not obstruct **economic development**.

Challenges in Achieving Global Climate Goals

1. **Widening Climate Adaptation Finance Gap:** The United Nations Environment Programme (UNEP), in its 2026 Adaptation Gap Report, estimates that developing countries need **$305 billion annually by 2035**. Even if international public adaptation finance is tripled, it would cover only **20–29%** of these requirements.
2. **Inadequate Loss and Damage Funding:** The Loss and Damage Fund approved only **$21 million for Nepal**. This is **far below the billions** sought to address the consequences of severe climate-related disasters.
3. **Geopolitical Conflicts and Energy Disruptions:** The West Asia war has **disrupted Middle Eastern crude oil supplies** and increased fuel prices. This has shifted government attention towards **energy security** instead of climate action.
4. **Declining Political Commitment:** The United States has skipped COP31 for the **second consecutive year** following its **withdrawal from the Paris Agreement**. France, Germany, Japan, Italy and Canada have also not sent their top leaders.
5. **Continued Dependence on Fossil Fuels:** COP30 ended **without a formal roadmap** for transitioning away from fossil fuels. Disagreements over energy security further weaken international efforts to **reduce dependence on conventional energy sources**.
6. **Inadequate National Climate Plans:** Existing national climate plans provide only about **one-third of the emission reductions** needed. This makes the **1.5°C temperature goal** increasingly difficult to achieve.
7. **Rising Climate Risks and Extreme Weather:** A United Nations report warned that the world is on course to exceed the **1.5°C warming limit**. In 2026, Western Europe experienced extreme heatwaves, while floods in Nepal killed over **1,450 people**, with **thousands still missing**.
8. **Delayed Scientific Assessment:** The Intergovernmental Panel on Climate Change (IPCC) **has not established a timeline** for its next reports. This delays the **scientific guidance** needed by policymakers to accelerate climate action.

Way Forward

A. **Strengthening Climate Finance and Climate Justice**

1. **Deliver Existing Climate Finance Commitments:** Developed countries must fulfil the **$300 billion annual climate finance target by 2035**. They must also establish **clear mechanisms and milestones** for delivering adaptation finance.
2. **Strengthen Loss and Damage Financing:** Climate finance mechanisms must provide **adequate, timely and accessible assistance** to countries facing **irreversible climate impacts**. This is particularly important for nations experiencing repeated disasters and extreme weather.

3. **Ensure Climate Justice for Vulnerable Nations: Small island developing states**, particularly Pacific countries such as **Fiji and Tuvalu**, need stronger international support. This will help them address rising climate risks and protect their future.
4. **Promote Affordable Finance and Debt Reform:** Multilateral development banks must **reform their lending practices** and reduce borrowing constraints. Affordable finance will help developing countries invest in climate action **without worsening their debt burdens**.
5. **Ensure Technology Transfer and Capacity Building:** Developed countries must provide **predictable technology transfer** and **capacity-building support**. Least developed countries and small island developing states particularly need this assistance to strengthen their climate response.

B. Ensuring Effective Implementation of Climate Commitments

1. **Develop Credible Fossil Fuel Transition Roadmaps:** Governments must establish clear pathways to **phase out unabated coal** and reduce oil and gas consumption. These transitions must **protect workers, livelihoods and energy security**.
2. **Strengthen Climate Preparedness and Early-Warning Systems:** Governments must ensure **universal coverage of early-warning systems**. They must also provide **swift support** when adaptation measures reach their limits, reducing climate-related deaths and losses.
3. **Improve International Cooperation and Accountability:** Major economies must take **greater responsibility** for climate action. Countries should establish **measurable implementation plans** to ensure existing commitments translate into **actual emission reductions**.

Conclusion

COP31 will be judged by the delivery of existing commitments, not by new announcements. Developed countries must provide promised finance, while all countries strengthen emissions cuts and adaptation. A fair transition also requires energy security, technology access and support for vulnerable nations. Implementation and accountability must now guide global climate cooperation.

Question for practice:

Discuss the key priorities, major challenges and way forward for achieving the global climate goals in the context of COP31.

Source: The Hindu ; Reuters ; DownToEarth

Why Siang Upper Multipurpose Project Has Been Contentious

UPSC Syllabus: Gs Paper 3-Infrastructure

Introduction

The **Siang Upper Multipurpose Project (SUMP)** in Arunachal Pradesh has triggered protests by the indigenous Adi community over displacement, ecological damage and inadequate consultation. The government views it as important for **water security, flood management and strategic interests against China**. Local communities, however, fear losing ancestral lands, traditional livelihoods and cultural identity. The controversy raises an important question about how India can pursue national development while protecting the environment and respecting the rights of indigenous communities.

Overview of the Siang Upper Multipurpose Project

1. **Nature and Location:** SUMP is a proposed multipurpose storage dam on the **Siang River**, the Indian stretch of the Yarlung Tsangpo, near Geku village in Upper Siang district.
2. **Implementing Agency and Project Origin:** The **National Hydroelectric Power Corporation (NHPC)** is the implementing agency, and the project was declared a national project in 2008. NITI Aayog proposed a **10,000 MW** multipurpose storage dam on the river in 2017.
3. **Power Generation and Storage Capacity:** The estimated capacity is **11,000–11,200 MW**, with a proposed dam height of **280–300 metres** and live storage of approximately **9.2 billion cubic metres**.
4. **Multipurpose Design:** The project combines hydropower generation, water storage and flood regulation in one reservoir. It also seeks to merge two earlier projects to reduce overall costs.
5. **Present Project Status:** SUMP remains at the **Pre-Feasibility Report (PFR) stage**, an early assessment of technical feasibility and safety. Detailed studies and statutory clearances are still required.
6. **Identified Sites and Approval Requirements:** Parong, Ditte Dime and Uggeng are among the identified sites. Required work includes **one year of baseline data**, impact studies, dam-break analysis and a disaster management plan.

Significance of the Siang Upper Multipurpose Project

1. **Strengthening India's Hydropower Potential:** The Northeast accounts for nearly **40% of India's hydropower potential**, making SUMP relevant to regional energy infrastructure and renewable electricity generation.
2. **Flood Control and River Regulation:** The reservoir could regulate river flows and reduce flooding and erosion in Arunachal Pradesh and Assam. It is also expected to support more consistent downstream water flows.
3. **Regional Energy and Economic Development:** The project could help stabilise peak electricity shortages in northeastern and eastern grids and provide approximately **12% free power to Arunachal Pradesh**. It could also create jobs and improve infrastructure.
4. **Strategic Response to China's Medog Dam:** China's proposed **60,000 MW Medog Dam** on the Yarlung Tsangpo has raised concerns about upstream flow manipulation, sudden releases and downstream flood risks.
5. **Strengthening India's Water Security:** SUMP's proposed **9.2 billion cubic metres of live storage** could help cushion sudden upstream releases. This may improve India's ability to regulate flows in the Brahmaputra basin.
6. **Hydrological Sovereignty and Hydro-diplomacy:** A large storage dam on the Siang could strengthen India's downstream water interests and establish prior-use rights. It is also viewed as a strategic response to China's upstream hydropower development.
7. **Water as a Strategic Instrument:** Upstream countries can use dams and river-flow regulation to influence downstream states. Water control can create regional tensions even when it is not the direct cause of armed conflict.
8. **International Examples of Transboundary Water Disputes:** Ethiopia's **Grand Ethiopian Renaissance Dam**, inaugurated in 2025, has faced opposition from Egypt and Sudan over reservoir filling and operation. The **Indus Waters Treaty (1960)** also illustrates tensions over shared rivers between India and Pakistan.

Major Concerns and Reasons Behind Opposition

1. **Displacement of Indigenous Communities:** Adi villagers claim that at least **40 villages would be affected, including 27 facing submergence**. This could displace communities and disrupt established social and economic life.
2. **Loss of Agricultural Livelihoods:** Submergence of paddy fields and orange orchards could destroy traditional agriculture. This would weaken the livelihoods of affected households.
3. **Threat to Cultural and Religious Heritage:** Submergence of ancestral burial grounds and disruption of sacred river practices could damage Adi cultural identity. The **Adi Bane Kebang (ABK)**, the apex body of the Adi community, regards the Siang River as *Ane Siang*, meaning the **Mother Siang**, and considers it sacred.
4. **Alleged Violation of Community Consent:** Villagers allege that signatures for Pre-Feasibility Report (PFR)-related **Memoranda of Understanding (MoUs)** were obtained through pressure, deception and threats to withhold welfare benefits. They stress that consent for a survey is not consent for the dam.
5. **Disagreement over the Development Package:** An MoU involving two Pangkang residents provided a **₹5 crore package over three years**. Other villagers opposed the agreement and questioned its legitimacy because wider community consultation was lacking.
6. **Threat to Biodiversity and Forest Ecosystems:** The Siang basin covers over **15,000 square kilometres, with more than 82% forest cover**. Its biodiversity-rich landscape supports numerous rare, endangered and threatened species.
7. **Disruption of Riverine Ecosystems:** Large reservoirs can cause sediment build-up, habitat flooding, forest fragmentation and altered river flows. They can also obstruct fish migration, reduce genetic diversity and affect wetlands and downstream agriculture.
8. **Seismic Vulnerability and Dam Safety:** The eastern Himalayan region falls under **Seismic Zone V**, where reservoir-induced earthquakes and active tectonic conditions raise safety concerns. A dam failure could cause catastrophic downstream destruction.
9. **Climate Change and GLOF Risks: Glacial Lake Outburst Floods (GLOFs)** and glacial retreat could increase sudden water surges and sediment inflows. The 2021 Uttarakhand glacier burst damaged the Tapovan-Vishnugad hydropower project, illustrating Himalayan infrastructure risks.
10. **Escalating Community Protests:** Alleged police action injured **54 elderly protesters on October 4**, and activists were arrested on October 9. Violence during a Pasighat march on October 23 led to the burning of NHPC premises.

Challenges in Balancing Strategic Interests with Socio-Ecological Protection

1. **Balancing National Security with Local Interests:** India's concerns over China's upstream infrastructure create strategic pressure to develop SUMP. Some villagers question why local communities should bear the cost of unresolved water-sharing issues with China.
2. **Weaknesses in Environmental Impact Assessment:** The **Cumulative Impact Assessment (CIA)** of the Siang basin, conducted in 2013, faced criticism over insufficient field data. This limits its usefulness for comprehensive environmental and upstream-downstream planning.
3. **Gaps in Disaster Risk Assessment:** Hydropower appraisal needs stronger Himalayan-specific risk protocols. These should cover reservoir-induced seismicity, dam safety, GLOF modelling and changing river conditions.

4. **Institutional Coordination and Regulatory Gaps:** Project planning requires coordination among the **Ministry of Environment, Forest and Climate Change (MoEFCC)**, **Central Water Commission (CWC)**, **National Disaster Management Authority (NDMA)** and **Ministry of Tribal Affairs (MoTA)**.
5. **Protection of Indigenous Rights:** The **United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), 2008**, recognises indigenous rights through Articles 10, 19 and 32. The **Forest Rights Act (FRA), 2006** also provides a framework for recognising forest rights; PESA's applicability to the project area needs verification.
6. **Trust Deficit and Conflict over Decision-making:** Allegations of inadequate consultation, deployment of **Central Armed Police Forces (CAPF)** and disagreement over the PFR have weakened trust. The Adi community has demanded withdrawal of the forces and scrapping of SUMP.
7. **Uncertainty over Transboundary Water Management:** The absence of a water-sharing treaty with China adds to concerns about upstream infrastructure. The Indus Waters Treaty dispute also shows the difficulty of maintaining cooperation over shared rivers.

Way Forward

1. **Comprehensive Environmental Assessment:** Conduct independent environmental and social assessments using reliable baseline data and detailed field studies. Cumulative assessments should examine the combined effects of hydropower projects across the Siang basin.
2. **Strengthening Multi-Agency Coordination:** Improve coordination among the Ministry of Environment, Forest and Climate Change (MoEFCC), Central Water Commission (CWC), National Disaster Management Authority (NDMA) and Ministry of Tribal Affairs (MoTA).This would integrate environmental clearances, hydrological appraisal, disaster management and tribal rights into project planning.
3. **Strengthening Disaster Preparedness:** Include reservoir-induced seismicity assessments, dam-break analysis and GLOF modelling in feasibility studies. Himalayan-specific disaster risk protocols should form an essential part of hydropower appraisal.
4. **Sustainable and Modular Infrastructure:** Examine smaller modular storage units and alternative designs instead of relying entirely on one mega-dam. These options could reduce displacement and ecological risks while supporting adaptive management.
5. **Climate Resilience and Ecological Restoration:** Promote habitat restoration, biodiversity conservation and monitoring of river ecosystems. Hydropower designs must account for extreme surges, changing river flows and increased sediment loads.
6. **Community-based Participation:** Ensure **Free, Prior and Informed Consent (FPIC)** through meaningful Gram Sabha consultations. Traditional institutions such as the ABK should participate in project planning and monitoring.
7. **Transparent and Inclusive Decision-making:** Disclose drilling results, environmental assessments and project risks. Promote dialogue and joint decisions on rehabilitation, livelihood protection and equitable sharing of project benefits.
8. **Diversifying the Renewable Energy Mix:** Explore solar, wind and geothermal energy alongside hydropower. India's target of **500 GW of non-fossil energy capacity by 2030** supports a diversified clean-energy approach.

Conclusion

The Siang Upper Multipurpose Project reflects the challenge of balancing **national security and energy needs** with **environmental protection and indigenous rights**. Its future depends on sound assessments, climate-resilient planning and meaningful community participation. Respecting ecological limits and local rights can help make Himalayan hydropower development more sustainable and inclusive.

Question for practice:

Examine the significance of the Siang Upper Multipurpose Project and the challenges involved in balancing strategic interests with environmental protection and the rights of indigenous communities.

Source: The Hindu

Critical ban: On recycling of lithium-ion batteries

Source: The post **"Critical ban: On recycling of lithium-ion batteries"** has been created based on **"Critical ban: On recycling of lithium-ion batteries"** published in **"The Hindu"** on 14th November 2026.

UPSC Syllabus: GS 3-Economy

Context: On November 10, the Directorate General of Foreign Trade (DGFT) banned the export of lithium-ion battery black mass by shifting it from the 'Free' to the 'Prohibited' category.

About Black mass

1. Black mass is a **powder-like material obtained by shredding and processing discarded lithium-ion batteries** and battery manufacturing waste.
2. It **contains valuable minerals such as lithium, cobalt, nickel and manganese,** which can be recovered and reused in battery manufacturing.
3. **Recycling black mass provides an alternative source of critical minerals,** thereby reducing dependence on fresh mining and imported raw materials.
4. This is **particularly significant for India, which has limited domestic reserves of several key battery minerals.**

Significance of the Export Ban:

1. The ban **will ensure the availability of feedstock for domestic refiners** and encourage investment in the recycling industry.
2. It will **improve the capacity utilisation of domestic recycling facilities.**
3. It can **help develop an indigenous supply chain** for critical minerals used in lithium-ion battery manufacturing.
4. It will **reduce India's dependence on imports of critical minerals** used in battery production.

Key Challenges in Developing the Recycling Ecosystem:

1. **Nascent Recycling Industry:** Unlike lead-acid battery recycling, which has an established end-to-end formalised ecosystem, lithium-ion battery recycling is still at an early stage.
2. **Limited Downstream Processing:** Black-mass production is largely a mechanical process, whereas further processing requires specialised chemical technologies and significant investment.

3. **Price Gap:** Undervalued Extended Producer Responsibility (EPR) certificates under the Battery Waste Management Rules, 2022, encourage recycling on paper rather than investment in high-yield recycling plants.
4. **Inadequate Policy Support:** Merely banning exports without developing domestic processing facilities may result in lithium-ion battery waste being dumped in landfills.
5. **Neglect of Rare Earth Recycling:** India's e-waste rules do not mandate the separation of rare earth elements from discarded electronic products.

Way Forward:

1. **Develop Downstream Processing:** Greater investment and policy support should be provided for specialised chemical processing facilities to convert black mass into usable materials for indigenous battery manufacturing.
2. **Introduce Floor Pricing:** A floor price for EPR certificates should cover the full cost of mineral recovery and encourage investment in efficient recycling plants.
3. **Strengthen Digital Tracking:** Digital tracking of battery waste and recovered materials should be introduced to ensure transparency and accountability.
4. **Create a Separate EPR Category:** Rare earth minerals should have a separate EPR category, as payment based only on weight is unsuitable for recovering high-value rare earth elements.
5. **Promote Rare Earth Recovery:**
    a. A smartphone may contain up to 3% neodymium-iron-boron magnets by weight, with rare earth content of around 3,000 parts per million.
    b. Recovering rare earths from these magnets requires less energy than mining them.
    c. Magnets from hard drives should be separated before shredding for data destruction.

Conclusion: The export ban is an important step towards securing critical mineral resources. However, India must develop an integrated ecosystem covering collection, recycling, downstream processing, pricing mechanisms and rare earth recovery to convert this opportunity into a sustainable domestic industry.

Question: India has taken steps to regulate the export of lithium-ion battery black mass. However, creating a robust domestic battery recycling ecosystem requires more than export restrictions. Discuss the challenges and suggest measures to strengthen India's battery recycling industry.

Source: The Hindu

AI and the Protection of Childhood

Source: The post **"AI and the Protection of Childhood"** has been created based on **"AI and the Protection of Childhood"** published in **"Indian Express"** on 14th November 2026.

UPSC Syllabus: GS-2-Governance

Context: The growing use of smartphones, digital learning applications and AI-based tools in early childhood education has raised concerns about their impact on children's intellectual and emotional development. The recent decision of CBSE to introduce AI in Grade III and Punjab's proposal to introduce it from Grade I reflects the growing trend of early digital exposure.

Concerns Associated with Early Digital Exposure:

1. **Impact on Intellectual Development:** Early exposure to digital devices and AI-assisted learning may interfere with children's intellectual growth and independent thinking.
2. **Reduced Attention Span:** Children dependent on app-based learning and digital entertainment are increasingly experiencing attention-related difficulties.
3. **Weakening of Teacher-Student Interaction:** When teaching is mediated through digital devices, it may reduce meaningful engagement between teachers and children, thereby affecting their intellectual and emotional development.
4. **Declining Reading and Writing Skills:** Excessive dependence on digital learning may undermine traditional reading, writing and numeracy skills. Experiences in Britain show that several schools are returning to paper-and-pencil-based learning after recognising the limitations of digital education.
5. **Impact on Emotional Development:** Digital entertainment and screen-based activities may reduce opportunities for spontaneous interaction, creativity and independent exploration.
6. **Growing Educational Inequality:** The increasing dependence on digital learning may widen the gap between privileged sections and ordinary middle-class children.

Measures to Protect Children:

1. **Age-Appropriate Digital Education:** The introduction of AI and digital tools should be guided by children's developmental needs rather than the pressure to adopt new technologies early.
2. **Strengthening Traditional Pedagogy:** Reading physical books, writing with paper and pencil, storytelling, poetry and classroom interactions should remain central to elementary education.
3. **Promoting Teacher-Led Learning:** Technology should supplement rather than replace direct engagement between teachers and students.
4. **Institutional Intervention:** Child-rights organisations and institutions such as the National Commission for Protection of Child Rights (NCPCR) should take appropriate steps to protect young children from excessive digital exposure.
5. **Responsible Policy Formulation:** Education policymakers should assess the long-term impact of digital devices and AI on children's development before introducing them at an early age.

Conclusion: Technology and AI can be useful educational tools, but their early and excessive introduction may adversely affect childhood development. Therefore, education policies must prioritise children's intellectual, emotional and creative development over the race for technological adoption.

Question: The increasing use of digital devices and Artificial Intelligence (AI) in early childhood education raises concerns about children's intellectual and emotional development. Examine the challenges associated with early digital exposure and suggest measures to protect children.

Source: Indian Express

To Strengthen the Supreme Court, Divide It

UPSC Syllabus: Gs Paper 2- Constitution of India

Introduction

The Supreme Court of India is currently facing record pendency and a sharp decline in constitutional cases. Its docket is increasingly occupied by ordinary appeals, limiting time for questions that shape the Constitution. A proposed two-tier structure would create a dedicated Constitutional Court in Delhi and regional Courts of Appeal, separating constitutional work from ordinary appellate work.

Present Situation of the Supreme Court

1. **Record Pendency of Cases:** The Supreme Court had **92,318 pending cases** at the end of 2025, **nearly 10,000 more** than the previous year, marking its **highest backlog**.
2. **Declining Constitutional Cases:** Constitution Benches decided an average of **134 cases annually** in the first half of the 1960s, but this fell to **fewer than 10 annually** over the last decade.
3. **Growing Dependence on Ordinary Appeals: Special Leave Petitions (SLPs)** under **Article 136** accounted for **84.6%** of the Supreme Court's admission docket in 2011, despite being intended as a **rare safety mechanism**.
4. **Growing Annual Caseload:** In 2025, the Supreme Court disposed of **65,615 cases** but received **75,410 fresh matters**, adding to its existing backlog.
5. **Unresolved Constitutional Reference:** In **2016**, three Supreme Court judges referred **11 questions** concerning the court's role and functioning to a larger Bench, but the reference **remained unheard even after a decade**.

Reasons Behind the Need for Supreme Court Reforms

1. **Disproportionate Burden of Ordinary Appeals:** The increasing number of ordinary appeals and SLPs **consumes judicial time** that should be available for important constitutional matters.
2. **Mismatch Between Institutional Role and Actual Workload:** The Supreme Court was designed to decide **constitutional questions and substantial questions of law**, but it increasingly functions as a **general court of fourth appeal**.
3. **Limits of Increasing Judicial Strength:** Despite expanding the Bench to **34 judges in 2019**, when pendency was around **60,000 cases**, the backlog reached **92,318** by the end of 2025. Parliament further increased the sanctioned strength to **38 judges in 2026**.
4. **Need for Judicial Specialisation:** Constitutional questions and ordinary appeals require **different judicial attention**, making **separate courts** necessary for efficient functioning.

Proposed Two-Tier Supreme Court Structure

1. **Constitutional Court in Delhi:** Establish a dedicated Constitutional Court with approximately **11 judges** to hear **constitutional cases and substantial questions of law**.
2. **Regional Courts of Appeal:** Establish **four or five regional Courts of Appeal** to handle ordinary appeals currently reaching the Supreme Court.
3. **Division of Judicial Responsibilities:** The **Constitutional Court** would focus on questions affecting the Constitution and the legal system, while regional courts would handle **individual appellate disputes**.
4. **Specialised Constitutional Benches:** The Constitutional Court could sit in **full Benches** and deliver **consistent, predictable judgments** on important constitutional questions.
5. **Regional Access to Justice:** Regional Courts of Appeal would bring the final stage of ordinary appellate justice **closer to citizens** and reduce their dependence on the Delhi-based Supreme Court.

Benefits, Global Practices and Previous Recommendations

1. **Judicial Specialisation:** Separate courts would allow constitutional judges to **focus on important legal questions** while regional judges handle ordinary appeals **more efficiently**.
2. **Consistent Constitutional Interpretation:** A dedicated Constitutional Court could hear selected cases through **full Benches** and deliver **consistent rulings** that settle important legal questions.

3. **Faster Disposal of Ordinary Appeals:** Regional Courts of Appeal could focus on ordinary cases and **clear the appellate backlog faster** than the present Supreme Court.
4. **International Practice – United States:** The U.S. Supreme Court functions above **13 federal Courts of Appeals** and decides only a **small proportion** of cases reaching it.
5. **International Practice – South Africa and Germany:** South Africa has **separate Constitutional and Supreme Courts of Appeal**, while Germany has a **Federal Constitutional Court** and specialised federal courts.
6. **International Practice – Brazil:** Brazil's **1988 Constitution** created a separate **Superior Tribunal of Justice** to handle ordinary federal appeals previously handled by its Supreme Federal Tribunal.
7. **Previous Reform Recommendations:** The **229th Law Commission Report (2009)** proposed a Constitutional Bench in Delhi and **four regional Cassation Benches**. A Parliamentary Standing Committee recommended regional Benches in **2023**, which the **Union Law Ministry accepted**.

Challenges in Dividing the Supreme Court

1. **Risk to Institutional Unity:** Successive Chief Justices have expressed concern that separating constitutional and appellate work could **weaken the Supreme Court's authority** as one unified institution.
2. **Unequal Status of Regional Courts:** Regional Courts of Appeal may be viewed as **inferior forums**, encouraging litigants to approach the **Constitutional Court in Delhi** for final decisions.
3. **Possibility of Continued Congestion:** Dividing the court **without filtering unnecessary cases** could **transfer the existing backlog** to the new Constitutional Court instead of solving it.
4. **Conflicting Decisions of Smaller Benches:** The Supreme Court already functions through several small Benches that sometimes deliver **conflicting judgments**, making it difficult to **maintain consistency** in legal interpretation.

Way Forward

1. **Introduce a Case-Filtering Mechanism:** The Constitutional Court should **admit only cases** involving important constitutional questions or issues with **wider legal implications**, rather than hearing every appeal.
2. **Adopt the U.S. Screening Model:** The U.S. Supreme Court selects roughly **1%** of the **7,000 petitions** it receives annually for review, demonstrating how **selective admission** can reduce the burden on an apex court.
3. **Apply the General Repercussion Test:** Brazil's **2004 reform** allowed its apex court to hear constitutional appeals only when questions had **wider implications beyond the parties involved**.
4. **Implement Regional Benches Under Article 130:** The 229th Law Commission Report suggested that **Article 130 may permit regional Benches without a constitutional amendment**, allowing initial steps without waiting for Parliamentary approval.

Conclusion

Separating constitutional work from ordinary appeals would let the Supreme Court focus on major legal questions while regional Courts of Appeal handle routine cases. Selective case admission and a workable regional structure could reduce pressure, improve consistency and bring appellate justice closer to citizens.

Question for practice:

Discuss the need for restructuring the Supreme Court of India into a two-tier judicial system, highlighting its proposed structure, benefits, challenges and the way forward.

Source: The Hindu

The Challenge of Holding the Quad Together

UPSC Syllabus: Gs Paper 2- Constitution of India

Introduction

The Quad experienced strategic turbulence in 2025 due to shifting U.S. geopolitical priorities and changing bilateral political dynamics, particularly between Washington and New Delhi. However, ministerial meetings and operational cooperation continued despite weakening political alignment. The proposed Quad Leaders' Summit in Manila in November 2026 is therefore important for renewing the members' shared commitment and clarifying the United States' role in the Indo-Pacific.

Background: Evolution and Objectives of the Quad

1. **Nature of the grouping:** The **Quadrilateral Security Dialogue (Quad)** is an informal strategic forum comprising **India, Australia, Japan and the United States**. It has no permanent bureaucracy or institutional structure.

2. **Revival in 2017:** The Quad was revived during **Donald Trump's first presidency**, giving fresh momentum to cooperation among the four countries in the Indo-Pacific.

3. **Core objective:** The grouping seeks to promote a **free, open, inclusive and prosperous Indo-Pacific**, based on regional stability, cooperation and respect for international law.

4. **Mode of cooperation:** The Quad functions through **leaders' and foreign ministers' meetings and practical initiatives**, rather than a formal treaty-based military alliance**.**

Significance of the Quad

1. **Strategic balance:** The Quad provides a platform for its members to coordinate their approach to **China's growing influence and assertiveness** in the Indo-Pacific.
2. **Maritime security:** Cooperation in **maritime domain awareness and surveillance** helps members monitor regional waters and respond to emerging maritime security concerns.
3. **Rules-based order:** The grouping supports **sovereignty, international law and peaceful dispute settlement**, particularly in the **South China Sea and East China Sea**.
4. **Economic and technological resilience:** Cooperation on **infrastructure development, critical technologies and resilient supply chains** helps strengthen regional economic security and reduce vulnerabilities arising from excessive dependence on individual countries.
5. **Regional public goods:** The Quad extends its cooperation beyond traditional security through initiatives in **health security, vaccine distribution** and **Humanitarian Assistance and Disaster Relief (HADR)**.

Recent Developments: Continuity of Quad Cooperation

1. **Proposed Manila Summit:** The leaders of India, Australia, Japan and the United States are expected to meet in **Manila in November 2026**, alongside the **Association of Southeast Asian Nations (ASEAN) Summit**. This would be their **first summit-level meeting** since Donald Trump began his second presidential term.
2. **Japanese leadership:** The proposed meeting would also be the first Quad summit attended by Japanese Prime Minister **Sanae Takaichi** since she assumed office.
3. **Previous summit:** The last Quad Leaders' Summit was held in **Wilmington in 2024** under U.S. President **Joe Biden** and Japanese Prime Minister **Fumio Kishida**. India was expected to host the subsequent summit.
4. **Ministerial engagement:** The Quad Foreign Ministers met **twice in Washington in 2025**, with the first meeting marking **Marco Rubio's first engagement as U.S. Secretary of State**. In 2026, they met **three times in New Delhi, Manila and Atlanta**.
5. **Maritime initiative:** In **May 2026**, the Quad elevated its **Indo-Pacific Maritime Domain Awareness** initiative to the **Indo-Pacific Maritime Surveillance Collaboration framework**, launched in New Delhi following the Quad Foreign Ministers' Meeting.
6. **Importance of summits:** Without a permanent institutional structure, leaders' meetings provide an important platform to **reaffirm the Quad's shared purpose** and set its agenda for the coming months.

Challenges to Quad Unity

1. **Shifting U.S. priorities:** Trump's second-term focus has been shaped by the **Russia-Ukraine war**, transatlantic relations, the **North Atlantic Treaty Organization (NATO)** and the **war in West Asia**.
2. **Uncertainty over U.S. engagement:** Washington has not publicly expressed disinterest in the Indo-Pacific, but **regional partners remain cautious** about a fundamental shift in its engagement.
3. **Burden-sharing concerns:** Trump's expectation that partners **contribute more towards the transatlantic security architecture** has raised concerns among Indo-Pacific countries about the future nature of U.S. security commitments.
4. **AUKUS review:** The White House's decision to review the **Australia-United Kingdom-United States (AUKUS)** partnership has increased uncertainty among Indo-Pacific countries and encouraged them to diversify their security policies.
5. **Continuing U.S. security role:** The United States remains a **significant security actor**, **especially in the Pacific**, where several like-minded countries are embedded in its security architecture.
6. **China and regional flashpoints: China's expanding footprint** is worsening maritime security, while Washington's role remains important in safeguarding the strategically critical **Taiwan Strait**.

Regional Responses: Diversification of Strategic Partnerships

1. **Japan's security outreach:** Through its **One Cooperative Effort Among Nations (OCEAN)** framework, Japan is deepening strategic alignment with partner countries and reshaping its post-war security posture.
2. **Australia's defence partnerships:** Australia is strengthening defence ties with **India, Japan, Southeast Asian countries and Pacific Island countries** to deter China's growing regional footprint.
3. **India's multi-alignment:** India continues to **diversify defence and strategic ties** with like-minded countries across the Indian Ocean and the wider Indo-Pacific.

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4. **JAI cooperation:** The **Japan-Australia-India (JAI)** Defence Ministers' meeting in **Cebu** signals their willingness to deepen cooperation regardless of Washington's regional role.
5. **France's engagement: France** is strengthening ties with regional countries to help sustain a balanced security environment in the Indo-Pacific.

Way Forward

1. **Reset American posture:** President Trump should use the Manila Summit to **clarify Washington's regional priorities** and **reset American engagement** in the Indo-Pacific.
2. **Reaffirm the Quad's commitment:** The four leaders should demonstrate their **shared commitment to regional security** and collectively oppose China's growing maritime assertiveness.
3. **Sustain maritime cooperation:** Members should build on the **maritime surveillance framework** to address the worsening maritime security environment and China's expanding regional footprint.
4. **Reinforce ASEAN centrality:** Hosting the summit in the Philippines reinforces **ASEAN centrality**, one of the Quad's foundational strategic pillars, amid ongoing **sovereignty disputes between Manila and Beijing**.
5. **Uphold sovereignty and international law:** Leaders are expected to reiterate **respect for sovereignty** in the **South and East China Seas** and condemn attempts to disregard **international law**.

Conclusion

The Quad has maintained practical cooperation despite political differences and uncertainty over U.S. priorities. Its future depends on renewed political commitment and continued American engagement. The Manila summit offers an opportunity to reaffirm ASEAN centrality and the members' commitment to sovereignty, international law and a stable, balanced Indo-Pacific.

Question for practice:

Examine the challenges facing the Quad amid shifting U.S. geopolitical priorities and discuss the measures needed to sustain its unity and cooperation in the Indo-Pacific.
Source: The Hindu

How the government's flagship PLI schemes are lagging in job creation

Source: The post **"How the government's flagship PLI schemes are lagging in job creation"** has been created based on **"How the government's flagship PLI schemes are lagging in job creation"** published in **"Indian Express"** on 15th November 2026.

UPSC Syllabus: GS 3-Economy

Context: According to a NITI Aayog report prepared in partnership with IIM Ahmedabad, the Production-Linked Incentive (PLI) scheme has performed better in investment and production but has significantly lagged in employment generation.

About Production-Linked Incentive (PLI) scheme

1. The Production-Linked Incentive (PLI) scheme was **launched in March 2020** by the **Government of India to promote domestic manufacturing, attract investments, increase production and generate employment.**

2. The scheme covers **14 sectors with a total financial outlay of ₹1.91 lakh crore.**
3. **Performance of PLI Schemes** (As of March 2026):
    a. The PLI scheme **achieved 76% of its investment target and 64% of its production target.** However, **the scheme generated only 8.49 lakh jobs against the targeted 30.18 lakh jobs**, achieving merely 28% of its employment target.
    b. The **food products sector emerged as the largest employment generator, creating 3.29 lakh jobs,** followed by large-scale electronics manufacturing with 1.69 lakh jobs.
    c. The **pharmaceutical sector generated 1.14 lakh jobs,** while automobiles and **auto components generated 67,820 jobs against their five-year target of 1.48 lakh jobs.**
    d. The w**hite goods sector generated 52,703 jobs, telecom and networking generated 33,610 jobs,** and textiles supported 33,427 jobs.
    e. **Solar PV modules, speciality steel, bulk drugs, medical devices, IT hardware, drones and battery manufacturing** generated **less than 15,000 jobs each.**
    f. The **cumulative incentive disbursement** stood at only **18.51% of the total outlay of ₹1.91 lakh crore.**

Reasons for Slow Employment Generation

1. **Long gestation period:** Manufacturing investments require considerable time to become fully operational, and employment opportunities increase gradually as production reaches commercial scale.

2. **Capital-intensive industries:** Several sectors require substantial investment in machinery and infrastructure but do not generate employment in proportion to the investment made.

3. **Increasing mechanisation:** The growing use of advanced machinery and automation reduces dependence on manual labour and limits employment generation.

4. **Stringent targets:** Strict employment and production targets make it difficult for industries to participate in the scheme and achieve the prescribed incentive conditions.

5. **Demand uncertainty:** Changes in international trade patterns and geopolitical circumstances create uncertainty regarding future demand and discourage industrial participation.

6. **Supply-driven approach:** The existing PLI framework primarily focuses on increasing domestic production and gives comparatively less attention to demand-side support.

7. **Low incentive disbursement:** The disbursement of only 18.51% of the total allocated incentives indicates relatively slow utilisation of the scheme's financial provisions.

8. **Different sectoral requirements:** The 14 schemes have different objectives and implementation timelines, as some focus on reducing import dependence while others aim to increase exports and integrate India into global value chains.

Suggestions to Improve the Effectiveness of PLI Schemes

1. **Rationalisation of targets:** Employment and production targets should be realistic and should take into account the gestation period and specific requirements of different industries.

2. **Industry participation:** Industries should be actively involved in designing sector-specific policies and determining achievable employment and production targets.

3. **Demand-side support:** The government should incorporate demand-side measures along with production incentives to ensure a sustainable market for domestically manufactured products.

4. **Promotion of labour-intensive sectors:** Greater emphasis should be placed on labour-intensive sectors such as textiles and food processing to maximise employment opportunities.

5. **Timely disbursement of incentives:** The government should ensure timely disbursement of incentives to encourage industrial participation and promote further investment.

6. **Skill development:** Industry-oriented skill development and vocational training should be promoted to create a skilled workforce and improve employment opportunities.

7. **Regular monitoring:** The performance of individual schemes should be periodically reviewed to identify implementation challenges and undertake necessary corrective measures.

8. **Policy stability:** A stable and predictable policy environment should be maintained to encourage long-term investment and strengthen the manufacturing sector.

Conclusion: The PLI scheme has contributed significantly to promoting investment and domestic manufacturing, but its employment generation performance remains below expectations. However, since 42% of the aggregate implementation period is still remaining, it would be premature to judge the schemes solely against their final targets. Therefore, a balanced approach focusing on investment, production, employment generation and demand-side support is necessary to make the PLI scheme more effective and achieve the objectives of Atmanirbhar Bharat and employment-led economic growth.

Question: The Production-Linked Incentive (PLI) scheme has achieved considerable progress in investment and production but has lagged in employment generation. Examine the reasons for this gap and suggest measures to improve its effectiveness.

Source: Indian Express

Coal gasification in India

Source: The post **"Coal gasification in India"** has been created based on **"Rs 37,500 cr coal gasification push: CDEP-CWS study identifies priority chemicals to cut import"** published in **"Economic Times"** on 15th November 2026.

UPSC Syllabus: GS 3-Economy

Context: The study by Centre for Domestic Economy Policy Research (C-DEP) and the Centre for WTO Studies (CWS) ranks 23 coal-derived products across eight economic, industrial and strategic parameters to guide investments under the government's Rs 37,500-crore scheme for promoting surface coal and lignite gasification projects.

About Coal gasification

1. Coal gasification is a **process of converting coal into synthesis gas (syngas), primarily consisting of carbon monoxide and hydrogen,** through its reaction with oxygen and steam under controlled conditions.
2. The syngas **can be further processed to produce hydrogen, synthetic natural gas (SNG), methanol, ammonia, fertilisers and other industrial chemicals.**
3. India is **promoting coal gasification to utilise its abundant coal reserves, reduce dependence on imported fuels and fertilisers,** and strengthen domestic manufacturing capabilities.

Coal Gasification Mission

1. The Government of India has committed **₹37,500 crore** under a **scheme to promote surface coal and lignite gasification projects.**
    a. The scheme aims **to facilitate the gasification of an additional 75 million tonnes of coal and lignite annually.**
2. India has set a target of achieving **100 million tonnes of coal gasification capacity by 2030**.
3. The mission aims **to encourage domestic coal utilisation, promote industrial development, reduce import dependence and strengthen energy security.**

Coal-to-Chemicals Policy in India

1. The **Coal-to-Chemicals Policy in India** aims **to promote the conversion of domestic coal into value-added products** such as hydrogen, synthetic natural gas (SNG), methanol, ammonia and fertilisers **through coal gasification.**
2. A study titled **Coal-to-Chemicals Policy in India: A Strategic Framework for Product Prioritisation under the National Coal Gasification Mission,** prepared by the Centre for Domestic Economy Policy Research (C-DEP) and the Centre for WTO Studies (CWS), **provides a framework for identifying priority coal-derived products.**
3. The study **evaluates 23 coal-derived products on eight economic, industrial and strategic parameters** to identify products offering greater economic returns, import substitution potential and supply security.
4. It **recommends prioritising products** that offer greater economic returns, import substitution opportunities and strategic supply security.

Priority products identified by the study:

1. **Hydrogen has emerged as the highest-priority product** because of its potential applications in energy and industrial manufacturing.
2. **Synthetic Natural Gas (SNG) has been identified as a priority** to reduce dependence on imported natural gas.
3. **Methanol and ammonia have been recommended** because of their applications in the chemical and fertiliser industries.
4. **Dimethyl Ether (DME), LNG and LPG have also been identified as important products** for **reducing fuel import dependence.**
5. **Urea and Diammonium Phosphate (DAP)** have been included because of t**heir importance in reducing dependence on imported fertilisers.**

Significance of Coal Gasification for India

1. Reduction in import dependence: Coal gasification can support domestic production of LPG, LNG substitutes, fertilisers and industrial chemicals, thereby reducing imports.

2. **Energy security:** Domestic production of synthetic fuels and gases can reduce India's vulnerability to international fuel price fluctuations and supply disruptions.

3. **Utilisation of coal reserves:** The technology can help India utilise its substantial coal reserves for producing value-added products instead of relying only on conventional coal consumption.

4. **Industrial development:** Coal-derived hydrogen, methanol and ammonia can strengthen domestic chemical manufacturing and support downstream industries.

5. **Economic benefits:** Domestic production of import-dependent products can save foreign exchange and strengthen domestic supply chains.

6. **Employment generation:** The development of gasification plants and integrated chemical manufacturing clusters can create investment and employment opportunities.

7. **Strategic self-reliance:** Coal-to-chemicals production can support the objectives of Atmanirbhar Bharat by reducing dependence on external suppliers for critical industrial inputs.

Major Challenges in Coal Gasification

1. Commercial viability: Coal gasification in India is still at an early stage, and the commercial feasibility of technologies suitable for Indian coal needs to be established.

2. **High capital costs:** Gasification plants require substantial initial investment, making projects financially challenging.

3. **Technological limitations:** The availability and adaptation of suitable gasification technologies for Indian coal remain important challenges.

4. **Water constraints:** Coal gasification requires significant quantities of water, which may create pressure on already stressed water resources.

5. **Environmental concerns:** The process can generate substantial carbon emissions and other pollutants if appropriate emission-control and carbon-management technologies are not adopted.

6. **Risk of underutilised capacity:** Rapid expansion without adequate demand assessment may result in underutilised plants and financial losses, as highlighted by China's experience.

7. **Market uncertainty:** Fluctuations in international fuel prices and competition from alternative energy sources may affect the commercial viability of coal-derived products.

Way Forward

1. **Phased investment:** India should adopt a phased approach to investment instead of rapidly expanding gasification capacity without establishing commercial feasibility.

2. **Integrated manufacturing clusters:** Common coal gasification facilities should be developed to supply multiple downstream chemical industries and reduce production costs.

3. **Technology development:** Research and development should be encouraged to develop commercially viable technologies suitable for Indian coal.

4. **Product prioritisation:** Investment should focus on products such as hydrogen, SNG, methanol and ammonia that offer greater import substitution and strategic benefits.

5. **Environmental sustainability:** Cleaner technologies, carbon capture, utilisation and storage (CCUS), and efficient water-management systems should be promoted to minimise environmental damage.

6. **Private sector participation:** Private investment and industry participation should be encouraged through suitable policy and financial support.

7. **Demand assessment:** Investments should be linked with realistic domestic demand and market conditions to prevent the creation of excess production capacity.

Conclusion: Coal gasification offers India an opportunity to convert its domestic coal resources into value-added fuels, fertilisers and industrial chemicals. However, its success will depend on commercial viability, technological suitability, environmental sustainability and proper product prioritisation. A phased and demand-driven approach can help India achieve energy security, reduce import dependence and strengthen domestic industrial capabilities.

Question: Discuss the significance of coal gasification in reducing India's import dependence and strengthening domestic chemical manufacturing. Examine the major challenges and suggest measures for its effective implementation.

Source: Economic Times